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EVALUATION OF SELECTED VARIETIES OF SOME CEREALS UNDER CONDITIONS OF THE CORN REGION

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Introduction

Grains comprise the principal group of crops in crop production. They are the basis of the population's food supply, and the most valuable feed for livestock. At the same time, they are also an important industrial raw material. One of the most important and effective means of systematically increasing the grain harvest is to suitably select the composition of the sown assortment, and to zone the varieties. The particular significance of zoning is that in every farm region only the most productive varieties are introduced for cultivation, with due consideration for the local climatic, soil and production conditions -- i.e., varieties that are able to maximally utilize the given cultivation conditions so as to attain constant and high yields. Sound zoning, however, requires reliable and objective data that are obtained in performance tests. Accordingly, one of the possibilities of directly utilizing the studied varieties within the world assortment is the performance testing of selected varieties that were the most promising in the basic tests.

Review of Literature

The worldwide professional literature devoted to the problems of grain is extensive. It sums up all available knowledge not only on the taxonomy, biology and utilization of grains, but also the detailed studies on the possibilities of maximally utilizing the bred new varieties, under certain pedological and climatic conditions. Since space limitations do not allow us to analyze the investigated problem in detail, we will cite

the works of only a few authors, with special attention to the varieties under study. Yakubtsiner (1964) discusses the intensive varieties of winter wheat and their utilization. Lelley et al (1963) analyze the problems of wheats and their utilization. Popov et al (1963) investigated the feasibility of growing southern types of wheat under the conditions in the Soviet Union. Rabinovich (1963) analyzes the problems of growing the wheat varieties of the Danube regions. Kostelecki (1963) evaluates Polish and foreign wheat varieties, under the conditions in Poland. Lantev (1963) discusses the Scandinavian wheats and their utilization. Kapas (1961) evaluates the feasibility of growing Soviet wheat varieties under the conditions in Hungary. Rabinovich (1963) evaluates the wheat varieties of East Germany. Exceptional attention is being devoted to some wheat varieties, because of the results that have been attained in their cultivation. Thus the Soviet Bezostaya 1 variety is held in high esteem by many authors; for example, by Zhlutenko (1961), Hulpoi (1962), Kuchumov (1961), Yakubtsiner (1962), Tyricheva (1963), Gorbatyuk (1963), and others. The same is true of the Mironovskaya 808 and 264 varieties, which produced outstanding yields in comparison tests. These varieties are evaluated by Remeslo (1962), Prutskova (1964), and others. Interesting results of international comparison tests are given by Darpatov (1962) who evaluates the promising new wheat varieties. An important part of the tests and of their evaluation are also the values of the technological properties. Exceptional attention is being devoted to these properties, as evident from the works of Boldea et al (1963), Waltl (1962), Betz and Wuschek (1962), Samolevskiy (1962), Hoeser (1962), Hyza (1959), Prugar (1964), and others.

The situation is the same with respect to the study and evaluation of the varieties of spring barley, which likewise is receiving considerable attention in the world literature. Bakhteyev (1955) speaks of barley as an important food and industrial crop. Aufhammer (1958) analyzes the quality of brewer's barley in various countries of Europe. Plumet (1955) studies the extracted substances and proteins. Szilvinyi and Payer (1955) investigate the qualitative indicators of brewer's barley. Moes (1955) discusses the varieties of spring barley. Gopp (1963) analyzes the problems of growing barley in various countries of Europe. Cans (1962) establishes grades for the properties and values of barley. Aufhammer (1962) considers an increase in the barley acreage.

In Czechoslovakia, considerable attention is being devoted to the problem of zoning. From 1956 to 1964, the Crop Production Research Institute in Piestany devoted much effort to the evaluation of grains, on the basis of the world assortment, and also of special experiments with selected varieties that proved promising in the basic tests. Reports on this work were published by Sestrienka and Polerecky (1961), Riman and Churova (1962), Riman (1962), Riman (1963 a + b), Riman and Foltin (1963), Riman and Bartos (1963), Riman (1964 a + b + ç), Foltin and Riman (1964), Pastorek and Churova (1965), Riman (1965 a + b), and Riman and Foltin (1965). The listed authors analyze in detail the entire problem under study, and also the results attained during this period.

Material and Methods

After researching and studying for several years the world's grain assortment, we selected for the tests certain varieties which proved promising in the basic studies and evaluations, or which could be assumed to be suitable for the corn region, on the basis of the data published in the literature. The actual tests evaluated in this work covered in all 285 grain varieties, including 166 varieties of winter wheat, 96 varieties of spring barley, and 23 varieties of spring wheat. The tests were made on the plots of the Crop Production Research Institute in Piestany, Trnava Okres; of the Krakovany Cooperative Farm, Trnava Okres; and of the Novy Tmh Experimental Farm, Dunajska Streda Okres. The general rules for comparison tests were observed. Increased doses of artificial fertilizer were used per hectare: for wheat, 20 + 20 kg N, 54 kg P_2O_5, and 100 kg K_2O; for spring barley, 30 kg N, 54 kg P_2O_5 and 60 kg K_2O. For control we used the varieties that have been zoned for the corn region. These were: the Kosutska variety in the case of winter wheat; the Slovensky Dunajsky tmh (SDT) variety in the case of spring barley; and the Niva variety in the case of spring wheat. The results of the tests were processed statistically and evaluated by the analysis of variance method due to Hruby and Konvicka (1954). The results were analyzed in terms of the grain and straw values, and of the technological (intrinsic) properties, in accordance with the nature of the test material. The analyses of malting values were made in close cooperation with the Experimental Malting Station of the Slovak Malthouses, Trnava. The technological properties of wheat were evaluated in the closest possible cooperation with the Plant Breeding Station, Solary. The tests were performed in 1961-1964.

Experimental Part

The scope of the tests and studies is considerable. Because of space restrictions, we cannot report all the tests and their results. Therefore, we will limit ourselves to some of the interesting tests and will evaluate the results of the winter-wheat and spring-barley tests on the plots of the Crop Production Research Institute, Piestany.

The weather in the 1961-1962 growing season was favorable for winter wheat, only a relative drought delayed sowing. In March the weather was fairly cold, and in June there was little precipitation. But essentially this did not affect the development of the plants of the individual varieties, because the weather in winter was favorable for winter wheat. Table 1 presents the results of the tests in terms of yield. From an analysis of the variances we obtained the following values. For the grain yield: varietal difference P = 0.05 = 7.2 quintals (= 9.07 percent); varietal difference P = 0.01 = 9.7 q (= 12.37 percent). For the straw yield: varietal difference P = 0.05 = 4.50 q (=8.86 percent); varietal

difference P = 0.01 = 6.03 q (= 11.88 percent). In Table 2 we present the technological analyses of the basic values of the grain yields in the performed tests. From the presented data it is evident that the investigated varieties did not have significantly higher values than the control (Kosutska variety).

The weather during the 1962-1963 growing season was exceptionally unsuitable for winter wheat, because the autumn was dry, and winter arrived unevenly, with temperature fluctuations. This produced frequent black frosts and glazed frosts, which damaged the crops and caused heavy losses to the national economy. For research and plant breeding, however, this disaster was exceptionally advantageous, because in this way the varieties could be tested from the viewpoint of their winter hardiness, etc. In other words, it was possible to study the complex of conditions which might occur when growing wheat in the corn region, and which are important from the viewpoint of evaluating the suitability of the individual varieties for zoning. In this respect the southern (especially Italian) varieties proved unsuitable for our corn region. Table 3 presents the results of the yield tests. From an analysis of the variances we obtained the following results. Grain: varietal difference P = 0.05 = 4.16 q (= 4.9 percent); varietal difference P = 0.01 = 5.54 q (= 6.7 percent). Straw: varietal difference P = 0.05 = 6.17 q (= 11.20 percent); varietal difference P = 0.01 = 8.26 q (= 14.98 percent). In Table 4 we present the technological analyses of the basic values of the grain yield from the performed tests. That year and the next, we were unable to do extensigraphic tests, because the instrument was out of order. The Mironovskaya 808, Bezostaya 1, and Fertodi 293 varieties proved very suitable in terms of technological properties. In view of the exceptional winter, we present also the stalk density per square meter. This count clearly illustrates the ability of the varieties to tolerate the extreme weather conditions of the corn region. From the presented results it is also evident that many varieties (1--8) had significant grain yields, in quintals per hectare. In the tests for straw, however, fewer varieties (1--5) showed significant results.

In the 1963-1964 growing season, the weather was average for winter wheat, except that in winter the temperature fluctuated. (But this did not affect the well-established crop as greatly as the preceding year.) The relative paucity of precipitation in winter, and also in summer, influenced to some extent the development of the plants. Table 5 presents the results of the yield tests. In the analysis of the variances we obtained the following results. Grain: varietal difference P = 0.05 = = 3.65 q (= 7.39 percent); varietal difference P = 0.01 = 4.83 q (10.32 percent). Straw: varietal difference P = 0.05 = 6.02 q (= 6.04 percent); varietal difference P = 0.01 = 7.96 q (= 9.18 percent). In Table 6 we present the technological analysis of the basic values of the grain in the performed tests. From the presented results it is evident that the varieties ranking from 1 to 16 are significantly better than the control in terms of grain yield, but the control has not been surpassed in terms of straw yield.

Table 1

Experiments with Winter Wheat (1961-1962 Growing Season)

(a) Číslo	(b) Odrody	Zrno (c) X	(d) X v %	(e) Poradie	Slama (f) X	(d) X v %	(e) Poradie
1	Svalöfs Panzer III (Švédsko)(g)	48,27	80,69	10	95,88	91,73	4
2	Weibulls Ergo (Švédsko)(h)	42,45	70,96	12	102,05	97,59	2
3	Hadmerslebener Qualitas (Nemecko)	60,71	101,46	2	89,59	85,69	7
4	Heines VII (Nemecko)	57,86	96,72	4	81,99	78,41	10
5	Małgosetka Ulycka (Poľsko)(i)	57,91	95,51	5	91,27	96,73	5
6	Bělocerkovskaja 198 (SSSR)	55,30	92,37	6	99,09	87,98	6
7	Bezostaja 1 (SSSR)(j)	63,61	106,42	1	78,19	74,74	11
8	ICAR 578 B (Rumunsko)	51,67	86,33	7	87,58	83,76	8
9	San Pastore Fan. II (Taliansko)(k)	45,36	75,65	11	69,99	66,91	12
10	Alsace 22 (Francúzsko)(l)	48,06	80,33	9	99,59	95,26	3
11	Pevek D'Esprès (Francúzsko)	51,19	85,55	8	85,29	81,63	9
12	Košútska (kontrola) (ČSSR)	59,82	100,00	3	104,45	100,00	1
S	Priemerné hodnoty	53,16	70,96 - 106,42	1 - 12	89,10	57,11 - 100,00	1 - 12

Key: a - number; b - variety; c - grain; d - $\bar{X}$ in percent; e - rank; f - straw; g - Sweden; h - Germany; i - Poland; j - Rumania; k - Italy; l - France; 6 - Belotserkovskaya 198 (USSR); 7 - Bezostaya 1 (USSR); 12 - Kosutska (control) (Czechoslovakia); S - average values.

