The Southern Oregon Branch Experiment Station

. . . Its Development, Program, and Accomplishments

1911 to 1962

SPECIAL REPORT 156
JULY 1963

Agricultural Experiment Station
Oregon State University
Corvallis

CONTENTS

AUTHORS: F. C. Reimer is Horticulturist Emeritus, H. H. White is former Superintendent, and F. G. Gentner is Entomologist Emeritus respectively, Southern Oregon Experiment Station. H. H. Hartman is Professor Emeritus of Horticulture and R. S. Besse is former Associate Director of the Agricultural Experiment Station, Oregon State University.

THE SOUTHERN OREGON BRANCH EXPERIMENT STATION--ITS DEVELOPMENT, PROGRAM AND ACCOMPLISHMENTS

1911 to 1962

F. C. Reimer, H. H. White, F. G. Gentner, H. H. Hartman, R. S. Besse

HISTORICAL BACKGROUND

In the early 1900's pear and apple growers in the Rogue River Valley were becoming alarmed at the advent of diseases and insects that were attacking fruits, reducing yields, impairing quality, and causing heavy economic losses. They appealed to the Oregon legislature for funds to conduct research on these baffling problems.

Research Established

In 1911 the legislature, under House Bill 185-Chapter 176 "established a Branch Agricultural Experiment Station of Oregon State College in Southern Oregon," and appropriated $5,000 annually for its maintenance and support. The station has been maintained as a field laboratory or branch of the Oregon Agricultural Experiment Station since that time.

Many of its research projects have been organized and conducted in active cooperation with the central experiment station departments at Corvallis. Likewise certain projects dealing with irrigation, drainage, fertilization, harvesting, orchard management, and others have been in cooperation with the USDA, Bureau of Plant Industry, Agricultural Engineering, Soils and Irrigation. This joint and cooperative effort has brought to the southern Oregon area the combined talents of the research groups and the maximum application of science to the problems under investigation.

The station was located near Talent, Oregon, on 20 acres of land, subsequently increased to 45½ acres, which, together with the buildings, were furnished by Jackson County.

Although the legislative act creating the station provided for research in the broad field of agriculture, most of the research work at this station from 1911 to 1937 was on horticultural problems.

Agronomic Research Inaugurated

At the urgent request of general farmers, 9 acres of farm land on the McCall tract 2 miles from the station headquarters were rented in 1937. During the next 4 years the station entomologist, L. G. Gentner, conducted research on general crop problems, in addition to his fruit entomological duties.

Agronomic research grew so rapidly in importance and interest that the Jackson County Court purchased the McCall tract of 45 acres in 1941, enabling a major expansion of the crops research program, which was carried on for a number of years by the station Entomologist in cooperation with the Farm Crops

Department, OSU, and the Bureau of Plant Industries, USDA. In 1947 a full time agronomist, H. H. White, was assigned to the program. From 1949 to 1953 Jackson County provided $9,700 for the construction of three buildings, and the Josephine County Court provided $2,074 for the research program.

Horticultural Research Expanded to Different Soil Types

Since a rather large percentage of commercial pear orchards were located on black sticky soil, different from the more sandy soil of the Talent station, the pear grower's organizations persuaded the County Court to purchase 21.86 acres known as the Budge Tract 2 miles southwest of Medford in 1931 for special research on pear problems, particularly irrigation and drainage on adobe type soils. The county furnished the residence, and the USDA furnished the office and laboratory buildings and technical equipment required. Federal cooperative projects were transferred to this station, and the government assigned technical research work crews.

Federal cooperation at this station was terminated in 1960, and the federal workers were transferred to other states. At that time the federally owned physical plant was transferred to the Oregon Agricultural Experiment Station, which in turn transferred it to Jackson County.

Agronomic and Part of Horticultural Research Moved to Hanley Research Farm

In the interest of more efficient use of personnel and public funds, and at the request of local farm organizations, the Jackson County Court provided $134,000 for the purchase of 81.4 acres of land from the Hanley sisters, 3 miles west of Medford on November 15, 1957, and for the construction of essential buildings. The property was then assigned to the experiment station for conducting research on both agronomic and horticultural problems. Jackson County constructed an office-laboratory building, an implement building, and a residence at this new location.

In November 1958 the offices and equipment of the old Southern Oregon Experiment Station at Talent were moved to the new site, and the buildings on the old station immediately reverted to the county. The land on the old station was released to the county in February, 1959.

In December 1958 the equipment of the agronomic research area at the McCall Tract was moved to the new location, and the land and buildings turned back to the county. This consolidation of land, equipment, and buildings permits more efficient operation of the research program.

