Chapter 8

Oat Breeding and Pathologic Techniques

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TECHNIQUES IN OAT BREEDING, as in all other fields of science, have undergone numerous changes. As a result they have become more and more complicated and exacting. Doubtless, this trend will continue, and techniques acceptable today may be replaced by still more complicated ones in the future. In general, the techniques for oat improvement are divided into two categories, those concerned with the breeding and agronomic testing phases and those concerned with the pathologic testing or so-called screening for resistance to diseases. The breeding techniques will be discussed first.

1. Breeding Techniques

1. Techniques of Early Oat Breeders

Natural selection in oats doubtless had been in progress long before man first made mass selections of oats from mixtures in other cereals. Ancient writings indicate man’s first attempts at mass selection were to save for seed the heaviest grain, the most attractive “ears,” or grain from the better fields or portions thereof.

The next technique employed was single “plant selection,” which possibly was used long before the Potato oat was originated from a single plant selected in Cumberland, England, in 1788. “Pure line or plant selection” is essentially the testing and increasing of the progeny of single selected plants. This procedure remains a basic technique for oat improvement today, although various devices are now employed for increasing variability prior to selection.

Hybridization in oats, as effected by Patrick Shirreff (1873) prior to 1870 and later practiced by many European and American breeders, became the accepted technique for oat improvement in the United States by 1925.

The techniques of oat crossing and the difficulties attending success were outlined by Norton (1902). In spite of much time and attention given the subject, astonishingly little has been added during the six decades since Norton’s obscure paper appeared.

2. Oat Crossing

The artificial crossing of oat varieties is both tedious and time consuming. Depending on the skill of the hybridist, from 6 to 42 florets can be emasculated and pollinated in an hour. The number of crosses one