Technological Analyses of Winter Wheat

(a)	(b)	(d)	(e)	(c) (f)	(g)	(h)
1	Pionýr 1 (Švédsko) (t)	28	8	(13)	(17)	(20)
2	Weibulls [illegible] go (Švédsko)	32	3	[illegible]	[illegible]	(21)
5	Hadmer Ideal × Quadrat (Německo)	20	11	(14)	(18)	(22)
4	Heines VII (Německo) (u)	27	10	[illegible]	[illegible]	[illegible]
5	Maigoratka Ulycka (Polsko) (v)	28	9	[illegible]	[illegible]	(23)
6	Belocerkovskaja (SSSR)	35	2	[illegible]	[illegible]	[illegible]
7	Bezostaja 1 (SSSR)	30	7	[illegible]	[illegible]	[illegible]
8	ICAR 378 B (Rumunsko) (w)	38	1	[illegible]	[illegible]	[illegible]
9	San Pastore Fam. 14 (Talianisko) (x)	33	4	(15)	[illegible]	[illegible]
10	Alsace 22 (Francúzsko) (y)	31	3	[illegible]	[illegible]	[illegible]
11	Povolo Dupres (Francúzsko)	32	6	[illegible]	[illegible]	[illegible]
12	Kvalitska (ČSSR) (z)	22	12	silné (16)	v. kráť. (19)	[illegible]
S	Priemerné hodnoty	29,01	1—12	—	—	—

Key to Table 2: a - number; b - variety; c - gluten; d - moist gluten, percent; e - rank; f - elasticity; g - extenisibility; h - gluten grade; i - swelling value; j - extensigraph; k - area under curve, cm^2; l - corrected, cm^2; m - category; n - farinograph; o - absorption, percent; p - drop-off after 10 minutes; q - drop-off after 15 minutes; r - drop-off area, cm^2; s - number; t - Sweden; u - Germany; v - Poland; w - Rumania; x - Italy; y - France; z - Czechoslovakia; S - average values;

6 - Belotserkovskaya (USSR); 7 - Bezostaya 1 (USSR); 13 - slightly elastic; 14 - elastic; 15 - inelastic; 16 - strong;

Table 2

(1961-1962 Growing Season)

		(j)					(n)			
(i)	(e)	(k)	(l)	(m)	(o)	(p)	(q)	(r)	(s)	(m)
[illegible]	7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	C1
[illegible]	9	[illegible]	[illegible]	C2	[illegible]	125	[illegible]	[illegible]	[illegible]	[illegible]
15	2	[illegible]	[illegible]	[illegible]	50,—	[illegible]	120	[illegible]	[illegible]	B2
[illegible]	8	10,8	18,8	C1	51,—	100	200	25,7	25,5	C2
[illegible]	6	32,1	20,2	[illegible]	57,—	[illegible]	150	16,—	47,1	B2
12	[illegible]	50,7	32,5	B1	60,—	60	110	12,—	51,5	B2 B1
15	3	40,6	36,1	A2 B1	60,—	65	100	9,7	58,7	B1
11	5	47,4	33,0	A2, B1	60,—	60	[illegible]	10,3	55,—	B1
1	12	17,5	19,4	C1	60,—	200	230	37,2	16,5	C2
2	10	15,5	20,8	C1	60,—	150	150	23,8	34,5	C1
2	11	15,8	21,4	C1	55,—	150	180	33,3	21,2	C2
20	4	45,—	32,4	B1 A2	56,—	40	105	8,3	62,0	B1
8,33	1—12	29,27	26,51	—	58,33	108,33	145,83	20,30	41,42	—

17 - extensible; 18 - intermediately extensible; 19 - very briefly; 20 - poorish; 21 - poor; 22 - good; 23 - intermediate.

Table 3

Experiments with Winter Wheat (1962-1963 Growing Season

(a) č.	Odroda (b)	Počet rastlín po prezimovaní (c) $\bar{X}$	$\bar{X}$ v % (d)	(e) Poradie	Výnos (f) $\bar{X}$	(d) $\bar{X}$ v %	(e) Poradie	Sláma (g) $\bar{X}$	(d) $\bar{X}$ v %	(e) Poradie
1	Bima (Švédsko) (h)	106,16	126,39	12	31,17	82,02	15	56,00	101,59	10
2	Skandia III B (Švédsko)	127,17	163,39	10	27,89	73,65	17	60,33	120,61	3
3	Svalöf (Švédsko)	83,33	107,06	13	37,07	97,59	13	60,00	109,08	6
4	Eros (Frio) (Nemecko) (i)	64,52	82,90	16	23,78	62,57	19	57,33	98,12	13
5	Hadmerslebener Qualitas (Nem.)	69,50	77,73	18	25,90	91,63	11	57,00	95,59	15
6	Heines VII (Nemecko)	61,67	79,37	17	26,61	70,10	18	41,00	74,87	18
7	Harrechtswizen (Rakúsko) (j)	57,67	75,35	19	20,06	70,10	16	30,00	70,75	19
8	Malgožatka Udycka (Poľsko) (k)	147,68	189,71	4	43,57	114,65	6	65,33	122,00	4
9	Fertődi 293 (Maďarsko) (l)	138,33	177,78	5	41,88	118,10	5	51,00	98,05	11
10	Etoile de Choisy (Francúzsko) (m)	33,33	42,78	20	13,58	35,73	20	17,33	31,29	20
11	Bezostaja 1 (4,5 mil.) (ZSSR) (n)	122,17	156,97	11	38,22	100,57	10	51,00	98,08	16
12	Bezostaja 1 (6 mil.) (ZSSR)	175,33	225,26	1	37,82	99,58	12	54,17	98,82	12
13	Červonaja (ZSSR)	167,83	215,63	2	46,37	122,02	2	71,00	136,70	2
14	Kuncevskaja 45 (ZSSR)	127,83	161,27	9	39,10	102,89	9	56,33	102,06	8
15	Mironovskaja 264 (ZSSR)	133,83	171,95	7	45,75	120,39	3	57,33	102,86	7
16	Mironovskaja 808 (ZSSR)	106,83	214,34	3	50,86	133,81	1	66,30	119,97	5
17	Tavričeskaja (ZSSR)	131,33	172,59	6	40,72	107,15	7	56,17	101,50	9
18	Stamm 6111 (Rakúsko) (j)	82,67	106,22	11	40,25	105,92	8	46,33	84,05	14
19	Fanone (Taliansko) (o)	6,83	8,78	21			21			21
20	Mara (Taliansko)	1,16	1,49	22			22			22
21	Knštická ostená (ČSSR) (p)	128,33	164,88	8	45,62	120,03	4	72,06	130,07	1
22	Košická (kontrola) (ČSSR) (q)	77,83	100,00	15	38,00	100,00	11	55,17	100,00	11
S	Priemerné hodnoty	100,24	1,49 - 225,26	1 - 22	36,88	35,73 - 133,81	1 - 22	54,93	31,29 - 130,07	1 - 22

Key: a - number; b - variety; c - plant density after wintering; d - $\bar{X}$ in percent; e - rank; f - grain; g - straw; h - Sweden; i - Germany; j - Austria; k - Poland; l - Hungary; m - France; n - USSR; o - Italy; p - Czechoslovakia; q - control; 11, 12 - Bezostaya; 13 - Chervonaya; 14 - Kuntsevskaya; 15, 16 - Mironovskaya; 17 Tavricheskaya; S - average values.

Table 5

Experiments with Winter Wheat (1963-1964 Growing Season)

Číslo (a)	Odroda (b)	Zrno (c) X	Zrno (c) (d)	Zrno (c) (e)	Slama (f) X	Slama (f) (d)	Slama (f) (e)
1	Diana 1 (ČSSR) (g)	55,60	119,06	6 7	[illegible]	[illegible]	18
2	Fanal (Hadmerslebener VIII) (ČSSR)	52,60	112,63	10	77,10	[illegible]	20
3	Hodonínska osténá (ČSSR)	40,80	87,57	28	[illegible]	[illegible]	1
4	Chlumecká 12 (ČSSR)	42,10	90,17	27	[illegible]	[illegible]	[illegible]
5	Iva (ČSSR)	48,00	102,78	18	[illegible]	101,78	3
6	Kaštická osténá (ČSSR)	50,50	108,13	14	[illegible]	96,06	8
7	Košútska (kontrola) (ČSSR) (h)	46,70	100,00	20	[illegible]	100,00	[illegible]
8	Pavlovická 198 (ČSSR)	50,20	107,49	16	84,70	97,60	5
9	Slovenská 200 (ČSSR)	44,70	95,72	24	[illegible]	92,01	[illegible]
10	Šalská (ČSSR)	44,30	94,86	25	[illegible]	92,61	[illegible]
11	Belocerkovskaja 198 (SSSR) (i)	47,80	102,35	19	[illegible]	96,88	7
12	Bezostaja 1 (1,5 mil.) (SSSR)	60,20	128,91	1	[illegible]	[illegible]	[illegible]
13	Bezostaja 1 (6 mil.) (SSSR)	59,30	126,98	2 3	[illegible]	76,12	[illegible]
14	Červonaja (SSSR)	51,30	109,85	12	[illegible]	91,38	[illegible]
15	Kuncevskaja 45 (SSSR)	49,90	106,85	17	[illegible]	87,65	24
16	Micurinka (SSSR)	46,50	99,57	21 22	[illegible]	68,71	[illegible]
17	Mironovskaja 264 (SSSR)	57,20	122,48	4	[illegible]	[illegible]	10 11
18	Mironovskaja 808 (SSSR)	59,30	126,98	2 3	[illegible]	93,27	[illegible]
19	Tavričeskaja (SSSR) (j)	51,60	110,45	11	78,70	[illegible]	19
20	Malgožatka Udycka (Poľsko)	56,60	121,20	5	[illegible]	[illegible]	6
21	Fertödi 293 (Maďarsko) (k)	50,30	107,70	15	[illegible]	[illegible]	[illegible]
22	Harrachsweizen (Rakúsko) (l)	53,70	114,99	8	[illegible]	98,65	10 11
23	Stamm 6111 (Rakúsko)	50,70	108,56	13	[illegible]	102,65	2
24	Hadmerslebener Qualitas (Nemecko) (m)	52,80	113,06	9	[illegible]	[illegible]	24
25	Heines VII (Nemecko)	55,60	119,06	6 7	[illegible]	77,96	[illegible]
26	Diana (Švédsko) (n)	41,20	94,65	26	[illegible]	82,00	21
27	Skandia III B (Švédsko)	45,10	96,57	23	[illegible]	93,12	[illegible]
28	Svale (Švédsko)	46,50	99,57	21 22	[illegible]	[illegible]	9
S	Priemerné hodnoty	50,50	87,37 128,91	1 28	[illegible]	66,20 [illegible]	1 28