RESEARCH FACILITIES AND PHYSICAL PLANT

With the transfers, consolidation, and acquisition of land through the years, made possible by the generous and broad-gaged cooperation of the officials of Jackson County, the station now (1962) occupies 103.26 acres, consisting of 21.86 acres on the Budge tract 2 miles southwest of Medford, and 81.4 acres on the Hanley tract 3 miles west of Medford. The Hanley tract is the headquarters for all research.

Buildings on the Budge tract consist of a laboratory-office building, a residence, and an implement storage building. On the Hanley headquarters tract the buildings consist of an office and laboratory building, an implement building, and a residence.

Although the land and buildings are owned by Jackson County, they have been conditionally assigned to the state for as long as experimental work is conducted with these facilities.

Essential technical laboratory and field experimental equipment and farm machinery necessary for efficient operation are owned by the station.

TECHNICAL POSITIONS AND PERSONNEL

The efficient conduct of the research program requires a technically trained superintendent, a horticulturist, an entomologist, an agronomist, two technical assistants, one secretary-clerk and a varying number of farm laborers.

Through the years the following technical personnel, some full-time USDA and some federal-state cooperative, have been employed and have contributed directly to the accomplishments of the research program in increasing the wealth of the Rogue River Valley:

F. C. Reimer, Horticulturist and Superintendent, 1911 to 1947
Andrew McCormick, Horticulturist, 1914 to 1919
Robert Norris, Horticulturist, 1923 to 1930
Vaughn Quackenbush, Research Aid, 1926 to date (1962)
R. A. Work, Irrigation Engineer (federal) 1929 to 1939
Snow Survey Supervisor (federal) 1939 to 1953
L. G. Gentner, Entomologist and Assistant Superintendent, 1930 to 1962
W. W. Aldrich, Horticulturist (federal), 1932 to 1937
Elliot Degman, Horticulturist (federal), 1941 to 1945 --
Superintendent 1947 to 1953
W. T. Frost, Snow Survey Supervisor (federal), 1942 to 1953
John Grim, Laboratory Technician, 1945 to date (1962) - except war years
H. H. White, Agronomist, 1947 to 1953--Superintendent 1953 to date (1962)
Robert Beaumont, Snow Surveyor, 1949 to 1951
Manes Barton, Snow Surveyor, 1951 to 1957
John A. Yungen, Agronomist, 1953 to date (1962)
John Higdon, Horticulturist (coop. with USDA), 1954 to 1957
Roland C. Blake, Horticulturist (federal), 1957 to 1959

PROGRESS AND ACHIEVEMENTS

Destructive Fireblight Controlled

Fireblight of pears has been a serious problem from the beginning of pear culture in the Rogue River Valley, and at one time threatened the existence of the pear industry in that area. Not only did blight infections cause the death of many pear trees, but they caused severe reduction in yields due to the loss of fruiting wood. As late as 1930 it was estimated that no

less than 25% of the fruiting wood on all of the pear trees in the Valley that season was lost as a result of necessary blight-cutting operations. How to cope with the blight problem, therefore, has been a major objective of the Southern Oregon Branch Experiment Station since the station was established. The fireblight menace, in fact, was the chief incentive in the establishment of the station.

Fireblight research at the station has been extensive and long continued. Much work has been done in the search to find blight-resistant varieties, rootstocks, and trunkstocks. The station pioneered research on sprays for blight control, and it carried on a wide variety of experiments pertaining to improved blight control through orchard sanitation and cultural practices.

Extensive collection of pear types assembled. One of the first ventures of the Southern Oregon Branch Experiment Station was to assemble a collection of blight-resistant types of pears, and to test these types as possible sources of varieties, rootstocks, trunkstocks, or possibly materials for breeding purposes. The search for such materials was not confined to the United States, but ultimately included the entire world.

Some of the materials came from Europe. Some came from Africa and the Near-East while many came from the Orient and from Russia. Among early accessions was a collection of about 500 named varieties of pears from France. Many additions to the collection came as the result of two expeditions to China, Japan, and Korea by F. C. Reimer, then Superintendent. These expeditions took place during the seasons of 1917 and 1919, and were sponsored jointly by the Oregon Agricultural Experiment Station and the United States Department of Agriculture. Other valuable accessions were collected in the eastern and Midwestern portions of the United States.

This collection of pear materials assembled in the Rogue River Valley by the Southern Oregon Station has long been recognized as the most complete of its kind in existence. The collection has recently been moved to the new Hanley tract, and for the most part is being maintained as a Western Regional Project "W-6" between the Southern Oregon Branch Station, the central station at Corvallis, and the United States Department of Agriculture.

