Making No-Till Wheat Production Profitable:
Corn Hybrid Selection

Morris J. Bitzer, Larry J. Grabau, and Colleen Steele
Department of Agronomy

Forty eight corn hybrids from the 1997 Kentucky Hybrid Corn Performance Tests were screened to determine their harvest index, amount of residue and grain yield. Harvest index is the ratio of grain yield to total biomass yield. The earlier maturing hybrids had lower average harvest index values than the later maturing hybrids. From these 48 hybrids, 12 corn hybrids were selected for double cropping with no-till wheat. These 12 hybrids included 5 early, 6 medium and 1 late maturing hybrid. These 12 hybrids were grown and evaluated for harvest index and grain yield in 1998. Two wheat varieties were no-till seeded into the residue shortly after the corn hybrids were harvested. Stand counts were taken of the wheat after it had completely emerged. There were very small differences between stand counts and corn hybrids which the wheat had been seeded into the residue from the corn. The stand counts ranged from 23.7 to 30.1 plants per square foot.

Introduction:

Corn residue helps reduce topsoil erosion in no-till wheat systems. However, that same corn residue can greatly complicate stand establishment for no-till wheat, may also reduce N availability and increase problems with winter survival. It is well known that corn hybrids differ in their yield potential. Kentucky farmers have naturally chosen to grow corn hybrids with the best possible yield potential. What is not known, however, is whether the high yielding corn hybrids all leave behind similar amounts of residue. In fact, a corn hybrid which yields slightly less but will substantially less residue might be a good hybrid to use for a no-till wheat management system. Therefore, it would be beneficial to Kentucky farmers considering no-till wheat systems to have information on how the available corn hybrids differ in residue amounts in relation to their grain yield. This study is designed to identify a set of corn hybrids which might work well in no-till wheat systems.

Materials and Methods:

In the fall of 1997, the 132 hybrids in the 1997 University of Kentucky

Hybrid Performance Tests were evaluated at 2 locations to select 48 hybrids for biomass, yield and harvest index. These 48 hybrids were selected on the basis of potential low biomass (visual observation) in each maturity group (early, medium and late). From the results of these 48 hybrids, 12 hybrids were selected to plant in the spring of 1998. The maturity of this group of 12 hybrids were 5 early maturity (less 112 days), 6 medium maturity (113-117 days) and 1 late (118 or more). The one late hybrid was selected as a check to compare for high yield, low harvest index and a higher amount of residue than the other hybrids. These 12 hybrids were planted in a 4 replicated randomized complete block design. At maturity, they were hand harvested for yield (40 feet of row of each hybrid was harvested and weighed). A separate whole plant sample (8 plants) was cut and weighed for biomass yield. The remainder of each plot was machine harvested and the residue evenly distributed on each plot. Five weeks after harvest, the two wheat varieties, Pioneer 2552 and Foster were no-till drilled at 35 seeds per square foot of row into one-half of each plot at the optimum time for wheat seeding (Oct. 14). Wheat stand counts (2 rows-.5m long) were taken on November 12.

Results and Discussion:

The data obtained on the 12 corn hybrids is shown in Table 1. In 1997, the early and medium maturity hybrids selected were the higher yielding hybrids with lower residue and higher harvest index values than the other hybrids from which they were selected. The late maturing hybrid was a high yielding hybrid with a high amount of residue and a low harvest index. All of the later maturing hybrids had high levels of residue and low harvest indexes. If the amount of residue or high harvest index is a reliable measure for obtaining better no-till wheat stands, then these hybrids selected should give an indication of this.

In 1998, the values obtained and the lack of a significant difference in stand counts did not support this hypothesis. The values were very inconsistent as to stand counts and there appeared to be no relationship between stands and amount of residue or harvest index. The main thing that can be denoted from this data is that the selection of an earlier maturing, high yielding hybrid will result in less residue, a slightly higher harvest index and good wheat stands than that obtained from later maturing hybrids. One of the reasons that this data may have been somewhat inconsistent was that very poor johnsongrass control was obtained in the plots. The competition from the johnsongrass somewhat

reduced the differences in the height of the different hybrids thus making the residue values less reliable. The late maturing hybrid was not any different in height or total biomass than several of the earlier maturing hybrids. If residue is a problem when establishing wheat stands, selecting a high yielding, early-medium or early maturing hybrid should reduce the amount of residue left in the field.

	1997			1998			1998
	Yield (Bu/A)	Residue (Lbs/A)	Harvest Index[1]	Yield (Bu/A)	Residue (Lbs/A)	Harvest Index	Wheat Stand Counts[2]
Corn Hybrid / Brand Early Yellow Hybrids							
1. Akin A6460	143	7627	51.5	162	7686	50.1	30.0
2. Crow's 496	146	6848	54.5	172	7800	51.1	27.0
3. DeKalb DK626	150	7298	55.1	149	7501	48.7	23.6
4. Pioneer 3394	154	8087	51.7	152	6329	53.4	27.0
5. So. States SS676	141	7774	50.5	153	6828	51.9	29.6
Medium Yellow Hybrids							
6. Cargill 6888	143	6588	54.9	150	7214	50.0	26.9
7. Caverndale CF840	143	6816	54.0	167	7721	50.7	27.5
8. DeKalb DK642	146	7385	52.9	159	8245	47.8	30.1
9. Great Lakes 6631	152	7691	52.6	167	7138	52.6	27.0
10. Mycogen 2815	149	7095	54.0	171	8341	49.2	27.6
11. NK Brand N73-Q3	145	7531	51.9	149	6380	52.4	25.2
Late Yellow Hybrid							
12. So. States SS943	162	9528	48.7	177	8080	51.1	26.8
L.S.D (0.10)	10	NS	NS	15	1294	5.3	NS

[1]Harvest index = grain yield/total biomass

[2]Stand counts are number of plants per square foot, average of 2 varieties.