

2002 ISSUES WITH BARREN CORN

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It is common to observe an occasional barren corn plant or plant with poorly filled and small ears in any given field each year. However in recent years, we have observed a greater than normal incidence of barren plants in many corn fields in southern Wisconsin. Furthermore, many crop consultants and company agronomists also have reported a higher than expected incidence of barren plants in specific fields. Frequently a problematic field is adjacent to a field with a more normal level of barren or small ear plants. Plants with no ears or small and poorly filled ears are certainly not a new problem. However, the greater incidence has us concerned, but also the observation that the problem reoccurs in a specific field from year to year. Many causes of barren corn plants are reported. Commonly accepted causes are genetic mutations, born deficiency or climatic related stress factors during pollination. Although not totally discounted, the cases we have investigated do not seem to involve these generally accepted causes of barren corn plants.

Two fields in western Dane Co., Wisconsin were identified to have this problem in 2001, and replicated field trials were conducted in 2002. Plants appeared normal at all vegetative stages and all plants produced normal tassels. At this time however, many plants differed in the development of earshoots and amount of silk present. Based on silk development, barren or small ear plants were predicted at an accuracy of 60-100%. Prediction accuracy differed with corn hybrid and location. Plants with abnormal ears appeared normal in color, but often appeared to have "slightly smaller stalks". Tissue analysis of ear leaves had acceptable ranges for macro- and micronutrients.

Yield potential of each site is estimated in the 180-200 bushels/acre range. Corn hybrids used in this study are those of proven high yield potential. Thus, the achieved yields of 137-156 bushels/acre are considered extremely low based on the anticipated yield goals of the site. Yields were actually lower in 2001 and were in the 90-110 bushels/acre range in these problematic fields. We conclude that lower than expected yields were achieved because of the high incidence of plants either barren or forming small ears. Barren or small ear plants are the result of delayed emergence of earshoots and silks. The cause of this malfunction in growth and plant development is not known. Currently, evidence does not support the conclusion that traditional causes of barren plants are responsible for this problem. We are pursuing two ideas related to an infectious cause of barren plants. The first is *Pythium* as a chronic pathogen of adult plants and the second is a virus. The *Pythium* theory is related to recent changes in seed applied fungicides. Early evidence suggests we have transferred a virus from leaves collected from barren plants.

Table. Agronomic performance of four corn hybrids at a location with a history of above average incidence of barren corn plants in Dane Co., Wisconsin in 2002.

Hybrid	Yield	Grain moisture	Plant pop.	Plant pop.	Ears not contributing to yield			
					Small ears	Smut	Blank ears	Total
	Bu/a	%	V3	harvest	%	%	%	%
RK 569	139	21.2	38,277	39,000	20	4	8	32
H2390	153	24.0	33,444	32,900	16	4	2	22
H7895	156	24.0	36,777	36,900	14	7	2	23
H7924	137	23.7	34,499	35,600	19	5	2	26

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