Blight resistant rootstocks found. Nearly all of the early pear orchards in Oregon were propagated on "so-called" French rootstocks. This rootstock was highly desirable in many respects, but was generally susceptible to blight. In the Rogue River Valley, where blight was particularly severe, root infections were common and often resulted in serious devitalization or death of the trees.

In an attempt to solve this problem, many rootstocks and rootstock combinations were tested, not only for their value from the standpoint of blight resistance but also for their desirability as rootstocks. Probably one of the outstanding contributions of the Southern Oregon Branch Experiment Station comes from test plantings of trees on various root and trunkstock combinations established during the period from 1920 to 1928. These plantings were set out not only on the station grounds but in commercial orchards throughout the Rogue River Valley and elsewhere.

Rootstock evaluation is of necessity a long-time venture, since rootstocks can be appraised only after long-time field performance. Thousands of seedlings, grown from seed selected from a large number of named and unnamed varieties obtained in China, were inoculated with the blight organism; and their growth habits, adaptability, and resistance to blight were determined. The few seedlings that proved to be resistant to blight after 5 years of annual inoculation were then budded to the common varieties grown in the Rogue River Valley. Further years of testing and observation were required to evaluate the qualities of this rootstock on the commercial varieties grown.

The plantings made by the station in the early days are intact for the most part, and now (1962) reveal a clear story as to how the various stocks have performed over a long period of years. These test plantings are particularly valuable now (1962) in view of the pear decline problem that has come to the fore within recent years. Pear decline is very obviously associated with certain rootstocks, and early test plantings now make it possible to select rootstocks without having to repeat the required long-time testing procedures.

Many rootstocks evaluated. A wide variety of pear rootstocks were tested and evaluated at the station--only a few are discussed in this report.

Pyrus ussuriensis, a native of China and Siberia, proved to be the most resistant to fireblight of any of the stocks tested. The stock derived from the vigorous cultivated varieties of the species appeared to be desirable for a period of time, but it soon developed certain weaknesses among which was "hard or black-end", particularly in the Bartlett variety. The Southern Oregon Station recommended against further use of the species as a rootstock in 1923, but unfortunately large numbers of trees on ussuriensis roots were planted in commercial orchards after this date. Of late years it has been found that trees on ussuriensis roots are susceptible to pear decline and should no longer be considered as a suitable rootstock.

Pyrus calleryana, a native of China, was brought to the Rogue River Valley by F. C. Reimer from his expedition in the Orient. This species has also proven to be highly resistant to blight, and has performed well in the test plantings as well as in commercial orchards. The stock appears to be highly resistant to root aphis, and seems to be tolerant of water to a considerable degree. Tests so far indicate that it is resistant to pear decline, although not entirely immune. The species seems to thrive in moderate climate, but is known to be susceptible to winter injury in regions that experience excessively low winter temperatures. Since its release extensive new plantings have been on this rootstock, and have given very satisfactory results.

Pyrus betulaefolia is another pear rootstock brought to the Rogue River Valley by the Southern Oregon Station as a result of Reimer's explorations in the Orient. Test plantings of pear trees on p. betulaefolia roots are not extensive, but they tell their story quite well. Trees on this rootstock planted in the early 1920's are large for their age, and have been productive. Up to date, these trees have been free of pear decline. P. betulaefolia is undoubtedly the most vigorous of all of the pear rootstocks. It is probably too vigorous for fast-growing varieties such as Anjou, as indicated by the frequent occurence of cork spot in Anjou fruits from trees on this species. This

rootstock, however, appears to be especially adapted to slow-growing varieties such as Bartlett, Red Bartlett, and Seckel; it seems to impart vigor which is lacking in such varieties.

Trees on p. betulaefolia roots appear to be quite susceptible to the physiological trouble known as lime-induced chlorosis, and it seems unwise to use this stock on soils that are known to be "limey" or underlain with marl.

French rootstocks in general are susceptible to blight. The possibility of finding resistant strains or varieties of this stock received much attention at this station over a long period of years. Extensive search was made to find blight-resistant French pears already in existence and to isolate such pears from French seedlings. All of the numerous named varieties of French assembled at the station were screened for blight resistance, and over 10,000 French seedlings were subjected to repeated blight-inoculation tests as well as to natural infection.

