

T H E S I S

On

A STUDY OF THE BEARING HABIT AND
POLLINATION OF THE SOUR CHERRY

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INDEX.

	Page
Title Page	1
Approval Sheet	2
Acknowledgment	3
Index	4
List of Illustrations	4-a
List of Tables	4-b
Introduction	5
Bearing Habit	7
Conclusions - One Year's Investigation	13
Pollination - Literature Review	14
Pollination Work in 1923.	16
Methods Used	17
Sterility Tests	17
Cross Pollination	23
Pollen Germination Work - 1924	28
Pollination Work in 1924	32
Discussion of Results	38
Final Summary and Conclusions	39
Literature Cited	42

LIST OF ILLUSTRATIONS.

	Page
Plate I.	
Fig. 1. A spur falling into Class I. (No leaves) Common on all varieties.	8
Fig. 2. A spur falling into Class II. (Miniature leaves) Common on all varieties especially English Morello.	8
Fig. 3. A spur falling into Class III. (With two or more full-sized leaves) Predominant in Montmorency.	8
Plate II.	
Fig. 4. Terminal shoot, May 1923.	11
Fig. 5. Resultant branch, May 1924.	11
Plate III.	
Fig. 6. Showing condition of buds at the time of sacking for sterility tests and proper time to make emasculations.	20
Plate III-A.	
Fig. 6-a. Ostheim tree sacked for sterility test.	21
Fig. 6-b. Close-up of bag showing method of marking.	21
Plate IV.	
Fig. 7. Showing method of marking check test	22
Plate V.	
Fig. 8. Showing the branch after emasculation. (See Fig. 6).	25

LIST OF TABLES.

Table No.		Page
I.	Spur Type Examination	9
II.	Results of Observations Upon Leafy Terminal Shoots. 1923-1924	12
III.	Sterility Tests - Corvallis, 1923.	19
IV.	Sterility Tests - Dallas, 1923	19
V.	Summary of Work at Dallas, 1923	26
VI.	Pollen Germination, March 13, 1924	30
VII.	Pollen Germination, March 15, 1924	30
VIII.	Pollen Germination Tests, April 11	32
IX.	Sterility Tests, Corvallis, 1924.	34
X.	Sterility Tests - Dallas, 1924	35
XI.	Crosses at Dallas, 1924	36 & 37

A STUDY OF THE BEARING HABIT AND
POLLINATION OF THE SOUR CHERRY.

John Howe Painter.

INTRODUCTION.

The sour cherry of the East is at last making its debut in the list of fruits of the Pacific Northwest. Plantings of the sour, or as they are commonly spoken of "Pie Cherries" are being added quite rapidly in Oregon. One of the leading nurserymen of the State says that he is finding no trouble at all in selling his sour cherry stocks; that the demand in fact, is even exceeding the supply. Canners are now accepting them and are even calling for them. The significance of this is that the prospects for the future plantings are very good.

Since the sour cherry is gaining in importance and because there is much to be known about them, especially in respect to their bearing habit and pollination requirements, this problem was undertaken in the spring of 1923.

It has been noticed that not all the spurs of the sour cherry bear every year, or even for more than one year. Slight differences in the make-up of the spurs have been noticed, and in one case recorded (1)

but yet no definitely related facts between such differences and the fruiting period of the spurs have been compiled. As a part of this investigational work, a study was made of the types of spur growths and the corresponding fruiting habits of those types noted.

Requests as to the pollination needs, if any of the sour cherry have been coming into the Station for some time, and the facts necessary for a correct and suitable reply to these requests are wanting.

Experiments of a preliminary nature, carried on at this Station the past few years, indicate a condition of self-sterility in the sour cherries.

In spite of the recommendation of the Economic Conference, held in Corvallis, January 23-25, 1924, that the planting of sour cherries in this State be discouraged, the fact remains that there are already large plantings and it is the duty of the Experiment Station to make available all facts tending to aid the producer of sour cherries who is already established.

The work was carried on for two seasons, 1923 and 1924 respectively. Each year's work will be considered separately. For the sake of convenience in dealing with the problem, it will be divided into two distinct parts; namely, (a) the bearing habit, and (b) the pollination study.

(a) BEARING HABIT.

