

AD-A257 067



US Army Corps  
of Engineers



ENVIRONMENTAL IMPACT  
RESEARCH PROGRAM

TECHNICAL REPORT EL-86-48

PASTURE DRILLS

Section 8.4.2, US ARMY CORPS OF ENGINEERS  
WILDLIFE RESOURCES MANAGEMENT MANUAL

by

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July 1986

Final Report

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Prepared for DEPARTMENT OF THE ARMY  
US Army Corps of Engineers  
Washington, DC 20314-1000  
Under EIRP Work Unit 31631

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| REPORT DOCUMENTATION PAGE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |                                         |                                                                                  | Form Approved<br>OMB No 0704 0188<br>Exp Date Jun 30, 1986 |                                         |
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| 1a REPORT SECURITY CLASSIFICATION<br><b>Unclassified</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |       |                                         | 1b RESTRICTIVE MARKINGS                                                          |                                                            |                                         |
| 2a SECURITY CLASSIFICATION AUTHORITY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |       |                                         | 3 DISTRIBUTION / AVAILABILITY OF REPORT                                          |                                                            |                                         |
| 2b DECLASSIFICATION / DOWNGRADING SCHEDULE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       |                                         | Approved for public release;<br>distribution unlimited.                          |                                                            |                                         |
| 4 PERFORMING ORGANIZATION REPORT NUMBER(S)<br><br>Technical Report EL-86-48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                         | 5 MONITORING ORGANIZATION REPORT NUMBER(S)                                       |                                                            |                                         |
| 6a NAME OF PERFORMING ORGANIZATION<br>USAEWES<br>Environmental Laboratory                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       | 6b OFFICE SYMBOL<br>(if applicable)     | 7a NAME OF MONITORING ORGANIZATION                                               |                                                            |                                         |
| 6c ADDRESS (City, State, and ZIP Code)<br><br>PO Box 631<br>Vicksburg MS 39180-0631                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                         | 7b ADDRESS (City, State, and ZIP Code)                                           |                                                            |                                         |
| 8a NAME OF FUNDING / SPONSORING ORGANIZATION<br>US Army Corps of Engineers                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |       | 8b OFFICE SYMBOL<br>(if applicable)     | 9 PROCUREMENT INSTRUMENT IDENTIFICATION NUMBER                                   |                                                            |                                         |
| 8c ADDRESS (City, State, and ZIP Code)<br><br>Washington, DC 20314-1000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |       |                                         | 10 SOURCE OF FUNDING NUMBERS                                                     |                                                            |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         | PROGRAM<br>ELEMENT NO.                                                           | PROJECT<br>NO                                              | TASK<br>NO                              |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         |                                                                                  |                                                            | WORK UNIT<br>ACCESSION NO<br>EIRP 31631 |
| 11 TITLE (Include Security Classification)<br>Pasture Drills: Section 8.4.2, US Army Corps of Engineers Wildlife Resources<br>Management Manual                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         |                                                                                  |                                                            |                                         |
| 12 PERSONAL AUTHOR(S)<br>Doerr, Ted B.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |       |                                         |                                                                                  |                                                            |                                         |
| 13a TYPE OF REPORT<br>Final report                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       | 13b TIME COVERED<br>FROM _____ TO _____ |                                                                                  | 14 DATE OF REPORT (Year, Month, Day)<br>July 1986          |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         |                                                                                  | 15 PAGE COUNT<br>13                                        |                                         |
| 16 SUPPLEMENTARY NOTATION<br>Available from National Technical Information Service, 5285 Port Royal Road, Springfield,<br>VA 22161.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |       |                                         |                                                                                  |                                                            |                                         |
| 17 COSATI CODES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         | 18 SUBJECT TERMS (Continue on reverse if necessary and identify by block number) |                                                            |                                         |
| FIELD                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | GROUP | SUB-GROUP                               |                                                                                  |                                                            |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         | Pasture drills Seeders Site restoration                                          |                                                            |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         | Grain drills Equipment Planting methods                                          |                                                            |                                         |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |       |                                         | Drill seeders Reclamation Grass-legume mixtures                                  |                                                            |                                         |
| 19 ABSTRACT (Continue on reverse if necessary and identify by block number)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |       |                                         |                                                                                  |                                                            |                                         |
| <p>An equipment report on pasture drills is provided as Section 8.4.2 of the US Army Corps of Engineers Wildlife Resources Management Manual. The report is designed to assist the Corps District or project biologist with the selection and use of types of equipment and materials available for habitat development and manipulation. Topics covered include description, operation and maintenance, limitations, and availability.</p> <p>Pasture drills are heavy-duty grain drills that combine certain qualities of grain drills and the rangeland drill. They are used widely throughout the United States for seeding reclamation projects, livestock forage pastures, and wildlife food plots. Management objectives for using pasture drills are stated, and applications to development of wildlife habitat are discussed. The design and assembly of equipment are described and illustrated, and general specifications are provided. Methods of operation are described, and maintenance and safety requirements are given. Appropriate cautions and limitations are discussed.</p> |       |                                         |                                                                                  |                                                            |                                         |
| 20 DISTRIBUTION / AVAILABILITY OF ABSTRACT<br><input checked="" type="checkbox"/> UNCLASSIFIED/UNLIMITED <input type="checkbox"/> SAME AS RPT <input type="checkbox"/> DTIC USERS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |       |                                         | 21 ABSTRACT SECURITY CLASSIFICATION<br><b>Unclassified</b>                       |                                                            |                                         |
| 22a NAME OF RESPONSIBLE INDIVIDUAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |       |                                         | 22b TELEPHONE (Include Area Code)                                                |                                                            | 22c OFFICE SYMBOL                       |