Some very valuable results were obtained from the work with these pears of French origin. Varieites such as Old Home, Farmingdale, Burkett, and others were found to be highly resistant to blight. It was also shown that the progeny from such varieties possessed blight resistance in a high degree, thus presenting the possibility of using the seedlings of such varieties as rootstocks. Of the 10,000 seedlings tested for blight resistance, 10 seedlings were found which were highly resistant and which imparted this characteristic to their progeny.

Unfortunately none of the blight-resistant French varieties isolated proved to be of sufficient merit to replace or supplement the standard commercial varieties. As a source of root and trunkstocks, however, and as a source of breeding materials, their discovery has opened up numerous possibilities. Seedlings of Burkett, as indicated by test plantings made as early as 1920, are proving to be a very desirable rootstock, and the merits of Old Home as a trunkstock have long been known. Other selections of blight-resistant pears made at the station may prove to be desirable in time, but their future status has not as yet been fully established.

Trees rebuilt with blight resistant trunkstocks. It has long been recognized that protection of trunks, roots, and framework branches of pear trees is highly important during periods of severe blight infections. During the time when blight was at its height in southern Oregon and in California, numerous pear trees were killed or permanently injured by blight infections in these portions of the trees. In this instance blight-resistant trunks became especially important.

It can be said that the Southern Oregon Branch Experiment Station was the pioneer and the leader of blight-resistant trunkstock research in the western United States. Beginning as early as 1912, the station set up many trial plantings of pear trees on blight-resistant trunks, including no less than 20 different types. Many of the test plantings made at that time are still living today (1962) and furnish unquestionable evidence as to how the various trunkstocks have performed over a long period of time. The results of these tests and their practical significance are well known to pear growers throughout the country.

While many of the stocks under test proved to be unsatisfactory for one reason or another, some of them proved to be highly desirable. Among these are Old Home, first brought to the Rogue River Valley by Reimer in 1915. This stock when used as a trunk or intermediary stock has proved to be very effective in protecting the framework, roots, and trunks of pear trees against blight infections. Recent surveys conducted in southern Oregon (1960-62) have failed to reveal cases of extensive blight damage to pear trees when Old Home was used as the trunkstock.

Aside from protection against blight, Old Home has other notable virtues. It appears to be thoroughly compatible, and makes very good graft unions with most types of pears. It also has the characteristic of self-rooting above the unions, thus forming a secondary root system above the grafts when the trunkstock comes into contact with the soil. This characteristic of Old Home is of particular significance in the light of recent findings concerning pear decline. Trees that are self-rooted, or partially self-rooted, appear to be highly resistant to decline. The use of Old Home as a trunkstock, plus the use of a resistant rootstock, offers double protection against decline provided that the trunkstock is encouraged to develop roots of its own. This is accomplished by lightly covering the graft unions with soil.

Insects and Diseases Checked

Since uncontrolled insects, mites, and diseases would prevent profitable pear production, methods must be found to check or control them. The Experiment Station and agricultural chemical companies working as a cooperative team are achieving these results.

A constant search for new and improved insecticides, miticides, fungicides, and other products lethal to pests and diseases is carried on by agricultural chemical industries. Testing these materials for performance, effectiveness, safety to foilage and fruit, compatibility with other materials used at the same time, and spray residues at harvest time under Rogue River Valley conditions is the function of the Experiment Station. Materials found by research to be satisfactory are recommended for use in orchards. Furthermore the station must study the habits and development of the various pests to determine the proper time for applying control measures and the number of applications needed for effective control.

Codling moth. A wormy pear finds no market. Only orchards that are well protected with proper measures produce clean fruit.

For many years lead arsenate was the recommended material and gave fairly good control. However, the codling moth developed more and more immunity to this material. It was then necessary to add spreaders and deposit builders and even stove oil to flocculate the material, but control continued to diminish. Then DDT was created by the chemical industry and after extensive tests by the station was substituted for lead arsenate, which had been the standard material for a quarter of a century prior to DDT. The use of this material has resulted in quite effective codling moth control even to the present time (1962).

Reducing the volume of wormy unsalable pears and providing clean marketable fruit is estimated to have increased grower income by a considerable amount.

Pear leaf aphids. The pear leaf aphid appeared and spread throughout the Rogue River Valley in 1946. It spent its entire life history on pear trees, being most abundant in the upper third of the trees. It produced a heavy honeydew condition which disfigured as much as one-third of the fruit, caused browning of foliage and leaf drop and entailed heavy losses. This pest was eradicated when the station found that DDT gave effective control.

The pear leaf aphid, an heretofore undescribed aphid, was a new discovery by Station Entomologist L. G. Gentner, and was officially named Macrosiphum gentneri as a new species by Preston W. Mason of the U. S. Bureau of Entomology and Plant Quarantine, in honor of Dr. Gentner.

