

OREGON AGRICULTURAL COLLEGE
FARM CROPS DEPARTMENT

JARDINE

NOTES
on
PRELIMINARY WORK
in
HOP BREEDING
in
OREGON



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HOP BREEDING WORK IN OREGON

By

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Work this fall on hop breeding in Oregon was begun on September 3, when a visit was made to the Ireland Hop Yard, East of Corvallis, Oregon. In addition to searching for mildew, two pictures of this yard were taken. No mildew was found. The manager, C. W. Butler, reported that all spikes had been removed early in the season, but the yard was not sprayed. Apparently the disease did not spread.

The next work was done on September 6, when the Ireland Yard was again visited and some of the outstanding plants were staked. Picking had progress^{ed} for two days, and the hops were yielding about a ton per acre. All of the hops in this yard are English Clusters. Ten pictures of various hop activities were taken.

On September 9, the writer visited Independence and interviewed Dean Walker, of the First National Bank. Mr. Walker is an extensive hop grower in the Independence district. He is also associated with Mr. Seavey in other yards. An appointment for the following day was made with Mr. Walker, as he was busy on the day he was interviewed. Mr. Walker stated that he has a thousand pickers working in his yards. The McLoughlin Yard, consisting of 400 acres, was then visited. This yard is owned by Louis L^achmund of Salem. The foreman said, "Mildew shows up when heavy late fogs are present. Rain is usually followed by the wind, so it does not necessarily bring on

Mildew." Seed was collected from English Clusters. Seed was also collected from several yards of early hops which had been picked. I was unable to get the variety names. Picking was in progress in these yards, and the foreman said there were about twelve hundred pickers at work. He also stated that on the Horst Ranch there were 2,000 pickers at work.

The Gilbert and Patterson place at Eola was next visited. They grew forty-two acres of hops, which yielded rather poorly because the vines were not trained up until late in the season. The foreman stated that they were using sulphur for bleaching, at the rate of a quarter of a pound per box, which is about a half a pound of sulphur for a hundred pounds of hops. They were running their kilns at a temperature of 140 to 150 degrees F. They carry about twenty-one inches of hops on the floor and dry for twenty-one hours. He stated that they liked to "case" their hops; that is, dry them in the warehouse for several days before baling, as they go through a "sweat", ^{and make a better quality.} Hop bales weigh 200 pounds net, allowing five pounds for the sack, and they are baled with a baler which has about 20 tons pressure. Considerable seed from last year's crop was collected at the Patterson place. It was stated that the price for hops had been poor for the last three years, and that the market now was from 12¢ to 14¢ per pound with no buyers. He stated that some quotations were as low as 7¢ per pound.

September 10 was spent in the vicinity of Independence. Most of the morning was spent with Mr. Dean Walker, collecting seed and noting various plants. Mr. Walker stated that there are three main varieties of hops grown in Oregon: First the English Clusters, or late hop; Second, the Early Clusters, which

were originated by a grower near Albany; Third, Fuggles, an early hop which is resistant to Mildew. All thru the yards, particularly of late hops, one finds some red vine hops. These latter hops are well known by the pickers, as they are very difficult to pick, the cones being scattered thru the leaves. A large quantity of seed was obtained of the Fuggles and Early Clusters from yards which had already been picked. Mr. Walker, however, was familiar with these yards and was certain of the varieties. Then, the writer, accompanied by Mr. Walker, collected seeds of various plants which the latter had noticed in the fields of English Clusters. Some of the plants bear cones which do not close; others bear extremely small cones; then considerable of the male hops containing cones were observed. These hermaphrodite plants were fairly common in the Independence district.

Pickers were receiving \$1.00 per hundred pounds in almost every case. In some instances, however, growers were paying 85¢ per hundred pounds with a bonus of 15¢ per hundred if the pickers stayed thruout the season. This is in contrast with the \$1.25 per hundred paid last year, with a 10¢ bonus. Most of the yards in this district are strung on high wires. The small wires are No. 6, and the large crossway wires are 00. Poles are in every fifth or in every seventh row, depending upon the yard.

Mr. Walker stated that there was an old gentleman by the name of Smeed at Eugene, who was supposed to have brought in about forty varieties of hops several years ago. He did not know Mr. Smeed's initials, and was of the opinion that he was not living. The writer got in touch with O. S. Fletcher, County Agent at Eugene. Fletcher stated that the person's name was

William Smeed, of Springfield, Oregon, Phone 20F--22. He stated that he was unable to get in touch with Mr. Smeed, but he was sure that they were still growing hops.