Key: a - number; b - variety; c - grain; d - $\overline{X}$ in percent; e - rank; f - straw; g - Czechoslovakia; h - control; i - USSR; j - Poland; k - Hungary; l - Austria; m - Germany; n - Sweden; S - average values; 11 - Belotserkovskaya; 12, 13 - Bezostaya; 14 - Chervonaya; 15 - Kuntsevskaya; 16 - Michurinka; 17, 18 - Mironovskaya; 19 - Tavricheskaya.

Technological Analyses of Winter Wheat

(a)	(b)	(d)	(e)	(f)	(g)	(h)
		(c)				
1	Diana (Švédsko) (t)	42	5	[illegible] (26)	v. faž. (30)	[illegible] C2 (33)
2	Skandia [illegible] (Švédsko)	42	8	[illegible]	faž. (32)	slabé C1 (34)
3	Svale (Švédsko)	36	18	nepruž.	faž.	slabé C1
4	Eros (Frio) (Nemecko) (u)	41,5	9	nepruž.	v. faž.	[illegible] C2
5	Irodlersiebener Qualitas (Nemecko)	32	20	(27) str. pruž.	(34) str. faž.	(35) str. B2
6	Hemes VII (Nemecko)	38	15	nepruž.	v. faž.	slabé C1 B2
7	Harrachsweizen (Rakúsko) (v)	42	6	slabé (28)	faž.	slabé B2 (36)
8	Malgorzatka Udycka (Poľsko) (w)	31	19	nepruž.	faž.	slabé C1
9	Fertődi 293 (Maďarsko) (x)	42	7	str. pr. (27)	str. faž.	str. B1
10	Etoille de Choisy (Francia) (y)	45	3	nepruž.	faž.	slabé C1 2
11	Bezostaja 1 (1,5 mil.) — (SSSR) (z)	35	16	pruž. (38)	str. faž.	dobré B (37)
12	Bezostaja (6 mil.) — (SSSR)	38	17	str. pruž.	str. faž.	str. B1 2
13	Červonaja (SSSR)	39	14	nepr. (29)	faž.	slabé B2 (34)
14	Kuncevskaja 45 (SSSR)	40	10	str. pruž.	str. faž.	str. B2
15	Mironovskaja 264 (SSSR)	39	13	str. pruž.	str. faž.	str. B1
16	Mironovskaja 808 (SSSR)	39	12	str. pruž.	str. faž.	str. B1/2
17	Tavričeskaja (SSSR)	43	4	nepruž.	faž.	sl. B2 C1 (34)
18	Stanan 0411 (Rakúsko)	49	1	nepruž.	faž.	slabé C1
19	Fanone (Taliansko) (23)					
20	Mara (Taliansko)					
21	Kaštická ostená (kontrola) (24) (ČSSR) (25)	46	2	nepruž.	v. faž.	[illegible] C2 (33)
22	Košútska (kontrola) (ČSSR)	39	11	str. pruž.	str. faž.	str. B1/2
s	Priemerné hodnoty	40,1	1—20	—	—	—

Key to Table 4: a - number; b - variety; c - gluten, d - moist gluten, percent; e - rank; f - elasticity; g - extensibility; h - gluten grade; i - swelling value; j - extensigraph; k - area under curve, cm^2; l - corrected, cm^2; m - category; n - farinograph; o - absorption, percent; p - drop-off after 10 minutes; q - drop-off after 15 minutes; r - drop-off area, cm^2; s - number; t - Sweden; u - Germany;

(1962-1963 Growing Season)

Table 4

		(j)					(n)			
(i)	(e)	(k)	(l)	(m)	(o)	(p)	(q)	(r)	(s)	(m)
[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	C2
[illegible]	2[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	C1
[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	C[illegible]
[illegible]	[illegible]				[illegible]	160	[illegible]	[illegible]	27,5	C2
[illegible]	5				[illegible]	[illegible]	[illegible]	23,5	32,2	C1
[illegible]	[illegible]				[illegible]	100	270	10,5	[illegible]	C2
[illegible]	1				[illegible]	200	170	15,7	[illegible]	C1 B2
[illegible]	17				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	C1
[illegible]	9				[illegible]	80	105	[illegible]	37,—	B[illegible]
[illegible]	16				165,5	170	220	31,5	28,8	C2
15,—	1				[illegible]	50	105	8,5	62,—	B[illegible]
7,—	6				167,5	80	140	15,5	51,8	B2 1
2,—	11				168	80	120	13,5	51,8	B2
3,—	10				170	80	[illegible]	13,—	52,7	B2
[illegible],—	5				167,5	60	120	10,5	57,7	B2
5,—	7				168,5	100	140	12,5	53,6	B2
0,—	18				168	90	150	17,—	43,5	B2
3,—	8				172	150	190	22,—	37,5	C1
0,—	19				168,5	165	205	20,5	26,5	C2
14,—	2				166	100	150	15,7	47,4	B2
4,7	1—20				167,42	118,5	170,0	20,78	40,27	—

v - Austria; w - Poland; x - Hungary; y - France; z - USSR; S - average values; 11, 12 - Bezostaya; 13 - Chervonaya; 14 - Kuntsevskaya; 15, 16 - Mironovskaya; 17 - Tavricheskaya; 23 - Italy; 24 - control; 25 - Czechoslovakia; 26 - inelastic; 27 - intermediate elasticity; 28 - poor; 29 - small; 30 - very extensible; 31 - intermediately extensible; 32 - extensible; 33 - bad; 34 - poor; 35 - intermediate; 36 - poorish; 37 - good; 38 - elastic.

Technological Analyses of Winter Wheat

(a)	(b)	(d)	(e)	(c) (f)	(g)	(h)
1	[illegible] (t)	28	27	(29)	(35)	(40)
2	[illegible] (SSSR)	28	25	(30)	(36)	(41)
3	[illegible] (SSSR)	40	2	str. pruž.	[illegible]	[illegible]
4	Chamovská 12 (SSSR)	39	3	str. pruž.	str. taž.	str. B2
5	Iva (SSSR)	39	4	str.	str. taž.	str. B2
6	Kostěnická osiřená (SSSR)	34	14	nepr.	v. taž.	zlé C2
7	Ki Sibiřská (SSSR)	32	22	pruž.	m. taž.	slabé C1
8	Pavlovická 128 (SSSR)	35	10	m. pruž.	taž.	slabé C1
9	Slovenská 200 (SSSR)	39	5	str. pruž.	str. taž.	str. B2
10	Sibiřská (SSSR)	42	1	pruž.	str. taž.	dobré A2 B1
11	Tulaikovskaja 108 (SSSR) (u)	38	6	pruž.	str. taž.	dobré B1 A2
12	Ukrajinka 1 (1,5 mil.) (SSSR)	32	26	v. pruž.	str. taž.	dobré A2
13	Bezostaja 1 (6 mil.) (SSSR)	31	25	v. pruž.	kříh.	dobré A2
14	Červonaja (SSSR)	31	15	pruž.	str. taž.	dobré A2
15	Kuncevskaja 45 (SSSR)	36	7	pruž.	str. taž.	dobré A2
16	Mičurinka (SSSR)	33	19	střed.	str. taž.	str. B2
17	Mironovskaja 264 (SSSR)	35	19	pruž.	str. taž.	dobré A2
18	Mironovskaja 808 (SSSR)	35	11	pruž.	str. taž.	dobré A2
19	Tavričeskaja (SSSR)	36	8	pruž.	str. taž.	dobré B1
20	Mulgozatka Udycka (Polsko) (v)	36	9	m. pruž.	taž.	str. B2
21	Fertődi 293 (Maďarsko) (w)	35	12	pruž.	str. taž.	dobré B1 A2
22	Hartmannsweizen (Rakousko) (x)	34	16	m. pruž.	taž.	slabé B2, C1
23	Stamm 0111 (Rakousko)	33	20	v. kříh.	m. taž.	dobré B1
24	Hadmersleibener Qualitas (Německo)	36	26	m. pruž.	taž.	slabé B2
25	Heines VII (Německo)	32	24	nepr.	v. taž.	zlé C2
26	Diana (Švédsko)	34	17	nepr.	v. taž.	zlé C2
27	Skandia III B (Švédsko) (y)	35	13	nepr.	v. taž.	zlé C2
28	Svea (Švédsko)	33	21	nepr.	v. taž.	zlé C2
S	Průměrné hodnoty	34,50	1—28	—	—	—

Key to Table 6: a - number; b - variety; c - gluten; d - moist gluten, percent; e - rank; f - elasticity; g - extensibility; h - gluten grade; i - swelling value; j - extensigraph; k - area under curve, cm^2; l - corrected, cm^2; m - category; n - farinograph; o - absorption, percent; p - drop-off after 10 minutes; q - drop-off after 15 minutes; r - drop-off area, cm^2; s - number; t - Czechoslovakia; u - USSR; v - Poland; w - Hungary; x - Austria; y - Sweden; S - average values;

Table 6

(1963-1964 Growing Season)

