Broadcast vs Drill Seeding

This article appeared in Issue No. 14 of ***The Cereal Sentinel***.

Broadcast Seeding

Broadcast seeding of wheat with fertilizer spreaders is increasingly popular. Just a few years ago this practice was confined primarily to late fall planted wheat, where time was short and a late fall planting was preferable to waiting until spring to drill. But these days more and more wheat is broadcast even with earlier plantings.

The cheapest of all broadcast practices seems to be the broadcast followed by corrugating. In two operations, only one of which the producer is directly involved in, the seed is on the ground and covered (mostly). Its quick, cheap, and reasonably effective relative to the alternatives, especially under the best of conditions when sufficient rainfall is received for rapid germination and emergence.

In some cases a light tillage is used to incorporate the seed prior to corrugating. It involves another operation but growers are more assured of covering the seed. If there is no corrugating, as with sprinklers, broadcasted wheat is most always tilled lightly to incorporate the seed.

Most producers realize that stands tend to be poorer with broadcast seeding and they compensate with higher seeding rates. The higher seeding rates can appreciably increase seed costs. Poorer stands result from poorer seed to soil contact, seeds covered too deep, and birds feeding on seeds not incorporated to name a few.

Poorer stands can be problematic as weeds are more competitive and maximum yields require a sufficient number of seed producing heads. But even poor stands can be remarkably productive given the ability of our wheat to produce additional stems (tillers), more seeds per head, and larger seed under less crowded conditions.

Unless adequate moisture is available for rapid germination and emergence, broadcasted seed is frequently slower to emerge due to poorer seed to soil contact. Delayed germination and emergence can ultimately reduce tillering and delay maturity such that grain filling occurs under higher and less productive

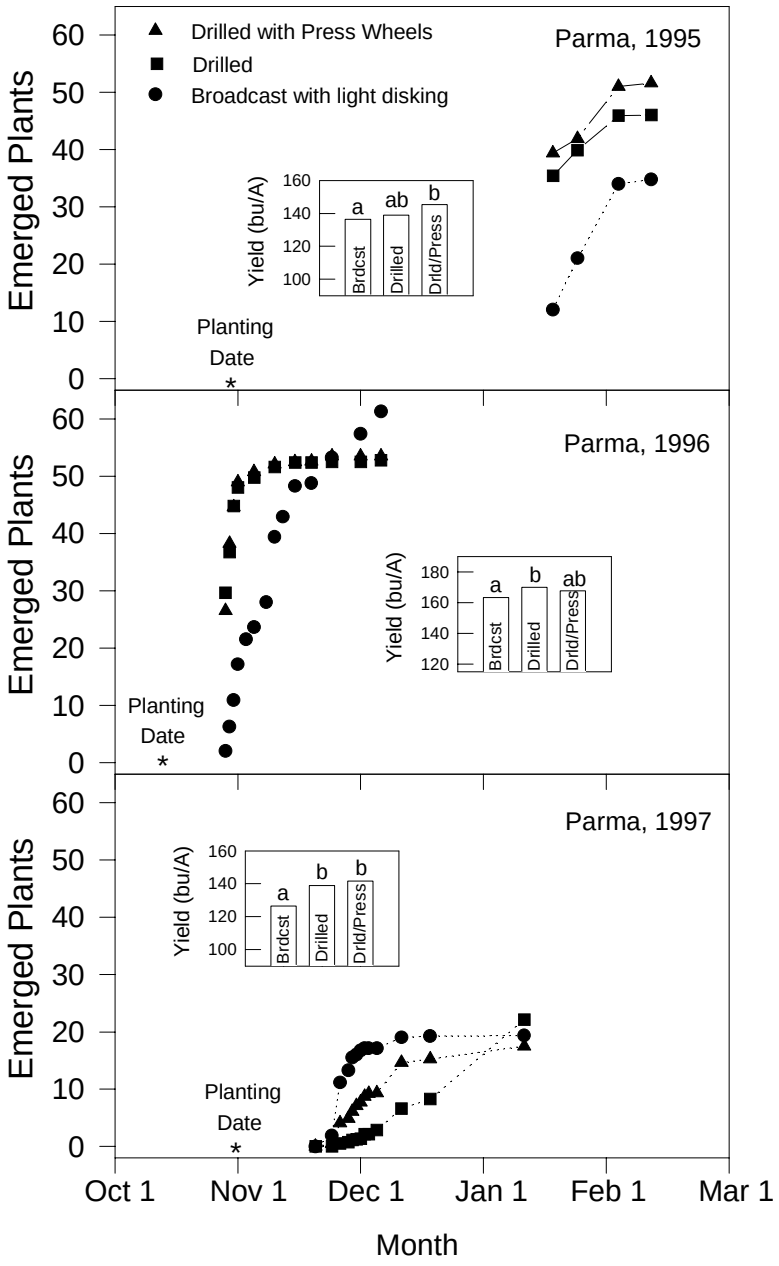

Figure 1. Emerged wheat as affected by seeding method.

temperatures.

Soil conditions at planting, particularly mid to late fall, are frequently too dry at normal planting depths to germinate wheat without timely rainfall. Broadcast seedings, with the attendant poorer seed to soil contact, are especially vulnerable to slower germination and emergence. It is the combination of poorer stands and delayed emergence that puts broadcast seeding at risk of lowering yields.

