OPERATION CENIZA-ARENA:

THE RETENTION OF FALLOUT PARTICLES FROM VOLCAN IRAZU (COSTA RICA) BY PLANTS AND PEOPLE

PART TWO

STANFORD
RESEARCH
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INTRODUCTION

This report presents the results of the foliar contamination and associated parametric measurements that were obtained in Costa Rica during the period from May 1964 through February 1965 for the second phase of the field work of Operation Ceniza-Arena.

During the first phase of the field work, described in Part One of this report, the desirability of obtaining foliar contamination data for whole plants during their growth cycle under field conditions rather than only for parts of pot-grown plants became increasingly clear. Two related technical factors indicated the desirability of extending the work: (1) difficulties associated with evaluating the parameters of the theoretical expressions for foliar contamination by plant part and applying the results to field situations; and (2) need for averaged foliar contamination data for whole plants and plant parts, together with weathering effects, in the development of the mathematical models for assessing foliar contamination problems.

Therefore, early in May of 1964, arrangements were made (through the Costa Rican office of the U.S. Agency for International Development (US/AID), Agriculture Division, and the Ministry of Agriculture of Costa Rica) with two landowners for the use of land for growing vegetables and cereal grains. The general locations of the two plots of land were selected from areas that had previously received moderate to heavy deposits of ceniza-arena from the eruptions of Volcán Irazú and were readily accessible for sampling over an extended period of time. The actual locations of the two land plots were as follows: Plot No. 1 (near Ipís) was at a distance of 9.4 miles and an azimuth of 263°TN from the location of the volcano; Plot No. 2 (near San Ramón) was at a distance of 9.4 miles and an azimuth of 251°TN from the location of the volcano.

The land plots were fenced after plowing; then the seed beds were prepared, and the planting was carried out between the 17th and 19th of May 1964 (see Procedures for details). Field sampling periods of one to three weeks' duration were carried out on a monthly basis beginning in June 1964; a total of nine sampling trips to Costa Rica were made. In mid-February 1965, the volcano apparently ceased erupting, and the second field phase of Operation Ceniza-Arena was terminated.

BACKGROUND

The basic parameters and equations for presenting the foliar contamination data and describing their dependence on other parameters are described in Part One of this report, and some of the parameters are evaluated in Part Three. For convenience, the definitions of several of the terms are repeated below. In addition, measurements for evaluating the impaction coefficient were added (see Procedures); some of the relationships pertaining to these measurements are discussed.

The foliar contamination factor for a plant or plant part is designated by a_L and is defined, in terms of experimentally measured quantities, by

$$a_L = C_p^o/\Delta m \qquad (1)$$

where C_p^o is the effective particle concentration on the foliage (in gm of particles per gm of dry foliage), and Δm is the weight of the particles deposited per unit of (open) ground area (in gm of particles per sq ft of soil area). The fraction of the deposited particles retained on the foliage, in a field of similar plants, is given by

$$F_L = a_L w_L \qquad (2)$$

where w_L is the average surface density of the foliage (in gm of dry foliage per sq ft of soil area).

The basic theoretical definition of the foliage contamination factor for the impaction and retention of airborne particles of a given diameter on aboveground parts of plants is given by

$$a_{Lp}(\alpha_p) = \epsilon_o(\alpha)(1 + \alpha_p^2)^{1/2} S_L(\alpha_p)\, \eta(\alpha_p) F(w_L) \qquad (3)$$

in which

$\epsilon_o(\alpha)$ is the initial retention coefficient for a particle size-group, designated by α, which hit a plant surface

α_p is the land-surface value of α ($\alpha_p = v_w^o/v_f^o$, where v_w^o is the

surface wind speed and v_f^o is the terminal, or falling, velocity at the plant of the particle size-group designated by α)

$S_L(\alpha_p)$ is the projected specific surface area of the foliage (i.e., plant area per unit plant weight) in a plane normal to the particle flux

$\eta(\alpha_p)$ is the particle impaction coefficient due to interception and inertia

and

$F(w_L)$ is the dilution function whose value depends on the planting density or the average foliage surface density.

The experimental measurements, designed to provide separate information on the impaction coefficient, consisted of the collection of particles on greased plates that were set at a series of angles, θ, from the horizontal; the plane of the plates was kept perpendicular to the direction of wind by mounting the collecting system with an attached wind vane on a swivel bearing. The grease film on the surface of the plates was used to assure that the value of the retention coefficients for all plates would be one. After an exposure to depositing particles, the weight of the collected particles was measured; this weight, after making a correction for background dust, is designated as m (in gm per sq ft). The wind speed was measured during the exposure with a hand-held calibrated anemometer, with this instrument, the average wind speed over the collecting period, designated as $\bar{v}_w^o$ (in ft per sec), was measured.

The basic assumptions used in the relationships described below include: (1) for a given exposure or set of measurements of m, the range of particle diameters in the collected deposits was small, so that the terminal fall velocity of the particles could be represented by an average value designated as $\bar{v}_f^o$; (2) the wind speed during the time that the particles impacted was near the value of $\bar{v}_w^o$; (3) the lag time of the wind vane was small relative to the time rate of change in the wind direction; and (4) the value of the impaction coefficient depends on plate angle, particle fall velocity, and wind speed.

To minimize the collection of particles with a broad range of diameters, large or extreme changes in wind speed, and overloading of the greased plates, short exposure periods were desired. On the other hand, some extended time was required to collect a sufficient quantity

of particles whose weight was significantly greater than the weight of the background dust.

With the above-described assumptions, the basic relationship for defining the impaction coefficient, η, is given by

$$m = \eta m_a \sin(\theta - \bar{\varphi}) \tag{4}$$

in which m_a is the integrated particle flux across a plane perpendicular to the average fall vector and $\bar{\varphi}$ is the average angle of fall of the particles at the height of the collector plates (measured from the horizontal in the direction of the wind). The average terminal fall velocity of the collected particles is given by

$$\bar{v}_f^o = \bar{v}_w^o \tan \bar{\varphi} \tag{5}$$

The average air concentration of the particles for the exposure period is given by

$$\bar{C}_a = m_a / \bar{v}_f^o t$$

where t is the exposure time. The values of θ, fixed by the design of the collector (see Procedures), were 0, 30, 60, 90, 120, 150, and 180 degrees. The values of m for each plate, $\bar{v}_w^o$, and t were measured.

The angular arrangement of the collector plates, in which the plate angles vary from 0 to 180 degrees, produces four general classes of relative geometries for impaction of falling particles in a horizontal wind stream:

1. Plate angles between 90 and 180 degrees; both the air and the particles strike the top or front face of the plates.

2. Plate angles less than $\bar{\varphi}$; the air strikes the bottom of the plates, and the majority of the impacting particles strike the top of the plates.

3. Plate angles greater than $\bar{\varphi}$ but less than 90 degrees; the air and particles strike the bottom of the plates.

4. An extension to the third class; a small number of particles may deposit on the top side of the plates at angles between $\bar{\varphi}$ and 90 degrees because of turbulence in the airflow over the top of the plates.

Generally, the plate that is set at an angle, θ, of 90 degrees from horizontal would be expected to cause a greater diversion of the airstream than one set at any other angle (assuming the airstream) moves parallel with the surface of the ground). However, the degree of diversion of the airstream by a plate should not be expected to cause a proportionate diversion of the airborne particles, especially in terms of the weight of the collected particles. For example, if the angle of the plate is very near the angle of fall of a particle, only a small deflection in the falling trajectory could cause the particle to miss the plate. Larger particles (i.e., in the size range of 50 to 500 microns in diameter) that impact mainly by gravity settling would not be deflected as readily as the smaller particles by the airflow around the plates. These two factors suggest that the plate set at an angle very nearly perpendicular to the angle at which the particles approach the collector should collect the largest fraction (per unit projected area) of the particles in the passing airstream.

If it is assumed, for the first class of geometries, that η has a maximum value at a plate angle, θ_o (which is approximately 90 degrees greater than $\bar{\varphi}$), and that fractional decreases in η are proportional to the angular displacement of the plate from θ_o, a first approximation of the dependence of η on the plate angle (due to the relative angle at which the wind strikes the plate) may be written as

$$\frac{d\eta}{\eta} = -\, 2\epsilon \sin 2(\theta - \theta_o) d(\theta - \theta_o) \qquad (7)$$

where ϵ is a proportionality constant whose value is assumed to depend on the average wind speed and on the average falling velocity of the particles. The factor of 2 is inserted to indicate that the sine function must vary a whole cycle for each 180 degrees change in $\theta - \theta_o$ (i.e., the value of η must be the same at θ_o and at $\theta_o \pm 180$ degrees).

Integrating Equation 7 under the condition that η is equal to η^o when θ is equal to θ_o (i.e., η^o is the impaction coefficient for a plate that is set at the angle, θ_o) gives

$$\log \eta/\eta^o = -\, \epsilon \left[1 - \cos 2(\theta - \theta_o) \right] \qquad (8)$$

Combining Equation 8 with Equation 4 in logarithmic form gives

$$\log m = \log \eta^o m_a + \log \sin(\theta - \bar{\varphi}) - \epsilon \left[1 - \cos 2(\theta - \theta_o) \right] \qquad (9)$$

If it is assumed that θ_o is 90 degrees larger than $\bar{\varphi}$ for all values of $\bar{v}_f^o$ and $\bar{v}_w^o$ of interest, Equation 9 can be written as

$$\log m = \log \eta^{o} m_a + \log \sin(\theta - \bar{\phi}) - \epsilon \left[1 + \cos 2(\theta - \bar{\phi})\right] \qquad (10)$$

The value of ϵ represents the fractional decrease in η^{o} for plates at angles other than θ_o. If the diversion of the airflow patterns around the plates increases as the wind speed increases (as expected), the value of ϵ should increase as the wind speed increases. Because the diversion of the airflow should have a smaller effect on the impaction of the larger particles than on the smaller particles, the value of $\bar{\epsilon}$ (for a given wind speed) should decrease as the value of $\bar{v}_f^{o}$ increases.

The value of η^{o} (i.e., the value of η for the plate that is set at the angle θ_o) should approach unity as the value of $\bar{v}_w^{o}$ approaches zero, especially for particles with large $\bar{v}_f^{o}$ values. For very small particles, η^{o} may approach unity at large $\bar{v}_w^{o}$ values. Unfortunately, the value of η^{o} cannot be directly evaluated from a single set of plate collector data. It may be evaluated from several sets of data by extrapolation to a zero wind speed condition or from separate calibration experiments under zero wind speed conditions.

The evaluation of the above equation constants (and of others) from the measured data as given in this report is discussed in a separate report.[1]

PROCEDURES

The dimensions of each of the two land plots were 150 x 100 feet. The crops selected for the initial planting are listed in Table 1; a general diagram of the plot layout is shown in Figure 1.

The soil at both locations was a loose sandy loam containing a large amount of humus. Prior to planting, the land on both plots was disc-plowed to a depth of about 10 inches. On Plot No. 2, many roots of the Quicuyo grass were pulled out by hand. The land was treated with about 70 lb/acre of (25 percent) Aldrin. The areas were fertilized with 290 lb/acre of 9-27-6 composition commercial fertilizer. The fertilizers were broadcast by hand and were washed in by rains before planting. Lime additions were made to sections of each plot during the August sampling period.

The grains were planted by hand-broadcasting followed by hand-raking. The average planting density of seed was as follows: wheat, 136 lb/acre; barley, 144 lb/acre; oat, 116 lb/acre; and rye, 138 lb/acre. The corn was planted in rows 2 feet apart at spacings of about 1.5 feet between hills. All of the vegetables were planted in rows 2 feet apart. Most were heavily seeded for later thinning. The Ministry of Agriculture of Costa Rica plowed the land on both plots at no cost to the project. Local labor was employed to construct fences around each plot and to prepare the land for planting. One Costa Rican farmer was employed for each plot to take care of the crops between the monthly sampling periods and to assist in the field sampling.

Later plantings were made as the crops matured or were killed by an occasional "acidic" deposit of ceniza-arena. Planting dates and plant designations according to planting time are given in Table 2.

During later sampling periods, two additional sampling locations, Stations 15 and 16, were developed for obtaining foliar contamination data on trees. Station 15 was located 17.5 km from San José on the road to Rancho Redondo (about 2 km before reaching the village); the site was about 100 yards south of the road. On this site, one of several mountain laurel trees, about 15 feet tall, was selected for sampling. Station 16 was located about 2 km northeast of Rancho

Table 1

LIST OF CROPS INITIALLY PLANTED IN EACH LAND PLOT

Cereal Grains

Barley
Oat
Rye
Wheat

Vegetables

Bean
Beet (Crosby's Egyptian)
Cabbage (Golden Acre)
Carrot (Chantenay)
Celery (Pascal)
Corn[a]
Lettuce (Imperial #847)
Onion (Cholla Roja C-5)
Pepper (Ruby Giant)
Squash (Cocozelle de Napoles #265)
Tomato (J. Moran)

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a Corn is listed along with the vegetables in this table and in all following tables because of the geometric dissimilarity of the plant. (With respect to the subject under discussion, the vegetable classification includes plants that are geometrically dissimilar.)

Figure I

PLANTING DIAGRAM OF LAND PLOTS

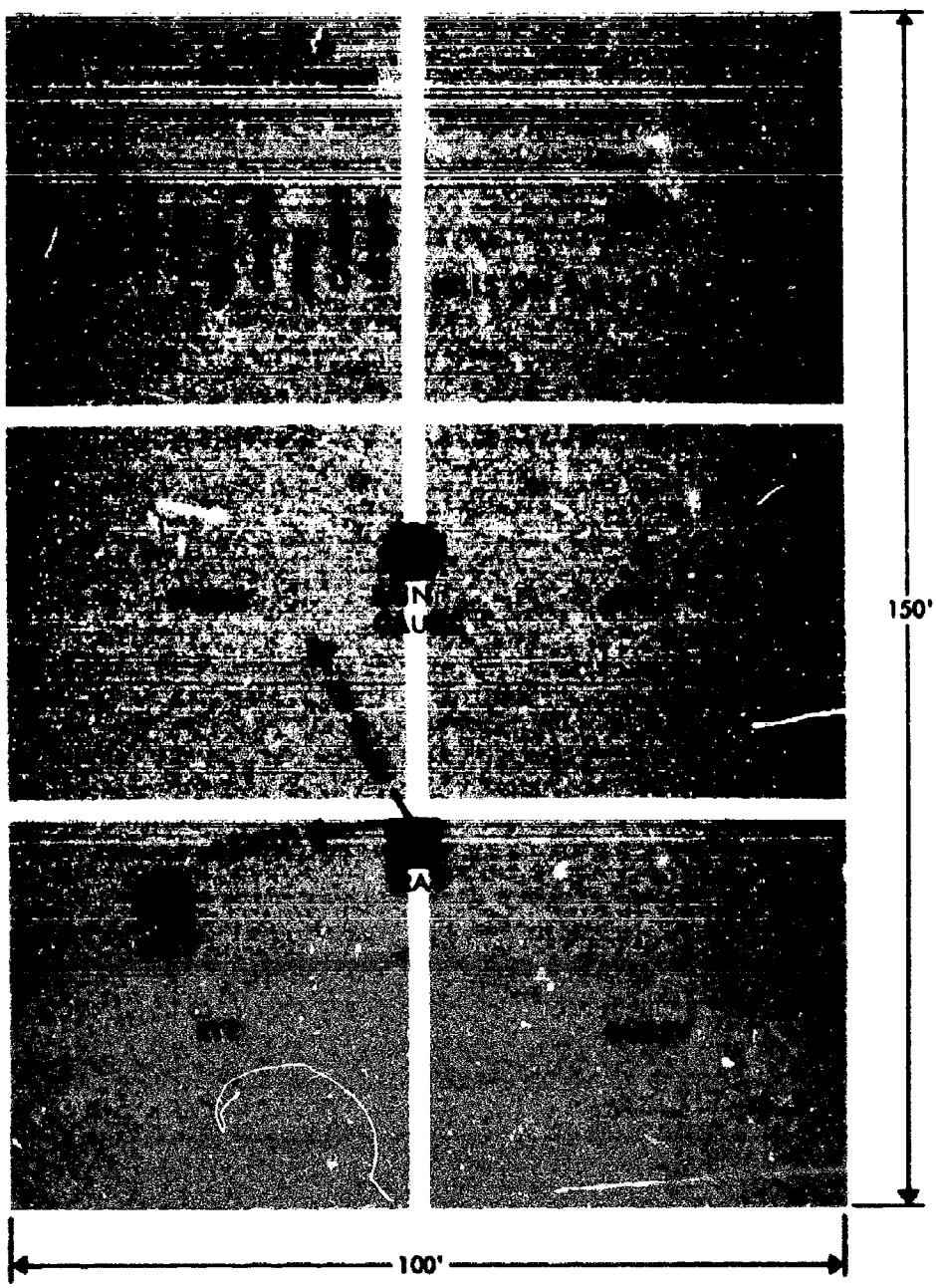


Table 2

PLANTING DATES AND PLANT DESIGNATIONS

Plant	Plot No. 1	Plot No. 2	Plant	Plot No. 1	Plot No. 2
Bean-1	5/17/64	5/19/64	Pea-1	10/10/64	10/10/64
Bean-2	8/17/64	8/17/64	Pea-2	11/11/64	11/11/64
Bean-3	-	9/10/64			
Bean-4	10/12/64	-	Pepper-1	7/20/64	7/21/64
Bean-5	11/11/64	11/11/64	Pepper-2	-	11/11/64
Bean-6	-	12/28/64			
Bean-7	-	1/25/65	Potato-1	10/10/64	10/10/64
Beet-1	7/20/64	7/21/64	Radish-1	10/10/64	10/10/64
Beet-2	11/11/64	11/11/64			
			Squash-1	5/17/64	5/19/64
Cabbage-1	5/17/64	5/19/64	Squash-2	7/20/64	-
Cabbage-2	10/12/64	-	Squash-3	10/12/64	10/12/64
Cabbage-3	11/11/64	11/11/64	Squash-4	11/11/64	11/11/64
Carrot-1	5/17/64	5/19/64	Tomato-1	5/17/64	5/19/64
Carrot-2	7/20/64	7/21/64	Tomato-2	7/20/64	-
Carrot-3	-	8/17/64	Tomato-3	10/12/64	-
Carrot-4	-	11/11/64	Tomato-4	11/11/64	11/11/64
Corn-1	5/17/64	5/19/64	Barley-1	5/16/64	5/18/64
Corn-2	-	9/10/64	Barley-2	11/11/64	11/11/64
Corn-3	10/5/64	10/5/64			
Corn-4	11/11/64	-	Oat-1	5/16/64	5/18/64
			Oat-2	11/13/64	11/11/64
Lettuce-1	5/17/64	5/19/64			
Lettuce-2	7/20/64	7/21/64	Rye-1	5/16/64	5/18/64
Lettuce-3	11/11/64	11/11/64			
			Wheat-1	5/16/64	5/18/64
Onion-1	5/17/64	5/19/64	Wheat-2	11/12/64	11/12/64
Onion-2	-	11/11/64			

Redondo (4 km from Station 15); the site was about 300 yards north of the road. One of several pine trees at this location was selected for sampling. In addition, a juniper tree clump was relocated at this site, and a composite grapefruit tree (three small trees in one hole) was planted.

Most of the field and laboratory experimental procedures described in Part One of this report were used without much alteration in the second phase of the operation.

The major steps in obtaining the foliar samples included: (1) washing specimen plants with a portable high-pressure water spray; (2) taking background samples of the washed plants or plant parts; (3) exposing the washed plants and a gross collector tray to depositing ceniza-arena for a given period of time; and (4) collecting the exposed plant or plant parts in glass jars or plastic jars and bags. To recover particles retained on the foliage, the fresh foliar samples were spray-washed (with hand-rubbing). The particles were removed from the water by filtration, after which the filter paper was ashed in a muffle furnace and the particles were weighed after cooling to room temperature. The plant material was dried at 105°C for at least 6 hours (mostly overnight) and then weighed.

Major changes in the original field sampling procedures were: (1) whole plants and groups of whole plants were taken as samples to obtain the desired type of data (this procedure was facilitated because many plants were small and in high abundance); and (2) a paraffin wax collecting system was developed for taking samples of the young cereal-grain plants. The previous experience in sampling and in analyzing the data on the particle retention, as measured from samples that consisted of small groups of leaves, as well as theoretical considerations strongly indicated that "whole plant" sampling procedure would be preferred for the smaller plants. However, great care in sampling was required when whole plants were sampled in a dry condition to minimize the loss of particles during sampling.

For sampling the cereal grains, 8 inch-diameter circular metal bands were prepared, to which one end of a plastic bag (both ends open) was taped. The bag was rolled down to the band prior to use; the whole assembly was set down over an area of growing plants, and the band was pressed into the ground. Afterward, the plants within and immediately around the ring were thoroughly washed. The soil within the ring was smoothed and thoroughly wetted and compacted by the spray in the washing process. Nearby plants, also washed, were taken for background samples.

Paraffin (wax) was melted in the laboratory and transferred to a thermos bottle for transport to the field. After exposure of the specimens, the plastic roll was carefully spray-washed, and the wax was poured into the ring to cover the soil and about 1/4 inch of the base of the plant stems. After the wax hardened, the plastic bag was unrolled, catching particles that were knocked from the plants in the process, and taped at the top. A long knife was inserted into the ground below the metal ring (or band), and the roots and soil were cut along the base of the ring. The assembly, with some soil, was removed from the field. The plants were cut at the top of the wax surface for washing, drying, and weighing. The particles were easily removed from the wax and the inner surface of the plastic bag by spray-washing. Finally, the plant stems in the wax mold were counted to obtain the planting density. A view of the paraffin wax collecting system is shown in Figure 2.

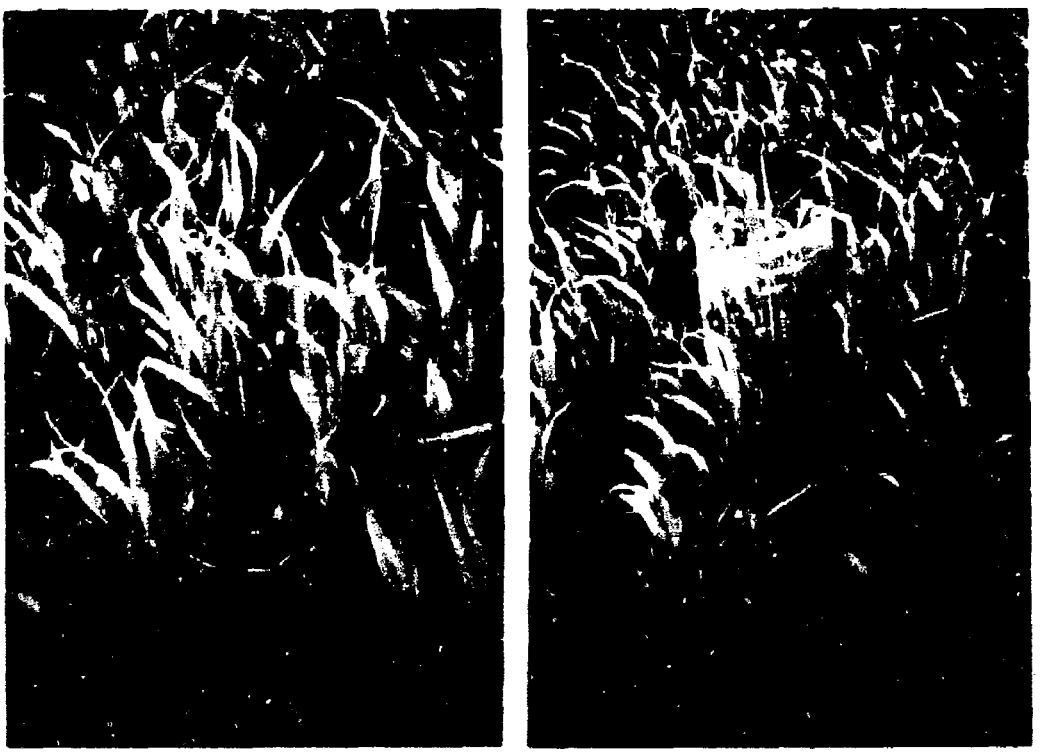
The paraffin wax band sampler was found suitable for sampling the cereal grain plants when the ceniza-arena was deposited on dry plant surfaces. To obtain an average value of the contamination factor for the larger grain plants, the tops of all of the plants in the area around the positioned band were gently brushed in one direction with a small stick after the wax had hardened. The particles, in any case, were disturbed when the plastic bag was rolled up from the band, and it was believed preferable to average the amount of particles falling from the upper leaves over an area larger than that encircled by the band.

For ceniza-arena deposits that arrived under damp or wet conditions (after an afternoon rain until about 0800 the following morning), the samples were taken, without loss of particles, by clipping off small sections of the grain plants, starting with the top leaves, and inserting them, section by section, into a container. At the ground level, it was necessary to eliminate sections of lower (usually dead) leaves that were lying on the soil surfaces. This same procedure was satisfactory for the wind- and rain-weathered samples.

For vegetable and corn plants growing singly in rows or grouped in hills, the sampling procedure for the dry deposit condition was to spread a slitted sheet of plastic under the plant and to clip off the leaves, singly or in groups, and then the fruit and stems. Any particles falling from the disturbed parts fell on the plastic and were later brushed into the sample container. (Four- and eight-inch-diameter plastic jars with snap-on covers were used as sample containers for most of these foliar samples.)

Under damp conditions, the vegetable plants were sampled without

Figure 2
THE PARAFFIN WAX BAND SAMPLER FOR CEREAL GRAINS



After Wax has set

After Plastic bag has been unrolled

the plastic sheet. For overnight exposures, the plastic sheets were positioned on the ground around the plant specimens to minimize the splashing of the soil and ceniza-arena particles onto the vegetable plants during periods of rainfall. The technique worked fairly well except for the very heavy rains, during which more than about 1 inch of water fell within an hour. The splashing was not noticeable until the water formed puddles and began running over the ground surface. For low-growing plants (such as potatoes) where the lower leaves lay on the ground, the plastic sheet kept the wet spray-washed leaves from contacting the soil after washing.

By July, the diurnal rainfall pattern for the season, in which most of the rain fell between about 1100 and 1800, was established. Rain seldom fell after sundown. The sky was generally clear, or nearly so, from sunrise until 0800 or 0900. Afterward, the cloud cover increased, and the rain clouds moved in from the Pacific Ocean. This cloud build-up was generally accompanied with increasing wind speed, especially of the southerly velocity components in the upper winds. After the rains ceased in the late afternoon, the wind speed decreased, and the wind usually swung back to the normal easterly flow at high altitudes. The surface winds, however, generally were from the northeast during the night and early morning hours at the two land plots, due to airflow through a gap in the mountains to the west of Irazú.

Because of the described behavior in the weather, the most favorable time of the day for deposits of ceniza-arena to occur was after 1800 at night and before 1100 in the morning. Thus, whenever possible, the plants were spray-washed after the rains ceased in the evening (at sundown) in preparation for interception of fresh ceniza-arena particles.

Because the work schedule could not always be adjusted to washing the plant specimens at sundown, another method was developed to protect the washed plants from splashed-up particles during the rain showers. In this method, a protective plastic sheet tent was constructed over groups of cleaned plants. In forming the tent, a stake was first inserted in the row between the plants to be protected, and the plastic (polyethylene) sheet was draped over the stake and secured at the corners by other stakes. This tent proved to be quite effective in protecting the clean plants from splashing, even during the heaviest rain. Clean plants were covered about noon each day, before the rain usually started, and uncovered between 1800 and 2200, depending on cessation of the rain. With this method, the sampling operation entailed visiting each station at least three times every day: (1) early in the morning to check whether ceniza-arena deposition had occurred during the night; (2) about noon to cover the plants if no deposit had

occurred up to that time (or if a new sampling series was to be initiated); and (3) late in the evening to uncover the plants.

When a deposition occurred during the night or very early in the morning under damp conditions and light or calm surface winds (with little or no loss of deposit from the foliage due to wind erosion), primary samples were taken upon arrival at the plot shortly after sunrise. Following this, wind-weathered foliar samples were taken during the morning hours, and, when the first rainfall was not too heavy, rain-washed samples were taken after the shower stopped. The same general procedure was used if the initial deposit occurred under dry conditions, usually after 0800 in the morning. The more exposed foliage of the vegetable and corn plants dried very rapidly after sunrise; the more sheltered lower leaves on the grain plants did not dry as rapidly.

In November and December when the end of the rainy season approached, the rains became more gentle, and their occurrence over the day became more random. To protect the vegetable plants from splashed-up particles during these random rains, rolls of plastic sheet measuring 10 x 100 feet were used so that several rows of crops could be protected with one sheet. To install these sheets, the plants, prior to washing, were drawn out through slits cut in the plastic, and the plastic was staked down along the edges. The method proved quite effective in preventing splash contamination of the plants during the less violent rains.

In December, January and February, the surface winds, especially at Plot No. 1, were generally very strong during the daytime, and they usually carried a fine mist across the plots (very little of which collected in the rain gauge). The mist was not heavy enough to wet the foliage of the plants or the surface of the soil but it appeared to be sufficient to reduce the rate of erosion of particles from the foliage and caused collection and retention of windblown soil dust on the washed plants. This dust required more frequent rewashing of the plants; however, it was found that the dust pickup in the vegetable subplot was greatly reduced when the dry soil was wetted before it was walked on during the washing and sampling of the plants.

Several general sampling methods for obtaining data on the amount of particles retained by trees were considered. The first method consisted of: (1) washing the particles from the leaves, twigs, and branches at random locations throughout the tree; (2) taking background samples from these locations; and (3) after contamination, taking leaf samples. The leaves were analyzed individually, and the average or median value of the contamination factor for the tree leaves was determined from a distribution curve. By this method, the total amount of particles

retained by the tree was computed from a separate estimate of the total mass of leaves on the tree. This method was used on a laurel and a pine tree. Photographs of the trees and of branches from the trees were taken for correlating the weights of the leaves or needles (plus twigs) and their spatial densities.

The second method was the same as the first except that the sampling sites would be at preselected locations within the tree canopy. This additional data indicated the degree of variation in leaf contamination levels throughout the volume of the tree and provided information on the dependence of this variation on direction, wind speed, volume density of the leaves, and other parameters. Measurements of the surface wind speeds and directions during deposition were needed to assist in analyzing the data. This method was used on the laurel and grapefruit trees. Photographs of a grapefruit tree, with marked branches before and after each sampling series, were taken for determining the spatial location and orientation of each leaf sampled. After the sampling run was completed, all the leaves were removed from the tree for drying and weighing.

The third method was an extension of the second method in which a network of greased disc collectors were placed at selected locations throughout the tree. The greased disc collectors provided information on the relative air concentration of the particles during the period of deposition at each disc collector location within and adjacent to the canopy of the tree. In this method, the disc collectors were not used to represent ideal leaves but to give information on the variability of the concentration of the airborne particles as they move through the volume of the tree. Ideally, the data from the disc collectors within the tree volume and outside the tree volume should provide the information needed for estimating the total amount of particles that is retained by the leaves. Use of the greased disc collectors required sufficient care in their placement and removal so that particles were not shaken from the tree leaves onto the discs; also, the discs had to be removed as soon as possible after a deposition to minimize transfer of particles from the leaves to the discs by wind erosion.

The third method was used on a mountain laurel tree. The laurel tree was about 15 feet tall. The greased disc collectors were 2 inches in diameter and made of thin aluminum sheet; they were mounted in a horizontal orientation at intervals along curtain rods with plastic clothespins. Two curtain rods were taped together at their centers to form a cross (called an X-rod). Two such X-rods were placed in the foliage of the tree at two different heights. A view of the laurel tree with the X-rods in place is shown in Figure 3.

Figure 3
LAUREL TREE WITH X-RODS IN PLACE

The procedure for removing the particles from the freshly collected foliar samples with a high-pressure spray of water and hand-rubbing was the same as was used during the first phase of the operation. However, when the plants became larger, more time was required in the washing. In addition, the leaves had to be stripped from the stems of the grains and corn in order to recover the required high fraction of the particles lodged in these joins. A minimum of about 6 hours of drying at 100°C was needed to dry most of the larger plant samples to a constant weight. Whole plant samples of matured cabbage and eared corn required at least overnight heating to dry to a constant weight.

Because of the hygroscopic nature of the oven-dried plant material, the dried plant material in the plastic containers was sealed upon removal from the drying oven and weighed as soon as it cooled to room temperature. The larger samples were transferred as rapidly as possible to a 4-inch-diameter plastic container, and the weight was read on the minimum of the second swing of the balance. The recorded weight therefore corresponded to the earliest measured weight before the balance dial indicated a steady increase in sample weight due to absorption of water vapor from the air. In extreme cases, weight gains of as much as 10 mg in the first minute after the initial weight recording were observed. Usually, however, such gains in weight were observed only for samples with a net weight of at least 5 to 10 gm.

Weight errors, in addition to the possibility of a recorded overweight of the dry plant material due to moisture absorption, initially included the contribution of particles not removed from the plant surfaces in the washing procedure. However, when particles were observed on the dried plant material, the sample was reprocessed.

The ceniza-arena particles tended to penetrate to the interior of the barley, rye, and wheat heads. They also penetrated between the main stem or stalk and the leaf folds of the grains and corn. Because of the rough exterior surfaces of these plants and the tightness of the leaf folds about the fresh stems, it was impossible to remove all of the particles in a single washing step.

Therefore, after the first drying and weighing, the foliar samples of the cereal grains and corn were reprocessed. In the drying process, the plant material contracted, and the nature of the surface of the stalks and grains was altered; many particles that had adhered to the green plant material readily fell to the bottom of the container during drying. Others fell from the dried material when the container was tapped. However, to ensure a high fractional recovery of the particles when reprocessing, the dried leaves and stalks were crushed and shredded.

This material was then floated on a layer of water in a tray; it floated even after a thorough wetting. After most of the loosened particles had settled to the bottom of the tray, the wetted broken stalks and chaff were picked up on a coarse screen and sprayed with a fine, high-pressure spray jet to remove the final amount of adhering particles. Any remaining grains, small pieces of stems, and chaff not removed with the coarse screen were retained on a finer screen when the water containing the particles was poured through the screen into the filtering apparatus. The particles, after the filter paper was burned off in the furnace, were cooled and added to those recovered in the initial washing. Only occasional foliar samples of the vegetables required reprocessing.

The gross deposits of ceniza-arena were collected and measured as described in Part One of this report. Continuous collections were made during the nine-month period at both land plots with a collector mounted on a post at a height of 6 feet. The tray was exchanged at the beginning and end of each monthly sampling period. During one sampling period, the tray on the post was exchanged at the same time as the one on the ground (i.e., every time either background samples or other foliar samples were taken).

The rain gauges were left in position during the nine-month period; they were read upon arrival at each station and after each rain shower if the station was manned. The time of rainfall during the monthly sampling periods was always known to within an hour, and, for most rain-washed samples, the time of rainfall was known to within a few minutes.

The relative humidity and temperature were only recorded during the monthly sampling periods. The surface wind speed was recorded with the anemometer head mounted at a height of 8 feet above the surface of the ground. During several of the weathering experiments, wind measurements were made at the height of the plants or at the height of the recording anemometer with a calibrated hand-held anemometer. This instrument was also used at Stations 15 and 16 because recording anemometers were not available.

The recording dew balance was used during the monthly sampling periods as described in Part One of this report. During the dry season, the underwater plastic collector pan and constant-head water container were removed, and an aluminum foil collector pan was prepared and attached to the balance arm. This greatly improved the sensitivity of the balance for the detection of arrival time and rate of arrival of the ceniza-arena particles. However, occasional difficulties in operation occurred when the dew was very heavy and water drops from the entry port fell on the collector pan, causing full-scale deflection of the balance arm. Views

of several items of field equipment are shown in Figure 4. The relative location of the field equipment and the crops at Plot No. 1 is shown in Figure 5.

A plate collector was designed, constructed, and operated in the field to obtain information on the impaction coefficients of particles with surfaces as required in the theoretical equations and as a basis for extrapolating the measured foliar retention data to a variety of wind speed, particle size, and collecting conditions other than those that apply to the measurements. The collector plates consisted of 4-inch-diameter thin aluminum discs welded to 1/4-inch-diameter aluminum rods that were 6 inches long. The assembled collector consisted of seven plates mounted 8 inches apart on a 4-foot rod in such a way that the plane of the plate was parallel to the rod but at angles of 0, 30, 60, 90, 120, 150, and 180 degrees from horizontal. The 4-foot rod was mounted on a swivel bearing with a wind vane to keep the center plate and rod perpendicular to the direction of the wind. The small rods holding the plates were threaded to accept hex-nuts to facilitate installation on and removal from the main rod. A view of the plate collector is shown in Figure 6. Before installation, the plates were greased by brushing both sides with a 50-50 mixture of petroleum jelly and xylene; after the xylene evaporated, the plates were warmed until the grease softened to form a smooth thin film over the plate.

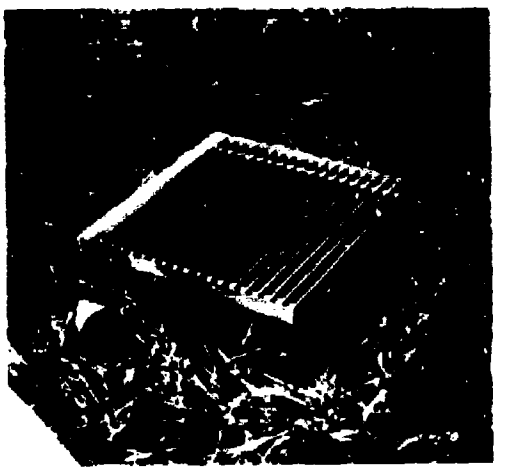
The particles were recovered from the plate, each side separately, by warming the plate and washing the grease and particles into beakers with a thin stream of xylene from a plastic wash-bottle. The particles were collected on filter paper. After the filter paper was ashed in a muffle furnace, the particles were cooled to room temperature and weighed on an analytical balance.

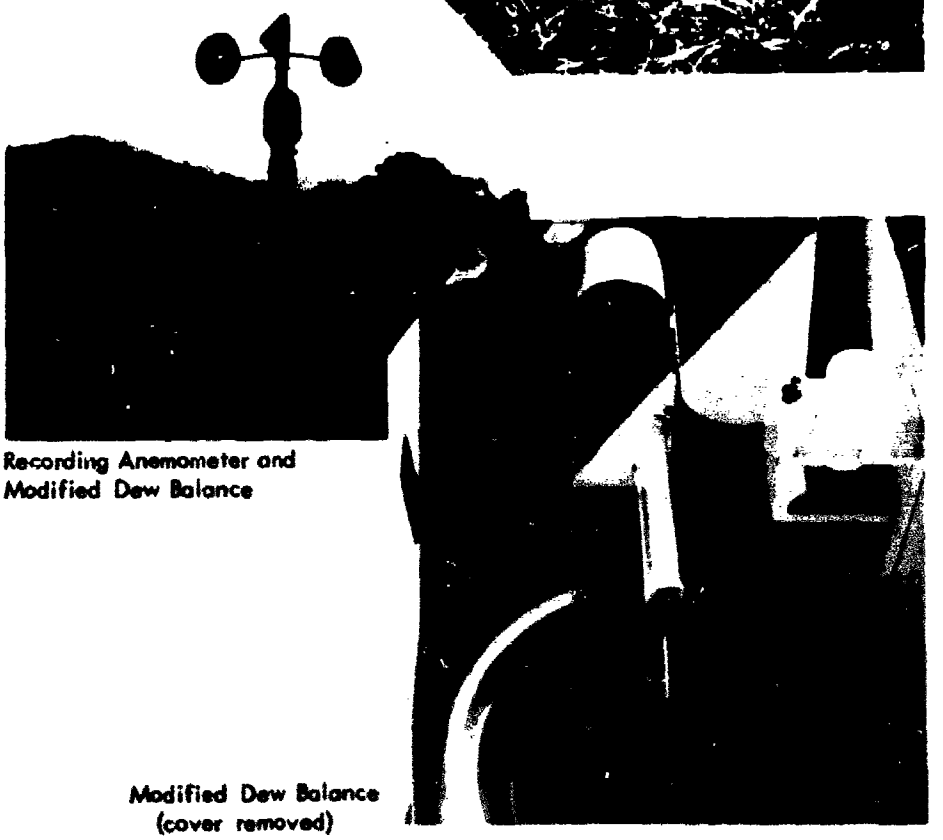
The greased plates were transported between the laboratory and the field in a dust-tight box. When a cloud of ceniza-arena appeared to approach the land plot being manned, the plates were quickly mounted on the main rod under cover (in the jeep or a rain shack) and installed on a prepared post. The length of exposure of the plates, from time of arrival of the particles to recovery of the sampler, was measured with a stopwatch. The wind speed during the exposure was measured with the hand-held anemometer mounted on an adjacent post at the same height (8 feet) as the collector.

To obtain data on the plant growth rates, leaf sizes and areas, and the fraction of the horizontal and vertical cross sections of a plant covered by foliage and the angular aspects of the leaves of various plants, photographs were taken of many of the plant specimens

Figure 4
VIEWS OF FIELD EQUIPMENT

Gross Collector



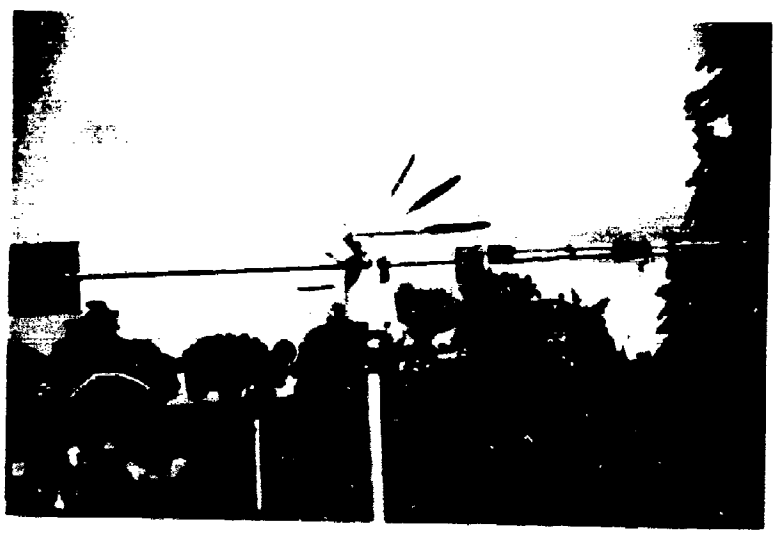


Recording Anemometer and Modified Dew Balance

Modified Dew Balance (cover removed)

Figure 5
GENERAL VIEW OF PLOT NO. 1

Figure 6
THE PLATE COLLECTOR



in the field prior to sampling. A painted 18-inch ruled stick or gridded paper was placed beside, behind, or under the specimens so that absolute dimensions could be taken from slide projections of the photographs on a gridded screen or from printed photographs. In the laboratory, outline drawings of sampled leaves, stems, and fruit were made after the samples were washed and the excess water had evaporated from them at room temperature. The plant material was then dried and weighed. The area of the outline drawings was determined with a planimeter. In the later stages of the operation, these measurements were facilitated by use of a Pentax copying camera and Copipod. With this equipment, a large number of area measurements were made by placing the leaves, stems, and fruit on grid paper prior to photographing them.

A method was improvised for harvesting the grain in order to obtain an estimate of crop yields. Samples of the barley, oat, and wheat grains were taken by clipping 100 heads of each at random while walking back and forth over the entire plot. The grain heads were oven-dried at 50°C, placed in a polyethylene bag, and flailed with the bristle side of a stiff brush. The thrashed material was passed over screens of different mesh sizes to remove the stems, after which the chaff and grain were collected in a 2-inch-deep enameled tray. The chaff was then blown out of the tray by a blower made with a fan blade attached to a drill press whose spindle speed was adjusted to effect a clean separation of chaff and grain. The dried grain was then weighed.

The weight distributions of the ceniza-arena particles recovered from the tray collectors and foliar samples and the physical, chemical, and magnetic properties of the particles were measured using the methods described in Part One of this report.

RESULTS

Gross Deposits of Ceniza-Arena

The measurements of ceniza-arena deposited at Plot Nos. 1 and 2 and at Stations 13, 15, and 16 during the various sampling periods are summarized in Table 3. The data include: (1) the sample number; (2) the time that the sample was collected (i.e., the time at which the collector tray was recovered); (3) the time period, Δt, over which the tray was exposed; (4) the weight of the particles per unit area, Δm, that were deposited; (5) the average deposition rate, $\Delta m/\Delta t$, during the sampling period; and (6) the accumulated deposit weight, m, for the sampling period. Data on the hourly deposition rates at the two land plots, as derived from the modified dew balance charts, are summarized in Appendix A.

The time-averaged deposition rates and accumulated ceniza-arena deposits for the various sampling periods at the two land plots are summarized in Table 4. The time variation of the average deposition rates after May 31, 1964, is shown for each of the successive sampling periods in Figure 7. The center line in the figure indicates that the concentration of the particles in the clouds formed in the eruptions decreased with a half-life of about 27 days (0.87 month). From mid-June 1964 to mid-February 1965, the average hourly deposit rate decreased by about a factor of 1,000. The deposit levels in February were not sufficient for making foliar contamination measurements. Data on the eruptive behavior of Volcán Irazú during the entire operation are given in Appendix A.

The relative amount of particles collected by collectors on the posts (about 6-feet high) and those on the ground was found, as expected, to depend on the wind speed during the collection of the particles. The log of the ratio, $\Delta m(\text{post})/\Delta m(\text{ground})$, for the collections made during the sampling period of June 15-20, 1964, is plotted as a function of wind speed in Figure 8. The plots indicate that, even for a very slow wind speed, the ratio did not become exactly equal to unity and that, with surface wind speeds of 9 to 10 mi/hr, the post collectors only collected about 50 percent of the particle weight deposited in the ground collectors. This was probably due to a disturbance in the airflow caused by the collector on the post.

Table 3

SUMMARY OF CENIZA-ARENA GROSS DEPOSITION MEASUREMENTS

Sample Number	Time Collected Day	Hour	Δt (hours)	Δm (gm/sq ft)	Δm/Δt (gm/sq ft-hour)	m (gm/sq ft)
			Plot No. 1			
14001	6/15	1156	2.93	5.140	1.76	-
14006[a]	6/15	1145	1.00	1.390	1.39	-
14007	6/15	1145	1.00	2.100	2.10	5.32
14011	6/16	0815	20.47	37.45	1.83	42.77
14027	6/16	0934	1.35	6.420	4.76	49.19
14028[a]	6/16	0934	1.32	4.708	3.57	-
14034	6/16	0956	2.47	13.820	5.59	-
14044	6/17	0836	21.03	90.10	4.29	139.29
14060	6/17	1226	3.83	6.095	1.59	145.39
14061[a]	6/17	1226	3.83	3.065	0.800	-
14077	6/18	0700	13.83	36.82	2.66	191.50
14078[a]	6/18	0700	13.83	34.29	2.48	-
14089	6/18	0925	2.42	18.59	7.68	210.09
14090[a]	6/18	0925	2.42	18.28	7.56	-
14105(RG)[b]	6/19	0840	22.92	44.40	1.94	254.49
14106[a]	7/13	0955	551.	443.9	0.806	-
14107[a]	7/21	0740	190.0	36.92	0.194	-
14113	7/14	1008	1.68	0.132	0.0786	0.132
14118	7/14	1715	7.12	1.117	0.157	1.249
14119	7/15	0735	14.33	12.62	0.881	13.87
14133	7/15	1045	3.17	8.813	2.78	22.68
14138	7/15	1235	1.83	2.061	1.13	24.74
14147	7/15	1620	3.75	4.136	1.10	28.88
14166	7/17	0720	39.00	12.81	0.328	41.69
14176	7/18	0715	23.91	16.26	0.680	57.95
14176	7/20	0800	48.75	2.911	0.0597	60.86
14192	7/21	0740	23.67	18.36	0.775	79.22

a Samples collected at post height

b RG designates samples recovered from the rain gauge

Table 3 (continued)

Sample Number	Time Collected Day	Time Collected Hour	Δt (hours)	Δm (gm/sq ft)	Δm/Δt (gm/sq ft-hour)	m (gm/sq ft)
			Plot No. 1 (continued)			
14193[a]	8/10	1530	487.5	198.99	0.408	-
14194[a]	8/15	1000	114.50	57.10	0.499	-
14195	8/10	1720	1.83	1.413	0.772	1.413
14196	8/11	1010	16.83	8.348	0.496	9.761
14209	8/11	1120	1.17	0.1038	0.0887	9.865
14216	8/11	1315	1.92	1.249	0.651	11.11
14230	8/11	1530	2.25	9.075	4.03	20.19
14238	8/13	1240	45.17	58.08	1.29	78.27
14251	8/14	0815	19.58	2.728	0.144	81.00
14263	8/15	0700	22.75	0.5142	0.0226	81.51
14264	8/15	0725	0.42	0.1508	0.359	81.66
14265	8/15	1000	2.58	0.2995	0.116	81.96
14269[a]	9/2	0700	429.0	43.570	0.102	-
14271	9/3	0615	23.25	19.112	0.822	19.112
14290	9/3	0830	2.25	5.124	2.277	24.236
14312	9/3	1250	4.33	1.366	0.315	25.602
14324	9/3	1345	0.92	0.8422	0.915	26.444
14335	9/4	0910	19.42	16.092	0.829	42.536
14337	9/7	0940	72.50	26.862	0.371	69.398
14352	9/7	1120	1.67	1.104	0.661	70.502
14353	9/9	0925	46.08	5.693	0.124	76.195
14354[a]	10/3	0915	576.0	55.960	0.0970	-
14355[a]	10/12	1445	221.5	2.2967	0.0104	-
14356	10/4	1515	30.0	0.4120	0.0137	0.4120
14388	10/6	0615	39.0	1.0061	0.0258	1.4181
14390	10/6	1235	6.33	1.1808	0.1870	2.5989
14443	10/6	1825	5.83	1.1465	0.1970	3.7454
14468	10/8	1220	41.92	0.2565	0.0061	4.0019

a Samples collected at post height

Table 3 (continued)

Sample Number	Time Collected Day	Hour	Δt (hours)	Δm (gm/sq ft)	Δm/Δt (gm/sq ft-hour)	m (gm/sq ft)
			Plot No. 1 (concluded)			
14495[a]	11/6	1050	596.0	7.189	0.0121	-
14448[b]	11/6	1050	693.5	11.504	0.0167	-
14496[a]	11/13	0615	163.4	1.673	0.01025	-
14497	11/9	0720	68.5	0.7634	0.0112	0.7634
14523	11/9	1320	6.0	0.2591	0.0432	1.0225
14548	11/10	0735	18.25	0.4164	0.0228	1.4389
14547	11/13	0615	70.3	1.3263	0.0189	2.7652
14571[a]	12/1	0800	433.8	15.695	0.0362	-
14572[a]	12/10	0715	215.25	0.6101	0.00283	-
14573	12/2	0900	25.0	0.2996	0.0120	0.2996
14591	12/3	1620	31.33	0.2762	0.00882	0.5758
14613	12/4	0715	14.92	0.1192	0.00797	0.6950
14642	12/4	1830	11.25	0.2832	0.0252	0.9782
14645	12/6	1720	46.83	0.1207	0.00258	1.0989
14648	12/9	0655	61.58	0.4657	0.00756	1.5646
14654	12/10	0715	24.33	0.0580	0.00238	1.6226
14655[a]	1/6	0800	649.0	2.3521	0.00362	-
14656[a]	1/17	1130	267.50	3.9797	0.0149	-
14657	1/7	1605	32.08	0.1329	0.00414	0.1329
14689	1/7	1700	0.92	0.1576	0.171	0.2905
14690	1/10	1800	73.00	1.6632	0.0228	1.9537
14708	1/11	0700	13.00	0.3556	0.0274	2.3093
14722	1/12	0900	26.00	0.9575	0.0368	3.2668
14728	1/15	1530	78.50	0.4286	0.00546	3.6954
14738	1/16	0600	14.50	2.3144	0.160	6.0098
14751	1/16	1200	6.00	1.6228	0.270	7.6326
14767	1/17	1130	23.50	0.0214	0.00091	7.6540
14796[a]	2/8	1100	527.5	2.3262	0.00441	-
14797[a]	2/23	0800	357.0	0.1390	0.000389	-
14798	2/23	0800	357.0	discarded	-	-

a Samples collected at post height

b Samples collected at ground level during the same period as the post collector

Table 3 (continued)

Sample Number	Time Collected Day	Time Collected Hour	Δt (hours)	Δm (gm/sq ft)	Δm/Δt (gm/sq ft-hour)	m (gm/sq ft)
			Plot No. 2			
06001	6/17	0956	41.01	10.93	0.267	10.93
06002[a]	6/17	0956	41.01	6.805	0.166	-
06003	6/18	0550	19.90	13.68	0.688	24.61
06004[a]	6/18	0550	19.90	12.50	0.628	-
06023	6/19	0940	27.83	33.30	1.20	57.91
06024[a]	6/19	0940	27.83	31.59	1.14	-
06044[a]	7/14	1330	577.	202.3	0.350	-
06055	7/15	0850	19.33	6.420	0.332	6.420
06056	7/15	1510	6.33	2.842	0.448	9.262
06079	7/16	1755	26.75	11.90	0.445	21.16
06088	7/19	1500	69.08	29.32	0.423	50.48
06089	7/21	0945	42.75	2.110	0.0493	52.59
06090[a]	8/10	0945	480.0	45.62	0.0950	-
06091	8/16	0945	144.00	22.24	0.154	-
06092	8/10	1145	2.00	0.8367	0.418	0.8367
06107	8/11	0725	19.67	4.342	0.221	5.179
06129	8/12	0640	23.25	14.81	0.637	19.99
06135	8/12	1310	6.50	1.886	0.290	21.88
06146	8/12	1735	4.42	1.442	0.326	23.32
06163	8/13	0800	14.42	7.716	0.535	31.03
06183	8/16	0950	73.83	6.862	0.0929	37.90
06192[a]	9/3	1515	437.5	48.608	0.111	-
06193[a]	9/8	1540	120.42	44.745	0.372	-
06194	9/4	0645	15.50	7.690	0.496	7.690
06228	9/4	1100	4.25	0.5091	0.120	8.199
06239	9/6	1520	52.33	7.287	0.139	15.486
06259	9/7	0650	15.50	5.845	0.377	21.331
06260	9/8	1520	32.50	28.218	0.868	49.549

a Samples collected at post height

Table 3 (continued)

Sample Number	Time Collected Day	Hour	Δt (hours)	Δm (gm/sq ft)	Δm/Δt (gm/sq ft-hour)	m (gm/sq ft)
			Plot No. 2 (continued)			
06280[a]	10/3	1345	598.0	15.668	0.0262	-
06281[a]	10/12	1145	214.0	0.8558	0.00400	-
06282	10/7	1145	94.0	1.0565	0.0112	1.0565
06295	10/11	1430	98.75	0.2770	0.00281	1.3335
06317[a]	11/6	1430	603.0	15.073	0.0250	-
06313[b]	11/6	1430	624.0	17.038	0.0273	-
06318[a]	11/13	0650	160.5	1.412	0.00880	-
06319	11/9	0905	66.5	0.4869	0.00732	0.4869
06335	11/13	0650	93.8	1.7546	0.0187	2.2415
06354[a]	12/1	1300	438.0	8.123	0.0185	-
06355[a]	12/10	0900	116.50[c]	1.4180	0.0122	-
06356	12/4	1015	69.25	0.3446	0.00498	0.3446
06380	12/5	0830	22.25	0.5145	0.0231	0.8592
06398	12/5	1230	4.00	0.1799	0.0450	1.0391
06409	12/6	1600	27.50	0.7018	0.0255	1.7409
06418	12/7	0750	15.83	0.2256	0.0143	1.9665
06431	12/8	0700	23.17	0.3398	0.0147	2.3063
06437	12/8	1230	5.50	0.1545	0.0281	2.4608
06460	12/9	0750	19.33	0.1067	0.00552	2.5675
06472	12/10	0900	25.17	0.3688	0.0147	2.9363
06473[a]	1/6	1400	653.0	13.628	0.0209	-
06474[a]	1/13	1115	165.25	5.0410	0.0305	-
06475	1/7	1025	20.42	0.7982	0.0391	0.7982
06504	1/7	1135	1.17	0.3512	0.300	1.1494
06519	1/7	1315	1.67	0.4331	0.259	1.5825
06520	1/8	0800	18.75	1.2536	0.0668	2.8361
06522	1/8	1300	5.00	0.5248	0.105	3.3609
06542	1/9	0730	18.50	2.1056	0.114	5.4665

a Samples collected at post height

b Samples collected at ground level during the same period as the post collector

c Collected from 12/5, 1230; earlier collection lost in cyclone wind which dislocated the tray

Table 3 (concluded)

Sample Number	Time Collected Day	Hour	Δt (hours)	Δm (gm/sq ft)	Δm/Δt (gm/sq ft-hour)	m (gm/sq ft)
			Plot No. 2 (concluded)			
06573	1/10	1630	33.00	1.0239	0.0310	6.4904
06594	1/11	0800	15.50	0.9571	0.0617	7.4475
06604	1/12	0800	24.00	0.3624	0.0151	7.8099
06637	1/13	1115	27.25	0.6614	0.0243	8.4713
06652[a]	2/9	1400	651.0	12.834	0.0197	-
06653[a]	2/22	1030	308.5	0.1831	0.000594	-
06654	2/18	0930	211.5	0.3968	0.00188	0.3968
06696	2/22	1030	97.0	~0.0	~0.0	0.3968
			Station 13			
13502	12/13	0730	18.00	1.6821	0.0934	1.6821
13503	12/13	0740	0.167	0.8968	5.38	2.5789
13509	12/13	1610	8.50	0.2245	0.0264	2.8034
13510	12/14	0800	15.83	2.4778	0.157	5.2812
			Station 15			
15001	1/14	1400	21.50	1.9599	0.0912	1.9599
15016	1/15	0715	17.25	0.8221	0.0477	2.7820
15036	1/15	1735	10.33	0.7724	0.0748	3.5544
15050	1/16	0630	12.92	0.8421	0.0652	4.3965
15051	1/16	1700	10.50	0.2340	0.0223	4.6305
15067	2/9	1700	24.50	0.4940	0.0202	0.4940
15069	2/16	0845	159.75	0.7188	0.00450	1.2128
15070	2/23	0715	166.50	~0.0	~0.0	1.2128
			Station 16			
16000	2/9	0730	17.00	0.6228	0.0366	0.6228
16005	2/11	0800	48.00	0.0(discard)	-	0.6228
16017	2/15	1530	103.50	0.2574	0.00249	0.8802
16027	2/16	0830	17.00	0.6248	0.0368	1.5050
16028	2/16	1400	5.50	0.1598	0.0291	1.6648
16029	2/22	1600	146.00	~0.0	~0.0	1.6648

a Samples collected at post height

Table 4

SUMMARY OF TIME-AVERAGED DEPOSITION RATES
AND ACCUMULATED CENIZA-ARENA DEPOSITS
BY SAMPLING PERIOD AT THE TWO LAND PLOTS

Sampling Period	Δm^*[a] (gm/sq ft)	Δm (gm/sq ft)	$\Delta m^*/\Delta m$[a]	$\Delta m/\Delta t$ (gm/sq ft-hr)	m (gm/sq ft)
		Plot No. 1			
6/15- 6/20	(265.2)[b]	300.09	0.882	2.48	300
6/20- 7/13	443.9	(659)[b]	0.674[c]	1.19	959
7/14- 7/21	36.92	79.22	0.466	0.47	1,038
7/21- 8/10	198.99	(342)	0.582[c]	0.71	1,380
8/10- 8/15	57.10	81.96	0.697	0.72	1,462
8/15- 9/2	43.57	(63)	0.694[c]	0.15	1,525
9/2 - 9/9	52.76	76.19	0.692	0.45	1,601
9/9 -10/3	55.96	(88)	0.633[c]	0.15	1,689
10/3 -10/10	2.297	4.002	0.574	0.021	1,693
10/10-11/6	7.189	11.504	0.625	0.017	1,705
11/6 -11/13	1.673	2.765	0.605	0.017	1,708
11/13-12/1	15.70	(32)	0.490[c]	0.073	1,740
12/1 -12/10	0.610	1.623	0.376	0.0075	1,742
12/10- 1/6	2.352	(5.2)	0.448[c]	0.0081	1,747
1/6 - 1/17	3.980	7.654	0.520	0.029	1,755
1/17- 2/8	2.326	(5.1)	0.456[c]	0.0096	1,760
2/8 - 2/23	0.139	(0.354)	0.393	0.00098	1,761
		Plot No. 2			
6/15- 6/20	(60.7)[b]	69.07	0.879	0.60	69
6/20- 7/14	202.3	(293)[b]	0.690[c]	0.51	362
7/14- 7/20	-	52.59	-	0.32	415
7/20- 8/10	45.62	(84)	0.544[c]	0.17	499
8/10- 8/16	22.24	37.90	0.587	0.26	537
8/16- 9/3	48.61	(65)	0.745[c]	0.14	602
9/3 - 9/8	44.74	49.55	0.903	0.41	652
9/8 -10/3	15.67	(20)	0.772[c]	0.042	672
10/3 -10/12	0.856	1.334	0.642	0.0069	673
10/12-11/6	15.07	17.04	0.884	0.027	690
11/6 -11/13	1.412	2.242	0.630	0.014	692
11/13-12/1	8.123	(15)	0.556[c]	0.033	707
12/1 -12/10	1.418	2.936	0.483	0.014	710
12/10- 1/6	13.63	(25)	0.539[c]	0.039	735
1/6 - 1/13	5.041	8.471	0.595	0.051	743
1/13- 2/9	12.83	(24)	0.528[c]	0.038	767
2/9 - 2/22	0.183	0.397	0.461	0.0013	768

a Δm^* represents deposit at post height

b Values in parentheses are calculated from the interpolated $\Delta m^*/\Delta m$ values

c Interpolated values

Figure 7

TIME VARIATION OF AVERAGE GROUND DEPOSITION RATES AT THE TWO LAND PLOTS

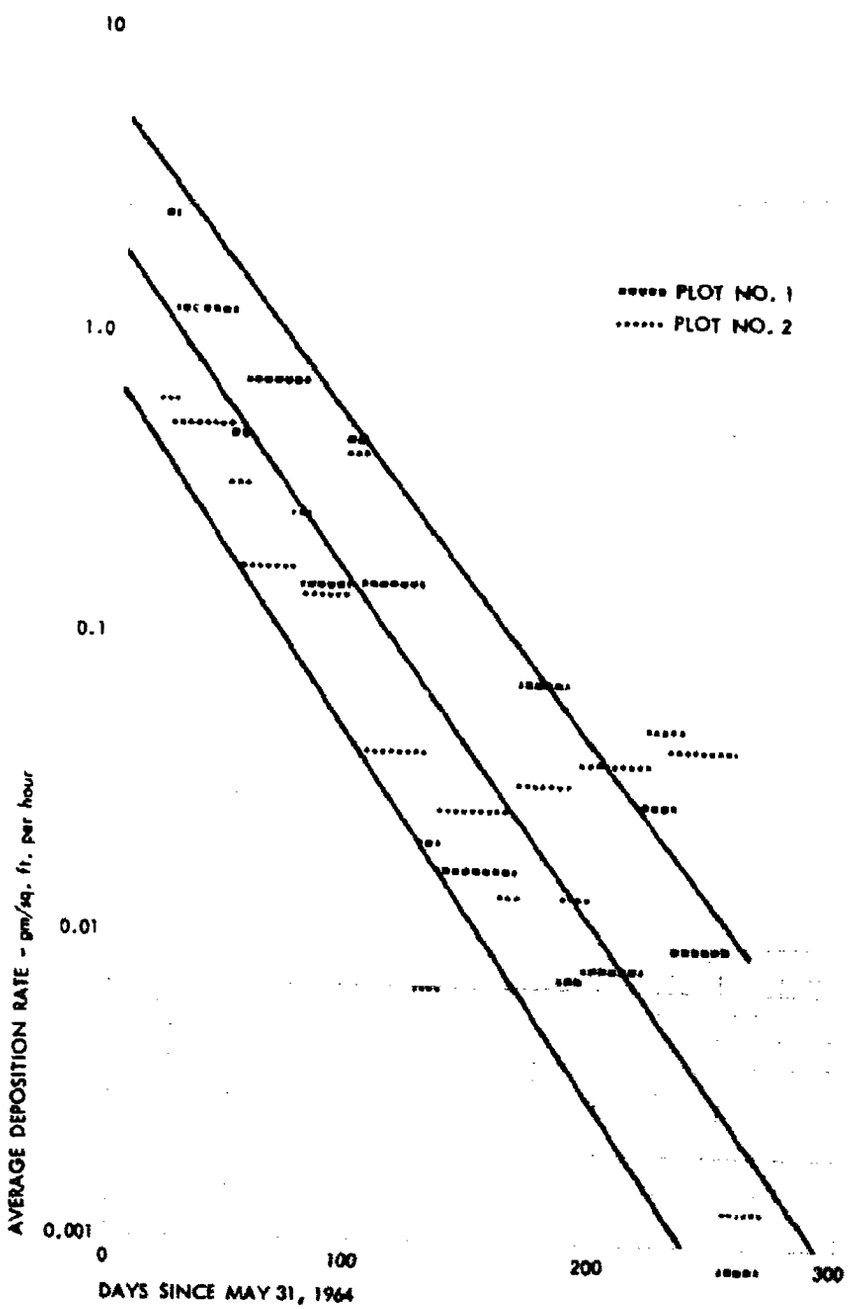
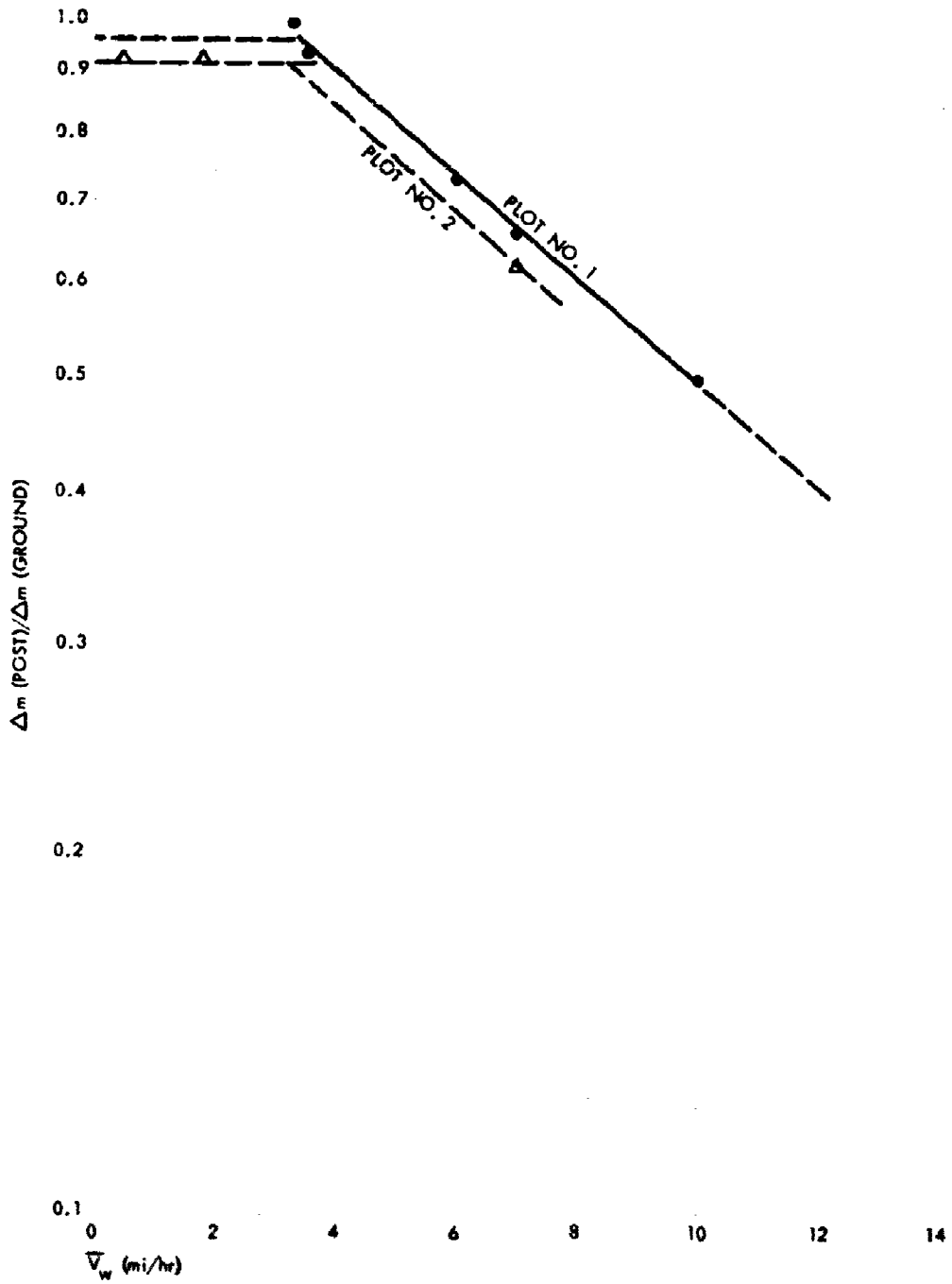


Figure 8

DEPENDENCE OF RATIO OF POST COLLECTION TO GROUND COLLECTION ON AVERAGE WIND SPEED DURING DEPOSITION



The average diurnal variation in the relative hourly deposition rates at the two land plots is illustrated by the percentages of the daily deposits that fell during each hour, as summarized in Table 5. (Note that the average hourly deposit percentage for each day is 100/24 or 4.17.) During the rainy season, when the volcano was still quite active, some deposit occurred at both land plots during every hour of at least one of the days during the sampling periods. During the dry season, no deposit occurred during several hours of every day during the sampling periods. For the four months of the rainy season, the heaviest deposits occurred most often between midafternoon and midnight. For the two months of the dry season, the heaviest deposits occurred most often between midnight and midmorning.