			(j)					(n)		
(i)	(e)	(k)	(l)	(m)	(o)	(p)	(q)	(r)	(s)	(m)
[illegible]	[illegible]				58	[illegible]	[illegible]	7,5	[illegible]	B1
[illegible]	17				[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	18				[illegible]	100	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	19				62	[illegible]	[illegible]	17,20	[illegible]	C1
[illegible]	20				62	150	150	[illegible]	[illegible]	C1
[illegible]	21				58	[illegible]	180	28,—	28,7	C2
[illegible]	12				58	80	[illegible]	[illegible]	61,—	B1
[illegible]	22				58	[illegible]	170	23,—	[illegible]	C1
[illegible]	15				[illegible]	120	170	16,—	[illegible]	B2
[illegible]	[illegible]				[illegible]	20	[illegible]	4,5	72,7	A2
[illegible]	3				62	[illegible]	[illegible]	1,5	[illegible]	[illegible]
[illegible]	2				58	0	[illegible]	2,5	[illegible]	A2
[illegible]	4				60	0	[illegible]	2,5	[illegible]	A2
[illegible]	7				62	20	[illegible]	[illegible]	[illegible]	A1
7,—	5				[illegible]	[illegible]	[illegible]	[illegible]	72,7	A2
[illegible]	13				66	50	120	17,5	[illegible]	B2
[illegible]	1				62	10	[illegible]	[illegible]	[illegible]	A2
[illegible]	6				62	0	60	3,25	[illegible]	A2
[illegible]	[illegible]				[illegible]	50	80	7,8	[illegible]	[illegible]
[illegible]	23				62	70	[illegible]	13,5	[illegible]	B2
[illegible]	[illegible]				61	80	120	[illegible]	[illegible]	B2
[illegible]	[illegible]				[illegible]	[illegible]	[illegible]	15,—	[illegible]	B2
8,—	8				[illegible]	[illegible]	85	[illegible]	[illegible]	B1
2,—	16				58	150	150	27,3	[illegible]	C1
6,—	25				[illegible]	210	270	[illegible]	[illegible]	C2
6,—	26				58	240	260	48,1	[illegible]	C2
6,—	27				60	210	260	42,5	[illegible]	C2
6,—	28				60	140	150	[illegible]	[illegible]	C1
8,12	1—28				60,42	100,2	125,5	15,89	50,73	—

11 - Belotserkovskaya; 12, 13 - Bezostaya; 14 - Chervonaya; 15 - Kuntsevskaya; 16 - Michurinka; 17, 18 - Mironovskaya; 19 - Tavricheskaya; 29 - intermediate elasticity; 30 - small elasticity; 31 - inelastic; 32 - elastic; 33 - very elastic; 34 - very briefly; 35 - intermediately extensible; 36 - extensible; 37 - very extensible; 38 - slightly extensible; 39 - briefly; 40 - intermediate; 41 - poor; 42 - bad; 43 - good.

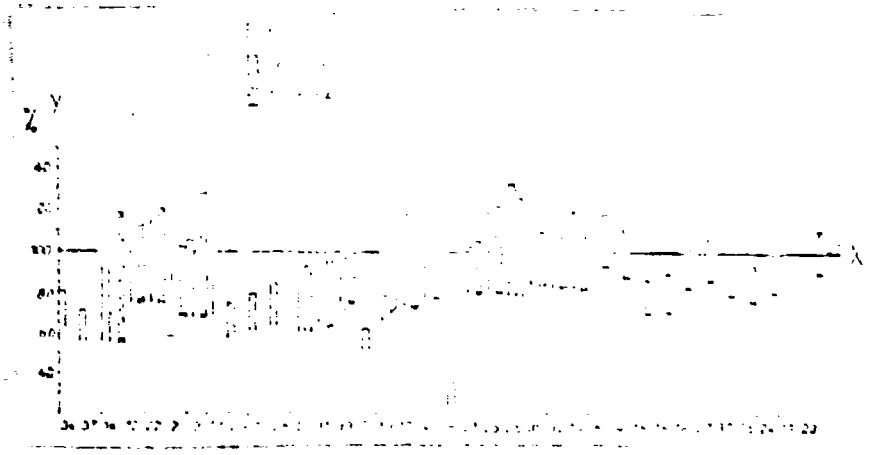

Fig. 1. Grain Yield of Winter Wheat in Piestany.
The y-axis shows the grain yield in percent; 100 percent is the grain yield of the control variety. The x-axis shows the varieties: 1 - Alsace; 2 - Belotserkovskaya; 3 - Bezostaya 1; 4 - Chervonaya; 5 - Diana; 6 - Diana I; 7 - Eros; 8 - Etoile de Choisy; 9 - Fanal; 10 - Fertodi 293; 11 - Funone; 12 - Hadmerslebener Qualitas; 13 - Harrachsweizen; 14 - Heines VII; 15 - Hodoninska ostena; 16 - Chlumecka 12; 17 - ICAR 578 B; 18 - Iva; 19 - Kasticka ostena; 20 - Kosutska; 21 - Kuntsevskaya 45; 22 - Malgozatka Udycka; 23 - Mara; 24 - Michurinka; 25 - Mironovskaya 264; 26 - Mironovskaya 808; 27 - Pavlovicka 196; 28 - Pevele D'espres; 29 - San Pastore fam. 14; 30 - Slovenska 200; 31 - Skandia III B; 32 - Stamm 6111; 33 - Svale; 34 - Svalofs Panzer III; 35 - Sal'ska; 36 - Tavricheskaya; 37 - Weibulls Ergo.

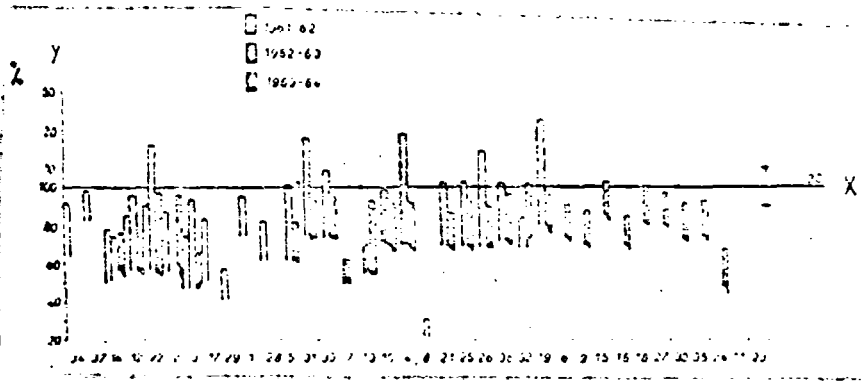

Fig. 2. Straw Yield of Winter Wheat in Piestany.
The y-axis shows the straw yield in percent; 100 percent is the straw yield of the control variety. The x-axis shows the varieties [1--37 as in Fig. 1, above].

Table 7

Experiments with Spring Barley (1962 Growing Season)

Číslo (a)	Odroda (b)	Zrno (c) $\bar{X}$	Zrno (c) $\bar{X}$ v % (d)	Poradie (e)	Slama (f) $\bar{X}$	Slama (f) $\bar{X}$ v % (d)	Poradie (e)
1	Proctor (Anglicko) (g)	64,69	103,09	3	81,15	111,23	1
2	Delta (Holandsko) (h)	65,25	104,13	1	74,62	98,[illegible]	10
3	Gazelle (Holandsko)	64,51	102,95	4	75,80	[illegible]	8
4	Carlsberg II (Dánsko) (i)	62,16	99,20	9	76,10	100,[illegible]	6
5	Hafnia (Dánsko)	62,56	100,15	8	72,15	95,0[illegible]	11
6	Sejet (Dánsko)	63,74	101,72	5	80,18	[illegible]	2
7	Brauns Wisa (Nemecko) (j)	6[illegible]	103,98	7	79,65	101,[illegible]	3
8	Firlbecks Union (Nemecko)	61,36	97,92	10	75,[illegible]	91,[illegible]	9
9	Lisa (Stamm 11705) (Nemecko)	57,20	91,28	12	78,[illegible]	101,0[illegible]	5
10	Violetta II (Rakúsko) (k)	60,25	96,15	11	68,88	89,9[illegible]	12
11	Iljineckij 43 (SSSR)	64,98	103,70	2	79,[illegible]	[illegible]	4
12	Slovenský Dunajský trh (kontrola) (l) (ČSSR) (m)	62,66	100,00	6	76,92	[illegible]	7
S	Priemerné hodnoty	62,61	91,28 – 104,13	1 – 12	76,59	[illegible] – 111,[illegible]	1 – 12

Key: a - number; b - variety; c - grain; d - X̄ in percent; e - rank; f - straw; g - England; h - Holland; i - Denmark; j - Germany; k - Austria; l - control; m - Czechoslovakia; S - average values; 11 - Il'yinetskiy 43 (USSR).

(a)	(b)	(c)	(d)		(e)	(f)		(g)	
								(h)	(i)
1	Proctor Anglosas (A)	71,1	91,5	5,5	1,2	39,--	8		98
2	Hella (Holandsko) (B)	71,5	98,1	0,8	1,1	41,0			100
3	Gazelle (Holandsko)	72,8	95,0	4,1	0,9	39,1	6		95
4	Carlsberg II (Dánsko) (C)	69,7	90,0	9,0	1,0	41,7	10		88
5	Heines (Dánsko)	70,1	85,0	11,0	0,1	38,0	6		92
6	Sejet (Dánsko)	66,8	70,0	16,0	13,1	38,1	8		90
7	Dreams Wisa (Nemecko) (D)	71,7	95,0	3,2	1,8	42,2	6		92
8	Fichtels Ehren (Nemecko)	70,2	86,6	2,8	1,2	41,0	10		86
9	Lost (Semen 15705) (Nemecko)	72,6	91,2	8,0	0,8	40,2			100
10	Violetta II (Rakúsko) (E)	70,5	96,0	2,3	1,7	40,2	6		91
11	Iljinskij 43 (SSSR) (F)	73,0	100,0			40,1	4		94
12	Slovenský Dunajský trio — kontrola (ČSSR)	72,8	96,0	3,0	1,0	40,0	6		90
S	Priemerné hodnoty	71,32	91,04	6,05	2,03	40,27	5,83		91,66

Key to Table 8: a - number; b - variety; c - hectoliter weight; d - sifting, mesh size; e - waste; f - absolute dry weight; g - cut through endosperm; h - mealy; i - half-steely; j - steely; k - mealy in percent; l - moisture content, percent; m - chemical content of dry matter; n - nitrogen; o - proteins; p - starch; q - malt extract; r - yield; s - dry malt; t - dry extract; u - crop; v - dry matter in the grain, per hectare; w - dry extract per hectare; x - dry extract produced per hectare, in percent of the control; y - rank;
A - England; B - Holland; C - Denmark; D - Germany; E - Austria; F - control (Czechoslovakia); S - average values; 11 - Il'yinetskiy 43 (USSR).