Literature Review:

R. H. Roberts (1) of Wisconsin draws attention to the fact that the spurs of the Montmorency have a large number of leaves, while those of the Early Richmond tend to have but few leaves. Roberts adds that this factor, accounts for the difference reported in yields of the two varieties. Quoting Roberts we have "Large yields on Richmond depend upon having some new spurs formed each year".

Roberts again, (2) in speaking about the formation of spurs, points out that spurs grow only from leaf buds, which are present in large numbers only on rather long growths. Growth of from twelve to fourteen inches give maximum number of leaf buds, he asserts. It has been noticed at this Station that there are three classes of fruiting spurs on the sour cherry trees. They are as follows: Class 1, fruit accompanied by no leaves at all; class 2, fruit accompanied by two or more sepal-like leaves, arbitrarily designated in this article as miniature leaves; and class 3, fruit accompanied by two or more large, full-sized, healthy leaves. (See figs. 1, 2, and 3.).

These three conditions were studied on the two principle varieties, Montmorency and Early Richmond, and the condition was found to exist freely in both varieties

PLATE I.

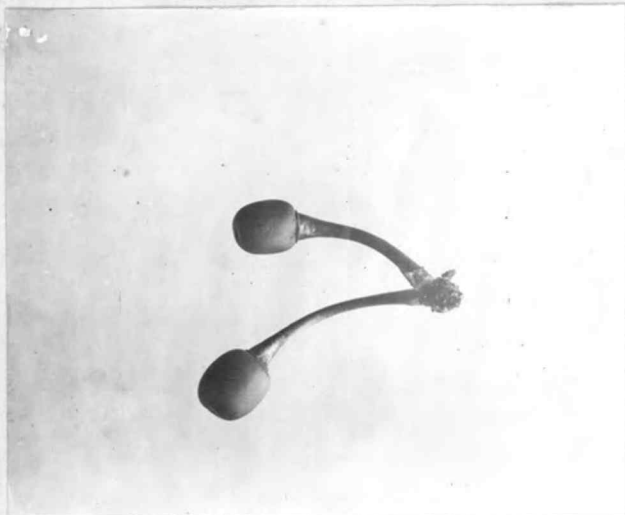


FIG. 1. A spur
falling in class I
(No leaves)

Common on all varieties.



FIG. 2. A spur
falling in class II
(Miniature leaves)

Common on all varieties
particularly English Morello.



FIG. 3. A spur falling
in class III (With
2 or more full sized
leaves.) Predominant
on Montmorency.

and not especially the Montmorency. Numerous individuals falling under each class were tagged in the spring of 1923, and then examined again in the spring of 1924, with the purpose of finding out whether any relationship existed between the class and the destiny of the class. The results of this investigation are set forth in Table I, which follows:

<u>TABLE I. Spur Type Examination.</u>						
<u>Class</u>	<u>No. Examined</u>	<u>No. Scars</u>	<u>No. Buds Only</u>	<u>No. Spurs</u>	<u>Percent Scars</u>	<u>Percent Spurs set.</u>
1	178	177	0	1	99.4	.5
2	166	161	3	2	96.9	1.2
3	132	16	0	116	12.1	87.8

From the above Table it can be seen that the only spurs that are going to be worth saving for future fruiting are those that bear two or more healthy leaves. The spurs having no leaves, and those having the miniature leaves, resulted in 99.4 and 96.9 percent scars respectively, the next year. That is, where these spurs were found in July 1923 with fruit, in June 1924, in the place where the spurs had been, all that could be seen was a scar, not unlike an ordinary leaf scar. Thus in 1923 in cases where these types of spurs (as designated

by Nos. 1 and 2) were found, the following year a long barren strip of wood, bearing nothing but scars could be seen. Those spurs in 1923, however, that had the healthy leaves accompanying them, the next year reset fruit buds on 87.8 percent of the number examined.

In May 1923, it was observed that the Montmorency variety at Dallas had made some fairly vigorous growth, this terminal growth bearing nothing but leaves. (Figs. 4 and 5). Each leaf cluster was tagged on a number of these shoots. Care was exercised to see that the labels were securely tied around the leaf cluster without injuring the same, and the following spring these were examined to see what percentage of those leafy clusters developed into spurs, if any, or just what condition did exist the next spring (1924). As a side issue, the lengths of the growth made in each of the cases were measured, to see if there was any relation between the length and the number of spurs set. Table II shows the result of this investigation.



