

# Penn State's Corn Research Results

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Much has been happening in the area of corn production research at Penn State and some of our neighboring institutions. The purpose of this paper is to provide a brief overview of some of the results of this research that you may find useful in your operation.

This overview will focus on cultural practices and hybrid selection. The research areas that will be discussed will include silage yield and quality studies, corn/sorghum comparisons, tropical hybrid evaluation, plant population research, row cleaning devices, effect of cultural practices on rootworms, stability analyses, and corn maturity studies.

### Silage Yield And Quality

For the past three years, we have been evaluating effect of hybrids, plant populations, and harvest date on silage yield and quality. Our hybrid studies have focused on determining whether or not some widely grown hybrids vary in silage quality as much as some reports have indicated in the literature. Also, we wanted to evaluate how consistent these differences were over a wide range of locations, because corn silage is produced under a wide range of conditions in Pennsylvania, unlike some other areas.

We used nine hybrids and grew them in four different tests in 1990 and 1991. We found that hybrids did vary for quality, but not that much. Variations in digestibility and protein were greatest. Digestibility differences ranged up to 1.8 percent and protein differences ranged up to 0.5 percent. The variation in ADF and NDF was not significant between hybrids when averaged over locations. On a percentage basis, yield varied much more than quality. We conclude that yield differences are most important and should concentrate on better testing for silage yield. Quality differences exist, but there appears to be some uncertainty about what to measure. Our data suggests that digestibility measurements may discriminate between hybrids better than traditional quality measurements like ADF and NDF.

Comparisons of different populations and harvest dates have indicated that silage were maximized near populations of 25,000 plants per acre with population having little effect on quality. Our harvest date studies have shown that for harvesting for silage in the 63-68 percent moisture range, harvest should occur between full dent and half milk in the kernel. We have found that maximum yields are obtained near half milk. Waiting to harvest silage until black layer results in silage that is too dry and increases the risk of molds in the silage.

### Corn/Sorghum Comparisons

We have been evaluating grain and forage sorghums as potential replacements for corn in areas with drought stress potential and deer damage potential. To date we have conducted five side-by-side comparisons. The sorghums are more drought tolerant and also resist damage from deer.

In three of the strip trials, the deer ate the corn right to the ground. In two others, the damage to the corn was more typical with most of the ears removed. Results of a typical trial are shown in Table 1.

Table 1. Performance of forage sorghum, grain sorghum and three corn varieties grown under moderately heavy deer pressure in Centre County in 1991.



## CORN TALK NEWS

PENNSYLVANIA MASTER CORN GROWERS ASSOC., INC.

Species/variety 19CYield  
Moisture ADF

	T/A	%	
Forage sorghum, Pioneer 947	11.01	61.8	35.1 64.6
Grain sorghum, Pioneer 8333	6.28	78.5	25.4 72.3
Corn/Doebler's 45X	4.65	42.9	36.5 61.3
Corn/Cargill SX 269	4.71	65.2	37.5 60.6
Corn/Doebler's 75X	5.30	68.3	33.0 63.7

Based on the results of these trials, I conclude that forage sorghum is a good alternative under these situations. Early, medium height forage sorghums that set a lot of grain appear to be a good choice for many of these situations. They resist deer damage even better than the grain sorghums, have low risk of lodging, produce good silage yields of reasonably good quality, mature before frost — reducing the risk of prussic acid and give the grower the option to harvest for grain.

### Tropical Hybrid Evaluations

Interest in the success of using these hybrids as double crop alternatives in the South. There, agronomists have found that some tropical hybrids do exceptionally well when planted late, when normal corn is often devastated by fall armyworm. Locally, some growers have been attracted to

these because of their height and seemingly large silage yield potential. In 1992 we compared the yield potential of a normal corn hybrid, a tropical hybrid corn and an open pollinated silage corn in three growing environments. As expected

Corn	Yield	Harvest	Yield	Harvest	Yield	Harvest
Normal	21.0	9/16	14.9 a	10/20	19.7 a	10/5
Tropical	19.5 ab	10/20	11.1 b	10/20	17.4 ab	10/12
Open poll.	17.7 a	9/29			14.0 b	10/12