The hourly deposition rates were derived from correlations between data read from the charts of the modified dew-balance, as shown in Figure 9, and the gross collector data. With the water-submerged collector tray that was used during the rainy season, the calibration factor varied to some degree from one sampling series to another due to hold-up of particles on the cylindrical plastic liner that extended from the entry port down to near the water tray. For the aluminum foil collector pans used under dry climatic conditions, the average calibration factor was 1.05 grams per scale unit.

Meteorological Parameters

The meteorological parameters that were measured continuously during the sampling periods at the two land plots were: (1) surface air temperature; (2) relative humidity; (3) rainfall; and (4) wind speed at 8 ft above ground level. The observed data are summarized in Appendix B. In addition, measurements of wind speed at various locations on the land plots and other stations were made with a standardized hand-held anemometer.

A summary of the observed data on the surface air temperature and relative humidity at the two land plots during the sampling periods is given in Table 6. At Plot No. 1, the maximum surface air temperature for each day was generally between 75 and 80°F during the rainy season and the dry season; however, during the rainy season this maximum generally occurred between about 1000 and 1100, whereas during the dry season, it occurred at about 0900. The minimum temperature for each day was between 53 and 59°F, and it occurred most frequently between 0400 and 0500 during the rainy season and at about 0300 during the dry

Table 5

PERCENTAGE OF AVERAGE DAILY CENIZA-ARENA DEPOSIT
BY HOUR OF DAY DURING SEVERAL SAMPLING PERIODS

	Sampling Period, Rainy Season					Sampling Period, Dry Season		
Hour	6/15-6/20	7/14-7/21	8/10-8/15	9/2-9/9	Weighted Average	12/2-12/10	1/6-1/16	Weighted Average
				Plot No. 1				
1	9.04	1.75	6.97	5.25	5.25	0.00	0.00	0.00
2	3.17	0.92	3.32	6.33	3.45	3.08	10.07	6.92
3	3.30	0.30[a]	0.20	7.27	2.91	0.00	18.04[b]	9.92
4	3.67	1.05	0.12	7.94	3.38	25.63[b]	0.81	11.98
5	1.84	3.45	0.17	4.55	2.72	0.00	0.80	0.44
6	3.63	2.44	0.05[a]	3.03	2.35	0.00	16.34	8.99
7	6.21	5.74	12.20	4.11	6.16	4.37	3.59	3.94
8	5.68	2.36	5.11	4.07	4.15	0.00	14.97	8.23
9	3.92	1.75	2.61	10.84[b]	5.00	18.48	5.81	11.51
10	2.92	4.28	2.59	1.52	2.84	0.62	0.00	0.28
11	0.47[a]	5.25	1.34	1.05	2.19	0.62	0.00	0.28
12	3.55	2.60	4.90	4.80	3.88	8.63	3.85	6.00
13	1.58	2.88	2.48	0.72[a]	1.90[a]	16.70	8.66	12.28[b]
14	2.46	0.93	8.43	2.28	3.25	12.32	0.91	6.04
15	1.11	20.07[b]	4.26	2.39	7.57[b]	2.22	5.10	3.80
16	0.74	1.86	13.04	4.45	4.75	0.00	2.35	1.29
17	12.06[b]	1.97	13.84[b]	3.36	7.07	0.00	2.05	1.13
18	4.07	7.55	4.08	5.30	5.42	7.33	2.01	4.40
19	6.37	5.28	4.16	4.06	4.92	0.00	0.00	0.00
20	1.42	3.00	3.29	2.23	2.50	0.00	0.00	0.00
21	9.42	2.95	1.82	2.23	3.89	0.00	0.00	0.00
22	5.54	2.13	0.82	3.29	2.91	0.00	4.64	2.55
23	3.13	16.21	0.83	3.54	6.50	0.00	0.00	0.00
24	4.91	3.27	3.37	6.01	4.43	0.00	0.00	0.00

a Minimum deposit b Maximum deposit

Table 5 (concluded)

Hour	Sampling Period, Rainy Season					Sampling Period, Dry Season		
	6/15-6/20	7/14-7/21	8/10-8/16	9/2-9/8	Weighted Average	12/2-12/10	1/7-1/13	Weighted Average
				Plot No. 2				
1	1.09	1.84	3.77	3.42	2.56	0.00	6.14	2.69
2	0.23[a]	1.73	3.96	2.87	2.25	0.00	8 30	3.64
3	2.46	1.22	2.82	3.02	2.34	3.41	4.20	3.76
4	4.60	0.97	2.96	3.67	2.92	2.72	4.18	3.36
5	1.32	0.89[a]	3.72	2.62	2.12	6.98	12.20[b]	9.27
6	0.96	1.25	12.56[b]	2.78	4.40	6.13	4.38	5.36
7	5.01	1.12	11.37	3.16	5.02	34.91[b]	0.00	19.62[b]
8	10.63	6.43	9.39	1.28	6.78	19.28	1.02	1 28
9	4.33	2.38	1.27	4.00	2.92	0.00	5.08	2.22
10	3.10	6.22	2.03	1.94	3.43	3.42	10.75	6.63
11	2.93	8.35	3.14	1.94	4.29	6.13	2.54	4.56
12	1.91	1.16	1.72	1.37	1.51[a]	1.87	3.05	2.39
13	0.80	8.10	4.70	0.73[a]	3.85	2.04	2.54	2.26
14	2.95	4.96	1.37	1.10	2.67	0.00	1.02	0.45
15	4.60	5.29	2.64	1.08	3.43	0.00	2.03	0.89
16	4.16	3.00	3.69	1.73	3.10	0.00	1.55	0.68
17	3.33	6.35	1.08[a]	7.93	4.78	10.42	0.00	5.86
18	6.82	16.62[b]	2.45	6.08	8.35[b]	2.69	0.00	1.50
19	8.94	7.95	1.64	7.47	6.46	0.00	0.00	0.00[a]
20	3.46	2.62	3.17	18.85[b]	6.99	0.00	0.51	0.22
21	6.49	2.00	2.06	7.16	4.27	0.00	7.62	3.34
22	7.75	5.36	4.80	5.79	5.84	0.00	9.92	4.34
23	11.87[b]	1.70	9.18	5.72	6.75	0.00	5.05	2.21
24	0.26	2.49	4.51	4.29	2.97	0.00	7.92	3.47

a Minimum deposit b Maximum deposit

Figure 9
MODIFIED DEW BALANCE CHART RECORDS FOR THE JULY SAMPLING PERIOD

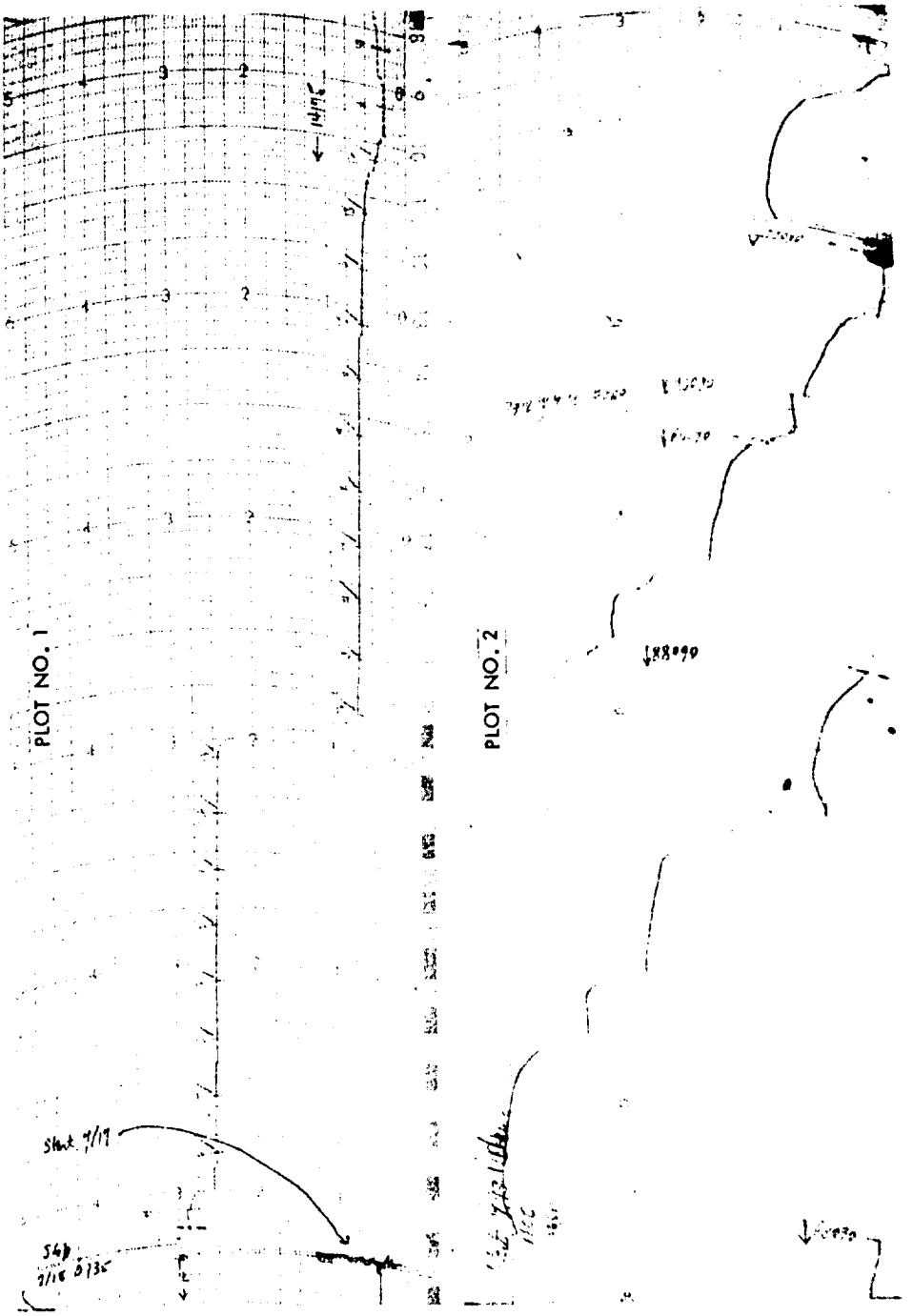


Table 6

AVERAGED VALUES OF TEMPERATURE AND RELATIVE HUMIDITY PARAMETERS AND TIMES OF OCCURRENCE FOR EACH SAMPLING PERIOD AS TAKEN FROM THE HYGROTHERMOGRAPH RECORDS

	Date								
	6/15-6/20	7/13-7/20	8/10-8/17	9/2-9/9	10/3-10/12	11/6-11/13	12/1-12/10	1/6-1/17	2/8-2/23
	Plot No. 1								
T max (°F)	70	75	80	79	80	83	79	76	78
Time of T max (hour)	1335	1050	0950	1145	1035	0940	0920	0905	0900
T min (°F)	56	57	59	58	59	57	54	53	53
Time of T min (hour)	0500	0510	0350	0750	0455	0400	0305	0315	0245
$\bar{T}$ (°F)	63	66	69	68	70	70	66	64	66
Time when RH ≥ 90 percent[a]	1535	1535	1400	1545	1520	1525	1555	1620	1635
Time when RH ≤ 90 percent	0715	0640	0710	0925	0700	0650	0635	0650	0635
Hours of damp conditions[a]	15.7	15.1	17.2	17.7	15.7	15.4	14.7	14.5	14.0
RH min (percent)	70	62	61	61	61	52	54	59	56
Time of RH min (hour)	1040	0850	0950	1145	1025	0855	0840	0855	0840

a These times do not take into account periods of rainfall near midday unless humidity remained greater than 90 percent continuously during the afternoon.

Table 6 (concluded)

	Date								
	6/15-6/20	7/13-7/20	8/10-8/17	9/2-9/9	10/3-10/12	11/6-11/13	12/1-12/10	1/6-1/17	2/8-2/23
	Plot No. 2								
T max (°F)	74	72	73	69	75	74	81	73	74
Time of T max (hour)	1020	1125	1125	1050	1120	1100	1235	1210	1140
T min (°F)	55	54	55	54	55	54	50	47	48
Time of T min (hour)	0520	0445	0410	0430	0420	0545	0510	0345	0420
$\bar{T}$ (°F)	64	63	64	61	65	64	66	60	61
Time when RH ≥ 90 percent[a]	1510	1415	1450	1340	1455	1550	1655	1710	1725
Time when RH ≤ 90 percent[a]	0745	0725	0715	1710	0630	0710	0615	0650	0705
Hours of damp conditions[a]	16.6	17.2	16.4	16.5	15.6	15.3	13.3	13.7	13.7
RH min (percent)	64	66	60	69	63	60	44	52	50
Time of RH min (hour)	0850	0945	1100	1050	1115	1015	1220	1150	1150

a These times do not take into account periods of rainfall near midday unless humidity remained greater than 90 percent continuously during the afternoon.

season. The average daily mean temperature was between 63 and 70°F. On the average, the relative humidity was greater than 90 percent after about 1530 during the rainy season and after about 1630 during the dry season (neglecting periods of rainfall during the early part of the day). The relative humidity usually decreased rapidly soon after sunrise. During the rainy season, the relative humidity was greater than 90 percent (defined as damp conditions) about 15 to 18 hours of each day; the longest periods under continuous damp conditions occurred in August. During the dry months, the relative humidity generally remained greater than 90 percent for 14 to 15 hours each day. The daily minimum relative humidity was usually between 50 and 70 percent, and the minimum was higher during the rainy season than during the dry season. As would be expected, the minimum in the relative humidity coincided on most days with the time at which the maximum temperature occurred.

At Plot No. 2, the daily maximum surface air temperature generally was between 70 and 80°F, occurring between 1100 and 1200. The daily minimum temperature was about 55°F during the rainy season and near 50°F during the dry season. The average daily mean temperature was between 60 and 65°F. Relative humidities greater than 90 percent persisted for periods of 15 to 17 hours each day during the rainy season and for 13 to 14 hours during the dry season.

Thus, the climatic conditions at the two plots were quite similar except that the surface air temperature usually was a few degrees lower at Plot No. 2, and the humidity during the dry season was somewhat lower.

The average daily rainfall at the two land plots during the sampling periods is summarized in Table 7. The rainy season in Costa Rica, which usually begins in late May and ends in mid-November, has two periods of rather heavy rainfall. As indicated by the data in Table 7, the first period has a peak rainfall rate between mid-June and mid-July, and the second period has a peak rainfall rate between mid-September and mid-October. The rains during these periods come from the Pacific Ocean. In November and December, the occasional rains usually come from the Caribbean Ocean.

As previously mentioned, the diurnal pattern of the rain showers during the rainy season is that showers ordinarily occur somewhere in the valley between about 1100 and 1800; the occurrence of showers after sundown is very infrequent. At sunrise, the sky is usually clear, but, shortly after 0800, the cloud cover starts building up and the sky is usually completely overcast by the time the rain showers start. After November, the occasional showers from the Caribbean Ocean occur at any

Table 7

AVERAGE DAILY RAINFALL AT THE TWO LAND PLOTS

Sampling Period	Δt (days)	Rainfall (inches)	Average Rate (inches/day)
	Plot No. 1		
6/14- 6/19	4.72	3.32	0.703
7/13- 7/21	7.94	7.64	0.962
8/10- 8/17	6.83	2.02	0.296
9/2 - 9/3	7.04	3.91	0.555
10/3 -10/13	9.98	7.75	0.776
11/9 -11/13	3.65	0.04	0.011
12/1 -12/9	7.96	0.87	0.109
12/9 - 1/6	28.08	0.17	0.006
1/6 - 1/17	11.17	0.24	0.021
	Plot No. 2		
6/14- 6/19	4.73	1.69	0.357
7/13- 7/21	7.96	9.74	1.224
8/10- 8/17	6.96	2.16	0.310
9/2 - 9/8	6.01	3.19	0.531
10/3 -10/13	9.72	7.11	0.731
11/7 -11/13	5.87	1.37	0.233
12/1 -12/9	8.19	0.65	0.079
12/9 - 1/6	28.14	0.36	0.013
1/6 - 1/13	8.75	0.03	0.003

hour of the day without any apparent diurnal frequency pattern.

The heavy rains in late June and through mid-July, with a daily rainfall rate of almost 1 inch per day, in combination with a few hours of sunshine each day did not favor good growth of many of the planted vegetables, especially the corn. The leaves of the lower growing plants under these conditions were susceptible to the growth of mildew and other fungi.

The average hourly wind speeds at the two land plots for each sampling period are summarized in Table 8. The wind speed was always higher at Plot No. 1 than at Plot No. 2 because the former was situated in the path of the airflow through a pass in the mountain chain between the central valley and the Caribbean side of the country. This airflow at ground level was generally from the north-northeast or northeast, whereas the general flow of the upper air was from the east. However, during the rainy season, the upper winds were from the southeast until the late afternoon hours when the rain showers ceased.

The diurnal variation in the wind speeds described below persisted throughout the whole operation. The speeds were generally low during the night and perhaps lowest in the hours just before sunrise. After sunrise, terrain heating caused the surface winds to pick up. These surface winds often were westerly, with the air flowing up the mountain-sides in countercurrent with the easterly flow of the upper winds. As the cloud cover built up, clouds could be seen moving in all directions at a given time.

The peak surface wind speeds usually occurred near midday. At Plot No. 1, the peak average hourly wind speed occurred between 1130 and 1230 on 27 percent of the days of observation. At Plot No. 2, the peak average hourly wind speed occurred between 1230 and 1330 on 31 percent of the days of observation. The median frequency of the daily peak in the average hourly wind speed occurred at about 1200 for Plot No. 1 and at about 1300 for Plot No. 2. During the 44 days of observation from June 15, 1964 through January 17, 1965, the maximum average hourly wind speed never occurred before 0900 or after 1600 at Plot No. 1 and never before 1000 or after 1700 at Plot No. 2. Thus, in general, the diurnal pattern of the wind speeds at Plot No. 2 was similar to that at Plot No. 1, except for a time lag of about one hour.

The surface wind speeds generally decreased during the afternoon hours and reached the average lower nighttime speeds by about 1800.

An example of the wind speed charts is shown in Figure 10 in which

Table 8

SUMMARY OF AVERAGE HOURLY WIND SPEEDS AT THE TWO LAND PLOTS FOR EACH OF THE SAMPLING PERIODS

Hour	6/15-6/20	7/13-7/21	8/10-8/16	9/3-9/7	10/3-10/6	11/9-11/13	12/1-12/10	1/6-1/17
				Plot No. 1				
1	3.0	1.6	1.8	(1.0)[a]	0.3	0.4	3.0	5.1
2	3.3	1.8	1.4	(1.0)	0.4	2.0	2.9	4.8
3	3.0	1.9	2.0	(1.0)	0.3	3.4	2.4	5.1
4	3.3	1.8	1.6	(1.0)	0.3	2.4	3.3	4.6
5	3.3	2.3	1.6	(1.0)	0.3	2.0	4.3	4.4
6	4.3	2.0	1.7	(1.0)	0.3	1.7	3.5	3.2
7	5.0	1.8	1.8	I.2	0.8	1.4	3.1	3.6
8	4.3	2.1	1.8	1.8	1.4	3.7	5.9	4.1
9	4.0	4.0	4.5	2.8	1.8	7.0	8.0	8.3
10	4.8	4.5	6.2	5.0	1.9	6.5	8.8	10.2
11	8.0	4.8	6.7	5.5	2.2	6.4	9.6	10.9
12	9.7	4.7	7.8	7.2	3.0	5.9	9.8	11.0
13	9.7	4.5	6.2	8.6	4.0	5.4	9.5	10.9
14	9.3	4.3	5.0	(9.2)	3.4	5.5	10.1	10.5
15	8.0	3.5	4.6	(7.7)	0.9	-	9.0	10.5
16	8.3	2.3	5.0	(5.8)	0.5	-	7.8	9.0
17	6.3	2.4	3.6	(4.5)	0.3	-	6.6	6.9
18	5.0	2.3	2.6	(3.4)	0.3	-	4.9	6.8
19	4.0	1.9	1.7	(2.4)	0.4	-	4.8	6.0
20	3.0	1.3	2.7	(1.4)	0.4	-	4.5	4.7
21	2.7	0.9	1.7	(1.2)	0.4	-	3.3	5.1
22	3.7	0.9	1.4	(1.0)	0.8	-	3.1	4.8
23	4.0	1.2	1.0	(1.0)	0.7	-	2.6	4.0
24	3.7	1.4	1.2	(1.0)	0.6	-	2.9	3.7

a Values in parentheses are estimated from hand-held anemometer measurements

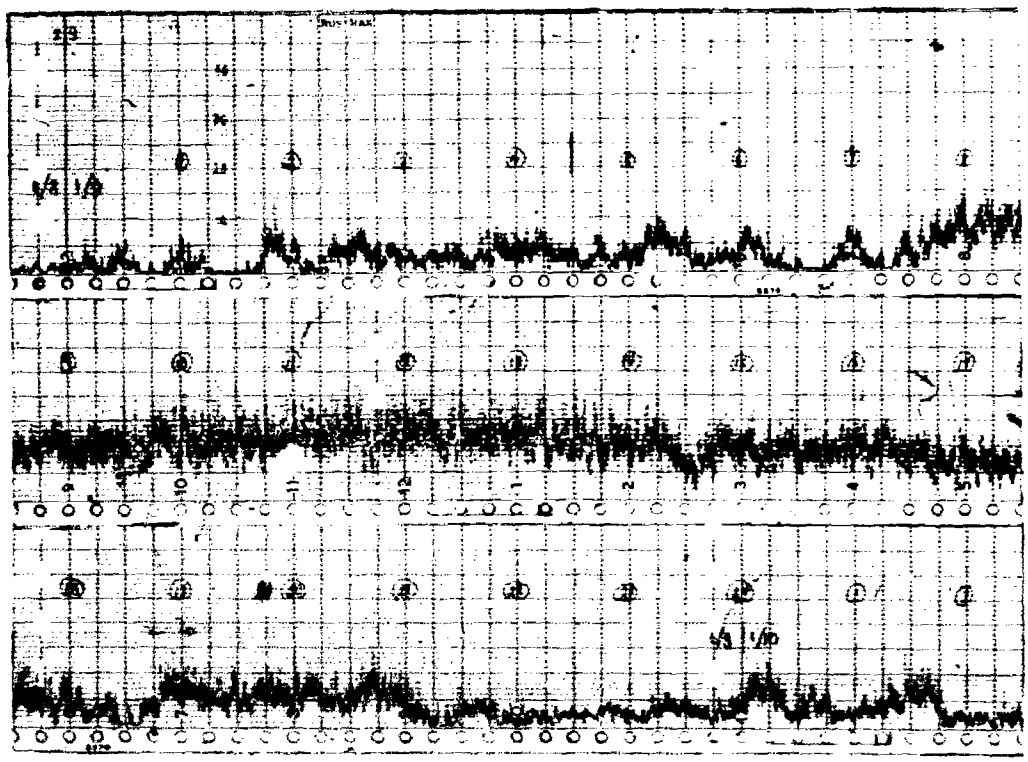
Table 8 (concluded)

Hour	6/15-6/20	7/13-7/21	8/10-8/17	9/2-9/8	10/3-10/6	11/9-11/13	12/1-12/10	1/6-1/13
				Plot No. 2				
1	1.1	1.1	0.3[a]	0.3	Data not	0.7	0.7	0.7
2	0.7	1.1	0.3	0.3	reduced	0.9	0.7	0.9
3	0.5	1.3	0.3	0.3	(No samples	1.4	0.9	1.0
4	0.9	1.5	0.4	0.3	taken)	1.3	1.0	0.9
5	1.4	1.7	0.4	0.3		1.3	1.5	1.0
6	1.0	1.4	0.3	0.3		1.2	1.3	1.0
7	0.7	1.3	0.3	0.3		1.0	1.1	0.7
8	1.4	1.2	0.4	0.3		1.0	1.6	0.9
9	1.8	1.8	0.8	0.6		2.2	2.6	2.6
10	2.6	2.2	2.0	1.0		2.8	3.2	3.0
11	5.0	2.6	2.5	1.4		4.8	3.9	3.1
12	4.4	4.6	2.8	2.2		4.6	3.8	2.9
13	5.0	4.6	3.0	1.8		4.2	3.6	3.6
14	4.0	3.8	1.6	1.1		3.5	3.6	3.7
15	2.5	3.2	1.5	0.5		1.5	2.6	3.0
16	2.4	2.6	0.7	0.7		2.4	1.8	2.1
17	2.0	1.8	0.6	0.6		1.0	0.9	1.6
18	1.0	1.8	0.3	0.3		1.2	0.6	0.9
19	0.6	1.5	0.4	0.3		1.3	0.7	0.7
20	1.0	1.1	0.3	0.3		0.7	0.7	0.4
21	0.5	1.2	0.4	0.3		0.8	0.6	0.6
22	0.6	1.4	0.4	0.4		1.6	0.9	0.7
23	0.7	1.3	0.3	0.3		1.1	0.8	0.8
24	0.7	1.1	0.3	0.3		0.6	0.7	0.7

a 0.3 mi/hr wind speed was assumed when the anemometer chart read zero

Figure 10

WIND SPEED CHART FOR JANUARY 9, 1965 AT PLOT NO. 1



the Rustrak recorder traces are reproduced for January 9, 1965 at Plot No. 1. The average hourly wind speeds were obtained from the charts by reading the centroid of the points for each 15-minute interval, taking the average of four consecutive readings, and tabulating these averages for each hour of the day.

The average wind speeds for each set of foliar samples or ground-collected gross samples of ceniza-arena were calculated by weighting the average hourly wind speeds by the hourly deposition rates; these average wind speeds are given by

$$\bar{v}_w^o = (1/\Delta m) \sum_i (\Delta m/\Delta t)_i v_i^o \Delta t \qquad (11)$$

where

$(\Delta m/\Delta t)_i$ is the deposition rate for the ith hour

v_i^o is the corrected average hourly wind speed (v_i is the average hourly wind speed as determined from the anemometer charts)

Δt is 1 hour or fraction thereof at the beginning or end of a sampling run

and

Δm is the total deposit for a set of samples.

The average wind speed for weathering periods was calculated from

$$\bar{v}_w^o = (1/t) \sum v_i^o \Delta t \qquad (12)$$

where t is the time of exposure of the foliar samples to wind-weathering for a set of weathered samples starting with the time at which the primary samples were taken.

Measurements of the wind speeds that were made occasionally with the calibrated hand-held anemometer (this anemometer was always mounted on a rod or post when in use) to obtain calibration data for the recording anemometers are summarized in Table 9. The average wind speed, measured over the time interval, Δt, with the hand-held anemometer is designated $\bar{v}_w^o$, and the average wind speed read from the recording anemometer charts for the same time interval is designated $\bar{v}_w$. (The latter is the same as v_i where the time interval is 1 hour and the time starts at 30 minutes before a given hour of the day.)

Table 9

SUMMARY OF WIND SPEED MEASUREMENTS WITH THE HAND-HELD ANEMOMETER AT A HEIGHT OF 3 FEET AND THE $\bar{v}^{o}_{w}/\bar{v}_{w}$ RATIOS

Date	End Time (hour)	Δt (min)	$\bar{v}^{o}_{w}$ (mi/hr)	$\bar{v}_{w}$ (mi/hr)	$\bar{v}^{o}_{w}/\bar{v}_{w}$
		Plot No. 1			
9/7	0941	20	7.8	5.8	1.34
9/7	0957	14	8.7	8.0	1.09
9/7	1005	7	9.9	9.9	1.00
9/7	1011	5	9.0	9.0	1.00
9/7	1028	16	9.0	8.6	1.05
9/7	1038	7	8.3	7.1	1.17
9/7	1107	28	9.6	9.2	1.04
9/7	1029	19	9.6	9.0	1.07
9/7	1136	6	10.4	9.8	1.06
10/4	1636	2	1.1	>0.0	-
10/4	1640	3	0.89	>0.0	-
10/4	1651	10	0.84	>0.0	-
10/4	1657	4	1.2	>0.0	-
10/4	1703	5	1.6	>0.0	-
10/4	1712	9	1.4	>0.0	-
10/4	1726	13	0.91	>0.0	-
10/4	1728	1	0.95	>0.0	-
10/4	1730	1	0.93	>0.0	-
10/4	1734	2	1.9	>0.0	-
10/4	1738	3	3.4	>0.0	-
10/4	1740	1	2.6	>0.0	-
10/6	0650	33	3.7	0.9	4.11
10/6	0728	2	4.5	>0.0	-
10/6	0730	2	4.4	>0.0	-
10/6	0740	10	3.8	0.5	7.60
10/6	0754	13	4.1	0.3	13.7
10/6	0811	16	2.6	0.2	13.0
10/6	0823	11	2.2	0.2	10.8
10/6	0840	16	1.5	2.4	0.62
10/6	0851	10	7.7	3.9	1.97
10/6	0858	6	6.7	2.8	2.39
10/6	0905	6	7.7	4.3	1.79
10/6	0915	10	7.9	5.7	1.38

Table 9 (continued)

Date	End Time (hour)	Δt (min)	$\bar{v}_w^o$ (mi/hr)	$\bar{v}_w$ (mi/hr)	$\bar{v}_w^o/\bar{v}_w$
		Plot No. 1 (continued)			
10/6	0952	27	5.5	5.1	1.08
10/6	0957	2	9.1	6.4	1.42
10/6	0959	2	9.2	6.0	1.53
10/6	1131	11	6.6	3.8	1.74
10/6	1142	10	6.5	4.4	1.48
10/6	1159	16	6.6	5.9	1.12
10/6	1211	11	8.3	6.6	1.26
10/6	1222	10	6.6	4.7	1.40
10/6	1243	20	8.1	5.7	1.42
10/6	1257	13	9.8	6.9	1.42
10/6	1325	27	10.4	8.4	1.24
10/6	1337	11	10.2	8.7	1.17
10/6	1344	6	10.7	8.8	1.22
10/6	1347	2	8.7	7.4	1.88
10/6	0730	60[a]	4.0	1.2	3.32
10/6	0830	60[a]	2.5	0.6	4.18
10/6	0930	60[a]	6.2	4.4	1.41
10/6	1030	60[a]	7.1	5.9	1.21
10/6	1130	60[a]	6.8	4.9	1.38
10/6	1230	60[a]	7.1	5.2	1.37
10/6	1330	60[a]	9.6	7.5	1.28
12/2	0740	3	9.6	6.2	1.54
12/2	0743	3	9.6	6.5	1.47
12/2	0800	17	7.6	5.9	1.29
12/2	0814	13	8.8	6.4	1.38
12/2	0828	12	6.5	5.4	1.21
12/2	0900	30	9.1	7.6	1.20
12/2	0922	18	9.8	8.4	1.16
12/2	0935	13	9.2	8.5	1.08
12/3	0920	15	8.0	7.6	1.05
12/3	0936	15	8.9	7.9	1.13
12/3	0952	15	8.5	7.5	1.14

a Based on average hourly wind speeds

Table 9 (concluded)

Date	End Time (hour)	Δt (min)	$\bar{v}^{o}_{w}$ (mi/hr)	$\bar{v}_{w}$ (mi/hr)	$\bar{v}^{o}_{w}/\bar{v}_{w}$
		Plot No. 1 (concluded)			
12/3	1008	15	9.4	8.4	1.12
12/3	1023	15	10.0	9.4	1.06
12/3	1039	16	10.4	9.5	1.09
12/3	1046	7	9.1	8.6	1.06
12/3	1108	15	10.4	9.9	1.05
12/3	1130	15	10.8	10.0	1.08
12/3	1145	15	9.4	8.9	1.06
12/3	1200	15	10.2	9.4	1.08
12/3	1210	10	10.2	9.5	1.07
12/4	0800	6.33	3.2	1.1	2.95
12/4	0815	15	6.9	-	-
12/4	0832	15	9.8	-	-
12/4	0848	15	10.2	-	-
12/5	0706	15	7.1	-	-
12/5	0725	19	6.2	-	-
12/5	0740	15	6.3	5.4	1.16
12/9	0702	15	2.7	1.0	2.66
12/9	0710	8	6.2	3.8	1.64
		Plot No. 2			
1/7	1120	30	5.2	2.8	1.86
2/9	1345	15	11.7	8.3	1.41
2/9	1401	15	10.6	7.8	1.36
2/9	1431	30	9.7	6.6	1.47
2/9	1501	30	10.0	6.3	1.58
2/9	1531	30	7.4	4.2	1.75
2/10	0800	30	3.6	1.6	2.22
2/10	0830	30	4.7	2.2	2.13
2/10	0900	30	5.8	3.3	1.77
2/10	0930	30	6.3	3.8	1.66
2/10	1000	30	8.8	4.6	1.91
2/10	1030	30	8.1	5.4	1.50
2/10	1100	30	6.2	3.6	1.72
2/10	1115	15	9.1	6.0	1.51

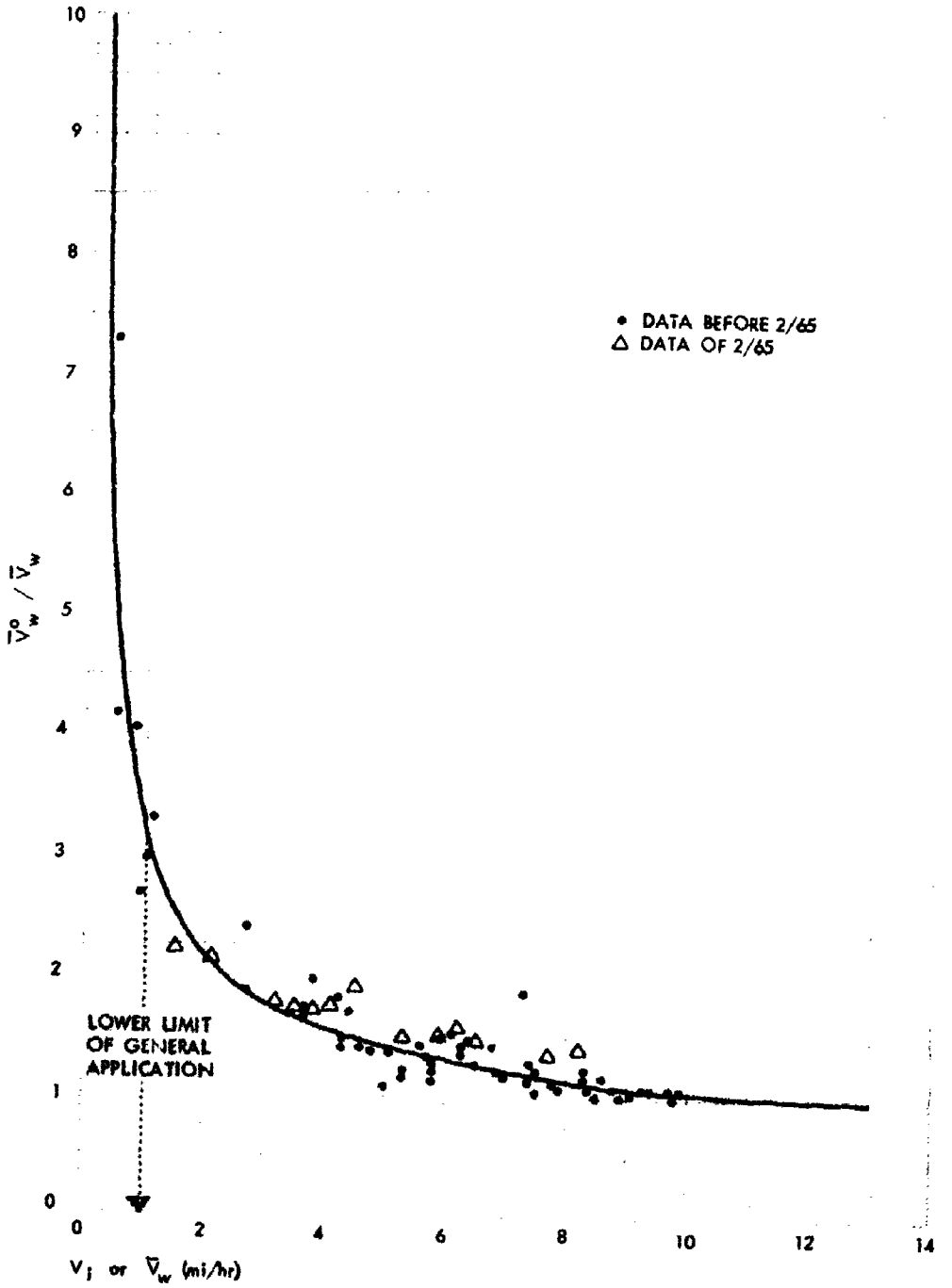
The wind speed measurements given in Table 9 for October 4 show that a wind speed of about 2 mi/hr was required to overcome the inertia of the anemometer and start it rotating. Except for the nighttime calm conditions, which were initially assigned a wind speed of 0.3 mi/hr (see Appendix B), wind gusts greater than 2 mi/hr usually occurred within any time interval exceeding 5 minutes. These gusts would be recorded and could be taken into account in the wind speed averages, so that chart-read average wind speeds of less than 2 mi/hr were possible for any interval of time. When a gust of wind started the anemometer, winds with speeds less than 2 mi/hr would keep it spinning for some period of time. Subsequent measurements of the drift speed of smoke puffs under calm conditions (no anemometer movement) gave average surface wind speeds nearer 0.7 mi/hr than 0.3 mi/hr.

The $\bar{v}_w^o/\bar{v}_w$ ratios from Table 9 are shown as a function of $\bar{v}_w$ in Figure 11. The values of v_i^o in Equations 11 and 12 are determined from $(\bar{v}_w^o/\bar{v}_w)v_i$ where $\bar{v}_w^o/\bar{v}_w$ is read from the curve in Figure 11. The ratios indicate that the recording anemometer chart readings (as averages over time intervals up to 1 hour) did not indicate the same average wind speed as that obtained from the calibrated hand-held anemometer until the wind speed was about 12 mi/hr or greater. The limit of application of the curve in Figure 11 for correcting the average chart readings is set at a $\bar{v}_w$ (or v_i) value of 1 mi/hr since, to obtain an average speed of 1 mi/hr, the anemometer would be spinning most of the time. Tabulated corresponding values of $\bar{v}_w$ and $\bar{v}_w^o$ taken from the curve are as follows:

$\bar{v}_w$ (mi/hr)	$\bar{v}_w^o$ (mi/hr)	$\bar{v}_w$ (mi/hr)	$\bar{v}_w^o$ (mi/hr)
0.5	2.9	7.0	8.6
1.0	3.4	7.5	9.0
1.5	3.9	8.0	9.3
2.0	4.4	8.5	9.6
2.5	4.9	9.0	9.8
3.0	5.4	9.5	10.2
3.5	5.9	10.0	10.5
4.0	6.3	10.5	10.8
4.5	6.7	11.0	11.2
5.0	7.2	11.5	11.7
5.5	7.6	12.0	12.1
6.0	8.0	12.5	12.6
6.5	8.3	13.0	13.0

Figure 11

WIND SPEED CORRECTION CURVE FOR RECORDING ANEMOMETER



The recording anemometer height of 8 ft was selected to minimize the effect of the plants and ground on the observed wind speeds. The effect of the plants on the wind speed is illustrated by a set of measurements of the wind speed at the height of several plant species, as summarized in Table 10. The average value of $\bar{v}_w^o(h)/\bar{v}_w^o(h_o)$, where $\bar{v}_w^o(h)$ is the wind speed measured with the calibrated anemometer at the height of the cereal grains in the center of the subplots and $\bar{v}_w^o(h_o)$ is the corrected average wind speed read from the recording anemometer charts, was 0.55. The wind speeds measured at the height of the cereal grains appear to be independent of the height of the measurement above ground level. The data indicate that the wind speeds at the locations where the falling particles first impact with the vegetation are between 0.5 to 0.6 of the speeds measured at the height of 8 ft.

Plate Collector Measurements

Twenty-two sets of plate collector measurements were made during the sampling periods from July 1964 through January 1965. The exposure period for the sets ranged from 6 minutes to about 8 hours, but most of the exposures were for less than 1 hour. Except for two overnight exposures, the average wind speed during the exposure was measured with the calibrated hand-held anemometer, and the exposure time was measured with a calibrated stopwatch. The weight measurements of the particles recovered from the plates and the exposure times for each set are summarized in Table 11. The plate deposit densities, corrected for background dust, and the average wind speed during the exposure period are given in Table 12. The average deposit density of the background dust was determined from the collections on the bottom or back side of the plates set at 0, 90, 120, 150, and 180 degrees; if the weight of the particles on the protected side of the plates set at 30 and 60 degrees was equal to or less than the largest background weight on the five other plates, it was also included in the average. The data from three sets for three different wind speeds are plotted in Figure 12. None of the curves can be represented or approximated by a sine function as might be described by Equation 4 with a constant value for the impaction coefficient.

The particles recovered from most of the plate collector sets were sieve-analyzed to determine the weight distributions. The samples recovered from each plate were sieve-analyzed separately when the samples were large enough to do so; the results for these plates are summarized in Table 13. The single plate data show that the distributions varied to some extent from one plate to another; however, no pattern of variation in the shape of the distribution curves with plate angle or with size of sample is readily apparent from the data.

Table 10

WIND SPEED MEASUREMENTS AT PLANT HEIGHTS: PLOT NO. 1

Date	End Time	Δt (min)	$\bar{v}^{o}_{w}(h)$ (mi/hr)	$\bar{v}^{o}_{w}(h_o)$ (mi/hr)	$\bar{v}^{o}_{w}(h)/\bar{v}^{o}_{w}(h_o)$
			1. Wheat (h = 18 inches)		
7/14	0922	1	3.7	6.7	0.55
7/14	0924	1	3.1	6.3	0.49
7/14	0926	1	3.7	6.5	0.57
7/14	0932	1	4.0	7.2	0.56
			2. Wheat (h = 16 inches)		
7/14	0944	10	2.9	6.7	0.43
7/14	0955	10	3.8	6.3	0.60
7/14	1016	20	4.2	8.0	0.52
7/14	1037	20	3.8	7.2	0.53
			3. Bean (h = 14 inches)		
7/14	1049	10	5.0	8.1	0.62
			4. Wheat (h = 18 inches)		
7/15	1120	10	4.2	7.6	0.55
7/15	1146	26	3.6	6.7	0.54
7/15	1158	10	4.2	7.6	0.55
7/15	1236	37	4.2	7.2	0.58
			5. Rye (h = 6 inches)		
7/18	0835	12	4.2	8.0	0.52
7/18	0848	12	4.2	7.6	0.55
7/18	0904	15	3.6	7.2	0.50
7/18	0925	20	4.2	8.0	0.52

Table 10 (concluded)

Date	End Time	Δt (min)	$\bar{v}_w^o(h)$ (mi/hr)	$\bar{v}_w^o(h_o)$ (mi/hr)	$\bar{v}_w^o(h)/\bar{v}_w^o(h_o)$
			6. Wheat (h = 21 inches)		
7/18	0945	17	4.8	8.3	0.58
7/18	1011	25	4.7	7.2	0.65
7/18	1022	10	4.4	8.0	0.55
7/18	1138	75	4.6	8.0	0.58

Table 11

SUMMARY OF PLATE COLLECTOR MEASUREMENTS

Set Number	Side of Plate	m_o (gm/sq ft)[a] Plate Angle (degrees) 0	30	60	90	120	150	180	Exposure Time (min)
1	Top[b]	0.0344	0.0172	0.0183	0.02705	0.2705	0.7295	0.0504	-
	Bottom	0.0160	0.0344	0.2154	0.0115	0.0149	0.0115	0.0183	
2	Top	0.1008	0.0711	0.0745	0.7025	0.6567	0.3472	0.0848	60
	Bottom	0.0321	0.2063	0.4286	0.0172	0.0115	0.0092	0.0344	
3	Top	0.0483	0.0160	0.0160	0.0779	0.1077	0.0928	0.0492	72
	Bottom	0.0115	0.0160	0.0413	0.0080	0.0172	0.0138	0.0000	
4	Top	0.1788	0.1730	0.0745	0.1112	0.2097	0.2430	0.2223	24
	Bottom	0.0183	0.0206	0.0344	0.0160	0.0115	0.0080	0.0046	
5	Top	0.1490	0.0779	0.0504	0.1513	0.2418	0.2372	0.1536	30
	Bottom	0.0080	0.0206	0.0562	0.0138	0.0138	0.0115	0.0080	
6	Top	13.57	2.808	-	23.49	30.52	27.28	13.64	675
	Bottom	-	-	5.689	-	-	-	-	
7	Top	0.5042	0.3278	0.1329	0.0974	0.3278	0.4962	0.3713	10
	Bottom	0.0080	0.0138	0.0206	0.0103	0.0080	0.0126	0.0149	

a m_o is the measured weight divided by the plate area (0.08726 sq ft)

b Front face for the plate angle of 90 degrees

Table 11 (continued)

Set Number	Side of Plate	m_o (gm/sq ft)[a] Plate Angle (degrees) 0	30	60	90	120	150	180	Exposure Time (min)
8	Top[b]	0.2212	0.0699	0.0103	0.3610	0.5764	0.4848	0.1971	10
	Bottom	0.0069	0.0172	0.0951	0.0080	0.0103	0.0069	0.0092	
9	Top	0.1490	0.0367	0.0126	0.5272	0.6429	0.3427	0.1226	9
	Bottom	0.0057	0.0447	0.2097	0.0138	0.0126	0.0069	0.0115	
10	Top	0.0539	0.0057	0.0069	0.2808	0.3954	0.1536	0.0539	16
	Bottom	0.0046	0.0275	0.0963	0.0057	0.0080	0.0057	0.0069	
11	Top	0.0367	0.0264	0.0183	0.4114	0.3152	0.1112	0.0390	28
	Bottom	0.0069	0.0298	0.1604	0.0194	0.0046	0.0034	0.0011	
12	Top	0.1020	0.0504	0.0309	0.0619	0.1387	0.1341	0.0882	33
	Bottom	0.0034	0.0057	0.0126	0.0046	0.0034	0.0034	0.0069	
13	Top	0.0424	0.0241	0.0298	0.2086	0.1857	0.0951	0.0413	27
	Bottom	0.0069	0.0252	0.0837	0.0103	0.0103	0.0092	0.0069	
14	Top	0.0291	0.0166	0.0156	0.0302	0.1139	0.0536	0.0252	12
	Bottom	0.0077	0.0268	0.0898	0.0138	0.0154	0.0154	0.0092	
15	Top	0.0364	0.0260	0.0176	0.3179	0.2481	0.1060	0.0551	60
	Bottom	0.0264	0.0724	0.2032	0.0123	0.0253	0.0346	0.235	

a m_o is the measured weight divided by the plate area (0.08726 sq ft)
b Front face for the plate angle of 90 degrees

Table 11 (concluded)

Set Number	Side of Plate	m_o (gm/sq ft)[a] Plate Angle (degrees) 0	30	60	90	120	150	180	Exposure Time (min)
16	Top[b]	0.0322	0.0096	0.0094	0.4325	0.3264	0.1117	0.0308	45
	Bottom	0.0102	0.0714	0.2642	0.0096	0.0155	0.0135	0.0165	
17	Top	1.1861	0.4446	0.2773	1.6468	2.4261	2.2049	0.1827	1,050
	Bottom	0.0046	0.0481	0.3633	0.0221	0.0138	0.0229	0.0241	
18	Top	0.5203	0.1799	0.1043	1.0474	1.3912	1.0807	0.4699	10
	Bottom	0.0115	0.0539	0.3919	0.0229	0.0183	0.0155	0.0126	
19	Top	0.1008	0.0481	0.0252	0.1306	0.2372	0.2474	0.1490	43
	Bottom	0.008[illegible]	0.0103	0.0355	0.0092	0.0092	0.0103	0.0080	
20	Top	0.1272	0.0252	0.0126	0.8733	0.9718	0.5673	0.1799	80
	Bottom	0.0172	0.1719	0.4859	0.0115	0.0080	0.0092	0.0160	
21	Top	0.0562	0.0275	0.0149	0.1639	0.1925	0.1341	0.0573	30
	Bottom	0.0115	0.0241	0.0848	0.0069	0.0160	0.0069	0.0155	
22	Top	0.7529	0.2441	0.0550	0.3358	1.1460	1.5551	0.7953	5
	Bottom	0.0172	0.0275	0.0596	0.0183	0.0026	0.0092	0.0115	

a m_o is the measured weight divided by the plate ar3a (0.08726 sq ft)
b Front face for the plate angle of 90 degrees

Table 12

SUMMARY OF CORRECTED PLATE COLLECTOR DATA

Set Number	Side of Plate	m(gm/sq ft)[a] Plate Angle (degrees) 0	30	60	90	120	150	180	Background (gm/sq ft)	$\bar{v}_w^o$ (ft/sec)
1	Top[b]	0.0190	-	-	0.2551	0.2551	0.1141	0.0350	0.0154	6.0
	Bottom		0.0190	0.2000						
2	Top	0.0799	0.0502	0.0536	0.6816	0.6358	0.3263	0.0639	0.0209	7.3
	Bottom		0.1854	0.4077						
3	Top	0.0367	0.004	-	0.0663	0.0961	0.0812	0.0377	0.0116	8.5
	Bottom		0.0044	0.0297						
4	Top	0.1671	0.1613	0.0628	0.0995	0.1980	0.2313	0.2106	0.0117	1.9
	Bottom		0.0089	0.0227						
5	Top	0.1380	0.0669	0.0394	0.1403	0.2308	0.2262	0.1426	0.0110	2.3
	Bottom		0.0096	0.0452						
6[c]	Top	13.56	2.797	-	23.48	30.51	27.27	13.63	0.011[d]	3.5[d]
	Bottom			5.678						
7	Top	0.4913	0.3149	0.1200	0.0845	0.3149	0.4833	0.3584	0.0129	2.0
	Bottom			0.0077						

a Inverse plate area is 11.46 ft^{-2}; m is the measured weight minus the background weight

b Front face for plate angle of 90 degrees

c Overnight exposure

d Estimated values

Table 12 (continued)

Set Number	Side of Plate	m(gm/sq ft)[a] Plate Angle (degrees) 0	30	60	90	120	150	180	Background (gm/sq ft)	$\bar{V}_w^o$ (ft/sec)
8	Top[b]	0.2126	0.0613	-	0.3524	0.5678	0.4762	0.1885	0.0086	7.1
	Bottom		0.0086	0.0865						
9	Top	0.1385	0.0262	-	0.5167	0.6324	0.3322	0.1121	0.0105	9.7
	Bottom		0.0342	0.1992						
10	Top	0.0477	-	-	0.2746	0.3892	0.1474	0.0477	0.0062	13.2
	Bottom		0.0213	0.0901						
11	Top	0.0277	0.0174	-	0.4024	0.3062	0.1022	0.0300	0.0090	14.0
	Bottom		0.0208	0.1514						
12	Top	0.0974	0.0458	0.0263	0.0573	0.1341	0.1295	0.0836	0.0046	5.4
	Bottom			0.0080						
13	Top	0.0337	0.0154	0.0211	0.1999	0.1770	0.0864	0.0326	0.0087	11.9
	Bottom		0.0165	0.0750						
14	Top	0.0168	0.0043	0.0033	0.1179	0.1016	0.0413	0.0129	0.0123	9.2
	Bottom		0.0145	0.0775						
15	Top	0.0127	-	-	0.2942	0.2244	0.0823	0.0314	0.0237	14.4
	Bottom		0.0487	0.1785						

a Inverse plate area is 11.46 ft^{-2}; m is the measu d weight minus the background weight

b Front face for plate angle of 90 degrees

Table 12 (concluded)

Set Number	Side of Plate	m(gm/sq ft)[a] Plate Angle (degrees) 0	30	60	90	120	150	180	Background (gm/sq ft)	$\bar{v}_w^o$ (ft/sec)
16	Top[b]	0.0202	-	-	0.4205	0.3144	0.0997	0.0188	0.0120	14.8
	Bottom		0.0594	0.2522						
17[c]	Top	1.1686	0.4271	0.2598	1.6293	2.4086	2.1874	1.1652	0.0175	2.9[d]
	Bottom		0.0306	0.3458						
18	Top	0.5049	0.1645	0.0889	1.0320	1.3758	1.0653	0.4545	0.0154	11.2
	Bottom		0.0385	0.3765						
19	Top	0.0916	0.0389	0.0160	0.1214	0.2280	0.2372	0.1398	0.0092	4.7
	Bottom			0.0263						
20	Top	0.1148	0.0128	-	0.8609	0.9594	0.5549	0.1675	0.0124	11.3
	Bottom		0.1595	0.4735						
21	Top	0.0449	0.0162	-	0.1526	0.1812	0.1228	0.0460	0.0113	7.6
	Bottom		0.0128	0.0735						
22	Top	0.7391	0.2303	0.0412	0.3220	1.1322	1.5413	0.7815	0.0138	5.8[d]
	Bottom		0.0137	0.0458						

a Inverse plate area is 11.46 ft^{-2}; m is the measured weight minus the background weight
b Front face for plate angle of 90 degrees
c Overnight exposure
d Estimated values

Figure 12

VARIATION OF PLATE COLLECTOR DEPOSITS WITH PLATE ANGLE

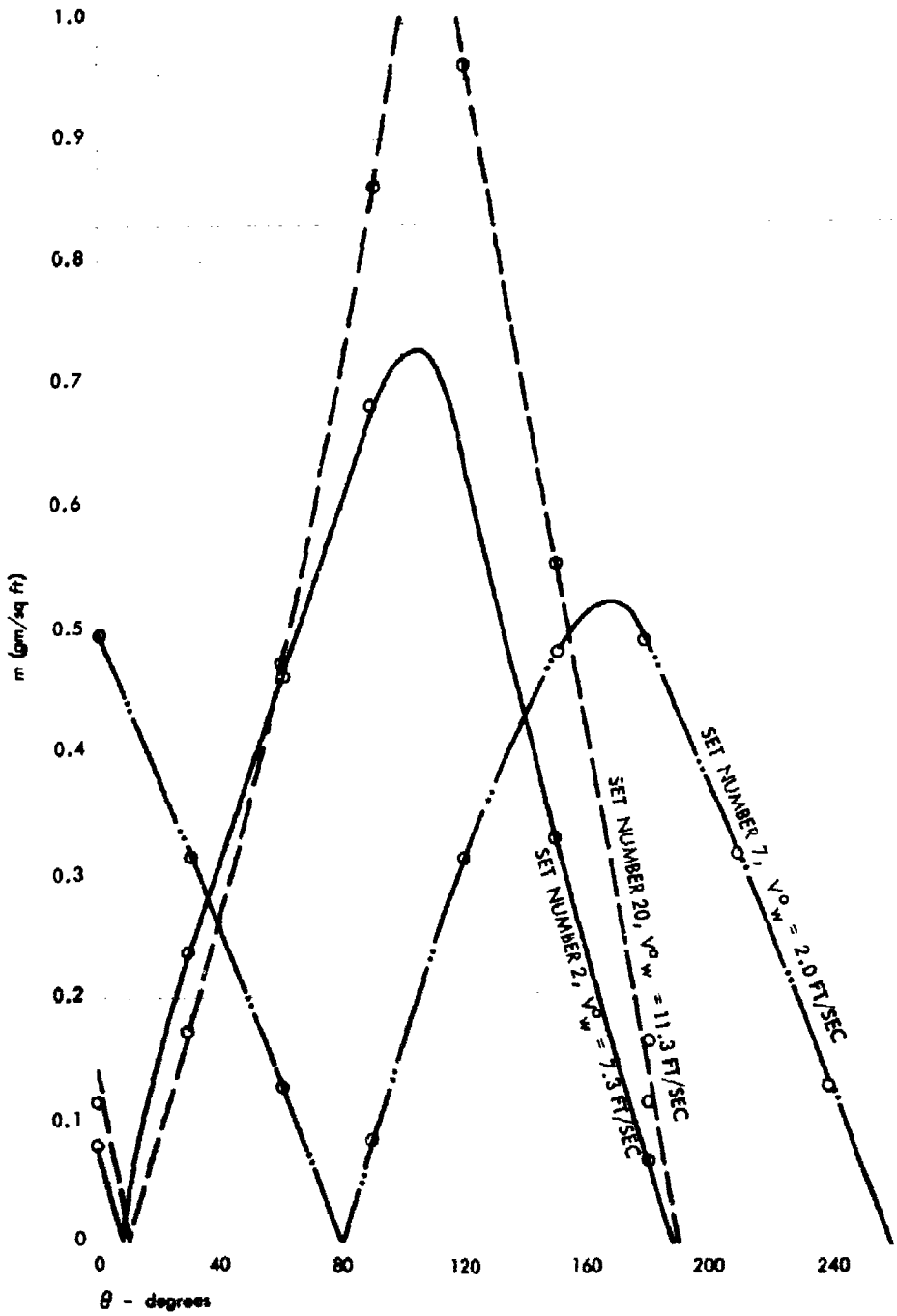


Table 13

WEIGHT DISTRIBUTION OF PARTICLES RECOVERED FROM THE PLATE COLLECTOR (SINGLE PLATE)

Set Number	Plate Angle (degrees)	Accumulated Weight Distribution in Percent (particle diameter in microns) 46	105	250	>250	d_{50}[a] (microns)	w_c (mg)
1	0,180	7.69	69.2	89.7	100	85	10.4
	30	Nil	83.3	100	-	(90)	4.5
	60	29.3	87.8	100	-	60	20.4
	90	19.0	84.8	98.4	100	67	24.6
	120	10.5	79.0	100	-	76	24.9
	150	15.5	81.7	97.2	100	71	12.3
2	0,180	44.3	85.7	97	100	51	22.0
	30	35.8	97.4	100	-	53	24.2
	60	42.2	97.0	100	-	50	43.9
	90	42.4	95.2	100	-	50	62.8
	120	39.8	96.0	100	-	51	58.3
	150	53 6	97.9	100	-	44	31.1
4	0,180	28.6	98.3	100	-	55	35.0
	30	26.8	95.1	100	-	58	15.1
	60	22.4	97.0	100	-	58	9.5
	90	21.3	94.7	100	-	60	9.7
	120	24.8	99.4	100	-	55	18.3
	150	25.4	98.2	100	-	56	21.2
5	0,180	37.7	99.1	100	-	50	26.4
	30	32.6	95.6	100	-	55	6.8
	60	37.1	98.6	100	-	51	9.3
	90	32.4	100.0	-		(50)	13.2
	120	34.5	100.0	-	-	(49)	21.1
	150	35.1	98.8	100	-	52	20.7
6	0,180	39.4	82.3	100	-	56	2374.0
	30	42.9	84.5	100	-	52	245.0
	60	52.4	94.0	100	-	44	496.4
	90	37.2	83.4	100	-	57	2049.8
	120	35.2	77.0	100	-	62	2662.8
	150	33.7	79.5	100	-	61	2380.4

a Assuming a log normal weight distribution for diameters between about 30 and 105 microns; values in parentheses are estimated values

Table 13 (continued)

Set Number	Plate Angle (degrees)	Accumulated Weight Distribution in Percent (particle diameter in microns) 46	105	250	>250	d_{50}[a] (microns)	w_c (mg)
7	0,180	43.7	92.3	100	-	50	76.4
	30	42.3	91.9	100	-	51	28.6
	60	34.7	91.6	100	-	55	13.4
	90	43.3	96.7	100	-	50	8.5
	120	40.8	98.5	100	-	50	28.6
	150	41.6	90.3	100	-	52	43.3
8	0,180	41.0	80.4	100	-	55	36.5
	30	37.5	95.8	100	-	51	7.6
	60	50.0	98.0	100	-	46	8.3
	90	55.9	89.5	100	-	41	31.5
	120	46.8	81.4	100	-	49	50.3
	150	48.6	80.9	100	-	48	42.3
9	0,180	60.4	89.8	100	-	37	23.7
	30	46.0	96.0	100	-	48	7.1
	60	61.4	94.3	100	-	41	18.3
	90	59.7	90.6	100	-	38	46.0
	120	55.7	88.4	100	-	41	56.1
	150	60.6	88.3	100	-	36	29.9
10	0,180	31.8	77.3	100	-	63	9.4
	30	44.4	88.9	100	-	50	2.4
	60	36.9	80.0	100	-	58	8.4
	90	61.9	78.8	100	-	28	24.5
	120	38.0	75.1	100	-	60	34.5
	150	35.6	74.3	100	-	62	13.4
11	0,180	27.9	76.7	100	-	66	6.6
	30	29.4	94.1	100	-	57	4.9
	60	40.7	89.8	100	-	52	14.0
	90	41.5	83.8	100	-	54	35.9
	120	39.2	81.4	100	-	56	27.5
	180	40.0	83.8	100	-	55	9.7
12	0,180	21.1	95.2	100	-	60	16.6
	30	9.68	90.3	100	-	70	4.4
	60	21.0	95.2	100	-	60	2.7

a Assuming a log normal weight distribution for diameters between about 30 and 105 microns; values in parentheses are estimated values

Table 13 (concluded)

Set Number	Plate Angle (degrees)	Accumulated Weight Distribution in Percent (particle diameter in microns) 46	105	250	>250	d_{50}[a] (microns)	w_c (mg)
12	90	24.7	97.3	100	-	57	5.4
	120	8.33	95.8	100	-	66	12.1
	150	32.9	97.3	100	-	54	11.7
13	0,180	30.1	84.9	98.6	100	60	7.3
	30	13.6	81.8	100	-	72	4.3
	60	34.2	89.6	99.3	100	54	7.3
	90	41.2	87.8	100	-	53	18.2
	120	33.3	86.0	100	-	58	16.2
	150	36.2	87.2	100	-	56	8.3
		(particle diameter in microns) 44	88	175	295	>295	
14	60	18.5	93.8	99.9	100	-	57	9.2
	90	30.8	100	-	-	-	~48	11.4
	120	17.1	92.7	97.6	100	-	58	9.9
15	60	39.6	89.2	100	-	-	50	19.3
	90	27.5	84.1	100	-	-	57	28.8
	120	42.2	85.3	99.5	100	-	49	26.8
16	60	38.7	83.1	90.9	94.6	100	51	23.9
17	0,180	47.1	91.5	98.5	99.3	100	46	209.2
	30	36.9	84.7	95.2	97.0	100	52	43.0
	60	44.4	93.4	96.8	98.5	100	47	55.9
	90	44.2	93.5	99.1	99.3	100	47	146.5
	120	44.8	90.4	99.1	99.5	100	47	212.9
	150	40.6	79.0	87.6	99.4	100	52	194.4
18	0,180	28.6	73.8	96.3	97.5	100	61	88.5
	30	23.8	74.6	100	-	-	62	20.4
	60	31.5	81.6	94.5	96.6	100	56	43.3
	90	30.3	90.7	98.8	98.7	100	53	93.4
	120	27.9	78.3	99.3	99.8	100	59	123.0
	150	28.9	73.9	98.0	98.9	100	61	95.3
22	0	36.0	60.0	87.3	98.6	100	67	65.7
	150	39.6	60.3	84.9	99.0	100	63	135.7

a Assuming a log normal weight distribution for diameters between about 30 and 105 microns; values in parentheses are estimated values

The data for the gross weight distribution of the particles recovered from all the plates in all sets except Set No. 19 are summarized in Table 14; weight distribution curves of the particles recovered from the plates in several sample sets are shown in Figure 13. The values of d_{min}, d_{50}, and d_{max} given in Table 14 for the particles from all the sample sets were estimated from distribution curves that were constructed similarly to those shown in Figure 13. Even though the curves differ greatly from each other, the median diameter for the particles from all the sets is near 50 microns.