Pear psylla. The destructive pear psylla reached the Rogue River Valley in 1950 and spread rapidly over the entire area. It produced large amounts of honeydew, disfiguring the fruit, causing defoliation, reducing yields and quality, and creating a sticky condition which made it difficult for pickers to harvest the fruit.

Some investigators feel that this pest is one of the contributing factors in pear decline through the introduction of a toxin while feeding. Recent information indicates that the pear psylla may carry a virus which affects the trees.

For a number of years station research showed excellent control of the pear psylla with oil and lime sulphur in the delayed dormant period followed by organic phosphate materials in the cover sprays. In a few years, however, the pest developed immunity to most of the organic phosphate compounds and other materials had to be substituted. One by one the substituted materials failed to control because of immunity. This necessitated continuous search for and testing of new chemicals to replace those previously effective. It would be difficult to estimate the economic value to growers from the control of this pest.

San Jose scale. A scale-infested fruit becomes a cull. From 1925 to 1935 it was estimated that from 10 to 35% of the pears were lost because of this pest. Infested fruit shipments were condemned. Growers suffered heavy losses. Research at the station found methods of controlling the scale, and very little loss has occurred since. The estimated saving to growers is substantial.

Wooly apple aphid. Early in the 1930's the Experiment Station introduced into the Rogue River Valley a parasitic wasp; its larvae lived within the wooly aphids and finally killed them. These parasites are still (1962) keeping this pest in control.

Spider mites. The two-spotted spider mite for many years has been a constant damaging factor in pear production causing heavy defoliation of trees when not controlled. This defoliation weakens the trees and results in small unsalable fruit. The mite has the ability to rapidly become immune to

materials which once controlled it effectively. This has required a continuous search for new materials to substitute for those that once were effective. This is becoming more and more difficult, until at present substitute materials are becoming very scarce.

Keeping spider mites in check through the years has been of substantial value to growers.

Proved sprays give growers confidence. Practically the entire spray program of pear growers in the Rogue River Valley consists of sprays tested, proved, and recommended by the Southern Oregon Branch Experiment Station.

Pear Industry Protected in Other Ways

Numerous miscellaneous accomplishments of the station have aided pear growers in handling their problems. For example:

(1) The station was the first to demonstrate that "stony pit" of pears is an infectious disease.

(2) When blight cutting was the only control measure for fireblight, the station developed a satisfactory disinfectant for the cleansing of wounds and pruning tools.

(3) The station was the first to demonstrate that certain forms of spray injury to fruit trees in the Rogue River Valley were caused by salts and other chemicals in water from deep wells.

(4) The station was the first to demonstrate that the red color of Red Bartlett and Red Hardy pears was transmissible through hybridization, thus paving the way for the breeding of red-colored pear varieties.

(5) In cooperation with the USDA the station was the first to demonstrate that yields in Anjou pears can be increased by proper pruning. This is in contradiction to the usual effects of pruning in the case of other pear varieties and fruits.

(6) The fruit growers of the Rogue River Valley have, through the years, adjusted and improved their production practices in accordance with research findings in irrigation, pruning, thinning, fertilizing and rootstock investigations conducted by the United States Department of Agriculture, Bureau of Plant Industry and Agricultural Engineering, in cooperation with this Branch Station.

(7) The station has cooperated with and given aid to other agencies.

The true worth of the Southern Oregon Branch Experiment Station must not be evaluated solely on the basis of the contributions it has made in its own right. Some of its major contributions come from the assistance and cooperation it has rendered to other agencies engaged in research in the Rogue River Valley. Among such agencies are the numerous experiment station departments of the central station at Corvallis, the United States Department of Agriculture, and such private concerns as the manufacturers of spray materials and agricultural chemicals. There have been times when almost the entire facilities and personnel of the branch station have been engaged in cooperative projects with other agencies.

For example, the extensive work on pear harvesting, storage, and handling done in the Rogue River Valley by the Department of Horticulture at Corvallis, Oregon, and the United States Department of Agriculture, could not have been done without the full cooperation and assistance of the Southern Oregon Branch Station. The same is largely true of the recent work on pear decline, as it is the work in insect and disease control and in numerous other ventures involving cooperative effort.

