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OF THE

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OF THE

UNIVERSITY OF CALIFORNIA

FROM JUNE 30, 1901, TO JUNE 30, 1903.

BEING A PART OF THE REPORT OF THE REGENTS OF THE UNIVERSITY



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1903.

SOUTHERN COAST RANGE SUBSTATION.

Near Paso Robles, San Luis Obispo County.

The report of the work of this station will necessarily have to be very brief. Its work was practically closed and the station was largely dismantled in March, 1902. At that time Mr. J. W. Neal resigned the foremanship to take a similar position at the Government experiment station in Alaska. The horses, wagons, and many of the implements were removed or sold, and Mr. J. H. Ooley was appointed workman-in-charge, to act mostly in the capacity of care-taker until the question of discontinuing the station could be definitely settled. All definite experiments, with the exception of the gluten-wheat tests, begun several years ago in coöperation with the U. S. Bureau of Chemistry, and a few test plots of saltbushes, were discontinued. Orders were given Mr. Ooley simply to plow and cultivate the young orchard at the rear and a portion of the vineyard, which, according to the map of 1901 (see Bulletin No. 147, p. 29), were allowed to remain, in the hope that some definite data could be secured from them.

The people of the district are not satisfied with the station. Upon the writer's first visit to the station last year, he chided several of the residents of the Paso Robles district with a lack of interest in the work of the station, which was located in their midst especially for the purpose of assisting in the solution of some of the problems confronting them. The reply was that nothing but negative results had ever been secured at the station. There is, therefore, a lack of appreciation of the value of knowing what can not be done. Some are unreasonable enough to assert that the station has even done great harm to the district by the publication of its record of failures. We can not afford to attempt to answer all of these statements. They are given here simply as a matter of record to serve in the future as an indication of what is to be expected when anything but positive results are obtained from our experiments.

The statement that nothing but negative results have been obtained at this station is hardly true and fair to those who have had charge of the work in the past. The demonstration of the adaptability of the Australian saltbush to dry non-alkaline soils is one of the achievements of the Southern Coast Range substation. The results of this demonstration have not received the wide recognition by the farmers of the district that they should. While some farmers are growing the plant for forage, and find it very valuable under their conditions, there are many more who could use it to great advantage.

Another of the positive results of the station's work is the demonstration of the fact that the hard wheats grown there have maintained their high gluten percentages to a larger extent than they have in any other district where they have been planted in California. This fact has been brought out by the gluten-wheat tests which have been maintained in coöperation with the U. S. Bureau of Chemistry during the past three years. This fact is significant, and would indicate the possibility of the use of macaroni wheats as a special and more profitable crop in the district. Attempts will be made in the future to introduce the cultivation of macaroni wheats on a scale sufficiently large to give the results of the

experiment a practical bearing. It is hoped that the coöperation of several large wheat-growers can be obtained. It is also hoped that the necessary seed can be obtained from the U. S. Department of Agriculture.

CLIMATE.

The recording of meteorological data has been faithfully maintained at this station, despite the fact that much of its active work has been discontinued. The records show the past two seasons to be no exceptions to the rule that the climate of this region is a very trying one for all cultivated plants.

The rainfall for the past two seasons was below the average (15.88 inches) as shown by the records of the station and Paso Robles for the past seventeen years. The rainfall for the past six seasons is shown by the following table:

SEASONAL RAINFALL AT PASO ROBLES.

Seasons of—	1897-8.	1898-9.	1899-00.	1900-1.	1901-2.	1902-3.	Average.
September .....	.03	.10	trace	trace	.04	0.00	.28
October .....	.56	.13	2.55	1.54	1.57	1.08	1.26
November .....	.05	.30	1.40	6.10	1.04	.71	1.60
December .....	.23	.27	2.55	.25	.....	.96	.71
January .....	.82	4.16	2.11	6.11	1.05	2.19	2.74
February	1.55	.08	.08	5.37	5.32	1.35	2.29
March .....	.83	4.99	1.90	.63	2.50	4.16	1.50
April .....	.....	1.37	.42	1.37	1.23	.79	.86
May .....	.68	.....	.67	1.43	.....	.....	.46
Totals	4.75	11.40	11.40	22.80	12.75	11.24	12.44

It will be noticed that the average for the past six seasons is considerably below the general average. During the past two seasons the late rains, which usually come during April and May, have been notably deficient. To make matters worse, this shortage was accompanied by exceedingly dry north winds, which coming, as they did, at the time that crops could withstand them least, prevented a large proportion of the heads of the grain from filling. At the station this lack of filling was especially severe. Many of the grain plots failed to produce seed. That the effects of these late droughts can be overcome to a large extent by using a "summer fallow" system, was strikingly illustrated during the past season by Mr. C. E. Cliff, whose farm adjoins the station tract. Mr. Cliff's grain on summer-fallowed land grew well, headed early, and filled well, despite the deficiency of late rains. Mr. Cliff goes over his land during the summer in order to keep down weed-growth and conserve the moisture. The favorable effects of this treatment were amply shown the past season.