## PREFACE

This work was sponsored by the Office, Chief of Engineers (OCE), US Army, as part of the Environmental Impact Research Program (EIRP), Work Unit 31631, entitled Management of Corps Lands for Wildlife Resource Improvement. The Technical Monitors for the study were Dr. John Bushman and Mr. Earl Eiker, OCE, and Mr. Dave Mathis, Water Resources Support Center.

This report was prepared by Mr. Ted B. Doerr, Range Science Department, Colorado State University, Fort Collins, Colo. Mr. Doerr was employed by the Environmental Laboratory (EL), US Army Engineer Waterways Experiment Station (WES), under an Intergovernmental Personnel Act contract with Colorado State University during the period this report was prepared. Mr. Chester O. Martin, Team Leader, Wildlife Resources Team, Wetlands and Terrestrial Habitat Group (WTHG), EL, was principal investigator for the work unit. The author wishes to thank the following persons for providing information and photographs used in this report: Mr. A. L. Higgons, Horizon Seeds, Inc., Lincoln, Nebr.; Mr. A. J. Truax, Truax Company, Minneapolis, Minn.; and Mr. A. O. Smith, The Tye Company, Lockney, Tex. Review and comments were provided by Mr. Martin, WES, and Mr. Larry E. Marcy, Texas A&M University.

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This report should be cited as follows:

Doerr, Ted B. 1986. "Pasture Drills: Section 8.4.2, US Army Corps of Engineers Wildlife Resources Management Manual," Technical Report EL-86-48, US Army Engineer Waterways Experiment Station, Vicksburg, Miss.

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#### NOTE TO READER

This report is designated as Section 8.4.2 in Chapter 8 -- EQUIPMENT, Part 8.4 -- DRILL AND BROADCAST SEEDERS, of the US ARMY CORPS OF ENGINEERS WILDLIFE RESOURCES MANAGEMENT MANUAL. Each section of the manual is published as a separate Technical Report but is designed for use as a unit of the manual. For best retrieval, this report should be filed according to section number within Chapter 8.

## PASTURE DRILLS

### Section 8.4.2, US ARMY CORPS OF ENGINEERS WILDLIFE RESOURCES MANAGEMENT MANUAL

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|                       |   |                            |    |
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Pasture drills are heavy-duty grain drills that combine certain qualities of grain drills and the rangeland drill and were originally designed for seeding simple mixtures to improve pastureland. They are of greatest use in areas with less site preparation than required by grain drills but are not as durable as the rangeland drill on extremely rough sites (Larson 1980). However, several companies are developing modifications to the pasture drill to improve seeding capabilities on range sites (The Tye Company 1982; Jim Truax, Truax Company, pers. commun., 1983). Pasture drills are used widely throughout the United States for seeding reclamation projects, livestock forage pastures, and wildlife food plots.

#### DESCRIPTION

Pasture drills feature multiple seedboxes on a heavy-duty frame from 7 to 16 ft wide (Figs. 1 and 2a). Chisel type or double-disk furrow openers can be used on pasture drills, but double-disk openers are more common and articulate individually to reduce breakage when going over small obstacles. Packer wheels are used to cover the furrows more often than chain drags, which are used on the rangeland drill. Oversized seed tubes are located between the double disks to ensure excellent seed placement and allow easier passage of "fluffy" warm-season grass seeds (Fig. 2b). Row spacing varies between 6 and 10 in. (see Table 1 for variations in brands of drills). The number of rows can vary from 8 in small drills to 20 rows in larger drills. Pasture drills usually have a grass seedbox and legume seedbox; however, some brands have extra boxes for special seed types or for applying fertilizer and seed in one