Table 8

(1962 Growing Season)

		(i)		(m)			(r)		(u)		(x)	
(j)	(k)		(n)	(o)	(p)	(q)	(s)	(t)	(v)	(w)		(y)
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	3
	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	920	[illegible]	[illegible]	[illegible]	[illegible]	2
	[illegible]	[illegible]	1,68	[illegible]	[illegible]	[illegible]	918	[illegible]	[illegible]	33,2	[illegible]	5
2	[illegible]	11,5	1,71	[illegible]	62,5	[illegible]	910	[illegible]	[illegible]	[illegible]	[illegible]	9
2	52	12,1	1,66	10,1	62,6	[illegible]	912	[illegible]	[illegible]	29,2	[illegible]	10
2	[illegible]	[illegible]	1,77	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	72,02	12
2	52	[illegible]	[illegible]	12,1	[illegible]	79,5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7—8
4	[illegible]	12,7	[illegible]	11,0	65,0	[illegible]	920	[illegible]	[illegible]	[illegible]	[illegible]	6
	[illegible]	12,5	[illegible]	12,1	[illegible]	[illegible]	[illegible]	577	[illegible]	[illegible]	[illegible]	11
	[illegible]	12,7	1,82	11,1	63,7	[illegible]	[illegible]	[illegible]	[illegible]	31,8	[illegible]	7—8
2	[illegible]	12,0	1,68	10,5	61,5	[illegible]	920	[illegible]	36,8	36,3	108,01	1
4	51	12,2	1,72	10,8	66,8	80,1	920	622	36,9	35,6	100,00	4
1,66	52,08	12,18	1,76	11,01	64,15	79,76	916	550	35,86	31,80	72,02- 108,01	1—12

(a)	(b)	(c)	(d)	(d)	(e)	(f)	(g) (h)	(g) (i)
1	[illegible] (Anglicko) (A)	70,7	78,0	[illegible]	[illegible]	[illegible]	6	[illegible]
2	[illegible] (Anglicko) (B)	[illegible]	78,5	[illegible]	5,2	[illegible]	2	98
3	[illegible] (Holandsko)	[illegible]	80,0	7,7	[illegible]	[illegible]		100
4	Carlsberg II (Dánsko) (C)	[illegible]	76,2	[illegible]	8,3	[illegible]		[illegible]
5	[illegible] (Holandsko)	[illegible]	[illegible]	[illegible]	2,4	[illegible]	2	98
6	[illegible] (Dánsko)	67,[illegible]	85,5	[illegible]	[illegible]	[illegible]	4	[illegible]
7	[illegible] (Dánsko)	[illegible]	76,0	[illegible]	7,6	[illegible]		100
8	Menter (Dánsko)	70,8	84,0	[illegible]	4,2	[illegible]		100
9	Dana (Dánsko)	66,8	80,7	[illegible]	3,1	42,6	2	98
10	[illegible] Wisa (Nemecko) (D)	70,8	[illegible]	6,7	[illegible]	37,9	12	88
11	Firlbecks Union (Nemecko)	71,6	93,4	3,9	2,7	[illegible]	5	92
12	Criewener II (Nemecko)	72,0	77,7	12,6	6,7	[illegible]		98
13	Wisa Stamm 11705 (Nemecko)	71,0	88,2	3,5	6,5	[illegible]		[illegible]
14	[illegible] (Nemecko) (E)	70,8	91,[illegible]	9,6	2,0	41,7	2	[illegible]
15	Violetta II (Rakúsko)	70,8	81,0	16,2	3,8	[illegible]		[illegible]
16	Stamm 21-11 6117 (Rakúsko)	66,8	80,2	6,8	4,0	43,2		98
17	Stamm 11-11 6118 (Rakúsko)	70,4	90,9	[illegible]	4,2	44,5		98
18	Iljineckij 13 (SSSR) (F)	71,6	80,5	[illegible]	6,0	[illegible]		100
19	Nosovickij 2 (SSSR)	68,8	80,7	11,7	7,6	41,2		98
20	Stepovoj (SSSR)	66,8	70,7	[illegible]	13,1	40,3		100
21	Umanskij 2021 (SSSR)	71,2	80,0	[illegible]	5,2	40,5		96
22	Donen (Nórsko) (G)	70,0	90,0	3,4	4,6	[illegible]		100
23	[illegible] (Poľsko) (H)	71,2	87,5	8,0	4,5	[illegible]		96
24	Ariel (Francúzsko) (I)	72,0	90,0	3,2	6,8	43,8		100
25	Slov. Dun. tri — kontr. (ČSSR) (J)	71,6	89,0	7,7	1,3	38,8	2	96
S	Priemerné hodnoty	69,60	84,50	10,56	5,29	40,82	4,4	97,12

Key to Table 10: a - number; b - variety; c - hectoliter weight; d - sifting, mesh size; e - waste; f - absolute dry weight; g - cut through endosperm; h - mealy; i - half-steely; j - steely; k - mealy in percent; l - moisture content, percent; m - chemical content of dry matter; n - nitrogen; o - protein; p - starch; q - malt extract; r - yield; s - dry malt; t - dry extract; u - crop; v - dry matter in the grain, per hectare; w - dry extract per hectare; x - dry extract produced per hectare, in percent of the control; y - rank;
A - England; B - Holland; C - Denmark; D - Germany; E - Austria; F - USSR; G - Norway; H - Poland; I - France; J - control (Czechoslovakia); S - average values;
18 - Il'yinetskiy; 19 - Nosovitskiy; 20 - Stepovoy; 21 - Umanskiy.

Table 10

(1983 Growing Season)

(j)	(k)	(l)	(m)	(o)	(p)	(q)	(s)	(t)	(u) (v)	(w)	(x)	(y)
1	30	12.0	1.70	1.10	60.50	77.83	910	521.25	16.26	21.04	31.02-117.31	1—25

Table 9

Experiments with Spring Barley (1963 Growing Season)

Číslo (a)	Odroda (b)	Zrno (c) $\bar{X}$	Zrno (c) $\bar{X}$ v % (d)	Zrno (c) Poradie (e)	Slama (f) $\bar{X}$	Slama (f) $\bar{X}$ v % (d)	Slama (f) Poradie (e)
1	Proctor (Anglicko) (g)	58,72	110,37	5	59,96	[illegible]	9
2	Rayston (Anglicko)	57,76	108,57	7	57,08	[illegible]	[illegible]
3	Delta (Holandsko) (h)	53,28	100,15	15	52,18	83,15	[illegible]
4	Gazelle (Holandsko)	54,27	102,01	12	55,58	88,57	[illegible]
5	Carlsberg II (Dánsko) (i)	51,56	96,91	20	[illegible]	[illegible]	6
6	Hafnia (Dánsko)	55,83	104,91	10	47,83	[illegible]	[illegible]
7	Sejet (Dánsko)	59,38	111,61	4	[illegible]	79,11	[illegible]
8	Mentor (Dánsko)	64,41	121,07	1	61,46	[illegible]	[illegible]
9	Dana (Dánsko)	56,45	106,10	9	[illegible]	[illegible]	[illegible]
10	Bruns Wisa (Nemecko) (j)	52,80	99,21	18	59,16	[illegible]	[illegible]
11	Firlbecks Union (Nemecko)	59,77	112,34	3	58,68	93,51	[illegible]
12	Criewener II (Nemecko)	55,15	103,66	11	64,73	103,16	[illegible]
13	Lisa (Stamm 11705) (Nemecko)	51,52	96,81	21	58,20	[illegible]	[illegible]
14	Plena (Nemecko)	53,96	101,12	13	[illegible]	[illegible]	[illegible]
15	Violetta (Rakúsko) (k)	53,41	100,39	14	54,23	[illegible]	[illegible]
16	Stamm H-II 6117 (Rakúsko)	58,00	109,02	6	[illegible]	95,18	[illegible]
17	Stam H-II 6118 (Rakúsko)	60,57	113,85	2	[illegible]	98,61	7
18	Iljineckij 43 (SSSR) (l)	52,50	98,61	19	50,23	[illegible]	[illegible]
19	Nosovickij 2 (SSSR)	50,19	94,90	22	[illegible]	[illegible]	[illegible]
20	Stepovoj (SSSR)	36,01	67,68	25	[illegible]	[illegible]	16
21	Umanskij 2021 (SSSR)	43,18	81,16	23	[illegible]	[illegible]	10
22	Domen (Nórsko) (m)	43,10	81,08	24	[illegible]	[illegible]	[illegible]
23	Antak (Poľsko) (n)	53,13	99,86	17	[illegible]	[illegible]	11
24	Ariel (Francúzsko) (o)	[illegible]	106,12	8	[illegible]	[illegible]	3
25	Slovenský Dunajský trh (kontrola) (p) (ČSSR)	53,20	100,00	16	[illegible]	100,00	5
S	Priemerné hodnoty	53,10	67,68 – 121,07	1 – 25	[illegible]	[illegible]	1 – 25

Key: a - number; b - variety; c - grain; d - $\bar{X}$ in percent; e - rank; f - straw; g - England; h - Holland; i - Denmark; j - Germany; k - Austria; l - USSR; m - Norway; n - Poland; o - France; p - control (Czechoslovakia); S - average vaules; 18 - Il'yinetskiy; 19 - Nosovitskiy; 20 - Stepovoy; 21 - Umanskiy.

