

IDAHO-OREGON VARIETY APPROVAL POLICY AND VARIETY TESTING PROGRAM

John J. Gallian, University of Idaho
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I. History

Curly top virus is the most serious threat to sugarbeet culture in Idaho and eastern Oregon. Before resistant varieties were developed and introduced to the Twin Falls factory district, yields were less than 10 tons/acre excluding abandoned acres in 10 out of 23 years. In those same 10 years, an average of 34% of the acreage was abandoned. Without resistance to curly top virus, there would not be a sugarbeet industry in Idaho and eastern Oregon.

The purpose of the Idaho-Oregon Variety Approval Policy for the Amalgamated Sugar Company growing area is to eliminate sugarbeet varieties with low quality and low curly top resistance and encourage the introduction of improved varieties, thus preventing the devastation that once nearly eliminated the industry. Amalgamated Sugar Company, which has four factories, is the only sugar company in our growing area. Last year, 203,000 acres were grown which yielded more than 5.3 million tons of sugarbeets.

The variety approval policy was developed by the Joint Idaho-Oregon Sugarbeet Seed Committee and was first implemented in the 1986 growing season. The seed committee consists of representatives from the Idaho Sugarbeet Growers Association, the Nyssa-Nampa Beet Growers Association, Amalgamated Sugar Company, one Oregon State University (OSU) representative, and one University of Idaho (UI) representative. The OSU and UI representatives are advisory only.

Before the policy was developed, there were no restrictions on varieties that could be sold or planted in Idaho and eastern Oregon. Varieties with considerably less resistance to curly top virus than those that had previously stabilized the industry were being introduced because in the absence of disease they would yield higher than resistant varieties. Our history of devastation in some years by curly top virus and the emphasis in recent years on quality improvement encouraged our industry to consider restricting the marketing and growing of varieties with low curly top resistance and quality in Idaho and eastern Oregon. Most other sugarbeet growing areas had variety policies, and often varieties that could no longer be marketed elsewhere were sold here. This situation was not in the best interest of our industry, and was the primary motivation to develop a policy. Following is a discussion of the salient features of the policy and the variety testing program that provides the data.

II. Rules for Testing

A. OFFICIAL TESTS

The official variety tests are conducted each year at two locations in the Magic and upper Snake River Valleys of Idaho conducted by the University of Idaho, and one location at the Malheur Experiment Station, Ontario, Oregon conducted by Oregon

State University. Three locations are planted in the upper Snake River Valley and the best two, as determined by the seed committee, are harvested. Each location is divided into one test of all commercial varieties and one test of experimental or semi-commercial varieties containing five approved commercial varieties as checks. Plots are four rows wide on a 22 inch row spacing and 25 feet long with five feet of alley between tiers and are replicated eight times. Plots are seeded to excess and hand thinned to a plant spacing of 8 to 10 inches. They are machine harvested and data is taken on the two center rows of each plot. Data from all three locations are published separately and combined for locations each year and the last two years.

B. NEW VARIETIES

No previous test data is required for test entry and there is no restriction on the maximum number of varieties entered. A minimum of two years' testing in the official trials is required before a variety can be added to the approved variety list for unlimited marketing; the first year in the experimental tests and the second year in the commercial tests. If desired, after the first year of testing the seed company may test market 1000 lb of seed in each of the four areas in which a variety meets the minimum standards. The second year a variety may be entered into the commercial test to seek full approval if a minimum of 1000 lb of seed is available to growers.

C. EXISTING VARIETIES

All approved varieties must be re-evaluated each year in all three variety tests in order to remain on the approved variety list. Only the data from the last two years are used in the quality calculations for eligibility. If a variety does not continue to meet the established standards for three consecutive years of testing, it is deleted from the approved list after the seed supplier is given one year's notice of deletion. This allows for one year's poor performance to be deleted from the calculations before a variety is removed from the approved list. If a variety continues to perform poorly, then it will be removed.

III. Standards for Approved Varieties

A. GENERAL

Varieties must meet the minimum standards for both quality and curly top virus resistance in order to gain approval and remain on the variety approval list. The initial approval list for 1986, the first year of the policy, included all varieties that had been marketed in Idaho and eastern Oregon in 1985.