Yields within a column followed by the same letter are not significantly different.\*Double crop corn was planted July 1. Plant population research

Population research programs are currently under way at Cornell, Ohio State, and Wisconsin. The Cornell program is far enough along so that recommendations are being revised. They are suggesting plant populations up to 28,000 ppa where corn is grown for grain

the tropical and the open pollinated were tall and late. The open pollinated was also prone to lodging, but the tropical hybrid stood well, even though it was twelve feet tall. The tropical hybrid was susceptible to smut and had poor early season growth. Yields of both the open pollinated and the tropical were less than the normal silage corn (Table 2).

Based on the results of these experiments, tropical and open pollinated silage corns do not appear to be competitive with top performing conventional hybrid corns.

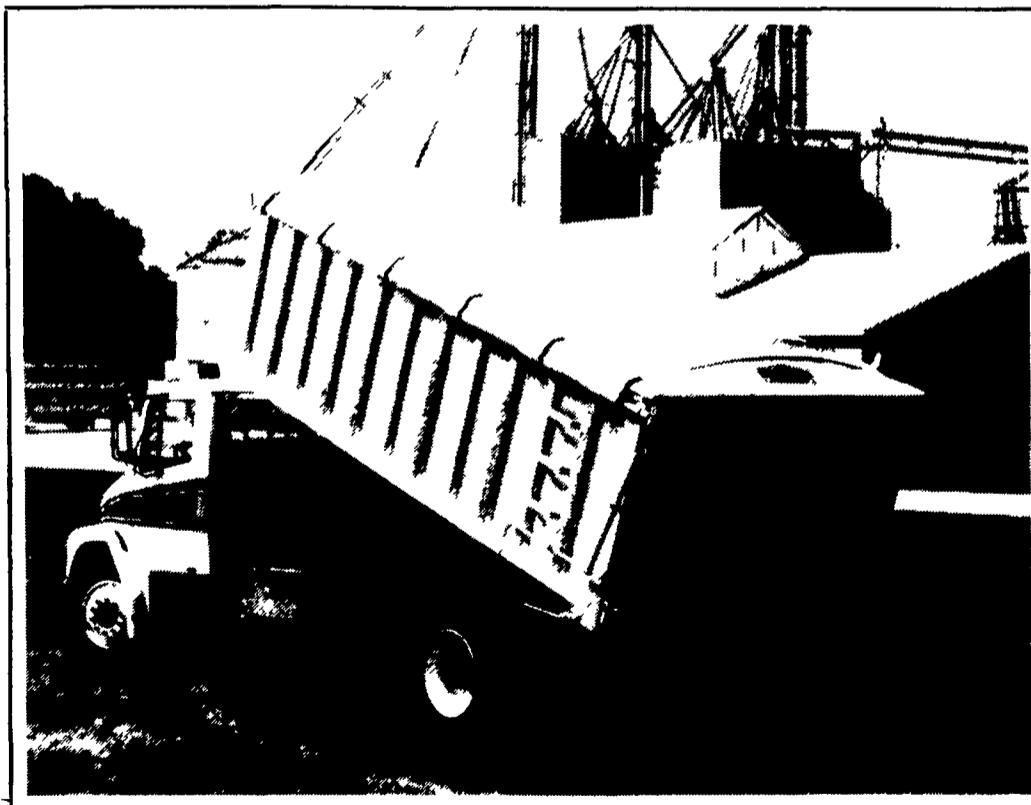
Table 2. Yield and harvest date of a normal hybrid, tropical hybrid and open pollinated silage variety in three environments in 1992

on good soils. They suggest up to 30,000 plants on good soils for silage. For less productive soils, plant populations should be reduced.

In the Ohio State research, populations, N rates, and hybrids are being compared. There, corn yields respond only when moisture was adequate and the full recommendation of N was applied. This occurred in one of three studies. A recent Univ. of Wisconsin study com-

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