Table 21

Experi[illegible] with Spring Barley ([illegible] Growing Season)

(a) Č. č.	Odroda (b)	Zrno (c) X	Zrno (c) X % (d)	Zrno (c) Poradie (e)	Slama (f) X	Slama (f) X % (d)	Slama (f) Poradie (e)
1	Proctor (Anglicko) (g)	49,?3	95,61	19	[illegible]	[illegible]	[illegible]
2	Rayston (Anglicko)	[illegible]	101,?6	1?	[illegible]	[illegible]	[illegible]
3	Delta (Holandsko)	[illegible]	111,15	4	[illegible]	[illegible]	[illegible]
4	Gazelle (Holandsko) (h)	[illegible]	111,?	6	[illegible]	[illegible]	[illegible]
5	Carlsberg II (Dánsko) (i)	[illegible]	103,?	1?	[illegible]	[illegible]	[illegible]
6	Hafnia (Dánsko)	[illegible]	103,?	1?	[illegible]	[illegible]	1
7	Sejet (Dánsko)	51,10	100,0?	9–10	[illegible]	[illegible]	1
8	Mentor (Dánsko)	57,36	111,10	5	[illegible]	[illegible]	[illegible]
9	Rama (Dánsko)	53,5?	105,9?	13	60,33	[illegible]	[illegible]
10	Bruns Wisa (Nemecko) (j)	[illegible]	105,?	8	[illegible]	[illegible]	[illegible]
11	Friedecks Union (Nemecko)	51,01	101,95	11	[illegible]	[illegible]	1?
12	Criewener II (Nemecko)	51,56	100,15	16	[illegible]	[illegible]	1?
13	Lisa (Stamm 11705) (Nemecko)	53,10	105,05	9–10	[illegible]	[illegible]	[illegible]
14	Plena (Nemecko)	58,00	112,81	3	[illegible]	[illegible]	[illegible]
15	Violetta II (Rakúsko) (k)	51,11	99,26	18	[illegible]	[illegible]	[illegible]
16	Stamm H 11 6117 (Rakúsko)	60,??	116,97	1	60,8?	[illegible]	4–5
17	Stamm H-11 6118 (Rakúsko)	58,6?	113,84	2	59,58	[illegible]	[illegible]
18	Iljineckij 43 (SSSR) (l)	[illegible]	9?,??	21	[illegible]	[illegible]	[illegible]
19	Nosovskij 2 (SSSR)	[illegible]	9?,?8	2?	[illegible]	[illegible]	1?
20	Stepovoj (SSSR)	36,5?	69,5?	2?	[illegible]	[illegible]	1?
21	Umanskij 2?? (SSSR)	[illegible]	91,1?	2?	[illegible]	[illegible]	19
22	Domen (Nórsko) (m)	3?,?0	7?,??	24	[illegible]	[illegible]	1
23	Antek (Poľsko) (n)	49,17	9?,??	20	[illegible]	[illegible]	11
24	Ariel (Francúzsko) (o)	5?,?8	108,5?	7	[illegible]	111,??	2
25	Slovenský Dunajský trh (kontrola) (p) (ČSSR)	51,39	100,00	17	51,8?	100,00	11
S	Priemerné hodnoty	52,30	69,51 – 116,97	1 – 25	51,0?	[illegible]	1 – 25

Key: a - number; b - variety; c - grain; d - $\overline{X}$ in percent; e - rank; f - straw; g - England; h - Holland; i - Denmark; j - Germany; k - Austria; l - USSR; m - Norway; n - Poland; o - France; p - control (Czechoslovakia); S - average values; 18 - Il'yinetskiy; 19 - Nosovitskiy; 20 - Stepovoy; 21 - Umanskiy.

(a)	(b)	(c)	(d)		(e)	(f)	(g) (h)	(i)
			[illegible]	[illegible]				
1	Proctor (Anglicko) (A)	65,2	58,0	[illegible]	17,[illegible]	[illegible]		96
2	Rex[illegible] (Anglicko)	6[illegible],6	57,1	2[illegible],5	18,1	42,0		9[illegible]
3	Delta (Holandsko) (B)	65,[illegible]	72,0	1[illegible],5	8,5	40,7		[illegible]
4	[illegible] (Holandsko)	67,2	60,5	2[illegible],5	[illegible],2	40,2		9[illegible]
5	Carlsberg II (Dánsko) (C)	6[illegible],0	57,7	2[illegible],0	17,7	3[illegible],0	2	9[illegible]
6	[illegible] (Dánsko)	6[illegible],8	52,0	32,2	[illegible],8	40,2		98
7	[illegible] (Dánsko)	58,2	38,8	[illegible],6	2[illegible],6	2[illegible],0		[illegible]
8	Mentor (Dánsko)	67,0	60,0	27,7	12,[illegible]	33,[illegible]		1[illegible]
9	Dana (Dánsko)	6[illegible],0	[illegible],0	2[illegible],5	12,7	[illegible]		1[illegible]
10	[illegible] (Nemecko) (D)	6[illegible],8	66,8	[illegible],8	1[illegible]	2[illegible],3		98
11	[illegible] Union (Nemecko)	66,2	71,5	1[illegible],2	10,[illegible]	3[illegible],3		9[illegible]
12	[illegible] (Nemecko)	65,8	55,2	20,0	15,8	[illegible],5	2	9[illegible]
13	[illegible] (Stamm 1705) (Nem.)	68,0	65,2	20,0	[illegible],8	3[illegible],5		9[illegible]
14	[illegible] (Nemecko)	68,0	76,2	1[illegible],8	[illegible],0	[illegible],8		10[illegible]
15	Violetta II (Rakúsko) (E)	66,2	57,2	22,0	10,8	31,1	2	98
16	Stamm H-1 617 (Rakúsko)	6[illegible],0	75,2	1[illegible],2	1[illegible],6	[illegible],3		10[illegible]
17	Stamm H-11 618 (Rakúsko)	65,8	75,6	1[illegible],2	[illegible],2	1[illegible],0		92
18	[illegible] 15 (SSSR) (F)	66,6	5[illegible],0	2[illegible],5	1[illegible],5	[illegible]		10[illegible]
19	Nosovickij 2 (SSSR)	6[illegible],6	55,0	[illegible],2	18,8	[illegible]		9[illegible]
20	Stepovoj (SSSR)	67,8	60,2	2[illegible],8	[illegible],0	[illegible],5	2	9[illegible]
21	[illegible] 2021 (SSSR)	63,6	40,0	37,5	22,5	[illegible],4		9[illegible]
22	Domen (Nórsko) (G)	68,0	79,0	12,2	8,8	[illegible],7	2	92
23	[illegible] (Poľsko) (H)	6[illegible],0	56,3	[illegible],2	7,5	38,7		10[illegible]
24	Ariel (Francúzsko) (I)	6[illegible],8	6[illegible],5	22,2	8,3	[illegible]		1[illegible]
25	Slov. Dun. [illegible] — kontr. (ČSSR) (J)	67,8	5[illegible],5	28,0	17,5	35,6		92
S	Priemerné hodnoty	65,52	61,[illegible]7	21,32	13,80	3[illegible],08	2	[illegible]

Key to Table 12: a - number; b - variety; c - hectoliter weight; d - sifting, mesh size; e - waste; f - absolute dry weight; g - cut through endosperm; h - mealy; i - half-steely; j - steely; k - mealy in percent; l - moisture content, percent; m - chemical content of dry matter; n - nitrogen; o - protein; p - starch; q - malt extract; r - yield; s - dry malt; t - dry extract; u - crop; v - dry matter in the grain, per hectare; w - dry extract per hectare; x - dry extract produced per hectare, in percent of the control; y - rank;

A - England; B - Holland; C - Denmark; D - Germany; E - Austria; F - USSR; G - Norway; H - Poland; I - France; J - control (Czechoslovakia); S - average values;

18 - Il'yinetskiy; 19 - Nosovitskiy; 20 - Stepovoy; 21 - Umanskiy.

Table 12

(1964 Growing Season)

		(l)		(m)			(r)		(u)		(x)	(y)
(j)	(k)		(n)	(o)	(p)	(q)	(s)	(t)	(v)	(w)		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	71,5	[illegible]	[illegible]	58,6	[illegible]	117,4	6
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	18,6	25,3	[illegible]	22
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74,9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	25
[illegible]	[illegible]	[illegible]	2,20	[illegible]	57,5	71,2	[illegible]	[illegible]	[illegible]	21,4	[illegible]	[illegible]
[illegible]	[illegible]	12,9	2,31	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	83,5	23
[illegible]	[illegible]	12,5	1,76	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	12,2	2,28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5
[illegible]	46	11,7	2,22	[illegible]	[illegible]	[illegible]	910	[illegible]	[illegible]	26,3	100,6	16
6,3	48,84	12,35	2,20	1?,51	53,70	73,60	910	518,2	52,25	27,22	65.9-120.2	1—25

Table 13

Evaluation of Malt Extract in Dry Matter Content of Spring Barley

Por. číslo (a)	Názov odrody (b)	1962 extrakt sladu (c)	1962 %	1962 poradie (d)	1963 extrakt sladu (c)	1963 %	1963 poradie (d)	1964 extrakt sladu (c)	1964 %	1964 poradie (d)
1	Antalek (Poľsko) (e)				77,2	96,50	16	[illegible]	[illegible]	[illegible]
2	Ariel (Francúzsko) (f)				78,4	98,00	9–10	[illegible]	[illegible]	[illegible]
3	Breuns Wisa (Nemecko) (g)	79,5	98,88	8	79,2	[illegible]	3	[illegible]	[illegible]	[illegible]
4	Carlsberg II (Dánsko) (h)	79,7	99,12	6	76,9	96,12	20–21	[illegible]	[illegible]	[illegible]
5	Criewener II (Nemecko)				78,0	97,50	12	[illegible]	[illegible]	11
6	Dana (Dánsko)				78,8	[illegible]	5–6	[illegible]	[illegible]	1
7	Delta (Holandsko) (i)	78,7	97,88	11–12	76,2	[illegible]	24	[illegible]	[illegible]	[illegible]
8	Domen (Nórsko) (j)				78,1	[illegible]	9–10	[illegible]	[illegible]	[illegible]
9	Fialbecks Union (Nemecko)	81,1	100,87	1	79,1	[illegible]	2	[illegible]	[illegible]	[illegible]
10	Gazelle (Holandsko)	79,6	99,01	5	78,8	[illegible]	5–6	[illegible]	[illegible]	[illegible]
11	Hafnia (Dánsko)	79,4	98,75	9	77,8	[illegible]	14–15	[illegible]	[illegible]	[illegible]
12	Iljineckij 43 (SSSR) (k)	80,4	100,00	3–4	78,6	[illegible]	7–8	[illegible]	[illegible]	[illegible]
13	Lisa (Stamm 14705) (Nemecko)	78,9	98,13	10	77,9	97,36	13	[illegible]	[illegible]	[illegible]
14	Mentor (Dánsko)				78,9	[illegible]	4	[illegible]	[illegible]	[illegible]
15	Nosovickij 2 (SSSR)				77,0	[illegible]	18–19	[illegible]	[illegible]	[illegible]
16	Plena (Nemecko)				77,8	[illegible]	14–15	[illegible]	[illegible]	[illegible]
17	Proctor (Anglicko) (l)	80,9	100,62	2	78,3	97,87	11	[illegible]	[illegible]	3
18	Royston (Anglicko)				76,8	96,00	22	[illegible]	[illegible]	[illegible]
19	Sejet (Dánsko)	78,7	97,88	11–12	78,6	[illegible]	7–8	[illegible]	[illegible]	[illegible]
20	Slovenský ... (kontrola) (ČSSR) (m)	80,4	100,00	3–4	80,0	100,00	1	[illegible]	[illegible]	[illegible]
21	Stamm ... 6117 (Rakúsko) (n)				75,2	94,00	25	[illegible]	[illegible]	[illegible]
22	Stamm H-11 6118 (Rakúsko)				76,9	96,12	20–21	[illegible]	[illegible]	[illegible]
23	Stepovoj (SSSR)				76,6	95,75	23	[illegible]	[illegible]	[illegible]
24	Umanskij 20?1 (SSSR)				77,0	96,25	18–19	[illegible]	[illegible]	[illegible]
25	Violetta II (Rakúsko)	79,9	99,37	5	77,1	96,37	17	[illegible]	[illegible]	[illegible]
25	Priemerné hodnoty (o)	79,56	97,88–100,87	1–12	77,83	94,00–100,00	1–25	[illegible]	[illegible]	1–[illegible]

Key: a - number; b - variety; c - malt extract; d - rank; e - Poland; f - France; g - Germany; h - Denmark; i - Holland; j - Norway; k - USSR; l - England; m - control (Czechoslovakia); n - Austria; o - average values; 12 - Il'yinetskiy; 15 - Nosovitskiy; 23-- Stepovoy; 24 - Umanskiy.