B. CURLY TOP VIRUS RESISTANCE

Each year all varieties tested in the University of Idaho and Oregon State University variety tests are entered in a curly top (CT) virus nursery for resistance evaluation conducted in the Twin Falls area by the Beet Sugar Development Foundation. US-41, an old open-pollinated USDA variety that contains moderate resistance to curly top virus, is used as a standard for comparison in the nursery. Six replications in a randomized complete block design are entered, with the exception that a minimum of four entries of the standard US-41 are contained in each block. Statistical analysis is not performed on the data. The average curly top rating for a variety is determined using a minimum of the last two years' ratings and compared with the

IV. Special Category For *Rhizoctonia* Root Rot Resistance

Specialty varieties with resistance to root rot caused by *Rhizoctonia solani* are generally lower in yield, quality and curly top resistance than standard varieties. In certain areas, however, particularly in southwest Idaho and Malheur County of Oregon, there is an need for varieties with resistance to *Rhizoctonia* due to the severity of the disease in some fields. The minimum required quality and curly top virus resistance standards are waived for varieties approved in this category. The only requirement is for seed companies to test these varieties in the Idaho-Oregon official tests and in the USDA-ARS *Rhizoctonia* nursery located at Fort Collins, Colorado, the year prior to approval and once every three years following. All test results are made available and growers are cautioned to carefully weigh the relative risks from *Rhizoctonia* and curly top virus before making the decision to plant.

V. Conclusion

We consider the approval policy and variety testing program a success. Average sugar percentage and yield have both increased. When the variety approval policy was initiated, there were 18 varieties being sold in Idaho and eastern Oregon with no restriction on their sale. The change in approved varieties has not been excessively rapid. Several varieties were lost the first two years, some to the policy and others to normal attrition. Of the 20 approved varieties for 1991, nine were among those available before the policy was initiated. Of the nine no longer on the list, only three were lost directly due to the policy. The remainder were discontinued by seed companies when new varieties were introduced. The fewest number of approved varieties available in the most restrictive CT Area during this transition was 12.

New varieties have been approved. CT Areas 1 and 2, that have the highest curly top resistance requirement and are the most difficult in which to gain approval, presently have 14 varieties with full approval and six that are being test marketed in 1991, with full approval expected for most of these for 1992. CT Area 3 has 17 approved and six test market varieties, and CT Area 4 has 20 approved and five for test market.

average rating of US-41 for the same test years, up to a maximum of the last three years. Because the threat of curly top virus increases from east to west within our growing area, four defined CT Areas are identified requiring differential resistance. For a variety to be approved in the Idaho-Oregon sugarbeet growing area, it must have the following minimum resistance to curly top virus:

CT Area 1. Nyssa and Nampa Factory Districts - equal resistance to US-41.

CT Area 2. Twin Falls Factory District - equal resistance to US-41.

CT Area 3. Mini-Cassia Area - 5% lower resistance than US-41.

CT Area 4. Upper Snake River Valley - 10% lower resistance than US-41.

Varieties must fall below the minimum curly top virus resistance for three consecutive years before one year's notice of deletion from the approved variety list is given to the seed supplier.

C. QUALITY

To account for the variability in the variety trials used for variety approval, the minimum limit is established by the values significantly below the means of approved varieties. These limits change with the statistical sensitivity of the trials. Recoverable sugar is estimated for each variety using the method developed by Amalgamated Sugar Company and included in their grower contract. Sugar percentage and conductivity are the variables in this method.

1. Existing varieties - (a) The mean estimated recoverable sugar per ton (ERS/T) and the mean estimated recoverable sugar per acre (ERS/A) for approved varieties within each CT Area, and the values significantly lower than these means ($p=.05$), are calculated from the two-year six-location statistical summary of the variety trials. The values significantly lower than the means are expressed as percentages of the means and the percentages are then summed. (b) The ERS/T and ERS/A for each variety are expressed as percentages of the approved variety means and then summed. This summed percentage must exceed the summed percentage in (a) for the variety to remain on the approved list.

A variety must be below standard in these calculations for three consecutive years before one year's notice of deletion from the approval list is given to the seed supplier.

2. New Varieties - Because new varieties are first tested in separate, experimental trials, the experimental data from each location is first factored to "commercial status" using the five commercial check varieties common to both the commercial and experimental tests. Calculations for approval are then made as described for existing varieties using the same summed percentage in paragraph 1(a) as the standard.