FIG 4. Terminal Shoot (May 1923)



FIG 5 Resultant Branch (May 1924)

TABLE II. Results of Observations Upon Leafy Terminal Shoots.

1923 - 1924 - Dallas.

Length of growth	No. of shoots observed.	Total number tagged 1923.	Total No. spurs formed 1924.	Total No. fruiting spurs.	No. with blossom bud only.	Percent fruiting spurs set.
9"	2	21	18	18	1	85.7
9½"	3	27	24	17	3	62.9
10"	3	33	30	25	2	75.7
11"	6	70	62	55	6	78.5
11½"	2	20	20	16	0	80.0
12 "	9	100	97	81	3	81.0
12½"	4	56	50	41	2	73.2
13"	3	38	38	30	0	78.9
13½"	2	30	30	27	0	90.0
14 "	4	48	46	42	1	87.5
15"	2	20	20	16	0	80.0
All	40	463	435	368	18	79.4

CONCLUSIONS DRAWN FROM THE ONE YEAR'S
INVESTIGATION.

Summing up the results of the entire investigation on the bearing habit of the sour cherry, the following conclusions may be drawn: First, there exists in the sour cherries, three classes of fruiting spurs, (1) those with no leaves, (2) those with miniature leaves, and (3) those with two or more normal leaves. Of these three classes, only the latter will bear fruit again, according to the results of the one year's work. Therefore, in picking, it will make no difference if the other two types of spurs are pulled off by the picker, but care should be exercised in picking from spurs bearing normal leaves, as a large percentage of these will set fruit again if not injured.

Any cultural or training practice that will tend to develop such spurs will add greatly to the continued productivity of the sour cherry.

Second, it appears that in the case where there are leafy terminal shoots one year, a large number of these leaf clusters will set healthy fruit spurs the next spring, judging from one year's observation only.

Third, a vigorous growth of from twelve to fourteen inches seems to give the highest average set of fruit spurs for the next season, in the case of Montmorency at least. This variety seems to be able to set

on the average, one spur to the inch.

b. POLLINATION.

Literature Review:

The literature pertaining to the pollination question of the sour cherry, is as has been previously indicated, quite scarce. Practically the only source of information on the subject as relates to the sour cherry in America, is the work of Roberts (1) who states in regard to them, "The two principle varieties grown, Richmond and Montmorency, are both highly inter-fertile and self-fertile. This would seem to eliminate any need of planting different varieties together for the purpose of being pollinizers".

Hedrick (3) in "Cherries of New York", though he assumes that the sour cherry is self-fertile in New York, does not ignore the fact that "There may be seasons or orchards in which cross-pollination cuts a figure".

M. B. Crane, (4) however, in England, states in reference to the duke and sour cherries as grown there: "The sour cherries and dukes have been less extensively dealt with but among them varying degrees of self-fertility occur. Crosses between these groups have varied in their ability to form fruits and from reciprocal crosses, there is evidence of compatability being greater when

crosses are made one way, than when made the other".

Many difficulties have occurred in the nomenclature of the sour cherries, especially varieties are quite confused. For example, Crane draws attention to difficulties between Morello and Kentish Red. He goes on to say, "The Morello which appears in the appended records is less self fertile and quite distinct from the Morello used and recorded in our 1918 report. The true Kentish Red as far as I can determine, is the individual which has proved self-sterile in our experiments."

Jardin (5) of France, says in reference to work done on the pollination of the sour cherries in France: "The few varieties of sour cherries which have been observed are divided into three groups, self-sterile, self-fertile, and partially self-fertile".

Florin (6) of Alnarp in Sweden says: "Ostheim shows poor figures as self pollinizers. Skugg-Morello (Morello) is self-fertile. Among Kentish dukes and sour cherries investigated at Alnarp, Empress Eugenie, Kentish and Ostheim show only very low percentage of fruit set." He states further; "As satisfactorily self-fertile then we need only two varieties by name Skugg-Morell (Morello) and a Kentish variety (The Swedish Garden Association variety)".