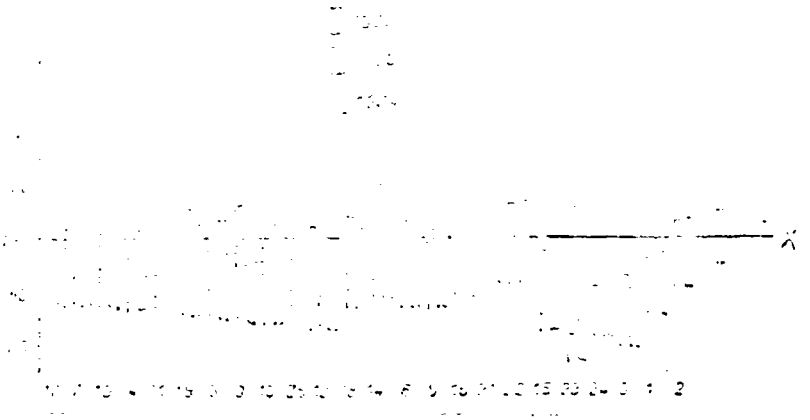

Fig. 3. Grain Yield of Spring Barley in Piestany.
The y-axis shows the grain yield in percent; 100 percent is the grain yield of the control variety. The x-axis shows the varieties: 1 - Antalek; 2 - Ariel; 3 - Brouns Wisa; 4 - Carlsberg II; 5 - Criewener II; 6 - Dana; 7 - Delta; 8 - Doran; 9 - Firlbecks Union; 10 - Gazelle; 11 - Haisa; 12 - Il'yinetskiy; 13 - Lisa; 14 - Mentor; 15 - Nosovitskiy 2; 16 - Plena; 17 - Proctor; 18 - Rayston; 19 - Sejet; 20 - Slovensky Dunajsky trh; 21 - Stamm K-II 6117; 22 - Stamm K-II 6118; 23 - Stepovoy; 24 - Umanskiy; 25 - Violetta II.

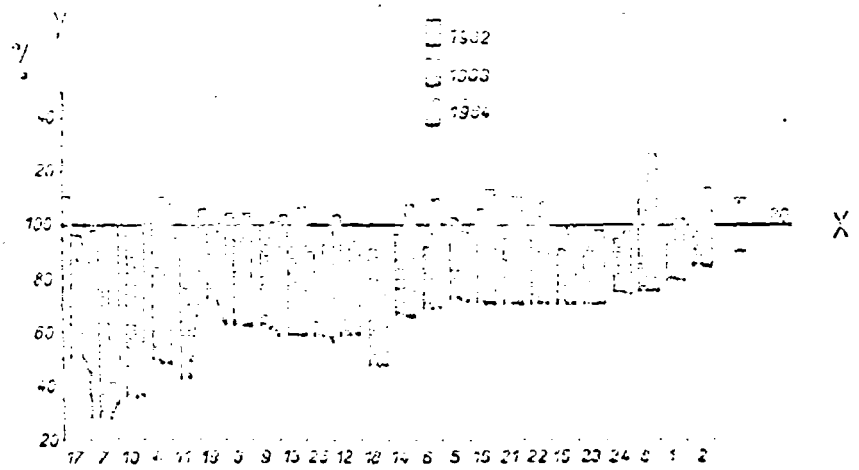

Fig. 4. Straw Yield of Spring Barley in Piestany.
The y-axis shows the straw yield in percent; 100 percent is the straw yield of the control variety. The x-axis shows the varieties [1--25 as in Fig. 3, above].

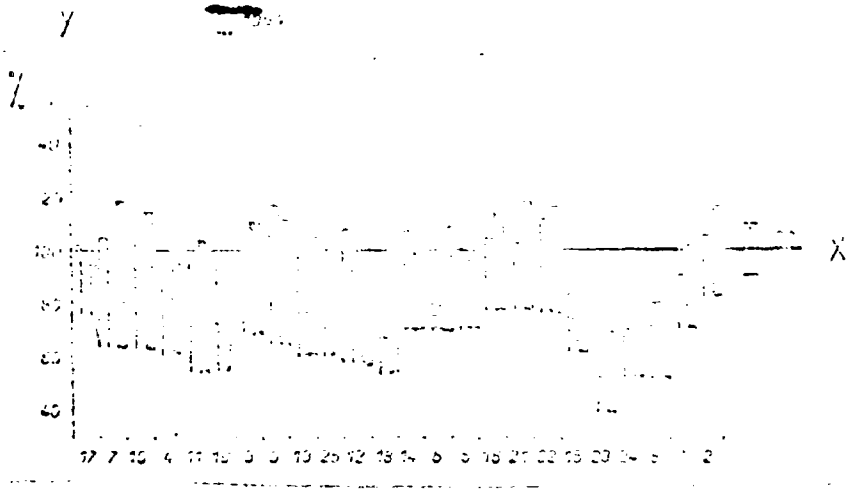

Fig. 5. Malt Yield of Spring Barley in Piestany.
The y-axis shows the malt yield in percent; 100 percent is the malt yield of the control variety. The x-axis shows the varieties: 1 - Antalek; 2 - Ariel; 3 - Breuns Wisa; 4 - Carlsberg II; 5 - Criewener II; 6 - Dana; 7 - Delta; 8 - Domen; 9 - Firlbecks Union; 10 - Gazelle; 11 - Hafnia; 12 - Il'yinetskiy 43; 13 - Lisa; 14 - Mentor; 15 - Nosovitskiy 2; 16 - Plena; 17 - Proctor; 18 - Rayston; 19 - Sejet; 20 - Slovensky Dunajsky trh; 21 - Stamm H-II 6117; 22 - Stamm H-II 6118; 23 - Stepovoy; 24 - Umanskiy 2021; 25 - Violetta II.

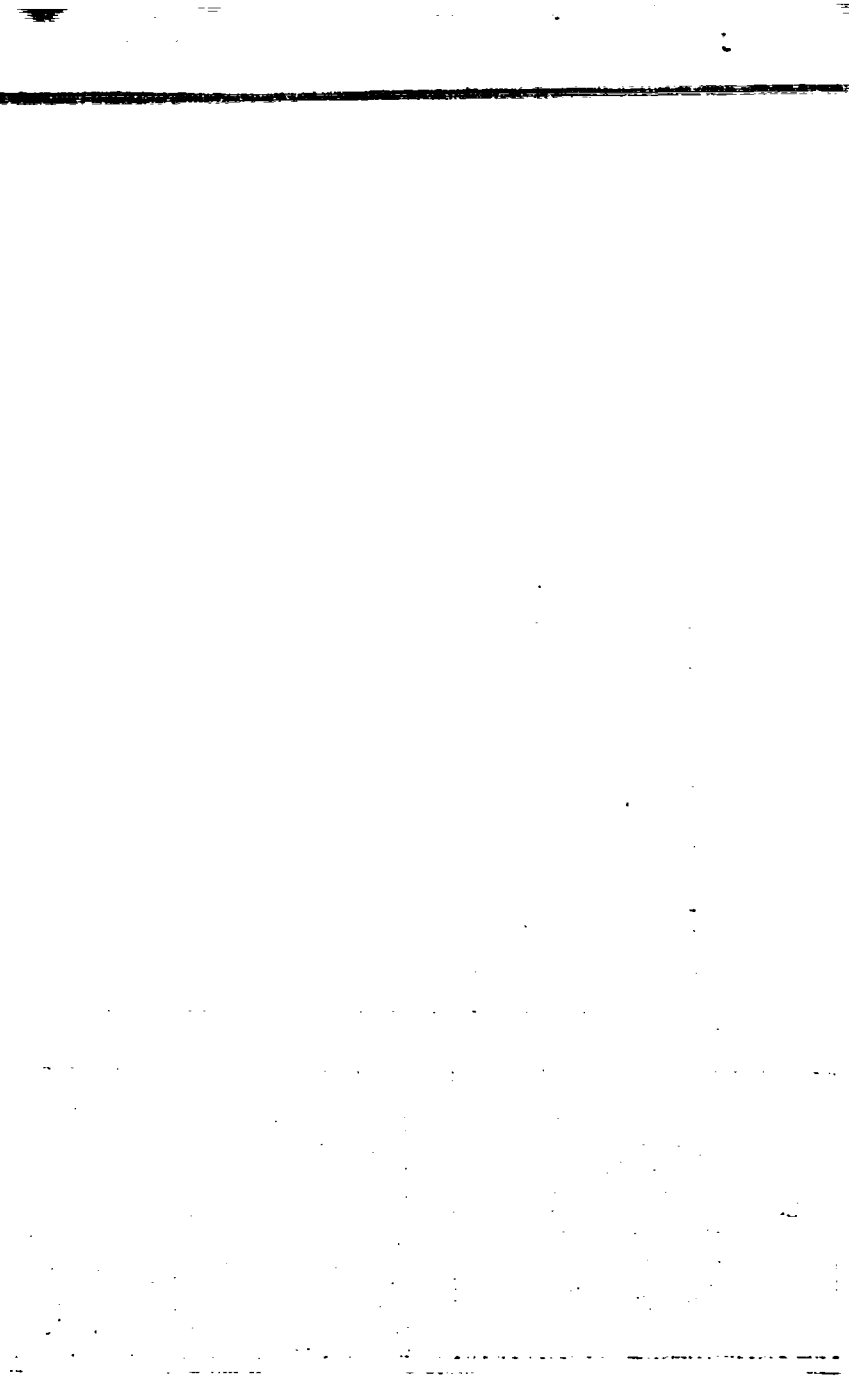

Fig. 6. Winter wheat, Bezostaya 1 variety (USSR).

