

GENERAL CONSIDERATIONS FOR THE YEAR.

PROJECT LEADERS

- G. H. Coons - Principal Pathologist - Division of Sugar Plant Investigations.
G. W. Deming - Assistant Agronomist - Division of Sugar Plant Investigations.
Keith M. Hemphill - Agent - Division of Sugar Plant Investigations.

COOPERATORS

U. S. Department of Agriculture.

Bureau of Plant Industry.

- John C. Gaskill - Assistance at Fort Collins Headquarters and at Fort Morgan and Ault.
Ralph E. Wood - Assistance at Fort Collins Headquarters and at Fort Morgan and Ault.
Harold W. Bockstahler - Assistance on Seed Production at Rocky Ford Headquarters.
Ralph F. Seamans - Assistance on Seed Production at Rocky Ford Headquarters.

Colorado State College.

- Dr. E. P. Sandsten, Director of Experiment Station.
Alvin Keser, Chief, Division of Agronomy.
W. P. Kintzley - Mangger College Farm.

Great Western Sugar Company.

- F. H. McMasters, Manager, local factory.
H. C. Giese, Manager, Fort Morgan factory.
Ralph Partridge, Manager, Windsor factory.
H. W. Dahlberg.
Asa C. Maxson.
Dr. H. E. Brewbaker.

Growers:

- Harry Clark for facilities and assistance with the Ault Spacing Test.
B. G. D. Bishepp, Virginia Dale - cooperation in Bagging Plot seed production.
The many householders in the Arkansas Valley, Greeley and Denver who cooperated in the care of isolation plantings in the Beet Breeding program.

Holly Sugar Corporation:

- C. E. Germany and Frank F. Lyles for testing and report on strains tried at Sheridan Wyoming.

OUTSTANDING ACCOMPLISHMENTS

Leaf Spot Resistant Varieties:

Tests of the new leaf spot resistant varieties in 1938 indicated that there are now, or soon will be, available to the grower varieties which are the equal of many of the varieties now used which are much more susceptible to this disease.

Spacing and Stand Studies:

Tests in 1938 did not differ from those of 1937 in that they indicate that with excellent stands the optimum spacing of the plants in 20 inch rows is 12 to 16 inches for maximum tonnage. Since the bests from thin stands tend to be slightly lower in percent sucrose the best spacing to use probably lies nearer 12 inches than 16 inches.

Tests with fractional stands indicated that a heavy loss of tonnage does not occur till the plant population drops below 70 to 60 plants per 100 feet of row.

Preliminary work on the elimination of "stoop labor" in thinning indicated that thin, very uniform germination stands are essential; and that the tendency in this kind of thinning is to leave too many rather than too few plants.

Date of Planting:

Very early planting of a non bolting variety was only slightly advantageous in comparison with a normal date of planting. Planting the middle of May resulted in a serious loss of tonnage. The beets from this late planting were relatively low in purity.

Very early, March, planting may result in excessive bolting of some varieties.

Advanced Generations:

Tests did not indicate loss of yield in the first, second and third increases of certain strains of more or less closely selected origin.

Bolting:

Bolting is usually negligible in Northern Colorado. A study of the bolters in the very early date of planting plots indicated that the only loss of yield caused by these bolters was from the smaller size and lower percent sucrose of the early bolting plants. Later, more or less leafy types of bolters did not differ significantly from normal beets in size or percent

sucrose. The competition of bolters of any type did not significantly affect adjacent plants.

40 X 40 Inch Spacing:

Competition between beet plants appears to be affectively eliminated by this spacing.

Differential varietal reaction to this spacing appears to be negligible; at least in regard to size of the beet.

20 X 20 Inch Two Beet Hills vs 10 x 20 Inch Single Plant Spacing:

The latter spacing appears to have a slight advantage in yield. This advantage is attributable to the significantly greater number of beets of non marketable size produced in the two plant hills.

Beet Breeding:

Sugar - Red Garden Beet Hybrid. The white root F_2 of this cross continued outstanding in tonnage in comparison with commercial strains of sugar beets. Percent sucrose is low, but is not definitely unsatisfactory for sugar manufacture.

A selected F_4 of this cross is equal to the F_2 in tonnage and this year was .5% higher in percent sucrose. This difference just reaches the level of probable significance.

Inbred Lines. A considerable number of inbred lines reached the third and fourth generation of inbreeding and show remarkable uniformity in top and root characters. Some of these lines appear to be approaching a degree of homozygosity for the percent sucrose factor. One line exhibited a reversal of the tendency for percent sucrose and purity to be correlated. This line while moderately high in percent sucrose is definitely low in coefficient of apparent purity.

A number of inbred lines appear to have factors of genetic interest sufficiently fixed to warrant some crosses for study of the inheritance of these factors.