"As the experiments of self-pollination with the Alnarp variety have been conducted two different years, it has proven that it is conspicuous as having a small degree of self fertility. Also, it is certain that the variety at the Experiment Station at Alnarp which was subject to experimentation this year, is from the viewpoint of productivity quite certainly self-fertile. The natural explanation to the apparently contradictory results is that there are two different varieties which go by the same name".

Therefore, since it has been previously shown that there has been a condition of sterility in the sour cherries, and since that has taken place in a climate not unlike our own Pacific Coast climate, we feel justified in investigating the problem further to show definitely the condition as it exists here in this locality.

POLLINATION WORK IN 1923.

Place of Experimentation.

The pollination work was carried on in two places, at the College orchard, Corvallis, and at a commercial orchard at Dallas. At the College orchard where numerous varieties could be found, the principle tests for sterility were run, and at Dallas, Oregon, sterility tests were also run on the five varieties. All crosses were made in

the commercial orchard at Dallas.

METHODS USED.

The work done in the spring of 1923, being carried on more as an 'opener', was not as extensive as the work done the second year. The main object was to see if the condition of sterility did seem to obtain, and then to also make some crosses. Sterility tests were made on all varieties in the College orchard, and those varieties at Dallas. Results of these tests are to be found in Tables III and IV.

With the Montmorency as the female parent, crosses were made with Early Richmond, English Morello and Ostheim; and with Early Richmond as the female parent, crosses were made with Montmorency. Ostheim serving as the female parent, crosses were made with Montmorency.

A summary of the work done at Dallas in 1923 is given in Table V.

Sterility Tests.

The sour cherry blossoms (1) are so borne as to make pollination fairly easy, in that the blossoms are close together. Roberts claims pollination took place without the aid of insects in 1920.

Because of this and because it is the usual method of procedure in such a problem, the blossom buds

were bagged before they had opened (Fig. 6) just when they were big enough to count easily, thereby making sure that no pollen of any other variety than their own could be present within the bags when the stigmas became receptive.

Owing to the common wind which is prevalent in this section daily in the spring and summer months, it was not deemed necessary to tap the bags to cause the pollen to fly within them.

These bags were not removed until all the blooming had ceased on the outside for quite awhile. As near as possible, five hundred blossoms of each variety at each of the two sites were bagged in this manner.

Checks, or open pollination tests were run along with the sterility tests, by counting five hundred of each variety and marking them by means of tags (Fig. 7) on limbs outside where they could get normal pollination. The results of this work follows in Tables III and IV on the following page.

The results shown in the following tables agree in general with those results secured in preliminary tests conducted at this Station.

TABLE III. Sterility Tests, Corvallis. 1923.

Variety.	No. sacked.	No. set	Percent set	No. check	Percent set check.
Montmorency (sweet)	500	5	1	500	28
Suda	500	4	.8	500	14
Terry	500	0	0	500	2.5
Timme	500	3	.6	500	6.7
Eng. Morello	500	2	.4	500	4.6
Wragg	500	2	.4	500	4.6
Baldwin	500	0	0	300	.1
Dyehouse	500	3	.6	500	25.
Early Richmond	500	1	.2	500	22.6
Ostheim	500	1	.2	462	1.1
Montmorency	500	0	0	500	23.
Large Montmorency	500	0	0	500	25.

TABLE IV. Sterility Tests, Dallas. 1923.

Variety.	No. sacked	No. set.	Percent set.	No. check	Percent set check.
Early Richmond	510	24	4	500	30.
Montmorency	501	0	0	500	25.
Eng. Morello	500	10	2	500	38.
Ostheim	500	0	0	500	.4
Large Montmor.	500	2	.4	500	9