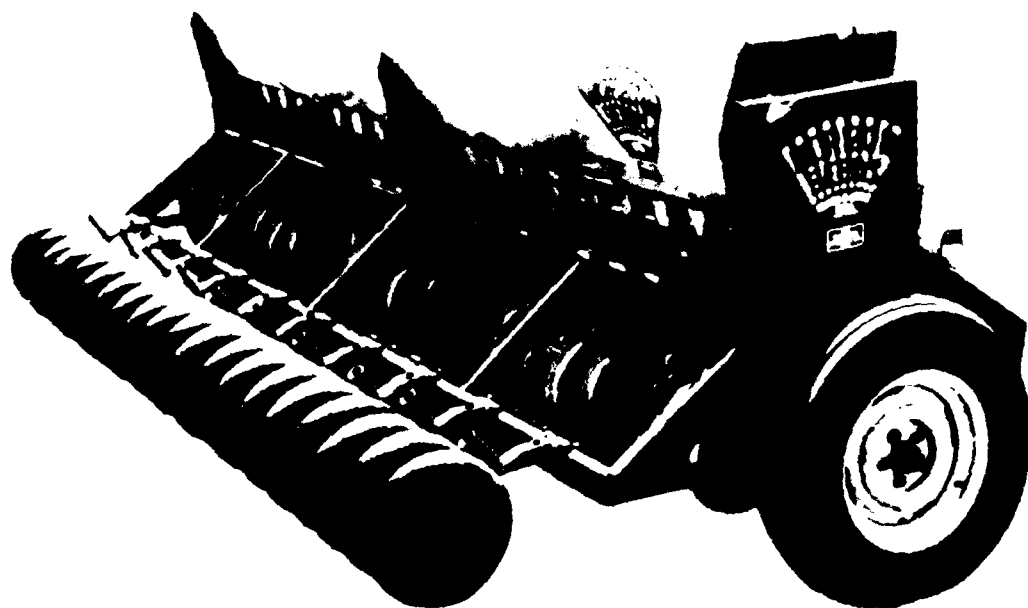
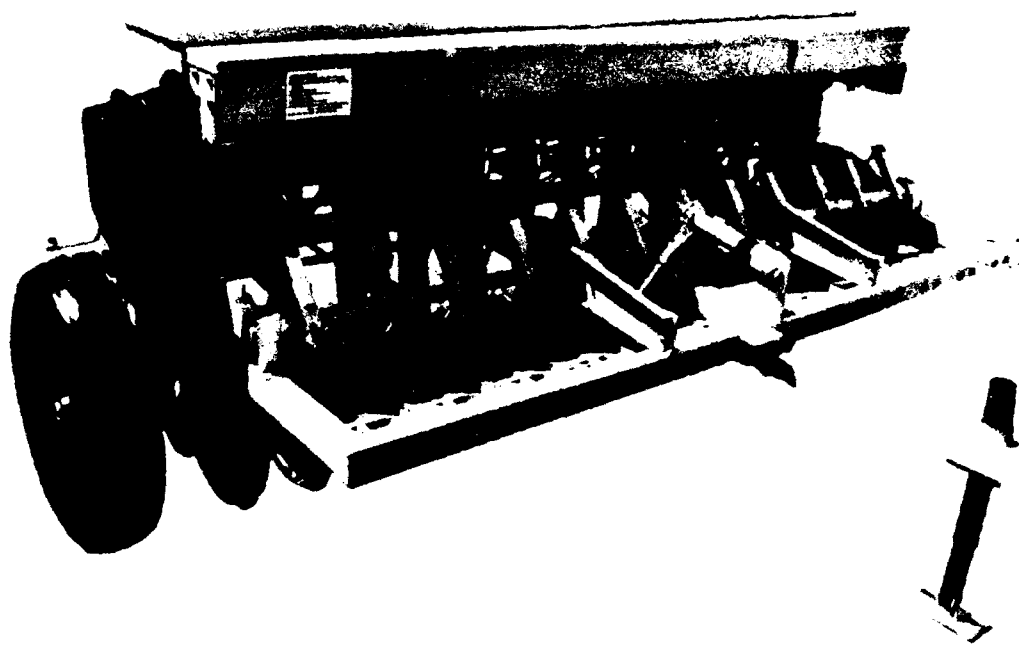
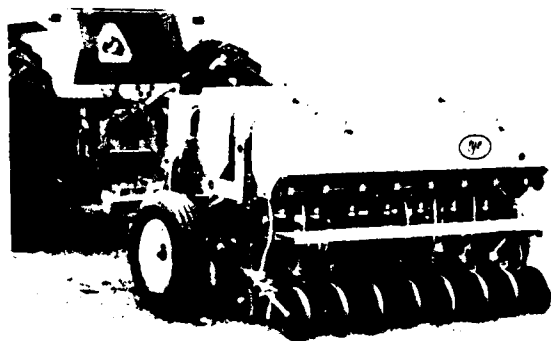