Superior Alfalfa Variety Created

The new alfalfa variety named "Talent" was developed at this station from extensive selections, crosses, and tests extending over the 14-year period (1936-1950) in cooperation with the USDA Bureau of Plant Industry and Agricultural Engineering. Extensive testing revealed that Talent yielded an average of one ton per acre more hay of better quality than any other variety available at that time. It is still (1962) equal in yielding ability to any other variety adapted to this area. Because of its high-production ability, good stem nematode resistance, long stand life, and high-feeding quality, it continues to be the dominant variety in the southern Oregon area.

Normally this area (Jackson and Josephine Counties) maintains around 15,000 acres of alfalfa for hay. About 13,000 acres of this is Talent, which is estimated to have increased production in the area by 10,000 to 13,000 tons annually since its development. Applying a modest farm value of $20 per ton to this increased tonnage, indicates an estimated increase in wealth of $200,000 annually or about $2,000,000 during the 10 years it has been in general use.

In addition the area has developed a substantial alfalfa-seed industry based on Talent. In 1952-1954 Jackson County ranked number one in Oregon in production of alfalfa seed most of which was Talent. Much of this seed was sold to Greece, where it has been an outstanding forage producer. Production of Talent seed and net income to growers by years for Talent seed marketed through the Josephine Growers Cooperative Association is given below:

Crop year	Production Pounds	Value Dollars
1952	131,000	59,800
1953	75,000	30,500
1954	81,300	25,100
1955	77,000	30,500
1956	140,000	55,500
1957	106,000	41,400
1958	157,800	60,000
1959	149,700	56,200
1960	224,000	79,300
1961	289,500	108,000
	1,431,300	546,300

Yield of Feed Grains Increased

The southern Oregon area is deficient in feed-grain production and many tons of wheat, oats, barley, and corn are shipped in annually. Because of high production costs, growers devote only a small portion of their land area to the production of these crops, and it is usually land that is being readied for a high income-producing crop.

In the interest of maximum efficiency on land that is devoted to feed grains, the station has introduced and tested many new varieties. Practically all varieties currently grown (1962) are varieties that were introduced or tested by the station for adaptation to this area.

Most of the acreage devoted to these crops is fertilized and treated for weed control according to recommendations developed by the station through field trials.

Role of Sulphur in Plant Nutrition Discovered

About 1914 the station discovered that sulphur was a vital nutritional element in the production of alfalfa. The Soils department at the central station also made this discovery about the same time. This disclosure was new to science and created considerable interest throughout the western states. Its use made possible the production of alfalfa hay on adobe soils, where previously it could not be grown, and it greatly increased yields on free soils where alfalfa is normally grown. The use of sulphur became standard practice in Oregon and in many other sections of the west, not only on alfalfa but on other legume crops as well.

Subsequent research by the station has demonstrated the economic value of sulphur in the fertilization of feed grains, corn, and grasses grown in the southern Oregon area.

General Fertility Research

Commercial agriculture in southern Oregon began with the "Gold Rush" days before Oregon became a state. Continued cropping of the soils for over 100 years without sufficient regard to restoration of fertility brought on declining yields. By 1950 and even before, farmers were in difficulty due to soil depletion, which together with narrowing cost-price relationships pointed up the need of more research aimed at increased yields and greater efficiency in production. Upon the urgent demand of growers for assistance, research on efficient use of fertilizers was expanded during the early 1950's. Through a fertility survey conducted in 1952-53 and numerous field trials scattered over Jackson and Josephine Counties, it was established that most of the soils of the area were in need of nitrogen, phosphorus, and sulphur and a large number would respond to calcium, potassium, and boron.

Based on field trials involving the various crops grown in the area and on the various soil types, new fertility recommendations were developed for all crops. These have been widely adopted, and the response has been clean cut and potent in lowering unit costs of production by increasing yields. Most of the guesswork as to kinds and amounts of fertilizers to use has been eliminated, and the money now spent for fertilizers is a safer investment.

It is impossible to measure the economic results of this type of research, for it permeates the entire agricultural endeavor of the area. Many operators, part-time farmers, and home gardeners use the station's recommendations which reach them through a wide list of agencies such as the Extension Service, the Soil Conservation Service, fieldmen for commercial agencies, feed, seed, and fertilizer dealers, newspaper releases, field days at experiment stations, tours to successful farms, and visits to neighboring farms.

Though no dollar value can be assigned to this research, its value is very large. It has reduced and in many cases reversed the downward trend of fertility in the area. It has enabled growers to produce profitably even though the cost-price squeeze has grown more intense.

