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Summary

Results of this study show that the harvesting method may influence grass seed yields by more than 50 percent.

Clean seed yields of Manchar smooth bromegrass averaged 694, 582, and 394 pounds per acre, respectively, for binder, swather, and direct combine methods of harvest. Nordan crested wheatgrass yields averaged 290, 350, and 249 pounds per acre, respectively, for the three methods.

Method of harvest had little influence on germination, purity, inert material, or weed seeds.

Grass seed can be harvested before it is mature enough to shatter if a binder or swather is used. A considerable amount of seed may be lost by shattering before a grass field is ripe enough to harvest by the direct combine method.

The labor and equipment available, resistance of the grass variety to seed shatter, grass height, stand density and uniformity of ripening are some of the factors that must be considered in choosing the method to use in harvesting grass seed.

These studies were conducted in accordance with the cooperative agreement between the Idaho Agricultural Experiment Station and the USDA Soil Conservation Service.

Grass Seed Harvesting Methods

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Grass seed production as a substitute for other crops offers possibilities on a limited basis under both dryland and irrigated conditions. The method used to harvest the seed is one of the most important decisions grass seed growers must make. This decision may influence seed yield by more than 50 percent as shown in this report.

Methods

Tests using a binder (Fig. 1), a swather (Fig. 2) and a combine (Fig. 3) to harvest grass seed were conducted at the Tetonia Branch Experiment Station from 1962 through 1964. Four plots of Manchar smooth bromegrass **(Bromus inermis)** and four of Nordan crested wheatgrass **(Agropyron desertorum)** were harvested two years by each of the three methods. Uniform stands in large seed fields were selected for these trials. Each plot consisted of three rows 100 feet long. Rows were spaced 35 inches apart.

The plots bound or swathed were cut when the seed was in the medium to hard dough stage and were threshed with a combine after the seed cured in the shocks or swaths. Direct combining was delayed until most of the seed was ripe.

All seed was cleaned with an air-screen cleaner.

Results

The yields and quality of grass seed as influenced by method of harvest are given in Table 1.

An average of 76 percent or 300 pounds more Manchar smooth bromegrass seed was obtained per acre by binding instead of direct combining. Swathing resulted in 48 percent or 188 pounds more seed per acre than direct combining. The direct combine method was equal to the swather method in clean seed yields the first year. Two days of strong wind just as the seed was ripe enough to combine caused considerable seed shatter the second year. The result was greatly reduced seed yields for this method. Binder yields were significantly greater than combine yields both years. These tests were conducted in Manchar smooth bromegrass fields which were producing their first seed crop.

On Nordan crested wheatgrass the swather method of harvest was the most productive over the 2-year period. The difference between the other two methods was not large. The Nordan yields represent first and second seed-production years.

The highest percentage cleanout for both grasses occurred when the direct combine method of harvest was used. The binder method resulted in the lowest percentage cleanout. The greater cleanout from direct combined grass seed was largely the result of green straw and leaves breaking up and falling through the combine sieves with the seed.

Method of harvest had little influence on germination, purity, inert material or weed seeds.

Table 1. Seed yields (90 percent purity), cleanout and germination for two grasses as influenced by harvesting methods at the Tetonia Branch Experiment Station.

Grass variety and harvest methods	Clean seed per acre			Average Cleanout*	Average Germination	Yield as % of combine
	1st yr.	2nd yr.	Ave.			
Manchar smooth bromegrass	lb.			%	%	
Binder	659	728	694	8	86	176
Swather	543	620	582	11	86	148
Combine	551	237	394	18	90	100
Nordan crested wheatgrass						
Binder	144	436	290	20	91	116
Swather	273	428	350	26	88	141
Combine	252	246	249	35	84	100

* Manchar cleanout data is for one year only.

Discussion and Conclusions

Costs of harvesting grass seed are influenced by the amount of family labor used and the equipment available. Average custom costs per acre are $8 for direct combining, $11 for swathing and pickup with a combine and $22 for binding and threshing. If

Figure 1. A binder equipped with a metal catch pan beneath the roller and with a canvas over the bundle rack catches seed that shatters during the binding operation.

the grass seed is sold for 20 cents a pound the amount of clean seed per acre necessary to pay for the harvesting costs would be 40 pounds for direct combine, 55 pounds for the swather, and 110 pounds for the binder.

One man can handle either the combining or swathing operation. An additional man is needed if the seed is sacked as soon as it is combined. At least two and preferably three men are needed to bind the grass and to shock and thresh the bundles. The canvas, tied over the bundle carrier to catch seed that shatters, makes it necessary to remove the bundles by hand.

Species or variety and type of grass must be considered when choosing a harvesting method. Short stemmed grasses are difficult to bind. Thin stands make light swaths that are not easily picked up. Grasses that shatter easily, such as Whitmar beardless wheatgrass **(Agropyron inerme)**, should either be swathed or bound to minimize seed loss.

Binding or swathing permits harvesting before the seed is mature enough to shatter. Harvesting by either of these two methods should be done when the seed is in the medium to hard dough stage. At this stage the stems of most grasses will have turned straw color below the head for several inches and some seed will shatter if the seed heads are beat gently against the palm of the hand. Since an entire field seldom ripens uniformly,

slight shatter frequently occurs before the field is ready to bind or swath. The seed is allowed to cure in the shocks or swath before being threshed. Seed should be thoroughly dried before cleaning and storing.

Some seed will shatter in swaths or shocks and during the pickup and threshing operations. This loss is usually greater for the swather than for the binder. A draper-type pickup attachment causes less seed shatter than the revolving drum-type attachment. An attempt to swathe with a mower and rake will likely end in failure because of seed shatter during the raking operation.

A considerable amount of seed will shatter if bundles are dropped when the seed is ready to thresh. Feeding whole bundles through the combine without any separation may result in a poor threshing job and seed loss.

Corrugations in irrigated fields create harvesting problems when a swather is used. Cut grass that falls into the corrugation is almost impossible to pick up. This same difficulty is encountered in swathed fields when tall stubble is left. Placing the swath on a row of stubble instead of between rows helps to alleviate these problems.

The swather method cannot be used when rocks on the ground are large enough to be picked up by the fingers on the combine pickup attachment.

Weather plays a major role in determining the date to direct combine. As the seed approaches maturity it should be checked daily to determine the proper time to harvest. Shatter may be a problem if the seed gets completely ripe before being harvested.

Figure 2. A self-propelled swather can be used advantageously for harvesting seed of some grass species.

Figure 3. Direct combining is the easiest method of harvesting grass seed, but the seed must be ripe before this method can be used.

If the seed is too green when combined it will heat in the sacks. To help eliminate this problem the seed should not be packed tightly in the sacks. This gives the green material a chance to dry. Sacked seed can be left in the field to dry if other drying facilities are not available.

When grass seed is harvested so early that it does not mature before being cleaned, the germination may be lower regardless of harvesting method.

Purity is controlled largely by the cleaning operation, but the better the threshing job the easier it is to clean the seed to a high purity. Weed seeds are no problem in cleaned grass seed if weeds are properly controlled before harvest.

Equipment used in the harvesting operations must be completely free of all seeds. The price of contaminated grass seed is always lower. Often it cannot be marketed at any price.

The light weight of grass seed necessitates careful adjustment of threshing equipment. Only minimum air should be used or the seed will be carried over with the straw.

Binding or swathing are usually the most profitable methods to use in harvesting seed of Manchar smooth bromegrass. Swathing might be the best choice if the labor supply is critical. For Nordan crested wheatgrass and similar grasses, swathing or binding may have no advantage over direct combining.