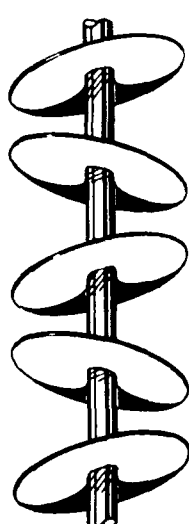
Figure 1. Truax Model 812 (top) and Horizon 14-row model (bottom) pasture drills. Note packer wheels on the Horizon drill (courtesy Truax Company and Horizon Seeds, Inc.)



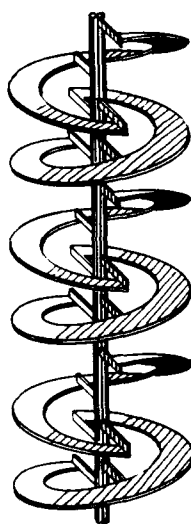
a. Reclamation Special



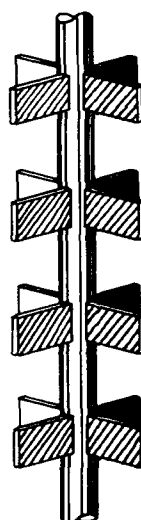
b. Furrow openers



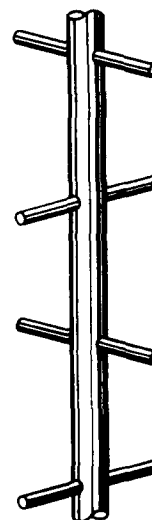
AUGER



MODIFIED  
AUGER



PADDLE



PIN

c. Seedbox agitators

Figure 2. Selected features of pasture drills: (a) Reclamation Special pasture drill showing multiple seedboxes (courtesy the Tye Company), (b) double-disk furrow openers with depth bands and oversized seed tubes (courtesy Horizon Seeds, Inc.), and (c) types of seedbox agitators (adapted from photos supplied by Horizon Seeds, Inc., Truax Company, and Texas Agricultural Experiment Station)

Table 1. Specifications for pasture drills

| Feature                      | Brand                                                                                                  |                                                                                                                                                  | Tye                                                                                                                                                                                                                                                      |
|------------------------------|--------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                              | Horizon                                                                                                | Truax                                                                                                                                            |                                                                                                                                                                                                                                                          |
| Available models             | 14-row model<br>20-row model                                                                           | Model 88<br>Model 812                                                                                                                            | Model 80 (All models available in the Grass Drill and Reclamation Special)<br>Model 120<br>Model 160                                                                                                                                                     |
| Furrow openers               | Double disk                                                                                            | Double disk                                                                                                                                      | Double disk                                                                                                                                                                                                                                              |
| Furrow depth                 | 0.5 in.                                                                                                | 0.5, 0.75, 1.0, 1.25, 1.5 in.                                                                                                                    | 1.0, 1.6, or 2.3 in.                                                                                                                                                                                                                                     |
| Furrow spacing               | 7 in.                                                                                                  | 8 in.                                                                                                                                            | 8-10 in.                                                                                                                                                                                                                                                 |
| Furrow cover mechanism       | Packer wheel or drag chain                                                                             | Packer wheel                                                                                                                                     | Packer wheel                                                                                                                                                                                                                                             |
| Number of furrows            | 14-row model: 14<br>20-row model: 20                                                                   | Model 88: 8<br>Model 812: 12                                                                                                                     | Model 80: to 8<br>Model 120: to 14<br>Model 160: to 20                                                                                                                                                                                                   |
| Seedbox types and capacities | 14-row model<br>grass: 10-12 bu<br>legume: 2-3 bu<br>20-row model<br>grass: 15-18 bu<br>legume: 4-5 bu | Model 88<br>cool-season grass: 5.5 bu<br>legume: 1.0 bu<br>Model 812<br>cool-season grass: 7.5 bu<br>legume: 1.5 bu<br>warm-season grass: 7.5 bu | Model 80<br>grass/grain: 11.9 bu<br>legume: 2.1 bu<br>warm-season grass: 6.3 bu<br>Model 120<br>grass/grain: 17.0 bu<br>legume: 3.0 bu<br>warm-season grass: 9.0 bu<br>Model 160<br>grass/grain: 23.8 bu<br>legume: 4.2 bu<br>warm-season grass: 12.6 bu |
| Seedbox agitators            | Paddle                                                                                                 | Auger; pin                                                                                                                                       | Auger                                                                                                                                                                                                                                                    |
| Overall drill width          | 14-row model: 88 ft<br>20-row model: 12.0 ft                                                           | Model 88: 80 ft<br>Model 812: 10.0 ft                                                                                                            | Model 80: 7.2 ft<br>Model 120: 10.5 ft<br>Model 160: 14.3 ft                                                                                                                                                                                             |

