Research at Field Stations

local agricultural problems are studied and fundamental research applied in distributed outdoor laboratories

B. A. Madson

Five field stations are an integral part of the College of Agriculture.

The field stations are set up in regions where—because of climatic or other conditions—special problems exist which can not readily be solved by studies at the major research centers, or even by tests carried on in co-operation with the Extension Service. While emphasis is placed on local problems, the field stations also provide facilities for any division to carry on investigations for which the region may be especially favorable. They also provide locations where varieties and strains of crops, or practices developed at the main research centers can be tested for regional adaptations.

Each station is staffed with one or more technically trained specialists who are responsible for carrying out the work at the local level. The research divisions, however, are responsible for the planning and supervision of the work in their respective fields. This assures the use of approved techniques in conducting the various experiments and close co-ordination with the work at the main research centers.

Imperial Valley

The oldest and one of the largest of the field stations is the Imperial Valley Field Station located at Meloland. This station was started in 1912 with 40 acres of land and one agronomist to carry out the work. Through later acquisitions, the station has been expanded to a total area of 250 acres. Until recently practically all of the work consisted of investigations on field crops, resulting in many contributions to field crop production in the Valley. The most notable, perhaps, was the introduction of flax which has become a very important crop in this area. Much valuable work has also been done on cereals, legumes, sorghums, sugar beet and forage crops. At the present time an extensive program of flax breeding and improvement is being continued. Work is also being carried on with cereals, corn, sorghums, cotton, sugar beets, alfalfa, and grasses, and legumes for pasture and forage.

In 1945, a truck crops specialist was added to the station, and an extensive program has been gotten under way. This includes a breeding program to improve quality, yield, and disease resistance of asparagus, cantaloupes, lettuce, tomatoes, and watermelons. Also in progress are fertilizer trials with onions, lettuce and garlic, variety trials with onions, sweet corn, beets and broccoli. The use of hormone sprays on celery to retard seedstalk formation, and the use of sugar sprays on tomato plants to improve survival has shown promising results.

A year later livestock investigations were started, with a specialist in charge. The effect of climate, particularly high temperature, on the efficiency of gains of Herefords, Brahman, Herford × Brahman, and Hereford × Shorthorn crossbred cattle is being studied. Information on the relative heat tolerance of the different breeds is being obtained. Studies on cooling devices is developing information which may be of value to livestock producers in the valley.

The Imperial Valley Station offers special advantages for the study of the effect of high temperature on the behavior of plants and animals. Many problems peculiar to the valley are still unanswered, and it is planned to expand the investigation in all fields.

Antelope Valley

The Antelope Valley Field Station near Lancaster, consisting of 60 acres, was opened in March 1949. The valley, at an elevation of 2,500 feet, has a short hot growing season, with moderately cold winters. The shortage of irrigation water is the most serious obstacle to the development of agriculture in this area. Alfalfa, a heavy user of water, has been the most important money crop.

The station investigates the more efficient use of water and experiments with a large variety of field and truck crops which might be grown profitably and with less water than is being used on alfalfa. A few crops not previously grown in the valley have shown outstanding possibilities. Some varieties of Indian corn, for example, have produced yields of more than 100 bushels per acre. Grain

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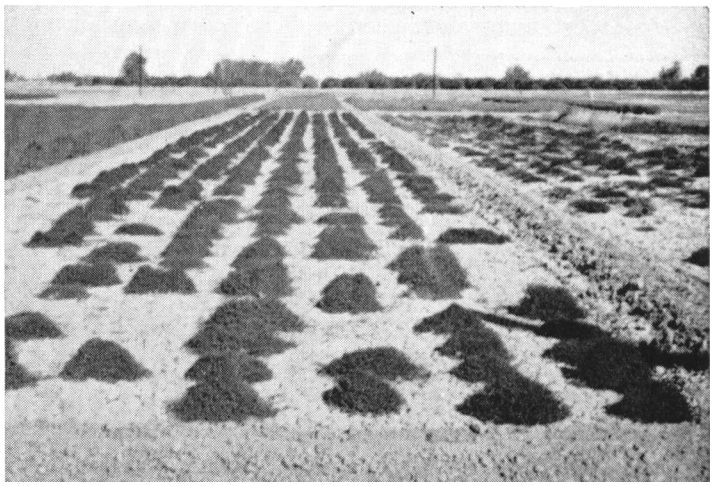
***Left:* Grass nursery at Tulelake Field Station. *Right:* Selection plot at Imperial Valley Field Station.**



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sorghums and some varieties of melons have shown promise. All these crops can be grown with less than half the amount of water commonly used on alfalfa.

Tulelake

The Tulelake Field Station, started in 1946, is located on 18 acres in the Tulelake basin at an elevation of 4,000 feet and only four miles from the Oregon border. The growing season is short and the winters extremely cold. Killing frosts may occur in any month of the year. The two major crops of the region are potaties and two-row barley.