The shape of most of the weight distribution curves, as shown by those for Set Nos. 3, 14, and 16, indicates the presence of two distributions in the sieved sample. The second distribution was presumably formed during the sieve analysis by the breakage of agglomerated particles into their basic soil or mineral grain sizes. As a first approximation, the curves indicate that, for Set No. 3, about 80 percent of the weight was in the form of agglomerated particles and, for Set Nos. 14 and 16, about 99 percent of the weight arrived on the plates in the form of agglomerated particles.

Thus, the median diameter of the particles obtained from the sieve analysis probably reveals only the median diameter of the original soil grains that were ejected from the volcano and not the diameter of the larger agglomerated particles that impacted on the plate collectors. In most cases, the median diameters of the falling particles probably varied from about 100 to 1,000 microns, rather than from about 40 to 70 microns as shown by the data in Table 14.

During the exposure of four sets of plates, simultaneous collections of ceniza-arena were made at ground level. The surface density of the deposit collected in the trays and that for the plates at angles of 0 and 180 degrees is as follows:

Set Number	m (gm/sq ft) Tray	Plate at 0 Degrees	Plate at 180 Degrees
1	0.132	0.0190	0.0350
3	0.104	0.0367	0.0377
4	0.151	0.167	0.211
5	0.159	0.138	0.143

Table 14

WEIGHT DISTRIBUTION OF PARTICLES RECOVERED FROM THE PLATE COLLECTOR (ALL PLATES)

Set Number	Accumulated Weight Distribution in Percent (particle diameter in microns) 46	105	250	>250	d_{min} (microns)	d_{50} (microns)	d_{max} (microns)	$\bar{v}_f$ [a] (ft/sec)
1	16.3	81.9	98.4	100	32	68	380	1.24
2	42.8	95.5	99.84	100	30	49	320	0.73
4	26.0	97.7	100	100	41	50	170	0.76
5	35.4	99.09	100	100	37	50	210	0.76
6	37.2	81.1	100	100	33	52	240	0.81
7	42.1	92.8	100	100	36	48	200	0.71
8	47.7	83.6	100	100	31	47	240	0.68
9	58.4	89.9	100	100	30	43	243	0.58
10	44.2	76.9	98.7	100	29	49	280	0.73
11	39.3	84.0	100	100	33	50	240	0.76
12	20.2	95.6	100	100	32	60	135	1.02
13	34.4	87.7	99.75	100	34	51	260	0.78
	(particle diameter in microns) 44	88	175	295	>295			
3	45.2	62.5	71.8	89.1	100	7	52	430	0.81
14	26.8	93.7	99.01	100	100	35	50	290	0.76
15	43.9	86.6	99.88	100	100	10	48	185	0.71

a Applicable to d_{50} for a spherical particle falling in air at an altitude of 6,000 to 10,000 ft msl

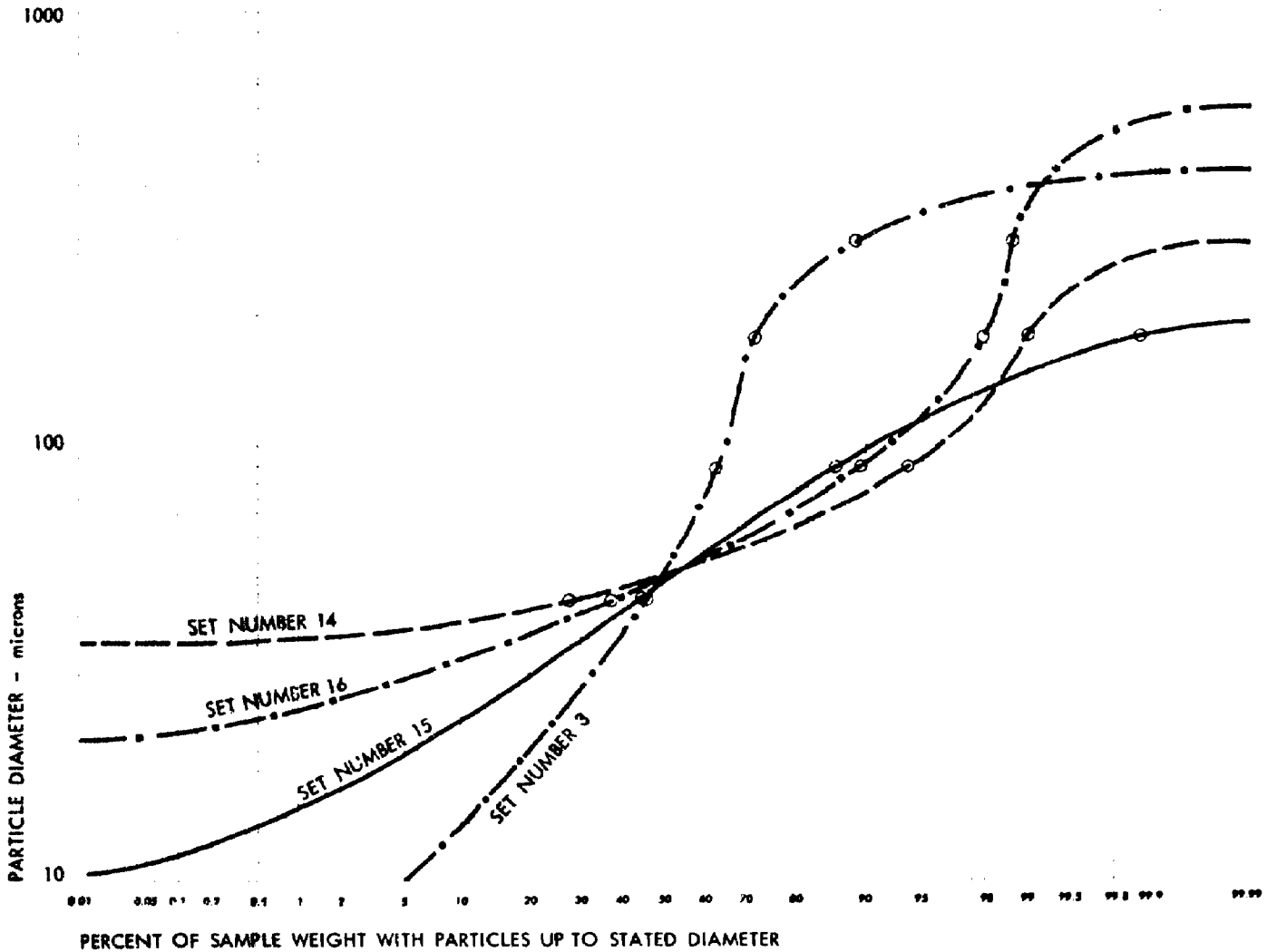
Table 14 (concluded)

Set Number	Accumulated Weight Distribution in Percent (particle diameter in microns) 44	88	175	295	>295	d_{min} (microns)	d_{50} (microns)	d_{max} (microns)	$\bar{v}_f$ [a] (ft/sec)
16	36.5	89.1	97.9	98.7	100	21	50	600	0.76
17	43.6	88.0	95.6	95.19	100	18	47	350	0.68
18	28.9	78.9	97.8	98.6	100	16	58	700	0.97
20	48.3	89.4	98.9	100	100	32	45	230	0.63
21	22.8	72.9	99.20	100	100	29	62	190	1.05
22	38.8	64.2	88.5	99.42	100	4	60	320	1.02

a Applicable to d_{50} for a spherical particle falling on air at an altitude of 6,000 to 10,000 ft msl

Figure 13

WEIGHT DISTRIBUTION CURVES FOR SEVERAL PLATE COLLECTOR SAMPLES



For Set Nos. 1 and 3, the surface density of particles on the horizontal plates was one-third or less of the density of particles collected in the tray. For Set Nos. 4 and 5, the surface density of particles on the plates was within about 10 percent of the density of the tray collection. The wind speeds, from Table 12, were 6.0 and 8.5 ft/sec for Set Nos. 1 and 3 and 1.9 and 2.3 ft/sec for Set Nos. 4 and 5, respectively. Thus, relative to the ground level collection by the tray, the collecting efficiency of the horizontal plates decreased as the wind speed increased.

Plant and Foliar Contamination Data

Plant and foliar contamination data are given in Tables 15, 16 and 17 for the vegetables, cereal grains, and trees, respectively. Information on the date, time, climatic conditions, and sample type for each set of foliar samples is given in Appendix C; data on plant age, dry weight, planting (or foliar) surface density, and the background (or C^{o}_{PNR}) values for the various types of plants are also summarized in Appendix C.

Correlations of these sets of data, including the effect of wind speed during deposition on the contamination factors and the effect of the wind and rain on removal of the particles from the foliage during weathering periods, are given in Part Three of this report.

General observations of the contamination behavior of the ceniza-arena particles under various conditions of deposition and of the major events that occurred during the sampling periods are presented in Appendix D as excerpts from the various trip itineraries. In addition, the general condition of the plants and the difficulties that occurred while obtaining the samples and data are described in Appendix D; some of the latter are summarized below.

In the field, certain difficulties were encountered in the spray-washing of some plants in order to obtain a high degree of removal of all the residual ceniza-arena and dust particles with the portable high-pressure spraying equipment. The plant parts most difficult to clean included barley heads, wheat heads, rye heads, and stalks of all the cereal grains and corn, because the particles tended to sift into the leaf folds around the stems and into the interior parts of the grain heads. A similar difficulty occurred in the laboratory, where complete removal of the particles from the samples was not readily accomplished; this difficulty was resolved by reprocessing the dried foliage until the desired high fraction of particle recovery was achieved.

Table 15

SUMMARY OF PLANT AND FOLIAR CONTAMINATION DATA FOR VEGETABLES

Notations

Sample Numbers: 14,000's for Plot No. 1
06,000's for Plot No. 2

B Background deposit remaining on washed specimens of foliage or plant

P Primary samples (short-period exposure or unweathered depositions representing initial contamination levels); 2P--samples with two successive primary depositions

S Secondary samples (long-period exposure representing weathering effects, multiple depositions, etc.)

O Original unwashed specimens (except for rain and wind cleaning to date of sampling)

R Weathering by rain (SR, secondary sample, washed by rain)

W Weathering by wind (SW, secondary sample, exposed to wind)

SWR Secondary samples, weathered by wind and then by rain

W_L Dry weight of foliage (gm)

Δm_L Dry weight of ceniza-arena retained on the foliage (gm)

C_p Foliar concentration of ceniza-arena, $W_L/\Delta m_L$ (gm/gm)

Δm Dry weight of ceniza-arena deposited per unit area of ground surface (gm/sq ft)

C_p^o C_p corrected for background (gm/gm)

a_L Contamination factor, $C_p^o/\Delta m$ (sq ft/gm)

Table 15

SUMMARY OF PLANT AND FOLIAR CONTAMINATION DATA FOR VEGETABLES

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Bean-1			
14004	0.7497	0.0479	0.0638	-	-	-	B, 1 plant
14013	1.2904	0.1893	0.1467	2.100	0.0829	0.0395	P, 2 plants, dry
14021	1.0401	0.0260	0.0250	-	-	-	B, 1 plant
14030-1	0.2713	1.1190	4.12	39.55	4.061	0.103	S, 4 leaves, damp
14036	1.7814	5.8674	3.296	-	-	-	O, 3 plants
14040-1	0.4288	0.2528	0.590	6.420	0.565	0.0880	P, 4 leaves, dry
14053	0.7024	3.6761	5.234	6.60	5.209	0.789	SR, 1 plant
14063	0.7379	0.0870	0.1177	-	-	-	B, 1 plant
14073-1	0.3423	0.3327	0.972	6.095	0.854	0.140	P, 4 leaves, dry
14079-1	0.4375	3.6385	8.32	12.35	8.20	0.664	SR, 4 lower vertical leaves
14080-1	0.2891	0.4469	1.547	12.35	1.429	0.116	SR, 4 higher horizontal leaves
14085-1	0.3350	0.9903	2.954	36.82	2.880	0.0782	P, 4 leaves, damp
14097-1	0.3331	0.9672	2.906	18.59	2.832	0.152	P, 4 leaves, dry
14098-1	0.2322	1.8869	8.13	55.41	8.08	0.147	2P, 3 leaves, damp
14109	3.8181	0.2670	0.0700	-	-	-	B, 2 plants
14121	4.4408	0.4790	0.1078	1.249	0.0378	0.0303	P, 3 plants, dry
14130-1,3	1.9636	3.0561	1.556	12.62	1.389	0.110	P, 2 plants less pods, damp
14130-2	3.3048	0.1468	0.0444	12.62	0.0444	0.00352	P, 7 pods, damp
14130	5.2684	3.2029	0.607	12.62	0.545	0.0432	P, 2 plants, damp
14140	4.1467	1.7428	0.420	21.43	0.358	0.0167	SW, 2 plants
14153	2.9802	1.4435	0.484	23.49	0.422	0.0180	SW, 1 plant
14163	4.0238	2.7897	0.693	27.63	0.631	0.0228	SWR, 2 plants

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Bean-1 (concluded)			
14172	2.9675	0.1019	0.0343	-	-	-	B, 1 plant
14200-1,3	6.9334	0.5816	0.0839	1.413	0.0639	0.0452	P, 3 plants less pods, dry
14200-2	6.0533	0.0865	0.0143	1.413	0.0129	0.00913	P, 7 pods, dry
14200	12.9867	0.6681	0.0514	1.413	0.0401	0.0284	P, 3 plants, dry
14212	3.3835	0.2735	0.0808	8.348	0.0710	0.0850	S, 2 plants, damp
14224-1,3	4.4041	0.0895	0.0200	-	-	-	B, 5 plants less pods
14224-2	7.6594	0.0107	0.00140	-	-	-	B, 9 pods
14224	12.1345	0.1002	0.00826	-	-	-	B, 5 plants
06006	0.2328	0.0204	0.0875	-	-	-	B, 1 plant
06016	0.8265	1.3396	1.622	13.68	1.534	0.112	P, 3 plants, damp
06027	1.0149	0.4922	0.485	31.44	0.397	0.0126	SW, 3 plants
06039-1	0.6207	0.3522	0.567	39.02	0.479	0.0123	SWR, 12 top horizontal leaves
06040-1	0.3483	0.9727	2.794	39.02	2.706	0.0693	SWR, 5 bottom vertical leaves
06050	1.1820	0.1192	0.101	-	-	-	B, 2 plants
06058	4.6164	1.7504	0.379	6.42	0.278	0.0433	P, 8 plants, damp
06072	1.9192	0.3298	0.172	7.03	0.072	0.0102	SWR, 2 plants
06085	2.4919	0.1076	0.0432	-	-	-	B, 2 plants
				Bean-2			
14273	0.4362	0.2221	0.0507	-	-	-	B, 2 plants
14294	0.4821	1.5140	3.1404	19.112	3.0897	0.162	P, 3 plants, damp
14317	0.4938	1.3473	2.7284	24.236	2.6777	0.110	SW, 3 plants

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Bean-2 (concluded)			
14322	0.5443	0.4504	0.8275	25.602	0.7768	0.0303	SW, 4 plants
14347	1.0017	0.1064	0.1062	1.104	0.0555	0.0503	P, 4 plants, dry
14390	1.2519	0.0535	0.0427*	-	-	-	B, 1 plant
14402	1.0676	0.2102	0.1971	1.006	0.1749	0.174	P, 1 plant, damp
14412	1.1189	0.2002	0.1686	1.107	0.1464	0.132	SW, 1 plant
14424	0.8938	0.1327	0.1485	1.139	0.1263	0.111	SW, 1 plant
14446	1.0206	0.0550	0.0539	1.070	0.0317	0.0296	P, 1 plant, dry
14479	0.9721	0.0104	0.0107	-	-	-	B, 1 plant
06219	0.5414	0.3524	0.6509	7.690	0.6002	0.0780	P, 4 plants, damp
06233	0.6216	0.1614	0.2597	8.199	0.2090	0.0255	SW, 3 plants
06244	0.7232	0.1764	0.2439	8.199	0.1932	0.0236	SWR, 5 plants
06293	0.7753	0.0177	0.0280	-	-	-	B, 5 plants
06300	0.9841	0.0224	0.0278	-	-	-	B, 5 plants
				Bean-3			
14658	2.8768	0.0426	0.0148	-	-	-	B, 1 plant
14659	1.7906	0.0322	0.0180	-	-	-	B, 1 plant
14691	3.2265	0.0984	0.0305	0.1576	0.0143	0.0907	P, 2 plants, dry
14709	3.5106	0.2345	0.0668	1.4532	0.0504	0.0347	S, 2 plants, damp

* Some particles not washed from lower section of stems

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Bean-3 (concluded)			
14723	7.4305	0.5012	0.0675	1.8086	0.0511	0.0282	P, 2 plants, damp
14729	6.1555	0.3197	0.0519	2.7663	0.0355	0.0128	S, 2 plants, dry
14740	8.1390	0.2469	0.0303	-	-	-	OR, 1 plant
14753	11.1056	0.8950	0.0806	2.3144	0.0503	0.0217	P, 2 plants, damp
14768	7.6781	0.4396	0.0572	3.9372	0.0269	0.00683	SW, 2 plants
14783-1	4.1285	0.3377	0.0818	3.9586	0.0515	0.0130	SWR, several top leaves
14799	28.43	0.7666	0.0270	-	-	-	O, 2 plants
14813	16.48	0.2767	0.0168	-	-	-	B, 2 plants
14833	32.9009	-	-	-	-	-	O, 2 plants (photo)
14837	12.2957	-	-	-	-	-	O, 1 plant (photo)
06320	0.9531	0.0510	0.0535	-	-	-	B, 2 plants
06334	0.7681	0.0752	0.0980	0.4869	0.0445	0.0913	P, 3 plants, damp
06344	0.9791	0.0337	0.0345	-	-	-	B, 5 plants
06348	1.8200	0.1548	0.0850	1.7546	0.0505	0.0288	P, 2 plants, damp
06364	2.4092	0.0627	0.0260	-	-	-	B, 3 plants
06376	3.2085	0.1122	0.0350	0.3446	0.0090	0.0261	S, 2 plants, damp
06391	4.0002	0.1847	0.0462	0.5146	0.0202	0.0393	P, 2 plants, damp
06400	2.5452	0.1017	0.0400	0.6945	0.0140	0.0202	SW, 2 plants
06426	4.4146	0.1269	0.0287	0.2256	0.0034	0.0417	P, 3 plants, damp
06444	1.6702	0.565	0.0338	0.3398	0.0145	0.0427	P, 2 plants, damp
06457	2.7684	0.0534	0.0193	0.4943	~0.0	~0.0	SW, 2 plants

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Bean-1			
14584	0.6594	0.0164	0.0249	-	-	-	B, 3 plants
14592	0.7683	0.0310	0.0403	0.2996	0.0103	0.0344	P, 4 plants, dry
14604	0.9562	0.0292	0.0305	0.2996	~0.0005	~0.0017	SW, 4 plants
14608	0.9861	0.0346	0.0351	-	-	-	B, 4 plants
14615	0.6706	0.0206	0.0307	0.2762	~0.0007	~0.0025	S, 3 plants, dry
14632	1.1581	0.0552	0.0477	0.1192	0.0170	0.143	P, 4 plants, damp
14667	1.3067	0.0691	0.0529	0.4657	0.0229	0.0492	S, 4 plants, semidamp
14710	4.0560	0.3666	0.0904	1.4532	0.0549	0.0378	S, 4 plants, damp
14724	2.4648	0.2417	0.0981	0.3556	0.0077	0.0217	P, 2 plants, damp
14724	2.4648	0.2417	0.0981	1.8088	0.0626	0.0346	S, 2 plants, damp
14730	3.4953	0.2877	0.0823	2.7763	0.0468	0.0168	S, 4 plants, dry
14741	2.7025	0.1313	0.0486	-	-	-	OR, 2 plants
14754	3.1316	0.3965	0.1266	2.3144	0.0780	0.0337	P, 3 plants, damp
14768	2.8058	0.2658	0.0947	3.9372	0.0461	0.0117	SW, 3 plants
14784	0.6724	0.1160	0.1725	3.9586	0.1239	0.0315	SWR, 1 plant
14800	7.8048	0.2216	0.0284	-	-	-	O, 2 plants
14814	9.20	0.1510	0.0164	-	-	-	B, 2 plants
14839	19.3501	-	-	-	-	-	O, 3 plants (photo)
06366	0.5756	0.0205	0.0356	-	-	-	B, 3 plants
06375	0.6925	0.0449	0.0648	0.3446	0.0272	0.0789	S, 4 plants, damp
06392	0.8576	0.0674	0.0786	0.5146	0.0410	0.0797	P, 5 plants, damp
06399	0.8804	0.0543	0.0617	0.6945	0.0241	0.0347	SW, 5 plants
06410	0.8958	0.0356	0.0397	-	-	-	B, 4 plants

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Bean-4 (concluded)			
06425	0.8634	0.0701	0.0812	0.2256	0.0436	0.193	P, 4 plants, damp
06443	0.8439	0.0526	0.0624	0.3398	0.0248	0.0730	P, 4 plants, damp
06456	0.9620	0.0411	0.0427	0.4943	0.0051	0.0103	SW, 4 plants
06467	1.4375	0.0525	0.0365	0.1067	0.0065	0.0609	S, 4 plants, damp
06487	1.7817	0.3312	0.1859	-	-	-	O, 2 plants
06499	2.0106	0.2360	0.1174	0.7982	0.0819	0.103	P, 4 plants, dry
06512	1.5216	0.2377	0.1562	1.1494	0.1207	0.105	2P, 4 plants, dry
06512	1.5216	0.2377	0.1562	0.3512	0.0388	0.110	P, 4 plants, dry
06528	2.3223	0.3335	0.1436	1.2536	0.1081	0.0862	P, 4 plants, dry
06552	2.0035	0.2941	0.1468	1.7784	0.1113	0.0626	SW, 4 plants
06568	1.6126	0.0418	0.0259	-	-	-	B, 3 plants
06584	1.2605	0.3161	0.2508	3.8840	0.2153	0.0554	S, 3 plants, dry and damp
06584	1.2605	0.3161	0.2508	2.1056	0.1040	0.0494	P, 3 plants, damp
06585	0.6278	0.1315	0.2095	2.1056	0.1836	0.0872	P, 1 plant, damp
06622	1.9495	0.0621	0.0319	-	-	-	B, 3 plants
06646	1.7324	0.1334	0.0770	0.3624	0.0451	0.124	S, 4 plants, damp
				Bean-5			
06501	0.5344	0.0383	0.0717	0.7982	0.0377	0.0472	P, 5 plants, dry
06513	0.5000	0.0533	0.1066	0.1494	0.0726	0.0632	2P, 5 plants, dry
06513	0.5000	0.0533	0.1066	0.3512	0.0349	0.0994	P, 5 plants, dry
06526	0.4403	0.0812	0.1844	1.2536	0.1504	0.120	P, 5 plants, dry
06551	0.4270	0.0670	0.1569	1.7784	0.1229	0.0691	SW, 5 plants

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Bean-5 (concluded)			
06567	0.5728	0.0128	0.0223	-	-	-	B, 5 plants
06582	0.4250	0.1112	0.2616	3.8840	0.2276	0.0586	S, 6 plants, dry and damp
06582	0.4250	0.1112	0.2616	2.1056	0.1047	0.0497	P, 6 plants, damp
06583	0.3836	0.0857	0.2234	2.1056	0.2011	0.0955	P, 4 plants, damp
06600	0.3769	0.0724	0.1921	-	-	-	O, 4 plants
06610	0.5991	0.1452	0.2424	0.9571	0.0503	0.0526	P, 7 plants, damp
06621	0.4431	0.0203	0.0458	-	-	-	B, 6 plants
06645	0.8805	0.0608	0.0691	0.3624	0.0233	0.0643	S, 7 plants, damp
				Bean-6			
06667	1.2618	0.0612	0.0485	-	-	-	O, 7 plants
06680	0.7964	0.0285	0.0370	-	-	-	B, 7 plants
06705	0.4601	-	-	-	-	-	O, 4 plants (photo)
				Beet-1			
14369	4.1375	0.8633	0.2090*	-	-	-	B, 3 plants
14386	5.8486	0.1206	0.0207	-	-	-	B, 3 plants
14405	2.6712	0.4422	0.1655	1.006	0.1302	0.129	P, 1 plant, damp
14414	5.3557	0.7560	0.1412	1.107	0.1059	0.0957	SW, 2 plants
14450	1.9380	0.1713	0.0884	1.070	0.0531	0.0496	P, 2 plants, dry
14476	1.3074	0.0504	0.0334	-	-	-	B, 3 plants

* Plant washed and sampled after dark with use of flashlight; value not used

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Beet-1 (continued)			
14501	1.8651	0.0351	0.0188	-	-	-	B, 2 plants
14515	2.0377	0.1518	0.0746	0.7634	0.0530	0.0694	P, 1 plant, damp
14528	5.8067	0.2433	0.0418	1.0225	0.0202	0.0198	SW, 1 plant
14539	1.8965	0.0786	0.0416	0.4164	0.0200	0.0480	P, 1 plant, damp
14551	2.0675	0.0503	0.0244	-	-	-	B, 1 plant
14563	8.0225	0.3717	0.0464	1.3263	0.0248	0.0187	P, 1 plant, damp
14582	4.6994	0.0501	0.0107	-	-	-	B, 1 plant
14596	4.0421	0.0506	0.0373	0.2996	0.0285	0.0951	P, 1 plant, damp
14606	7.8312	0.1883	0.0240	0.2996	0.0152	0.0507	SW, 1 plant
14610	5.1037	0.0347	0.00680	-	-	-	B, 1 plant
14618	2.5994	0.0260	0.0100	0.2762	0.0032	0.0116	S, 1 plant, damp and dry
14636	4.9658	0.0786	0.0158	0.1192	0.0070	0.0587	P, 1 plant, damp
14663	3.2317	0.1465	0.0453	0.4657	0.0365	0.0784	S, 1 plant, damp
14669	3.2353	0.0355	0.0110	-	-	-	B, 1 plant
14696	3.5474	0.0712	0.0201	0.1576	0.0091	0.0577	P, 1 plant, dry
14715	5.6667	0.3494	0.0617	1.4532	0.0423	0.0291	S, 1 plant, damp
14733	12.3920	0.3454	0.0279	2.7763	0.0169	0.00609	S, 1 plant, semidamp
14752	4.9162	0.1374	0.0279	-	-	-	OR, 1 plant
14758	6.5590	0.5394	0.0822	2.3144	0.0628	0.0271	P, 1 plant, damp
14772	9.4460	0.2465	0.0261	3.9372	0.0067	0.00170	SW, 1 plant
14788	3.9249	0.3155	0.0804	3.9586	0.0610	0.0154	SWR, 1 plant
14848	8.7510	-	-	-	-	-	O, 1 plant (photo)

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Beet-1 (concluded)			
06096	1.4739	0.1159	0.0786	-	-	-	B, 5 plants
06111	0.6856	0.0981	0.1431	0.8367	0.0645	0.0771	P, 3 plants, damp
06117	0.5499	0.2259	0.4108	4.342	0.3322	0.0765	P, 3 plants, damp
06136	0.9289	1.5716	1.6919	14.81	1.6133	0.109	P, 3 plants, damp
06154	0.4903	0.1447	0.2951	16.696	0.2165	0.0130	SW, 3 plants
06174	0.5398	0.4984	0.9233	9.158	0.8447	0.0922	2P, 3 plants, damp
06212	1.7562	0.1090	0.0621	-	-	-	B, 3 plants
06215	2.6750	2.1851	0.8169	7.690	0.7548	0.0982	P, 3 plants, damp
06231	1.1960	0.4708	0.3936	8.199	0.3315	0.0404	SW, 2 plants
06242	1.6315	0.4178	0.2561	8.199	0.1940	0.0237	SWR, 3 plants
06262	2.3269	0.0459	0.0197	-	-	-	B, 2 plants
06270	3.6474	1.8630	0.5108	5.845	0.4911	0.0840	P, 2 plants, damp
06290	4.3772	0.1220	0.0279	-	-	-	B, 3 plants
06298	2.6300	0.1559	0.0593	-	-	-	B, 3 plants
				Beet-2			
14805	2.7104	0.0798	0.0294	-	-	-	O, 1 plant
14838	4.1776	0.0449	0.0107	-	-	-	B, 1 plant
06661	2.8301	0.1440	0.0509	-	-	-	O, 2 plants
06678	2.7890	0.0257	0.00921	-	-	-	B, 2 plants
06699	3.5354	-	-	-	-	-	O, 1 plant (photo)

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Cabbage-1			
14005	0.5504	0.0350	0.0635	-	-	-	B, 6 plants
14015	0.5787	0.1119	0.1931	2.100	0.1296	0.0617	P, 6 plants, dry
14023	0.8398	0.0823	0.0980	-	-	-	B, 6 plants
14032	0.3126	1.4566	4.660	39.55	4.596	0.116	S, 6 plants, damp and dry
14043	0.2833	0.1533	0.5411	6.420	0.4431	0.0690	P, 6 plants, dry
14065	0.3523	0.0686	0.1947*	-	-	-	B, 4 plants
14075	0.2443	0.0609	0.2496	6.095	0.1688	0.0277	P, 3 plants, dry
14088	0.5473	4.4528	8.12	36.82	8.04	0.218	P, 6 plants, damp
14103-1	0.4684	1.4841	3.17	18.59	3.09	0.166	P, leaves, dry
14104-1	0.1735	1.8213	10.49	55.41	10.41	0.188	2P, leaves, damp
14112	2.5151	0.0579	0.0230	-	-	-	B, 3 plants
14123	2.7617	0.1668	0.0605	1.249	0.0375	0.0300	P, 3 plants, dry
14129	2.2124	2.8327	1.282	12.62	1.253	0.0993	P, 3 plants, damp
14141	1.5949	2.1128	1.262	21.43	1.233	0.05775	SW, 2 plants
14154	2.2613	1.2440	0.551	23.49	0.522	0.0222	SW, 2 plants
14164	1.3035	0.4990	0.382	27.63	0.353	0.0128	SWR, 2 plants
14173	2.3076	0.0650	0.0282	-	-	-	B, 2 plants
14202	12.8724	0.7223	0.0561	1.413	0.0488	0.0345	P, 1 plant, dry
14215	19.88	2.5142	0.1265	8.348	0.1192	0.0143	S, 1 plant, damp
14226	15.14	0.0635	0.00419	-	-	-	B, 1 plant

* With some soil on stems

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm gm/sq ft	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Cabbage-1 (continued)			
14233	6.54	0.1318	0.0198	1.249	0.0156	0.0125	P, 1 plant, dry
14240	12.30	2.8180	0.2291	9.075	0.2218	0.0244	P, 1 plant, dry
14260	13.2600	0.0230	0.00173	-	-	-	B, 1 plant (18 leaves plus small head and stem)
14268	13.2224	0.3092	0.0234	0.4503	0.0161	0.0358	P, 1 plant, dry
14274	27.2651	0.4224	0.0155	-	-	-	B, 1 plant
14295	50.59	28.1277	0.5560	19.112	0.5405	0.0283	P, 1 plant, damp
14329	54.83	10.9943	0.2005	26.444	0.1850	0.00700	SWR, 1 plant
14348	88.23	2.7457	0.0311	1.104	0.0156	0.0141	P, 1 plant, dry
14349[a]	47.36	0.8860	0.0187	1.104	0.0157	0.0142	P, 1 plant, dry
14367-3	6.7297	0.1760	0.0264[b]	-	-	-	B, stem
14367-2	49.67	0.0169	0.000340[b]	-	-	-	B, head
14367-1	28.33	0.5036	0.0177[b]	-	-	-	B, leaves
14367	84.73	0.6965	0.00822[b]	-	-	-	B, 1 plant
14384-3	8.4699	0.1924	0.0228	-	-	-	B, stem
14384-2	72.25	0.0851	0.00118	-	-	-	B, head
14384-1	25.02	0.6482	0.0259	-	-	-	B, leaves
14384	105.74	0.9257	0.00885	-	-	-	B, 1 plant

a Very thoroughly washed

b Plant washed and sampled after dark with use of flashlight

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Cabbage-1 (continued)			
14406-3	9.7808	0.2598	0.0267	1.006	0.0039	0.00388	P, stem, damp
14406-2	55.80	0.5973	0.0107	1.006	0.0095	0.00944	P, head, damp
14406-1	27.40	2.2655	0.0827	1.006	0.0568	0.0565	P, leaves, damp
14406	92.98	3.1226	0.0336	1.006	0.0229	0.0228	P, 1 plant, damp
14453-3	5.2835	0.1256	0.0238	1.070	~0.0	~0.0	P, stem, dry
14453-2	41.95	0.0882	0.0021	1.070	0.0013	0.00121	P, head, dry
14453-1	17.48	0.9567	0.0548	1.070	0.0380	0.0355	P, leaves, dry
14453	64.71	1.1705	0.0181	1.070	0.0111	0.0104	P, 1 plant, dry
06013	0.3605	0.0906	0.2586*	-	-	-	B, 12 plants
06015	0.4395	0.8042	1.827	13.68	1.746	0.128	P, 12 plants, damp
06052	0.9834	0.0137	0.0139	-	-	-	B, 2 plants
06064	1.3025	1.0380	0.798	6.42	0.784	0.122	P, 3 plants, damp
06086	2.3834	0.1200	0.0502	-	-	-	B, 2 plants
06094	5.2375	0.0845	0.0161	-	-	-	B, 1 plant
06109	7.4938	0.4170	0.0556	0.8367	0.0395	0.0472	P, 1 plant, dry
06118	13.39	2.9737	0.2221	4.342	0.2060	0.0474	P, 1 plant, damp
06139	4.6249	5.0512	1.0922	14.81	1.0849	0.0733	P, 1 plant, damp
06155	6.9468	3.3367	0.4803	16.696	0.4730	0.0283	SW, 1 plant
06165	5.0111	0.6973	0.1392	1.602	0.1319	0.0823	P, 1 plant, damp
06176	3.4110	3.4258	1.0043	9.158	0.9970	0.1089	2P, 1 plant, damp
06217	26.34	4.9374	0.1874	7.690	0.1719	0.0224	P, 1 plant, damp

* With some soil on stems

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Cabbage-1 (concluded)			
06246	21.94	3.7993	0.1732	8.199	0.1577	0.0192	SWR, 1 plant
06289-2	17.85	0.0128	0.000717	-	-	-	B, head
06289-1	19.39	0.1312	0.00676	-	-	-	B, leaves
06289	37.24	0.1440	0.00387	-	-	-	B, 1 plant
				Cabbage-2			
14662	2.2932	0.0343	0.0150	-	-	-	B, 1 plant
14663	2.3766	0.0239	0.0101	-	-	-	B, 1 plant
14707	3.7240	0.0601	0.0161	0.1576	0.0035	0.0222	P, 2 plants, dry
14721	3.1625	0.1334	0.0422	1.4532	0.0295	0.0203	S, 2 plants, damp
14726	4.1830	0.2886	0.0690	0.3556	0.0268	0.0754	P, 2 plants, damp
14726	4.1830	0.2886	0.0690	1.8088	0.0563	0.0311	S, 2 plants, damp
14732	6.7225	0.4276	0.0636	2.7763	0.0509	0.0183	S, 2 plants, semidamp
14742	8.7975	0.1131	0.0129	-	-	-	OR, 2 plants
14755	8.7385	0.6249	0.0715	2.3144	0.0586	0.0253	P, 2 plants, damp
14770	7.0640	0.1921	0.0272	3.9372	0.0143	0.00363	SW, 2 plants
14785	6.8475	0.2111	0.0308	3.9586	0.0179	0.00452	SWR, 2 plants
14801	14.5570	0.3178	0.0218	-	-	-	O, 2 plants
14820	9.0370	0.0431	0.00477	0	0	0	B, 1 plant
14834	45.6190	-	-	-	-	-	O, 1 plant (photo)
14840	62.14	-	-	-	-	-	O, 1 plant (photo)
				Cabbage-3			
06500	0.6314	0.0671	0.1063	0.7982	0.0559	0.0700	P, 10 plants, dry
06514	0.3940	0.0509	0.1292	1.1494	0.0788	0.0686	2P, 10 plants, dry

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Cabbage-3 (concluded)			
06514	0.3940	0.0509	0.1292	0.3512	0.0229	0.0652	P, 10 plants, dry
06527	0.4630	0.0998	0.2156	1.2536	0.1652	0.132	P, 10 plants, dry
06549	0.5330	0.1217	0.2283	1.7784	0.1779	0.100	SW, 10 plants
06565	0.4920	0.0120	0.0244	-	-	-	B, 10 plants
06580	0.3579	0.1461	0.4082	2.1056	0.3578	0.170	P, 10 plants, damp
06619	0.2825	0.0216	0.0765	-	-	-	B, 10 plants
06643	0.4295	0.0575	0.1339	0.3624	0.0574	0.158	S, 10 plants, semidamp
06664	0.9493	0.0699	0.0736	-	-	-	O, 2 plants
06681	0.9179	0.0309	0.0337	-	-	-	B, 3 plants
06704	0.9037	-	-	-	-	-	O, 1 plant (photo)
				Carrot-1			
14502	0.4286	0.0145	0.0339	-	-	-	B, 1 plant
14516	1.0582	0.0713	0.0674	0.7634	0.0427	0.0559	P, 2 plants, damp
14552	0.8090	0.0186	0.0230	-	-	-	B, 1 plant
14564	0.8802	0.0990	0.1125	1.3263	0.0878	0.0662	P, 1 plant, damp
14587	2.9685	0.0771	0.0260	-	-	-	B, 3 plants
14602	2.7548	0.1120	0.0407	0.2996	0.0184	0.0614	P, 3 plants
14611	1.7506	0.0204	0.0117	-	-	-	B, 2 plants
14619	1.1580	0.0306	0.0264	0.2762	0.0041	0.0148	S, 3 plants, damp and dry
14637	1.9350	0.0951	0.0491	0.1192	0.0227	0.190	P, 2 plants, damp
14650	2.1689	0.0633	0.0292	-	-	-	B, 3 plants
14662	2.7639	0.1152	0.0417	0.4657	0.0194	0.0416	S, 3 plants, semidamp
14664	1.7179	0.0324	0.0189	-	-	-	B, 1 plant

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Carrot-1 (continued)			
14695	8.3796	0.2013	0.0240	0.1576	0.0051	0.0324	P, 3 plants, dry
14714	2.8354	0.1068	0.0377	1.4532	0.0183	0.0126	S, 3 plants, damp
14745	3.3484	0.0665	0.0199	-	-	-	OR, 3 plants
14759	5.0612	0.4187	0.0827	2.3144	0.0628	0.0271	P, 3 plants, damp
14773	7.0895	0.2851	0.0402	3.9372	0.0203	0.00516	SW, 3 plants
14795	1.7126	0.2895	0.1690	3.9586	0.1491	0.0377	SWR, 1 plant
14804	8.9180	0.1500	0.0168	-	-	-	O, 1 plant
14819	3.5634	0.0403	0.0113	-	-	-	B, 2 plants
14841-2[a]	10.2357	-	-	-	-	-	O, root (photo)
14841	13.8397	-	-	-	-	-	O, 1 plant (photo)
06097	1.9104	0.1309	0.0685	-	-	-	B, 10 plants
06112	0.5632	0.516	0.0916	0.8367	0.0231	0.0276	P, 5 plants, dry
06115	0.7866	0.04535	0.5765	4.342	0.5080	0.117	P, 5 plants, damp
06138	0.4318	0.9150	2.1190	14.81	2.0505	0.138	P, 5 plants, damp
06152	0.3623	0.2803	0.7737	16.696	0.7052	0.0422	SW, 5 plants
06167	1.3231	0.2523	0.1907	1.602	0.1222	0.0763	P, 5 plants, damp
06173	0.4110	0.6553	1.5944	9.158	1.5259	0.167	2P, 3 plants, damp
06211	1.2073	0.2313	0.1916[b]	-	-	-	B, 3 plants
06214	1.8033	1.3862	0.7687	7.690	0.6866	0.0893	P, 3 plants, damp

a Wet weight = 97.04 grams

b Particles on end of some of the leaf stems

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Carrot-1 (concluded)			
06230	1.1942	0.7927	0.6638	8.199	0.5817	0.0710	SW, 2 plants
06241	0.7863	0.2301	0.2926	8.199	0.2105	0.0257	SWR, 3 plants
06263	1.3030	0.1070	0.0821	-	-	-	B, 3 plants
06269	1.7504	0.2524	0.7155	5.845	0.6334	0.108	P, 2 plants, damp
06294	2.2999	0.0910	0.0396	-	-	-	B, 3 plants
06297	1.5823	0.0216	0.0136	-	-	-	B, 1 plant
06322	1.6835	0.0558	0.0332	-	-	-	B, 1 plant
06343	2.2086	0.0192	0.00869	-	-	-	B, 1 plant
				Carrot-2			
06442	1.4703	0.1051	0.0715	0.3398	0.0492	0.145	P, 4 plants, damp
06454	1.3220	0.0453	0.0343	0.4943	0.0120	0.0243	SW, 5 plants
06465	0.9223	0.0431	0.0467	0.1067	0.0244	0.229	S, 5 plants, damp
06480	3.0133	0.0323	0.0107	-	-	-	OR, 3 plants
06496	2.2994	0.0985	0.0428	0.7982	0.0178	0.0187	P, 3 plants, dry
06510	2.1025	0.1018	0.0484	1.1494	0.0205	0.0178	2P, 3 plants, dry
06510	2.1025	0.1018	0.0484	0.3512	0.0056	0.0159	P, 3 plants, dry
06530	1.5356	0.2514	0.1637	1.2536	0.1358	0.108	P, 3 plants, dry
06550	1.2464	0.1210	0.0971	1.7784	0.0692	0.0389	SW, 3 plants
06564	2.5100	0.0685	0.0273	-	-	-	B, 3 plants
06578	0.9352	0.3081	0.3294	3.8840	0.3015	0.0776	S, 3 plants, damp
06578	0.9352	0.3081	0.3294	2.1056	0.2323	0.110	P, 3 plants, damp
06579	0.9419	0.3038	0.03225	2.1056	0.2952	0.140	P, 2 plants, damp

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Carrot-2 (concluded)			
06598	1.4700	0.0680	0.0463	-	-	-	B, 3 plants
06608	2.7549	0.2748	0.0997	0.9571	0.0534	0.0558	P, 3 plants, damp
06618	1.1962	0.0327	0.0273	-	-	-	B, 3 plants
06632	4.4234	-	-	-	-	-	O, 3 plants, leaf area
06636	2.2950	0.5874	0.2559	-	-	-	O, 1 plant (photo), leaf area
06642	2.3053	0.1457	0.0632	0.3624	0.359	0.0991	S, 3 plants, semidamp
06660	2.8215	0.1823	0.0646	-	-	-	O, 3 plants
06683	1.0509	0.0109	0.0104	-	-	-	B, 3 plants
06701	1.9326	-	-	-	-	-	O, 2 plants (photo)
				Carrot-3			
06682	0.4282	0.0157	0.0367	-	-	-	B, 3 plants
06700	1.3805	-	-	-	-	-	O, 5 plants (photo)
				Corn-1			
14002	0.6978	0.4807	0.688*	-	-	-	B, 3 plants
14014	0.4677	0.2425	0.519	2.100	0.244	0.116	P, 2 plants, dry
14022	0.4395	0.1242	0.283	-	-	-	B, 3 plants
14031	0.3019	1.5160	5.02	39.55	4.74	0.120	S, 1 plant, damp and dry

* One leaf touched ground, carried some extra soil plus ceniza-arena

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Corn-1 (continued)			
14038	0.5533	3.1630	5.71	-	-	-	0, 2 plants
14041	0.9371	0.4864	0.519	6.420	0.236	0.0368	P, 3 plants, dry
14052	0.4397	1.5459	3.52	6.60	3.24	0.491	SR, 2 plants
14066	0.2264	0.1228	0.542	-	-	-	B, 1 plant
14076	0.2465	0.1754	0.712	6.095	0.434	0.0712	P, 2 plants, dry
14087	0.6433	3.7672	5.86	36.82	5.58	0.152	P, 2 plants, damp
14101	0.5350	1.4315	2.672	18.59	2.394	0.129	P, 2 plants, dry
14102	0.3697	1.8890	5.11	55.41	4.83	0.0872	2P, 2 plants, damp
14111*	0.8924	0.6002	0.672	-	-	-	B, 3 plants
14122	1.4842	0.5963	0.401	1.249	0.214	0.171	P, 3 plants, dry
14128	1.0452	3.2907	3.15	12.62	2.96	0.235	P, 3 plants, damp
14142	0.7259	0.9384	1.290	21.43	1.103	0.0515	SW, 2 plants
14155	0.3798	0.4652	1.223	23.49	1.036	0.0441	SW, 2 plants
14165	0.7683	1.1057	1.440	27.63	1.253	0.0453	SWR, 2 plants
14174	0.7820	0.0284	0.0364	-	-	-	B, 2 plants
14197	16.7546	0.4738	0.0283	-	-	-	B, 1 plant
14203	22.01	1.3038	0.0592	1.413	0.0309	0.0219	P, 1 plant, dry
14213	8.160	1.5146	0.1856	8.348	0.1426	0.0171	S, 1 plant, damp
14214	7.580	1.8331	0.2418	8.348	0.1988	0.0238	S, 2 plants, damp
14234	2.8894	0.2462	0.0852	1.249	0.0569	0.0456	P, 1 plant, dry

* Particles remaining in crown

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Corn-1 (continued)			
14241	4.3332	0.4737	0.1093	9.075	0.0663	0.00731	P, 1 plant, dry
14262	7.5455	0.1780	0.0236	-	-	-	B, 1 plant
14278-4	0.6738	0.0760	0.1128	-	-	-	B, 1 tassel
14278-3	7.2814	0.2171	0.0298	-	-	-	B, stalk
14278-2	5.1997	0.1225	0.0236	-	-	-	B, ear and husk
14278-1	5.3709	0.2529	0.0471	-	-	-	B, 7 leaves
14278	18.5258	0.6685	0.0361	-	-	-	B, 1 plant
14300-4	0.6280	0.5896	0.9389	19.112	0.8261	0.0432	P, 1 tassel, damp
14300-3	12.4658	1.3517	0.1084	19.112	0.0786	0.00411	P, stalk, damp
14300-2	6.3116	0.6881	0.1090	19.112	0.0854	0.00447	P, ear and husk, damp
14300-1	5.3846	8.5187	1.5820	19.112	1.5349	0.0803	P, leaves, damp
14300	24.7900	11.1481	0.4497	19.112	0.4156	0.0217	P, 1 plant, damp
14323	6.1891	1.3457	0.2174	25.602	0.1861	0.00727	SW, 1 plant
14330	14.96	1.9135	0.1279	26.444	0.0966	0.00365	SWR, 1 plant
14361-4	1.1065	0.8287	0.7490	-	-	-	O, tassel
14361-3	19.0950	9.2563	0.4855	-	-	-	O, stalk
14361-2	14.0395	1.4725	0.1049	-	-	-	O, ear plus husk
14361-1	7.8468	2.8140	0.3588	-	-	-	O, 6 leaves
14361	42.10	14.3715	0.3414	-	-	-	O, 1 plant
14371-4	0.4687	0.5723	1.2220*	-	-	-	B, tassel
14371-3	5.4456	1.7082	0.3140*	-	-	-	B, tassel

* Plant washed and sampled after dark with use of flashlight; values not used

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Corn-1 (continued)			
14371-2	10.8656	1.6130	0.1485*	-	-	-	B, 1 ear plus husk
14371-1	2.7062	0.1050	0.0388*	-	-	-	B, 5 leaves
14371	19.50	3.9985	0.2051*	-	-	-	B, 1 plant
14456-4	0.4177	0.1464	0.3510	1.070	0.2650	0.248	B, tassel, dry
14456-3	7.9167	0.5958	0.0753	1.070	0.0513	0.0479	P, stalk, dry
14456-2	7.1466	0.2303	0.0323	1.070	0.0087	0.00813	P, 1 ear plus husk, dry
14456-1	1.0729	0.0876	0.0816	1.070	0.0455	0.0425	P, 5 leaves, dry
14456	16.56	1.0601	0.0640	1.070	0.0379	0.0354	P, 1 plant, dry
06007	0.1274	0.0189	0.148	-	-	-	B, 2 plants
06014	0.4890	1.3316	2.72	13.68	2.58	0.189	P, 3 plants, damp
06025	0.1801	0.0253	0.140	-	-	-	B, 2 plants
06030	0.3516	0.3988	1.135	31.44	0.991	0.0315	SW, 2 plants
06042	0.2832	0.2043	0.721	39.02	0.577	0.0148	SWR, 3 plants
06043	0.1760	1.3779	7.83	39.02	7.69	0.197	SWR, corn centers
06054	1.6809	0.2874	0.171	-	-	-	B, 2 plants
06059	2.6815	2.1847	0.815	6.42	0.644	0.100	P, 2 plants, damp
06099	9.1864	0.7093	0.0772	-	-	-	B, 1 plant
06071	3.4456	1.4938	0.434	7.03	0.263	0.0374	SWR, 2 plants
06078	2.2792	2.2321	0.979	9.26	0.808	0.0873	SWR, 2 plants
06087	2.5552	0.9040	0.354	-	-	-	B, 2 plants
06121	15.37	2.8244	0.1838	4.342	0.1066	0.0246	P, 1 plant, damp

* Plant washed and sampled after dark with use of flashlight; values not used

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Corn-1 (concluded)			
06145	12.99	9.7488	0.7505	14.81	0.7075	0.0478	P, 1 plant, damp
06162	6.3312	2.2289	0.3520	16.696	0.3090	0.0185	SW, 1 plant
06168	9.3405	1.5350	0.1643	1.602	0.1213	0.0757	P, 1 plant, damp
06181	4.5734	3.2406	0.7086	9.158	0.6656	0.0727	2P, 2 plants, damp
06264-4	1.6900	0.1000	0.0592	-	-	-	B, 1 tassel
06264-2,3	9.0263	0.1920	0.0213	-	-	-	B, stalk plus two ears
06264-1	5.6926	0.1431	0.0251	-	-	-	B, leaves
06264	16.4089	0.4351	0.0265	-	-	-	B, 1 plant
06267-4	1.5230	0.2846	0.1869	5.845	0.1277	0.0218	P, 1 tassel, damp
06267-2,3	28.0105	1.0043	0.0359	5.845	0.0146	0.00250	P, stalk plus two ears, damp
06267-1	10.6736	4.4354	0.4155	5.845	0.3904	0.0668	P, 8 leaves, damp
06267	40.2071	5.7243	0.1424	5.845	0.1187	0.0203	P, 1 plant, damp
				Corn-2			
06301	0.5202	0.0217	0.0415	-	-	-	B, 5 plants
06332	1.8560	0.2800	0.1510	0.4869	0.0950	0.195	P, 3 plants, damp
06349	2.4640	0.3325	0.1342	1.7546	0.1044	0.0596	P, 5 plants, damp
06361-3	6.9380	0.0883	0.0127	-	-	-	B, stalk
06361-1	10.77	0.3756	0.0349	-	-	-	B, 7 leaves
06361	17.71	0.4639	0.0262	-	-	-	B, 1 plant
06387-3	14.6965	0.4476	0.0304	0.5146	0.0177	0.0344	P, stalk, damp
06387-1	14.70	0.5575	0.0379	0.5146	0.0030	0.00583	P, 7 leaves, damp
06387	29.40	1.0051	0.0342	0.5146	0.0104	0.0202	P, 1 plant, damp

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Corn-2 (continued)			
06483-3	15.26	1.2898	0.0845	-	-	-	O, stalk
06483-1	18.08	2.7870	0.1541	-	-	-	O, several leaves
06483	33.34	4.0768	0.1223	-	-	-	O, 1 plant
06489-4	9.4450	0.0384	0.00407	-	-	-	B, 1 tassel
06489-3	56.04	0.3465	0.00618	-	-	-	B, 1 stalk
06489-1	20.34	0.1853	0.00911	-	-	-	B, 10 leaves
06489	85.82	0.5702	0.00664	-	-	-	B, 1 plant
06492-4	17.54	0.1003	0.00572	0.7892	0.00165	0.00207	P, tassel, dry
06492-3	90.42	1.4696	0.0163	0.7982	0.0101	0.0127	P, stalk, dry
06492-1	31.95	0.4502	0.0141	0.7982	0.0050	0.00626	P, 12 leaves, dry
06492	139.91	2.0201	0.0144	0.7982	0.00788	0.00987	P, 1 plant, dry
06525-1,4	26.73	1.3973	0.0523	1.2536	0.0432	0.0345	P, leaves plus tassel, dry
06525-3	44.92	0.8209	0.0183	1.2536	0.0121	0.00965	P, stalk, dry
06525	71.65	2.2182	0.0310	1.2536	0.0237	0.0189	P, 1 plant, dry
06559-3	30.17	-	-	-	-	-	O, area, stalk
06559-1	28.38	-	-	-	-	-	O, leaf area, 12 leaves
06559	58.55	-	-	-	-	-	O, 1 plant
06595-3	47.2104	1.1437	0.0242	-	-	-	B, stalk
06595-1	31.11	0.4423	0.0142	-	-	-	B, leaves
06595	78.32	1.5860	0.0202	-	-	-	B, 1 plant
06605-1,4	32.26	1.6990	0.0527	0.9571	0.0385	0.0402	P, 9 leaves plus forming tassel, damp
06605-3	41.34	1.0353	0.0255	0.9571	0.013	0.00136	P, stalk, damp
06605	73.60	2.7543	0.0374	0.9571	0.0176	0.0184	P, 1 plant, damp

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Corn-2 (concluded)			
06626-1,4	27.69	0.8685	0.0314	0.9571	0.0172	0.0180	PW, 10 leaves plus forming tassel
06626-3	41.87	1.3590	0.0325	0.9571	0.0083	0.00867	PW, stalk
06626	69.56	2.2275	0.0320	0.9571	0.0118	0.0123	PW, 1 plant
06638-1,4	25.04	0.5574	0.0223	0.3624	0.0107	0.0295	S, 11 leaves, plus forming tassel, semidamp
06638-3	41.34	0.5205	0.0126	0.3624	0.0064	0.0177	S, stalk, semidamp
06638	66.38	1.0779	0.0162	0.3624	0.0080	0.0221	S, 1 plant, semidamp
06656-4	5.8415	0.1389	0.0238	-	-	-	O, 1 tassel
06656-3	89.81	0.6551	0.00845	-	-	-	O, 1 stalk
06656-2	35.16	0.0961	0.00273	-	-	-	O, 2 ears plus husks
06656-1	28.98	0.5815	0.0201	-	-	-	O, 10 leaves
06656	159.79	1.4716	0.00933	-	-	-	O, 1 plant
06688-4	5.6715	0.1181	0.0208	-	-	-	B, 1 tassel
06688-3	76.63	1.0859	0.0142	-	-	-	B, 1 stalk
06688-2	40.81	0.3625	0.00888	-	-	-	B, 2 ears plus husk
06688-1	23.13	0.1424	0.00161	-	-	-	B, 10 leaves
06688	146.24	1.7089	0.011[illegible]	-	-	-	B, 1 plant
06694-4	4.3550	-	-	-	-	-	O, 1 tassel (ph[illegible])
06694-3	68.7915	-	-	-	-	-	O, 1 stalk (photo)
06694-2	35.90	-	-	-	-	-	O, 1 ear plus husk (photo)
06694-1	31.8586	-	-	-	-	-	O, 12 leaves, (photo)
06694	140.91	-	-	-	-	-	O, 1 plant (photo)

