Selection for Disease Resistance

Families of K2(GHYM)C2 and K2(GHYL)C2 were planted specifically for selection for disease resistance at Aitkin. However, the incidence of disease in these families was not high enough to carry out a reliable selection, and individual plants were selected for yield, vigor, and shattering resistance (see above). However, when a severe epidemic was manifested in the Petrowske bottlebrush population in a separate paddy at Aitkin, 112 plants were selected from about 500-1000 plants tagged for medium maturity. The selection pressure appeared to be optimum for differentiating resistant plants, and tagging ensured that selected plants were not just escapes due to their maturity. In the four-way cross (M3XNe)X(MeXJn) planted at Grand Rapids, heavy disease pressure due to its earliness may have resulted in intense natural selection for disease resistance. Only a small amount of seed was recovered from that stand.

Hybridization Activities

Hybridization, or crossing of plants, families, or populations, creates new genetic variability. In 1990, plants of Pistillate M3 were transplanted among plants of several populations, then later rogued to remove normal plants, leaving only male sterile pistillate plants to receive pollen from the donor population. In this way, Sturdy was crossed to Pistillate M3 in hopes that a high-yielding pistillate population more lodging-resistant than Pistillate M3 would result. Pistillate M3 was also crossed to K2(1)C4 and K2(2)C3 to combine the pistillate trait with shattering resistance.

K2 was crossed as the pollen parent to extremely tall and robust plants of a related species, Zizania aquatica, obtained from the Suwannee River Florida. Seven seedlings of this cross are currently growing on hydroponic medium in Dr. Percich's lab, and an eighth plant is growing in the greenhouse. The seed of this population apparently lacks dormancy, or has greatly reduced dormancy--seed germinated within one week after harvest. The objective of this cross is primarily to transfer this non-dormancy, if possible, to cultivated varieties. This would allow shattered seed to germinate in the fall and die, permitting annual reseeding of paddies from harvested seed. Such a system, if feasible, would actually favor "natural selection" (really combine selection) for shattering resistance in production paddies. The current system in Minnesota favors natural selection for increased shattering for as long as continual production is allowed. In parts of California, shattered seed can be killed off by drying the paddies after harvest, favoring selection for shattering resistance. Therefore, obtaining non-dormancy in Minnesota varieties may help Minnesota growers harvest more seed and be more competitive with California in the long-term.

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