On October 11, the Ireland Yard was again visited and the manager, Mr. Butler, was interviewed. Mr. Butler said that part of the yard was planted in 1890; another part in 1916; and the last part in 1920. The yard is owned by Dr. Ireland, of Portland, and leased by Mr. Seavey. One of the weighers who had removed spikes early in the season reported that he had seen some mildew in the yard, but the writer was unable to locate it. In this yard they use three strings and four vines per hill, stringing two vines on the center string. They grow male hops every ten hills square, and in the hill is placed a large stake, so that in the spring they can distinguish the males from the females. Ordinarily they seed in vetch with a one-horse drill early in the fall. This not only adds fertility but gives pretty good sheep pasture in the spring. They allow sheep to clean up the old vines and to eat the lower leaves of the hop plants after they have been trained. Several good hop plants were staked in the yard on this date.

The entire day of September 12 was spent in the vicinity of McMinnville and Newberg. The yard of W. C. Miller at McMinnville was visited. He is growing twenty-five acres at McMinnville, and thirty acres of hops at Yamhill. All of them are English Clusters. He stated that he and his brother have a yard at Forest Grove in which they are growing what is known as a Hungarian hop, which has a heart shape. He stated that several years ago they got about fifteen roots. All of them died except one, which they have increased until they now picked

from it this year 200 pounds of hops. It is extremely early and was picked on August 5. He stated that T. A. Livesly had offered them \$50 for 50 roots of this hop. The writer attempted to get some of this hop from Mr. Miller, but he did not seem very anxious to part with any of them. Mr. Miller stated that the sulphur contained arsenic and so the English buyers do not like hops that are bleached. He also stated that they liked to get hops that were rather green in color and picked early. Part of his crop had been contracted to English buyers.

Next the yard of Henry L. Bent, of Star Route, Newberg, was visited. He has four yards. This one contained 62 acres, all English Clusters. The foreman stated that Mr. Bent had a yard of Fuggles at Aurora. Seed of both dry and new hops were obtained in this yard; also some seed from red vines were obtained. Several of the smaller yards in the vicinity of St. Paul were visited. Most of these yards are rather small and apparently are operated by independent growers. A visit was then made to the Independence district. Some time was spent at the McLoughlin baler, where 100 bales were baled a day. The wheelers were paid 4¢ per bale, and it was stated that all working on baling were paid by the bale.

Previously in the day, Mr. Miller had stated that there was considerable frost damage in his yard last fall and that the frosted plants bore no cones. At the Bent ranch the foreman stated that they called the red vine hop Welsh hops.

In thrashing out of the seed, it was noted that the Early clusters have extremely large seed, the seeds of this variety being nearly twice the size of other varieties. No differences were noted in the other seed.

The first seeds were planted in pots in the greenhouse on September 9. At this writing, a week later, none of them have sprouted. At the same time seeds were placed in blotters in the germinator, and these also appeared to be dormant. They are neither sprouted nor moulded.

On September 11 considerable seed was placed in the Dairy Department cold room at a temperature of zero degrees F. It was thought that this chilling of the seed may overcome its dormant habit. The seed was allowed to remain until this date, or for four days at this temperature. Some of the seed was then placed in the germinator to see if it would sprout.

On September 16th the writer went to Eugene and got in touch with Stephen Smeed and found that he had quit growing hops and had retired. However, his son, Herbert Smeed, is planning to re-enter the hop growing field. Stephen Smeed is 89 years of age. He came to this country at the age of 25 from Sussex, Kent, England. He grew hops for a few years in Wisconsin and then came to Oregon. He has grown six varieties-- English Clusters, Prolific, German Grape, Jones and Cobbs. He said that the English Clusters and Fuggles were the best. The German Grape was fair. He finally discarded all varieties except the English Clusters and Fuggles. He stated that Fuggles do well on long poles, and that they got from 2000 to 3000 pounds per acre.

I next visited the hop yard of Herschel Anderson. It is across the river and south of Eugene, Oregon, adjoining the Chase's garden. Mr. Anderson has 80 acres of hops--60 acres of English Clusters and 20 of Red Vine. He states that he contracted his crop for 22 cents per pound and figures that

he will have nearly 120,000 pounds. He had some mildew this spring, but pulled the spikes and none was present this fall. He had a very peculiar long, pencil-shaped hop which did not seem to fatten up. He thought maybe this was caused by disease. In the last few days it has started to increase in size, particularly at the end. He stated that the year before he had two plants which bore no hops, but this year they bore a crop. He stated that the English people do not mind a little reddish discoloration on the hops, and that they do not like green hops. This is contrary to the statement made by Mr. Miller.