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Corn-3			
14506	0.3447	0.0259	0.0751	-	-	-	B, 5 plants
14518	0.03766	0.1083	0.2878	0.7634	0.2318	0.304	P, 3 plants, damp
14531	0.1449	0.0174	0.1200	1.0225	0.0640	0.0626	SW, 1 plant
14542	0.3924	0.0576	0.1468	0.4164	0.0908	0.218	P, 4 plants, damp
14554	0.5493	0.0241	0.0439	-	-	-	B, 4 plants
14566	0.9922	0.2473	0.2490	1.3263	0.1930	0.146	P, 5 plants, damp
14588	1.1313	0.0619	0.0547	-	-	-	B, 3 plants
14600	1.5678	0.1607	0.1025	0.2996	0.0325	0.108	P, 2 plants, dry
14621	0.6774	0.0568	0.0838	0.2762	0.0138	0.0500	S, 1 plant, damp and dry
14656	3.3363	0.2483	0.1044	0.4657	0.0344	0.0739	S, 1 plant, semidamp
14762	13.55	1.3666	0.1009	2.3144	0.0775	0.0335	P, 1 plant, damp
14739	13.3340	0.3122	0.0234	-	-	-	OR, 1 plant
06324	0.4435	0.0334	0.0754	-	-	-	B, 5 plants
06341	0.3235	0.0096	0.0298	-	-	-	B, 3 plants
06362	2.1490	0.1832	0.0852	-	-	-	B, 3 plants
06373	3.2963	0.3480	0.1056	0.3446	0.0204	0.0592	S, 2 plants, damp and dry
06388	3.7201	0.4795	0.1289	0.5146	0.0589	0.114	P, 2 plants, damp
06406	2.6418	0.3049	0.1154	0.6945	0.0454	0.0654	SW, 3 plants
06420	3.0991	0.3373	0.1088	0.2256	0.0388	0.172	P, 1 plant, damp
06439	2.3785	0.3394	0.1427	0.3398	0.0727	0.214	P, 2 plants, damp
06462	4.4210	0.4046	0.0915	0.1067	0.0215	0.201	S, 1 plant, damp

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Corn-3 (concluded)			
06490	13.4814	0.5830	0.0432	-	-	-	B, 1 plant
06493	23.2689	1.2277	0.0528	0.7982	0.0096	0.0120	P, 1 plant, dry
06506	14.4602	0.8594	0.0594	1.1494	0.0162	0.0141	2P, 1 plant, dry
06506	14.4602	0.8594	0.0594	0.3512	0.0066	0.0188	P, 1 plant, dry
06524	25.85	2.0635	0.0798	1.2536	0.0329	0.0262	P, 1 plant, dry
06545	11.57	1.3763	0.1190	1.7784	0.0721	0.0405	SW, 1 plant
06546	4.8525	0.4535	0.0935	1.7784	0.0466	0.0262	SW, 1 plant
06561	9.59	0.3706	0.0386	-	-	-	B, 1 plant
06575-3,4	1.1521	0.2773	0.2407	2.1056	0.1080	0.0513	P, stalk plus tassel, damp
06575-3,4	1.1521	0.2773	0.2407	3.8840	0.2255	0.0581	S, stalk plus tassel, damp
06575-1	6.31	1.5545	0.2464	3.8840	0.2348	0.0604	S, 7 leaves, damp
06575-1	6.31	1.5545	0.2464	2.1056	0.1450	0.0689	P, 7 leaves, damp
06575	7.46	1.8318	0.2456	3.8840	0.2334	0.0601	S, 1 plant, damp
06575	7.46	1.8318	0.2456	2.1056	0.1394	0.0662	P, 1 plant, damp
06576	5.1933	1.2607	0.2428	3.8840	0.1959	0.0504	S, 1 plant, damp
06576	5.1933	1.2607	0.2428	2.1056	0.1366	0.0649	P, 1 plant, damp
06615	18.74	1.1038	0.0589	-	-	-	B, 1 plant
06639	25.27	1.6568	0.0656	0.3624	0.0067	0.0185	S, 1 plant, semidamp
06655-3	32.67	-	-	-	-	-	O, 1 stalk
06655-1	30.04	-	-	-	-	-	O, leaves
06655	62.71	6.1523	0.0981	-	-	-	O, 1 plant
06689-3	20.52	-	-	-	-	-	B, 1 stalk
06689-1	22.84	-	-	-	-	-	B, leaves
06689	43.36	0.5994	0.0138	-	-	-	B, 1 plant

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Corn-4			
14647	0.5440	0.0328	0.0603	-	-	-	B, 10 plants
14657	0.8588	0.1061	0.1235	0.4657	0.0632	0.136	S, 10 plants, semidamp
14672	4.9073	0.2916	0.0594*	-	-	-	O, 1 plant
14684	4.7358	0.2536	0.0535	-	-	-	B, 1 plant
14685	5.50	0.2970	0.0540	-	-	-	OR, 1 plant
14699	8.1177	0.4662	0.0574	0.1576	0.0036	0.0228	P, 1 plant, dry
14717	4.6335	0.4794	0.1035	1.4532	0.0599	0.0412	S, 1 plant, damp
14736	5.9400	0.5275	0.0888	2.7763	0.0452	0.0163	S, 1 plant, semidamp
14776	8.3278	0.7610	0.0914	3.9372	0.0680	0.0173	SW, 1 plant
14790	4.9177	0.5241	0.1066	3.9586	0.0832	0.0210	SWR, 1 plant
14808	25.88	0.3545	0.0137	-	-	-	O, 1 plant
14824	8.4915	0.0944	0.0111	-	-	-	B, 1 plant
14825-4	1.9388	0.0078	0.00402	-	-	-	B, 1 tassel
14825-3	25.6134	0.0905	0.00353	-	-	-	B, 1 stalk
14825-1	12.2140	0.0711	0.00582	-	-	-	B, 9 leaves
14825	39.7662	0.1694	0.00426	-	-	-	B, 1 plant
14845-4	2.3724	-	-	-	-	-	O, 1 tassel (photo)
14845-3	16.8411	-	-	-	-	-	O, 1 stalk (photo)
14845-1	13.2343	-	-	-	-	-	O, 11 leaves (photo)
14845	32.4478	-	-	-	-	-	O, 1 plant (photo)

* Value not used

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Lettuce-1			
06098	0.7941	0.1331	0.1676	-	-	-	B, 5 plants
06113	1.2629	0.4680	0.3706	0.8367	0.2030	0.243	P, 3 plants, dry
06114	0.7596	0.7507	0.9883	4.342	0.8207	0.189	P, 5 plants, damp
06134	1.0018	2.6589	2.6541	14.81	2.4865	0.168	P, 5 plants, damp
06151	0.8513	1.0359	1.2168	16.696	1.0492	0.0628	SW, 5 plants
06166	0.7889	0.3328	0.4219	1.602	0.2543	0.159	P, 5 plants, damp
06172	0.7893	2.1612	2.7381	9.158	2.5705	0.281	2P, 5 plants, damp
06210	1.0107	0.4517	0.4469*	-	-	-	B, 3 plants
06213	0.8915	1.3242	1.4854	7.690	1.4179	0.184	P, 3 plants, damp
06229	0.6537	0.5540	0.8475	8.199	0.7800	0.0951	SW, 2 plants
06240	0.6637	0.3252	0.4900	8.199	0.4225	0.0515	SWR, 3 plants
06260	0.4996	0.0337	0.0675	-	-	-	B, 2 plants
06268	1.0345	1.4040	1.3572	5.845	1.2897	0.221	P, 3 plants, damp
06292	2.6964	0.0661	0.0223	-	-	-	B, 3 plants
				Lettuce-2			
14387	0.7607	0.0257	0.0338	-	-	-	B, 5 plants
14404	0.8142	0.4076	0.5020	1.107	0.4682	0.423	P, 3 plants, damp
14416	0.9805	0.3410	0.3475	1.006	0.3137	0.312	SW, 5 plants
14452	1.4889	0.2277	0.1530	1.070	0.1087	0.102	P, 5 plants, dry

* Particles on stems of bottom leaves

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Lettuce-2 (continued)			
14473	0.4374	0.0465	0.1040	-	-	-	B, 3 plants
14508	1.1553	0.0197	0.0170	-	-	-	B, 2 plants
14517	1.6001	0.2346	0.1465	0.7634	0.1259	0.165	P, 2 plants, damp
14529	1.5990	0.2086	0.1305	1.0225	0.1099	0.107	SW, 1 plant
14540	1.7095	0.1050	0.0614	0.4164	0.0408	0.0980	P, 1 plant, damp
14553	0.7631	0.0195	0.0256	-	-	-	B, 1 plant
14565	2.4893	0.3742	0.1505	1.3263	0.1299	0.0979	P, 1 plant, damp
14585	3.9365	0.2849	0.0724	-	-	-	B, 1 plant
14590	14.36	0.6465	0.0450	-	-	-	B, 1 plant
14597	4.3785	0.4120	0.0941	0.2996	0.0363	0.121	P, 1 plant, damp
14620	1.1420	0.1326	0.1161	0.2762	0.0574	0.208	S, 1 plant, damp and dry
14631	5.3149	0.6761	0.1272	0.1192	0.0111	0.0931	P, 1 plant, damp
14660	8.9191	0.7148	0.0801	0.4657	0.0223	0.0479	S, 1 plant, semidamp
14661	3.5854	0.3879	0.1082	0.4657	0.0495	0.106	S, 1 plant
14671	8.9689	0.2620	0.292	-	-	-	B, 1 plant
14697	15.71	0.6152	0.0392	0.1576	0.0100	0.0634	P, 1 plant, dry
14716	12.2935	2.4374	0.1983	1.4532	0.1401	0.0964	S, 1 plant, damp
14735	14.67	2.3806	0.1623	2.7763	0.1041	0.0375	S, 1 plant, semidamp
14746	7.67	0.6686	0.0872	-	-	-	OR, 1 plant
14760	23.01	5.5790	0.2425	2.3144	0.1553	0.0671	P, 1 plant, damp
14774	5.0950	1.8285	0.3589	3.9372	0.2717	0.0690	SW, 1 plant
14789	8.5711	8.3468	0.9738	3.9586	0.8866	0.224	SWR, 1 plant

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Lettuce-2 (concluded)			
06296	1.3018	0.0223	0.0171	-	-	-	B, 5 plants
06323	0.6755	0.0356	0.0527[a]	-	-	-	B, 1 plant
06342	1.3104	0.0251	0.0191	-	-	-	B, 2 plants
				Lettuce-3			
06659	1.5189	0.4599	0.303	-	-	-	O, 3 plants
06677	0.6273	0.0273	0.0435	-	-	-	B, 20 leaves, 1 plant
06698	3.3290	-	-	-	-	-	O, 1 plant (photo)
				Onion-1			
14279	0.7088	0.0243	0.0343	-	-	-	B, 5 plants
14296	0.7188	0.2117	0.2945	19.112	0.2602	0.0136	P, 5 plants, damp
14368	2.2924	0.0392	0.0171[a]	-	-	-	B, 3 plants
14385	2.1539	0.1076	0.0500[b]	-	-	-	B, 5 plants
14403	1.8125	0.0660	0.0364	1.006	0.0176	0.0175	P, 5 plants, damp
14415	2.4041	0.0763	0.0317	1.107	0.0129	0.0117	SW, 5 plants
14433	0.5459	0.0160	0.0293	1.535	0.0105	0.00684	SW, 5 plants
14449	2.2925	0.0654	0.0285	1.070	0.0097	0.00907	P, 5 plants, dry

a Plants washed and sampled after dark with use of flashlight

b Particles on bottom part of some of the stems (cut too close to ground); value not used

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Onion-1 (continued)			
14477	0.8958	0.0184	0.0205	-	-	-	B, 5 plants
14503	1.0431	0.0154	0.0148	-	-	-	B, 3 plants
14514	1.3545	0.0347	0.0256	0.7634	0.0126	0.0165	P, 2 plants, damp
14527	1.6022	0.0304	0.0190	1.0225	0.0060	0.00587	SW, 2 plants
14538	1.9567	0.0349	0.0178	0.4164	0.0048	0.0115	P, 1 plant, damp
14550	0.9026	0.0126	0.0140	-	-	-	B, 2 plants
14562	2.4945	0.0615	0.0247	1.3263	0.0117	0.00882	P, 2 plants, damp
14581	2.4998	0.0150	0.00600	-	-	-	B, 3 plants
14595	3.8122	0.0336	0.00881	0.2996	0.00257	0.00858	P, 2 plants, dry
14617	1.6062	0.0128	0.00797	0.2762	0.00173	0.00626	S, 1 plant, damp and dry
14634	4.0106	0.0525	0.0131	0.1192	0.0051	0.0428	P, 2 plants, damp
14649	3.0500	0.0198	0.00649	-	-	-	B, 2 plants
14664	4.3698	0.0361	0.00826	0.4657	0.00202	0.00434	S, 2 plants, semidamp
14667	1.8748	0.0097	0.00517	-	-	-	B, 1 plant
14668	1.6662	0.0120	0.00720*	-	-	-	B, 1 plant
14694	4.8355	0.0268	0.00554	0.1576	~0.00037	0.00235	P, 1 plant, dry
14713	3.2990	0.0274	0.00831	1.4532	0.00355	0.00244	S, 1 plant, damp
14727	4.5670	0.0340	0.00744	1.8088	0.00268	0.00148	S, 1 plant, damp
14734	3.1974	0.0435	0.01360	0.9575	0.00616	0.00644	S, 2 plants, semidamp
14734	3.1974	0.0435	0.01360	1.3131	0.00529	0.00403	S, 2 plants, semidamp
14734	3.1974	0.0435	0.01360	2.7763	0.00884	0.00318	S, 2 plants, semidamp

* Value not used

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Onion-1 (continued)			
14744	7.1903	0.0313	0.00435	-	-	-	OR, 1 plant
14757	6.3410	0.0685	0.01080	2.3144	0.00645	0.00279	P, 1 plant, damp
14781	6.1240	0.0489	0.00798	3.9372	0.00363	0.000922	SW, 2 plants
14786	3.0316	0.0172	0.00567	3.9586	0.00132	0.000333	SWR, 1 plant
14803	10.8779	0.0452	0.00416	-	-	-	O, 2 plants
14818	5.2142	0.0160	0.00307	-	-	-	B, 2 plants
14836	21.1778	-	-	-	-	-	O, 1 plant (photo)
14842	9.6353	-	-	-	-	-	O, 3 plants (photo)
14850-3	3.7336	-	-	-	-	-	O, stems (photo)
14850-2	0.9834	-	-	-	-	-	O, seed pod (photo)
14850	4.7170	-	-	-	-	-	O, 1 plant (photo)
06053	0.2794	0.0121	0.0433	-	-	-	B, 20 plants
06061	0.3154	0.0572	0.1814	6.42	0.1381	0.0215	P, 20 plants, damp
06095	0.4451	0.0344	0.07733	-	-	-	B, 15 plants
06110	0.2792	0.0347	0.1243	0.8367	0.0470	0.0562	P, 10 plants, dry
06116	0.4846	0.0605	0.1248	4.342	0.0475	0.0109	P, 10 plants, damp
06137	0.3158	0.0569	0.1802	14.81	0.1029	0.00695	P, 10 plants, damp
06153	0.2635	0.0247	0.0937	16.696	0.0164	0.000982	SW, 10 plants
06175	0.8435	0.0948	0.1124	9.158	0.0351	0.00383	2P, 10 plants, damp
06216	0.9012	0.3034	0.3367	7.690	0.3111	0.0405	P, 5 plants, damp
06232	0.4117	0.0536	0.1302	8.199	0.1046	0.0128	SWR, 3 plants
06243	0.5841	0.0337	0.0577	8.199	0.0321	0.00392	SWR, 3 plants
06261	0.9576	0.0162	0.0169	-	-	-	B, 5 plants

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Onion-1 (concluded)			
06271	0.6483	0.1588	0.2449	5.845	0.2280	0.0390	P, 3 plants, damp
06291	1.3119	0.0184	0.00793	-	-	-	B, 3 plants
06299	0.5287	0.0156	0.0295	-	-	-	B, 5 plants
06321	0.9475	0.0097	0.0102	-	-	-	B, 2 plants
				Onion-2			
06663	0.06780	0.0131	0.0193	-	-	-	O, 10 plants
06684	0.4757	0.0066	0.0139	-	-	-	B, 10 plants
06702	4.5034	-	-	-	-	-	O, 64 plants (photo)
				Pea-1			
14507	0.9115	0.0090	0.00986	-	-	-	B, 5 plants
14519	0.9876	0.0586	0.0594	0.7634	0.0485	0.0635	P, 5 plants, damp
14530	0.7833	0.0220	0.0281	1.0225	0.0172	0.0168	SW, 5 plants
14541	0.9595	0.0338	0.0353	0.4164	0.0244	0.0586	P, 5 plants, damp
14555	0.9745	0.0101	0.0138	-	-	-	B, 5 plants
14567	1.4567	0.0842	0.0578	1.3263	0.0469	0.0354	P, 5 plants, damp
14586	3.5220	0.0444	0.0126	-	-	-	B, 3 plants
14599	2.4564	0.0568	0.0231	0.2996	0.0121	0.0404	P, 3 plants, dry
14622	2.2800	0.0360	0.0158	0.2762	0.0048	0.0174	S, 3 plants, damp and dry
14630	3.1560	0.0838	0.0266	0.1192	0.0108	0.0906	P, 3 plants, damp
14655	5.0535	0.0615	0.0122	0.4657	0.0012	0.00258	S, 3 plants, semidamp

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Pea-1 (continued)			
14670-2	3.4300	0.0067	0.00195	-	-	-	B, 5 pods
14678	31.62	0.9746	0.0308	-	-	-	O, 3 vines
14701-2	5.6984	0.0130	0.00228	0.1576	0.00033	0.00209	P, 10 pods, dry
14702	4.5810	0.0267	0.00583	0.1576	0.00383	0.0243	P, vine tops, dry
06325	0.6530	0.0244	0.0374*	-	-	-	B, 5 plants
06333	0.7091	0.0470	0.0663	0.4869	0.0554	0.114	P, 5 plants, damp
06340	1.0070	0.0090	0.00898	-	-	-	B, 5 plants
06350	0.7210	0.0410	0.0567	1.7546	0.0458	0.0261	P, 5 plants, damp
06371	2.4285	0.0226	0.00931	-	-	-	B, 3 plants
06372	2.1538	0.0729	0.0338	0.3446	0.0228	0.0662	S, 3 plants, damp and dry
06386	5.4845	0.1589	0.0290	0.5146	0.0180	0.0350	P, 3 plants, damp
06405	4.6220	0.0650	0.0141	0.6945	0.0031	0.00446	SW, 3 plants
06419	5.5785	0.1247	0.0224	0.2256	0.0114	0.0505	P, 3 plants, damp
06438	4.3917	0.0816	0.0186	0.3398	0.0076	0.0224	P, 3 plants, damp
06451	4.4826	0.0565	0.0126	0.4943	0.0016	0.00324	SW, 3 plants
06461	4.3292	0.0618	0.0143	0.1067	0.0033	0.0309	S, 3 plants, damp
06533-2	5.1632	0.0595	0.01152	1.2536	0.00982	0.00783	P, 10 pods, dry
06544-2	4.8291	0.0635	0.01315	1.7784	0.01145	0.00644	SW, 10 pods
06569-2	3.1415	0.0046	0.00146	-	-	-	B, 10 pods

* Value not used

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Pea-1 (concluded)			
06586-2	4.3855	0.0522	0.01190	3.8840	0.01020	0.00263	S, 10 pods, protected, damp
06586-2	4.3855	0.0522	0.01190	2.1056	0.00408	0.00194	P, 10 pods, protected, damp
06587-2	4.5038	0.0936	0.02078	3.8840	0.01908	0.00491	S, 10 pods, exposed, damp
06587-2	4.5038	0.0936	0.02078	2.1056	0.00763	0.00362	P, 10 pods, exposed, damp
06614-2	4.8554	0.0481	0.00991	0.9571	0.00821	0.00858	P, 10 pods, damp
06634-3	1.9284	-	-	-	-	-	O, stems
06634-2	1.7303	-	-	-	-	-	O, pods and tendrils
06634-1	1.5865	-	-	-	-	-	O, leaves
06634	5.2452	-	-	-	-	-	O, 1 vine (photo), leaf area
				Pea-2			
14646	0.9216	0.0141	0.0153	-	-	-	B, 5 plants
14658	1.4164	0.0475	0.0335	0.4657	0.0201	0.0432	S, 5 plants, semidamp
14679	14.59	0.3317	0.02273	-	-	-	O, 3 vines
14680	4.1735	0.0405	0.00970	-	-	-	O, 3 vine tops
14688	8.49	0.1044	0.01230	-	-	-	B, 2 vines
14700	8.7385	0.1429	0.01635	0.1576	0.00405	0.0257	P, 2 vines, dry
14763	15.08	0.4871	0.03230	2.3144	0.02289	0.00989	P, 2 vines, damp
14777	10.0348	0.2119	0.02112	3.9372	0.01171	0.00297	SW, 2 vines
14791	10.9813	0.1239	0.01128	3.9586	0.00187	0.000472	SWR, 2 vines
14807	13.00	0.1595	0.0123	-	-	-	O, 2 vines
14822-2	6.6325	0.0076	0.00115	-	-	-	B, 5 pods
14823	28.86	0.3622	0.0126	-	-	-	B, 3 vines
14844	19.7634	-	-	-	-	-	O, 1 vine (photo)

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Pea-2 (continued)			
06384	1.1862	0.0587	0.0495	0.5146	0.0361	0.0702	P, 5 plants, damp
06404	1.4734	0.0334	0.0227	0.6945	0.0093	0.0134	SW, 5 plants
06412	1.3575	0.0155	0.0114	-	-	-	B, 5 plants
06421	1.3547	0.0480	0.0354	0.2256	0.0220	0.0975	B, 5 plants
06440	1.2439	0.0397	0.0319	0.5398	0.0185	0.0544	P, 5 plants, damp
06452	1.0102	0.0265	0.0262	0.4943	0.0128	0.0259	SW, 5 plants
06463	1.4756	0.0394	0.0267	0.1067	0.0133	0.125	S, 5 plants, damp
06485	13.92	0.4949	0.03555	-	-	-	O, 3 vines
06491	6.00	0.0411	0.00685	-	-	-	B, 1 vine
06494	8.70	0.1695	0.01948	0.7982	0.01263	0.0158	P, 2 vines, dry
06507	6.1508	0.2097	0.03409	1.1494	0.02724	0.0237	2P, 1 vine, dry
06507	6.1508	0.2097	0.03409	0.3512	0.01461	0.0416	P, 1 vine, dry
06523	11.97	0.4821	0.04028	1.2536	0.03087	0.0246	P, 3 vines, dry
06543	6.7040	0.2220	0.03311	1.7784	0.02370	0.0133	SW, 1 vine
06562	8.8144	0.0442	0.00501	-	-	-	B, 2 vines
065 4	17.7605	1.1313	0.06370	3.8840	0.05429	0.0140	S, 3 vines, damp
06 74	17.7605	1.1313	0.06370	2.1056	0.03059	0.0145	P, 3 vines, damp
06506	7.9240	0.0825	0.01041	-	-	-	B, 2 vines
06606	9.5600	0.5948	0.06222	0.9571	0.05181	0.0541	P, 2 vines, damp
06616	5.3655	0.0669	0.01247	-	-	-	B, 1 vine
06628	10.0784	0.2143	0.02126	0.9571	0.01085	0.0113	PW, 2 vines
06635-3	1.7800	-	-	-	-	-	O, stems
06635-2	0.2474	-	-	-	-	-	O, pods and tendrils
06635-1	2.0464	-	-	-	-	-	O, leaves
06635	4.0738	-	-	-	-	-	O, 1 vine (photo), leaf area

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Pea-2 (concluded)			
06640	12.7085	0.2843	0.02237	0.3624	0.00990	0.0273	S, 2 vines, semidamp
06657	21.91	0.4982	0.0227	-	-	-	B, 1 vine
06679	15.68	0.2100	0.0134	-	-	-	B, 2 vines
				Pepper-1			
14471	0.5457	0.0195	0.0357	-	-	-	B, 10 plants
14448	0.5152	0.0257	0.0499	1.070	0.0142	0.0133	P, 10 plants, dry
14474	0.2680	0.0168	0.0627	-	-	-	B, 10 plants
14505	0.4586	0.0393	0.0857	-	-	-	B, 5 plants
14513	0.6817	0.1463	0.2150	0.7634	0.1293	0.169	P, 5 plants, damp
14526	0.6523	0.1311	0.2014	1.0225	0.1157	0.113	SW, 5 plants
14537	0.6975	0.1059	0.1518	0.4164	0.0610	0.159	P, 5 plants, damp
14580	1.6805	0.0320	0.0190	-	-	-	B, 5 plants
14594	0.5497	0.0226	0.0411	0.2996	0.0251	0.0837	P, 2 plants, dry
4612	1.0978	0.0085	0.00774	-	-	-	B, 4 plants
14616	0.4992	0.0106	0.0212	0.2762	0.0052	0.0188	S, 3 plants, damp and dry
14635	0.8480	0.0302	0.0356	0.1192	0.0144	0.121	P, 4 plants, damp
14651	1.2832	0.0275	0.0214	-	-	-	B, 4 plants
14665	2.4023	0.0600	0.0250	0.4657	0.0090	0.0193	S, 4 plants, semidamp
14665A	1.0531	0.0393	0.0373	-	-	-	B, 1 plant
14666A	0.9628	0.0294	0.0305	-	-	-	B, 1 plant
14743	2.3355	0.1365	0.0584	-	-		OR, 2 plants

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Pepper-1 (concluded)			
14693	1.9701	0.0707	0.0359	0.1576	0.0020	0.0127	P, 3 plants, dry
14712	2.3129	0.1266	0.0547	1.4532	0.0208	0.0143	S, 3 plants, damp
14725	2.5233	0.1652	0.0655	0.3556	0.0108	0.0304	P, 2 plants, damp
14725	2.5233	0.1652	0.0655	1.8088	0.0316	0.0175	S, 2 plants, damp
14731	1.7603	0.1043	0.0592	1.3131	0.0045	0.00342	S, 2 plants, semidamp
14731	1.7603	0.1043	0.0592	2.7763	0.0298	0.0107	S, 2 plants, semidamp
14756	2.6737	0.2899	0.1084	2.3144	0.0500	0.0216	P, 3 plants, damp
14771	3.2920	0.2311	0.0702	3.9372	0.0118	0.00300	SW, 3 plants
14787	1.7307	0.2321	0.1341	3.9586	0.0757	0.0191	SWR, 1 plant (splashed)
14802	4.5172	0.1543	0.0342	-	-	-	O, 3 plants
14816	3.5443	0.0427	0.0120	-	-	-	B, 1 plant
14817-2	3.9574	0.0029	0.000733	-	-	-	B, 2 fruit
14847-3	1.1116	-	-	-	-	-	O, stem (photo)
14847-2	5.6597	-	-	-	-	-	O, fruit (photo)
14847-1	2.4457	-	-	-	-	-	O, leaves (photo)
14847	9.2170	-	-	-	-	-	O, 1 plant (photo)
06389	2.7040	0.0975	0.0360	0.5146	0.0200	0.0389	P, 2 plants, damp
06402	2.4145	0.0730	0.0302	0.6945	0.0140	0.0204	SW, 3 plants
06423	1.3923	0.0595	0.0427	0.2256	0.0267	0.118	P, 4 plants, damp
06497	0.8763	0.0518	0.0591	0.7982	0.0252	0.0316	P, 2 plants, dry
06662	1.1853	0.0883	0.0745	-	-	-	O, 1 plant
06685	0.9745	0.0237	0.0243	-	-	-	B, 1 plant
06703	1.5633	-	-	-	-	-	O, 1 plant (photo)

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Potato-1			
14598	0.8761	0.0750	0.0856	0.2996	0.0489	0.163	P, 1 plant, dry
14659	1.1288	0.1339	0.0916	0.4657	0.0549	0.118	S, 1 plant, semidamp
14677	2.6385	0.1724	0.0653	-	-	-	B, 1 plant
14698	2.3265	0.1719	0.0739	0.1576	0.0086	0.0546	P, 1 plant, dry
14747	3.5183	0.1745	0.0496	-	-	-	OR, 1 plant
14761	2.2605	0.4620	0.2044	2.3144	0.1548	0.0669	P, 1 plant, damp
14775	1.6657	0.4850	0.2912	3.9372	0.2416	0.0614	SW, 1 plant
14806	1.6557	0.1178	0.0711	-	-	-	O, 1 plant
14821	1.9966	0.0826	0.0414	-	-	-	B, 2 plants
14843	3.4072	-	-	-	-	-	O, 1 plant (photo)
06363	0.9100	0.0358	0.0393	-	-	-	B, 1/2 plant
06413	1.3328	0.0455	0.0341	-	-	-	B, 1 plant
06374	3.8134	0.3059	0.0802	0.3446	0.0435	0.126	S, 1 plant, damp and dry
06385	4.1636	0.2481	0.0596	0.5146	0.0229	0.0445	P, 1 plant, damp
06403	1.5991	0.0997	0.0623	0.6945	0.0256	0.0369	SW, 1 plant
06422	1.3267	0.1169	0.0881	0.2256	0.0514	0.228	P, 1 plant, damp
06441	1.4553	0.1362	0.0936	0.3398	0.0569	0.167	P, 1 plant, damp
06453	1.4850	0.0932	0.0628	0.4943	0.0261	0.0528	SW, 1 plant
06464	1.7458	0.0668	0.0383	0.1067	0.0016	0.0150	S, 1 plant, semidamp
06486	4.7508	1.1213	0.2360	-	-	-	O, 1 plant
06495	5.2103	0.4855	0.0932	0.7982	0.0564	0.0706	P, 1 plant, dry
06508	3.3418	0.3029	0.0906	1.1494	0.0538	0.0468	2P, 1 plant, dry
06508	3.3418	0.3029	0.0906	0.3512	~0.0	-	P, 1 plant, dry

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Potato-1 (concluded)			
06509	4.4301	0.4146	0.0936	1.1494	0.0568	0.0494	2P, 1 plant, dry
06509	4.4301	0.4146	0.0936	0.3512	~0.0	-	P, 1 plant, dry
06521	7.9239	0.0846	0.0107	-	-	-	B, 1 plant
06531	2.6258	0.6694	0.2549	1.2536	0.2181	0.174	P, 1 plant, dry
06532	4.9750	0.7988	0.1606	1.2536	0.1238	0.0988	P, 1 plant, dry
06547	2.8340	0.3933	0.1388	1.7784	0.1020	0.0574	SW, 1 plant
06548	2.7930	0.5138	0.1840	1.7784	0.1472	0.0828	SW, 1 plant
06563	4.0835	0.0779	0.0191	-	-	-	B, 1 plant
06577	7.6566	2.6511	0.3464	3.8840	0.3096	0.0797	S, 1 plant, damp
06577	7.6566	2.6511	0.3464	2.1056	0.1850	0.0879	P, 1 plant, damp
06597	2.9701	0.1690	0.0569	-	-	-	B, 1 plant
06607	3.5485	0.5125	0.1444	0.9571	0.0875	0.0914	P, 1 plant, damp
06617	5.9100	0.1121	0.0190	-	-	-	B, 1 plant
06627	2.5815	0.2378	0.0921	0.9571	0.0352	0.0368	PW, 1 plant
06641	5.8217	0.3928	0.0675	0.3624	0.0485	0.134	S, 1 plant, semidamp
06658	2.6382	0.6735	0.255	-	-	-	O, 1 plant
06676	3.6259	0.0571	0.0157	-	-	-	B, 1 plant
06697	2.7864	-	-	-	-	-	O, 1 plant (photo)
				Radish-1			
14583	0.8532	0.0505	0.0592	-	-	-	B, 3 plants
14593	0.8510	0.0525	0.0617	0.2996	0.0103	0.0344	P, 3 plants, dry
14605	0.9937	0.0587	0.0591	0.2996	0.0077	0.0257	SW, 3 plants

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Radish-1 (continued)			
14609	1.1056	0.0435	0.0393	-	-	-	B, 4 plants
14614	0.8500	0.0589	0.0693	0.2762	0.0179	0.0648	S, 3 plants, damp and dry
14633	1.4528	0.1472	0.1013	0.1192	0.0320	0.268	P, 4 plants, damp
14660A	1.4629	0.0673	0.0460	-	-	-	B, 1 plant
14661A	1.6086	0.1084	0.0674	-	-	-	B, 1 plant
14666	2.9008	0.2188	0.0754	0.4657	0.0240	0.0515	S, 4 plants, semidamp
14692	3.1458	0.1971	0.0626	0.1576	0.0059	0.0374	P, 3 plants, dry
14711	4.2575	0.4254	0.0999	1.4532	0.0548	0.0377	S, 2 plants, damp
06365	0.8980	0.0549	0.0611	-	-	-	B, 3 plants
06377	1.6551	0.1461	0.0883	0.3446	0.0369	0.107	S, 3 plants, damp and dry
06390	1.8129	0.1671	0.0922	0.5146	0.0408	0.0793	P, 4 plants, damp
06401	1.4070	0.1035	0.0736	0.6945	0.0222	0.0320	SW, 5 plants
06411	1.5285	0.0703	0.0460	-	-	-	B, 4 plants
06424	1.4026	0.1797	0.1281	0.2256	0.0767	0.340	P, 4 plants, damp
06445	0.9692	0.0880	0.0908	0.3398	0.0394	0.116	P, 4 plants, damp
06455	1.6318	0.1325	0.0812	0.4943	0.0298	0.0603	SW, 4 plants
06466	2.3325	0.1507	0.0646	0.1067	0.0132	0.124	S, 4 plants, damp
06484	2.5843	0.9231	0.3572	-	-	-	O, 3 plants
06566	2.1328	0.0658	0.0309	-	-	-	B, 3 plants
06599	2.9121	1.3353	0.4585	-	-	-	O, 3 plants
06620	2.5087	0.0906	0.0361	-	-	-	B, 3 plants
06498	4.5173	0.3331	0.0737	0.7982	0.0286	0.0358	P, 3 plants, dry
06511	4.7637	0.4874	0.1023	1.1494	0.0572	0.0498	2P, 3 plants, dry

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Radish-1 (concluded)			
06511	4.7637	0.4874	0.1023	0.3512	0.0286	0.0814	P, 3 plants, dry
06529	4.2090	0.8883	0.2110	1.2536	0.1659	0.132	P, 3 plants, dry
06560	1.5411	0.2776	0.1801	1.7784	0.1350	0.0759	SW, 3 plants
06581	1.7985	0.8406	0.4674	3.8840	0.4223	0.109	S, 3 plants, damp
06581	1.7985	0.8406	0.4674	2.1056	0.2873	0.136	P, 3 plants, damp
06609	4.4855	2.6836	0.5983	0.9571	0.1398	0.146	P, 3 plants, damp
06644	4.9275	0.3273	0.0664	0.3624	0.0303	0.0836	S, 3 plants, semidamp
06666	2.3185	0.4532	-	-	-	-	O, 2 plants
06686	1.8600	0.0464	-	-	-	-	B, 2 plants
				Squash-1			
14003	1.0380	0.1534	0.1476	-	-	-	B, 1 plant
14012	1.2608	0.2396	0.1904	2.100	0.428	0.0204	P, 1 plant, dry
14020	0.7582	0.0451	0.0595	-	-	-	B, 1 plant
14029-1	0.3995	1.5521	3.89	39.55	3.74	0.0946	S, 2 leaves, damp and dry
14035-1	0.7584	6.4053	8.43	-	-	-	O, 4 leaves
14039-1	0.6863	0.7566	1.102	6.420	1.042	0.162	P, 3 leaves, dry
14054-1	0.3922	7.4708	19.05	6.60	18.99	2.88	SR, 3 leaves
14062-1	0.7904	0.1787	0.226*	-	-	-	B, 3 leaves
14072-1	0.8471	0.2234	0.264	6.095	0.164	0.0269	P, 4 leaves, dry

* Particles on tips of leaves

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Squash-1 (continued)			
14083-1	0.2137	0.9240	4.32	36.82	4.22	0.115	P, 2 leaves, damp
14084-1	0.2780	2.7571	9.93	36.82	9.83	0.267	P, 2 leaves, damp
14095-1	0.6172	2.5968	4.20	18.59	4.10	0.221	P, 3 leaves, dry
14096-1	0.7504	9.4500	12.61	55.41	12.51	0.226	2P, 4 leaves, damp
14108	1.5325	0.1853	0.121	-	-	-	B, 1 plant
14120	3.0711	0.5939	0.193	1.249	0.072	0.0576	P, 2 plants, dry
14134	1.5327	2.0584	1.343	12.62	1.219	0.0966	P, 2 small plants, damp
14139	1.1966	0.5111	0.427	21.43	0.303	0.0141	SW, 1 plant
14152	1.4973	0.5258	0.351	23.49	0.227	0.00966	SW, 1 plant
14156-2*	0.0951	0.2311	2.430	23.49	2.430	0.103	S, 1 blossom, damp
14162	1.5569	4.6318	2.975	27.63	2.851	0.103	SWR, 1 plant
14171	0.8170	0.0200	0.147	-	-	-	SWR, 1 plant
14198-1	2.9641	0.4208	0.1420	1.413	0.1090	0.0770	P, 3 leaves, dry
14199-2	0.7871	0.0983	0.1249	1.413	0.1249	0.0884	P, 3 fruits, dry
14211-1	3.8350	1.1117	0.2899	8.348	0.2569	0.0308	S, 10 leaves (1 plant), damp
14223-1	1.7771	0.0371	0.0209	-	-	-	B, 3 leaves
14231-1,3	1.1608	0.1396	0.1203	1.249	0.0994	0.0796	P, 1 plant less 2 leaves, dry
14231-1	0.5041	0.0633	0.1256	1.249	0.1047	0.0838	P, 2 leaves, dry
14231	1.6649	0.2029	0.1219	1.249	0.1010	0.0809	P, 1 plant, dry
14239-1	1.8270	1.0957	0.5997	0.075	0.5667	0.0624	P, 3 leaves, dry
14266-2	0.6360	0.0322	0.0506	0.4503	0.0506	0.112	P, 1 fruit, dry
14266-1(1)	0.8000	0.0790	0.0988	0.4503	0.0658	0.146	P, 1 leaf, dry
14266-1(2)	1.1457	0.1063	0.0928	0.4503	0.0598	0.133	P, 1 leaf, dry
14266-1(3)	0.5570	0.0778	0.1397	0.4503	0.1067	0.237	P, 1 leaf, dry

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p^o (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Squash-1 (continued)			
14266-1(4)	1.3810	0.0651	0.0471	0.4503	0.0141	0.0313	P, 1 leaf, dry
14266-1(5)	0.9793	0.0985	0.1006	0.4503	0.0676	0.150	P, 1 leaf, dry
14266-1(6)	1.1422	0.0418	0.0366	0.4503	0.0036	0.00799	P, 1 leaf, dry
14266-1(7)	1.2705	0.0967	0.0761	0.4503	0.0431	0.0957	P, leaf, dry
14266-1(8)	1.3316	0.0767	0.0576	0.4503	0.0246	0.0546	P, 1 leaf, dry
14266-1	8.6073	0.6419	0.0746	0.4603	0.0146	0.0924	P, 8 leaves, dry
14266	9.2433	0.6741	0.0729	0.4503	0.0422	0.0937	P, 1 plant, dry
14272-1	3.1043	0.1749	0.0563	-	-	-	B, 3 leaves
14289-2	0.8315	0.0060	0.00722	-	-	-	B, 1 fruit
14291-1	2.8171	9.7672	3.4671	19.112	3.4108	0.178	P, 2 leaves, damp
14292-2	2.1669	0.7284	0.3361	19.112	0.3289	0.0172	P, 2 fruits, damp
14293-2*	0.3120	1.0244	3.2833	19.112	3.2833	0.172	P, 2 flowers, damp
14318-1	3.5270	7.2451	2.0542	24.236	1.9979	0.0824	SW, 3 leaves
14321-1	3.0353	5.3067	1.7483	25.602	1.6920	0.0661	SW, 2 leaves
14336	40.34	35.0843	0.8697	16.092	0.8134	0.0505	P, 1 plant, dry
14343-1	2.1204	3.0177	1.4784	(8.55)[b]	1.4221	0.166	P, 1 leaf, damp
14344-1	2.4868	2.1402	0.8606	(8.70)[b]	0.8043	0.0924	SW, leaf
14345-1	1.8390	1.9538	1.0624	(9.10)[b]	1.0061	0.111	SW, leaf
14346[a]	20.4968	0.9752	0.0476	1.104	0.0326	0.0295	P, 1 plant (8 leaves), dry

a Plant very thoroughly spray-washed
b Value calculated from dew balance record

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	S ple Designation
				Squash-1 (continued)			
14350-1	1.3584	0.1443	0.1062	1.104	0.0499	0.0452	P, 1 leaf, horizontal, dry
14351-1	1.1695	0.1459	0.1248	1.104	0.0685	0.0620	P, 1 leaf, ~45 degrees from horizontal, dry
14365-1	4.4385	0.4428	0.0996[a]	-	-	-	B, 2 leaves
14366-2	29.4782	0.0627	0.00213	-	-	-	B, 1 fruit
14383-1	6.2282	0.1273	0.0203	-	-	-	B, 2 leaves
14399-1	1.8618	0.3882	0.2085	1.006	0.1882	0.187	P, 1 leaf (north), damp
14400-1	2.3636	0.3371	0.1425	1.006	0.1222	0.121	P, 1 leaf (west), damp
14409-2*	0.3004	0.0561	0.1870	1.006	0.1870	0.186	P, 1 flower (protected), damp
14410-1	4.9646	0.5735	0.1155	1.107	0.0952	0.0860	SW, 1 leaf
14411-1	4.7098	0.4348	0.0922	1.107	0.0719	0.0650	SW, 2 leaves
14422-1	4.5291	0.6349	0.1405	1.139	0.1202	0.105	SW, 2 leaves
14431-1	3.5431	0.5693	0.1604	1.535	0.1401	0.0913	SW, 2 leaves
14442-1	3.2959	0.7372	0.2240	2.187	0.2037	0.0931	SW, 2 leaves
14444-2	6.2869	0.1536	0.0244	1.070	0.0223	0.0208	P, 2 small fruit, dry
14445-1	4.5482	0.4752	0.1045	1.070	0.0779	0.0728	P, 2 leaves, dry
14451-2	23.63	0.0849	0.00358	1.070	0.0015	0.00140	P, 1 large fruit, dry
14475-1	4.0026	0.0464	0.0116	-	-	-	B, 2 leaves
14504-1	1.9282	0.1162	0.0603	-	-	-	B, 2 leaves
14512-1	2.4644	0.2387	0.0969	0.7634	0.0605	0.0792	P, 2 leaves, damp

a Plant washed and sampled after dark with use of flashlight; value not used

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p m/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Squash-1 (continued)			
14525-1	3.1820	0.2365	0.0744	1.0225	0.0380	0.0372	SW, 2 leaves
14536-1	4.9540	0.4716	0.0952	0.4164	0.0588	0.141	P, 2 leaves, damp
14549-1	3.0160	0.0379	0.0126	-	-	-	B, 1 leaf
14561-1	3.8308	0.6001	0.1566	1.3263	0.1202	0.0906	P, 2 leaves, damp
14815	2.4267	0.0703	0.0475	-	-	-	B, 5 leaves
14846-3	1.9716	-	-	-	-	-	O, stem (photo)
14846-2	6.2831	-	-	-	-	-	O, 6 fruit (photo)
14846-1	13.45	-	-	-	-	-	O, 12 leaves (photo)
14846	22.3071	-	-	-	-	-	O, 1 plant (photo)
06005-1	0.2512	0.0235	0.0936	-	-	-	B, 3 leaves
06017	0.5863	1.7791	3.035	13.68	2.941	0.215	P, 3 plants, damp
06026	0.4438	0.3804	0.856	31.44	0.762	0.0242	SW, 2 plants
06038	0.3672	0.6570	1.792	39.02	1.698	0.0435	SWR, 2 plants
06049	3.3375	0.3718	0.111	-	-	-	B, 1 plant
06057	4.1390	5.0809	1.228	6.42	1.117	0.174	P, 1 plant, damp
06073	0.9814	0.6675	0.680	7.03	0.569	0.0809	SWR, 1 plant
06084	2.4628	0.2856	0.116	-	-	-	B, 1 plant
06093-1	2.5881	0.1652	0.0638	-	-	-	B, 3 leaves
06108-1	2.5605	0.3948	0.1542	0.8367	0.0904	0.108	P, 3 leaves, dry
06119-1	2.8325	2.8416	1.0032	4.342	0.9394	0.216	P, 3 leaves, dry
06120-2*	0.4609	0.2925	0.6346	4.342	0.6346	0.146	P, 2 upright open flowers
06140-1	2.5028	6.2926	2.5142	14.81	2.4812	0.168	P, 3 leaves, damp
06156-1	1.7869	2.1159	1.1841	16.696	1.1511	0.0689	SW, 3 leaves

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Squash-1 (concluded)			
06157-2	0.7870	0.3618	0.4597	16.696	0.4597	0.0275	P, 1 fruit, damp
06158-2*	0.2373	0.9520	4.0118	16.696	4.0118	0.240	P, 1 upright flower, damp
06164-1	1.7400	0.9597	0.5516	1.602	0.5186	0.324	P, 3 leaves, damp
06177-1	1.6070	3.2767	2.0390	9.158	2.0060	0.219	2P, 3 leaves, damp
06188-1	2.3093	0.5002	0.2166	11.908	0.1836	0.0154	SWR, 3 (top) leaves
06218-1	1.2765	1.6753	1.3124	7.690	1.2561	0.163	P, 1 leaf, damp
06234-1	1.5725	1.5861	1.0086	8.199	0.9523	0.116	SW, 1 leaf
06245-1	1.1184	1.0131	0.9058	9.199	0.8495	0.104	SWR, 1 leaf
06288-1	3.9016	0.1878	0.0480	-	-	-	B, 3 leaves
06647-1	1.0768	0.1149	0.1067	0.3624	~0.0725	~0.200	S, 11 leaves, 2 plants, semidamp
				Tomato-1			
14008	0.4510	0.1162	0.257	-	-	-	B, 12 plants
14016	0.3241	0.1223	0.377	2.100	0.120	0.0571	P, 10 plants, dry
14024	0.1531	0.0110	0.0718	-	-	-	B, 6 plants
14033	0.1841	0.4659	2.53	39.55	2.27	0.0574	S, 6 plants, dry and damp
14037	0.2752	2.0474	7.44	-	-	-	O, 6 plants
14042	0.1599	0.0480	0.300	6.420	0.228	0.0355	P, 6 plants, dry
14064	0.2671	0.0921	0.345	-	-	-	B, 6 plants
14074	0.1509	0.1802	1.193	6.095	0.848	0.139	P, 6 plants, dry
14086	0.1526	1.2030	7.88	36.82	7.57	0.206	P, 6 plants, damp
14099	0.1627	0.4291	2.64	18.59	2.33	0.125	P, 6 plants, dry

Table 15 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Tomato-1 (concluded)			
14100	0.1780	0.9712	5.46	55.41	5.15	0.0929	2P, 6 plants, damp
14110	0.3093	0.0242	0.0782	-	-	-	B, 3 plants
14132	0.2815	0.4278	1.520	12.62	1.442	0.114	P, 2 plants, damp
14280	0.9415	0.2161	0.2295	-	-	-	B, 1/2 plant
14297	1.6040	3.1576	1.9686	19.112	1.7391	0.0910	P, 3/4 plant, damp
14401	1.1499	0.2214	0.1925	1.006	0.1229	0.122	P, 1/2 plant, damp
14413	0.8521	0.1505	0.1765	1.107	0.1069	0.0966	SW, 1/2 plant
14423	1.2004	0.2221	0.1848	1.139	0.1152	0.101	SW, 1/2 plant
14432	1.7910	0.3428	0.1914	1.535	0.1218	0.0793	SW, 1/2 plant
06012	0.0936	0.0513	0.548	-	-	-	B, 20 plants
06018	0.1223	0.3747	3.07	13.68	2.52	0.184	P, 24 plants, damp
06029	0.1229	0.2380	1.935	31.44	1.387	0.0441	SW, 20 plants
06041	0.0708	0.2834	4.01	39.02	3.46	0.0887	SWR, 12 plants
06051	0.2288	0.0489	0.214	-	-	-	B, 2 plants
06060	0.4189	0.2770	0.661	6.42	0.447	0.0696	P, 3 plants, damp
				Tomato-2			
14370	0.6777	0.1720	0.2540*	-	-	-	B, 1 plant
14389	0.3532	0.0341	0.0965	-	-	-	B, 1/2 plant
14447	1.1413	0.2207	0.1935	1.070	0.1239	0.116	P, 1 plant, dry
14478	0.9149	0.0389	0.0426	-	-	-	B, 1 plant

* Plant washed and sampled after dark with use of flashlight; value not used

Table 15 (concluded)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Tomato-3			
14849	7.6897	-	-	-	-	-	O, 3 plants (photo)
				Tomato-4			
14830	1.6401	0.0721	-	-	-	-	B, 2 plants
06665	0.4364	0.1593	-	-	-	-	O, 4 plants
06687	0.3254	0.0533	-	-	-	-	B, 5 plants

Table 16

SUMMARY OF PLANT AND FOLIAR CONTAMINATION DATA FOR CEREAL GRAINS

Notations

Sample Numbers: 14,000's for Plot No. 1
06,000's for Plot No. 2

B Background deposit remaining on washed specimens of foliage or plant

P Primary samples (short-period exposure or unweathered depositions representing initial contamination levels); 2P--samples with two successive primary depositions

S Secondary samples (long-period exposure representing weathering effects, multiple depositions, etc.)

O Original unwashed specimens (except for rain and wind cleaning to date of sampling)

R Weathering by rain (SR, secondary sample, washed by rain)

W Weathering by wind (SW, secondary sample, exposed to wind)

SWR Secondary samples, weathered by wind and then by rain

W_L Dry weight of foliage (gm)

Δm_L Dry weight of ceniza-arena retained on the foliage (gm)

C_p Foliar concentration of ceniza-arena, $W_L/\Delta m_L$ (gm/gm)

Δm Dry weight of ceniza-arena deposited per unit area of ground surface (gm/sq ft)

C_p^o C_p corrected for background (gm/gm)

a_L Contamination factor, $C_p^o/\Delta m$ (sq ft/gm)

Table 16

SUMMARY OF PLANT AND FOLIAR CONTAMINATION DATA FOR CEREAL GRAINS

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Barley-1			
14048-1	0.2635	0.2554	0.969	-	-	-	O, several blades
14058	0.7378	0.0282	0.0382	-	-	-	B, 8 plants
14071	2.5077	0.9575	0.382	6.095	0.344	0.0564	P, 27 plants, dry[a]
14093	2.0913	4.4533	2.13	18.59	2.10	0.113	P, 22 plants, dry
14117	7.5858	0.5273	0.0695	-	-	-	B, 10 stalks
14127	13.4036	1.3688	0.1021	0.0326	1.249	0.0261	P, 23 stalks, dry
14136	8.9939	4.3747	0.486	0.446	12.62	0.0353	P, 19 stalks, damp
14143	9.1307	1.6679	0.183	0.143	21.43	0.00667	SW, 14 stalks
14150	9.9340	1.0137	0.1020	0.0620	23.49	0.00264	SW, 17 stalks
14158	11.4678	0.7749	0.0676	0.0276	27.63	0.00100	SWR, 22 stalks
14157	5.7639	0.0597	0.0104	-	-	-	B, 10 stalks
14194	10.4726	2.1203	0.202	0.162	4.70	0.0345	P, 22 stalks, damp
14205	8.6512	1.8954	0.2191	8.348	0.1263	0.0151	S, 6 stalks, damp
14208-2	3.6248	1.0689	0.2949	8.348	0.2381	0.0285	S, 5 heads, damp
14222-1,3	5.9851	1.7805	0.2975[b]	-	-	-	B, 5 stalks less heads
14222-2	3.1808	0.1241	0.0390	-	-	-	B, 5 heads
14222	9.1659	1.9046	0.2078[b]	-	-	-	B, 5 stalks
14229-2	2.6739	0.7265	0.2717	8.452	0.2149	0.0254	SW, 5 heads

a Plants in 0.35 sq ft of ground area

b Particles on some of the bottom leaves, values not used

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Barley-1 (continued)			
14236-2	2.4370	0.1895	0.0778	1.249	0.0388	0.0311	P, 5 heads, dry
14243-2	3.7510	1.1202	0.2986	10.32	0.2596	0.0251	P, 5 heads, dry
14250-1,3	6.6994	1.7626	0.2631	58.08	0.1703	0.00293	SWR, 5 stalks less heads
14250-2	3.3575	0.8142	0.2425	58.08	0.1857	0.00320	SWR, 5 heads
14250	10.0569	2.5768	0.2562	58.08	0.1638	0.00281	SWR, 5 stalks
14254-2	4.2142	0.6482	0.1538	60.81	0.0970	0.00160	SWR, 5 heads
14257	9.9345	2.3462	0.2362	60.81	0.1434	0.00236	SWR, 5 stalks
14272	9.8392	1.0850	0.1103	-	-	-	B, 5 stalks
14285-2	5.2325	0.7982	0.1525	-	-	-	B, 5 heads
14286	8.2110	1.7386	0.2117*	-	-	-	B, 5 stalks
14305-2	5.3829	1.5618	0.2901	19.112	0.1376	0.00720	P, 5 heads, damp
14306	2.3563	0.5807	0.2464	19.112	0.1145	0.00599	P, 2 stalks, damp
14310-2	4.5658	1.2662	0.2773	24.236	0.1248	0.00515	SW, 5 heads
14315-2	3.6933	0.8167	0.2211	24.236	0.0686	0.00283	SW, 5 heads
14320-2	2.8613	0.5600	0.1957	24.236	0.0432	0.00178	SW, 5 heads
14327-2	3.0136	0.5456	0.1810	25.602	0.0285	0.00111	SW, 5 heads
14333-2	2.9892	0.4781	0.1599	26.444	0.0074	0.0280	SWR, 5 heads
14359-2	4.9403	0.9466	0.1915	-	-	-	OR, 5 heads
14381-1,3	7.8510	1.9497	0.2475	-	-	-	B, 5 stalks less heads
14381-2	6.0912	1.0013	0.1644	-	-	-	B, 5 heads
14381	13.9422	2.5510	0.1830	-	-	-	B, 5 stalks

* Lower leaves almost dead, difficult to clean in field; value not used

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Barley-1 (continued)			
14395-1,3	9.2210	3.0549	0.3313	1.006	0.0113	0.0112	P, 5 stalks less heads, damp
14395-2	5.9556	1.1126	0.1888	1.006	0.0164	0.0163	P, 5 heads, damp
14395	15.1766	4.1675	0.2746	1.006	0.0083	0.00825	P, 5 stalks, damp
14419-2	5.1653	0.9716	0.1881	1.107	0.0157	0.0142	SW, 5 heads
14429-2	5.2514	0.9664	0.1840	1.535	0.0116	0.00756	SW, 5 heads
14438-1,3	8.9052	2.9644	0.3329	2.187	0.0129	0.00590	SW, 5 stalks less heads
14438-2	4.7302	0.0493	0.1795	2.187	0.0071	0.00325	SW, 5 heads
14438	13.6354	3.8137	0.2797	2.187	0.0134	0.00613	SW, 5 stalks
14462-2	4.7998	0.8489	0.1769	2.200	0.0045	0.00205	SW, 5 heads
14466-2	4.1240	0.7502	0.1819	3.333	0.0095	0.00285	SWR, 5 heads
14471	9.9776	2.8492	0.2856	3.333	0.0193	0.00579	SWR, 5 stalks
14481	5.5455	1.4772	0.2663	-	-	-	OR, 5 stalks
14485-2	7.0081	1.1303	0.1613	-	-	-	OR, 10 heads
06011	0.3594	0.0093	0.0259	-	-	-	B, 4 plants
06021	2.8175	1.8706	0.663	13.68	0.637	0.0466	P, 28 plants, damp*
06032	1.7046	0.5607	0.329	31.44	0.303	0.00964	SW, 17 plants
06035	1.6360	0.1868	0.1143	39.02	0.0884	0.00227	SWR, 16 plants
06048	4.9618	0.1917	0.0386	-	-	-	OR, 10 stalks
06066	13.4230	4.0180	0.299	0.260	6.42	0.0405	P, 26 stalks, damp
06067	12.7108	1.0034	0.0789	0.0403	7.03	0.00573	SWR, 25 stalks

* Plants in 0.35 sq ft of ground area

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Barley-1 (continued)			
06074	10.5860	1.1224	0.1060	0.0674	9.26	0.00728	SWR, 21 stalks
06080	8.0749	0.4963	0.0615	-	-	-	OR, 15 stalks
06102-2	3.8496	0.2867	0.0745	-	-	-	B, 5 heads
06105	8.3248	0.6263	0.0752	-	-	-	B, 5 stalks
06124-2	3.3980	0.3109	0.0915	4.342	0.0170	0.00392	P, 5 heads, damp
06126	7.5500	0.8309	0.1101	4.342	0.0349	0.00804	P, 5 stalks, dry
06132-2	2.9880	0.4900	0.1640	14.81	0.1072	0.00724	P, 5 heads, damp
06143	5.6272	2.8163	0.5005	14.81	0.4077	0.0275	P, 5 stalks, damp
06148-2	2.7948	0.3515	0.1258	16.70	0.0690	0.00413	SW, 5 heads
06159	5.5424	0.9589	0.1730	16.70	0.0802	0.00480	SW, 5 stalks
06169-2	2.9524	0.3651	0.1237	18.14	0.0669	0.00369	S, 5 heads, damp
06180-2	3.3363	0.4991	0.1496	9.158	0.0238	0.00260	2P, 5 heads, damp
06186-2	3.0524	0.1887	0.0618	11.908	0.0050	0.000420	SWR, 5 heads
06191	7.1345	0.5528	0.0775	28.60	0.0023	0.0000804	SWR, 5 stalks
06199-2	5.5485	0.6249	0.1126	-	-	-	OR, 5 heads
06200	9.1502	1.0808	0.1181	-	-	-	OR, 5 stalks
06206	3.7146	0.2946	0.0793	-	-	-	B, 5 heads
06207	7.7044	1.1223	0.1457	-	-	-	B, 5 stalks
06222-2	4.6149	0.7351	0.1593	7.690	0.0633	0.00823	P, 5 heads, damp
06225	7.8909	1.2664	0.1605	7.690	0.0286	0.00372	P, 5 stalks, damp
06237-2	4.0412	0.6328	0.1566	8.199	0.0606	0.00739	SW, 5 heads
06249-2	4.4920	0.6584	0.1466	8.199	0.0506	0.00617	SWR, 5 heads
06256-1,3	5.3220	0.9793	0.1840	8.199	0.0149	0.00182	SWR, 5 stalks less heads

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Barley-1 (continued)			
06256-2	4.8848	0.5776	0.1182	8.199	0.0222	0.00271	SWR, 5 heads
06256	10.2068	1.5569	0.1525	8.199	0.0206	0.00251	SWR, 5 stalks
06277-1,3	4.9875	0.8681	0.1741	5.845	0.0050	0.000855	P, 5 stalks less heads, damp
06277-2	4.5984	0.6676	0.1452	5.845	0.0492	0.00842	P, 5 heads, damp
06277	9.5859	1.5357	0.1602	5.845	0.0283	0.00484	P, 5 stalks, damp
06286-2	3.9171	0.9028	0.2310	-	-	-	OR, 5 heads, upright
06287-2	4.4500	0.8779	0.1975	-	-	-	OR, 5 heads, hanging down
06303	5.5315	1.3358	0.2362	-	-	-	OR, 5 stalks
06307-2	8.5280	1.2043	0.1412	-	-	-	OR, 10 heads
				Barley-2			
14675	2.4065	0.0574	0.0239	-	-	-	OR, 5 stalks
14705	2.3228	0.0709	0.0305	0.1576	0.0066	0.0419	P, 5 stalks, dry
14720	4.1293	0.2087	0.0505	1.4532	0.0266	0.0183	S, 10 stalks, damp
14812	7.9190	0.1309	0.0165	-	-	-	OR, 10 stalks
14829	7.7000	0.0576	0.00748	-	-	-	B, 10 stalks
06415	1.3240	0.0507	0.0383	-	-	-	B, 20 plants
06427	1.0873	0.0870	0.0800	0.2256	0.0417	0.185	P, 20 plants, damp
06446	1.3147	0.1091	0.0830	0.3398	0.0447	0.132	P, 20 plants, damp
06458	1.2740	0.0610	0.0479	0.4943	0.0096	0.0194	SW, 20 plants
06468	1.5674	0.0535	0.0341	0.1067	0.0041	0.0384	S, 20 plants, damp
06477	3.0462	0.4132	0.1356	-	-	-	O, 10 stalks

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Barley-2 (continued)			
06536	2.1850	0.3827	0.1751	1.2536	0.0395	0.0315	P, several stalks, dry
06537	3.1487	0.5644	0.1792	1.2536	0.0436	0.0348	P, 10 stalks, dry
06555	3.0160	0.4457	0.1478	1.7784	0.0122	0.00686	SW, 10 stal'
06572	2.8469	0.0902	0.0317	-	-	-	B, 10 stalks
06590	2.8519	0.3806	0.1335	2.1056	0.1018	0.0483	P, 10 stalks, damp
06603	3.6210	0.6748	0.1864	-	-	-	O, 10 stalks
06613	4.0339	0.9746	0.2416	0.9571	0.0552	0.0577	P, 10 stalks, damp
06625	3.8305	0.0821	0.0214	-	-	-	B, 10 stalks
06631	6.6753	-	-	-	-	-	O, 10 stalks, leaf area (photo)
06651	4.3920	0.1518	0.0346	0.3624	0.0132	0.0364	S, 10 stalks, semidamp
06670	9.46	0.3635	0.0384	-	-	-	Ok, 10 stalks
06675	9.2778	-	-	-	-	-	O, 10 stalks (photo)
06690	4.8061	0.1206	0.0251	-	-	-	B, 5 stalks
				Oat-1			
14046-1	0.4768	1.3371	2.804	-	2.744	-	O, several blades
14051-1	0.7453	0.0623	0.0836	-	0.0234	-	OR, several blades
14059	0.8474	0.0511	0.0602	-	-	-	B, 6 plants
14070	4.4094	1.0062	0.228	6.095	0.168	0.0276	P, 27 plants, dry*
14092	1.5543	1.5542	1.000	18.59	0.954	0.0513	P, 10 plants, dry
14116	6.2849	0.1918	0.0305	-	-	-	B, 10 stalks