PLATE III

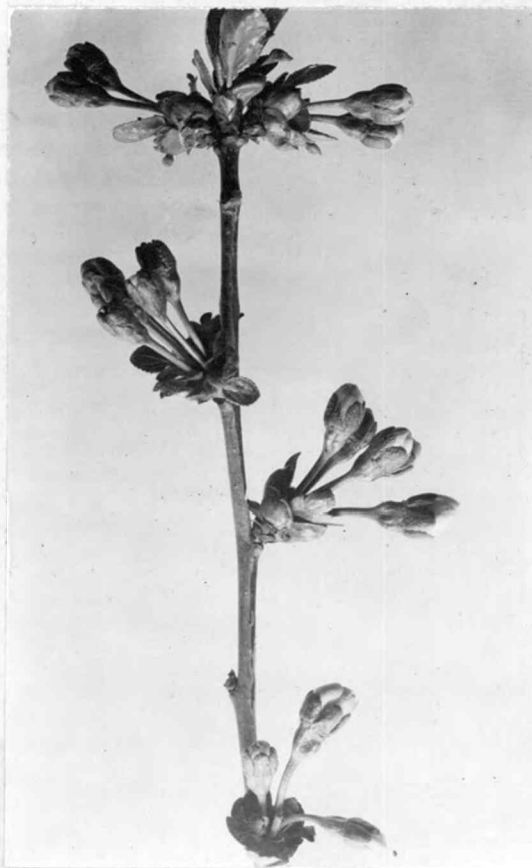


Fig. 6 Showing condition of buds
at the time of sucking for sterility
tests, and proper time to
MAKE emasculations.

Plate III - 4.



Fig 6-A. Ostheim tree ~~sacked~~ Sacked
For Sterility Test.



Fig 6-B Close up of Bag
Showing method of marking.

Plate IV



FIG. 7. Showing method of
MARKING check tests.

Cross Pollinations.

All the crosses were made at Dallas, Oregon. Not very many were made in 1923 and the results were not very satisfactory, though partially so and enough so to stimulate more thorough investigation in 1924.

Emasculation was effected by nipping the bud between the thumb nail and the nail of the third finger, nipping it at the base and cutting clear through on one side and then giving a quick pull upward, accompanied by a slight squeezing pressure of the fingers. This method was found to be quite fast and efficient. (Fig. 8). After emasculating them, they were bagged for a day or so and only the healthy pistils were counted and pollinated. At the time of pollination, the bags were removed and the pollen previously prepared, was applied to the pistils by using a camels-hair brush. Enough pollen was applied so that it could be seen on the stigma with the naked eye. Bags were then placed over them again and left on until all blossoming had ceased. The cherries were counted after the first fall or drop.

Table V, gives a summary of the work done at Dallas.

Along with this it might be mentioned that wherever branches were bagged and the bags then removed, it was noticed that the leaves that had been inside the bags were

different in appearance from those that were left out in the open or normal. Those bagged appeared much more succulent and a paler green, and generally larger than those outside. Since Roberts said pollination took place for him in 1920 without the use of insects, and since Schuster (#) has reported that he had used the method satisfactorily, an attempt was made at emasculating flowers on entire limbs, thereby eliminating the chances of insect visitation by removal of the flower parts, i. e. corolla, sepals and stamens, so that any pollination that would take place would of necessity be due to wind pollination or at least from pollen jarred down from the top of the tree, and most probably of its own kind of pollen. Some slight set was noticed in all cases except the Ostheim which gave no set under any condition this year. It may be that the percentage of set in this case would be sufficiently small to be figured upon, and this may offer one method of getting around the use of bags which everyone agrees is not ideal.

Verbal suggestion made to writer.

Plate V.

