Corn Variety Trial, 2007

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Abstract

Corn prices have recently reached historical highs due to the proliferation of grain-based ethanol plants across the United States. A trial was conducted to determine whether corn could be produced in central Oregon and, if so, what would be the yield. A variety trial consisting of eight cultivars was conducted under furrow-irrigated conditions in a farmer's field north of Madras in 2007. The plots were attacked by blackbirds, although when the estimated yield loss is taken into account, cultivars produced between 217 and 312 bu/acre. Stover production was between 5.7 and 8.4 ton/acre. These data could be useful if grain and/or cellulosic ethanol production is to be considered for central Oregon in the future.

Introduction

United States' corn production in 2007 was at a 50-year high due to the proliferation of ethanol plants utilizing corn in the Midwest states. Production of corn in the Columbia Basin has also increased due to the construction of ethanol plants in the area. Following grower interest, a short season (less than 85 days) corn variety trial was conducted in central Oregon. Roundup® Ready cultivars were used in the trial because the technology would be simple and useful in controlling persistent weeds. The aim of the trial was to determine whether corn could be successfully produced in the area and, if so, what yields could be expected. Also, with the prospect of ethanol being produced from cellulose, the amount of stover, or plant material left after harvest, will be determined.

Methods and Materials

The trial was conducted at Sullivan's farm (44° 42.479'N, 121° 12.488'W, 2,338 ft above sea level) on Agency plains just north of Madras. The site had a moderate slope and was furrow irrigated. Eight cultivars were supplied from local seed companies; four contained the resistance transgene for corn borer (Yieldgard® corn borer) developed by Monsanto. Plots measured 30 ft long by 10 ft (i.e., 5- by 24-inch beds). The trial was sown on May 7, 2007 using a tractor-mounted precision planter, and seeds were placed at 7-inch in-row spacing. The area was irrigated that evening, and seedlings emerged within a week. On May 25 (3.5 leaves) and again on June 21 (10 leaves) 16 oz/acre of Roundup® Max was applied in 20 gal of water/acre using a tractor-mounted spray unit. All cultivars were tasselling by July 20, were at milky-dough stage by mid-August and were denting by early September. Red-wingedblack birds, *Agelaius phoeniceus*, attacked the corn ears from early August until early September. Corn leaf aphids, *Rhopalosiphum maidis*, infested the crop in early September but were gone by late September and did not seem to affect yield. On October 16 and 17, a 3-m length of row in each plot was selected and all ears in this section of row were harvested by hand. Moisture content was later determined as being 16 percent. Ears were placed inside polyethylene bags and dried for 4 days at

100°F. The level of bird damage to each ear was then estimated. Ears were then shelled using a hand sheller and the seed yield estimated by dividing the actual yield by the estimated remaining following the bird damage. On October 22 the stalks from the 3 m of row where the cobs were harvested were cut off at ground level and were weighed. Subsamples were taken, weighed, dried at 100°F for 4 days and reweighed to determine moisture content. The dry weight of the stover (i.e., the plant material remaining following grain harvest) was then determined.

Results and Discussion

Grain yield for the trial could only be estimated given the severity of the bird damage to plots. The trial had a large dam on one side, cattails on another, and telephone cables along one length, making it ideal habitat for blackbirds. If production was scaled up to commercial level, this damage would likely have been spread out and would not have been significant. There was no significant yield difference despite the almost 100 bu/acre difference between the highest and lowest yielding cultivars (Table 1). At the current value of between $4 and $4.50/bu for corn, the crop might be an economic option for growers. Although it gives growers the option of growing a Roundup Ready crop, corn is a relatively high user of nitrogen fertilizer (200lb/acre), and the lateness of harvest means that there is insufficient time to plant most fall-sown crops. However, if cellulosic ethanol becomes viable, then the crop may be a more attractive option for growers. The cultivars 184 RR2/BT and X4043RR produced the most stover, although only significantly more than cultivars 212 RR2 and DKC29-97. Baled corn stover currently sells for around $50/ton.

Bird damage tended to be higher for the cultivars that did not contain the Yieldgard corn borer transgene. Corn borers were observed in some of the ears of lines that did not contain this transgene, and it may be that the blackbirds damaged the ears in search of these grubs. If they discovered a grub they may have continued to damage the ears in search of more. Certainly the cultivars that suffered the highest level of damage (DKC29-97 and DKC33-72) did not contain the Yieldgard corn borer transgene.

Table 1. Grain yield (bu/acre), estimated bird damage (percent), and stover yield (ton/acre) of the Madras 2007 corn variety trial.

Cultivar	Transgenes[1]	Relative maturity (d)	Grain yield (bu/acre)	Bird damage (%)	Stover yield (ton/acre)
184 RR2/BT	RR/YGCB	80	291	31	8.42
212 RR2	RR	82	255	27	5.74
DKC29-97	RR	83	217	51	6.45
DKC33-72	RR	79	246	49	7.57
INT 6584	RR/YGCB	84	246	21	7.33
INT 65D85	RR/YGCB	84	312	30	7.07
INT 6683	RR/YGCB	83	273	29	7.89
X4043RR	RR	83	262	33	8.10
$LSD_{(0.05)}$			NS	19	1.68

[1]RR = Roundup® Ready, YGCB = Yieldgard® corn borer.

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