Chapter 10

Breeding to Control Pests

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A wide array of pest problems confronts the crop producer. Each crop plant is subject to characteristic diseases and insects, and any plant part can be affected. Diseases are caused by parasitic fungi, bacteria, viruses, mycoplasmas, spiroplasmas, nematodes, and even other seed plants that grow or replicate in their hosts. These causal agents of plant disease are called pathogens. Injuries also occur to plants through the feeding and reproduction of various insect pests. Weeds compete with crop plants and may injure them in other ways.

Breeding to control pathogens and insect pests is most effective when agronomists, plant breeders, geneticists, plant pathologists, and entomologists work together in the same improvement program. Disease and insect resistance is incorporated into the new cultivar or hybrid, and the pest-resistant cultivar or hybrid integrated into agriculture.

Studies on the genetics and biology of plant-pest interactions and the application of this knowledge to breeding for pest resistance represent some of the most fascinating of today’s challenges. Breeding is the most widely used and most effective method of plant disease control. Much of the world’s food and fiber supply depends upon the growth of disease-resistant crops. Because of the wide use of insecticides, breeding for insect resistance has lagged behind that for disease control. Nevertheless, such resistance is effective and has been developed to limit pests. Rapid advances are now being made to extend the range of insect species considered in plant breeding programs. Weeds are the third major class of pests confronting the agronomist. Crop tolerance to weeds is not usually considered part of plant breeding programs but is a challenge to future plant breeders.

**USE OF RESISTANCE IN PEST CONTROL**

Breeding for pest resistance is an integral part of any system of crop pest control. Such efforts interact with systems of crop management and the nature of the crop itself.