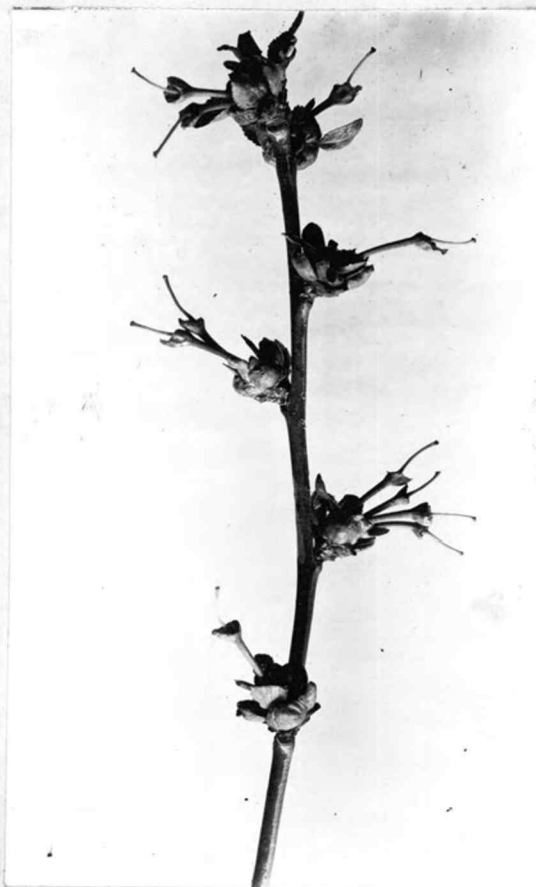


Fig 8 Showing the branch
After EMASCULATION.

TABLE V. Summary of work at Dallas - 1923.

Treatment	No. blossoms used.	No. set.	Percent set.	No. check	Percent check set.
Montmorency selfed	501	0	0	500	25
Montmorency emasculated and left open	500	19	4	500	25
Montmorency X Early Richmons	500	41	8	500	25
Montmorency X English Morello	500	83	16	500	25
Montmorency X Ostheim	484	4	.8	500	25
Early Richmond selfed	510	24	4	500	30
Early Richmond emasculated and left open	500	9	2	500	30
Early X Montmorency	500	10	2	500	30
Ostheim selfed	500	0	0	500	.4
Ostheim emasculated and left open	500	0	0	500	.4
English Morello selfed	500	10	2	500	38

From Table III, the trouble with the first year's work is noticeably the lack of very heavy sets under any condition of control. The hopeful feature of the work is, however, that in the case of the Montmorency, we find an increase of 8 percent in the set by crossing with Early Richmond and 16 percent by crossing with Morello. The work for 1924 is much more extensive, more crosses being made and more of each kind of crosses.

Summing up then the pollination work for 1923, it seems that rather than being "highly inter-fertile and self-fertile" as Roberts suggests, they are decidedly low in self fertility with considerable sterility apparent, and it even appears from the first season's work that they are not even highly inter-fertile, though one year's work is not sufficient to verify any such fact. The results of the preliminary experiments at the College farm, the complaints of the shyness of bearing of the sour cherry in this part of the country, which caused an investigation into the matter, and the frequent complaints made by certain growers in Oregon, seem to all substantiate the claim that there does exist in the Pacific Northwest, a condition of very low self-fertility in the case of the sour cherries, and especially with the principle variety grown, the Mont-

morency, which is apparently absolutely self-sterile.

Pollen Germination Work in 1924.

As would naturally be expected, the pollen is the biggest factor in a pollination problem. Without good pollen to work with, good results are impossible.

Dorsey (7) has shown in the case of the grape, that the secret to the sterility lies in the fact that the pollen itself is not viable. He says "Sterile pollen in the grape, then, is due to degeneration in the generative nucleus". In speaking of self-sterility in clover, C. W. Moore (8) says it is "Due probably to the apparent fact that the pollen tube finds a very suitable medium for its food supply and hence does not grow long enough." R. D. Cole (9) says, "The species of Rosa are characterized by a large amount of abortive pollen and also by great variability".

With this thought in mind, but with no intention of undertaking to prove anything by it, it was decided upon in the winter or very early spring of 1924, to study the pollen of the sour cherry as carefully as time would permit. Practically no study was made on this score the past season.

On February 7, pollen which had been forced in the greenhouse from an Early Richmond tree, was run through a series of germination tests, in 20, 15, 10,

5, $2\frac{1}{2}$ and 0. (distilled water) percent sucrose solution.

In preparing the solutions, one gram of sugar to 100 cc of distilled water was considered a one percent solution.

From all the tests made as stated on February 7, no germination at all was found. No bursting took place even in distilled water.

On February 17, another lot was tried with absolutely the same negative results.

On March 3, pollen from Montmorency Sweet was germinated, with a germination of 25 percent in the 15 percent sugar and 23 percent in the 20 percent sugar, but considerable bursting took place along with the germination, even in the 20 percent solution.

Solutions were then made up of 10 percent sugar and 1 percent agar-agar, and 5 percent sugar and 1 percent agar-agar. Not so much bursting took place, but the percentage of germination was decidedly lowered.