* Plants in 0.35 sq ft of ground area

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Oat-1 (continued)			
14126	6.4081	0.4113	0.0642	0.0337	1.249	0.0270	P, 21 stalks, dry
14137	10.8897	3.1205	0.287	0.259	12.62	0.0205	P, 22 stalks, damp
14144	12.5156	1.7642	0.141	0.113	21.43	0.00527	SW, 24 stalks
14149	9.5595	0.8993	0.0941	0.0665	23.49	0.00283	SW, 15 stalks
14159	8.3123	0.3792	0.0456	0.0180	27.63	0.000651	SWR, 17 stalks
14168	3.8728	0.0961	0.0248	-	-	-	B, 10 stalks
14183	8.2741	0.3837	0.0464	0.0188	16.26	0.00116	SW, 17 stalks
14195	9.0570	1.0386	0.1147	0.0847	4.70	0.0180	P, 15 stalks, damp
14206	8.9691	0.7489	0.0835	8.348	0.0477	0.00571	S, 8 stalks, damp
14207-2	1.6464	0.0288	0.0175	8.348	0.0075	0.000898	S, 5 heads, damp
14220-1,3	4.0050	0.1363	0.0340	-	-	-	B, 5 stalks less heads
14220-2	1.2205	0.0083	0.00680	-	-	-	B, 5 heads
14220	5.2255	0.1446	0.0277	-	-	-	B, 5 stalks
14228-2	1.1467	0.0167	0.0146	8.452	0.0046	0.000544	SW, 5 heads
14237-2	1.2139	0.0133	0.0110	1.249	0.0042	0.00336	P, 5 heads, dry
14244-2	1.8837	0.0620	0.0329	10.32	0.0261	0.00253	P, 5 heads, dry
14248-1,3	7.3155	0.9688	0.1324	58.08	0.0984	0.00169	SWR, 5 stalks less heads
14248-2	1.7750	0.0170	0.0096	58.08	0.0028	0.0000482	SWR, 5 heads
14248	9.0905	0.9858	0.1084	58.08	0.0726	0.00125	SWR, 5 stalks
14253-2	2.0179	0.0175	0.0087	60.81	0.0019	0.0000312	SWR, 5 heads
14261	6.3805	0.4541	0.0712	60.81	0.0354	0.000582	SWR, 5 stalks
14271	7.3720	0.3043	0.0413	-	-	-	B, 5 stalks
14283-2	3.6865	0.0545	0.0148	-	-	-	B, 5 heads
14284	6.3236	0.4384	0.0693	-	-	-	B, 5 stalks
14303-2	2.6962	0.2618	0.0971	19.112	0.0823	0.00431	P, 5 heads, damp
14304	2.7614	0.5122	0.1855	19.112	0.1162	0.00608	P, 2 stalks, damp

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Oat-1 (continued)			
14309-2	2.8503	0.2205	0.0774	24.236	0.0626	0.00258	SW, 5 heads
14314-2	3.4359	0.2593	0.0755	24.236	0.0607	0.00250	SW, 5 heads
14326-2	2.6224	0.0953	0.0338	25.602	0.0190	0.00C0742	SW, 5 heads
14332-2	2.9904	0.0734	0.0245	26.444	0.0097	0.000367	SWR, 5 heads
14358-2	5.7293	0.1510	0.0261*	-	-	-	OR, 5 heads
14378-1,3	9.0386	0.6202	0.0686	-	-	-	B, 5 stalks less heads
14378-2	3.2357	0.0557	0.0172	-	-	-	B, 5 heads
14378	12.2743	0.6759	0.0551	-	-	-	B, 5 stalks
14394-1,3	5.8904	0.4937	0.0838	1.006	0.0152	0.0151	P, 5 stalks less heads, damp
14394-2	4.2113	0.1126	0.0268	1.006	0.0143	0.0142	P, 5 heads, damp
14394	10.1017	0.6063	0.0600	1.006	0.0148	0.0147	P, 5 stalks, damp
14418-2	5.9012	0.1250	0.0212	1.107	0.0087	0.00786	SW, 5 heads
14428-2	3.6571	0.0734	0.0201	1.535	0.0076	0.00495	SW, 5 heads
14437-1,3	5.1781	0.3934	0.0761	2.187	0.0075	0.00343	SW, 5 stalks less heads
14437-2	3.1425	0.0506	0.0161	2.187	0.0036	0.00164	SW, 5 heads
14437	8.3206	0.4440	0.0534	2.187	0.0060	0.00274	SW, 5 stalks
14461-2	4.1764	0.0806	0.0145	2.200	0.0020	0.000909	SW, 5 heads
14465-2	3.4422	0.0516	0.0149	3.333	0.0024	0.000720	SWR, 5 heads
14470	10.3497	0.6536	0.0630	3.333	0.0079	0.00237	SWR, 5 stalks
14482	10.9917	0.6459	0.0646	-	-	-	OR, 5 stalks
14486-2	4.3356	0.0541	0.0127	-	-	-	OR, 5 heads
14498-2	6.8526	0.0512	0.00746	-	-	-	OR, 5 heads

* Value not used

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Oat-1 (continued)			
14521-2	7.5461	0.0897	0.0119	0.7634	0.0043	0.00563	P, 5 head, 1 damp
14533-2	6.4040	0.0589	0.0092	1.0225	0.0016	0.00156	SW, 5 heads
14544-2	3.5181	0.0416	0.0117	0.4164	0.0041	0.00985	P, 5 heads, damp
14556-2	8.8707	0.0674	0.00774	-	-	-	OR, 5 heads
06009	0.5602	0.0180	0.0321	-	-	-	B, 6 plants
06020	2.5175	1.2894	0.512	13.68	0.480	0.0351	P, 32 plants, damp*
06031	2.1481	0.2158	0.1005	31.44	0.0684	0.00218	SW, 20 plants
06034A	2.4789	0.1748	0.0705	39.02	0.0384	0.000984	SWR, 20 plants
06047	7.7643	0.2465	0.0317	-	-	-	OR, 10 stalks
06065	9.8003	2.0251	0.2066	0.175	6.42	0.0272	P, 24 stalks, damp
06068	18.7773	1.5458	0.0823	0.0506	7.03	0.00720	SWR, 30 stalks
06075	15.2336	0.6250	0.0410	0.0093	9.26	0.00100	SWR, 22 stalks
06081	7.1152	0.2435	0.0342	-	-	-	OR, 10 stalks
06101-2	2.7178	0.0360	0.0132	-	-	-	B, 5 heads
06104	11.4018	0.4390	0.0385	-	-	-	B, 5 stalks
06123-2	3.3390	0.0956	0.0286	4.342	0.0154	0.00355	P, 5 heads, damp
06125	12.59	1.1286	0.0896	4.342	0.0511	0.0118	P, 5 stalks, dry
06131-2	3.0731	0.2306	0.0750	14.81	0.0650	0.00439	P, 5 heads, damp
06142	9.8770	2.6996	0.2733	14.81	0.2375	0.0160	P, 5 stalks, damp
06150-2	2.1137	0.0274	0.0130	16.70	0.0030	0.000180	SW, 5 heads
06161	8.9382	0.6762	0.0757	16.70	0.0399	0.00239	SW, 5 stalks

* Plants in 0.35 sq ft of ground area

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Oat-1 (continued)			
06171-2	2.0667	0.0605	0.0293	18.14	0.0193	0.00106	S, 5 heads, damp
06179-2	2.2567	0.1013	0.0449	9.158	0.0319	0.00348	2P, 5 heads, damp
06185-2	1.6310	0.0171	0.0105	11.908	0.0005	0.0000420	SWR, 5 heads
06190	11.5780	0.6896	0.0596	28.60	0.0238	0.000832	SWR, 5 stalks
06197-2	3.9327	0.0345	0.00877	-	-	-	OR, 5 heads
06198	11.1804	0.7599	0.0680	-	-	-	OR, 5 stalks
06205	8.5167	0.5254	0.0617	-	-	-	B, 5 stalks
06221-2	3.0168	0.3650	0.1210	7.690	0.1092	0.0142	P, 5 heads, damp
06227	9.4557	1.0149	0.1073	7.690	0.0425	0.00553	P, 5 stalks, damp
06236-2	3.6816	0.2192	0.0595	8.199	0.0477	0.00582	SW, 5 heads
06248-2	2.7918	0.1121	0.0402	8.199	0.0284	0.00346	SWR, 5 heads
06254-1,3	8.7252	0.7215	0.0827	8.199	0.0029	0.000354	SWR, 5 stalks less heads
06254-2	2.4847	0.0437	0.0176	8.199	0.0058	0.000707	SWR, 5 heads
06254	11.2099	0.7652	0.0683	8.199	0.0035	0.000427	SWR, 5 stalks
06273-1,3	6.2631	0.8755	0.1398	5.845	0.0533	0.00912	P, 5 stalks less heads, damp
06273-2	2.5763	0.1600	0.0621	5.845	0.0503	0.00861	P, 5 heads, damp
06273	8.8394	1.0355	0.1171	5.845	0.0523	0.00878	P, 5 stalks, damp
06285-2	5.4076	0.0658	0.0122	-	-	-	OR, 5 heads
06304	13.6352	0.9046	0.0663*	-	-	-	OR, 5 stalks
06309-2	10.4549	0.0836	0.00800	-	-	-	OR, 10 heads
06327-2	6.2418	0.0623	0.00990*	-	-	-	OR, 5 heads
06337-2	3.3874	0.0460	0.0136	0.4869	0.0060	0.0123	P, 5 heads, damp

* Values not used

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designations
				Oat-2			
14589	0.4024	0.0124	0.0308	-	-	-	B, 20 plants
14603	0.4916	0.0190	0.0386	0.2996	0.0078	0.0260	P, 20 plants, dry
14623	0.4354	0.0219	0.0503	0.2762	0.0195	0.0706	S, 20 plants, damp and dry
14638	0.5658	0.0405	0.0716	0.1192	0.0213	0.179	P, 20 plants, damp
14668	0.8411	0.0383	0.0455	0.4657	0.0147	0.0316	S, 20 plants, semidamp
14673	3.2745	0.1283	0.0392	-	-	-	OR, 10 stalks
14687	3.1944	0.1780	0.0557	-	-	-	OR, 10 stalks
14703	1.8924	0.0953	0.0504	0.1576	0.0030	0.0190	P, 5 stalks, dry
14718	2.7375	0.1455	0.0585	1.4532	0.0111	0.00764	S, 10 stalks, damp
14748	3.2175	0.1104	0.0343	-	-	-	OR, 10 stalks
14764	4.3178	0.5564	0.1544	2.3144	0.1201	0.0519	P, 10 stalks, damp
14778	4.2333	0.1940	0.0458	3.9372	0.0115	0.00292	SW, 10 stalks
14792	4.7870	0.1947	0.0407	3.9586	0.0064	0.00162	SWR, 10 stalks
14809	6.5409	0.1739	0.0266	-	-	-	OR, 10 stalks
14826	5.3875	0.2015	0.0374	-	-	-	B, 5 stalks
06476	3.2041	0.2902	0.0906	-	-	-	O, 10 stalks
06503	2.3454	0.1620	0.0691	0.7982	0.0427	0.0535	P, 10 stalks, dry
06516	2.9481	0.2283	0.0774	1.1494	0.0510	0.0444	2P, 10 stalks, dry
06516	2.9481	0.2283	0.0774	0.3512	0.0083	0.0236	P, 10 stalks, dry
06535	2.7575	0.2212	0.0802	1.2536	0.0538	0.0429	P, 10 stalks, dry
06554	3.0086	0.1028	0.0342	1.7784	0.0078	0.00439	SW, 10 stalks
06571	3.7452	0.0828	0.0221	-	-	-	B, 10 stalks
06589	2.2154	0.3454	0.1559	2.1056	0.1338	0.0635	P, 10 stalks, damp
06602	3.3145	0.3479	0.1050	-	-	-	O, 10 stalks

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Oat-2 (continued)			
06612	3.5970	0.4261	0.1185	0.9571	0.0135	0.0141	P, 10 stalks, damp
06624	3.2086	0.0988	0.0308	-	-	--	B, 10 stalks
06630	3.3530	-	-	-	-	-	O, 10 stalks, leaf area (photo)
06650	2.9983	0.1287	0.0429	0.3625	0.0121	0.0334	S, 10 stalks, semidamp
				Rye-1			
14010	0.6044	0.1316	0.2177	-	-	-	B, 8 plants
14019	2.3150	0.9893	0.4273	2.100	0.2096	0.0998	P, 31 plants, dry*
14026	0.5427	0.0185	0.0341	-	-	-	B, 7 plants
14047-1	0.2682	1.1224	4.185	-	4.151	-	O, several blades, damp
14049-1	0.4386	0.0566	0.1290	-	0.0949	-	OR, several blades
14057	0.3898	0.0461	0.1183	-	-	-	B, 5 plants
14069	2.4730	1.3529	0.5471	6.095	0.4288	0.0704	P, 32 plants, dry*
14082	2.2391	4.9092	2.192	36.82	2.074	0.0563	P, 33 plants, damp*
14094	2.0313	4.4505	2.192	18.59	2.074	0.112	P, 28 plants, dry*
14114	1.0803	0.1611	0.1491	-	-	-	B, 10 stalks
14125	5.3377	0.9556	0.1790	1.249	0.0299	0.0239	P, 41 stalks, dry
14145	2.4509	2.9062	1.1858	21.43	1.0367	0.0484	SW, 22 stalks, damp
14151	2.2113	2.1631	0.9782	23.49	0.8291	0.0353	SW, 24 stalks
14160	2.0115	0.8799	0.4374	27.63	0.02883	0.0104	SWR, 15 stalks
14169	1.3168	0.0935	0.0710	-	-	-	B, 10 stalks
14196	3.9726	1.3482	0.3394	4.70	0.2684	0.0571	P, 34 stalks, damp

* Plants in 0.35 sq ft of ground area

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Rye-1 (continued)			
14255-2	0.6048	0.0260	0.0430	-	-	-	OR, 3 heads
14258	5.0060	0.2068	0.0413	-	-	-	OR, 5 stalks
14288-1,3	3.2240	0.0753	0.0234	-	-	-	B, 5 stalks less heads
14288-2	1.2277	0.0535	0.0436	-	-	-	B, 5 heads
14288	4.4517	0.1288	0.0289	-	-	-	B, 5 stalks
14307-2	1.0589	0.6049	0.5713	19.112	0.5277	0.0276	P, 5 heads, damp
14311-2	1.1897	0.6451	0.5422	24.236	0.4986	0.0206	SW, 5 heads
14316-2	0.8237	0.3889	0.4721	24.236	0.4285	0.0177	SW, 5 heads
14328-2	1.2483	0.4039	0.3236	25.602	0.2800	0.0109	SW, 5 heads
14334-2	0.8326	0.2159	0.2593	26.444	0.2157	0.00816	SWR, 5 heads
14360-2	1.3072	0.3257	0.2490*	-	-	-	OR, 5 heads
14379-1,3	2.6991	0.0260	0.00966	-	-	-	B, 5 stalks less heads
14379	3.3658	0.0660	0.0120	-	-	-	B, 5 stalks
14397-1,3	5.3169	0.0815	0.0153	1.006	0.0056	0.00557	P, 5 stalks less heads, damp
14397-2	1.5719	0.1879	0.1195	1.006	0.0595	0.0591	P, 5 heads, damp
14397	6.8888	0.2694	0.0391	1.006	0.0271	0.0269	P, 5 stalks, damp
14420-2	1.3266	0.1323	0.0997	1.107	0.0397	0.0359	SW, 5 heads
14426-2	0.9984	0.0947	0.0948	1.139	0.0348	0.0306	SW, 5 heads
14430-2	1.3234	0.0978	0.0740	1.535	0.0140	0.00912	SW, 5 heads
14440-1,3	5.3536	0.1190	0.0222	2.187	0.0125	0.00571	SW, 5 stalks less heads
14440-2	0.9745	0.0740	0.0759	2.187	0.0159	0.00727	SW, 5 heads
14440	6.3281	0.1930	0.0305	2.187	0.0185	0.00846	SW, 5 stalks

* Value not used

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Rye-1 (continued)			
14463-2	1.2950	0.1023	0.0790	2.20	0.0190	0.00864	SW, 5 heads
14467-2	0.8534	0.0541	0.0634	3.333	0.0034	0.00102	SWR, 5 heads
14472	5.7292	0.1323	0.0231	3.333	0.0111	0.00333	SWR, 5 stalks
14483	6.5236	0.1609	0.0246	-	-	-	OR, 5 stalks
14487-2	1.9479	0.1600	0.0823	-	-	-	OR, 10 heads
14500-2	1.8879	0.0567	0.0300	-	-	-	OR, 5 heads
14522-2	1.4078	0.0708	0.0503	0.7634	0.0203	0.0266	P, 5 heads, damp
14534-2	1.4225	0.0506	0.0355	1.0225	0.0055	0.00538	SW, 5 heads
14545-2	0.9668	0.0441	0.0456	0.4164	0.0156	0.0374	P, 5 heads, damp
14558-2	1.1538	0.0432	0.0374	-	-	-	OR, 5 heads
14559	5.4320	0.0786	0.0145	-	-	-	OR, 5 stalks
14568-2	1.3264	0.0827	0.0623	1.3263	0.0323	0.0244	P, 5 heads, damp
14569	6.6296	0.1578	0.0238	1.3263	0.0093	0.00701	P, 5 stalks, damp
14574	4.5300	0.1736	0.0383	-	-	-	O, 5 stalks
14575-2	1.3150	0.0504	0.0383	-	-	-	O, 5 heads
14578	8.5040	0.0592	0.00696	-	-	-	B, 5 stalks
14579-2	1.3123	0.0337	0.0257	-	-	-	B, 5 heads
14601-2	1.3392	0.0806	0.0602	0.2996	0.0219	0.0731	P, 5 heads, dry
14607-2	1.3948	0.0548	0.0393	0.2996	0.0010	0.00334	SW, 5 heads
14639-1,3	5.8549	0.1104	0.0189	0.3954	0.0102	0.0258	P, 5 stalks less heads, dry
14639-2	1.5194	0.0720	0.0474	0.3954	0.0091	0.0230	P, 5 heads, damp
14639	7.3743	0.1824	0.0247	0.3954	0.0131	0.0331	P, 5 stalks, damp
14652-2	1.9820	0.0828	0.0418	-	-	-	OR, 5 heads

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Rye-1 (continued)			
14653	7.5533	0.0722	0.00956	-	-	-	OR, 5 stalks
14669-2	1.6110	0.0932	0.0579	0.4657	0.0161	0.0346	S, 5 heads, semidamp
14670	7.7603	0.1642	0.0212	0.4657	0.0096	0.0206	S, 5 stalks, semidamp
14674	6.3735	0.0626	0.00982	-	-	-	O, 5 stalks
14676-2	2.1076	0.0203	0.00963	-	-	-	O, 5 heads
14706-2	2.4575	0.0431	0.0175	0.1576	0.0079	0.0501	P, 5 heads, dry
06010	0.2951	0.0154	0.0522	-	-	-	B, 5 plants
06022	1.2325	0.8604	0.6981	13.68	0.6459	0.0472	P, 25 plants, damp[a]
06034	1.7291	1.0232	0.5918	31.44	0.5396	0.0172	SW, 35 plants
06037	1.2324	0.1687	0.1369	39.02	0.0847	0.00217	SWR, 25 plants
06045	2.2828	0.4197	0.1838	-	-	-	OR, 10 stalks
06063	8.3325	3.4108	0.4093	0.2255	6.42	0.0351	P, 45 stalks, damp
06069	3.1662	0.7913	0.2499	0.0661	7.03	0.00940	SWR, 18 stalks
06076	7.3461	1.4739	0.2006	0.0168	9.26	0.00181	SWR, 27 stalks
06082	1.9038	0.6857	0.3602[b]	-	-	-	OR, 10 stalks
06106-1	2.5194	0.3695	0.1467	-	-	-	B, several blades
06128	2.4390	0.6551	0.2686	4.342	0.2273	0.0523	P, 3 stalks, damp
06133-2	0.6341	0.3887	0.6130	14.81	0.5700	0.0385	P, 3 heads, damp
06144-1	2.2199	2.9176	1.3143	14.81	1.1676	0.0788	P, several blades, damp
06147-2	0.5775	0.1085	0.1879	16.70	0.1449	0.00868	SW, 3 heads

a Plants in 0.35 sq ft of ground area

b Particles on bottom part of some stalks

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Eyc-1 (continued)			
06182-2	0.7626	0.3300	0.4327	9.158	0.2448	0.0267	2P, 3 heads, damp
06187-2	0.5628	0.0471	0.0837	11.908	0.0407	0.00342	SWR, 3 heads
06202-1,3	3.7055	0.0882	0.0238	-	-	-	OR, 5 stalks less heads
06202-2	0.9156	0.0902	0.0985	-	-	-	OR, 5 heads
06202	4.6211	0.1784	0.0386	-	-	-	OR, 5 stalks
06209-1,3	2.9156	0.0852	0.0292	-	-	-	B, 5 stalks less heads
06209-2	0.7145	0.0760	0.1064	-	-	-	B, 5 heads
06209	3.6301	0.1612	0.0444	-	-	-	B, 5 stalks
06223-2	0.5754	0.2007	0.3488	7.690	0.2464	0.0320	P, 5 heads, damp
06224	3.0112	0.4109	0.1365	7.690	0.0950	0.0124	P, 5 stalks, damp
06238-2	0.9192	0.2343	0.2549	8.199	0.1525	0.0186	SW, 5 heads
06250-2	0.6727	0.1231	0.1830	8.199	0.0806	0.00983	SWR, 5 heads
06258-1,3	3.4173	0.0943	0.0276	8.199	0.0011	0.000134	SWR, 5 stalks less head
06258-2	0.6887	0.1064	0.1545	8.199	0.0521	0.00635	SWR, 5 heads
06258	4.1060	0.2007	0.0489	8.199	0.0097	0.00183	SWR, 5 stalks
06279-1,3	5.6859	0.4285	0.0754	5.845	0.0489	0.00837	P, 5 stalks less heads, damp
06279-2	0.9127	0.3437	0.3766	5.845	0.2742	0.0469	P, 5 heads, damp
06279	6.5986	0.7722	0.1170	5.845	0.0800	0.0137	P, 5 stalks, damp
06283-2	1.0779	0.0951	0.0887	-	-	-	OR, 5 heads
06305	7.3556	0.0832	0.0113	-	-	-	OR, 5 stalks
06308-2	2.1701	0.0587	0.0271	-	-	-	OR, 10 heads
06328-2	1.1265	0.0493	0.0438	-	-	-	OR, 5 heads
06329	6.0643	0.1301	0.0216*	-	-	-	OR, 5 stalks

* Value not used

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Rye-1 (continued)			
06336-2	1.3205	0.1043	0.0790	0.4869	0.0352	0.0723	P, 5 heads, damp
06346-2	0.9677	0.0442	0.0457	0.4869	0.0019	0.00390	SW, 5 heads
06351-2	0.7917	0.0641	0.0823	1.7546	0.0385	0.0219	P, 5 heads, damp
06352	4.7262	0.1173	0.0248	1.7546	0.0116	0.00661	P, 5 stalks, damp
06357-2	1.3756	0.0663	0.0482	-	-	-	O, 5 heads
06358	7.7530	0.2298	0.0284	-	-	-	O, 5 stalks
06359-2	0.8339	0.0347	0.0416	-	-	-	B, 5 heads
06360	3.9892	0.0597	0.0150	-	-	-	B, 5 stalks
06378-2	1.1513	0.0765	0.0664	0.3446	0.0182	0.0528	S, 5 heads, damp and dry
06379	6.0470	0.0972	0.0161	0.3446	0.0045	0.0130	S, 5 stalks, damp and dry
06393-2	1.2291	0.0784	0.0638	0.5146	0.0222	0.0431	P, 5 heads, damp
06394	4.9305	0.1090	0.0221	0.5146	0.0105	0.0204	P, 5 stalks, damp
06407-2	0.9610	0.0472	0.0491	0.6945	0.0075	0.0108	SW, 5 heads
06408	4.0497	0.0696	0.0172	0.6945	0.0056	0.00806	SW, 5 stalks
06414-2	0.9640	0.0409	0.0424	-	-	-	OR, 5 heads
06428-2	1.1017	0.0630	0.0572	0.2256	0.0148	0.0656	P, 5 heads, damp
06435-2	1.1495	0.0713	0.0620	-	-	-	OR, 5 heads
06436	3.9341	0.0580	0.0147	-	-	-	OR, 5 stalks
06447-2	1.5154	0.1230	0.0812	0.3398	0.0192	0.0565	P, 5 heads, damp
06448	5.3805	0.1592	0.0296	0.3398	0.0149	0.0438	P, 5 stalks, damp
06459-2	1.3610	0.0966	0.0710	0.4943	0.0090	0.0182	SW, 5 heads
06469-2	1.5743	0.1206	0.0766	0.1067	0.0056	0.0525	S, 5 heads, damp
06478	8.1001	0.1099	0.0136	-	-	-	O, 5 stalks
06488-2	2.5545	0.0680	0.0266	-	-	-	O, 5 heads

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Rye-1 (concluded)			
06538-2	1.5737	0.1283	0.0815	1.2536	0.0609	0.0486	P, 5 heads, dry
06539	6.2135	0.1909	0.0307	1.2536	0.0190	0.0152	P, 5 stalks, dry
06556-2	1.9685	0.0876	0.0445	1.7784	0.0239	0.0134	SW, 5 heads
06591-2	2.1986	0.1770	0.0805	3.8840	0.0599	0.0154	S, 5 heads, damp
06591-2	2.1986	0.1770	0.0805	2.1056	0.0360	0.0171	P, 5 heads, damp
06633-2	4.5890	0.1168	0.0255	-	-	-	O, 10 heads, area (photo)
06671	2.2682	0.0979	0.0432	-	-	-	O, 6 heads
				Wheat-1			
14009	0.6430	0.0754	0.1173	-	-	-	B, 11 plants
14017	1.2413	0.3482	0.2808	2.100	0.1635	0.0779	P, 22 plants, dry*
14018	0.7790	0.2753	0.3528	2.100	0.2355	0.1122	P, 15 plants, dry*
14025	0.8475	0.0298	0.0352	-	-	-	B, 15 plants
14045-1	0.2066	0.9585	4.639	-	4.604	-	O, several blades
14050-1	0.6237	0.1093	0.1752	-	0.1400	-	OR, several blades
14055	0.5463	0.0331	0.0606	-	-	-	B, 10 plants
14056	0.5113	0.0391	0.0765	-	-	-	B, 10 plants
14067	3.2105	0.6425	0.2003	6.095	0.1397	0.0229	P, 52 plants*
14068	2.4351	0.8629	0.3542	6.095	0.2777	0.0456	P, 48 plants, dry*
14081	2.4199	7.6124	3.148	36.82	3.081	0.0837	P, 43 plants, damp*
14091	1.4123	1.9902	1.408	18.59	1.341	0.0721	P, 25 plants, dry*
14115	3.1401	0.0687	0.0219	-	-	-	B, 10 stalks

* Plants in 0.35 sq ft of ground area

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Wheat-1 (continued)			
14124	10.6462	0.9852	0.0925	1.249	0.0627	0.0502	P, 34 stalks, dry *
14135	10.9961	8.2947	0.7543	12.62	0.7245	0.0574	P, 44 stalks, damp *
14146	8.1544	1.9604	0.2404	21.43	0.2106	0.00983	SW, 23 stalks
14148	11.1377	1.5001	0.1347	23.49	0.1049	0.00446	SW, 36 stalks
14161	7.4946	0.5281	0.0705	27.63	0.0407	0.00147	SWR, 20 stalks
14170	3.5835	0.0932	0.0260	-	-	-	B, 10 stalks
14177	4.1434	0.9028	0.2179	16.26	0.1939	0.0119	S, 10 stalks, damp
14178	4.8050	0.7453	0.1551	16.26	0.1311	0.00806	S, 15 stalks, damp
14179	4.7782	0.8132	0.1702	16.26	0.1462	0.00899	SW, 15 stalks
14180	4.2920	0.5995	0.1397	16.26	0.1157	0.00712	SW, 14 stalks
14181	3.0390	0.2471	0.0813	16.26	0.0573	0.00352	SW, 10 stalks
14182	4.0881	0.4841	0.1184	16.26	0.0944	0.00580	SW, 12 stalks
14184	2.9553	0.1913	0.0647	16.26	0.0407	0.00250	SW, 9 stalks
14185	5.3104	0.4140	0.0780	16.26	0.0540	0.00332	SW, 17 stalks
14186	4.7944	0.2460	0.0513	16.26	0.0273	0.00168	SW, 15 stalks
14187	4.4752	0.3012	0.0673	16.26	0.0433	0.00266	SW, 14 stalks
14188	3.6799	0.1515	0.0412	16.26	0.0172	0.00106	SWR, 12 stalks
14189	6.3571	0.2352	0.0370	16.26	0.0130	0.000800	SWR, 20 stalks
14190	5.6360	0.4732	0.0840	16.84	0.0600	0.00356	SWR, 20 stalks
14191	5.7523	0.1633	0.0284	16.84	0.0044	0.000261	SWR, 16 stalks
14197	4.8784	0.8280	0.1697	4.70	0.1399	0.0298	P, 16 stalks, damp

* Plants in 0.29 sq ft of ground area

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Wheat-1 (continued)			
14204	7.0435	1.2459	0.1769	8.348	0.1389	0.0166	S, 11 stalks, damp
14210-2	0.9082	0.1137	0.1252	8.348	0.0586	0.00702	S, 5 heads, damp
14218-1,3	3.4845	0.1072	0.0308	-	-	-	B, 5 stalks less heads
14218-2	0.7160	0.0597	0.0834	-	-	-	B, 5 heads
14218	4.2005	0.1669	0.0397	-	-	-	B, 5 stalks
14227-2	0.8037	0.0902	0.1122	8.452	0.0288	0.00341	SW, 5 heads
14235-2	0.6067	0.0553	0.0911	1.249	0.0077	0.00616	P, 5 heads, dry
14242-2	0.9044	0.1087	0.1202	10.32	0.0368	0.00357	P, 5 heads, dry
14246-1,3	3.6835	0.3947	0.1072	58.08	0.0764	0.00132	SWR 5 stalks less heads
14246-2	0.8768	0.0817	0.0932	58.08	0.0266	0.000458	SWR, 5 heads
14246	4.5603	0.4764	0.1045	58.08	0.0665	0.00114	SWR, 5 stalks
14252-2	0.7659	0.0645	0.0842	60.81	0.0176	0.000289	SWR, 5 heads
14256	3.5896	0.3308	0.0922	60.81	0.0542	0.000891	SWR, 5 stalks
14270	4.2360	0.1671	0.0394	-	-	-	B, 5 stalks
14281	1.3612	0.1352	0.0993	-	-	-	B, 5 heads
14282	4.2820	0.3211	0.0750	-	-	-	B, 5 stalks
14301-2	1.1605	0.3402	0.2931	19.112	0.1938	0.0101	P, 5 heads, damp
14302	1.3504	0.3934	0.2913	19.112	0.2163	0.0113	P, 2 stalks, damp
14308	1.3502	0.3170	0.2348	24.236	0.1355	0.00559	SW, 5 heads
14313-2	1.0350	0.2418	0.2336	24.236	0.1343	0.00554	SW, 5 heads
14319-2	1.0986	0.2218	0.2019	24.236	0.1026	0.00423	SW, 5 heads
14325-2	0.8814	0.1799	0.2041	25.602	0.1048	0.00409	SW, 5 heads
14331-2	0.8543	0.1586	0.1856	26.444	0.0863	0.00326	SWR, 5 heads

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Wheat-1 (continued)			
14338-2	1.6459	0.3066	0.1863	8.55*	0.0889	0.0104	P, 5 heads, damp
14339-2	1.6461	0.2891	0.1756	8.70*	0.0782	0.00899	SW, 5 heads
14340-2	1.8436	0.3024	0.1640	9.10*	0.0666	0.00732	SW, 5 heads
14341-2	1.7266	0.2759	0.1598	9.50*	0.0624	0.00657	SW, 5 heads
14342-2	1.6655	0.2393	0.1437	9.50*	0.0463	0.00487	SW, 5 heads
14357-2	1.7256	0.2312	0.1340	-	-	-	OR, 5 heads
14375-1,3	2.7613	0.2513	0.0910	-	-	-	B, 5 stalks less heads
14375-2	1.9530	0.2150	0.1101	-	-	-	B, 5 heads
14375	4.7143	0.4518	0.0958	-	-	-	B, 5 stalks
14391 2	1.7024	0.2072	0.1215	1.006	0.0114	0.0113	P, 5 heads, damp
14391	5.1665	0.5974	0.1156	1.006	0.0176	0.0175	P, 5 stalks, damp
14395-1,3	3.4641	0.3902	0.1129	1.006	0.0210	0.0209	P, 5 stalks less heads, damp
14417-2	1.6515	0.1979	0.1198	1.107	0.0097	0.00876	SW, 5 heads
14425-2	1.9187	0.2258	0.1177	1.139	0.0076	0.00667	SW, 5 heads
14427-2	1.3362	0.1549	0.1159	1.535	0.0058	0.00378	SW, 5 heads
14434-1,3	3.2462	0.3576	0.1102	2.187	0.0181	0.00828	SW, 5 stalks less heads
14434-2	1.5518	0.1780	0.1147	2.187	0.0046	0.00210	SW, 5 heads
14434	4.7980	0.5356	0.1116	2.187	0.0136	0.00622	SW, 5 stalks
14460-2	1.6795	0.1892	0.1126	2.20	0.0025	0.00114	SW, 5 heads
14464-2	1.7286	0.1936	0.1020	3.333	0.0019	0.000570	SWR, 5 heads
14469	3.8382	0.3863	0.1006	3.333	0.0026	0.000780	SWR, 5 stalks

* Values estimated from dew balance chart data

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Wheat-1 (continued)			
14480	3.8373	0.3412	0.0889	-	-	-	OR, 5 stalks
14484-2	2.6805	0.3219	0.1201	-	-	-	OR, 10 heads
14499-2	3.2295	0.1586	0.0491	-	-	-	OR, 5 heads
14520-2	3.2171	0.2055	0.0639	0.7634	0.0148	0.0194	P, 5 heads, damp
14532-2	3.2287	0.1600	0.0496	1.0225	0.005	0.00489	SW, 5 heads
14543-2	3.7580	0.2112	0.0562	0.4164	0.0071	0.0170	P, 5 heads, damp
14557-2	3.2289	0.2240	0.0697	-	-	-	OR, 5 heads
06008	0.6015	0.0263	0.0437	-	-	-	B, 10 plants
06019	1.7690	1.3293	0.751	13.68	0.707	0.0517	P, 21 plants, damp[a]
06033	1.6554	0.2062	0.1244	31.44	0.0807	0.00257	SW, 20 plants
06036	1.7673	0.1481	0.0835	39.02	0.0398	0.00102	SWR, 25 plants
06046	4.4320	0.7119	0.161[b]	-	-	-	OR, 10 stalks
06062	9.3665	1.9666	0.210	6.42	0.01669	0.0263	P, 27 stalks, damp[c]
06070	6.4810	0.5802	0.0895	7.02	0.0481	0.00635	SWR, 23 stalks
06077	5.2342	0.4697	0.0897	9.26	0.0483	0.00522	SWR, 21 stalks
06083	4.4191	0.1831	0.0414	-	-	-	B, 10 stalks
06100-2	1.0619	0.0529	0.0498	-	-	-	B, 5 heads
06103	5.7680	0.2018	0.0350	-	-	-	B, 5 stalks
06122-2	1.2723	0.0926	0.0728	4.342	0.0230	0.00530	P, 6 heads, damp
06127	4.7257	0.4465	0.0945	4.342	0.0595	0.0137	P, 5 stalks, dry

a Plants in 0.35 sq ft of ground area
b Particles on bottom of some stalks
c Plants in 0.29 sq ft of ground area

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Wheat-1 (continued)			
06130-2	1.0013	0.1567	0.1565	14.81	0.0899	0.00607	P, 5 heads, damp
06141	4.4580	1.1213	0.2515	14.81	0.2135	0.0144	P, 5 stalks, damp
06149-2	0.7876	0.0612	0.0777	16.70	0.0111	0.000665	SW, 5 heads
06160	4.8407	0.4627	0.0956	16.70	0.0576	0.00345	SW, 5 stalks
06170-2	0.8493	0.0948	0.1116	18.14	0.0450	0.00248	S, 5 heads, damp
06178-2	0.9093	0.1319	0.1451	9.158	0.0674	0.00736	2P, 5 heads, damp
06184-2	0.7880	0.0724	0.0919	11.908	0.0142	0.00119	SWR, 5 heads
06189	4.8672	0.3761	0.0773	28.60	0.0393	0.00137	SWR, 5 stalks
06195-2	2.1416	0.2420	0.1130	-	-	-	OR, 5 heads
06196	5.2300	0.5961	0.1140	-	-	-	OR, 5 stalks
06203-2	1.8707	0.1789	0.0956	-	-	-	B, 5 heads
06204	5.9629	0.6114	0.1025	-	-	-	B, 5 stalks
06220-2	2.1873	0.2534	0.1158	7.690	0.0202	0.00263	P, 5 heads, damp
06226	5.4896	0.7428	0.1353	7.690	0.0465	0.00605	P, 5 stalks, damp
06235-2	2.1273	0.2249	0.1057	8.199	0.0101	0.00123	SW, 5 heads
06247-2	1.7581	0.1773	0.1008	8.199	0.0052	0.000634	SWR, 5 heads
06252-1,3	3.9510	0.4255	0.1077	8.199	0.0226	0.00276	SWR, 5 stalks less heads
06252-2	1.6830	0.1667	0.0990	8.199	0.0034	0.000415	SWR, 5 heads
06252	5.6340	0.5922	0.1083	8.199	0.0105	0.00128	SWR, 5 stalks
06275-1,3	4.5044	0.5697	0.1265	5.845	0.0413	0.00707	P, 5 stalks less heads, damp
06275-2	1.8593	0.2377	0.1278	5.845	0.0322	0.00551	P, 5 heads, damp
06275	6.3637	0.8074	0.1269	5.845	0.0381	0.00652	P, 5 stalks, damp
06284-2	2.9544	0.2596	0.0879	-	-	-	OR, 10 heads
06302	3.3048	0.3616	0.1094	-	-	-	OR, 5 stalks

Table 16 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Wheat-1 (concluded)			
06306-2	3.4516	0.3359	0.0972	-	-	-	OR, 10 heads
06326-2	3.1460	0.1732	0.0550	-	-	-	OR, 5 heads
06338-2	3.4088	0.2070	0.0607	0.4869	0.0057	0.0117	P, 5 heads, damp
				Wheat-2			
14681	3.2574	0.0320	0.00982	-	-	-	O, 10 stalks
14686	4.2530	0.0410	0.00964	-	-	-	OR, 10 stalks
14704	3.1850	0.0586	0.01840	0.1576	0.00867	0.0550	P, 10 stalks dry
14719	3.3239	0.1330	0.04001	1.4532	0.03109	0.0214	S, 10 stalks, damp
14737-2	2.1672	0.0542	0.02501	2.7763	0.01629	0.00587	S, 12 heads, semidamp
14749	8.7200	0.0412	0.00472	-	-	-	O, 10 stalks
14750-2	2.8339	0.0247	0.00872	-	-	-	O, 12 heads
14765	8.1351	0.2340	0.02876	2.3144	0.02404	0.0104	P, 10 stalks, damp
14766-2	2.7488	0.0632	0.02299	2.3144	0.01427	0.00617	P, 12 heads, damp
14779	9.0320	0.0934	0.01034	3.9372	0.00562	0.00143	SW, 10 stalks
14780-2	2.8587	0.0383	0.01340	3.9372	0.00468	0.00119	SW, 12 heads
14782	11.3990	-	-	-	-	-	Leaf area, 10 stalks
14793	9.7625	0.0650	0.00666	3.9586	0.00194	0.000490	SWR, 10 stalks
14794-2	1.9080	0.0174	0.00912	3.9586	0.00040	0.000101	SWR, 10 heads
14810	16.8559	0.0758	0.00450	-	-	-	OR, 10 stalks
14811-2	4.4035	0.0303	0.00688	-	-	-	OR, 10 heads
14827-2	2.7407	0.0182	0.00644	-	-	-	B, 5 heads
14828	5.0013	0.0215	0.00430	-	-	-	B, 5 stalks
14835	19.6917	-	-	-	-	-	O, 10 stalks (photo)
14851-2	73.68	-	-	-	-	-	O, 1741 grains, 100 heads

Table 16 (concluded)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Wheat-2 (concluded)			
06479	4.0063	0.2243	0.05598	-	-	-	O, 10 stalks
06502	3.1028	0.0866	0.02791	0.7982	0.01899	0.0238	P, 10 stalks, dry
06515	3.2625	0.1304	0.03997	1.1494	0.03105	0.0270	2P, 10 stalks, dry
06515	3.2625	0.1304	0.03997	0.3512	0.01206	0.0343	P, 10 stalks, dry
06534	4.2370	0.2935	0.06927	1.2536	0.06035	0.0481	P, 10 stalks, dry
06553	4.3006	0.2149	0.04997	1.7784	0.04105	0.0231	SW, 10 stalks
06570	3.9170	0.0340	0.00868	-	-	-	B, 10 stalks
06588	4.0394	0.2812	0.06961	2.1056	0.6093	0.0289	P, 10 stalks, damp
06601	3.9325	0.2202	0.05599	-	-	-	O, 10 stalks
06611	5.1816	0.3349	0.06463	0.9571	0.00864	0.00903	O, 10 stalks, damp
06623	4.1450	0.0487	0.01175	-	-	-	B, 10 stalks
06629	5.0985	-	-	-	-	-	Leaf area, 10 stalks (photo)
06648	5.8661	0.0938	0.01599	0.3624	0.00424	0.0117	S, 10 stalks, semidamp
06649-2	2.3055	0.0240	0.01041	0.3624	0.00169	0.00466	S, 12 heads, semidamp
06668-2	4.0586	0.0577	0.0142	-	-	-	OR, 10 heads
06669	12.56	0.1423	0.0113	-	-	-	OR, 10 stalks
06674-2	6.7165	-	-	-	-	-	O, 8 heads (photo)
06691-2	2.2737	0.0327	0.0144	-	-	-	B, 5 heads
06692	8.4805	0.0820	0.00967	-	-	-	B, 5 stalks
06695	27.1397	-	-	-	-	-	O, 15 stalks (photo)
06706-2	92.47	-	-	-	-	-	O, 2185 grains, 100 heads

Table 17

SUMMARY OF PLANT AND FOLIAR CONTAMINATION DATA
FOR TREE LEAVES, NEEDLES, AND TWIGS

Notations

Sample Numbers: 14,000's for Plot No. 1
06,000's for Plot No. 2
13,000's for Station 3 km above Rancho Redondo
15,000's for Station 1 km below Rancho Redondo
16,000's for Station 1 km above Rancho Redondo

B Background deposit remaining on washed specimens of foliage or plant

P Primary samples (short-period exposure or unweathered depositions representing initial contamination levels); 2P--samples with two successive primary depositions

S Secondary samples (long-period exposure representing weathering effects, multiple depositions, etc.)

O Original unwashed specimens (except for rain and wind cleaning to date of sampling)

R Weathering by rain (SR, secondary sample, washed by rain)

W Weathering by wind (SW, secondary sample, exposed to wind)

SWR Secondary samples, weathered by wind and then by rain

W_L Dry weight of foliage (gm)

Δm_L Dry weight of ceniza-arena retained on the foliage (gm)

C_p Foliar concentration of ceniza-arena, $W_L/\Delta m_L$ (gm/gm)

Δm Dry weight of ceniza-arena deposited per unit area of ground surface (gm/sq ft)

C_p^o C_p corrected for background (gm/gm)

a_L Contamination factor, $C_p^o/\Delta m$ (sq ft/gm)

Table 17

SUMMARY OF FOLIAR CONTAMINATION DATA FOR TREE LEAVES, NEEDLES, AND TWIGS

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Avocado			
14509-1	1.0015	0.0072	0.00719	-	-	-	OR, 10 leaves, bottom (new)
14510-1	2.3524	0.0102	0.00434	-	-	-	OR, 10 leaves, middle (new)
14511	3.1014	0.7201	0.232	-	-	-	O, 10 leaves, middle (old)
14524-1	1.5408	0.0340	0.0220	0.7634	0.0162	0.0212	P, 10 leaves (new), damp
14535-1	1.8418	0.0211	0.0114	1.0225	0.0056	0.00548	SW, 10 leaves (new)
14546-1	1.0808	0.0192	0.0178	0.4164	0.0092	0.0221	P, 10 leaves (new) damp
14560-1	3.7319	0.0547	0.0147	0.4164	0.0061	0.0146	SW, 18 leaves (new)
14570-1	4.4623	0.1455	0.0326	1.3263	0.0224	0.0169	P, 19 leaves (new) damp
14576-1,3	3.5658	0.1928	0.0541	-	-	-	OR, 12-leaf twig, old leaves
14577-1,3	1.9485	0.0761	0.0391	-	-	-	OR, 8-leaf twig, new leaves
14624-1,3	2.9185	0.1707	0.0585	0.5758	0.0119	0.0207	S, 9-leaf twig, old and new leaves, damp
14641-1,3	3.4781	0.1743	0.0501	0.1192	0.0035	0.0294	P, 17-leaf twig, new leaves, damp
14643-1,3	8.1185	0.1281	0.0158	-	-	-	B, 17-leaf twig, old leaves
14644-1,3	5.5232	0.0457	0.00827	-	-	-	B, 15-leaf twig, new leaves
14682	4.9715	0.1328	0.0267	-	-	-	O, 17 leaves
14683	4.6383	0.1884	0.0406	-	-	-	O, 16 leaves
14831-1,3	10.6211	0.0669	0.00630	-	-	-	O, 93 new leaves plus twigs
14831-3	7.4234	-	-	-	-	-	O, twigs
14831-1	3.1977	-	-	-	-	-	O, 93 new leaves
14832-1,3	9.8479	0.1027	0.0104	-	-	-	O, 28 old leaves plus twigs
14832-3	3.5954	-	-	-	-	-	O, twigs
14832-1	6.2525	-	-	-	-	-	O, 28 old leaves

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample designation
				Camphor			
06330-1	1.1700	0.0121	0.0104	-	-	-	OR, 24 leaves, N side
06331-1	1.6767	0.0284	0.0169	-	-	-	OR, 24 leaves, under limb
06339-1	0.8357	0.0353	0.0422	0.4869	0.0318	0.0653	P, 24 leaves, N side, damp
06347-1	0.8388	0.0125	0.0149	0.4864	0.0045	0.00925	PW, 20 leaves, N side
06353-1	1.6796	0.2376	0.1415	1.7546	0.1235	0.0704	P, 32 leaves, N side, damp
06367-1,3	2.3105	0.0846	0.0366	-	-	-	O, 14-leaf twig, protected
06368-1,3	1.9278	0.0663	0.0344	-	-	-	O, 16-leaf twig, protected, low
06369-1,3	2.1644	0.1026	0.0474	-	-	-	O, 24-leaf twig, exposed, NE
06370-1,3	1.0034	0.0386	0.0385	-	-	-	O, 16-leaf twig, exposed, SW
06381-1,3	1.4743	0.0954	0.0647	0.3446	0.0173	0.0502	S, 16-leaf twig, exposed NE side, damp and dry
06382-1,3	1.5128	0.0686	0.0453	0.3446	0.0068	0.0197	S, 12-leaf twig, exposed SW side, damp and dry
06383-1,3	0.8475	0.0319	0.0376	0.3446	0.0032	0.00929	S, 8-leaf twig, protected, low, damp and dry
06395-1,3	1.3137	0.1024	0.0779	0.5146	0.0132	0.0256	P, 16-leaf twig, exposed, NE side, damp
06395-1,3	1.3137	0.1024	0.0779	0.8592	0.0305	0.0355	S, 16-leaf twig, exposed, NE side, damp and dry
06395-1,3[a]	1.3137	0.1024	0.0779	-	0.0659	-	O, 16-leaf twig, exposed, NE side
06396-1,3	1.1339	0.0637	0.0562	0.5146	0.0109	0.0212	P, 15-leaf twig, exposed, SW side, damp

a Assumed spray-washed Backgrounds

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Camphor (continued)			
06396-1,3	1.1339	0.0637	0.0562	0.8592	0.0177	0.0206	S, 15-leaf twig, exposed, SW side, damp and dry
06397-1,3	1.0156	0.0428	0.0421	0.5146	0.0045	0.00874	P, 12-leaf twig, protected, low, damp
06397-1,3	1.0156	0.0428	0.0421	0.8592	0.0077	0.00896	S, 12-leaf twig, protected, low, damp and dry
06397-1,3[a]	1.0156	0.0428	0.0421	-	0.0301	-	O, 12-leaf twig, protected, low
06416-1,3[a]	1.6546	0.0492	0.0297	-	0.0177	-	OR, 32-leaf twig, exposed, NE side
06417-1,3[a]	1.6769	0.0308	0.0184	-	0.0064	-	OR, 18-leaf twig, protected, low
06429-1,3	1.6779	0.0438	0.0261	0.2256	0.0077	0.0341	P, 14-leaf twig, protected, low, damp
06429-1,3	1.6779	0.0438	0.0261	-	0.0161	-	O, 14-leaf twig, protected, low
06430-1,3	0.9568	0.0494	0.0516	0.2256	0.0219	0.0971	P, 12-leaf twig, exposed, NE side, damp
06430-1,3	0.9568	0.0494	0.0516	-	0.0416	-	O, 12-leaf twig, exposed, NE side
06432-1,3	1.4929	0.0180	0.0120	-	0.0020	-	OR, 16-leaf twig, protected, low
06433-1,3[a]	1.7529	0.0209	0.0119	-	0.0019	-	OR, 40-leaf twig, exposed, NE side
06434-1,3[a]	0.9398	0.0174	0.0185	-	0.0085	-	OR, 14-leaf twig, exposed, SW side

a Assumed spray-washed Backgrounds

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Plant Designation
				Camphor (continued)			
06499-1,3	1.5345	0.0374	0.0244	0.3398	0.0125	0.0368	P, 24-leaf twig, exposed, NE side, damp
06450-1,3	1.0919	0.0190	0.0174	0.3398	0.0054	0.0159	P, 14-leaf twig, protected, low, damp
06470-1,3	1.3449	0.0253	0.0188	0.6010	0.0069	0.0115	SW, 23-leaf twig, exposed, NE
06471-1,3	1.3621	0.0198	0.0145	0.6010	0.0025	0.00416	SW, 19-leaf twig, protected, low
06481-1,3	1.0297	0.6757	0.6562	-	-	-	O, 12-leaf twig, protected
06481-1	0.8965	0.6757	0.7537	-	-	-	O, 12 leaves, protected
06482-1,3	1.8657	0.0815	0.0437	-	-	-	O, 30-leaf twig, exposed, NE side
06482-1	1.6243	0.0815	0.0502	-	-	-	O, 30 leaves, exposed, NE side
06517-1,3[a]	1.5236	0.0382	0.0251	1.1492	0.0131	0.0114	P, 16-leaf twig, protected, dry
06517-1	1.2897	0.0382	0.0296	1.1492	0.0176	0.0153	P, 16 leaves, protected, dry
06518-1,3[a]	1.3772	0.0477	0.0346	1.1492	0.0226	0.0197	P, 17-leaf twig, exposed NE side, dry
06518-1	1.2265	0.0477	0.0389	1.1492	0.0269	0.0234	P, 17 leaves, exposed, NE side, dry
06540-1,3	1.5292	0.0982	0.0642	1.6867	0.0391	0.0232	P, 25-leaf twig, protected, dry
06540-1	1.3164	0.0982	0.0746	1.6867	0.0450	0.0267	P, 25 leaves, protected, dry

a Take OR Background of 0.0120

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Camphor (concluded)			
06541-1,3	1.6872	0.1337	0.0792	1.6867	0.0446	0.0264	P, 22 leaf-twig, exposed, NE side, dry
06541-1	1.4648	0.1337	0.0913	1.6867	0.0524	0.0311	P, 22 leaves, exposed, NE side, dry
06557-1,3	1.7447	0.0650	0.0372	2.2115	0.0121	0.00547	SW, 13-leaf twig, protected
06557-1	1.5762	0.0650	0.0412	2.2115	0.0116	0.00525	SW, 23 leaves, protected
06558-1,3	0.9544	0.0618	0.0648	2.2115	0.0302	0.0137	SW, 16-leaf twig, exposed, NE side
06558-1	0.8452	0.0618	0.0731	2.2115	0.0342	0.0155	SW, 16 leaves, exposed, NE side
06592-1,3	1.2015	0.0752	0.0626	4.3171	0.0375	0.00869	S, 12-leaf twig, protected, damp
06592-1,3	1.2015	0.0752	0.0626	2.1056	0.0254	0.0121	P, 12-leaf twig, protected, damp
06592-1	1.0948	0.0752	0.0687	4.3171	0.0391	0.00906	S, 12 leaves, protected, damp
06592-1	1.0948	0.0752	0.0687	2.1056	0.0275	0.0131	P, 12 leaves, protected, damp
06593-1,3	1.6374	0.1510	0.0922	4.3171	0.0576	0.0133	S, 22-leaf twig, exposed, NE side, damp
06593-1,3	1.6374	0.1510	0.0922	2.1056	0.0274	0.0130	P, 22-leaf twig, exposed, NE side, damp
06593-1	1.3761	0.1510	0.1097	4.3171	0.0708	0.0164	S, 22 leaves, exposed, NE side, damp
06593-1	1.3761	0.1510	0.1097	2.1056	0.0366	0.0174	P, 22 leaves, exposed, NE side, damp
06672-1	1.9618	0.0627	0.0320	-	-	-	O, 23 leaves, SW side, bottom
06673-1	2.0298	0.0451	0.0222	-	-	-	O, 28 leaves, NE side, bottom
06693-1	6.1915	0.1353	0.0218	-	-	-	O, 60 leaves, random