Fig. 7. Winter wheat, Mironovskaya 808 variety (USSR).

Fig. 3. Winter wheat, Fertodi 293 variety (Hungary).

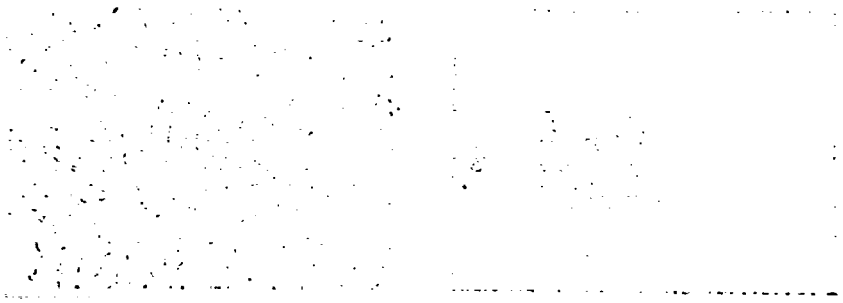

Fig. 9. Spring barley, Mentor variety (Denmark).

Fig. 10. Spring barley, Plena variety (East Germany).

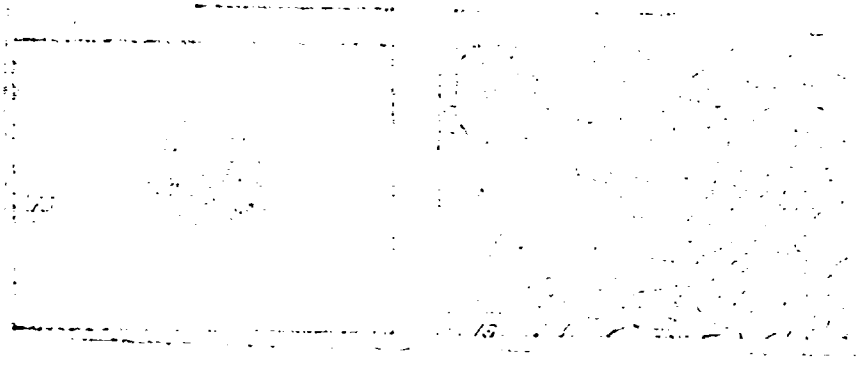

Fig. 11. Spring barley, Stamm H-II 6117 variety (Austria).

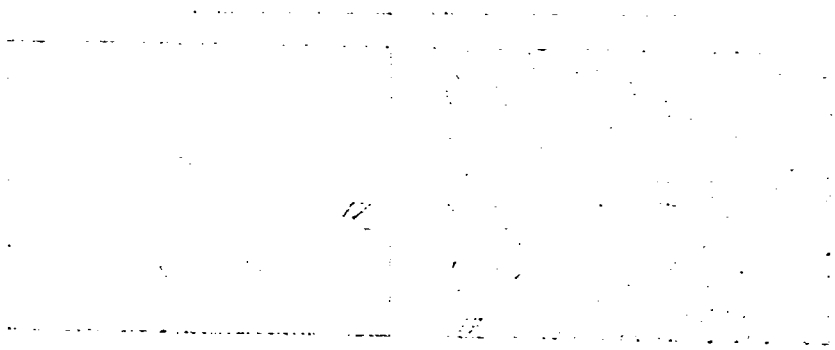

Fig. 12. Spring barley, Stamm H-II 6118 variety (Austria)

Fig. 13. General view of plots in spring of 1962.

Fig. 14. General view of same plots in full growth.

Fig. 15. General view of plots in spring of 1963.

Fig. 16. General view of same plots in full growth in 1963.

The diagram in Fig. 1 shows the attained grain yields. The control variety equals 100.00 percent and coincides with the x-axis. Fig. 2 illustrates the achieved straw yields.

For spring barley the weather in the 1962 growing season was basically favorable. Table 7 presents the results of the yield tests. From an analysis of the variances we obtained the following results. Grain: varietal difference P = 0.05 = 2.9 q (= 4.62 percent); varietal difference P = 0.01 = 3.9 q (= 6.22 percent). Straw: varietal difference P = 0.05 = = 9.68 q (= 12.75 percent); varietal difference P = 0.01 = 13.15 q (= 17.32 percent). From this it is evident that in the tests the grain yields are not significant as compared with the control. In the straw yields there were likewise no significant differences. Table 8 presents the results of the technological and malting analyses of the investigated varieties. The Il'yinetskiy 43, Delta, and Proctor varieties had higher malt yields per hectare.

In the 1963 growing season the weather was initially unfavorable for the development of spring barley. The dry and late spring, and also the seeding caused the uneven emergence and development of the plants, which significantly improved later in the season. Table 9 presents the yield tests for this season. From an analysis of the variances we obtained the following values. Grain: varietal difference P = 0.05 = 2.53 q (= 4.75 percent); varietal difference P = 0.01 = 3.36 q (= 6.32 percent). Straw: varietal difference P = 0.05 = 3.96 q (= 6.60 percent); varietal difference P = 0.01 = 5.26 q (= 8.74 percent). From the presented data it is evident that the varieties ranking from 1 to 10 are significantly better than the control in terms of the grain yield, and that the varieties ranking first and second are significantly better in terms of the straw yield. In Table 10 we present the results of the technological and malting analyses of the performed tests. The Firlbecks Union, Stamm H-II 6118, Mentor, Ariel, Plena, Gazella, and Stamm H-II 6117 varieties had higher malt yields per hectare than the control variety.

The weather was favorable for spring barley in the 1964 growing season. Table 11 presents the results of the yield tests. From an analysis of the variances we obtained the following values. Grain: varietal difference P = 0.05 = 3.78 q (= 7.34 percent); varietal difference P = 0.01 = = 5.00 q (= 9.71 percent). Straw: varietal difference P = 0.05 = 5.36 q (= 9.78 percent); varietal difference P = 0.01 = 7.10 q (= 12.95 percent. The varieties ranking from first to seventh have significantly higher grain yields than the control, and the varieties ranking from first to sixth have significantly higher straw yields. Table 12 presents the technological and malting analyses of the performed tests. In this case many varieties (up to 15) gave higher malt yields per hectare.

The diagram in Fig. 3 sums up the grain yields during the entire test. Fig. 4 sums up the straw yields; and Fig. 5, the malt yields per hectare. The control variety equals 100.00 percent and corresponds to the x-axis.

One of the most important values and standards for introducing the cultivation of brewer's barley varieties (or for recommending them for special breeding) is the value of the dry malt extract. As evident from Table 13 and the results of the evaluation, the Slovensky Dunajsky trh (SDT) variety, which is zoned for the corn region, maintains its high international level in comparison with the other tested varieties. In 1962 it ranked third and fourth, surpassed only by Germany's Firlbecks Union (100.87 percent) and England's Proctor (100.62 percent) varieties. However, the differences are so slight that practically it is impossible to speak of a lead. In 1963 the SDT variety ranked first. In 1964 it was second, after Denmark's Dana (100.31 percent). Here again we cannot speak of a lead in practical evaluation. On the basis of the dry malt extract values in the spring barley tests conducted in Piestany, we have come to the conclusion that on this basis the tested and evaluated foreign varieties of spring barley are not better in the corn region than the zoned SDT variety.

Discussion

We will evaluate briefly the obtained results. In terms of the grain yield of winter wheat, the best results were achieved by the Mironovskaya 808, Mironovskaya 264, and Chervonaya varieties. A drawback of the last two varieties is their tendency to lodge. The results of Bezostaya 1 fluctuate from year to year. Very favorable results were obtained with the Malgczatka Udycka and Fertodi 293 varieties. The Stamm 6111 and Kasticka ostena varieties gave higher yields than the control. The southern varieties, particularly from Italy, proved unsuitable. In terms of the straw yield, all the varieties were less productive than the control. This is due especially to the fact that all the investigated varieties are basically short-stemmed varieties.

In terms of grain yield, many spring barley varieties exceeded the control. Particularly noteworthy among them is the Mentor variety which basically proved to be the best. Also in this group are the Stamm H-II 6118 and Stamm H-II 6117 varieties, which ranked second, with likewise very favorable results. In terms of straw yield, the investigated varieties did not surpass the control. The only exception was the Domen variety, but its grain yield did not attain the level of the best world varieties. Noteworthy is the Plena variety. Interesting is the evaluation of the malt yield per hectare. In this respect the Stamm H-II 6118, Firlbecks Union, Ariel, Plena, Mentor, and Gazelle varieties deserve mention.

In general the Czechoslovak zoned varieties are good. But it must be admitted that many foreign varieties of winter wheat and spring barley attained the level of our domestic varieties and even surpassed them in certain properties, particularly in terms of yield and technological

characteristics. These varieties should be included in a special breeding program, or their direct use in breeding should be considered.

Summary

Selected varieties of certain grains were evaluated in the 1961-1964 growing seasons, from the viewpoint of their use in the corn region. The world assortment of grains served as the basis for the tests. The actual tests covered 285 grain varieties, including 166 varieties of winter wheat, 96 varieties of spring barley, and 23 varieties of spring wheat. Some interesting results are presented for winter wheat and spring barley. On the basis of the tests we have reached the following conclusions.

1. We recommend the following varieties of winter wheat for inclusion in a special breeding program, or for cultivation: Mironovskaya 808 (USSR) for its grain and straw yields, and for its intrinsic value; Bezostaya 1 (USSR) for its grain yield, technological properties and suitability for mechanized harvesting; and Fertodi 293 (Hungary) for the quantity and quality of its yields.

2. Because of their yields, technological qualities and resistance to lodging, we recommend the following varieties of spring barley for inclusion in a special breeding program or for cultivation: Mentor (Denmark), Stamm H-II 6117 and Stamm H-II 6118 (Austria), and Plena (East Germany).

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