On March 13, pollen taken from a different tree of the Early Richmond variety than the one previously used, was tested, the results being shown in the following Table VI.

TABLE VI. Pollen Germination - March 13.

Early Richmond forced in Greenhouse.

<u>Solution used.</u>			<u>Percent germination.</u>
15	percent	Sucrose	26
20	"	"	59.6
25	"	"	8
50	"	"	40
10	"	" and 1 percent agar-agar	12

There was considerable bursting even in the 25 percent solution. No bursting occurred in the 50 percent solution.

More pollen was forced from the Early Richmond tree originally tested and another attempt at germination was made. The results are shown as follows:

TABLE VII. Pollen Germination Tests - March 15.

Early Richmond. Same Tree as Test No. 1. Page 28.

<u>Solution used.</u>			<u>Percent germination.</u>
15	percent	Sucrose	0
20	"	"	0
25	"	"	2
50	"	"	0
10	"	" and 1 percent agar- agar	0

The peculiar thing about this case was that the anthers at the time they were stripped, had the appearance of being water-logged, and when allowed to ripen instead of bursting and expelling the pollen grains, seemed to shrivel up and the pollen was secured only by mashing the anthers.

At this stage, it was decided that it was useless to attempt forcing the pollen.

No further pollen germination tests were made until the time the pollination was actually done.

The results of the tests made at this time were all but satisfactory. The following facts were apparent:

Sour cherry pollen, in Oregon, this year at least, was decidedly scarce and not very viable as a whole, though some of the varieties tested far surpassed others. The results are shown in the following Table. Time was rather scarce so only one germinating media was used and that was a solution of 15 percent commercial sugar.

TABLE VIII. Pollen Germination Tests - April 11.

<u>Variety tested - 15 percent sugar.</u>	<u>Percent germination.</u>
Early Richmond (from Dallas)	2.
Montmorency (from Dallas)	10.
Ostheim (from Dallas)	1.
English Morello (College)	0.
Dyehouse (College)	85.
Baldwin (College)	40.
Montmorency Sweet (College)	12.

Pollination Work in 1924.

The work done in 1924 was of the same general nature as that done in 1923, the only differences being in the increase in the number of types of crosses, and the number of individual crosses made in each type.

Additional labor was hired to make the above mentioned increase in work possible.

A slight difference in the method of applying the pollen was made. This year, instead of using a camels-hair brush to apply the pollen to the stigmas, the pollen was collected, ripened and placed in a vial, and by shaking the vial, pollen adhered to the cork, and by simply touching the stigma with the cork, a good

supply of pollen was seen to adhere to the stigmas.

Emasculations were made the same as last year. Many more blossoms were emasculated than were pollinated, the difference being due to loss by frost. In Table XI which shows the results of the work in cross pollination, the numbers emasculated are given only to show the necessity of emasculating more than it is intended to make crosses upon.

At the time the crosses were made, the weather was extremely unfavorable.

TABLE IX. Sterility Tests - Corvallis, 1924.

Variety.	No. sacked	No. set	Percent set	No. Check	No. check set.	Percent check set.
Montmorency (sweet)	586	14	2.3	496	28	5.6
Suda	549	66	12	533	197	36.9
Terry	585	1	.17	589	25	4.2
Timme	444	2	.4	562	47	8.3
English Morello	749	67	9.9	595	103	17.
Wragg	509	8	1.5	401	75	18
Baldwin	633	0	0	226	1	.1
Dyehouse	526	1	.1	556	38	6.9
Early Richmond	557	0	0	622	23	3.6
Ostheim	671	1	.1	364	24	6.
Montmorency	587	12	2	514	19	3.6

TABLE X. Sterility Tests - Dallas, 1924.

Variety	No. sacked	No. set	Percent set	No. check sacked	No. check set	Percent check set.
Early Richmond	597	0	0	475	80	14.5
Montmorency	511	0	0	500	155	31.0
Ostheim	517	0	0	500	2	.1
English Morello	500	25	5	500	147	29.4
Montmorency # (back yard)	338	0	0	332	18	5.4

This Montmorency tree is thought to be the Large Montmorency.

TABLE XI. Crosses at Dallas, 1924.