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Grapefruit Tree			
16020-1	3.1426	0.0338	0.0108	-	-	-	B, 5 2-year leaves, dry
16021-1	3.1807	0.0189	0.00594	-	-	-	B, 6 1-year leaves, dry
16022-1	1.7961	0.0109	0.00607	-	-	-	B, 6 new leaves, dry
16030-1	3.9657	0.0175	0.00441	-	-	-	B, 6 2-year leaves, dry
16031-1	1.6538	0.0118	0.00714	-	-	-	B, 6 new leaves, dry
16032-1	2.5309	0.0126	0.00498	-	-	-	B, 6 1-year leaves, dry
16046-1	0.2309	0.00360	0.01559	0.6248	0.00988	0.01581	P, 1 leaf, t-1, s-1,[a] dry
16047-1	0.2050	0.00210	0.01024	0.6248	0.00453	0.00725	P, 1 leaf, t-1, s-1, dry
16048-1[b]	0.1603	0.00140	0.00873	0.6248	0.00302	0.00483	P, 1 leaf, t-1, s-1, dry
16049-1	0.1823	0.00216	0.01185	0.6248	0.00614	0.00983	P, 1 leaf, t-1, s-1, dry
16050-1	0.4021	0.00318	0.00791	0.6248	0.00220	0.00352	P, 1 leaf, t-1, s-1, dry
16051-1	0.7002	0.01282	0.01831	0.6248	0.01260	0.02017	P, 1 leaf, t-1, s-1, dry
16052-1	0.4548	0.00330	0.00726	0.6248	0.00155	0.00248	P, 1 leaf, t-1, s-1, dry
16053-1	0.7914	0.00770	0.00973	0.6248	0.00402	0.00643	P, 1 leaf, t-1, s-1, dry
16054-1	0.9086	0.01334	0.01468	0.6248	0.00897	0.01436	P, 1 leaf, t-1, s-1, dry
16055-1	1.1364	0.02125	0.01870	0.6248	0.01299	0.02079	P, 1 leaf, t-1, s-1, dry
16056-1	1.0347	0.01355	0.01310	0.6248	0.00739	0.01183	P, 1 leaf, t-1, s-1, dry
16057-1	1.2886	0.01150	0.00892	0.6248	0.00321	0.00514	P, 1 leaf, t-1, s-1, dry
16057s-1	7.4953	0.09590	0.01279	0.6248	0.00708	0.01133	P, 12 leaves, t-1, s-1, dry
16058-1	0.1305	0.00482	03693	0.6248	0.03122	0.04997	P, 1 leaf, t-1, s-2, dry

a t-1 for trunk 1; s-1 for section 1; s-2 for section 2

b Sample dropped

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Grapefruit Tree (continued)			
16059-1	0.1534	0.00603	0.03931	0.6248	0.03360	0.05378	P, 1 leaf, t-1, s-2,[a] dry
16060-1	0.2950	0.00599	0.02030	0.6248	0.01459	0.02335	P, 1 leaf, t-1, s-2, dry
16061-1	0.3787	0.01138	0.03005	0.6248	0.02434	0.03896	P, 1 leaf, t-1, s-2, dry
16062-1	0.4245	0.01118	0.02634	0.6248	0.02063	0.03302	P, 1 leaf, t-1, s-2, dry
16063-1	0.5159	0.01024	0.01985	0.6248	0.01414	0.02263	P, 1 leaf, t-1, s-2, dry
16064-1	0.3912	0.00922	0.02357	0.6248	0.01786	0.02858	P, 1 leaf, t-1, s-2, dry
16065-1	0.5320	0.00802	0.01508	0.6248	0.00938	0.01500	P, 1 leaf, t-1, s-2, dry
16066-1	0.4369	0.01036	0.02371	0.6248	0.01800	0.02881	P, 1 leaf, t-1, s-2, dry
16066s-1	3.2581	0.07724	0.02371	0.6248	0.01800	0.02881	P, 9 leaves, t-1, s-2, dry
16067-1	0.4982	0.00816	0.01638	0.6248	0.01067	0.01708	P, 1 leaf, t-2, s-1, dry
16068-1	0.2850	0.00368	0.01291	0.6248	0.00720	0.01152	P, 1 leaf, t-2, s-1, dry
16069-1	0.3112	0.00558	0.01793	0.6248	0.01222	0.01956	P, 1 leaf, t-2, s-1, dry
16070-1	0.5277	0.00968	0.01834	0.6248	0.01263	0.02021	P, 1 leaf, t-2, s-1, dry
16071-1	0.3553	0.00884	0.02488	0.6248	0.01917	0.03068	P, 1 leaf, t-2, s-1, dry
16072-1	0.3001	0.00522	0.01044	0.6248	0.00473	0.00757	P, 1 leaf, t-2, s-1, dry
16073-1	0.3578	0.00680	0.01900	0.6248	0.01329	0.02127	P, 1 leaf, t-2, s-1, dry
16074-1	0.2460	0.00339	0.01378	0.6248	0.00807	0.01292	P, 1 leaf, t-2, s-1, dry
16075-1	0.3961	0.00521	0.01315	0.6248	0.00744	0.01191	P, 1 leaf, t-2, s-1, dry
16076-1	0.4950	0.00580	0.01172	0.6248	0.00601	0.00962	P, 1 leaf, t-2, s-1, dry
16077-1	0.5916	0.00547	0.00925	0.6248	0.00354	0.00567	P, 1 leaf, t-2, s-1, dry
16078-1	0.1110	0.00078	0.00703	0.6248	0.00132	0.00211	P, 1 leaf, t-2, s-1, dry

a t-1 for trunk 1; t-2 for trunk 2;
s-1 for section 1; s-1 for section 2

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
			Grapefruit Tree (continued)				
16079-1	0.0905	0.00245	0.02707	0.6248	0.02136	0.03419	P, 1 leaf, t-2, s-1,[a] dry
16080-1	0.1221	0.00317	0.02596	0.6248	0.02025	0.03241	P, 1 leaf, t-2, s-1, dry
16081-1	0.1486	0.00348	0.02342	0.6248	0.01771	0.02834	P, 1 leaf, t-2, s-1, dry
16082-1	0.1903	0.00520	0.02733	0.6248	0.02162	0.03460	P, 1 leaf, t-2, s-1, dry
16083-1	0.1662	0.00425	0.02557	0.6248	0.01986	0.03179	P, 1 leaf, t-2, s-1, dry
16084-1	0.1545	0.00327	0.02116	0.6248	0.01545	0.02473	P, 1 leaf, t-2, s-1, dry
16085-1	0.1634	0.00334	0.02044	0.6248	0.01473	0.02358	P, 1 leaf, t-2, s-1, dry
16086-1	0.7456	0.00850	0.01140	0.6248	0.00569	0.00911	P, 1 leaf, t-2, s-1, dry
16087-1	0.0394	0.00135	0.03426	0.6248	0.02855	0.04569	P, 1 leaf, t-2, s-1, dry
16088-1	0.3718	0.00528	0.01420	0.6248	0.00849	0.01359	P, 1 leaf, t-2, s-1, dry
16089-1	0.0490	0.00147	0.03000	0.6248	0.02429	0.03888	P, 1 leaf, t-2, s-1, dry
16090-1	0.0942	0.00280	0.02972	0.6248	0.02401	0.03843	P, 1 leaf, t-2, s-1, dry
16091-1[b]	0.1373	0.00201	0.01464	0.6248	0.00893	0.01429	P, 1 leaf, t-2, s-1, dry
16092-1	0.1834	0.00672	0.03664	0.6248	0.03093	0.04950	P, 1 leaf, t-2, s-1, dry
16093-1	0.1568	0.00357	0.02277	0.6248	0.01706	0.02730	P, 1 leaf, t-2, s-1, dry
16094-1	0.1804	0.00300	0.01663	0.6248	0.01092	0.01748	P, 1 leaf, t-2, s-1, dry
16095-1	0.1644	0.00405	0.02464	0.6248	0.01893	0.03030	P, 1 leaf, t-2, s-1, dry
16096-1	0.1694	0.00360	0.02125	0.6248	0.01554	0.02487	P, 1 leaf, t-2, s-1, dry
16097-1	0.1050	0.00192	0.01829	0.6248	0.01258	0.02013	P, 1 leaf, t-2, s-1, dry

a t-2 for trunk 2; s-1 for section 1

b Sample dropped

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
			Grapefruit Tree (continued)				
16098-1	0.0422	0.00113	0.02678	0.6248	0.02107	0.03372	P, 1 leaf, t-2, s-1[a], dry
16099-1	0.5476	0.00360	0.00657	0.6248	0.00086	0.00138	P, 1 leaf, t-2, s-1, dry
16100-1	0.1369	0.00270	0.01972	0.6248	0.01401	0.02242	P, 1 leaf, t-2, s-1, dry
16001-1	0.0840	0.00436	0.05190	0.6248	0.04619	0.07393	P, 1 leaf, t-2, s-1, dry
16102-1	0.3787	0.00424	0.01120	0.6248	0.00549	0.00878	P, 1 leaf, t-2, s-1, dry
16103-1	0.1545	0.00410	0.02654	0.6248	0.02083	0.03334	P, 1 leaf, t-2, s-1, dry
16104-1	0.1274	0.00215	0.01688	0.6248	0.01117	0.01788	P, 1 leaf, t-2, s-1, dry
16105-1	0.1066	0.00231	0.02167	0.6248	0.01596	0.02554	P, 1 leaf, t-2, s-1, dry
16106-1	0.2903	0.00319	0.01099	0.6248	0.00528	0.00845	P, 1 leaf, t-2, s-1, dry
16107-1	0.0788	0.00195	0.02475	0.6248	0.01904	0.03047	P, 1 leaf, t-2, s-1
16108-1	0.0707	0.00230	0.03253	0.6248	0.02682	0.04293	P, 1 leaf, t-2, s-1, dry
16109 1	0.0963	0.00188	0.01952	0.6248	0.01381	0.02210	P, 1 leaf, t-2, s-1, dry
16110-1	0.0950	0.00227	0.02389	0.6248	0.01818	0.02910	P, 1 leaf, t-2, s-1, dry
16111-1	0.0703	0.00185	0.02632	0.6248	0.02061	0.03299	P, 1 leaf, t-2, s-1, dry
16112-1	0.1231	0.00262	0.02128	0.6248	0.01557	0.02492	P, 1 leaf, t-2, s-1, dry
16113-1	0.1219	0.00333	0.02732	0.6248	0.02161	0.03459	P, 1 leaf, t-2, s-1, dry
16114-1	0.0899	0.00241	0.02681	0.6248	0.02110	0.03377	P, 1 leaf, t-2, s-1, dry
16115-1	0.0925	0.00465	0.05027	0.6248	0.04456	0.07132	P, 1 leaf, t-2, s-1, dry
16116-1	0.1241	0.00445	0.03586	0.6248	0.03015	0.04826	P, 1 leaf, t-2, s-1, dry
16117-1	0.0580	0.00185	0.03190	0.6248	0.02619	0.04192	P, 1 leaf, t-2, s-1, dry
16118-1	0.1143	0.00255	0.02231	0.6248	0.01660	0.02657	P, 1 leaf, t-2, s-1, dry
16119-1	0.1756	0.00450	0.02563	0.6248	0.01992	0.03188	P, 1 leaf, t-2, s-1, dry

a t-2 for trunk 2; s-1 for section 1

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Description
			Grapefruit Tree (continued)				
16120-1	0.1629	0.00360	0.02210	0.6248	0.01639	0.02623	P, 1 leaf, t-2, s-1,[a] dry
16121-1	0.1400	0.00138	0.00986	0.6248	0.00415	0.00664	P, 1 leaf, t-2, s-1, dry
16122-1	0.1173	0.00276	0.02353	0.6248	0.01782	0.02852	P, 1 leaf, t-2, s-1, dry
16123-1	0.0954	0.00238	0.02495	0.6248	0.01924	0.03079	P, 1 leaf, t-2, s-1, dry
16124-1	0.1156	0.00278	0.02405	0.6248	0.01834	0.02935	P, 1 leaf, t-2, s-1, dry
16125-1	0.1048	0.00285	0.02719	0.6248	0.02148	0.03438	P, 1 leaf, t-2, s-1, dry
16126-1	0.2383	0.00529	0.02220	0.6248	0.01649	0.02639	P, 1 leaf, t-2, s-1, dry
16127-1	0.2294	0.00312	0.01360	0.6248	0.00789	0.01263	P, 1 leaf, t-2, s-1, dry
16128-1	0.2319	0.00445	0.01919	0.6248	0.01348	0.02157	P, 1 leaf, t-2, s-1, dry
16129-1	0.3132	0.00515	0.01644	0.6248	0.01073	0.01717	P, 1 leaf, t-2, s-1, dry
16130-1	0.2619	0.00465	0.01775	0.6248	0.01204	0.01927	P, 1 leaf, t-2, s-1, dry
16131-1	0.1600	0.00260	0.01625	0.6248	0.01054	0.01687	P, 1 leaf, t-2, s-1, dry
16132-1	0.2150	0.00390	0.01814	0.6248	0.01243	0.01989	P, 1 leaf, t-2, s-1, dry
16133-1	0.1754	0.00245	0.01397	0.6248	0.00826	0.01322	P, 1 leaf, t-2, s-1, dry
16134-1[b]	0.1878	0.00382	0.02034	0.6248	0.01463	0.02342	P, 1 leaf, t-2, s-1, dry
16134s-1	14.0349	0.25361	0.01807	0.6248	0.01236	0.01978	P, 68 leaves, t-2, s-1, dry
16135-1	0.4659	0.00620	0.01331	0.6248	0.00760	0.01216	P, 1 leaf, t-3, s-1, dry
16136-1	0.3977	0.00462	0.01162	0.6248	0.00591	0.00946	P, 1 leaf, t-3, s-1, dry
16137-1	0.9199	0.01613	0.01753	0.6248	0.01182	0.01892	P, 1 leaf, t-3, s-1, dry
16138-1	0.8096	0.01305	0.01612	0.6248	0.01041	0.01666	P, 1 leaf, t-3, s-1, dry
16139-1	1.0783	0.02098	0.01946	0.6248	0.01375	0.02201	P, 1 leaf, t-3, s-1, dry

a t-2 for trunk 2; t-3 for trunk 3; s-1 for section 1

b Sample dropped

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Grapefruit Tree (continued)			
16140-1	0.9001	0.01222	0.01358	0.6248	0.00787	0.01260	P, 1 leaf, t-3, s-1,[a] dry
16141-1	1.0070	0.02074	0.02060	0.6248	0.01489	0.02383	P, 1 leaf, t-3, s-1, dry
16142-1	0.8091	0.01650	0.02039	0.6248	0.01468	0.02350	P, 1 leaf, t-3, s-1, dry
16143-1	0.8071	0.00972	0.01204	0.6248	0.00633	0.01013	P, 1 leaf, t-3, s-1, dry
16144-1	0.7962	0.01381	0.01734	0.6248	0.01163	0.01861	P, 1 leaf, t-3, s-1, dry
16145-1	0.4977	0.00369	0.00741	0.6248	0.00170	0.00272	P, 1 leaf, t-3, s-1, dry
16146-1	0.6588	0.00466	0.00707	0.6248	0.00136	0.00218	P, 1 leaf, t-3, s-1, dry
16147-1	0.5853	0.01016	0.01736	0.6248	0.01165	0.01865	P, 1 leaf, t-3, s-1, dry
16148-1	0.3000	0.00566	0.01132	0.6248	0.00561	0.00898	P, 1 leaf, t-3, s-1, dry
16149-1	0.4967	0.00805	0.01621	0.6248	0.01050	0.01681	P, 1 leaf, t-3, s-1, dry
16150-1	0.4389	0.00641	0.01460	0.6248	0.00889	0.01423	P, 1 leaf, t-3, s-1, dry
16151-1	0.4320	0.00502	0.01162	0.6248	0.00591	0.00946	P, 1 leaf, t-3, s-1, dry
16152-1	0.4301	0.00720	0.01674	0.6248	0.01103	0.01765	P, 1 leaf, t-3, s-1, dry
16153-1	0.3487	0.00397	0.01139	0.6248	0.00568	0.00909	P, 1 leaf, t-3, s-1, dry
16154-1	0.3470	0.00770	0.02219	0.6248	0.01648	0.02638	P, 1 leaf, t-3, s-1, dry
16155-1	0.2200	0.00281	0.01277	0.6248	0.00706	0.01130	P, 1 leaf, t-3, s-1, dry
16155s-1	12.9461	0.19930	0.01539	0.6248	0.00968	0.01549	P, 21 leaves, t-3, s-1, dry
16156-1	0.1540	0.00249	0.01617	0.6248	0.01046	0.01674	P, 1 leaf, t-3, s-2, dry
16157-1	0.1166	0.00337	0.02890	0.6248	0.02319	0.03712	P, 1 leaf, t-3, s-2, dry
16158-1	0.2581	0.00270	0.01046	0.6248	0.00475	0.00760	P, 1 leaf, t-3, s-2, dry

[a] t-3 for trunk 3; s-1 for section 1; s-2 for section 2

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
			Grapefruit Tree - (continued)				
16159-1[a]	0.2813	0.00323	0.01148	0.6248	0.00577	0.00923	P, 1 leaf, t-3, s-2[b], dry
16160-1	0.3349	0.00341	0.01018	0.6248	0.00447	0.00715	P, 1 leaf, t-3, s-2, dry
16161-1	0.2487	0.00308	0.01238	0.6248	0.00667	0.01068	P, 1 leaf, t-3, s-2, dry
16162-1	0.2957	0.00580	0.01961	0.6248	0.01390	0.02225	P, 1 leaf, t-3, s-2, dry
16163-1	0.2769	0.00428	0.01546	0.6248	0.00975	0.01560	P, 1 leaf, t-3, s-2, dry
16164-1	0.2853	0.00292	0.01023	0.6248	0.00452	0.00723	P, 1 leaf, t-3, s-2, dry
16165-1	0.2256	0.00270	0.01197	0.6248	0.00621	0.00994	P, 1 leaf, t-3, s-2, dry
16166-1	0.2427	0.00394	0.01623	0.6248	0.01052	0.01684	P, 1 leaf, t-3, s-2, dry
16166s-1	2.7198	0.03792	0.01394	0.6248	0.00823	0.01317	P, 11 leaves, t-3, s-2, dry
16167-1	0.2264	0.00314	0.01387	0.6248	0.00816	0.01306	PW, 1 leaf, t-1, s-3, dry
16168-1	0.5235	0.00404	0.00772	0.6248	0.00201	0.00322	PW, 1 leaf, t-1, s-3, dry
16169-1	0.6014	0.00450	0.00748	0.6248	0.00177	0.00283	PW, 1 leaf, t-1, s-3, dry
16170-1	0.4861	0.00345	0.00710	0.6248	0.00139	0.00222	PW, 1 leaf, t-1, s-3, dry
16171-1	0.6035	0.00503	0.00803	0.6248	0.00232	0.00371	PW, 1 leaf, t-1, s-3, dry
16172-1	0.4102	0.00270	0.00658	0.6248	0.00087	0.00139	PW, 1 leaf, t-1, s-3, dry
16173-1	0.4425	0.00272	0.00615	0.6248	0.00044	0.00070	PW, 1 leaf, t-1, s-3, dry
16173s-1	3.2936	0.02558	0.00777	0.6248	0.00206	0.00330	PW, 7 leaves, t-1, s-3, dry
16174-1	0.2723	0.00308	0.01131	0.6248	0.00560	0.00896	PW, 1 leaf, t-1, s-4, dry
16175-1	0.2513	0.00727	0.02893	0.6248	0.02322	0.03716	PW, 1 leaf, t-1, s-4, dry
16176-1	0.4723	0.00715	0.01514	0.6248	0.00943	0.01509	PW, 1 leaf, t-1, s-4, dry

a Sample dropped

b t-1 for trunk 1; t-3 for trunk 3;
s-2 for section 2; s-3 for section 3; s-4 for section 4

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Grapefruit tree (continued)			
16177-1	0.4759	0.01296	0.02723	0.6248	0.02152	0.03444	PW, 1 leaf, t-1, s-4,[a] dry
16178-1	0.5214	0.00542	0.01040	0.6248	0.00469	0.00751	PW, 1 leaf, t-1, s-4, dry
16179-1	0.6536	0.01227	0.01877	0.6248	0.01306	0.02090	PW, 1 leaf, t-1, s-4, dry
16180-1	0.5596	0.00705	0.01260	0.6248	0.00689	0.01103	PW, 1 leaf, t-1, s-4, dry
16181-1	0.6535	0.00584	0.00894	0.6248	0.00323	0.00517	PW, 1 leaf, t-1, s-4, dry
16182-1	0.5908	0.00490	0.00829	0.6248	0.00258	0.00413	PW, 1 leaf, t-1, s-4, dry
16183-1	0.6769	0.00552	0.00816	0.6248	0.00245	0.00392	PW, 1 leaf, t-1, s-4, dry
16184-1	0.6650	0.00956	0.01438	0.6248	0.00867	0.01388	PW, 1 leaf, t-1, s-4, dry
16184s-1	5.7926	0.08102	0.01399	0.6248	0.00828	0.01325	PW, 11 leaves, t-1, s-4, dry
16185-1	0.2511	0.00350	0.01394	0.6248	0.00823	0.01317	PW, 1 leaf, t-2, s-2, dry
16186-1	0.0662	0.00170	0.02568	0.6248	0.01997	0.03196	PW, 1 leaf, t-2, s-2, dry
16187-1	0.2930	0.00305	0.01041	0.6248	0.00470	0.00752	PW, 1 leaf, t-2, s-2, dry
16188-1	0.3539	0.00435	0.01229	0.6248	0.00658	0.01053	PW, 1 leaf, t-2, s-2, dry
16189-1	0.3378	0.00405	0.01199	0.6248	0.00628	0.01005	PW, 1 leaf, t-2, s-2, dry
16190-1	0.3244	0.00315	0.00971	0.6248	0.00400	0.00640	PW, 1 leaf, t-2, s-2, dry
16191-1	0.3339	0.00310	0.00928	0.6248	0.00357	0.00571	PW, 1 leaf, t-2, s-2, dry
16192-1	0.2808	0.00215	0.00766	0.6248	0.00195	0.00312	PW, 1 leaf, t-2, s-2, dry
16193-1	0.2000	0.00215	0.01075	0.6248	0.00504	0.00807	PW, 1 leaf, t-2, s-2, dry
16194-1	0.1837	0.00180	0.00980	0.6248	0.00409	0.00655	PW, 1 leaf, t-2, s-2, dry
16195-1	0.1799	0.00170	0.00945	0.6248	0.00374	0.00599	PW, 1 leaf, t-2, s-2, dry
16196-1	0.1655	0.00260	0.01571	0.6248	0.01000	0.01601	PW, 1 leaf, t-2, s-2, dry
16197-1	0.1542	0.00285	0.01848	0.6248	0.01277	0.02044	PW, 1 leaf, t-2, s-2, dry

a t-1 for trunk 1; t-2 for trunk 2;
s-2 for section 2; s-4 for section 4

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Grapefruit Tree (continued)			
16198-1	0.1387	0.00355	0.02559	0.6248	0.01988	0.03182	PW, 1 leaf, t-2, s-2,[a] dry
16199-1	0.0234	0.00115	0.04915	0.6248	0.04344	0.06953	PW, 1 leaf, t-2, s-2, dry
16200-1	0.1237	0.00205	0.01657	0.6248	0.01086	0.01738	PW, 1 leaf, t-2, s-2, dry
16201-1	0.1998	0.00220	0.01101	0.6248	0.00530	0.00848	PW, 1 leaf, t-2, s-2, dry
16202-1	0.2300	0.00355	0.01543	0.6248	0.00972	0.01556	PW, 1 leaf, t-2, s-2, dry
16203-1	0.2096	0.00265	0.01264	0.6248	0.00693	0.01109	PW, 1 leaf, t-2, s-2, dry
16204-1	0.2356	0.00270	0.01146	0.6248	0.00575	0.00920	PW, 1 leaf, t-2, s-2, dry
16205-1	0.2210	0.00255	0.01154	0.6248	0.00583	0.00933	PW, 1 leaf, t-2, s-2, dry
16206-1	0.1745	0.00465	0.02665	0.6248	0.02094	0.03351	PW, 1 leaf, t-2, s-2, dry
16207-1[b]	0.1610	0.00205	0.01273	0.6248	0.00702	0.01124	PW, 1 leaf, t-2, s-2, dry
16208-1	0.1520	0.00260	0.01711	0.6248	0.01140	0.01825	PW, 1 leaf, t-2, s-2, dry
16209-1	0.1093	0.00140	0.01281	0.6248	0.00710	0.01136	PW, 1 leaf, t-2, s-2, dry
16209s-1	5.1030	0.06725	0.01318	0.6248	0.00747	0.01196	PW, 25 leaves, t-2, s-2, dry
16010-1	0.0661	0.00220	0.03328	0.6248	0.02757	0.04413	PW, 1 leaf, t-3, s-3, dry
16011-1	0.1832	0.00255	0.01392	0.6248	0.00821	0.01314	PW, 1 leaf, t-3, s-3, dry
16012-1	0.2480	0.00320	0.01290	0.6248	0.00719	0.01151	PW, 1 leaf, t-3, s-3, dry
16013-1	0.2754	0.00335	0.01216	0.6248	0.00645	0.01032	PW, 1 leaf, t-3, s-3, dry
16014-1	0.2266	0.00440	0.01942	0.6248	0.01371	0.02194	PW, 1 leaf, t-3, s-3, dry

a t-2 for trunk 2; t-3 for trunk 3;
s-2 for section 2; s-3 for section 3

b Sample dropped

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Grapefruit Tree (continued)			
16215-1	0.2459	0.00380	0.01545	0.6248	0.00864	0.01558	PW, 1 leaf, t-3, s-3,[a] dry
16216-1	0.3057	0.00275	0.00900	0.6248	0.00329	0.00527	PW, 1 leaf, t-3, s-3, dry
16217-1[b]	0.1903	0.00225	0.01182	0.6248	0.00611	0.00978	PW, 1 leaf, t-3, s-3, dry
16217s-1	1.7412	0.02450	0.01407	0.6248	0.00836	0.01338	PW, 8 leaves, t-3, s-3, dry
16218-1	0.0255	0.00085	0.03333	0.6248	0.02762	0.04421	PW, 1 leaf, t-3, s-4, dry
16219-1	0.0800	0.00180	0.02250	0.6248	0.01679	0.02687	PW, 1 leaf, t-3, s-4, dry
16220-1	0.3653	0.00470	0.01287	0.6248	0.00716	0.01146	PW, 1 leaf, t-3, s-4, dry
16221-1	0.3307	0.00480	0.01451	0.6248	0.00880	0.01408	PW, 1 leaf, t-3, s-4, dry
16222-1	0.3318	0.00495	0.01492	0.6248	0.00921	0.01474	PW, 1 leaf, t-3, s-4, dry
16223-1	0.4497	0.00715	0.01590	0.6248	0.01019	0.01631	PW, 1 leaf, t-3, s-4, dry
16224-1	0.3205	0.00805	0.02512	0.6248	0.01941	0.03107	PW, 1 leaf, t-3, s-4, dry
16225-1	0.4073	0.00505	0.01240	0.6248	0.00669	0.01071	PW, 1 leaf, t-3, s-4, dry
16226-1	0.3407	0.00550	0.01614	0.6248	0.01043	0.01669	PW, 1 leaf, t-3, s-4, dry
16227-1	0.3946	0.00335	0.00849	0.6248	0.00278	0.00445	PW, 1 leaf, t-3, s-4, dry
16228-1	0.3203	0.00455	0.01421	0.6248	0.00850	0.01360	PW, 1 leaf, t-3, s-4, dry
16229-1	0.2279	0.00420	0.01843	0.6248	0.01272	0.02036	PW, 1 leaf, t-3, s-4, dry
16229s-1	3.5943	0.05495	0.01529	0.6248	0.00958	0.01533	PW, 12 leaves, t-3, s-4, dry
16230-1	0.0669	0.00180	0.02691	0.7846	0.02120	0.02702	SW, 1 leaf, t-1, s-5, dry
16231-1	0.5048	0.00610	0.01208	0.7846	0.00637	0.00812	SW, 1 leaf, t-1, s-5, dry
16232-1	0.3853	0.00570	0.01479	0.7846	0.00908	0.01157	SW, 1 leaf, t-1, s-5, dry

a t-1 for trunk 1; t-3 for trunk 3;
s-3 for section 3; s-4 for section 4; s-5 for section 5

b Sample dropped

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δn (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
			Grapefruit Tree (continued)				
16233-1	0.6296	0.00805	0.01279	0.7846	0.00708	0.00902	SW, 1 leaf, t-1, s-5,[a] dry
16234-1	0.7472	0.00620	0.00830	0.7846	0.00259	0.00330	SW, 1 leaf, t-1, s-5, dry
16235-1	0.5067	0.00465	0.00918	0.7846	0.00347	0.00432	SW, 1 leaf, t-1, s-5, dry
16236-1	0.8200	0.00720	0.00878	0.7846	0.00307	0.00391	SW, 1 leaf, t-1, s-5, dry
16237-1	0.9011	0.00640	0.00710	0.7846	0.00139	0.00177	SW, 1 leaf, t-1, s-5, dry
16238-1	0.7533	0.00865	0.01148	0.7846	0.00577	0.00735	SW, 1 leaf, t-1, s-5, dry
16239-1	0.2368	0.00290	0.01225	0.7846	0.00654	0.00834	SW, 1 leaf, t-1, s-5, dry
16240-1	0.9050	0.01200	0.01326	0.7846	0.00755	0.00962	SW, 1 leaf, t-1, s-5, dry
16241-1	0.5535	0.00500	0.00903	0.7846	0.00332	0.00423	SW, 1 leaf, t-1, s-5, dry
16242-1	0.8665	0.00754	0.00870	0.7846	0.00299	0.00381	SW, 1 leaf, t-1, s-5, dry
16243-1	0.8674	0.00666	0.00768	0.7846	0.00197	0.00251	SW, 1 leaf, t-1, s-5, dry
16244-1	0.9435	0.01262	0.01338	0.7846	0.00767	0.00978	SW, 1 leaf, t-1, s-5, dry
16245-1	0.5253	0.00620	0.01180	0.7846	0.00609	0.00776	SW, 1 leaf, t-1, s-5, dry
16246-1	0.7266	0.00465	0.00640	0.7846	0.00069	0.00088	SW, 1 leaf, t-1, s-5, dry
16247-1	0.7384	0.00760	0.01032	0.7846	0.00461	0.00588	SW, 1 leaf, t-1, s-5, dry
16247s-1	11.6759	0.11992	0.01027	0.7846	0.00456	0.00581	SW, 18 leaves, t-1, s-1, dry
16248-1	0.1600	0.00160	0.01000	0.7846	0.00429	0.00547	SW, 1 leaf, t-1, s-6, dry
16249-1	0.4726	0.00810	0.01714	0.7846	0.01143	0.01457	SW, 1 leaf, t-1, s-6, dry
16250-1	0.1437	0.00340	0.02366	0.7846	0.01795	0.02288	SW, 1 leaf, t-1, s-6, dry
16251-1	0.2429	0.00385	0.01585	0.7846	0.01014	0.01292	SW, 1 leaf, t-1, s-6, dry

[a] t-1 for trunk 1; s-1 for section 1; s-5 for section 5; s-6 for section 6

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Plant Designation
			Grapefruit Tree (continued)				
16252-1	0.5057	0.00860	0.01701	0.7846	0.01130	0.01440	SW, 1 leaf, t-1, s-6[a]
16253-1	0.3222	0.00525	0.01629	0.7846	0.01058	0.01348	SW, 1 leaf, t-1, s-6
16254-1	0.4821	0.00365	0.00757	0.7846	0.00186	0.00237	SW, 1 leaf, t-1, s-6
16255-1	0.5122	0.00505	0.00986	0.7846	0.00415	0.00529	SW, 1 leaf, t-1, s-6
16256-1	0.3153	0.00535	0.01697	0.7846	0.01126	0.01435	SW, 1 leaf, t-1, s-6
16257-1	0.4002	0.00265	0.00662	0.7846	0.00091	0.00116	SW, 1 leaf, t-1, s-6
16258-1	0.4862	0.00415	0.00854	0.7846	0.00283	0.00361	SW, 1 leaf, t-1, s-6
16259-1	0.4058	0.00450	0.01109	0.7846	0.00538	0.00686	SW, 1 leaf, t-1, s-6
16260-1	0.4596	0.00655	0.01425	0.7846	0.00854	0.01088	SW, 1 leaf, t-1, s-6
16260s-1	4.9085	0.06270	0.01277	0.7846	0.00706	0.00900	SW, 13 leaves, t-1, s-6
16261-1	0.1764	0.00380	0.02154	0.7846	0.01583	0.02018	SW, 1 leaf, t-1, s-3
16262-1	0.2234	0.00332	0.01486	0.7846	0.00915	0.01166	SW, 1 leaf, t-2, s-3
16263-1	0.1262	0.00153	0.01212	0.7846	0.00641	0.00817	SW, 1 leaf, t-2, s-3
16264-1	0.2765	0.00235	0.00850	0.7846	0.00279	0.00356	SW, 1 leaf, t-2, s-3
16265-1	0.1881	0.00165	0.00877	0.7846	0.00306	0.00390	SW, 1 leaf, t-2, s-3
16266-1	0.1850	0.00199	0.01076	0.7846	0.00505	0.00644	SW, 1 leaf, t-2, s-3
16267-1	0.2159	0.00186	0.00862	0.7846	0.00291	0.00371	SW, 1 leaf, t-2, s-3
16268-1	0.1873	0.00125	0.00667	0.7846	0.00096	0.00122	SW, 1 leaf, t-2, s-3
16269-1	0.1590	0.00179	0.01126	0.7846	0.00555	0.00707	SW, 1 leaf, t-2, s-3

a t-1 for trunk 1; s-3 for section 3; s-6 for section 6

Table 1 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
			Grapefruit Tree (continued)				
16269s-1	1.7378	0.01954	0.01124	0.7846	0.00553	0.00705	SW, 9 leaves, t-2, s-3,[a] dry
16270-1	0.3294	0.00508	0.01542	0.7846	0.00971	0.01238	SW, 1 leaf, t-2, s-4, dry
16271-1	0.5350	0.00456	0.00852	0.7846	0.00281	0.00358	SW, 1 leaf, t-2, s-4, dry
16272-1	0.7421	0.00525	0.00707	0.7846	0.00136	0.00173	SW, 1 leaf, t-2, s-4, dry
16273-1	0.8307	0.00677	0.00815	0.7846	0.00244	0.00311	SW, 1 leaf, t-2, s-4, dry
16274-1	0.2765	0.00440	0.01591	0.7846	0.01020	0.01300	SW, 1 leaf, t-2, s-4, dry
16275-1	0.7315	0.00932	0.01274	0.7846	0.00703	0.00895	SW, 1 leaf, t-2, s-4, dry
16276-1	0.5806	0.00612	0.01054	0.7846	0.00483	0.00616	SW, 1 leaf, t-2, s-4, dry
16277-1	0.5875	0.00342	0.00582	0.7846	0.00011	0.00014	SW, 1 leaf, t-2, s-4, dry
16278-1	0.4217	0.00658	0.01560	0.7846	0.00989	0.01260	SW, 1 leaf, t-2, s-4, dry
16279-1	0.5443	0.00435	0.00799	0.7846	0.00228	0.00291	SW, 1 leaf, t-2, s-4, dry
16280-1	0.3700	0.00225	0.00608	0.7846	0.00037	0.00047	SW, 1 leaf, t-2, s-4, dry
16280s-1	5.9493	0.05810	0.00977	0.7846	0.00406	0.00517	SW, 11 leaves, t-2, s-4, dry
16281-1	0.1238	0.00190	0.01535	0.7846	0.00964	0.01229	SW, 1 leaf, t-3, s-5, dry
16282-1	0.2412	0.00280	0.01161	0.7846	0.00590	0.00752	SW, 1 leaf, t-3, s-5, dry
16283-1	0.2949	0.00249	0.00844	0.7846	0.00273	0.00348	SW, 1 leaf, t-3, s-5, dry
16284-1	0.2883	0.00421	0.01460	0.7846	0.00889	0.01133	SW, 1 leaf, t-3, s-5, dry
16285-1	0.2690	0.00325	0.01208	0.7846	0.00637	0.00812	SW, 1 leaf, t-3, s-5, dry

[a] t-2 for trunk 2; t-3 for trunk 3;
s-3 for section 3; s-4 for section 4; s-5 for section 5

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Grapefruit Tree (continued)			
16286-1	0.2603	0.00245	0.00941	0.7846	0.00370	0.00472	SW, 1 leaf, t-3, s-5,[a] dry
16287-1	0.1798	0.00129	0.00718	0.7846	0.00147	0.00187	SW, 1 leaf, t-3, s-5, dry
16288-1	0.2231	0.00411	0.01842	0.7846	0.01271	0.01620	SW, 1 leaf, t-3, s-5, dry
16288s-1	1.8804	0.02250	0.01197	0.7846	0.00626	0.00798	SW, 8 leaves, t-3, s-5, dry
16289-3	3.0661	0.00394	0.00129	0.7846	0.00129	0.00164	S, twig, t-1, s-5, dry
16289s-1,3	14.7420	0.12386	0.00840	0.7846	0.00388	0.00495	S, 18 leaves plus twigs, t-1, s-5, dry
16290-3	0.7692	0.00260	0.00338	0.7846	0.00338	0.00431	S, twig, t-1, s-6, dry
16290s-1,3	5.6777	0.06530	0.01150	0.7846	0.00656	0.00836	S, 13 leaves plus twigs, t-1, s-6, dry
16291-3	0.3767	0.00170	0.00451	0.7846	0.00451	0.00575	S, twig, t-2, s-3, dry
16291s-1,3	2.1145	0.02124	0.01004	0.7846	0.00535	0.00682	S, 9 leaves plus twigs, t-2, s-3, dry
16292-3	0.9970	0.00354	0.00355	0.7846	0.00355	0.00452	S, twig, t-3, s-5, dry
16292s-1,3	2.8774	0.02604	0.00905	0.7846	0.00532	0.00678	S, 8 leaves plus twigs, t-3, s-5, dry
16293-1	24.63	-	-	-	-	-	O, 28 2-year leaves, 17 1-year leaves, t-1, s-1,
16294-1	28.00	-	-	-	-	-	O, 57 2-year leaves, 6 1-year leaves, 22 new leaves, t-1, b-2

[a] t-1 for trunk 1; t-2 for trunk 2; t-3 for trunk 3;
s-3 for section 3; s-5 for section 5; s-6 for section 6;
b-1 for branch 1; b-2 for branch 2

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Grapefruit Tree (concluded)			
16295-1	50.20	-	-	-	-	-	O, 110 2-year leaves, 6 1-year leaves, t-1, b-3,[a] dry
16296-1	48.24	-	-	-	-	-	O, 63 2-year leaves, 15 1-year leaves, 13 new leaves, t-1, b-4, dry
16297-1	61.49	-	-	-	-	-	O, 37 2-year leaves, 100 1-year leaves, 111 new leaves, t-2, b-1, dry
16298-1	53.33	-	-	-	-	-	O, 33 2-year leaves, 56 1-year leaves, 134 new leaves, t-2, b-2, dry
16299-1	16.27	-	-	-	-	-	O, 52 2-year leaves, t-3, b-1, dry
16300-1	53.90	-	-	-	-	-	O, 59 2-year leaves, 116 1-year leaves, t-3, b-2, dry

a t-1 for trunk 1; t-2 for trunk 2; t-3 for trunk 3;
b-1 for branch 1; b-2 for branch 2; b-3 for branch 3

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Juniper			
16023	8.9512	0.0308	0.00344	-	-	-	B, northwest
16024-3	1.0667	-	-	-	-	-	B, east, twigs
16024-2	5.7315	-	-	-	-	-	B, east, twigs
16024-1	3.1550	-	-	-	-	-	B, east, twigs (photo)
16024	9.9532	0.0662	0.00665	-	-	-	B, east, twigs
16025	6.8825	0.0443	0.00644	-	-	-	B, southeast
16026	7.1960	0.0551	0.00766	-	-	-	B, southwest
16033	10.2245	0.07240	0.00708	0.6248	0.00128	0.00205	P, north, twigs, dry
16034	6.7485	0.03920	0.00580	0.6248	~0.0	~0.0	P, east, twigs, dry
16035	9.1636	0.06330	0.00691	0.6248	0.00111	0.00178	P, south, twigs, dry
16036	6.2347	0.1130	0.01812	0.6248	0.01232	0.0192	P, west, twigs, dry
16037	4.5026	0.0303	0.00673	0.6248	0.00093	0.00149	P, top center, twigs, dry
				Laurel			
15002-1	1.2917	0.3112	0.2409	-	-	-	O, 11 leaves, north, bottom
15003-1	0.8286	0.2833	0.3419	-	-	-	O, 9 leaves, east, bottom
15004-1	0.8288	0.1710	0.2063	-	-	-	O, 11 leaves, south, bottom
15005-1	1.1325	0.2738	0.2418	-	-	-	O, 10 leaves, west, bottom
15006-1	0.7360	0.1350	0.1834	-	-	-	O, 10 leaves, center, bottom
15007-1	1.3108	0.4026	0.3071	-	-	-	O, 12 leaves, north, top
15008-1	1.2137	0.3658	0.3014	-	-	-	O, 13 leaves, east, top
15009-1	1.2060	0.3895	0.3230	-	-	-	O, 11 leaves, south, top
15010-1	1.3869	0.4187	0.3019	-	-	-	O, 11 leaves, west, top
15011-1	1.1662	0.1722	0.1476	-	-	-	O, 14 leaves, center, top

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Laurel (continued)			
15012-1	1.5724	0.0838	0.0533*	-	-	-	B, 16 leaves, south, top
15013-1	1.0248	0.0246	0.0240	-	-	-	B, 10 leaves, center, top
15014-1	1.3098	0.0322	0.0246	-	-	-	B, 10 leaves, west, top
15015-1	1.4709	0.0516	0.0351	-	-	-	B, 15 leaves, north, bottom
15017-1	1.2231	0.0412	0.0337	1.9599	0.0057	0.00291	S, 10 leaves, north, bottom, semidamp
15018-1	1.6298	0.0642	0.0394	1.9599	0.0114	0.00582	S, 12 leaves, south, bottom, semidamp
15019-1	1.7723	0.0558	0.0315	1.9599	0.0035	0.00179	S, 15 leaves, east, bottom, semidamp
15020-1	1.9837	0.0847	0.0427	1.9599	0.0147	0.00750	S, 11 leaves, west, bottom, semidamp
15021-1	1.3373	0.0493	0.0369	1.9599	0.0089	0.00454	S, 10 leaves, center, bottom, semidamp
15022-1	1.8783	0.0646	0.0344	1.9599	0.0064	0.00327	S, 15 leaves, north, top, semidamp
15023-1	1.2402	0.0390	0.0314	1.9599	0.0034	0.00173	S, 11 leaves, south, top, semidamp
15024-1	2.4982	0.0718	0.0287	1.9599	0.0007	0.00036	S, 13 leaves, east, top, semidamp
15025-1	0.9959	0.0529	0.0531	1.9599	0.0251	0.0128	S, 12 leaves, west, top, semidamp

* Value not used

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_P (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Laurel (continued)			
15026-1	1.6173	0.0664	0.0411	1.9599	0.0131	0.00668	S, 13 leaves, center, top, semidamp
15026s-1	16.1761	0.5899	0.0365	1.9599	0.0085	0.00434	S, 122 leaves, semidamp
15027-1	1.3571	0.0753	0.0555	0.8221	0.0240	0.0292	P, 11 leaves, east, bottom, damp
15028-1	1.3946	0.0591	0.0424	0.8221	0.0087	0.0106	P, 12 leaves, north, bottom, damp
15029-1	0.9919	0.0433	0.0436	0.8221	0.0009	0.00109	P, 6 leaves, west, bottom, damp
15030-1	1.0793	0.0486	0.0450	0.8221	0.0056	0.00681	P, 10 leaves, south, bottom, damp
15031-1	1.0065	0.0808	0.0803	0.8221	0.0459	0.0558	P, 12 leaves, north, top, damp
15032-1	1.5071	0.0944	0.0626	0.8221	0.0339	0.0412	P, 24 leaves, east, top, damp
15033-1	1.5422	0.1039	0.0674	0.8221	0.0143	0.0174	P, 14 leaves, west, top, damp
15034-1	1.2430	0.0779	0.0627	0.8221	0.0313	0.0381	P, 11 leaves, south, top, damp
15035-1	1.4017	0.0919	0.0656	0.8221	0.0245	0.0298	P, 15 leaves, center, top, damp
15035s-1	11.5234	0.6752	0.0586	0.8221	0.0221	0.0269	P, 115 leaves, damp
15037-1	3.8065	0.1000	0.0263	-	-	-	B, 30 leaves, random
15038-1	0.7787	0.0390	0.0501	0.7724	0.0238	0.0308	P, 8 leaves, east, bottom, dry
15039-1	1.0386	0.0512	0.0493	0.7724	0.0230	0.0298	P, 10 leaves, south, bottom, dry
15040-1	0.9240	0.0331	0.0358	0.7724	0.0095	0.0123	P, 10 leaves, west, bottom, dry
15041-1	0.9184	0.0329	0.0358	0.7724	0.0095	0.0123	P, 10 leaves, north, bottom, dry
15042-1	0.7395	0.0210	0.0284	0.7724	0.0021	0.00272	P, 8 leaves, center, bottom, dry
15043-1	0.7585	0.0389	0.0513	0.7724	0.0250	0.0324	P, 9 leaves, north, top, dry

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Laurel (continued)			
15044-1	1.1271	0.0896	0.0795	0.7724	0.0532	0.0689	P, 13 leaves, south, top, dry
15045-1	0.9076	0.0448	0.0494	0.7724	0.0231	0.0299	P, 12 leaves, west, top, dry
15046-1	0.9226	0.0804	0.0871	0.7724	0.0608	0.0787	P, 10 leaves, east, top, dry
15047-1	0.9971	0.0828	0.0830	0.7724	0.0567	0.0734	P, 10 leaves, center, top, dry
15048-1	0.9368	0.0488	0.0521	0.7724	0.0258	0.0334	P, 10 leaves, east, center, dry
15049-1	0.8572	0.0476	0.0555	0.7724	0.0292	0.0378	P, 9 leaves, west, center, dry
15049s-1	10.9061	0.6101	0.0559	0.7724	0.0296	0.0383	P, 119 leaves, dry
15052-1	1.3037	0.0786	0.0603	0.8421	0.0245	0.0291	P, 10 leaves, north, bottom, damp
15052-1	1.3037	0.0786	0.0603	1.6145	0.0340	0.0211	2P, 10 leaves, north, bottom, damp
15053-1	1.0619	0.0649	0.0611	0.8421	0.0118	0.0140	P, 10 leaves, south, bottom, damp
15053-1	1.0619	0.0649	0.0611	1.6145	0.0348	0.0216	2P, 10 leaves, south, bottom, damp
15054-1	1.1966	0.0665	0.0556	0.8421	0.0055	0.00653	P, 14 leaves, east, bottom, damp
15054-1	1.1966	0.0665	0.0556	1.6145	0.0293	0.0181	2P, 14 leaves, east, bottom, damp
15055-1	1.4045	0.0900	0.0641	0.8421	0.0283	0.0336	P, 14 leaves, west, bottom, damp
15055-1	1.4045	0.0900	0.0641	1.6145	0.0378	0.0234	2P, 14 leaves, west, bottom, damp
15056-1	1.2426	0.0438	0.0352	0.8421	0.0068	0.00808	P, 12 leaves, center, bottom, damp

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Laurel (continued)			
15056-1	1.2426	0.0438	0.0352	1.6145	0.0089	0.00551	2P, 12 leaves, center, bottom, damp
15057-1	1.3114	0.1296	0.0988	0.8421	0.0475	0.0564	P, 13 leaves, north, top, damp
15057-1	1.3114	0.1296	0.0988	1.6145	0.0725	0.0449	2P, 13 leaves, north, top, damp
15058-1	2.1351	0.2398	0.1123	0.8421	0.0328	0.0390	P, 22 leaves, south, top, damp
15058-1	2.1351	0.2398	0.1123	1.6145	0.0860	0.0533	2P, 22 leaves, south, top, damp
15059-1	1.0609	0.1029	0.0970	0.8421	0.0099	0.0118	P, 12 leaves, east, top, damp
15059-1	1.0609	0.1029	0.0970	1.6145	0.0707	0.0438	2P, 12 leaves, east, top, damp
15060-1	1.0673	0.1364	0.1278	0.8421	0.0784	0.0931	P, 15 leaves, west, top, damp
15060-1	1.0673	0.1364	0.1278	1.6145	0.1015	0.0629	2P, 15 leaves, west, top, damp
15061-1	1.4240	0.1650	0.1159	0.8421	0.0329	0.0391	P, 15 leaves, center, top, damp
15061-1	1.4240	0.1650	0.1159	1.6145	0.0896	0.0555	2P, 15 leaves, center, top, damp
15061s-1	13.2080	1.1175	0.0846	0.8421	0.0287	0.0341	P, 137 leaves, damp
15061s-1	13.2080	1.1175	0.0846	1.6145	0.0583	0.0361	2P, 137 leaves, damp
15062-1	0.1317	0.0351	0.266	1.6145	0.240	0.149	2P, 1 leaf, NW sector, center, damp
15063-1	0.1282	0.0093	0.0725	1.6145	0.0462	0.0286	2P, 1 leaf (V).* NW sector. center, damp
15064-1	0.1263	0.0231	0.183	1.6145	0.157	0.0972	2P, 1 leaf, NW sector, center, damp
15065-1	0.1305	0.0074	0.0567	1.6145	0.0304	0.0188	2P, 1 leaf (V) NW sector, center. damp

* (V) indicates leaves hanging vertically; remainder were horizontal

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Laurel (continued)			
15066-1	0.1301	0.0162	0.125	1.6145	0.0987	0.0611	2P, 1 leaf, NW sector, center, damp
15067-1	0.1371	0.0056	0.0408	1.6145	0.0145	0.00898	2P, 1 leaf (V),* NW sector, center, damp
15068-1	0.1069	0.0193	0.181	1.6145	0.155	0.0960	2P, 1 leaf, NW sector, center damp
15068s-1	0.4950	0.0937	0.1893	0.6145	0.163	0.101	2P, 4 leaves, NW sector, center, damp
15069-1	0.1567	0.0199	0.127	1.6145	0.101	0.0626	2P, 1 leaf, SW sector, center, damp
15070-1	0.1288	0.0186	0.144	1.6145	0.118	0.0731	2P, 1 leaf, SW sector, center, damp
15071-1	0.0887	0.0155	0.175	1.6145	0.149	0.0923	2P, 1 leaf, SW sector, center, damp
15072-1	0.1546	0.0249	0.161	1.6145	0.135	0.0836	2P, 1 leaf, SW sector, center, damp
15073-1	0.1152	0.0103	0.0894	1.6145	0.0631	0.0391	2P, 1 leaf, SW sector, center, damp
15074-1	0.1384	0.0110	0.0794	1.6145	0.0531	0.0329	2P, 1 leaf, SW sector, center, damp
15075-1	0.1322	0.0150	0.113	1.6145	0.0867	0.0537	2P, 1 leaf, SW sector, center, damp

* (V) indicates leaves hanging vertically; remainder were horizontal

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Laurel (continued)			
15075s-1	0.9146	0.1152	0.1260	1.6145	0.0997	0.0618	2P, 7 leaves, SW sector, center, damp
15076-1	0.1818	0.0162	0.0891	1.6145	0.0628	0.0389	2P, 1 leaf, SE sector, center, damp
15077-1	0.0759	0.0193	0.254	1.6145	0.228	0.0141	2P, 1 leaf, SE sector, center, damp
15078-1	0.0939	0.0099	0.105	1.6145	0.0787	0.0487	2P, 1 leaf, SE sector, center, damp
15079-1	0.1874	0.0231	0.123	1.6145	0.0967	0.0599	2P, 1 leaf, SE sector, center, damp
15080-1	0.1176	0.0174	0.148	1.6145	0.122	0.0756	2P, 1 leaf, SE sector, center, damp
15081-1	0.1199	0.0204	0.170	1.6145	0.144	0.0892	2P, 1 leaf, SE sector, center, damp
15082-1	0.1575	0.0342	0.217	1.6145	0.191	0.118	2P, 1 leaf, SE sector, center, damp
15802s-1	0.9340	0.1405	0.1504	1.6145	0.1241	0.0769	2P, 7 leaves, SE sector, center, damp
15083	0.1807	0.0373	0.206	1.6145	0.180	0.111	2P, 1 leaf, NE sector, center, damp
15084-1	0.1396	0.0245	0.176	1.6145	0.150	0.0929	2P, 1 leaf, NE sector, center, damp
15085-1	0.1325	0.0218	0.164	1.6145	0.138	0.0855	2P, 1 leaf, NE sector, center, damp

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Laurel (continued)			
15086-1	0.1025	0.0155	0.151	1.6145	0.125	0.0774	2P, 1 leaf, NE sector, center, damp
15087-1	0.1002	0.0093	0.0928	1.6145	0.0665	0.0412	2P, 1 leaf, NE sector, center, damp
15088-1	0.1145	0.0125	0.109	1.6145	0.0827	0.0512	2P, 1 leaf, NE sector, center, damp
15089-1	0.1167	0.0224	0.192	1.6145	0.166	0.103	2P, 1 leaf, NE sector, center, damp
15089s-1	0.8867	0.1433	0.1616	1.6145	0.1353	0.0838	2P, 7 leaves, NE sector, center, damp
15089s-1	3.6261	0.5150	0.142	1.6145	0.1160	0.0718	2P, 28 leaves, center, damp
15090-1	52.89	3.9590	0.07501	0.8421	0.02026	0.0241	P, random, 552 leaves
15090-1	52.89	3.9590	0.07501	1.6145	0.0487	0.0302	2P, random, 552 leaves
15091-1	40.55	2.2255	0.05488	1.0761	0.00010	0.0000929	SW, random, 411 leaves
15091-1	40.55	2.2255	0.05488	1.8485	0.0286	0.0155	2PW, random, 411 leaves
15092-1	70.17	-	-	-	-	-	Leaf density, 890 leaves
15093-1	52.55	-	-	-	-	-	Leaf density, 592 leaves
15095-1	14.13	0.4223	0.0299	-	-	-	B, 145 leaves, random
15097-1	26.03	0.5695	0.0219	-	-	-	B, 241 leaves, random
15098-1	3.4431	0.0882	0.0256	0.7188	0.0037	0.00515	S, 35 leaves, north, top, dry
15099-1	4.4487	0.1460	0.0328	0.7188	0.0109	0.0152	S, 47 leaves, east, top, dry
15100-1	3.8695	0.1131	0.0292	0.7188	0.0073	0.0102	S, 39 leaves, south, top, dry

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Laurel (continued)			
15101-1	4.7083	0.1196	0.0254	0.7188	0.0035	0.00487	S, 48 leaves, west, top, dry
15102-1	3.3225	0.1047	0.0315	0.7188	0.0096	0.0134	S, 34 leaves, north, center, dry
15103-1	2.9938	0.1731	0.0578	0.7188	0.0359	0.0499	S, 33 leaves, east, center, dry
15104-1	3.3468	0.1200	0.0358	0.7188	0.0139	0.0193	S, 35 leaves, south, center, dry
15105-1	4.9625	0.01513	0.0305	0.7188	0.0086	0.0120	S, 47 leaves, west, center, dry
15106-1	2.7274	0.0886	0.0325	0.7188	0.0106	0.0147	S, 27 leaves, center, bottom, dry
15106s-1	33.8226	1.1046	0.0327	0.7188	0.0108	0.0150	S, 345 leaves, center, dry
15108-1	3.1259	0.0769	0.0246	-	-	-	B, 36 leaves, south
15109-1	2.4575	0.0443	0.0180	-	-	-	B, 26 leaves, west
15110-1	3.6830	0.0659	0.0179	-	-	-	B, 37 leaves, north
15111-1	1.9607	0.0466	0.0238	-	-	-	B, 24 leaves, east
				Pine-1			
13501-1,3	5.2130	0.0230	0.00441	-	-	-	B, needles plus twigs
13504-1,3	9.8205	0.0852	0.00868	2.5789	0.00427	0.00166	P, needles plus twigs, south side, damp
13505-1,3	7.0632	0.0413	0.00585	2.5789	0.00144	0.000558	P, needles plus twigs, north side, damp
13506-1,3	4.6283	0.0618	0.01335	2.5789	0.00894	0.00347	P, needles plus twigs, east side, damp

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Pine-2			
16001-1,3	68.70	1.1255	0.0164	-	-	-	O, twig
16001-3	7.5462	-	-	-	-	-	O, stem
16001-1	61.15	-	-	-	-	-	O, 900 needles
16002-1,3	25.0367	0.2044	0.00816	-	-	-	B, twig, north
16002-3	3.0582	-	-	-	-	-	B, stem, north
16002-1	21.9785	-	-	-	-	-	B, 310 needles, north
16003-1,3	41.6734	0.2564	0.00615	-	-	-	B, twig, south
16003-3	4.7219	-	-	-	-	-	B, stem, south
16003-1	36.9515	-	-	-	-	-	B, 550 needles, south
16004-1,3	11.3686	-	-	-	-	-	B, twig
16004-3	1.8100	-	-	-	-	-	B, top stem (photo)
16004-3	0.5167	-	-	-	-	-	B, center stem (photo)
16004-3	1.9049	-	-	-	-	-	B, bottom stem (photo)
16004-1	7.0770	-	-	-	-	-	B, 104 needles (photo)
16006-1,3	5.8252	0.0460	0.00790	0.6228	0.00074	0.00119	P, twig, south-southeast, dry
16006-3	0.9101	-	-	-	-	-	P, stem, south-southeast, dry
16006-1	4.9151	-	-	-	-	-	P, 76 needles, south-southeast, dry
16007-1,3	6.3904	0.0583	0.00920	0.6228	0.00204	0.00328	P, twig, south, dry
16007-3	0.7003	-	-	-	-	-	P, stem, south, dry
16007-1	5.6901	-	-	-	-	-	P, 82 needles, south, dry
16008-1,3	8.0765	0.0867	0.01073	0.6228	0.00357	0.00573	P, twig, southwest, dry
16008-3	0.7993	-	-	-	-	-	P, stem, southwest, dry
16008-1	7.2772	-	-	-	-	-	P, 110 needles, southwest, dry

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
				Pine-2 (continued)			
16009-1,3	5.2897	0.0604	0.00960	0.6228	0.00244	0.00392	P, twig, south-southwest, dry
16009-3	0.6850	-	-	-	-	-	P, stem, south-southwest, dry
16009-1	5.6047	-	-	-	-	-	P, 86 needles, south-southwest, dry
16010-1,3	13.0212	0.3444	0.02645	0.6228	0.01919	0.0308	P, twig, west, dry
16010-3	1.0768	-	-	-	-	-	P, stem, west, dry
16010-1	11.9444	-	-	-	-	-	P, 162 needles, west, dry
16011-1,3	4.2185	0.0950	0.02252	0.6228	0.01536	0.0247	P, twig, north-northwest, dry
16011-3	0.5260	-	-	-	-	-	P, stem, north-northwest, dry
16011-1	3.6925	-	-	-	-	-	P, 56 needles, north-northwest, dry
16012-1,3	6.3733	0.0801	0.01257	0.6228	0.00541	0.00869	P, twig, north, dry
16012-3	0.6229	-	-	-	-	-	P, stem, north, dry
16012-1	5.7504	-	-	-	-	-	P, 94 needles, north, dry
16013-1,3	5.5532	0.0463	0.00834	0.6228	0.00118	0.00189	P, twig, northeast, dry
16013-3	0.7293	-	-	-	-	-	P, stem, northeast, dry
16013-1	4.8239	-	-	-	-	-	P, 68 needles, northeast, dry
16014-1,3	2.7090	0.0226	0.00834	0.6228	0.00118	0.00189	P, twig, east, dry
16014s-1,3	58.4570	0.8403	0.01437	0.6228	0.00721	0.0116	P, 9 twigs, dry
16014-3	0.4506	-	-	-	-	-	P, stem, east, dry
16014-1	2.2584	-	-	-	-	-	P, 32 needles, east, dry
16015-1,3	36.6864	0.1450	0.00395	-	-	-	B, random twigs
16015-3	3.4564	-	-	-	-	-	B, stems
16015-1	33.2320	-	-	-	-	-	B, 488 needles

Table 17 (continued)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o (gm/gm)	a_L (sq ft/gm)	Sample Designation
			Pine-2 (continued)				
16016-1,3	8.4887	0.0401	0.00472	-	-	-	B, random meristem twigs
16016-3	1.3767	-	-	-	-	-	B, meristem tips
16016-1	7.1120	-	-	-	-	-	B, 112 meristem needles
16018-1,3	41.10	0.0352	0.000856	-	-	-	B, random twigs
16018-3	5.9960	-	-	-	-	-	B, stems
16018-1	40.50	-	-	-	-	-	B, 570 needles
16019-1,3	3.4484	0.0156	0.00185	-	-	-	B, random meristem twigs
16019-3	1.7031	-	-	-	-	-	B, meristem tips
16019-1	6.7453	-	-	-	-	-	B, 114 meristem needles
16038-1,3	16.1942	0.0234	0.00144	0.6248	0.00058	0.000928	S, twig, north, dry
16038-3	2.3548	-	-	-	-	-	S, stem, north, dry
16038-1	13.8394	-	-	-	-	-	S, 220 needles, north, dry
16039-1,3	21.0470	0.0360	0.00171	0.6248	0.00085	0.00136	S, twig, east, dry
16039-3	3.1219	-	-	-	-	-	S, stem, east, dry
16039-1	17.9251	-	-	-	-	-	S, 276 needles, east, dry
16040-1,3	20.9126	0.1978	0.00946	0.6248	0.00860	0.0138	S, twig, south, dry
16040-3	3.3016	-	-	-	-	-	S, stem, south, dry
16040-1	17.6110	-	-	-	-	-	S, 256 needles, south, dry
16041-1,3	31.76	0.1105	0.00348	0.6248	0.00262	0.00419	S, twig, west, dry
16041s-1,3	89.91	0.3677	0.00409	0.6248	0.00323	0.00517	S, 4 twigs, dry
16041-3	4.4014	-	-	-	-	-	S, stem, west, dry
16041-1	27.36	-	-	-	-	-	S, 402 needles, west, dry
16042-1,3	6.4247	0.0421	0.00655	0.6248	0.00470	0.00752	S, meristem, twig, north, dry
16042-3	0.9242	-	-	-	-	-	S, meristem, tip, north, dry
16042-1	5.5005	-	-	-	-	-	S, 88 meristem needles, north, dry

Table 17 (concluded)

Sample Number	W_L (gm)	Δm_L (gm)	C_p (gm/gm)	Δm (gm/sq ft)	C_p^o gm/gm)	a_L sq ft/gm)	Sample Designation
				Pine-2 (continued)			
16043-1,3	5.4802	0.0281	0.00513	0.6248	0.00328	0.00525	S, meristem twig, east, dry
16043-3	0.6853	-	-	-	-	-	S, meristem tip, east, dry
16043-1	4.8149	-	-	-	-	-	S, 72 meristem needles, east, dry
16044-1,3	3.0112	0.0425	0.01411	0.6248	0.01226	0.0196	S, meristem twig, south, dry
16044-3	0.7303	-	-	-	-	-	S, meristem tip, south, dry
16044-1	2.2809	-	-	-	-	-	S, 40 meristem needles, south, dry
16045-1,3	8.3749	0.0652	0.00779	0.6248	0.00594	0.00951	S, meristem twig, west, dry
16045s-1,3	23.29	0.1779	0.00764	0.6248	0.00579	0.00927	S, 4 meristem twigs, dry
16045-3	1.4562	-	-	-	-	-	S, meristem tip, west, dry
16045-1	6.9187	-	-	-	-	-	S, 112 meristem needles, west, dry

The low air temperatures at the altitude of the land plots and the short period of sunshine each day resulted in very slow germination of seeds and slow growth rates of many of the vegetables, and, as previously noted, the damp conditions were favorable to the growth of mildew and molds and to rotting. In addition, the growth of many plants was adversely affected by occasional showers of ceniza-arena particles that carried sufficient quantities of sulfuric acid or sulfate salts to burn the foliage. Single showers of such particles killed entire bean crops and burned the corn leaves to a uniform gray color. Large squash plants so affected died within a few days. Tomato leaves were easily burned at their edges and tips; the burned edges first dried and became brittle, but within a few days, under damp conditions, the dead tissue became soft and rotted. The tips of the onion foliage were burned, but otherwise the onion foliage did not retain enough particles to seriously affect the growth of the plants. (The acidic solution would run down the stems to the ground rather than concentrate in place on the foliage as the water evaporated, as was the case for the other leafy plants.) The oat and rye foliage was less sensitive to burn than was the wheat and barley (the latter was most sensitive) foliage; all the grains suffered leaf-tip burns to some degree. Cabbage was never affected by acid burn.

The acidic ceniza-arena showers apparently developed from eruptions that produced white-colored steam (plus sulfur oxide) clouds. When such an eruption was followed closely by one that produced a dark particle cloud, and the two became mixed, the particles were apparently wetted by the acidic water drops and carried larger than usual amounts of sulfuric acid on their surfaces.

The severest burn condition on the plants resulted when the acid-carrying particles landed on the foliage during the night or early morning hours when the foliage was damp with dew. The acid then dissolved into the dew and spread more or less uniformly over the whole top surface of each contaminated leaf. When the temperature increased after sunrise, the water rapidly evaporated; in the process, the acidic salts were concentrated on the surface of the leaves, and, as dryness approached, the acidic salts dehydrated and burned the leaves.

Tree and Greased Disc Collector Contamination Data

Some contamination data were obtained on six different types of trees--avocado, camphor, grapefruit, juniper, laurel, and pine. Greased disc collector data were obtained for only one of the two pine trees and for a laurel tree. The general conditions under which the contamination data for the camphor, grapefruit, laurel, and pine trees were obtained are briefly discussed below.

The foliar samples from the camphor tree were usually taken from two or three locations on the tree canopy. One of these was an exposed location on the northeast side of the tree at a height of 9 to 11 feet from the ground; the second was an exposed location on the southwest side of the tree at a similar height; and the third was a shielded location on the southeast to southwest side of the tree at a height of 5 to 7 feet. The tree was about 12 feet tall, with the lower branches, or bottom of the canopy, at a height of 5 feet; the width, or diameter of the canopy (maximum at mid-height of the canopy) was about 6 feet; and the trunk diameter at 3 feet was about 3.5 inches.

The contamination factors obtained from the samples taken at a given time from both the exposed and the protected locations can be used to evaluate the $F(w_L)$ parameter of Equation 3. If a uniform density of foliage between the two sampling locations is assumed, the decrease in $F(w_L)$ or a_L, with distance parallel to the average fall trajectory of the particles, should approximately be given by

$$F(w_L) = e^{-\beta r} \tag{13}$$

where r is the distance from an exposed exterior location to a protected (interior or exterior) location along the line of fall of the particles through the canopy. For the camphor tree data, the true value of r is not readily determined; however, because the direction of fall through the canopy usually was approximately in the direction of the line between one of the exposed sampling locations and the protected location, the geometric distance, r', was used as the estimate of r in the treatment of the data. The corresponding value of β for this approximation of r is then β'.

The computed values of $F(w_L)$ and β' for the camphor tree are summarized in Table 18; the averaged data indicate that β' values of 0.2 ft^{-1} for damp conditions and 0.1 ft^{-1} for dry conditions would give satisfactory representations of the observed results. The dependence of the value of β (or β') on wind speed is discussed in Part Three of this report.