Because of climatic conditions the area is limited to cool climate crops. Experiments are being carried on with varieties and species of truck crops, and field and seed crops. Special attention is being given to potato diseases and storage problems as potatoes probably will continue to be a major crop in this area.

The climate conditions and the isolation of the area probably will greatly limit the number of crops which can be grown profitably.

San Jose

The Deciduous Fruit Field Station at San Jose has been in existence for about 25 years. It is a small station of 15 acres and until recently was operated by the Division of Plant Pathology, and used primarily for investigation on fruit tree diseases. Because of its strategic location in the coastal fruit belt, it will continue to be used for the same purpose, as well as a place for developing and testing deciduous fruit varieties for that area.

Hopland

The latest addition to the system of field stations is the Hopland Field Station consisting of 4,637 acres in southern Mendocino County.

This station was acquired in July 1951. The area will be used for the study of range improvement, the handling and management of livestock on the range and other problems incident to range land utilization. It will provide excellent facilities for the long-time study of range investigation and management problems.

Co-operative Work

In addition to these five field stations co-operative work is carried on at two stations operated by the United States Department of Agriculture—the United States Cotton Field Station at Shafter, and the United States Rice Station at Biggs.

The Shafter area is an important potato and vegetable growing region. Here the Division of Truck Crops investigates various potato and vegetable production problems, and the Division of Agricultural Engineering co-operates on cotton mechanization studies.

At the Rice Station, the Division of Agronomy experiments mainly with crops other than rice, which are adapted to the area.

Because of California's great variations in soil and climate the field stations can contribute materially to the solution of many of the state's agricultural problems. While emphasis will probably always be placed on problems of the immediate area, the stations also provide outdoor laboratories for trial and verification of fundamental research.

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CONTROL

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Late winter and early spring treatments were applied in February and early March.

Thorough-coverage sprays, outside-coverage sprays, and dusts all reduced the scale populations in comparison to untreated check plots.

Good control was obtained with thorough-coverage sprays using a dosage of one-quarter pound of 25% parathion wettable powder per 100 gallons of spray. Increasing the dosage to one-half or one pound per 100 gallons did not increase the effectiveness of this type of application.

Outside-coverage sprays applied with a spray duster at the rate of 100 to 200 gallons per acre did not give commercial control with application of eight pounds of 25% parathion wettable powder per acre. Nor were dust applications of 2% parathion applied at the rate of 100 pounds per acre commercially effective.

No residue determinations for navel oranges were made following winter treatments since the applications came after the harvest period. On Valencia oranges, an average of 0.4 ppm of parathion was recovered in the peel following thorough-coverage application of one-quarter pound of 25% parathion wettable powder per 100 gallons of spray.

Treatments for the early part of the hatching period were applied from late April through early June.

All three types of application reduced the scale population in comparison to untreated check plots but only the thorough-coverage sprays gave commercial control.

The effectiveness of thorough-coverage sprays improved as the dosage was increased from one-half pound to two pounds of 25% parathion wettable powder per 100 gallons of spray. Increasing the dosage beyond the two-pound level was of no benefit. The control obtained with dosages less than one pound of 25% parathion wettable powder was not satisfactory from a commercial standpoint.

Single treatments of sprays applied at the rate of 100 to 200 gallons per acre with spray-duster equipment at the beginning of the hatching period did not give commercial control with dosages up to 12 pounds of 25% parathion wettable powder per acre. In a two-treatment program with spray-duster applications in which the first application was made at the beginning of the hatching period followed by the second application two to four weeks later, promising control was obtained with a dosage of six pounds of 25% parathion wettable powder per acre per application.

Single treatments at the beginning of the hatching period with 2% parathion dust in which parathion was combined with an inert diluent or with sulfur did not give satisfactory commercial control.

Double treatments of 2% parathion dusts—the first at the beginning of the hatching period with the second two to four weeks later—were more effective than the single treatments but still not so effective as single thorough-coverage sprays applied with conventional high-pressure spray equipment.

Parathion dusts in which sulfur was included to the extent of 85% were more effective than parathion dusts having an inert diluent in place of the sulfur.

Parathion residues recovered in the peel of navel oranges at time of harvest averaged less than 0.5 ppm from commercially effective treatment applied at this time of year.

Abnormally high populations of soft brown scale, *Coccus hesperidum* L., have occurred with some applications of parathion in citrus groves—apparently because parasites of this species were eliminated. In most cases with dosages of parathion that have controlled citricola scale, high populations of soft scale have not been extensive or of long duration. However, any application of parathion carries a possibility that soft scale populations may increase substantially.

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Parathion is extremely toxic to humans and the most serious hazard relating to its use is danger to personnel who may come in contact with the compound while making applications or working in newly treated groves. Precautions recommended by the manufacturer should be followed carefully.