Cross.	No. Emasculated	No. Crossed	No. set	Percent set.
Montmorency X Montmorency	676	475	0	0
Montmorency X Early Richmond	887	450	14	3.1
Montmorency X English Morello	854	473	22	4.6
Montmorency X Dyehouse	648	505	13	2.4
Montmorency X Baldwin	721	494	7	1.4
Early Richmond X Early Richmond	521	455	3	0.6
Early Richmond X English Morello	808	514	33	6.4
Early Richmond X Dyehouse	553	483	36	7.4
Early Richmond X Montmorency	729	509	27	5.3
Early Richmond X Montmorency sweet	523	447	13	2.9
Early Richmond X Baldwin	531	432	18	4.1

TABLE XI (Continued) Crosses at Dallas, 1924.

Crosses	No. Emasculated	No. Crossed	No. set	Percent. set
English Morello X English Morello	545	380	23	6.0
English Morello X Early Richmond	542	334	29	8.6
English Morello X Montmorency	552	362	39	10.7
English Morello X Dyehouse	534	423	51	12.0
Ostheim X Ostheim	531	481	0	0
Ostheim X Baldwin	593	530	0	0
Ostheim X Montmorency sweet	563	484	0	0
Ostheim X Early Richmond	558	462	0	0

DISCUSSION OF RESULTS.

The results have been generally speaking, unsatisfactory. The fault is laid to the fact that the frost injury was even greater within the bags, than was at first anticipated.

The difference between the figures in the first column and the second column in Table XI, indicates the loss by frost anticipated at first. It was noticed at the time of crossing, however, that even some of those that were crossed and counted as such, were in a questionable state of healthiness. It is evident that these and others, that were not noticed at the time, were injured by the frost, beyond recovery.

The only encouraging fact noticeable in Table XI, is the fact that in the cases of the crosses with Montmorency and Early Richmond as the female parent, where they were all sacked, and had equal chances of being frozen; the sets secured by crosses, though small, were all in increase over sets where they were crossed with their own pollen, or selfed. For this fact the writer feels somewhat encouraged.

In the case of sterility tests this year, the results were better. At Corvallis, practically no frost injury prevailed. Early Richmond this year

gave zero percent set in the sterility tests at both places. Montmorency gave two percent at Corvallis this year and zero percent set in two tests at Dallas. Suda, this year at Corvallis, showed a decided tendency towards self fertility, and English Morello, which last year gave indications of self fertility, this year strengthened that indication by a set in Corvallis, of nine and nine-tenths percent, and in Dallas, five percent.

SUMMARY AND CONCLUSIONS.

Summing up the entire problem then, from the two season's work, the following facts were shown:

1. There are three types of fruiting spurs in the case of the sour cherry.
2. Only those spurs bearing two or more normal leaves are capable of re-setting fruit another year.
3. Any cultural or training practice that will encourage the formation of fruiting spurs with leaves will greatly aid the continued productivity of the sour cherry.
4. In picking, care should be taken not to pull off those spurs bearing the leaves. The others do not matter.
5. In the case of the Montmorency, a growth of from

12 to 14 inches is apparently best. This variety seems to be able to set one fruit spur to the inch.

6. In the case of the Montmorency, a large percentage of the leaf clusters that are formed on the terminal shoots one year, will set fruit spurs the following year.
7. Out of seven tests over the two year's work, using a total of 3,437 blossoms, Montmorency is apparently self sterile.
8. Out of four tests over the two year's work, using 2,164 blossoms, Early Richmond is apparently self-sterile, averaging only one and five-hundredths percent set.
9. English Morello is apparently self-fertile.
10. Suda is apparently self-fertile.
11. The cherries tested two seasons may be grouped in the following approximate classification:

Self-sterile:

Montmorency

Early Richmond

Ostheim

Baldwin

Terry

Dyehouse

Partially Self-fertile:

Montmorency Sweet

Wragg

Timme

Self-Fertile:

Suda

English Morello

12. Until further work entirely disproves the above indications, the mixing of varieties is advisable. At least it is well to have the two principle varieties, Montmorency and Early Richmond, since there are commercial orchards which are getting good sets of fruit with these two varieties as the only probable pollenizers.

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