The accompanying table shows the complete meteorological record taken at the station during the past eighteen months. The table shows both winters to have been very severe. During the year 1902 there were only three months during which 32° was not registered. The number of days when 32° or below was registered was ninety-nine during the past season. Eight frosts are recorded for March, seven for April, and three for May.

METEOROLOGICAL RECORD AT THE SOUTHERN COAST RANGE SUBSTATION—JANUARY 1, 1902, TO JUNE 30, 1903.

MONTH.	Mean Monthly Maximum	Mean Monthly Minimum	Mean Monthly Range	Extreme Maximum with Dates	Extreme Minimum with Dates	Number of Days 90° or Over	Number of Days 32° or Below	Rainfall During Month	Number of Days when Rain Fell.	Number of Cloudy Days	Number of Partly Cloudy Days	Number of Clear Days
1902—January	58.54°	29.48°	29.06°	69°—1st	19°—30th	0	21	1.05	3	8	12	11
February	59.39	39.10	20.29	72°—15th	24°—1st	0	7	5.32	10	12	7	9
March	60.00	33.67	26.33	75°—30th	28°—3d, 24th	0	15	2.50	9	2	5	24
April	63.03	37.53	30.50	84°—15th	27°—2d, 3d	0	7	1.23	3	0	12	18
May	73.51	40.80	32.71	86°—24th, 27th	32°—3d, 14th, 20th	0	0	0.00	0	4	4	23
June	80.63	44.16	45.13	105°—9th	36°—1st, 4th	16	0	0.00	0	0	1	29
July	91.61	46.61	45.09	109°—23d	40°—6th, 7th, 11th	21	0	0.00	0	2	2	27
August	86.38	44.61	41.77	105°—2d, 31st	38°—20th, 26th, 28th, 30th	12	0	0.00	0	0	3	28
September	88.70	43.06	46.63	110°—1st	32°—30th	16	1	0.00	0	1	6	23
October	73.61	39.45	34.16	93°—15th	32°—3d	1	1	1.08	3	8	6	17
November	60.00	32.96	27.04	74°—2d	21°—30th	0	15	0.71	2	7	6	17
December	55.98	29.64	26.32	66°—7th, 8th, 24th, 25th	18°—31st	0	21	0.96	2	11	3	17
1903—January	58.19	31.29	26.90	68°—6th	19°—15th	0	20	2.19	7	5	7	19
February	55.64	27.82	27.82	68°—20th, 28th	15°—15th	0	23	1.35	5	2	8	18
March	58.70	36.32	20.38	70°—21st, 22d	20°—6th	0	8	4.16	12	10	14	7
April	67.66	36.86	30.80	84°—30th	29°—12th	0	7	0.79	3	5	1	24
May	78.38	41.00	37.38	102°—30th	30°—22d	4	3	0.00	0	0	4	27
June	80.46	46.70	42.76	106°—27th	68°—15th	17	0	0.00	0	0	6	24

GLUTEN AND MACARONI WHEATS.

The growth of "gluten wheats" was continued during the past two seasons. For the season of 1901-2 the following table shows the rate of yield for the several varieties:

Variety.	Sown 1901.	Harvested 1902.	Yield at the Rate per Acre of
No. 5493 -----	Nov. 8	June 25	845 lbs.
No. 151 B -----	" 8	" 25	885 "
No. 36 B -----	" 8	" 25	890 "
No. 5145 -----	" 9	" 25	865 "
No. 5486 -----	" 9	" 25	900 "
No. 3823 -----	" 9	" 25	Failed to fill.