Costly Weed Toll Reduced

In the early 1950's it was difficult to find a reasonably weed-free field of feed grain or corn in the area. Seed fields of alfalfa and ladino clover were heavily infested with weeds. Weeds were not only reducing yields of all economic crops, but were increasing the cost of processing the crops for market. Through field plots, both on-station and off, recommendations for control of weeds in feed-grains, corn for grain and silage, seed crops, truck crops, and pastures were developed. During the 1961 and 1962 crop years, most commercial operators and many of the part-time farmers used some form of weed control tested, refined, and recommended by the station.

Lygus Bug, Seed Weevil, and Midge Conquered

The control of lygus bug, clover seed weevil, and a hitherto unidentified seed midge materially increased per-acre income of ladino-clover producers, and enabled Jackson County to become the leading alfalfa-seed producing county in Oregon from 1952-1954. The seed midge was new to science and had never been named. It was described by Dr. A. E. Pritchard of the University of California and named Dasyneura Gentneri in honor of Dr. F. G. Gentner, Entomologist, who discovered it and found methods for its control at this station.

At the present time (1962) seed production is relatively small in the Rogue River Valley due to a number of economic and other factors chiefly unrelated to insect and disease problems. In the meantime extensive tests of varieties, rates and dates of seeding, spacing, fertilizing, insect and disease control for different seed crops, grasses, and legumes have assembled a body of facts that may become the turning point in the future success of the seed enterprise.

Range Capacity Increased by St. Johnswort Control

The noxious weed, St. Johnswort, was invading large sections of the rangelands in Jackson and Josephine Counties by 1950 and eliminating economic grazing of infested areas. Likewise the banks of the highways surrounding these areas were covered with the rapidly spreading pest. This station, cooperating with the Department of Entomology, obtained 15,000 leaf beetles which had been reported to be effective in controlling this weed in Australia.

They were procured from the University of California where they were being raised for experimental work.

These beetles were released in a number of spots in the heavy stands of St. Johnswort in both Jackson and Josephine Counties and annually observed to note their spread, increase in numbers, and effectiveness. At the end of 4 years, a survey in the areas treated in Jackson and Josephine Counties showed practically all of the land to be free of the weed and again available for pasture. The beetle had also disappeared in that area, inasmuch as its sole diet is the St. Johnswort weed.

More Grass from Improved Mixtures

Several thousand acres of logged-off and newly burned-over rangelands have been seeded to grass mixtures tested on many plots in 32 different high rangeland areas and found to be superior to the ground cover which normally appears. These grass mixtures provide more feed, are more palatable, and have withstood the prevailing grazing and weather conditions. They have materially reduced erosion in burned-over and logged-off areas.

Improved Truck Crops Sought

In response to repeated grower appeals for assistance, the station entered upon a research program for truck crops in 1958. Key crops were sweet corn and tomatoes for fresh market and onions. The objectives were to introduce and test new and improved varieties, develop better fertilizer recommendations, and develop weed control recommendations. Substantial progress has been made on all three objectives, though much remains to be done in the future. With the pressure of increased population for food, a favorable climate, the development of new water for irrigation, and increasing availability of labor during the growing and processing season the southern Oregon area has an undeveloped truck and small fruit crops potential. A background of research in this area is important to the expansion of this potential industry. Economic returns from this research are now substantial, but they will be great when expansion and development of the potential gets under way.

Search Continues for New and Better Crops

The continuous search for new or better crops is of twofold importance. First, the testing and screening of every crop that may appear to have promise in the Rogue River Valley might introduce one or more that would have a potential far exceeding any now in use. Secondly, such testing and screening shows what not to grow, saving newcomers and others from wasting money on unsuited crops. This answers many questions posed by new settlers coming from other areas of the country.

ECONOMIC EVALUATION OF ACCOMPLISHMENTS

It would be impossible accurately to measure the financial benefits of the research programs of the Southern Oregon Branch Experiment Station from 1911 to 1962. Nevertheless, it is clearly evident that saving a crop, a tree, or an industry, controlling a devastating disease or a destructive insect, increasing yields and reducing costs by superior varieties, proper fertilization,

more efficient practices, and improving the quality and marketability of a product creates new wealth. Such wealth is cumulative. Its creation for one year, in most cases, continues annually.

More Dollars for Fruit Growers

There can be no doubt that research has aided in the maintenance, stability, and growth of the pear industry. There are those who believe that if destruction from blight alone had been unrestrained, the commercial pear production enterprise would have long since folded. Likewise pear decline had a potential of destruction. Possibly these maladies might have eventually run their course and the survivors kept in the business. The federal government or some other experiment station might ultimately have solved these problems--but this did not happen. The Southern Oregon Station, jointly and in cooperation with the USDA and Oregon State University departments, and the eager assistance and collaboration of progressive pear growers solved them. A very substantial annual increase in wealth has accrued to the Rogue River Valley.