(Continued)

Table 1 (Concluded)

| Feature               | Brand                 |                    |  | Tye                                 |
|-----------------------|-----------------------|--------------------|--|-------------------------------------|
|                       | Horizon               | Truax              |  |                                     |
| Power requirements    | 14-row model: 25 hp   | Model 88: 30 hp    |  | Model 80: 40 hp (with lift assist)  |
|                       | 20-row model: 35 hp   | Model 812: 40 hp   |  | Model 120: 50 hp (with lift assist) |
|                       |                       |                    |  | Model 160: 80 hp (with lift assist) |
| Area seeded/hour      | 14 row model: 4 ac/hr | Model 88: 3 ac/hr  |  | Model 80: 3 ac/hr                   |
|                       | 20 row model: 5 ac/hr | Model 812: 4 ac/hr |  | Model 120: 4 ac/hr                  |
|                       |                       |                    |  | Model 160: 6 ac/hr                  |
| Optimum seeding speed | 6-7 mph               | 4-5 mph            |  | 3.5-4 mph                           |

operation. Warm-season, fluffy seedboxes use modifications similar to those found on rangeland drill fluffy seedboxes (Wiedemann 1982). Paddle- or auger-type seedbox agitators are most common (Fig. 2c). Seedbox capacities vary between 1 bu on small legume boxes to 18 bu on large grass boxes.

#### OPERATION

Power requirements for pasture drills range from 25 to 150 hp (Larson 1980). Horizon brand drills require 25 hp for the 9-ft model and 35 hp for the 12-ft model (Horizon Seeds, Inc. 1983). Truax brand drills require 30 hp for their 8-ft Model 88 and 40 hp for the 10-ft Model 812 (Truax Company 1983a, 1983b). Tye drills require 40, 50, and 80 hp for Models 80, 120, and 160, respectively, if they have a lift-assist wheel (The Tye Company 1982). Otherwise, these drills require 60 to 150 hp. Most drills have an optimal operation speed between 3.5 and 5 mph and can seed 3 to 6 acres/hour depending on site conditions and the brand of drill being used. Pasture drills require only 1 person for operation, and no special safety precautions are necessary. Truax and Horizon brand drills have a cover for the roller chain seed drive mechanism to protect the machinery and ensure that hands or clothing are not accidentally caught in the chains.

#### MAINTENANCE

Little maintenance is required for pasture drills. All bearings are sealed and require lubrication once every 1 to 3 years. Chains and hinges should be checked daily and cleaned and oiled when necessary. Some drills, such as the Horizon brand models, require daily lubrication of clutch and drive fitting. Drills should be protected from inclement weather when possible.

#### LIMITATIONS

Pasture drills are not as durable as the rangeland drill when used on rocky, rough terrain and should not be operated on slopes greater than 18%. Vegetation establishment is not as successful when seeding is accomplished on wet soils that clog seed tubes and on dry soils that become powdery (loose soil structure) as heavy equipment passes over the surface.

#### AVAILABILITY

Pasture drills are available from several companies, including:

Horizon Seeds, Inc.  
P. O. Box 81823  
Lincoln, Nebraska 68501

Truax Company  
3717 Vera Cruz Avenue  
Minneapolis, Minnesota 55422

Marliss Industries  
P. O. Box 3097  
Jonesboro, Arkansas 72403

The Tye Company  
P. O. Box 218  
Lockney, Texas 79241

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- Horizon Seeds, Inc. 1983. Horizon grass drill. Information Sheet. 2 pp.
- Larson, T. E. 1980. Revegetation equipment catalogue. USDA For. Serv. Equipment Development Center, Catalogue No. 8042 2501. 198 pp.
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- \_\_\_\_\_. 1983b. Native grass drill - Model 812. Information sheet. 6 pp.
- Wiedemann, H. T. 1982. Fluffy grass seed metering device for rangeland seeders. Pages 178-182 In Reclamation of Mined Lands in the Southwest. Albuquerque, New Mexico. 217 pp.