

Bolting Performance of Sugar Beet

Breeding Stocks

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In the production of commercial sugar beet seed it is desirable, other things being equal, to use seed varieties of high seed reproductive ability. Large tonnages of seed per acre make for cheaper production and a more profitable crop.

It has been observed that the old stand-by types of European seed formerly used so extensively in this country vary considerably in their ability to produce seed. Since most of the American seed varieties can be traced back to these original types it is reasonable to expect that the new ones will produce seed in about like manner. This is generally true and unless careful selection has been made in the early development of the varieties for highest seed production some of the low seed producers may persist.

In attempting to maintain a high level of seed producing ability in Holly Commercial seed, many breeding strains of seed and all elite or stock seed is being tested for its seed reproductive ability under the actual conditions where the commercial seed is grown.

While no detailed data are offered, a few observations in the nature of a progress report will be made in this paper.

Beet breeding and improvement work for Holly Sugar Corporation is headquartered at Sheridan, Wyo., with substations elsewhere in the Rocky Mountain area. Practically all the initial increases of breeding lines are made at Sheridan, using the mother beet or steckling method. Increases of seed for commercial use are made by the over-wintering method in New Mexico, Arizona, California, and Oregon.

Before these over-wintering commercial increases are planted it is highly desirable that the seed production habits of each variety be known. This information is now being secured by plantings of elite material in small plots beside commercial fields in the Arizona area a year or two prior to actually using it for commercial seed plantings. By this method the best seed producers are determined and are favored over the less productive of equal agronomic value when direct increase or crosses are made. In many instances strains of high merit for their agronomic characteristics or disease resistance have been found to be poor seed producers. Such outstanding strains are not

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discarded but in subsequent plantings only the best, most promising seed producing individuals are selected. This type of selecting for desirable seed production is not new to sugar beet breeders.

In the production of commercial beet seed in America by the over-wintering method, it is desirable that at least 90 percent of the total plants in the field form seed stalks and of these seed stalks not less than 85 to 90 per cent participate in the seed crop. An even greater percentage of participating bolters is desirable. Early bolting is favored over late bolting, and excessive vegetativeness or leafiness of seed plants is not desirable. These standards are probably higher than the average actuals of commercial fields.

With this standard in mind, 99 strains of seed supplied by the Holly Sugar Corporation have been studied under actual growing conditions in the Phoenix area. Unfortunately it was not feasible to make actual seed yield records on all these plots. Only field notes descriptive of top growth characteristics were made.

The data secured indicate that only one-fourth of the strains tested could be classified as acceptable, about one-fourth were very poor, and one-half were intermediate, many of which can be greatly improved by further selection for seed production.

In these tests, strains with curly top resistant blood were as a whole much better seed producers than non-curly top resistant kinds. Very few of our curly top resistant lines are poor seed producers.

Strains being developed for leafspot resistance were distributed about equally as good, fair, and poor seed producers.

The so-called agronomic group which are not developed for resistance to either curly top or leafspot afford a great opportunity for selective improvement for seed production.

It is not always possible to predict accurately the seed yielding ability of hybrids.

The only sure way of knowing the seed producing ability of a new strain or variety is to test it out under the conditions where the commercial seed crop will be grown.

Further studies of the seed producing habits of breeding strains of sugar beets are planned.