The foliar samples for the composite grapefruit tree (see Figure 14) were all single leaves taken from selected sections or branches of the tree for a single contamination and weathering sequence. In the sequence, 243 leaf samples were taken. The number distribution of the a_L values are shown in Figure 15 for the P, PW, and SW samples. The averaged values of the contamination factors and the median values taken from Figure 14 are summarized as follows:

Table 18

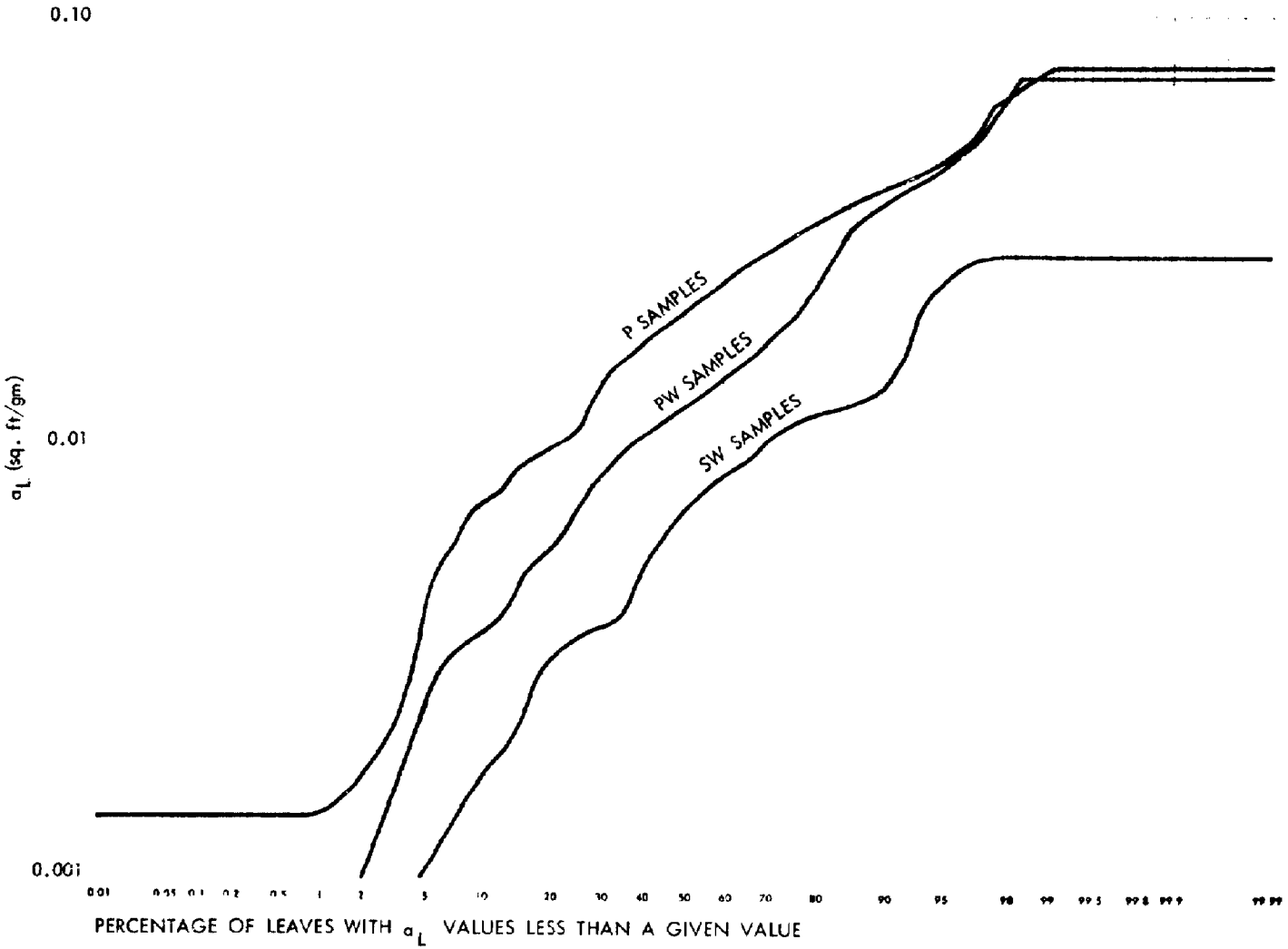
COMPUTED VALUES OF $F(w_L)$ AND β' FOR THE CAMPHOR TREE

Sample Number	$F(w_L)$	r'	β'	Sample Type and Conditions
06383-1,3/06381-1,3	0.185	6	0.281	S, damp and dry
06397-1,3/06395-1,3	0.341	6	0.179	P, damp
06397-1,3/06395-1,3	0.252	6	0.230	S, damp and dry
06429-1,3/06430-1,3	0.351	6	0.175	P, damp
06450-1,3/06449-1,3	0.432	6	0.140	P, damp
06517-1,3/06518-1,3	0.579	5	0.110	P, dry
06540-1,3/06541-1,3	0.879	4	0.0322	P, dry
06592-1,3/06593-1,3	0.653	3	0.143	S, damp
06592-1,3/06593-1,3	0.931	3	0.0238[a]	P, damp
		Average:	0.191	Damp conditions
		Average:	0.0711	Dry conditions

a Not used in calculating the average

Figure 14
COMPOSITE GRAPEFRUIT TREE AT STATION 16

Figure 15
CONTAMINATION FACTOR DISTRIBUTIONS FOR GRAPEFRUIT LEAVES



Type of Sample	Number of Leaves	$\bar{a}_L$ (sq ft/gm)	$a_L(50)$ (sq ft/gm)
Primary	121	0.0171	0.020
Primary, Wind Weathered	63	0.0108	0.012
Secondary, Wind Weathered	59	0.00650	0.0070

The frequency peaks in the a_L distribution curves were 0.020 to 0.030 sq ft/gm for the P samples, 0.010 to 0.015 sq ft/gm for the PW samples, and 0.003 to 0.004 and 0.010 to 0.015 sq ft/gm (two peaks) for the SW samples. As the weathering progressed, the distributions tended to smooth out.

After the sampling series was completed, all the leaves were removed from the tree, counted, washed, dried, and weighed. The total number of leaves, including those taken as foliar samples, was 1,344; their total dry weight was 438.46 gm (gross average of 0.326 gm/leaf). Further analysis of the data on the grapefruit tree leaves regarding location and orientation is given in Part Three of this report.

The laurel tree specimen was about 15-feet tall; the surface of the leaves, after cleaning, was smooth and glossy. The newer leaves were V-shaped and curved from tip to stem: the angular orientation of the leaves ranged from near horizontal to vertical. Several sets of greased disc (2-inch-diameter) collector data were obtained on the contamination of the foliage of this tree.

Sampling location $F(w_L)$ values from the several sets of contamination factor data on the laurel tree are summarized in Table 19 as a function of the direction of the sampling location from the center of the tree and the height of the sample location on the periphery of the canopy (i.e., top, center or bottom). The $F(w_L)$ value of the sample with the largest a_L value was taken as unity for each set of samples; in all sets except one, the highest a_L value was found for a sample near the top of the tree canopy. The lowest $F(w_L)$ value for the primary samples usually occurred for the leaves or twigs taken from the bottom of the canopy opposite the direction of arrival of the shower or for the samples taken from the bottom center of the canopy. The average value of $F(w_L)$ for all the leaf (plus twig) samples taken from the periphery of the laurel tree was 0.421. The $F(w_L)$ values for similar types of samples taken at random throughout the tree canopy were 0.259 and 0.480 for Set Nos. 4 and 5, respectively.

The variation in the contamination factor with direction around the

Table 19

SUMMARY OF PERIPHERAL SAMPLING LOCATION $F(w_L)$ VALUES FOR LAUREL TREE LEAVES AND TWIGS

	Direction of Sample Location from Center of Tree						Sample Type and Condition
	N	E	Center[a]	S	W	Average	
				Set No. 1			
Top	0.255	0.028	0.521	0.135	1.000	0.388	S, semidamp
Bottom	0.227	0.140	0.354	0.454	0.585	0.352	
Average	0.241	0.084	0.438	0.294	0.792	0.370	
				Set No. 2			
Top	1.000	0.738	0.534[b]	0.683	0.312	0.683	P, damp
Bottom	0.190	0.523	-	0.122	0.020	0.214	
Average	0.595	0.630	-	0.402	0.166	0.448	
				Set No. 3			
Top	0.412	1.000	0.933	0.876	0.380	0.702	P, dry
Center	-	0.424[b]	-	-	0.480[b]	-	
Bottom	0.156	0.391	0.035	0.379	0.156	0.223	
Average	0.284	0.696	0.484	0.628	0.268	0.472	
				Set No. 4			
Top	0.606	0.127	0.420	0.419	1.000	0.514	P, damp
Bottom	0.313	0.070	0.087	0.150	0.361	0.196	
Average	0.460	0.098	0.254	0.284	0.680	0.355	
				Set No. 5			
Top	0.714	0.696	0.882	0.847	1.000	0.828	2P, damp
Bottom	0.335	0.288	0.088	0.343	0.372	0.285	
Average	0.524	0.492	0.485	0.595	0.686	0.556	
				Set No. 6			
Top	0.103	0.305	-	0.204	0.098	0.178	S, dry
Center	0.269	1.000	-	0.387	0.241	0.474	
Bottom	-	-	0.295[b]	-	-	-	
Average	0.186	0.652	-	0.296	0.170	0.326	

a Protected locations around the bottom of the canopy

b Not used in taking averages

periphery of the center of the tree canopy for horizontal leaves is shown in Figure 16. This set of data (corresponding to Set No. 5 of Table 19) shows that two major depositions occurred--one from the east (93 degrees) and one from the north (351 degrees). The lowest $F(w_L)$ value for the set is 0.0903; this value occurred at an azimuth of 162 degrees, which is almost 180 degrees from the direction of the leaf sample with the largest a_L value. The integrated average value of a_L for the horizontal peripheral leaves (center of canopy) was about 2.5 times larger than the a_L obtained for the leaves taken at random throughout the canopy.

Data on the locations and contamination levels of the 2-inch-diameter horizontal greased discs that were mounted on the two X-rods in the laurel tree are given in Tables 20 and 21. The contamination data are plotted as a function of the distance from the X-rod centers in Figures 17 through 21; estimates of the disc contamination contours in the planes of the X-rods are given in Figures 22 and 23 for Runs D1, D2 and D4.

The Run D1 samples were contaminated by a dense ceniza-arena shower that lasted about 5 minutes. An initial set of discs had been exposed for almost 8 hours and had only collected a few scattered particles on the grease film; these discs were in the process of being replaced with clean ones when the shower occurred. All the original discs had been removed, and only the discs on the north, south, and east sections of the top X-rod had been replaced when the shower started. After the shower, these discs were recovered, and new clean discs were put on the lower X-rod to obtain weathering information during the night. The remaining supply of clean prepared discs was only sufficient for one X-rod, since the few extra clean discs for the top X-rod were contaminated in their open carrying case when the shower took place. A second shower occurred a few minutes after the team left the station, but it was then too dark to attempt the recovery of the second set of discs; they were recovered shortly after sunrise the following morning.

The disc contamination data for Run D1 correspond to the leaf contamination data of Set No. 3 in Table 19; both sets of data show that the shower came from an easterly direction (see Figure 22). The disc contamination data for Run D2 correspond to the leaf contamination data of Set No. 4 in Table 19. The leaf contamination data indicate that the second shower came from the west or northwest (also see Figure 16 for the directions of these two showers); the lobe of the Run D2 contours in Figure 22 also indicates a northwesterly direction, but the highest air concentrations at the protected locations near the bottom of the canopy, as represented by the disc contamination data, are shown for the downwind side of the tree (east to south).

Figure 16

VARIATION OF CONTAMINATION FACTORS WITH DIRECTION FOR HORIZONTAL LAUREL TREE LEAVES (2P SAMPLES) TAKEN AT MIDHEIGHT OF THE PERIPHERY OF THE CANOPY

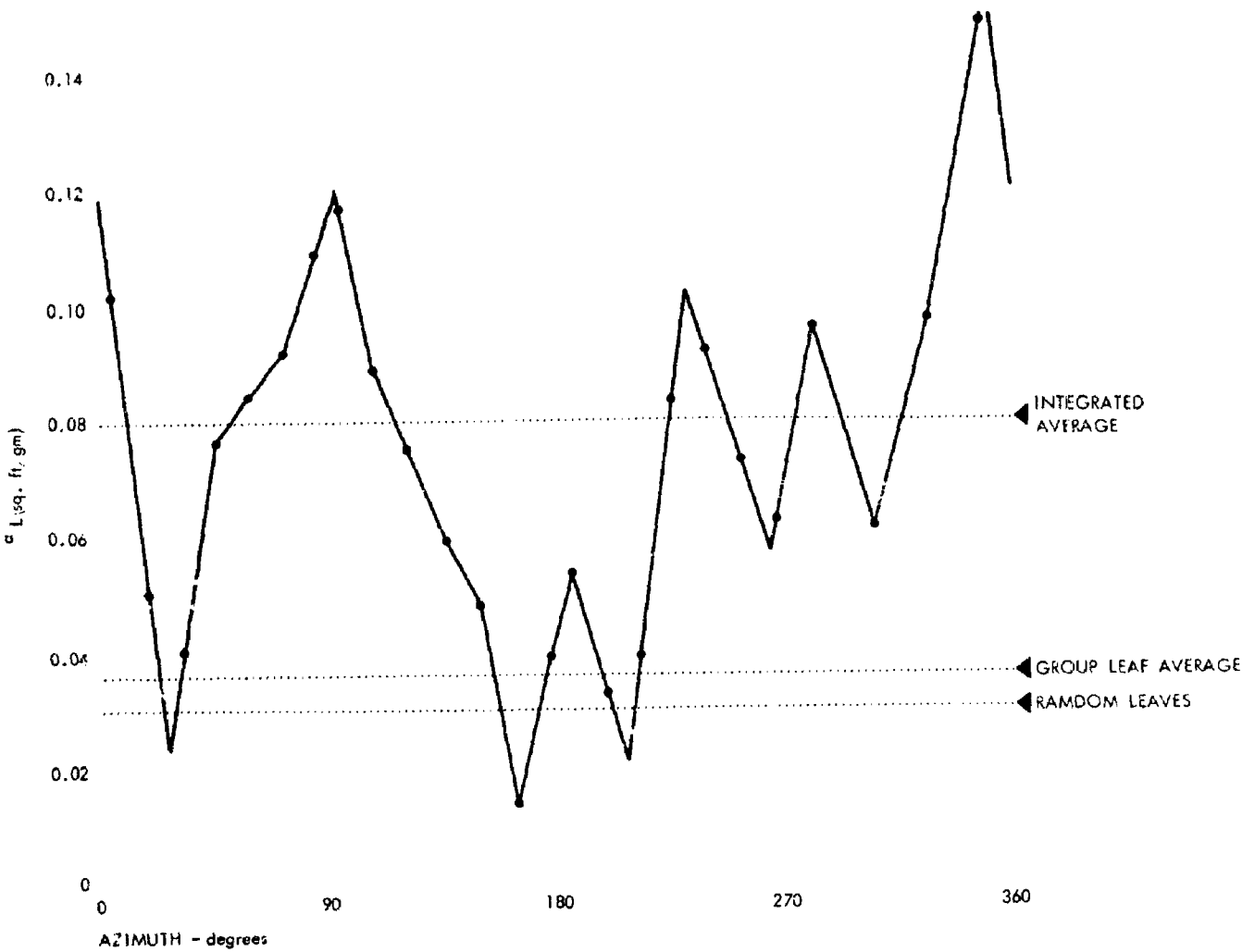


Table 20

DISC CONTAMINATION DATA FOR THE LAUREL TREE:
RUNS D1, D2, AND D3

θ_d (degrees)	r_d (ft)	Exposure Condition	Δm_d (gm/sq ft) Run D1	Run D2	Run D3
			Top X-rod		
5	0.20	E	0.752	-	-
	0.89	E	0.723	-	0.0723
	1.62	E	1.037	-	0.106
	2.21	PP	0.743	-	0.0916
	2.75	PP	0.545	-	-
	3.29	EO	0.656,0.690	-	0.106,0.0964
95	1.05	P	0.767	-	0.116
	1.72	PP	1.128	-	0.121
	2.18	PP	0.907	-	0.0868
	2.67	P	0.931	-	0.0868
	3.66	P	0.256	-	0.0820
185	2.13	P	0.781	-	0.0964
	2.44	PP	0.477	-	0.0916
	3.08	EO	0.868	-	0.0820
	3.76	EO	0.844	-	0.0916
	0.92	PP	-	-	0.140
	1.77	P	-	-	0.101
	2.72	PP	-	-	0.116
	3.64	EO	-	-	0.116,0.111
			Bottom X-rod		
70	0.52	P	-	0.270	0.0916
	0.98	P	-	0.217	0.0772
	1.66	P	-	0.207	0.0916
	2.21	P	-	0.212	0.125
	2.85	E	-	0.506	0.149
	3.77	EO	-	0.559	0.135
160	0.38	P	-	0.183	0.135
	0.95	P	-	0.227	0.145
	1.51	P	-	0.260	0.116
	2.31	P	-	0.227	0.154

Table 20 (concluded)

θ_d (degrees)	r_d (ft)	Exposure Condition	Δm_d (gm/sq ft) Run D1	Run D2	Run D3
			Bottom X-rod (concluded)		
160	3.07	PP	-	0.357	0.159
	0.387	EO	-	0.521,0.564	0.125,0.101
250	0.52	P	-	0.246	0.0916
	1.02	P	-	0.251	0.0964
	1.53	PP	-	0.284	0.0916
	2.30	EO	-	0.376,0.342	0.106,0.0916
340	0.10	P	-	0.217	0.0868
	0.59	PP	-	0.212	0.101
	1.49	P	-	0.280	0.0868
	2.07	P	-	0.188	0.0916
	2.66	PP	-	0.231	0.0723
	3.48	EO	-	0.347,0.429	0.0964,0.0820

Notes:

Run D1: Recovered 1/15, 1745; Δt = 0.083 hrs; Δm (tray) = 0.7724 gm/sq ft

Run D2: Recovered 1/16, 0630; Δt = 12.50 hrs; Δm (tray) = 0.8421 gm/sq ft

Run D3: Recovered 1/16, 1655; Δt = 7.83 hrs; Δm (tray) = 0.0

E: Disc exposed from above and to the sides
O: Disc outside of tree canopy
P: Disc protected by leaves (top and all sides)
PP: Disc partially protected by leaves (top and at least one side)

θ_d: Azimuth of the arm of the X-rod on which the discs were mounted

r_d: Distance from the center of the X-rod to the point where the disc was located

Table 21

DISC CONTAMINATION DATA FOR THE LAUREL TREE: RUN D4

θ_d (degrees)	r_d (ft)	Exposure Condition	Δm_d (gm/sq ft) Run D4
		Top X-rod	
13	0.31	P	0.454
	0.80	PP	0.665
	1.71	PP	0.608
	2.30	E	0.771
	2.89	PP	0.698
	3.71	EO	0.836
103	0.49	P	0.449
	1.52	PP	0.624
	2.07	E	0.703
	2.71	E	0.744
	3.64	EO	0.756
193	0.74	P	0.448
	1.31	P	0.520
	2.11	PP	0.602
	2.86	PP	0.609
283	0.33	P	0.553
	0.79	PP	0.627
	1.82	PP	0.686
	2.32	P	0.597
	2.83	E	0.607
	3.60	EO	0.882,0.650
		Bottom X-rod	
6	0.20	P	0.511
	0.89	P	0.546
	1.62	P	0.475
	2.21	PP	0.625
	2.76	PP	0.696
	3.03	EO	0.958,0.756
96	0.85	P	0.504
	1.92	P	0.538
	2.97	PP	0.693

Table 21 (concluded)

θ_d (degrees)	r_d (ft)	Exposure Condition	Δm_d (gm/sq ft) Run D4
	Bottom X-rod (concluded)		
96	3.87	EO	0.754
	3.92	EO	0.776
186	0.48	P	0.503
	2.12	P	0.527
	2.67	P	0.472
	3.08	PP	0.569
	3.74	EO	0.640,0.694
276	0.59	P	0.525
	1.28	P	0.598
	2.18	PP	0.612
	3.13	EO	0.652

Notes:

Run D4: Recovered 2/16, 0900; $\Delta t \geq$ 3 hrs; Δm(tray) = 0.7188 gm/sq ft

E: Disc exposed from above and to the sides
O: Disc outside of tree canopy
P: Disc protected by leaves (top and all sides)
PP: Disc partially protected by leaves (top and at least one side)

θ_d: Azimuth of the arm of the X-rod on which the discs were mounted

r_d: Distance from the center of the X-rod to the point where the disc was located

Figure 17

CONTAMINATION OF DISCS IN THE LAUREL TREE: RUN D1

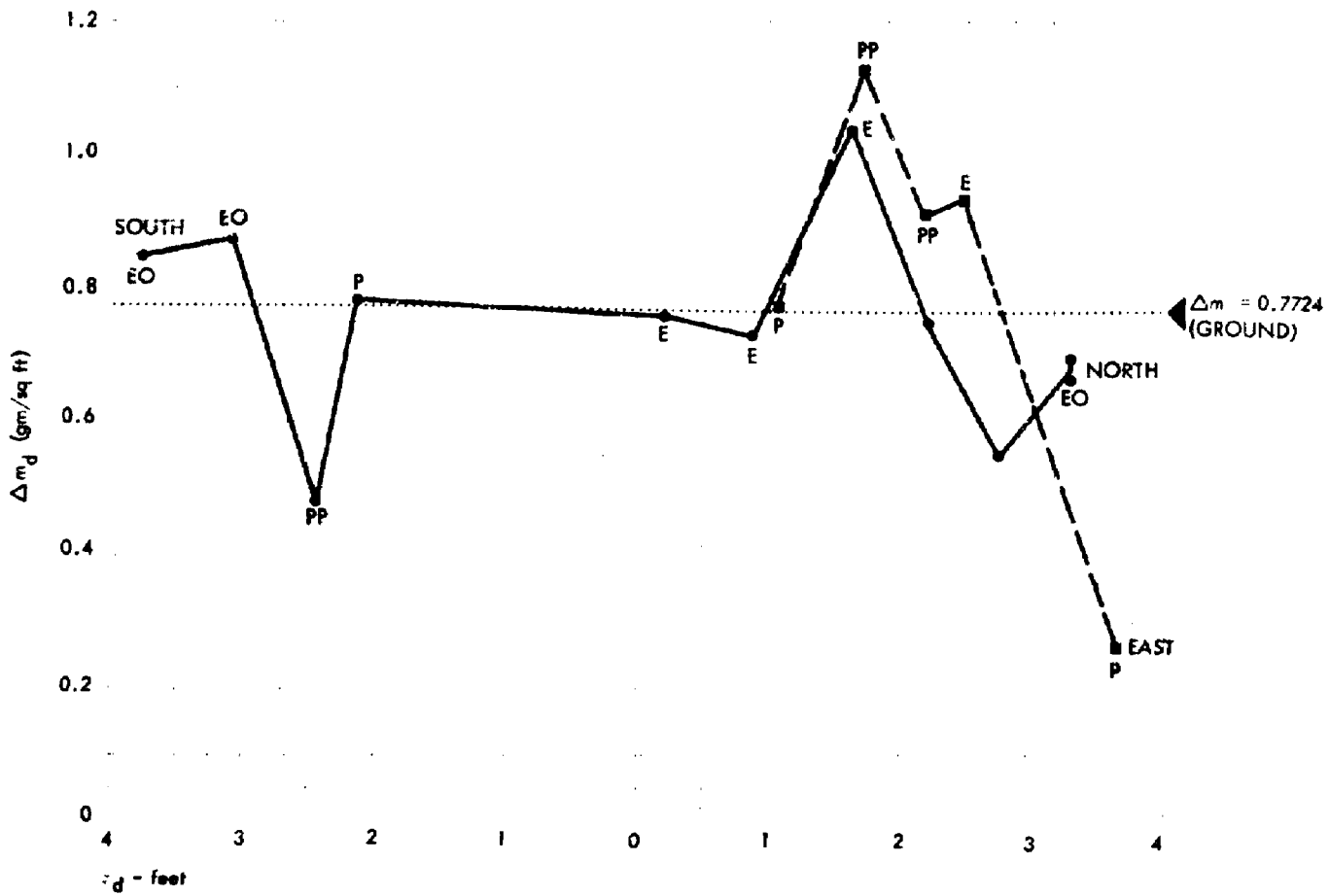


Figure 18
CONTAMINATION OF DISCS IN THE LAUREL TREE: RUN D2

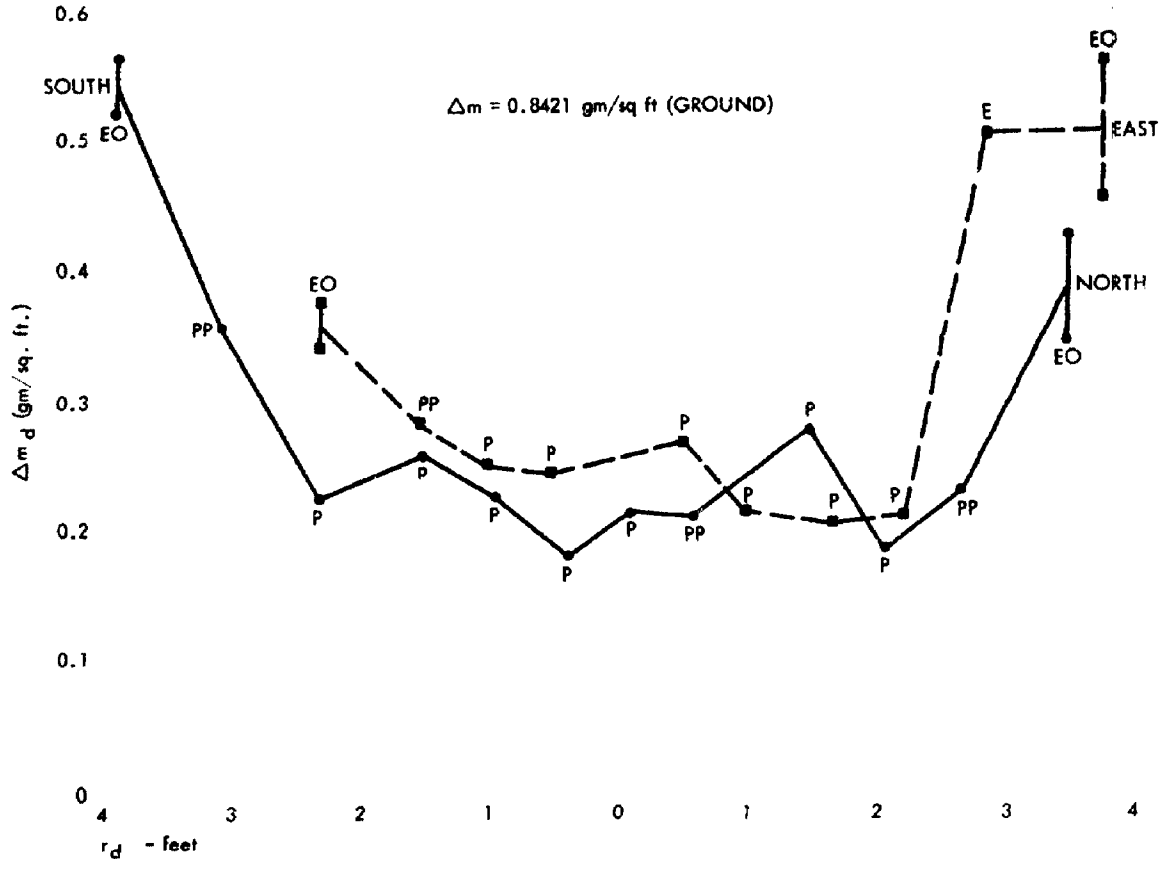


Figure 19
CONTAMINATION OF DISCS IN THE LAUREL TREE: RUN D3

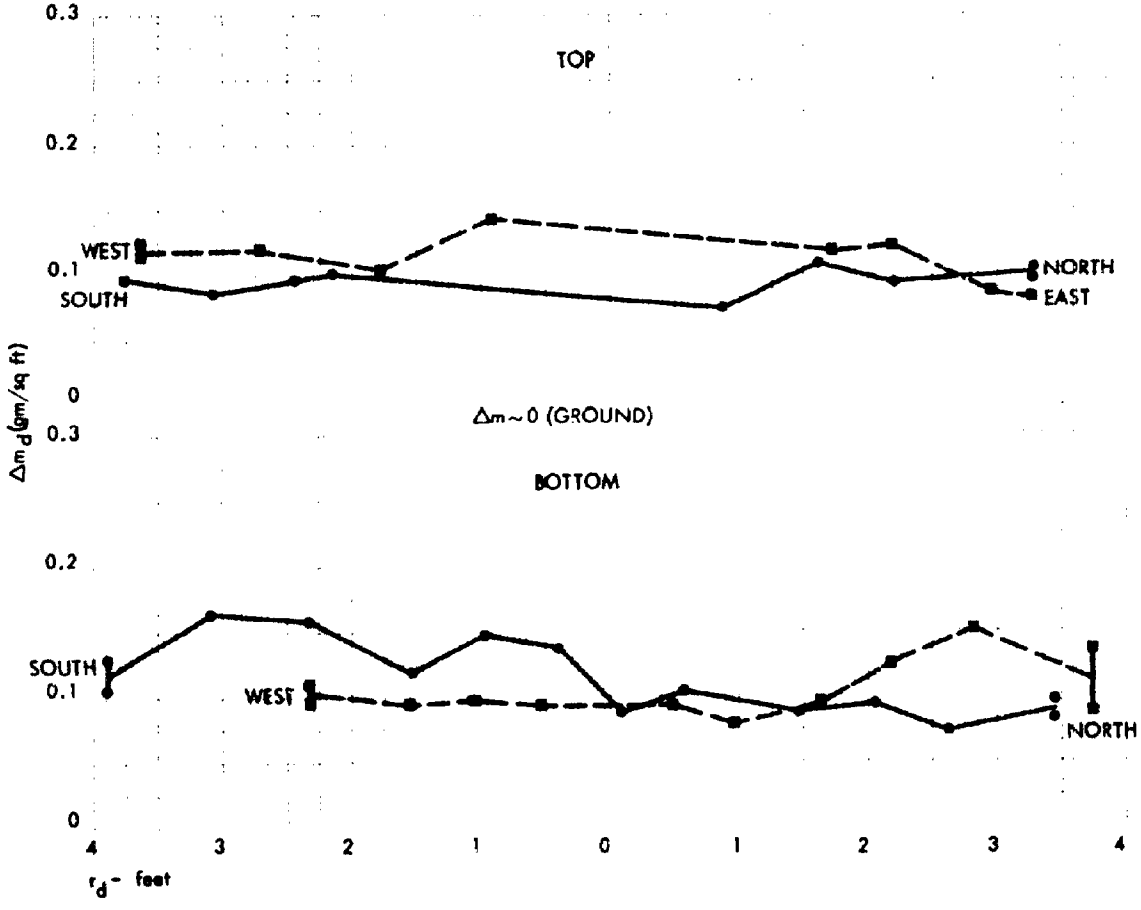


Figure 20

CONTAMINATION OF DISCS IN THE LAUREL TREE: RUN D4, TOP X-ROD

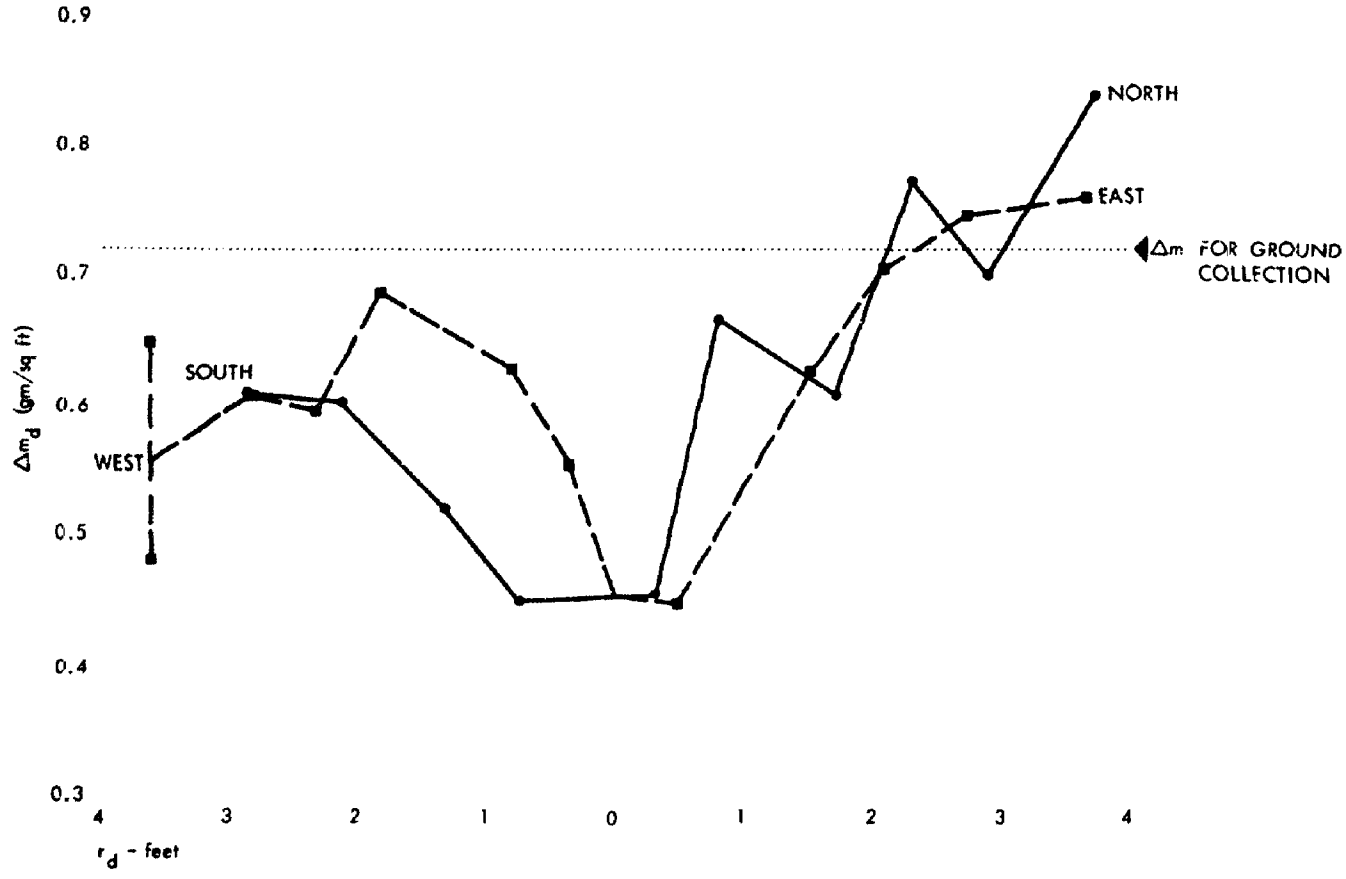


Figure 21

CONTAMINATION OF DISCS IN THE LAUREL TREE: *RUN D4, BOTTOM X-ROD*

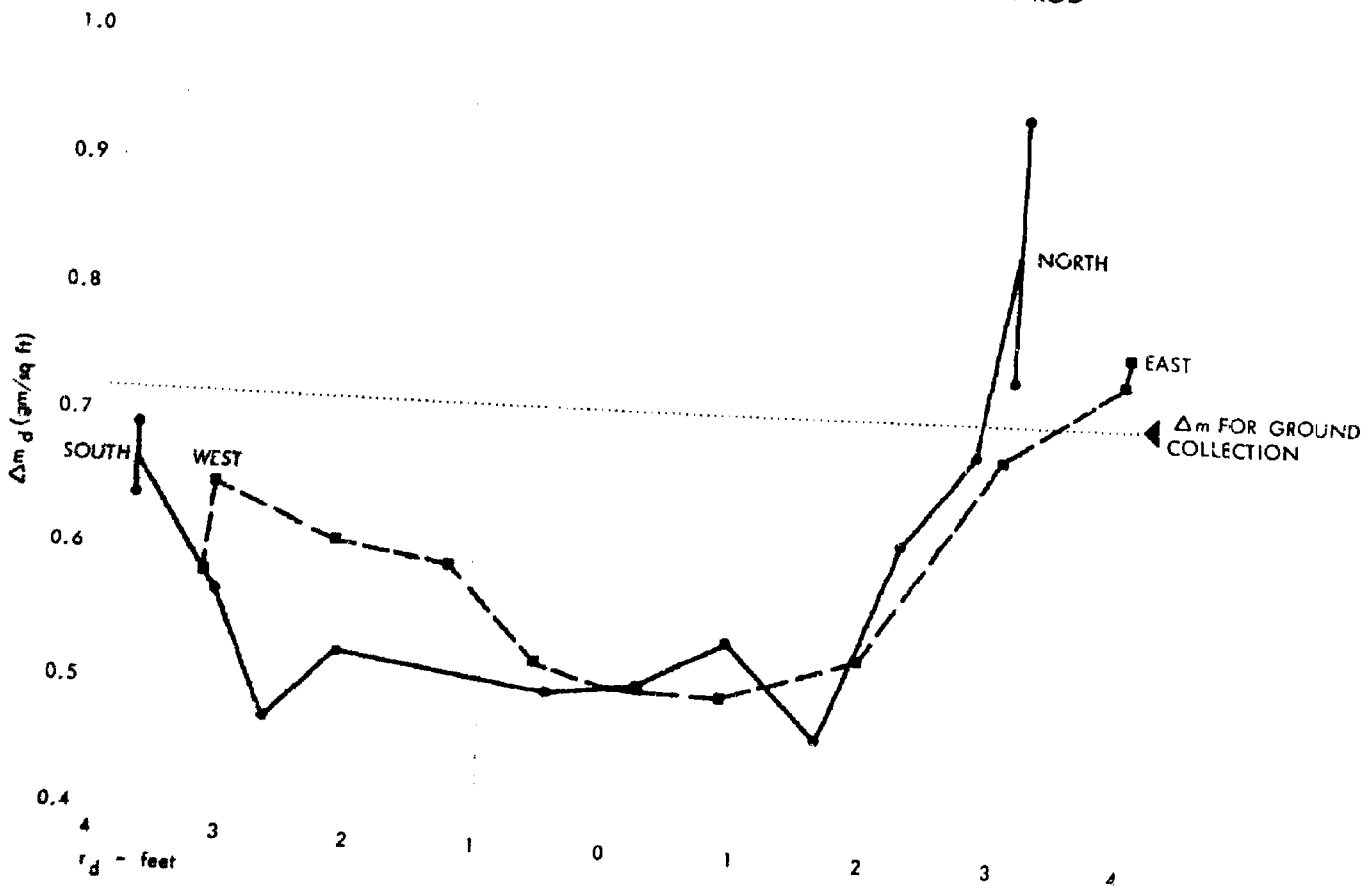


Figure 22

DISC CONTAMINATION CONTOURS (ESTIMATED) FOR THE LAUREL TREE: RUNS D1 AND D2

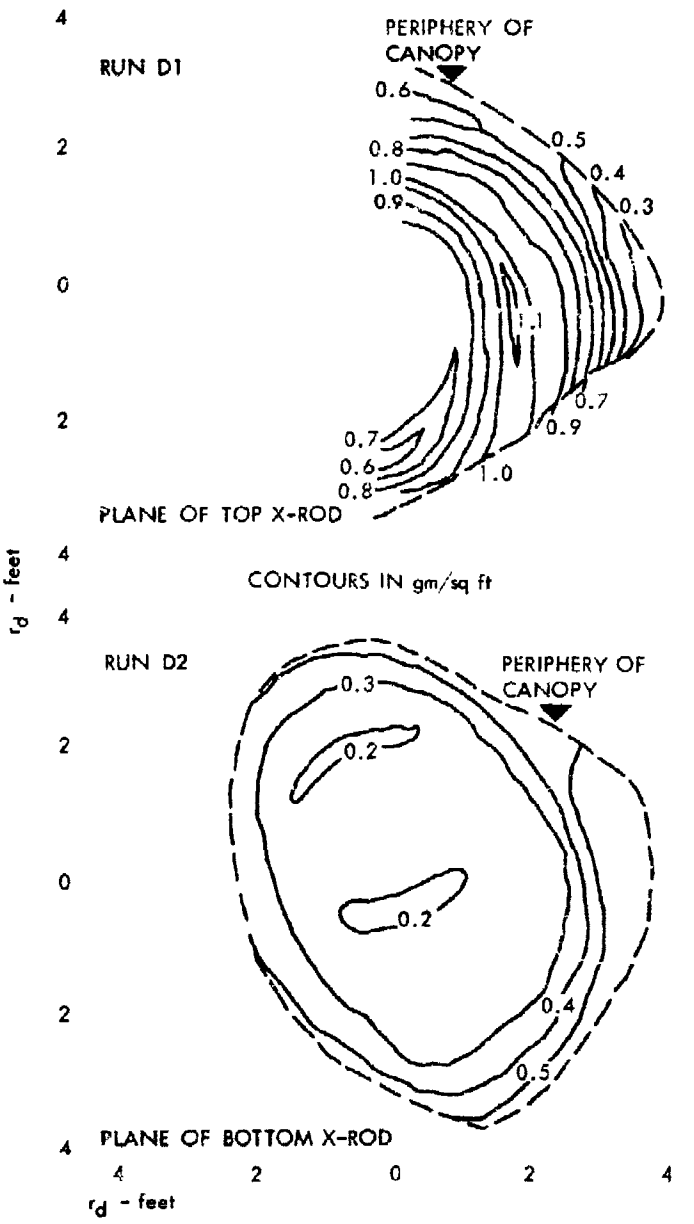
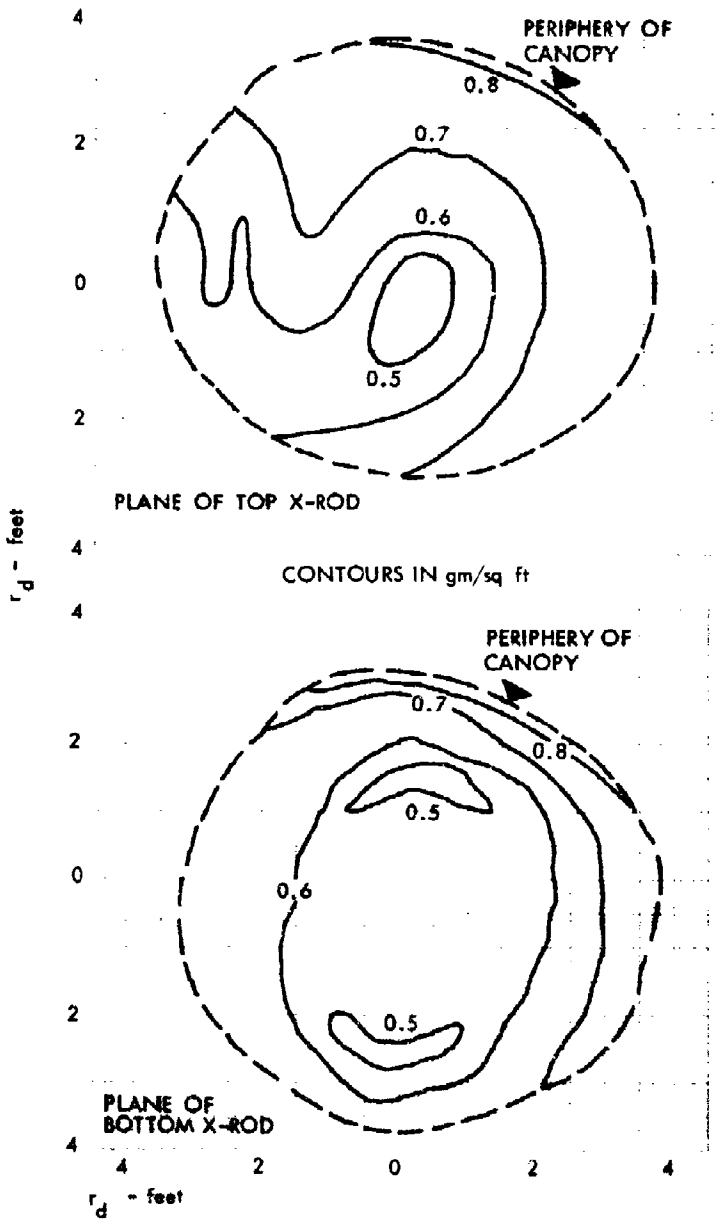


Figure 23

DISC CONTAMINATION CONTOURS (ESTIMATED) FOR THE LAUREL TREE: RUN D4



Run D3 was a weathering experiment following the second shower, since very little ceniza-arena was deposited during the exposure period. The data given in Figure 19 show very little variation in the deposits on the discs, although the discs to the south and west of the X-rod centers were contaminated to levels as much as 50 percent higher than the average (0.104 gm/sq ft). The average wind-weathering factor, φ_w, during the same period for the random leaf samples was 0.513; this loss of particles from the leaves was undoubtedly the main source of the particles collected by the discs.

The disc contamination data for Run D-4 correspond to the leaf contamination data of Set No. 6 in Table 19. The leaf contamination data indicate that the shower came from the east, whereas the disc contamination data indicate a more northerly direction; however, the contours from the disc data include variable effects of leaf shielding and probably are not as reliable an indicator of the direction of the shower as are the peripheral leaf samples.

Data on the weight distributions of the ceniza-arena particles recovered from all the discs used in Runs D1, D2 and D4, as determined from the sieve analysis, are summarized in Table 22. The d[illegible] for the ceniza-arena collected in the trays at ground level at the same times are included for comparison. In all three runs, the median size of the particles recovered from the discs is about the same as that of the particles recovered from the tray, but the distributions for the disc samples are somewhat broader than they are for the tray samples, with larger percentages of both smaller and larger particles.

The tree, Pine-1, shown in Figure 24, was about 7.5 feet tall; it was purchased as a Christmas tree but instead was set in position at Station 13 to obtain contamination data. In the only good foliar contamination experiment, an observed $F(w_L)$ value as low as 0.16 was obtained. In this experiment, a plastic sheet was placed on the ground around the tree. The deposit on the sheet did not show a tree shadow of decreased deposit on the downwind side; rather, the deposit on the downwind side was somewhat larger than on the upwind side, probably due to disturbance of the windflow by the tree. In another experiment with two X-rods in place, a cow appeared on the scene just as preparations were being made to recover the discs and to take foliar samples; she walked across the plastic sheet, brushed against the tree, and went on her way. Some of the discs were knocked off the X-rods in the process; the tree was shaken, spoiling the deposit for foliar sampling (and some additional particles probably fell on the remaining discs)

Table 22

SUMMARY OF CENIZA-ARENA SIEVE ANALYSIS MEASUREMENTS
FOR THE LAUREL TREE DISC CONTAMINATION RUNS

Sample Type	Disc Contamination Runs Accumulated Weight Distribution in Percent (particle diameter in microns) 10	44	88	175	295	>295	d_{50} (microns)
			Run D1				
Tray	2.7	33.2	77.7	99.7	100	-	60
Discs	-	36.6	58.9	88.3	99.4	100	72
			Run D2				
Tray	2.0	25.4	71.4	99.7	100	-	68
Discs	-	35.3	71.6	97.2	99.2	100	60
			Run D4				
Tray	1.3	25.9	77.0	99.3	99.9	100	62
Discs	3.5	33.0	80.4	99.4	99.8	100	58

Figure 24
VIEW OF PINE-1 IN POSITION AT STATION 13

The disc contamination data from the cow-disturbed experiment are given in Table 23; they are plotted as a function of distance from the center of the X-rod in Figure 25. The estimated locations of the contours for the disc contamination levels in the planes of the two X-rods are plotted in Figure 26. If it is assumed that the low deposit levels to the south of the tree trunk were due to shielding by the trunk, the deposit came from the north. The deposit density on the more exposed discs near the periphery of the tree was very near to that of the tray collector.

Pine-2, shown in Figure 27, was a fairly large tree located at Station 16. Two sets of foliar contamination data were obtained on the tree; the $F(w_L)$ values for samples (needles plus twigs) taken around the periphery of the tree from the lower one-third of the canopy are given in Table 24 (Set No. 2m consisted of meristem samples). The data of Set No. 2 were obtained from Pine-2 for the same ceniza-arena shower that contaminated the grapefruit and the juniper. The $F(w_L)$ values are plotted as a function of the azimuth from the center of the tree, θ_r, in Figure 28. The data show significant shielding effects for the pine tree with $F(w_L)$ values as low as 0.04 across the diameter of the canopy.

One experimental check was made comparing the collecting efficiency of the 2-inch-diameter discs with that of the tray collector near ground level. A set of five discs were placed on branches of a dead tree at Station 16 at heights ranging from 10 to 12 feet. The recovered weights of ceniza-arena were as follows:

Disc Number	Δm (gm sq ft)
1	1.101
2	0.844
3	0.887
4	0.770
5	0.820

The average value of Δm for the set is 0.884 ± 0.088 (9.9 percent) gm/sq ft; the deposit density for the tray collection was 0.882 gm/sq ft. This agreement indicates that the wind speed must have been low during the particle shower because surface density of the particles deposited on the small discs was within about 10 percent of that for the large collector at ground level.

Table 23

DISC CONTAMINATION DATA FOR PINE-1

θ_d (degrees)	r_d (ft)	Exposure Condition	Δm_d (gm/sq ft)
		Top X-rod (h = 4.5 ft)	
90	1.25	PP	1.951
180	0.50	P	1.403
	1.00	P	1.403
	1.50	PP	1.824
270	0.83	PP	2.119
	1.25	E	2.212
	1.67	EO	2.085
	2.00	EO	2.058
		Bottom X-rod (h = 2.0 ft)	
0	0.83	PP	2.418
	2.08	PP	2.123
90	0.67	P	2.400
	1.25	PP	2.418
	2.33	PP	2.829
180	0.33	P	1.833
	1.00	P	2.119
	1.67	P	2.175
270	0.75	P	2.460
	1.67	PP	2.722

a Height of tree = 7.5 ft

Notes:

Run D1: Recovered 12/14, 0830; Δt = 0.15 hr; Δm (tray) = 2.7023 gm/sq ft
E: Disc exposed from above and to the sides
O: Disc outside of tree canopy
P: Disc protected by needles (top and all sides)
PP: Disc partially protected by needles (top and at least one side)
θ_d: Azimuth of the arm of the X-rod on which the discs were mounted
r_d: Distance from the center of the X-rod to the point where the disc was located

Figure 25
CONTAMINATION OF DISCS IN PINE-1

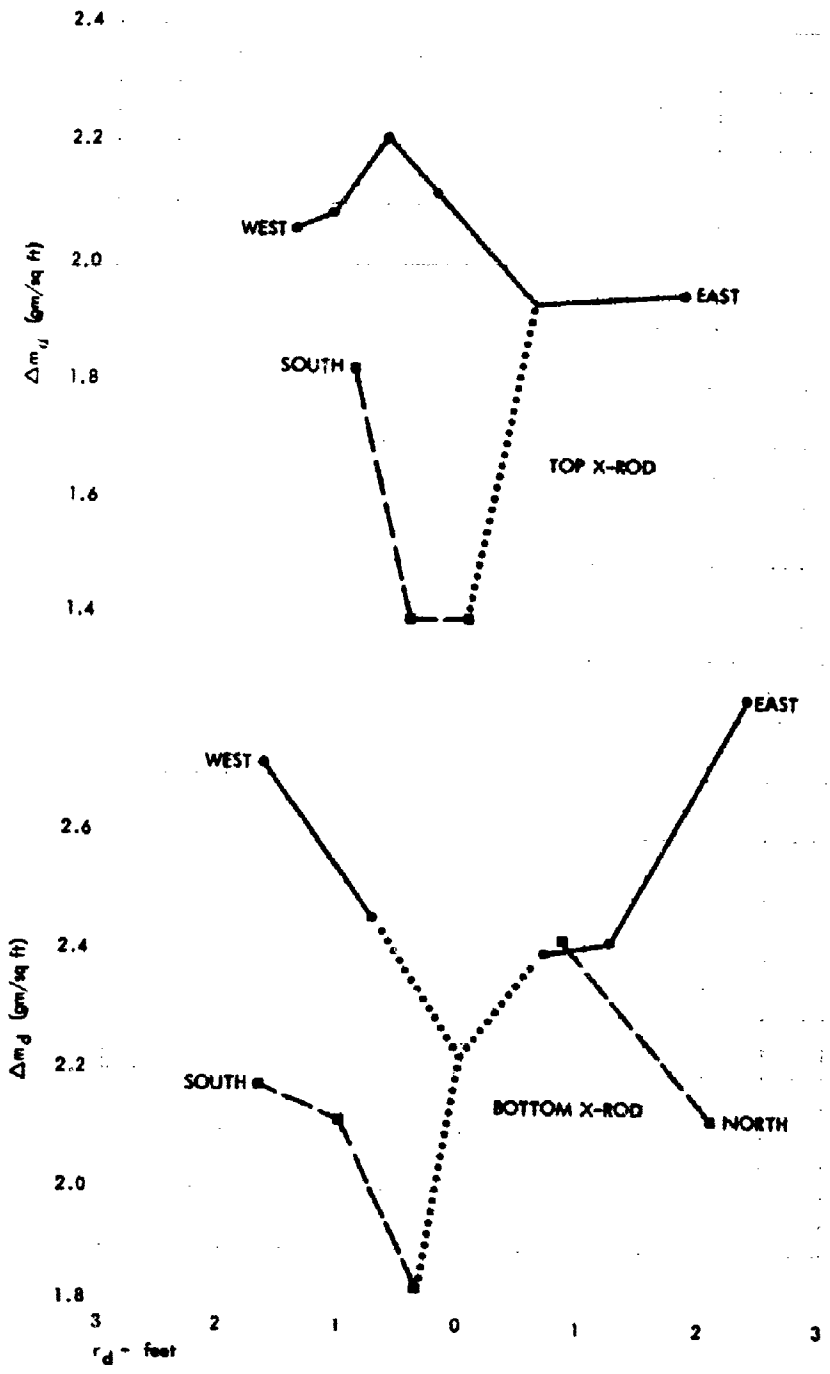


Figure 26

DISC CONTAMINATION CONTOURS (ESTIMATED) FOR PINE-1

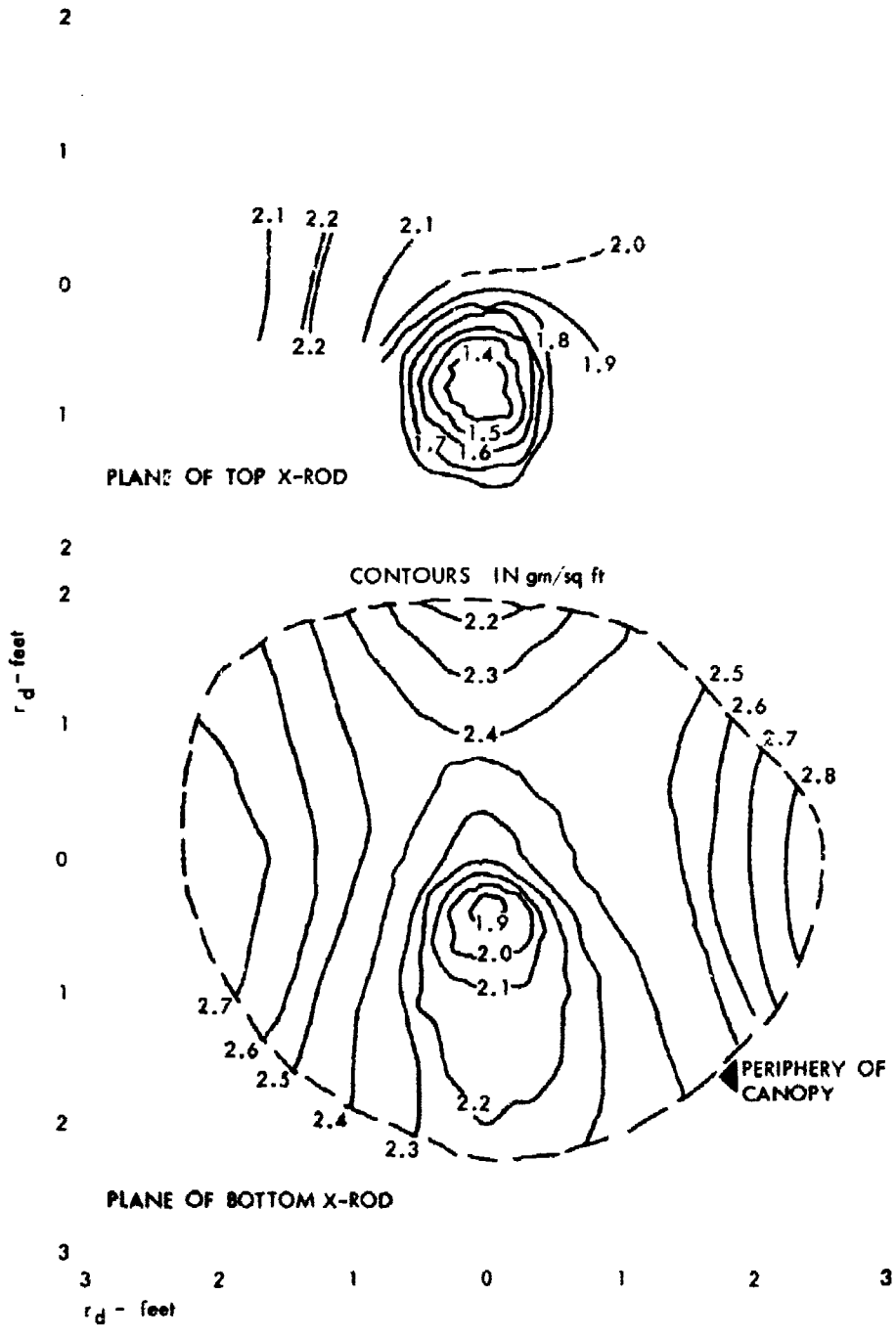


Figure 27
VIEW OF PINE-2 AT STATION 16

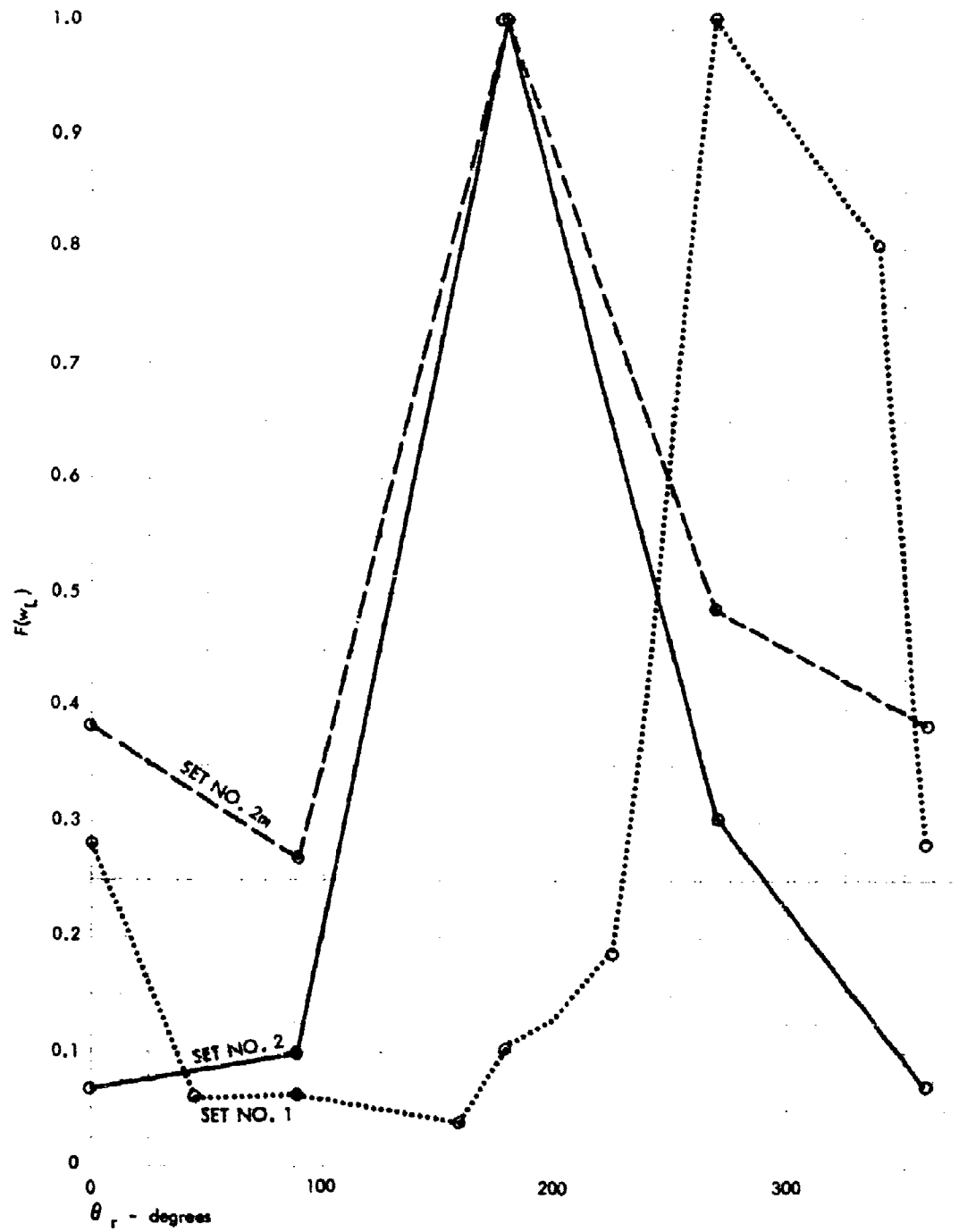
Table 24

SUMMARY OF PERIPHERAL SAMPLING LOCATION
$F(w_L)$ VALUES FOR PINE-2 TWIGS

θ_r (degrees)	$F(w_L)$ Set No. 1	$F(w_L)$ Set No. 2	$F(w_L)$ Set No. 2m
0	0.282	0.067	0.384
45	0.061	-	-
90	0.061	0.098	0.268
160	0.039	-	-
180	0.106	1.000	1.000
200	0.127	-	-
225	0.186	-	-
270	1.000	0.304	0.485
340	0.802	-	-

Figure 28

VARIATION OF PERIPHERAL $F(w_L)$ VALUES FOR PINE-2 TWIGS AS A FUNCTION OF θ_r



Personnel Contamination

Because of the press of work in obtaining and processing the foliar samples, only 26 measurements of personnel contamination were made. The results are summarized in Table 25. In all cases, the contamination events took place while the project members were working in the open (moving about, taking samples, preparing plant specimens for sampling, changing collectors, or standing still). A small fraction of the exposure time was spent in the jeep writing field notes and labeling and packaging samples. In all but one case, the exposure period ended when the project members entered the jeep station wagon, closed the windows, and proceeded to the laboratory in San José where the ceniza-arena particles were removed, collected, and prepared for weighing.

The personnel contamination factor for any part of the body or clothes is defined by

$$a_h = \Delta w_h / \Delta m \qquad (14)$$

where Δw_h is the weight in grams of the particles retained (in terms of the weights recovered by various removal methods) and Δm is the weight in gm/sq ft of the particles deposited on a horizontal surface during the exposure period.

No attempts were made to remove the particles from any part of the body or clothing during the exposure periods or to stay in positions where the deposits would be minimized or maximized (some normal movements were restrained whereby the hair or other exposed part of the body was not touched during the period). However, the resulting higher a_h values for the shorter exposure periods indicate that particles were removed during the course of normal activities in the field.

Most of the sample descriptions given in Table 25 should be sufficient definitions of the part of the body from which the particles were recovered and the method of recovery. A few designations may require further clarification. For example, the designation, hair, includes all hair on the top of the head and that on the back of the neck to the point where the skin is readily visible. The designation, face, includes all the skin surfaces in front of the ears and below the hairline on the forehead to the bottom of the chin.

