Onion Seed Yields Increased

by adequate supply of irrigation water

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Onion seed yields were increased by irrigation in a two-year series of tests at Davis.

The studies were made in 1943–45 to obtain information regarding the effect of irrigation treatment on onion seed production.

A sedimentary soil of the Yolo Loam type was used and sampled for soil moisture before and after irrigation.

Average Yellow Sweet Spanish bulbs were planted in a trench four inches deep and were spaced three feet by four inches.

Winter rainfall in the Davis area was 15.5 inches from July 1, 1943, to July 1, 1944, and 15.4 inches in 1944–45. Little or none occurs during the months of May or June, nor until October. The rainfall during the winter months usually wets the soil to field capacity by spring to the depth of six feet or more.

Three types of irrigation treatments were used: dry, where plots were not irrigated throughout the test, but did receive winter rain; medium, where sufficient irrigation was supplied to produce near a maximum yield; and wet, where the plots received more than sufficient irrigation water, so maximum yield would be obtained.

The crop was raised with good cultural practices.

Yields

The yields obtained on the wet treatment slightly exceeded the usual yield of 400–600 pounds per acre. The wet treatment in 1944 produced 35% greater weight of seed than the unirrigated, and similarly in 1945 the increase was 80%.

The wet treatment produced larger plants and in general the heads were larger and more numerous. Some measurements were made of seed stalk growth and usually this growth was in proportion to the amount of water added to the plot. The plants bloomed each year about the first week in May and the seed was harvested the middle of August.

There has been a tendency with crops harvested for a vegetative part of the plant to have earliness affected by irrigation treatment. Both white potatoes and market ripe onions have given definite indications of maturing sooner when subjected to insufficient water. In 1944 there was some indication that seed heads matured sooner on the dry than the wet plots. The 1945 results failed to confirm this effect.

Probably three or four irrigations are desirable with a minimum application of 10 inches of water in Davis and similar areas. Irrigation close to the harvest period tended to cause the seed stalks to fall over.

Germination

High seed germination is an important characteristic of good seed. Under commercial production conditions there is considerable variation in the germination of seed from different fields. Data obtained from these studies gave surprisingly similar germination for all three treatments. Usually a germination of 85% is to be desired and these were slightly below the desired germination. In both years the medium irrigation treatment gave the highest percentage germination.

Seed Weight

Onion seeds are small in size so the weight of 100 seeds is less than one half gram. The dry treatment always produced the smallest seed and the medium treatment was always the highest. The differences in weight were small being .028 and .037 grams per 100 seed harvested in 1944 and 1945.

Soil moisture removal graphs indicate that water was removed from the top four feet of soil and there were about 0.6 inches available in the nonirrigated plot in this depth of soil on August 14. In the fresh onion crop most of the roots are found in the top two feet of soil.

Effect of Storage

The seed from these experiments was stored in order to produce a crop of bulbs as well as to study the effect of storage on their germination.

Germination tests were made by the State Seed Laboratory each fall after the harvest of the seed and similar tests were made in October, 1947, of both lots of seed.

The 1944 seed had been stored three years and the 1945 seed two years. The 1944 seed was stored most of the time at 32° F but there were periods when refrigeration was not available. Part of the period, the seed was at room temperature as was the 1945 seed. After the storage period there was no significant difference in germination. There was little difference in the germination of the 1945 crop either in the fall of 1945 or the fall of 1947.

The 1944 crop suffered more severe reduction in germination from storage than did the 1945 crop.

The wet treatment seed suffered an average reduction in germination of 21%; dry, 13%, and medium, 11%.

All lots of seed were planted in 1945 for bulb production. Average size transplants were grown two rows per bed and field planted on April 6, 1945.

There was no significant difference in the yields between treatments of bulbs from seed produced in 1944 and in 1945.

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Onion seed irrigation. Plants grown with different amounts of soil moisture at Davis, California. Plants in plot A received only water stored from winter rains—rainfall 15½ inches—and produced 387 pounds of seed per acre; plot B received winter rains plus 15 inches of irrigation water and produced 698 pounds of seed per acre. Note the difference in the amount of growth and size of seed heads.