More Dollars for General Farmers

Accurately assessing the increase in wealth to southern Oregon farmers from the results of the research program from 1937 to 1962 would be a difficult and expensive task. It is certain, however, that the creation of Talent alfalfa, the increase in yields of feed grains and forage crops, the introduction of improved varieties, the determination of fertilizer needs, and the control of weeds and crop-devastating insects have resulted in increased income from general farming.

THE RESEARCH PROGRAM OF 1962

In close collaboration with horticultural and agronomic advisory committees, consisting of active local fruit growers, general farm leaders, and county agents, research programs are developed. Problems in the fields of horticulture and general farming are presented by these local leaders, and suggested research projects to aid in their solution are proposed.

In these advisory committee meetings, project priorities are considered, and a constructive forward-looking research program is adopted. The superintendent and research staff then confer with the appropriate scientists at OSU engaging their cooperation, technical assistance, and leadership in jointly carrying out the research on some of the projects. This joint effort of the leading growers, the OSU scientists, and the branch station staff gives assurance that research will be conducted on the most vital problems in the area insofar as funds and personnel are available.

Horticultural Projects

Under the leadership and in cooperation with the OSU Department of Horticulture, the following research projects were active in 1962:

1. Evaluation of several thousand hybrid pears, as seedlings and at maturity, for the purpose of developing new superior late-keeping varieties.

2. Maintenance of a collection of over 300 varieties and species of pears for breeding purposes.

3. Evaluation of pollenizer placement as related to yield.

4. Effect of mineral nutrition on tree growth and fruit set on superior and inferior pear trees.

5. Testing the use of lime to correct low pH resulting from excessive use of ammonium sulfate.

6. Residual effect of five different nitrogen carriers when used to fertilize pear trees.

7. Testing methods of establishing replants in mature pear orchards.

8. Completion of long-term cultural and fertilizer tests and the preparation of a bulletin.

9. New rootstock tests--screening a large number of different root types for possible future planting stock.

10. Testing methods of propagation to determine the best methods.

11. Cross-pollination with special lines of pear rootstocks to further determine the value of species hybrids as rootstocks.

12. Testing various herbicides for weed control to determine the effect of repeated applications upon the trees and the degree to which chemical residues are built up in the soil.

Under the leadership and in cooperation with the OSU Department of Botany and Plant Pathology, the following research projects were active in 1962:

1. Studies of Albino virus in sweet cherries in an effort to find or develop virus-resistant lines. Over 300 trees are now under test.

2. Study of pear-tree viruses to develop rapid methods of detecting them, determine their effect on production, and develop virus-free sources for nursery and commercial production. Over 300 trees are used in this study.

3. Testing fungicides on d'Anjou and Bartlett pears to determine their effect on fruit finish.

4. Testing fungicides to determine their effectiveness in controlling fireblight and pear scab.

5. Testing 200 rootstock selections for susceptibility to diseases (fireblight, root rot, etc.).

Agronomic Projects

A number of projects dealing with general farm problems are conducted jointly and in close cooperation with OSU experiment station departments.

1. Testing feed grain varieties.

   Many wheat, barley and oat varieties are under test to determine comparative yields, disease resistance, and growth habits.

2. Evaluating field corn varieties.

   Approximately 40 hybrid field corn varieties have been evaluated for silage and grain yields under both irrigated and dryland conditions and in close or solid-planting methods. More varieties are under test at present.

3. Forage investigations.

   Testing alfalfa varieties, including 27 from foreign countries.

   Testing some 23 grasses and legumes for efficiency in hay and pasture production under irrigation.

   Testing dryland forage grasses and legumes in three field nurseries on different sites with different lime and fertility treatments (in cooperation with the Soil Conservation Service, and the Extension Service).

4. Fertilizer and lime experiments.

   Testing the effects of different fertilizers on legumes, rowcrops, and forage grasses.

   Conducting field-fertilizer demonstration trials on cooperating farms in Jackson and Josephine Counties in cooperation with the Extension Service.

5. Testing the efficiency of different herbicidal materials for controlling weeds in grain, forage, truck and vegetable crops.

6. Searching for improved seed crops by evaluating alfalfa crosses, Tifton #1 ryegrass, Merit ladino clover, and certain new bluegrasses.

7. Comparing efficiencies of irrigation and nonirrigation on various crops.

8. Conducting truck and vegetable crop experiments to determine the best suited varieties of sweet corn, tomatoes, peas, rhubarb, beans, and onions for commercial production.