The mass distribution data obtained from sieve analyses of the recovered particles are summarized in Table 26; the data for ceniza-arena particles from the trays for each set are included for comparison. In most cases, the median diameter of the particles recovered from the

Table 25

SUMMARY OF PERSONNEL CONTAMINATION DATA

Sample Number	Date	Exposure Period (hours)	Δm (gm/sq ft)	Δw_h (gm)	a_h (sq ft)	Sample Description[a]
PC-1	6/15	2.93	5.140	0.9897	0.193	WBL, hair, spray-wash
				1.1952	0.233	WBL, hair, spray-wash, plus brushing
PC-2				0.4996	0.0972	CFM, hair, spray-wash
				0.6504	0.127	CFM, hair, spray-wash plus brushing
PC-3				0.0374	0.00728	WBL, inside ears, spray-wash
PC-4				0.0320	0.00623	CFM, inside ears, spray-wash
PC-5				0.0074	0.00144	CFM, spectacles, spray-wash
PC-6	6/16	2.47	13.82	0.1533	0.0111	WBL, hair, dry brushing
				1.0019	0.0725	WBL, hair, dry brushing, plus wet brushing
PC-7				0.2463	0.0178	CFM, hair, dry brushing
				0.7069	0.0512	CFM, hair, dry brushing, plus wet brushing
PC-8				0.1114	0.00806	CFM, forehead, spray-wash
PC-9				0.0153	0.00111	CFM, spectacles, spray-wash
PC-10	8/11	7.10	15.13	1.5701	0.104	CFM, hair, dry brushing
PC-11				0.0401	0.00265	CFM, face, wash plus shave
PC-12	10/6	7.00	1.13	0.1640	0.145	CFM, forearms, spray-wash plus rubbing
PC-13	12/9	0.67	0.0422	0.0026	0.0616	WBL, hair, dry brushing
PC-14	1/7	4.00	1.197	0.2438	0.204	WBL, hair and face, spray-wash
				0.3180	0.266	WBL, hair and face, spray-wash plus dry-combing hair

Table 25 (concluded)

Sample Number	Date	Exposure Period (hours)	Δm (gm/sq ft)	Δw_h (gm)	a_h (sq ft)	Sample Description[a]
PC-15	1/7	5.00	1.582	0.2440	0.154	CFM, hair, spray-wash with combing
PC-16				0.1626	0.103	JLJ, hair, spray-wash with combing
PC-17				0.0322	0.0204	CFM, face, spray-wash
PC-18				0.0102	0.00645	CFM, inside ears, spray-wash
PC-19				0.1121	0.0709	CFM, forearms and hands, spray-wash
PC-20				0.0078	0.00493	CFM, spectacles, spray-wash
PC-21	1/7	2.67	0.7982	0.3302	0.414	JLJ, blouse, spray-wash
PC-22	1/7	0.92	0.1576	0.0349	0.221	WBL, hair, dry-combing
				0.0710	0.450	WBL, hair, dry-combing, plus spray-wash
PC-23				0.1050	0.666	CFM, hair, spray-wash
PC-24				0.0291	0.185	CFM, forearms and hands, spray-wash
PC-25	1/15	0.25	0.7724	0.4855	0.629	WBL, hair, spray-wash
PC-26				0.3262	0.422	CFM, hair, spray-wash

a Hair Cut: WBL, crew, male
CFM, medium, male
JLJ, medium, female

Table 26

SUMMARY OF CENIZA-ARENA SIEVE ANALYSIS FOR PERSONNEL CONTAMINATION SAMPLES

Sample Number	Type	Accumulated Weight Distribution in Percent (particle size in microns)										d_{50} (microns)
		3	5	10	20	30	44	88	175	295	>295	
						Set 1						
14001	Tray	0.30	0.47	1.2	13.4	35.0	32.5	54.3	91.7	99.6	100	80
PC-1	WBL, hair	-	-	-	-	-	29.5	52.6	92.5	99.7	100	84
	WBL, hair	-	-	-	-	-	27.9	51.6	92.3	99.7	100	86
PC-2	CFM, hair	-	-	-	-	-	21.3	44.4	89.2	99.6	100	96
	CFM, hair	-	-	-	-	-	20.6	45.2	90.6	99.7	100	95
PC-3	WBL, ears	-	-	-	-	-	32.5	65.7	96.8	100	-	68
PC-4	CFM, ears	-	-	-	-	-	27.9	63.7	95.0	100	-	71
PC-5	CFM, specs	-	-	-	-	-	33.3	56.5	87.0	100	-	77
						Set 2						
14034	Tray	0.30	0.46	1.6	18.0	31.0	38.1	60.3	98.9	100	-	71
PC-6	WBL, hair	-	-	-	-	-	6.5	29.4	92.8	100	-	110
	WBL, hair	-	-	-	-	-	43.9	69.5	98.9	100	-	57
PC-7	CFM, hair						7.0	28.9	99.1	100	-	108
	CFM, hair						39.1	61.4	99.3	100	-	69
PC-8	CFM, forehead	-	-	-	-	-	66.8	86.3	99.5	100	-	27
PC-9	CFM, specs	-	-	-	-	-	46.0	73.0	100	-	-	54

Table 26 (concluded)

Sample Number	Type	Accumulated Weight Distribution in Percent (particle size in microns) 3	5	10	20	30	44	88	175	295	>295	d_{50} (microns)
						Set 3						
14390,1443	Tray	0.80	1.1	2.7	14.6	26.6	38.0	73.4	99.8	99.9	100	60
PC-12	CFM, forearms	-	-	-	-	-	71.7	94.3	99.0	99.7	100	32
						Set 4						
06425	Tray	0.36	0.64	2.1	9.7	18.1	27.4	58.5	98.6	100	-	78
PC-14	WBL, hair & face	-	-	-	-	-	28.4	55.9	97.5	99.1	100	27
PC-15,17,18	CFM, head	-	-	-	-	-	31.0	57.4	97.3	98.9	100	78
PC-16	JLJ, hair	-	-	-	-	-	53.1	79.1	98.6	99.5	100	39
PC-19	CFM, forearms	-	-	-	-	-	78.2	93.2	97.2	98.8	100	27
PC-21	JLJ, blouse	2.3	3.1	5.6	23.3	41.8	62.1	91.5	99.2	99.7	100	35
						Set 5						
14689	Tray	0.62	0.97	2.3	12.4	22.2	31.4	66.9	99.7	99.9	100	69
PC-22	WBL, hair	-	-	-	-	-	32.6	63.6	96.3	98.5	100	70
PC-23	CFM, hair	-	-	-	-	-	35.6	63.3	98.4	99.5	100	70
PC-24	CFM, forearms	-	-	-	-	-	80.0	90.8	96.5	98.1	100	22
						Set 6						
15036	Tray	0.65	1.1	2.7	9.4	18.4	33.2	77.7	99.7	100	-	60
PC-25	WBL, hair	2.4	3.4	5.4	17.1	26.0	34.4	57.5	86.0	99.2	100	71
PC-26	CFM, hair	0.25	0.63	4.4	15.7	25.5	34.4	55.2	82.5	99.0	100	77

hair was a few microns larger than that deposited in the trays. However, the median diameter of the particles recovered from other parts of the body and clothing was generally much smaller than that of the particles deposited in the trays. Dry brushing preferentially removed the larger particles from the hair (see data for PC-6 and PC-7), whereas any of the wet removal methods removed the smaller particles about as effectively as the larger particles.

Correlations of the data of Table 25 with wind speed during the exposure and other factors are given in Part Three of this report.

Particle Size Analyses

The results of the particle size analysis, in terms of accumulated weight distributions from the sieving and settling measurements, of the ceniza-arena recovered from the foliar samples and collector trays are summarized in Appendix E. The procedures used in obtaining, tabulating, and treating the measured data are discussed in this appendix.

Because a large number of the ceniza-arena particles in many of the showers fell and impacted on the foliar specimens in the form of agglomerated particles and these agglomerates disintegrated into separate sand or mineral grains on impaction or in the sieving analysis, the reported distributions are not always true representations of the distributions that were transported through the air to the sampling locations. The consequences of particle breakage after impaction would be that, relative to the distribution of the airborne particles, the reported distributions would show (1) the presence of small particles that would otherwise not have fallen at the location; (2) higher fractions of smaller particles; (3) a smaller value of the mass median diameter, d_{50}; (4) a break or discontinuity in the mass distribution curve (i.e., the presence of a double distribution; however, this evidence would not be conclusive since a similar discontinuity in the curve could result from a sample produced by multiple showers or other causes); and (5) a lower value of the maximum particle diameter in some cases.

The agglomerated particle breakage problem is a major limitation on the application of the reported distribution data for evaluating the constants of the basic contamination factor equation. However, the data are applicable with respect to other questions about the contamination process, such as whether the foliage retained the largest particles in the distribution, whether the distribution of the particles on the foliage was significantly different from that of the particles deposited on the ground, and whether the distribution of the particles varied

significantly from one type of plant to another.

The data given in Appendix E show that the maximum diameter of the particles retained by the foliage was generally the same as that of the particles collected in the tray at ground level. Over all sample sets, the accumulated weight percentage at a diameter of 295 microns was generally smaller for the foliar deposits than for the tray deposits. (A smaller accumulated percentage at 295 microns, in this case, represents a larger percentage of the sample weight for larger particles.) In the few cases where the maximum diameter of the foliar deposits was definitely smaller than that of the ground deposit, the plant specimen was usually a cereal grain (or grain head), onion, squash leaf, or young cabbage plant.

In most sample sets, the accumulated weight percentages, up to a diameter of 44 microns, was generally larger for the foliar deposits than for the ground deposit, indicating a higher degree of retention of the smaller particles by the foliage. Accordingly, the value of d_{50} for foliar deposits is smaller than it is for the ground deposit. The most frequent exceptions to the relative higher retention of small particles were corn, tomato, lettuce, barley, and onion.

The data indicate, at least to some degree, preferential retention by the foliage of particles within a given size range. In general, the d_{50} values for the foliar deposits have larger positive differences from the d_{50}^{o} values of the tray samples, where the latter are large. However, when the d_{50}^{o} value is small, the differences decrease, and the frequency of negative values of $d_{50}^{o}-d_{50}$ tend to increase. The mass median diameters of the ceniza-arena from the primary sample sets of vegetable plants are summarized in Table 27; the data are grouped by one of the two major types of climatic conditions under which the deposit occurred--dry or damp.

Since the maximum diameter of the particles in all samples of each set was about the same, the departure of the ratio, d_{50}/d_{50}^{o}, from unity to a lower value is a relative measure of the preponderance of smaller particles in the distribution for the foliar samples compared with the ground deposit. The ratio specifically gives the shift of the distribution peak of the foliar deposits relative to that of the ground deposit. For all except two plants (onion and pepper), the values of the ratio, d_{50}/d_{50}^{o}, are larger for the foliar deposits that occurred under damp conditions. In other words, the weight distribution of the foliar deposit under damp conditions was more like that of the ground deposit than it was under dry conditions. However, the averages of the d_{50} values in Table 27 do not take into account possible effects of wind

Table 27

SUMMARY OF THE MASS MEDIAN DIAMETERS FOR THE CENIZA-ARENA PARTICLES RECOVERED FROM PRIMARY SAMPLES OF VEGETABLE PLANTS

(d_{50} values in microns)

	Type of Foliar Sample												
	Tray	Bean	Beet	Cabbage	Carrot	Corn	Lettuce	Onion	Pea	Pepper	Potato	Radish	Squash	Tomato
						Dry Conditions								
	81	32		71		102							44	76
	77	25		63		103							21	63
	87	68		75		84							78	76
	105	75		76		88								75
	79	47		73		51							66	
	160			80		75							33	
	107			102		79							93	
	55			51									47	
	63	48		60									54	
	57	52	60	66		59	35	80		59			65	70
	49	50	62		51	102	58	52	53	61	50	57		
	69	26	29	24	26	47	56	64	22	32	28	47		
	81		34	51	35		66	34						
	78	42		46	33	60			42	32	68	54		
	80	42		38	33	69			48		39	47		
	68	48		56	53	58			52		58	57		
Average	81	46	46	62	38	75	54	58	43	51	49	52	56	72
d_{50}/d^{o}_{50}	-	0.62	0.72	0.75	0.54	0.89	0.84	0.91	0.82	0.81	0.71	0.75	0.66	0.89
						Damp Conditions								
	71	58		69		71							65	78
	84	68		84		72							73	86
	63	57		54		57							77	61
	60	57		61		59		66					61	63
	55	53	66	55			66	51					50	54
	66		64		66	84	81	62	79	59			67	
	94		74			93	75	83	51	90			68	
	61		53		53	74	60	50	40				57	
	73	46	60		70		66	58	38	50		63		
	85	30	45	55	30	57	65	41	34	39		36		
	67	64		72		68							69	73
	64	54		68		64		57					56	59
	102		90	95	100	98	92	50					96	
	75		65	69	65	72	70	46					68	
	74		68	67	68	82	73	46					68	
	71			48	51	86	55						51	
	79	65	75	72	79		78	73					74	
	55		53		54	49	55	58						
	55	54				73			54					
	57	70				73			46					
	65	46				63			50	50	52	56		
	70	47				74			54	62	58	78		
	56	52			71	83			60		77	60		
	88	75		83	75									
	52	43			48	54			50		48	59		
Average	70	55	65	68	64	72	70	57	51	58	59	58	67	65
d_{50}/d^{o}_{50}	-	0.82	0.88	0.92	0.89	1.04	0.95	0.78	0.76	0.76	0.97	0.68	0.93	0.98

speed; and if it is assumed the distributions of the foliar deposits would depend on the wind speed and that the shift in the d_{50} value for the foliar deposits would decrease as the wind speed decreases, some of the differences between the d_{50} values between dry and damp conditions could be due to differences in wind speed, since lower wind speeds usually prevailed for the damp conditions. In addition, the averages of the d_{50} values are for all sizes and ages of a given plant.

The unweighted average value of d_{50}(dry)/d_{50}(damp) for all the vegetable plants from the data of Table 27 is 0.85. The order of the plant species with decreasing values of d_{50}/d_{50}^{o} for the foliar deposits that were collected under damp conditions is (1) corn, (2) tomato, (3) potato, (4) lettuce, (5) squash, (6) cabbage, (7) carrot, (8) bean, (9) beet, (10) radish, (11) onion, (12) pea, and (13) pepper.

The mass median diameter for the ceniza-arena particles recovered from primary samples of the cereal grains and of the trees are given in Tables 28 and 29, respectively. For the cereal grains, the smallest value of d_{50}/d_{50}^{o} is for oat heads under dry conditions, and the largest value of d_{50}/d_{50}^{o} is for barley stalks (and heads) under damp conditions. The values of both d_{50} and d_{50}/d_{50}^{o} for the juniper and pine trees were smaller than they were for the other trees. The values of d_{50} and d_{50}/d_{50}^{o} for the leaves and twigs of the avocado, camphor, grapefruit, and laurel trees were similar under both dry and damp conditions.

The effect of weathering on the weight distributions, as measured by the ratio of the d_{50} value for the weathered foliar deposit to that for the primary sample foliar deposit, is shown in Tables 30 and 31 for vegetables and cereal grains, respectively. The tabulated data indicate that the wind weathering of the deposits on young or small plants did not cause a preferential loss of the larger particles. Even for the deposits on the taller plants (e.g., grain heads), the d_{50} ratios did not decrease consistently for all sample sets (except for oats). The effect of the rain on the d_{50} ratios usually indicated a preferential removal of the smaller particles, as indicated by an increase in the d_{50} ratios; however, for the young and smaller plants, splashing up of soil could have been a cause for the observed d_{50} ratios being larger than unity. In one weathering series for the laurel tree leaves, the d_{50} values decreased from 42 to 36 microns (ratio of 0.86); and on one series for the grapefruit tree leaves, the d_{50} values decreased from 36 to 32 microns (ratio of 0.89). Thus, the data show no large changes in the distribution of the particles not removed from the foliage of the vegetables, cereal grains, and tree leaves by wind and rain weathering.

Table 28

SUMMARY OF THE MASS MEDIAN DIAMETERS FOR THE CENIZA-ARENA PARTICLES RECOVERED FROM PRIMARY SAMPLES OF THE CEREAL GRAINS
(d_{50} values in microns)

	Type of Foliar Sample								
	Tray	Barley Stalks	Barley Heads	Oat Stalks	Oat Heads	Rye Stalks	Rye Heads	Wheat Stalks	Wheat Heads
				Dry Deposit Conditions					
	81					72		62	
	77	56		63		36		54	
	87	73		74		67		69	
	105	64		67		50		68	
	160		69		24				30
	126		90		28				60
	49			57			47		
	69	36		40		42		30	
	78			62				44	
	80			55				48	
	68	57		58		43	42	58	
Average	89	57	80	60	26	52	44	54	45
d_{50}/d°_{50}	-	0.70	0.56	0.78	0.18	0.64	0.76	0.67	0.31
				Damp Exposure Conditions					
	71					69		58	
	63	56		57				60	
	103	58		65		71		92	

Table 28 (concluded)

Tray	Barley Stalks	Barley Heads	Oat Stalks	Oat Heads	Rye Stalks	Rye Heads	Wheat Stalks	Wheat Heads
			Type of Foliar Sample					
			Damp Exposure Conditions (concluded)					
60	60	63	60	39		49	59	40
55	54	55	53	38	47	49	38	39
66				42		66		80
94				37		50		57
61					39	41		
73			43		42	55		
85			45				33	35
67	62		66		64		65	
64	60		57		56		68	
102	74	71	65	35	83		53	37
75	63	73	63	41	67	54	61	53
74		65		57		50		49
79	51	59	64	59	63	56	45	45
55	54	56	40	37	41	46	35	39
55				54		49		50
57					38	40		
65					41	43		
70	107					60		
56	80				40	48		
88	81		75				74	
52	55		56				50	
Average 70	65	63	58	44	54	50	56	48
d_{50}/d_{50}° -	0.92	0.89	0.79	0.61	0.77	0.76	0.77	0.66

Table 29

SUMMARY OF THE MASS MEDIAN DIAMETERS FOR THE CENIZA-ARENA PARTICLES RECOVERED FROM PRIMARY SAMPLES OF TREE LEAVES, NEEDLES, AND TWIGS (d_{50} values in microns)

	Type of Foliar Sample					
Tray	Avocado	Camphor	Grapefruit	Juniper	Laurel	Pine
66	46					
94	54					
61	42					
73	41					
55		49				
57		35				
65		39				
70		38				
56		42				
80		26[a]				
63					39	
60					35[a]	
64					42	
73						22[a]
69			36[a]	17[a]		
Average -	46	41(26)[a]	36[a]	17[a]	41(35)[a]	22[a]
d_{50}/d_{50}^{C} -	0.62	0.67(0.32)[a]	0.52[a]	0.25[a]	0.64(0.58)[a]	0.30[a]

a Dry conditions (all other values apply to damp exposure conditions)

Table 30

SUMMARY OF d_{50} RATIOS FOR SOME WEATHERING SERIES SAMPLES: VEGETABLES

Type of Sample	d_{50} (microns)	Type of Foliar Sample: Bean	Beet	Cabbage	Carrot	Corn	Lettuce	Onion	Pea	Pepper	Potato	Radish	Squash	Tomato	Average
P	83	1.00		1.00		1.00							1.00		1.00
SW	61	0.88		0.98		1.23							0.56		0.91
SWR	62	0.89		0.93		1.09							0.51		0.86
SWR	62	1.68		1.94		1.42							1.30		1.58
P	60	1.00		1.00		1.00							1.00		1.00
SW	59	1.09		-		-							0.98		1.04
SW	58	0.91		-		1.19							0.98		1.00
SWR	58	-		0.98		0.95							-		0.96
P	55	1.00	1.00				1.00	1.00					1.00	1.00	1.00
SW	55	1.09	0.89				1.06	1.39					1.12	1.06	1.10
SW	55	0.96	-				-	-					1.02	1.06	1.01
SW	56	-	-				-	1.04					1.04	1.22	1.10
SW	58	-	-				-	-					1.24	-	1.24
P	85	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				1.00
SW	92	0.80	0.64	0.69	0.77	1.04	1.34	0.76	0.85	0.92	1.03				0.88
SWR	92	0.93	1.38	1.44	2.63	1.37	1.31	-	0.82	1.31	-				1.40
P	67	1.00				1.00							1.00	1.00	1.00
SW	67	0.86				1.15							0.84	1.08	0.96
SWR	67	1.23				1.44							1.28	1.48	1.36
P	75		1.00	1.00	1.00	1.00	1.00	1.00					1.00		1.00
SW	71		0.52	0.93	0.57	0.99	0.92	0.70					0.81		0.78
P	79	1.00	1.00	1.00	1.00		1.00	1.00					1.00		1.00
SW	78	0.78	0.93	-	0.94		0.91	0.90					0.93		0.90
SWR	78	0.78	0.83	0.82	0.52		0.77	0.59					0.89		0.74
P	65	1.00				1.00			1.00	1.00	1.00	1.00			1.00
SW	63	0.98				0.83			0.72	0.90	0.75	0.85			0.84
P	56	1.00			1.00				1.00		1.00	1.00			1.00
SW	57	0.92			0.83				0.73		0.92	1.12			0.90
P	68	1.00		1.00	1.00	1.00			1.00		1.00	1.00			1.00
SW	69	1.00		0.95	0.87	0.92			0.94		0.90	1.04			0.95

Table 31

SUMMARY OF d_{50} RATIOS FOR SOME WEATHERING SERIES SAMPLES: CEREAL GRAINS

Type of Sample	d°_{50} (microns)	Types of Foliar Samples: Barley Stalks	Barley Heads	Oat Stalks	Oat Heads	Rye Stalks	Rye Heads	Wheat Stalks	Wheat Heads	Average
P	56	1.00		1.00		1.00		1.00		1.00
SW	54	0.96		0.95		0.90		0.83		0.91
SW	48	0.86		0.79		0.83		0.70		0.80
SWR	54	0.96		0.98		0.88		0.98		0.95
P	60		1.00		1.00		1.00		1.00	1.00
SW	59		0.92		1.00		1.02		0.98	0.98
SW	58		0.83		0.82		0.98		0.88	0.88
SWR	58		0.84		0.67		0.82		0.88	0.80
P	55	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SW	55	-	1.02	-	0.87	-	1.16	-	0.92	0.99
SW	55	-	-	-	-	-	1.14	-	0.92	1.03
SW	56	-	1.14	-	0.82	-	0.94	-	1.03	0.98
SW	58	1.11	0.98	0.75	0.92	0.72	0.73	0.89	1.21	0.91
SWR	59	1.04	1.13	0.83	0.74	1.26	1.04	0.89	0.82	0.97
P	85			1.00				1.00		1.00
SW	92			0.91				0.82		0.86
SWR	92			0.93				0.97		0.95
P	67	1.00		1.00		1.00		1.00		1.00
SW	67	0.85		0.64		0.94		0.69		0.78
SWR	67	1.29		1.08		1.02		1.02		1.10
P	75	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00
SW	71	0.95	1.15	0.59	0.56		0.70	0.64	0.68	0.75
P	79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
SW	78	-	0.90	-	0.86	-	0.91	-	0.89	0.89
SWR	78	-	0.97	-	0.51	-	0.71	-	0.89	0.77
SWR	78	1.04	0.98	0.72	0.36	0.52	0.79	0.89	0.89	0.77
P	65					1.00	1.00			1.00
SW	63					0.71	1.12			0.92
P	56	1.00					1.00			1.00
SW	57	0.80					0.98			0.89
P	68	1.00		1.00				1.00	1.00	1.00
SW	69	0.95		1.00				1.07	0.84	0.96

Particle Properties

One tray-collected sample of the ceniza-arena particles at each land plot was selected from each monthly sampling period for making measurements on various properties of the particles. When available, the sample was selected from those collected under dry conditions, so that the soluble chemical compounds carried by the particles could be determined without the effects of washing by rainwater. The pair of samples from each of the nine sampling periods was analyzed so that any noticeable changes in the particle properties over the duration of the whole operation could be detected.

The photomicrographs of the particles in all samples were similar to those shown previously in Part One of this report and in Reference 2; therefore, no additional photomicrographs are exhibited here.

The relative abundance of the chemical elements present in the ceniza-arena particles from semiquantitative spectrographic analyses is given in Table 32; quantitative analysis data on the contents of the more abundant oxides are given in Table 33. No significant change in the chemical composition of the ceniza-arena particles over the nine-month period is shown by these data. The small increase in the iron content (noted in Part One of this report) appears to persist in the Table 33 data. No explanation of the slightly larger Na_2O content of the samples from Plot No. 1 has been found. Within the limits of precision of the analytical methods, these reported chemical compositions are the same as those given in Part One of this report for the ceniza-arena samples collected in the first phase of the operation.

Data on the relative density of the particles, the pH (relative acidity) of water in contact with the particles, the amount of soluble materials leached from the particles by water and by 0.1 normal hydrochloric acid, and the amount of sulfate (SO_4) in the acid leaching are summarized in Table 34. The relative density (specific gravity) of the particles was between 2.61 and 2.68, similar to previous measurements. The pH of the water solutions, also similar to previous measurements, indicated a slight degree of acidity due to the presence of bisulfate or sulfuric acid. The amount of soluble salts carried by the particles varied considerably from one sample to the next and occasionally exceeded 3 percent in the acid leaching, on a dry weight basis. On the average, about 26 percent of the weight of the acid-soluble residues was sulfate (SO_4).

The data from spectrographic analysis of the acid-soluble residues are summarized in Table 35. The major metallic elements present in the

Table 32

COMPOSITION OF CENIZA-ARENA PARTICLES AS DETERMINED FROM SPECTROGRAPHIC ANALYSIS[a]

1. Plot No. 1 Samples

Sample Number

Element	14089	14175	14230	14335	14390	14495	14571	14656	14751	Average
K	4.0	4.5	5.0	4.5	5.0	4.0	4.0	4.0	4.5	4.4
Ca	9.0	10.0	8.5	9.0	10.0	9.0	9.0	9.0	8.0	9.1
Al	15.0	17.5	15.0	15.0	20.0	15.0	20.0	15.0	15.0	16.4
Mn	0.1	0.1	0.1	0.08	0.1	0.08	0.12	0.1	0.1	0.098
Fe	9.0	10.0	7.0	9.0	7.0	8.0	7.0	8.0	7.0	8.0
Sr	0.1	0.1	0.08	0.08	0.08	0.07	0.1	0.08	0.06	0.08
Ti	0.9	1.0	0.9	0.9	0.8	0.9	0.8	0.75	0.8	0.86
Mg	4.5	5.0	6.0	4.5	5.0	4.0	4.5	4.5	4.0	4.7
Cr	0.02	0.04	0.03	0.025	0.03	0.025	0.02	0.035	0.025	0.028
Ga	0.002	0.002	0.002	0.002	0.003	0.001	0.002	0.002	0.002	0.002
Mo	-	-	-	-	-	-	-	-	-	-
V	0.07	0.08	0.05	0.05	0.06	0.05	0.04	0.04	0.05	0.054
Cu	.025	0.02	0.008	0.015	0.008	0.015	0.008	0.01	0.008	0.013
Na	6.0	8.0	7.0	6.0	7.0	5.0	6.5	6.0	6.0	6.4
Sc	0.002	0.003	0.002	0.002	0.003	0.002	0.002	0.003	0.003	0.002
Zr	0.03	0.04	0.03	0.03	0.02	0.02	0.02	0.01	0.02	0.024
Ni	0.008	0.01	0.008	0.01	0.008	0.008	0.007	0.008	0.008	0.008
Co	0.002	0.002	0.002	0.003	0.002	0.003	0.002	0.002	0.002	0.002
Ba	0.1	0.1	0.12	0.12	0.1	0.1	0.1	0.1	0.1	0.10
Y	<0.01 in all samples									

Si + non-detectables: Balance in all samples

2. Plot No. 2 Samples

Sample Number

Element	06003	06088	06183	06239	06282	06335	06354	06542	06652	Average
K	3.5	3.5	5.0	4.5	5.0	5.0	3.0	6.0	5.0	4.5
Ca	7.5	9.0	9.0	10.0	7.5	8.0	9.0	9.0	10.0	8.8
Al	15.0	20.0	17.5	20.0	15.0	15.0	15.0	15.0	17.5	16.7
Mn	0.1	0.12	0.1	0.1	0.07	0.06	0.06	0.08	0.12	0.090
Fe	9.0	10.0	9.0	10.0	8.0	8.0	8.0	10.0	10.0	9.1
Sr	0.12	0.12	0.1	0.1	0.07	0.06	0.06	0.07	0.1	0.09
Ti	0.8	1.0	0.9	1.0	0.85	0.75	0.85	0.9	1.0	0.89
Mg	4.5	5.0	5.0	5.0	4.5	4.5	4.0	5.0	6.0	4.8
Cr	0.02	0.035	0.035	0.03	0.025	0.02	0.02	0.025	0.03	0.027
Ga	0.002	0.003	0.002	0.002	0.002	0.002	0.001	0.003	0.003	0.002
Mo	0.001	-	-	-	-	-	-	-	-	0.001
V	0.04	0.08	0.07	0.06	0.04	0.04	0.05	0.08	0.08	0.060
Cu	0.02	0.01	0.008	0.015	0.008	0.007	0.008	0.01	0.01	0.011
Na	6.5	6.5	7.0	6.5	7.5	6.0	4.5	8.0	8.0	6.7
Sc	0.003	0.004	0.004	0.004	0.003	0.002	0.003	0.003	0.004	0.003
Zr	0.03	0.05	0.04	0.04	0.02	0.03	0.03	0.04	0.03	0.034
Ni	0.007	0.01	0.008	0.01	0.007	0.006	0.007	0.008	0.01	0.008
Co	0.003	0.004	0.003	0.004	0.002	0.002	0.003	0.002	0.003	0.003
Ba	0.1	0.1	0.08	0.1	0.1	0.08	0.1	0.1	0.1	0.096
Y	<0.01 in all samples									

Si + non-detectables: Balance in all samples

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a Reported as weight percent of the oxides of the indicated elements

Table 33

COMPOSITION OF CENIZA-ARENA PARTICLES

AS DETERMINED FROM QUANTITATIVE ANALYSIS[a]

Sample Number	Oxide								
	Na_2O	K_2O	CaO	MgO	Al_2O_3	Fe_2O_3	MnO_2	TiO_2	SiO_2
14089	2.89	2.04	7.66	4.02	19.51	7.12	0.10	1.19	55.46
14175	3.56	1.96	7.87	4.42	19.20	7.44	0.10	1.28	54.16
14230	3.69	1.91	8.09	5.44	17.62	7.70	0.11	1.24	54.20
14335	3.49	1.99	7.77	4.52	17.63	7.77	0.10	1.32	54.53
14390	3.47	1.83	8.12	4.75	18.88	7.45	0.11	1.20	54.18
14495	3.59	2.03	7.48	4.52	17.71	7.60	0.10	1.24	55.38
14571	3.73	2.03	7.74	4.33	17.67	7.75	0.10	1.19	55.19
14656	3.70	1.91	7.85	5.07	17.58	7.88	0.11	1.18	54.71
14751	3.63	1.81	8.11	5.56	16.85	8.12	0.11	1.22	54.49
06003	2.95	2.17	7.53	3.86	19.82	7.43	0.10	1.15	55.00
06088	2.76	2.19	7.68	4.24	19.58	7.65	0.11	1.11	54.67
06183	2.74	2.04	8.05	4.82	18.10	7.96	0.11	1.15	54.97
06239	2.66	2.02	7.85	4.42	19.05	7.41	0.10	1.19	54.92
06282	2.84	1.96	7.67	4.35	19.00	7.04	0.10	1.19	55.02
06335	2.68	1.87	8.11	5.05	19.20	7.52	0.11	1.11	54.34
06354	2.61	2.16	7.76	4.54	20.46	7.49	0.10	1.09	53.79
06542	2.81	1.95	7.78	4.05	19.81	7.02	0.10	1.12	55.35
06652	2.83	1.96	7.87	5.19	18.83	7.57	0.11	1.17	54.45
Average	3.15	1.99	7.83	4.62	18.69	7.55	0.10	1.18	54.71

a Reported as weight percent of the dried ignited samples

Table 34

RELATIVE DENSITY, SOLUBLE SALT CONTENT, AND SOLUBLE SULFATE CONTENT OF THE CENIZA-ARENA PARTICLES AND pH OF WATER IN CONTACT WITH THE PARTICLES

Sample Number	Relative Density of Particles	pH of Water Solution	Water Soluble Salts[a]	Acid Soluble Salts[a]	SO_4 Content of Acid Soluble Salts[a]
14089	2.64	5.25	1.18	2.87	1.22
14175	2.67	5.50	0.87	2.72	0.66
14230	2.69	5.55	0.14	0.92	0.10
14335	2.68	5.90	1.61	3.76	1.65
14390	-	-	0.62	3.13	0.66
14495	2.66	5.80	0.16	2.05	0.31
14511	2.69	5.60	0.29	2.27	0.64
14656	2.68	5.40	0.31	1.49	0.25
14751	-	-	0.50	-	0.30
06003	2.64	5.25	1.16	3.01	1.23
06088	2.61	5.40	0.16	1.87	0.25
06183	2.61	5.80	0.23	2.52	0.19
06239	2.66	5.60	0.82	2.47	0.97
06282	-	-	0.19	1.89	0.38
06335	-	-	0.25	1.10	0.21
06354	2.65	5.35	0.76	2.89	1.07
06542	-	-	0.17	-	0.12
06652	2.68	6.10	0.62	1.65	0.43
Average	2.66	5.58	0.56	2.29	0.59

a Reported as weight percent of the original dried particles; 2.0 grams of the particles were shaken in 50 milliliters of water or 0.1 normal hydrochloric acid for one hour at room temperature; the slurry was then filtered, the filtrate evaporated to dryness at 105°C, and the dried residue weighed; the SO_4 content of the acid soluble salts includes total sulfur, computed as SO_4 (most of the sulfur was present as SO_4).

Table 35

COMPOSITION OF THE ACID-SOLUBLE CONSTITUENTS OF THE CENIZA-ARENA SAMPLES AS DETERMINED FROM SPECTROGRAPHIC ANALYSIS

Element	Sample Number 06003	06068	06183	06239	06354	14089	14175	14230	14335	14495	Average
B	-	0.06	-	-	-	-	-	0.05	-	0.03	0.05
Fe	3.5	4.0	3.5	5.0	3.5	5.0	4.0	6.0	4.5	4.5	4.4
Si	10.0	25.0	8.5	5.0	7.0	5.0	6.5	10.0	6.0	15.0	9.8
P	5.0	20.0	8.0	8.0	7.5	8.0	10.0	20.0	8.0	20.0	11.4
Mn	0.12	0.4	0.5	0.1	0.07	0.15	0.2	0.25	0.2	0.06	0.2
Al	10.0	15.0	10.0	8.0	12.0	8.0	8.0	12.0	8.0	6.0	9.7
Mg	3.0	2.0	1.0	3.5	1.5	4.0	3.0	6.0	5.0	0.8	3.0
Pb	0.002	0.1	0.04	0.005	0.02	0.002	0.025	0.04	0.002	0.006	0.02
Cu	1.0	0.3	0.05	0.6	0.03	0.7	0.8	0.6	0.4	0.04	0.45
Sn	-	-	-	-	-	-	-	0.008	-	0.002	0.005
Ga	-	0.001	0.001	-	-	-	-	0.001	-	0.002	0.001
Ca	10.0	5.0	8.0	12.0	8.0	12.0	10.0	10.0	12.0	2.5	9.0
V	0.015	0.01	0.01	0.015	0.008	0.015	0.008	0.02	0.01	0.005	0.013
Y	0.01	0.02	0.005	0.02	0.005	0.015	0.015	0.015	0.01	-	0.013
Na	0.9	0.9	0.7	2.5	1.0	2.5	2.0	3.0	2.5	1.0	1.7
Ti	0.03	0.08	0.06	0.07	0.05	0.07	0.04	0.06	0.06	0.01	0.05
Ni	0.007	0.004	0.01	0.01	0.008	0.01	0.008	0.03	0.008	0.01	0.01
Co	0.002	-	0.003	0.001	0.001	0.004	0.002	0.002	0.001	-	0.002
Sr	0.1	0.08	0.05	0.1	0.06	0.15	0.05	0.2	0.2	0.1	0.11
K	1.5	N.D.	-	2.0	0.75	3.5	2.5	N.D.	3.0	N.D.	2.2
Cr	0.01	0.008	0.005	0.01	0.01	0.01	0.007	0.01	0.008	0.02	0.01
Ba	0.04	0.06	0.1	0.08	0.03	0.07	0.04	0.08	0.06	0.06	0.06
Zn	0.05	N.D.	0.1	0.05	0.05	-	-	N.D.	-	N.D.	0.06
Si[b]	40.9	13.4	7.5	39.3	37.0	42.5	24.0	10.9	43.9	15.1	27.4

a Reported as weight percent of the oxides of the indicated elements; N.D. indicates "not determinable" because of insufficient sample size

b From the data of Table 34 (not from spectrographic analysis)

residues were calcium, aluminum, iron, magnesium, potassium, and sodium; the major nonmetallic elements (besides oxygen and perhaps chlorine from the hydrochloric acid, which were not measured) were sulfur, phosphorous, and silicon.

The solubility data indicate that a water soluble residue of 1.0 to 1.5 percent resulted in severe acid burns on the foliage of the tomato, bean, corn, and other similar plants and in fatality of these plants when the deposit levels were moderately high.

Specific Area of Leaves and Other Plant Parts

Although the foliar contamination factor, as defined by Equation 1, has been used as the basic coefficient for tabulation of the experimental data on retention of particles by leaves and other aboveground plant parts, the projected area of these same plant parts is actually a more basic parameter in the retention process. This fact is shown by the form of Equation 3, in which the conversion of the area to weight is indicated by the inclusion of the specific area, S_L, as a direct multiplier. Additional factors that influence the degree of foliar retention by plant parts include the geometry and volume density of the foliage; these are also indicated as parameters in Equation 3.

Many scaled photographs were taken of the plants in the field during the sampling periods. Information from these photographs are to be presented in a subsequent report when a sufficient number of analyses are completed; generalized descriptions of the geometric form and gross projected areas of plant parts are to be evaluated from the photographic data. The measurements of the areas of individual leaves and other parts of many plants and of the dry weights of these foliar samples are presented in Appendix F. Average values of the foliar specific areas calculated from the data are summarized in Tables 36, 37, and 38 for vegetables, cereal grains, and trees, respectively. Average values of the foliar specific areas from measurements on individual leaf samples are summarized in Table 39. As discussed in Appendix E, the tabulated values of the areas and foliar specific areas refer to the maximum projected area of a leaf and the minimum projected areas (or their averages) of plant parts, such as stems and fruit.

The data show that the values of the specific areas for leaves generally range from about 0.1 to 0.2 sq ft/gm, except for the cereal grains, which have values about twice as large. Inspection of the data indicates that the specific areas of the leaves depend on plant or leaf age, leaf weight, and, to some degree, on the relative amount of sunlight

Table 36

SUMMARY OF FOLIAR SPECIFIC AREA CALCULATIONS: VEGETABLES

Sample Number	Age (days)	Total Area (sq ft)	Total Weight (gm)	$\overline{S_L}$ (sq ft/gm)	$\overline{S_L}$[a] (sq ft/gm)	Average Area per Plant Part (sq ft)
			Bean			
14658-1	86	0.5068	2.8768		0.177	0.0158
14659-1	86	0.3043	1.7906		0.170	0.0138
14833-1	122	1.0125	6.3160	0.160		0.0178
14833-2[b]		0.1895	9.8375	0.0193		0.0111
14833-3		0.3625	8.7704	0.0413		0.181
14833		2.8433	32.9009	0.0864		-
14837-1	122	0.3172	2.2823	0.139		0.0117
14837-2[b]		0.1256	6.8184	0.0184		0.0157
14837-2[c]		0.0846	6.8184	0.0124		0.0106
14837-2		0.1051	6.8184	0.0154		0.0131
14837-3		0.0463	1.8124	0.0255		0.0463
14837		0.6606	12.2957	0.0537		-
14839-1	93	0.7461	4.3004	0.173		0.0111
14839-2[b]		0.1302	7.2174	0.0180		0.0118
14839-2[c]		0.1169	7.2174	0.0162		0.0106
14839-2		0.1236	7.2174	0.0171		0.0112
14839-3		0.0787	3.3842	0.0233		0.0262
14839		1.5356	19.3501	0.0794		-
06567-1	11	0.1385	0.5728		0.294	0.0168
			Beet			
14669-1	170	0.3931	2.6829	0.147		0.0357
14669-1,3		0.3931	3.2353		0.122	0.0357
14805-1	90	0.2602	2.7104	0.0960		0.0173
14848-1	214	0.7961	8.7510	0.0910		0.0468
			Cabbage			
14662-1	86	0.4698	2.2932		0.205	0.0522
14663-1	86	0.4561	2.3766		0.192	0.0507

a S_L includes stem weight
b Maximum area
c Minimum area

Table 36 (continued)

Sample Number	Age (days)	Total Area (sq ft)	Total Weight (gm)	$\overline{S_L}$ (sq ft/gm)	$\overline{S_L}$[a] (sq ft/gm)	Average Area per Plant Part (sq ft)
			Cabbage (concluded)			
14834-1	122	4.242	42.3127	0.100		0.128
14834-3		0.0242	3.3063	0.00732		0.0242
14834		4.266	45.6190	0.0935		-
06565-1	58	0.1660	0.4920		0.337	0.0118
			Carrot			
14841-1	207	1.450	13.8397	0.105		0.112
06632-1	174	0.6946	4.4234	0.157		0.0366
			Corn			
14845-1	96	2.963	13.2343	0.224		0.269
14845-3[b]		0.154	16.8411	0.00914		0.154
14845-3[c]		0.103	16.8411	0.00612		0.103
14845-3		0.128	16.8411	0.00760		0.128
14845-4		0.0468	2.3724	0.0197		0.0468
14845		3.138	32.4478	0.0967		-
06559-1	120	5.598	28.4297	0.197		0.466
06559-3[b]		0.187	30.17	0.00620		0.187
06559-3[c]		0.146	30.17	0.00484		0.146
06659-3		0.166	30.17	0.00550		0.166
06559		5.764	58.60	0.0984		-
06694-1	158	4.683	31.8586	0.147		0.390
06694-2[b]		0.1870	35.90	0.00521		0.187
06694-2[c]		0.1320	35.90	0.00368		0.130
06694-2		0.1595	35.90	0.00444		0.160
06694-3[b]		0.3870	68.7915	0.00563		0.387
06694-3[c]		0.3397	68.7915	0.00494		0.340
06694-3		0.3634	68.7915	0.00528		0.363
06694-4		0.2043	4.3550	0.0469		0.204
06694		5.369	140.91	0.0381		-

a S_L includes stem weight
b Maximum area
c Minimum area

Table 36 (continued)

Sample Number	Age (days)	Total Area (sq ft)	Total Weight (gm)	$\overline{S_L}$ (sq ft/gm)	$\overline{S_L}$[a] (sq ft/gm)	Average Area per Plant Part (sq ft)
			Onion			
14667-1	234	0.1261	1.8748	0.0673		0.0140
14836-1[b]	270	0.6161	13.0031	0.0474		0.0616
14836-1[c]		0.5874	13.0031	0.0452		0.0587
14836-1		0.6018	13.0031	0.0463		0.0602
14836-3		0.0242	-	-		0.0242
14836[b]		0.697	21.1778	0.0329		-
14836[c]		0.1003	21.1778	0.00474		-
14836		0.3985	21.1778	0.0188		-
14850-1	278	0.0663	4.1903	0.0158		0.0663
14850-2		0.0158	0.5267	0.0300		0.0158
14850		0.0821	4.7170	0.0174		-
			Pea			
14844-1[d]	93	0.3848	-	-		0.00962
14844-1[e]		0.4117	-	-		0.0412
14844-1		0.7965	4.3121	0.185		0.0159
14844-2[b]		0.1315	8.1430	0.0161		0.0164
14844-2[c]		0.0846	8.1430	0.0104		0.0106
14844-2		0.1080	8.1430	0.0133		0.0135
14844-3		0.1025	4.8178	0.0213		0.102
14844		1.0070	17.2729	0.0583		-
06569-2[b]	90	0.0687	3.1415	0.0219		0.00687
06569-2[c]		0.0315	3.1415	0.0100		0.00315
06569-2		0.0501	3.1415	0.0160		0.00501
06634-1[d]	93	0.2054	-	-		0.00411
06634-1[e]		0.1770	-	-		0.0221
06634-1		0.3824	1.5865	0.241		0.00648
06634-3		0.0454	1.9284	0.0235		0.0454

a S_L includes stem weight
b Maximum area
c Minimum area
d Regular leaves
e Stem leaves

Table 36 (concluded)

Sample Number	Age (days)	Total Area (sq ft)	Total Weight (gm)	$\overline{S_L}$ (sq ft/gm)	$\overline{S_L}$[a] (sq ft/gm)	Average Area per Plant Part (sq ft)
			Pea (concluded)			
06635-1[b]	61	0.3741	-	-		0.0107
06635-1[c]		0.5139	-	-		0.0467
06635-1		0.8880				0.0193
06635-3		0.0910				0.0910
			Pepper			
14665-1	142	0.1389	1.0531		0.132	0.00731
14666-1	170	0.0618	0.4628	0.170	0.134	0.00412
14847-1	214	0.2706	2.4457	0.111		0.00933
14847-2		0.0426	5.6597	0.00753		0.0426
14847-3		0.00893	1.1116	0.00803		0.00893
14847		0.3221	9.2170	0.0349		-
			Potato			
14843-1	125	0.5843	-	-	0.171	0.0531
14843-3		0.0067	-	-		0.0067
14843		0.5910	3.4072	0.173		-
06521-1	89	2.2732	7.9239		0.287	0.0334
06563-1	90	0.9919	4.0835		0.243	0.0992
			Radish			
14660-1	88	0.3037	1.4629	0.208		0.0152
14661-1	88	0.2954	1.6086	0.184		0.0148
06566-1	90	0.4624	2.1328	0.217		0.0231
			Squash			
14846-1	100	1.321	13.45	0.0982		0.110
14846-2		0.0703	6.2831	0.0112		0.0117
14846-2*		0.0384	0.6024	0.0638		0.0128
14846-3		0.0282	1.9716	0.0143		0.00235
14846		1.4579	22.3071	0.0654		-

a S_L includes stem weight
b Regular leaves
c Stem leaves

Table 37

SUMMARY OF FOLIAR SPECIFIC AREA CALCULATIONS: CEREAL GRAINS

Sample Number	Age (days)	Total Area (sq ft)	Total Weight (gm)	$\overline{S_L}$ (sq ft/gm)	$\overline{S_L}^a$ (sq ft/gm)	Average Area per Plant Part (sq ft)
			Barley			
06631-1(1)	61	0.4317	0.9725	0.444		0.0432
06631-1(2)		0.3628	0.8477	0.428		0.0363
06631-1(3)		0.2872	0.6453	0.445		0.0287
06631-1(4)		0.2082	0.4945	0.421		0.0231
06631-1(5)		0.1310	0.3098	0.423		0.0146
06631-1		1.6163	3.7094	0.436		0.0296
06631-3		0.1609	3.0411	0.0529		0.0161
06631		1.7772	6.7505	0.263		-
06675-1(1)	90	0.2278	0.8775	0.260		0.0228
06675-1(2)		0.2897	0.9130	0.317		0.0290
06675-1(3)		0.2327	0.7047	0.330		0.0233
06675-1(4)		0.2018	0.5790	0.349		0.0202
06675-1(5)		0.1635	0.4426	0.369		0.0164
06675-1(6)		0.1158	0.2990	0.387		0.0129
06675-1(7)		0.0303	0.0822	0.369		0.0101
06675-1		1.2616	3.8990	0.324		0.0203
06675-3		0.2570	5.3788	0.0478		0.0257
06675		1.5186	9.2778	0.164		-
			Oat			
06630-1(1)	61	0.2727	0.6843	0.398		0.0273
06630-1(2)		0.2622	0.8793	0.298		0.0262
06630-1(3)		0.1937	0.6770	0.286		0.0194
06630-1(4)		0.1121	0.4422	0.254		0.0112
06630-1		0.8755	2.7702	0.316		0.0210
06630-3		0.0341	0.6020	0.0566		0.00341
06630		0.9096	3.3722	0.270		-

a S_L includes stem weight

Table 37 (concluded)

Sample Number	Age (days)	Total Area (sq ft)	Total Weight (gm)	$\overline{S_L}$ (sq ft/gm)	$\overline{S_L}$[a] (sq ft/gm)	Average Area per Plant Part (sq ft)
			Wheat			
14782-1(1)	65	0.1168	0.4440	0.2 3		0.0117
14782-1(2)		0.1472	0.5517	0.267		0.0147
14782-1(3)		0.1208	0.4282	0.282		0.0121
14782-1(4)		0.0880	0.3011	0.292		0.00880
14782-1		0.4728	1.7250	0.274		0.0118
14782-2[b]		0.1186	2.4541	0.0483		0.0119
14782-2[c]		0.0917	2.4541	0.0374		0.00917
14782-2		0.1052	2.4541	0.0428		0.0105
14782-3		0.1936	7.2167	0.0268		0.0194
14782		0.7716	11.3958	0.0677		-
14835-1(1)	91	0.0917	0.6000	0.153		0.00917
14835-1(2)		0.1069	0.6334	0.169		0.0107
14835-1(3)		0.0879	0.4602	0.191		0.00879
14835-1(4)		0.0348	0.1660	0.210		0.00870
14835-1		0.3213	1.8596	0.173		0.00945
14834-2[b]		0.0607	5.7180	0.0106		0.00607
14835-2[c]		0.0579	5.7180	0.0101		0.00579
14835-2		0.0593	5.7180	0.0104		0.00593
14835-3		0.2186	12.1141	0.0180		0.0219
14835		0.5992	19.6917	0.0304		-
06629-1(1)	60	0.1502	0.4540	0.331		0.0150
06629-1(2)		0.1405	0.4341	0.324		0.0140
06629-1(3)		0.0864	0.2718	0.318		0.00864
06629-1(4)		0.0598	0.2002	0.299		0.00598
06629-1		1.0398	3.1824	0.327		0.0109
06629-3		0.0596	1.9122	0.0312		0.00596
06629		1.0994	5.0946	0.216		-
06674-2[b]	89	0.0598	6.7165	0.00890		0.00748

a S_L includes stem weight
b Maximum area
c Minimum area

Table 38

SUMMARY OF FOLIAR SPECIFIC AREA CALCULATIONS: TREES

Sample Number	Total Area (sq ft)	Total Weight (gm)	$\overline{S_L}$ (sq ft/gm)	$\overline{S_L}$[a] (sq ft/gm)	Average Area per Plant Part (sq ft)
			Avocado		
14641-1	0.3670	2.9745	0.123		0.0216
	0.3670	3.4832		0.105	0.0216
14643-1	0.7172	7.1290	0.101		0.0422
	0.7172	8.1199		0.0883	0.0422
14644-1	0.4809	4.5124	0.107		0.0321
	0.4809	5.5359		0.0869	0.0321
14682-1	0.7675	4.9715	0.154		0.0451
	0.7675	6.1020		0.126	0.0451
14831-1	0.6255	3.1818	0.197		0.0313
14832-1	0.6116	6.2155	0.0984		0.0408
			Camphor		
06381-1	0.1483	1.3014	0.114		0.00927
	0.1483	1.4767		0.100	0.00927
06382-1	0.1608	1.3543	0.119		0.0146
	0.1608	1.5106		0.106	0.0146
06383-1	0.1111	0.7503	0.148		0.0139
	0.1111	0.8452		0.131	0.0139
06481-1	0.1176	0.8965	0.131		0.00840
	0.1176	1.0297		0.114	0.00840
			Grapefruit		
16020-1(t)[b]	0.2422	3.1285	0.0774		0.0484
16020-1(b)[c]	0.2286	3.1285	0.0731		0.0457
16020-1	0.2354	3.1285	0.0752		0.0471
16021-1(t)	0.2312	3.1715	0.0729		0.0385
16021-1(b)	0.2658	3.1715	0.0838		0.0443
16021-1	0.2485	3.1715	0.0784		0.0414

a S_L includes stem weight

b Letter t designates projected area measured for top side of leaf

c Letter b designates projected area measured for bottom side of leaf

Table 38 (concluded)

Sample Number	Total Area (sq ft)	Total Weight (gm)	$\overline{S_L}$ (sq ft/gm)	$\overline{S_L}$[a] (sq ft/gm)	Average Area per Plant Part (sq ft)
			Grapefruit (concluded)		
16022-1(t)[b]	0.2200	1.7855	0.123		0.0367
16022-1(b)	0.2239	1.7855	0.125		0.0373
16022-1	0.2220	1.7855	0.124		0.0370
16166s-1	1.0224	15.6659	0.0653		0.0320
16198s-1	0.2696	3.2631	0.0826		0.0193
16209s-1	0.2558	1.8399	0.139		0.0233
16229s-1	0.4138	5.3355	0.0776		0.0207
16260s-1	1.3961	16.5844	0.0842		0.0450
16280s-1	0.6246	7.6871	0.0812		0.0312
16288s-1	0.1501	1.8804	0.0798		0.0188
			Juniper		
16024-1	0.214	3.1550		0.0678	-
			Laurel		
15012-1	0.2671	1.5677	0.170		0.0167
15013-1	0.1818	1.0202	0.178		0.0152
15014-1	0.2613	1.1557	0.226		0.0218
15015-1	0.2643	1.4246	0.186		0.0155
			Pine[c]		
16004-1	0.1640	7.0770	0.0232		0.00156
16004-3	0.0143	4.2916	0.00333		-
16004-1,3	0.1783	11.3686	0.0157		-

a S_L includes stem weight

b See page 238 for t and b designations

c Outer branches have an average of 220 needles/ft; average needle length is 0.359 ft; average needle width is 0.00436 ft

Table 39

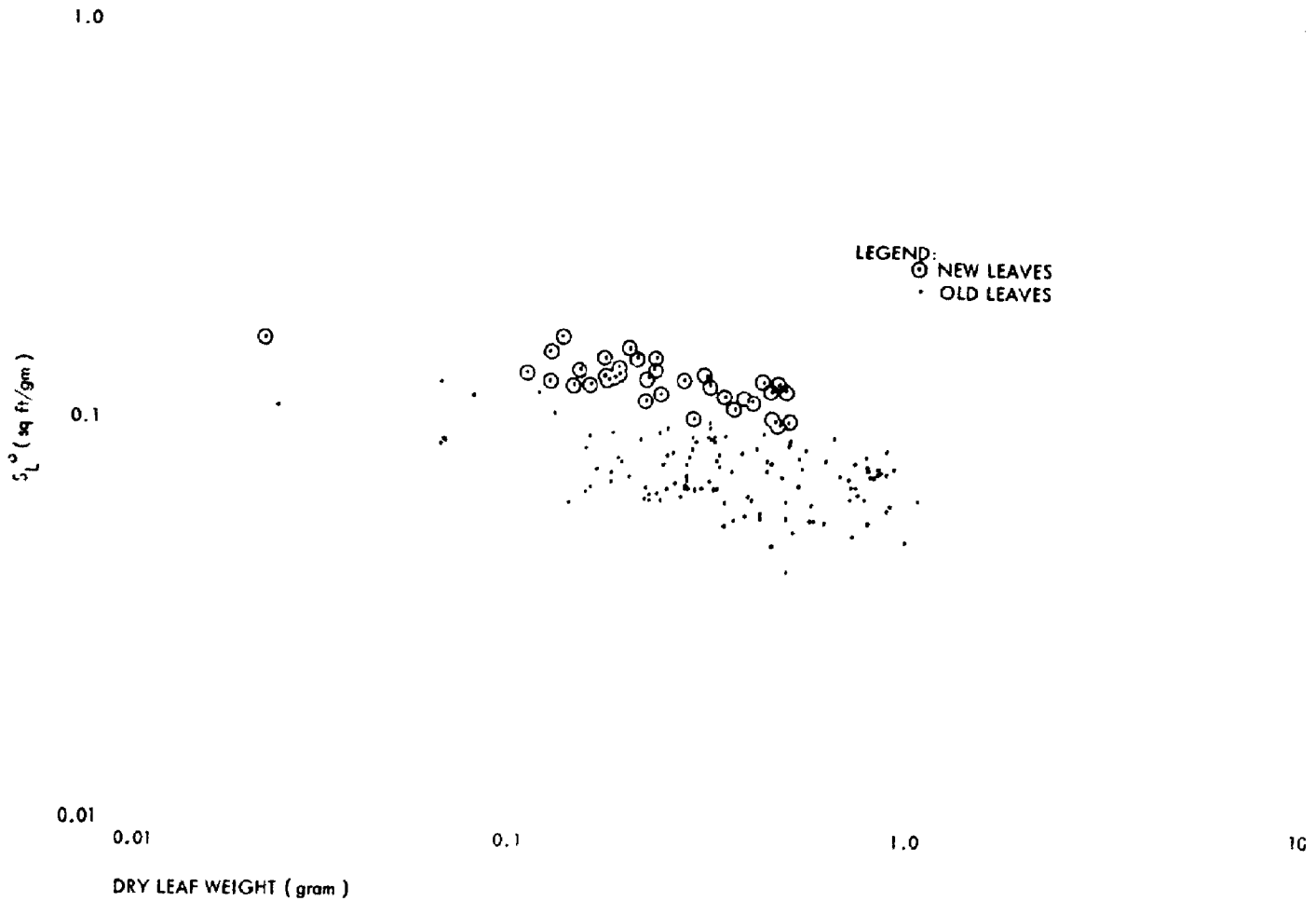
SUMMARY OF AVERAGE FOLIAR SPECIFIC AREAS
FROM MEASUREMENTS ON INDIVIDUAL LEAVES

Sample Number	Plant	$\overline{S_L}$ (sq ft/gm)
14834-1	Cabbage	0.0981
14845-1	Corn	0.228
06559-1	Corn	0.245
06694-1	Corn	0.154
14641-1	Avocado	0.129
14643-1	Avocado	0.103
14644-1	Avocado	0.109
14831-1	Avocado	0.209
14832-1	Avocado	0.0968
06381-1	Camphor	0.116
06382-1	Camphor	0.123
06383-1	Camphor	0.149
16020-1	Grapefruit	0.0775
16021-1	Grapefruit	0.0798
16022-1	Grapefruit	0.129
16166s-1	Grapefruit	0.0686
16198s-1	Grapefruit	0.0830
16209s-1	Grapefruit	0.141
16229s-1	Grapefruit	0.0814
16260s-1	Grapefruit	0.0891
16280s-1	Grapefruit	0.0928
16288s-1	Grapefruit	0.0830
15012-1	Laurel	0.171
15013-1	Laurel	0.184
15014-1	Laurel	0.225
15015-1	Laurel	0.192

to which the leaf is exposed. The dependence of the specific area on leaf age and weight is illustrated in Figure 29, where the specific areas of both new and old grapefruit tree leaves are plotted as a function of dry leaf weight. In this set of data, the new leaves (at a given dry leaf weight) have a higher specific area than the older, more mature leaves, and, for both classes of leaves, the specific area is shown to decrease as the dry leaf weight increases. The analysis of the foliar specific area data for all plants is presented in Part Three of this report.

Figure 29

VARIATION OF SPECIFIC AREA OF GRAPEFRUIT LEAVES WITH DRY LEAF WEIGHT



SUMMARY AND CONCLUSIONS

In the second phase of Operation Ceniza-Arena, measurements were made of the contamination factors for retention of airborne particles by the foliage of thirteen different vegetable plants (including corn), four different cereal grains, and six different kinds of trees. Data were obtained on both the initial contamination of these plants by individual ceniza-arena showers and the weathering of the initial deposit by wind and rain. The vegetables and grains grown at two land plots provided a sufficient supply of vegetation for the sampling of whole plants or parts thereof through their complete growth cycles or from planting to harvesting of the crops.

The contamination data showed that, depending on the foliage density and meteorological conditions, up to 100 percent of the depositing particles is initially retained by foliage. Under dry conditions, moderate wind speeds rapidly dislodge the initial deposits. After brief periods of weathering, about 0.01 inch of rain is required to remove a significant additional amount of particles; however, under dry conditions, heavier rains may remove essentially all of the removable particles from most of the foliage.

The deposits of ceniza-arena particles at the two land plots were measured continuously over a nine-month period beginning in June 1964. The data revealed a continuous decrease in volcanic activity and led to a prediction of the month in which the volcano would cease erupting (at least to the degree that significant amounts of debris would be deposited in the central valley); the observed decrease in activity was related to deposit density decrease with a half-life of 27 days. The gross deposition data for the two land plots have been tabulated on an hourly basis in terms of the hourly deposit rate and accumulated deposit for the duration of each of eight of the nine sampling periods.

During each sampling period, continuous measurements were made of the surface air temperature, humidity, and wind speed. Rainfall measurements were made on a daily (or more frequent, depending on the sampling schedule) basis during the same periods. The wind speed records were tabulated in terms of the average hourly surface wind speed for each hour of the day for the duration of each sampling period (except for several

short periods of malfunction or loss of equipment). The seasonal patterns and diurnal variations of these climatic variables during the various sampling periods are discussed in the report; these climatic patterns were used a great deal to establish sampling schedules in the field.

A new greased plate collector was designed and used in the field to obtain information on the angle of fall of the particles and to obtain data on the impaction coefficient of large airborne particles; 22 sets of measurements were made. The plate collector data are summarized, together with the measured wind speeds, for each set of measurements. The median diameter of the collected material, as determined by sieve analysis, ranged from about 40 to 70 microns.

The foliar contamination data and the calculated values of the contamination factors are tabulated by plant type, sample type, and environmental conditions during deposition (damp or dry). In addition, data were obtained on the dry weights of the plants and plant parts as a function of age after planting and on the average surface density of the foliage. Data on the contamination of tree leaves included the effects of foliage volume density (or shadowing) from one side of a tree canopy to another. Reductions in the contamination factors as low as 0.09 across the canopy of a laurel tree were observed. Small greased discs mounted on rods through the canopy of the laurel tree and on one pine tree were used to obtain information on the particle air concentration gradients through the canopy of those trees. The data show that, in general, the individual leaf contamination is highly dependent on the direction of fall of the particles.

During the operation, 26 measurements of personnel contamination were made; of these, most were for contamination of hair, since it was the most efficient collector of all the exposed parts of the human body.

Essentially all the ceniza-arena particles recovered from the foliar samples and the collecting equipment were sieve-analyzed for determination of particle weight distributions as a function of particle diameter. These data show that the foliage intercepted and retained, at least initially, all particle sizes that fell. In most sample sets, the distribution of particles on the foliage tended to have somewhat greater fractions of small particles than did the distribution of those deposited on the ground; this increased concentration of smaller particles in the foliage deposits was higher when the deposit occurred under dry conditions. Weathered deposits, either by wind or wind and rain, had about the same distribution as the initial deposits on the foliage. In other words, wind and rain did not preferentially remove large particles; rain appeared to remove the smaller particles somewhat more effectively than the medium

or relatively large particles. Most of the sample sets had distributions with all but 2 or 3 percent of the weight contributed by particles with diameters between about 7 and 300 microns; for such distributions, the median mass diameter was between 40 and 80 microns.

The particle properties of the ceniza-arena collected during the second phase of the field operation were similar to those reported for the first phase. The solubility data indicated that, when the ceniza-arena particles carried water soluble residues greater than about 1.0 percent by weight and were deposited on foliage under damp conditions, severe or fatal acid burns occurred on the foliage of the tomato, bean, corn, and similar plants.

The areas of leaves, stems, fruit, and flowers of all the plants were measured, and the specific areas of these plant parts were determined from the data. The specific areas of younger leaves were generally found to be larger than for older mature leaves, and the specific areas decreased with increasing dry weight of the leaves. A number of plant geometry photographs were taken of the plants in the field; data from some of these photographs are summarized in Part Three of this report.

Correlation and analysis of the experimental data presented in this part of the report are discussed in Part Three of this report. In all essential aspects, the data reported in this part of the report appear to be consistent with the conclusions given in Part One, as deduced from the data obtained during the first phase of the operation.

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