Selected seeding practices were evaluated at the Parma Research and Extension Center during the 1995, 1996, and 1997 seasons. Seeding methods included (1) broadcast with light disking, (2) drilling using double disk openers spaced 7", and (3) drilling with the same disk openers followed by 2" press wheels. All seeding methods were evaluated at 60, 120, and 180 lb per acre seeding rates. Very little seed was covered during the corrugation operation due to orientation of rows parallel to corrugates.

Wheat planted October 31, 1994 did not begin to emerge until after snow cover and did not finish emerging until late January due to dry soil conditions before and after planting (figure 1). In fall 1995 wheat planted October 13 began emerging within two weeks. Emergence was completed within two weeks in the drilled treatments but took two weeks longer to reach the same population in the broadcast treatment.

Wheat planted November 1, 1996 did not begin to emerge until three weeks after seeding due to dry soil conditions. Drilling with press wheels hastened emergence, with final stands reached in about 2.5 weeks. Drilling without press wheels significantly delayed emergence for the first time in the three year study. Emergence was delayed even more with broadcast seeding. Whereas emergence was completed by the first week in December when drilling with press wheels, emergence was not completed until mid January for the broadcast seeding.

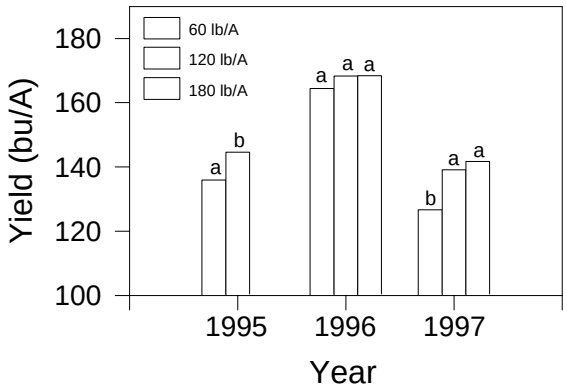

Figure 2. Yield as affected by seeding rate (across all seeding methods).

Broadcast seeding delayed or reduced emergence every year of the study (Figure 1). In 1995 broadcast seeding significantly reduced stand. In other years emergence was delayed with broadcast seeding but stands were eventually the same as with drilled treatments. Stands were considerably poorer in 1997 than in 1995 or 1996.

Yield was lower for broadcast seeding every year of the study. Yield for broadcast seeding was from 3 to 12 bu per acre less than drilled (without press wheel) wheat, and from 4 to 15 bu per acre less than wheat drilled with 2" press wheels trailing behind double disk openers. These yield differences were less than year to year yield differences and would be difficult for growers to see visually.

Using the three year yield average for each seeding method, the income lost per acre of broadcasting wheat was calculated assuming wheat prices of $3.50 per bushel (Table). The yield average for the two drilled treatments did not differ significantly. Gross income with broadcast seeding averaged about $26 per acre less than with drilling.

If drilling wheat requires more labor, the extra labor costs would also need to be considered. If they exceeded the application costs and additional seed costs the differences in gross income would be minimized. Also, if drilling resulted in some wheat not planted until spring, the reduced yield from a spring planting would also have to be taken into consideration.

Seeding rates are frequently increased with broadcast seeded wheat. There are reports of 200 lb per acre seeding rates in some cases. High seeding rates are sometimes used for even conventionally seeded or drilled wheat.

In this study higher seeding rates were no more important for broadcast seeding than for drilled wheat as there was no yield interaction between seeding method and seed rate. The effects of seeding rates are shown in figure 2.

Seeding rate made little if any difference in 1996 when wheat was planted mid October, emergence was completed by Dec. 1 and a high percentage of planted seed germinated and emerged.

Yield increased 9 bu/A in 1995 and 12 bu/A in 1997 when seeding rate increased from 60 to 120 lbs per acre. Emergence was delayed until spring in 1995 and emergence was poor with all seed treatments in 1997. But even in 1997 when 60 lbs per acre was not adequate and emergence was generally poor, there was no advantage to using more than 120 lbs seed per acre.

The results suggest that higher seeding rates alone can not fully compensate for the delayed emergence associated with broadcast seeding. The population of seedlings seems to have less to do with yields than the conditions associated with tillering and grain filling.

Similar results have been found with planting dates. Later plantings are less productive in many years and higher seeding rates don't fully compensate for later planting either. In effect, delayed emergence works pretty much the same as delayed planting. Both result in fewer heads (due to less tillering) and later maturity.

Table 1. Average gross income loss from broadcast seeding, 1995-97.

Seeding Method	Yield	Gross Income	Income Loss
Broadcast	142.0	497	26
Drilled	149.3	523	--

Trailing double disk openers with 2" press wheels did not significantly improve emergence in 1995 and 1996. In 1997 press wheels significantly improved emergence over wheat drilled without press wheels, but yields did not differ.

In summary, broadcast seeding reduced yield due to delayed emergence and increased seeding rates did not compensate. High seeding rates (180 lb per acre) did not improve yield regardless of seeding method.