The hop ranch of Murphy Brothers at Harrisburg, Oregon was visited. They are growing both English Clusters and Fuggles. Also they have a planting of Early Clusters which should bear next year. Mr. C. W. Murphy stated that they had no mildew. He also stated that the Fuggles dried out about 30 pounds to the hundred, where the English Clusters dried out 24 pounds to the hundred. However, the Fuggles do not yield as many pounds in the field. They are also rather rooty and hard to train.

Next visited J. R. Cartwright at Harrisburg. He has 130 acres of hops, mostly English Clusters. They did not take care of the yards this year, and consequently picked only about 25,000 pounds off of the 130 acres. He was very familiar with Mr. Smeed, and knew of the varieties which Mr. Smeed grew. In/^{the}order of the earliness he listed them Hobbs, Prolific, Fuggles, German Grape, Jones Cluster and English Clusters. He says that the German Grape and the Early Clusters are identical. He also stated that the Wells Seedling, or Red

Vine, was the first hop grown in this country. He called attention to small hops, which they call peanut hops. He said that they had sold roots for as high as \$20 per thousand, 3 inch roots with two eyes. He stated that he liked these roots better than the long ones. Roots usually sell for \$8 per thousand. It costs about \$5 per thousand to dig them.

On September 18 I visited the Horst Ranch, at Independence, together with Professor C. E. Owens, to inspect the hop mildew experiment he has been carrying on. The work was carried on in a yard which was not being harvested this season. As a rule, it was stated, the Horst Ranch leaves some of their yards each year. It is the custom to plant corn between the rows in these yards which are not trained. The corn was making a very nice growth and maturing ears. Many hops were being produced where the vines were climbing on corn plants. No males were visible, and so^a/large quantity of hops was picked to use in grading work. These were of the variety of the English Cluster. Similar hops of this variety adjoining males were also picked for comparison.

The only place new infections of downy mildew were observed were in cases where Professor Owens had covered the hills with a tent made of burlap sacks and wet down the tent thoroly with water from a hose for forty-eight hours. Infected spikes were rubbed over these hills and spikes left in the hills. A good many leaves showing recent infections were found in these hills. In practically all other cases the mildew had not spread, even tho infected spikes were rubbed over the leaves and infected spikes were left in the hills. It indicates that the dry weather

during August did not permit the spread of the disease.

The dryers on this ranch were noted. The heated air is forced thru the hops by means of large fans. Apparently this facilitates the work greatly and allows quicker drying. Oil was being used as fuel in the furnace.

On September 19 the greater part of the day was spent at the Linn & Linn ranch, near Albany. Seed and roots were collected. They have forty-six acres of hops of all four varieties, English Cluster, Fuggles, Late Cluster,^s and Canadian Reds. Mr. James Linn, owner of the Marion Hotel, stated that he was responsible for the Early Cluster variety. He says that he found two plants in 1908 growing in the English Cluster variety. The roots of these plants were dug and planted on the ranch of Mr. McKee, at Jefferson. The same variety was also grown by Mr. Magness. This variety has long and numerous roots which are difficult to handle. He stated that they get sometimes as high as 120 roots to a plant in the Early Cluster variety. The variety apparently is also quite susceptible to both mildew and aphid. These growers, however, are very enthusiastic about the Early Cluster variety, stating that it yields more than the Fuggles and makes a hop which is in a little more demand than the Fuggles, which is bought only by English buyers for making stout. They stated that they were going to quit growing the Fuggles variety because it yields so little, not one-half of the yield of other varieties. These growers like the Canadian Red variety. They state that it is high yielding, comes later than the English Cluster, and makes a fair quality hop, altho the odor is a little strong. Apparently the chief objection to this variety is that it is hard to pick and is very sus-

ceptible to red spider. The spider seems to work on Red Vine more than any of the others. These growers stated that they would like to have a variety which has the good characteristics of both the Canadian Reds and the Early Clusters, without the poor characteristics of these varieties.

Small samples were taken by Mr. Linn from several bales of hops. These were removed by means of special tongs. The samples were about a foot each way in dimension.

