

Derecho Proof Corn Research

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There have been several articles in the news recently which were titled **“Farmers could soon be growing derecho-proof”** corn. These articles observed advantages in standability following the August 7 derecho, for shorter corn hybrids being developed by research conducted independently by Bayer and Stine corn research programs. Miller Hybrids has already developed a key “derecho proof” medium-short corn with a pineapple leaf structure, which will allow light to easily penetrate to the ear leaf. The ear leaf has been shown to be the most productive leaf to feed the ear. Also, because of the smaller plant and this leaf design, it appears standability is greatly improved as there the plants do not “catch the wind” like most current corn hybrids. Miller Hybrids’ unique shorter corn hybrid with a “pineapple” leaf structure is called M11-66. M11-66 is a high yielding and stress tolerant conventional 110-day hybrid, which stood and yielded extremely well compared to most hybrids being tested at our 2020 corn research test site amid the derecho (east central Iowa by highway 30). This is one of the first of these futuristic shorter corn hybrid types which will increase the ratio of grain to total dry matter and ultimately lead to better standability as well. The way this hybrid was developed is quite different than a typical corn research testing protocol used by most plant breeders, as I will describe below. A concern is that to demonstrate the yield advantage of these types of hybrids to farmers, will require a different design than most current independent or state testing services use. It also requires a different way of conducting farmer strip plots, or side-by-side field tests. We have discovered pure stand or self-bordered plots with at least two unused border rows, are needed to fairly evaluate these types of hybrids.

The typical way corn hybrid development is conducted by most plant researchers involves selecting for the best new parental inbreds in hybrid combinations by 1) First evaluating new hybrids in 2-row plots for 1 to 3 years and 2) Then evaluate hybrids in 4-row plots or continue in with 2-row plots till commercialization. Essentially what this does is to ensure that hybrids must compete well with the hybrids in adjacent plots before they can get selected for advancement (i.e., they must maintain a plant type that wins the interplot-competition versus neighboring hybrids). With this test design, the hybrids selected will have to place too much emphasis on directing photosynthetic energy toward outcompeting the neighboring hybrids, instead being able to accurately select hybrids that are only concerned with efficiently feeding their ears, while maintaining good standability. Miller Hybrids (MH) is unique to the corn industry in that our new parental lines have never used 2-row plot testing at any level of hybrid testing. Instead, MH’s research has used 4-row plots in the first development year (stage 1) where the center 2 of 4 rows is harvested for grain and then hybrids entered 8-row plot testing in the 2nd year, where only the center 4 rows are used for data. Miller Hybrids has discovered that leaving 2 untested border rows in the 8-row plots, nearly eliminates the interplot competition. Starting with self-bordered plots when the genetic diversity is the highest, has greatly improved the ability to accurately identify new shorter, high yielding hybrids, with good standability. These hybrids do not need to build a bigger factory to outcompete hybrids in adjacent plots and so they can maximize genetic gain for grain yield. Because use of 8-row plots with 4 harvested rows is a superior method of identifying pure hybrid performance, our new testing protocol is to switch to 8-row plots in all testing stages in 2021.