TULELAKE

Below, rod-row cereal plots at the station have been completely mechanized from planting (allowing alleyways automatically) through harvest with a 90% reduction of time involved.

TULELAKE FIELD STATION, located in Siskiyou County on the State's northern border, serves a 100-square mile farming basin that has become particularly well known for production of seed potatoes and malting barley. Specialty crops, such as horseradish, have also been developed from the extensive and continuous exploratory program on new crops.

A large part of the 64,000-acre area was still under water until the 1930's when a Bureau of Reclamation drainage project was completed. The drainage waters from the Upper Klamath Lake in Oregon and Clear Lake (in Siskiyou County, California) have now been diverted into Tule Lake through a system of canals and holding lakes from which it is pumped again into the Klamath River for discharge into the Pacific Ocean.

About 600 farms are now in operation, about one third of which were homesteaded by World War II veterans in 1947. The Tulelake Field Station was also started in 1947 at the present 19-acre site which was formerly a labor camp. Basic purpose of the station was to develop new crops suitable for the area

Photo to left shows barley lodging problem whi was attacked by varietal research at the station r sulting in two new malting barley varieties: Pirolin and Firlbeck III.

FIELD STATION

and to demonstrate better ways of growing old crops, as well as advising unfamiliar newcomers on techniques with irrigated crops. To further aid growers with the application of research results, an Agricultural Extension Service farm advisor is located in the station office.

The area has an unusual topsoil situation with a 2,000-ft thick upper layer of organic matter including volcanic ash and diatomaceous remains. Temperatures range from minus 30°F to 100°F, but seldom go over 90°F. Rainfall averages about 12 inches annually, and occurs in the winter along with some snow. Frosts have been known to occur every month of the year and are a basic limiting factor in crop production for the area.

With no temperature inversions in this row-crop area, wind machines or conventional heaters were ruled out, and emphasis was placed on experimentation with solid-set sprinkler systems for frost control. Using an intermittent sprinkling technique, with time clocks turning the water on and off (at 15-minute intervals, for example), it was possible to obtain frost control for potatoes down to temperatures as low as 25°F. This approach is considered very important in en-

New horseradish variety, Tulelake No. 1, developed at the station, increased yields more than 50%.

Asparagus bed preparation was part of one of the new crop exploratory projects at the station.

Left, above, frost control experiments were successful in this first commercial-scale (off-station) trial using a solid-set system for intermittent sprinkling. Center, above, potato storage bins were used in experiments to determine air flow rates for inhibition of sprouting of seed potatoes. Right, above, soil fumigation in bands just before potato planting in experiments for possible control of rhizoctonia.

larging crop possibilities presently limited by frost. Research on sprinklers for frost control is being continued by Burton J. Hoyle, station superintendent.

The new crop research program at the station has had to consider consumer acceptance and marketing possibilities as well as crop adaptability for the area. Station research led to the development of a new horseradish variety, "Tulelake No. 1," which is the only specific, named, variety; and when put into production by local growers, it increased yields by more than 50%. The station also participated in the durum wheat development program in cooperation with Kenneth Baghoff, Farm Advisor. Previously, durum was grown only in the Dakotas, but when it was determined that the crop could be grown in the Tulelake basin, grower representatives went to Washington, D.C., and obtained a 10,000-acre allotment. The result was an increase of about $1,000,000 per year in farm income above what the same acreage would have produced in Hannchen barley.

Spinach, broccoli, asparagus, endive, parsley and cabbage have also shown promise on an experimental basis. Tests with cranberries, blueberries and soybeans were not encouraging and were discontinued. Some success was obtained in safflower trials on the sandy rim of the basin. Sugarbeet trials were successful, but contracts were not available for growers. Mint was another possibility, but there was no market for the crop. Winterhardy fruit and berry rootstocks are being sought in a cooperative effort with USDA researchers.

Extensive trials on seed potato storage proved the value of forced air circulation to inhibit root sprouting. Objectionable sprout and root formation was delayed one month to six weeks by circulating air at a rate in excess of 1¾ cfm/bu at 40°F and 85% humidity. Storage studies in the air-conditioned potato cellars were done with the cooperation of L. W. Neubauer, Professor, Department of Agricultural Engineering, Davis.

As many as 5,000 varieties of barley have been grown in test plots at the station some time during the past 17 years. Two of these—Firlbeck III and Piroline—show promise for replacing Hannchen, the malting barley that has been in production in the area for 20 years. The weak straw of Hannchen, grown on the organic soil of the Tulelake area, has caused lodging problems for the grower; and cloudiness in beer has resulted from the high protein content. Firlbeck III has outyielded Hannchen by 10 to 15%, and the stiffer straw has stood erect under most conditions that would have caused lodging in the other variety. Changes in irrigation, including more critical timing in the early growth stages and curtailment of late water applications, are expected to allow yields to stay high, while protein is kept at a lower level. C. W. Schaller, Professor and Agronomist, and C. A. Suneson, Associate in the Experiment Station, Department of Agronomy, Davis, cooperated in the barley variety studies.

Another development at the station is the complete mechanization of cereal rod-row test plots. Hoyle developed a completely integrated system from planting through harvest, reducing the working time on these test plots to one-tenth of what it had been.

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Harvester Injuries to Seed Reduce Flax Seedling Emergence

Cracking of flax seed caused by improper adjustment of combine threshing equipment has reduced the germination and vigor of seedlings, according to this report of studies conducted at University of California, Riverside, and U. S. Department of Agriculture, Brawley in the Imperial Valley. Seedsmen have often placed the blame on fungicidal treatment and long storage; but although mercurial fungicides have some adverse effects, cracked seed is largely responsible for the reduced seedling emergence.

FLAX SEEDS held over from the previous year have been observed to germinate poorly in southern California. This poor germination was attributed largely to certain fungicidal treatments, but experimental tests had not been made to confirm these hypotheses. Previous reports, however, showed that cracking (visible only under magnification) reduced germination of flax seeds and induced seedling abnormalities. The greenhouse and field experiments reported here showed that cracking—caused by mechanical threshing—reduced germination more than the suspected fungicidal treatments, age of seed, or storage treatment.

Effects of cracking

To determine the effect on seedling emergence, different lots of mechanically cracked (30%) and noncracked seeds of the flax variety Imperial, were stored at air temperature in the Imperial Valley and at 1°C in Riverside. The effect of storage on seedling emergence of another variety, Punjab 47 (noncracked seeds) was also observed. Seeds were not treated with fungicides.

Before storage treatments were started, average emergence from Punjab 47 and Imperial was 90%. Six months later, emergence in steamed soil from the noncracked seed of both varieties stored in Riverside at 1°C and in the Imperial Valley remained high (96 to 99%); but emergence from cracked Imperial seeds had dropped to 83% (significant at the 1% level). No differences in emergence