Mr. Linn stated that the estimate given out in August by the College of 50,000 bales of hops in Oregon was entirely wrong, and that there are at least 75,000 in the State and 40,000 of these bales are contracted. These growers stated that they have gotten as high as 4,000 pounds of hops per acre. Part of their crop is contracted.

Linn & Linn are very emphatic in their statements against the spray for downy mildew. They claim that the spray reduces yields and that there is no difference noted in the spread of the disease. They said that they have noted only one spiked hop this fall, and it was in the Red Vines. In the months of May and June, when the mildew was present, they removed the spikes but did not take them away from the field. They were cut off and dropped in the rows.

These growers called attention to a variety known as the Bavarian Hop, which was growing on the adjoining place, now owned by the First National Bank of Oregon. It was stated that Ezra Meeker brought these hops to Oregon from Puyallup, Washington. It produces rather a small cone and is just between the Early Clusters and the Late Clusters in maturity. They state that they practically always begin picking Early

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Clusters on August 24, the Bavarians on August 28, and the late hops on September 3. Their cost of production is 13 cents per pound.

Some mold was found in the Canadian Red hop. These molded hops were found only on the tops of the wires, not down on the sides. It was stated that this was the first mold which had appeared this year. Hops with cones which are molded appear a little drier on the outside. When the cone is broken open longitudinally, the entire center has turned black, and this blackish mold has almost entirely ruined the hop. A small green grub had worked on the lower end of many of the hops; that is, cut off the food supply and the lower end of the hop had turned brown. A few hops which they call "stinkers", which are rather fluffy hops which do not close, were observed in the field. A large number of these were observed in an adjoining field owned by Mr. Irvine.

The Irvine ranch was also visited. They are completing their picking on this date. The Wigrich ranch in the vicinity of Independence was also visited. They had completed their picking. This ranch has about four hundred acres and is owned by English hop importers.

On September 25 I visited the Horst Ranch at Independence and conferred with the manager, Mr. Kennedy, about the condition found in hop yards this year known as "Sleepers". This condition appears to be fairly common in many of the yards and is characterized by hills which give no growth or only a few weak

arms, not sufficient for training. Mr. Kennedy was of the opinion that these sleepers were plants that were dying or already dead. He stated that they planned to grub out those hills. The Horst Ranch produced 2800 bales on about 275 acres. They had 300 acres of hops in corn, making a total of about 575 acres of hops on this ranch. The downy mildew plots were noted and it appears that the downy mildew is spreading from one hill to another around the hill which had considerable infection. An adjoining yard showed an enormous amount of "mold", and in fact quite a bit of the hops in this yard were left in the field because of "mold".

I then visited the Frank DuBois Hop Yard at West Woodburn, Oregon. This three year old yard of English clusters consists of 26 acres. Nearly two acres in one corner of the field contained, with few exceptions, nothing but "Sleepers". Mr. DuBois had written in regard to information on this condition. Many of the hills were dug and they appeared to be dying or already dead. A few of the hills, however, were sending out fairly good arms that appeared to be in good condition. From all appearances this condition was caused by some organism, maybe verticillium or fusarium. Specimens were brought in but it was found that there was no one available to work on them. Roots of healthy and diseased plants, also diseased crowns, were planted in the greenhouse here for further study. Mr. DuBois was advised to grub out the hills which were apparently gone or nearly dying. In handling the hills that were making some growth, he planned to crown part of them this fall and the others in the spring. A large number of plants were staked in the corner of this yard.

It appears that this condition is causing as much trouble as downy mildew and it should be thoroughly investigated. It may be that this trouble is responsible for the large number of missing hills found in many of the hop yards.

Several seedlings from the various lots of seed are growing in the greenhouse at this date, October 31. It is of interest to note that the only cuttings which are growing are from the early Clusters variety. There is no reason why a large number of interesting and valuable plants should not be obtained. The possibilities of developing varieties appear to be great.



Picking Hops at Corvallis, Oregon, 1930.



Sacks of Hops being hauled into the Dryers - Oregon, 1930.



Corn in Hop Fields - hops not trained.
Horst's Method of "Resting" the Yards.



Male Plant in Field.



General View of Hop Yard, Oregon, 1930.



"Wire down" - he lowers the Wires to Facilitate Picking.



Family Group of Hop Pickers.



English Clusters - The Common Variety in Oregon.



Cones of Early Cluster, "Wild", Red Vine and "Peanut" Hops.



The Fuggles Variety - Resistant to Mildew.