Samples of these grains were sent to Washington for analysis, and a portion was reserved for this season's planting. In accordance with instructions received from Washington, the numbers of the samples were changed in order to conform to the system adopted by the Bureau of Chemistry, which gives new numbers for the grain produced each year. No. 151 B became 205 B, No. 36 B became 180 B, No. 131 B became 227 B, No. 155 B became 204 B, No. 5145 retained its old number. In addition to these, seed of Tulare-grown wheat was received and planted at this station and was designated No. 183 B. The Tulare-grown seed was from a similar series of gluten wheats under trial at the San Joaquin Valley substation, which were found to have lost their high gluten content. This grain is to be tried at this station in order to determine whether it will improve in the Paso Robles climate and soil. Another sowing of old seed of No. 3823 was made. At this writing, it seems that this valuable series of experiments will be broken. The unfavorable weather conditions prevented the filling out of the grains. An attempt will be made by careful hand picking to secure sufficient seed for analysis and for next season's planting; but it is extremely doubtful whether any seed will be obtained.

Three varieties of macaroni wheats were received from Cerealist Carleton, of the U. S. Department of Agriculture, last fall and small plots of each were sown. The plants grew well during the season, but owing to the lack of late spring rains, together with heavy north winds, the heads did not fill well. Very little grain will be produced.

MISCELLANEOUS CULTURES.

Several saltbushes and forage grasses new to the district were planted in November, 1902. These were: *Atriplex nuttallii*, Wats.; *Atriplex canescens*, James; *Atriplex* species; *Atriplex polycarpa*, Wats.; *Atriplex coronata*, Wats.; *Melinis minutiflora*, Molasses-grass; *Arrhenatherum elatius*, Tall Oat-grass; *Paspalum dilatatum*, Australian Water-grass; *Festuca arundinacea*, Reed fescue. Owing no doubt to unfavorable weather conditions following the sowing, the seeds failed to start.

Other saltbushes, especially *Rhagodia spinescens inermis*, *Atriplex cachiuyum*, *A. pamparum*, and *A. nummularia* grew very well without irrigation during the summer, forming compact bushes from 3 to 4 feet high. They all withstood the rather severe winter frosts very well. They should, therefore, prove valuable as both summer and winter browsing plants, and as such deserve further trial.

Seed of fenugreek (*Trigonella fœnum-græcum*), received from the Division of Plant Introduction and Distribution, was sown as a green-manure crop in the orchard. Two acres of orchard were sown. Two sowings were made; one before rain had fallen in October, and the other after the first rains fell. The seed came up well in both cases. No visible difference could be detected between the dry-sown and that sown after the rains. Both plots were severely injured during the winter, most of the plants being killed to the ground. At the opening of the growing season those plants which survived the winter frosts averaged less than five inches in height. No nodules were found upon the roots, and attempts to inoculate the soil after the plants had started to grow in the spring failed. Before this plant is recorded as a failure in this region it should be tested upon well-inoculated plots.

THE ORCHARD AND VINEYARD.

As shown by the map published by Inspector Shinn (Bulletin No. 147, p. 29) a large portion of the orchard and vineyard was grubbed out. The remaining orchard and vineyard plots as indicated by the map for 1901 still remain, and have been cared for in the hope that further data of value regarding them could be obtained. The young orchard of hardy varieties of pears and apples at the rear of the station tract was given especial care and attention. During the season of 1902, all of these young trees made a splendid growth and some of them bore a few fruits. A record of the blooming of the trees was kept last spring, which shows that while many of the trees bloomed profusely, very little fruit was set, owing, no doubt, to the unfavorable weather conditions.

A noteworthy point was observed last season regarding the bearing of a number of Bartlett pear trees which originally were planted as avenue trees along the main road leading to the rear of the tract. These trees were set in 1894. They grew slowly, however, and are not at present more than half as large as they should be. In addition, they show plainly the effects of unfavorable soil conditions (hardpan). Last season, for some reason, these trees bore a very heavy crop of small fruits, nearly all of which was produced upon the wood of the previous season. The bearing of these trees more nearly resembled that of the peach than that of the pear. The fact is worthy of mention, as it indicates that the trees have been subjected to unusual stress of climatic and soil conditions.

The first crop of grapes suffered severely in 1902 from late frosts; but a fair second crop was produced. Not a pound of sound grapes was obtainable, however. Practically every berry was destroyed or eaten, before it was half ripe, by linnets which visited the station in immense flocks. The depredations of these feathered enemies have always formed one of the most serious drawbacks to fruit and grape production in the neighborhood of the station tract. Now that most of the orchards and vineyards in the vicinity of the station have been grubbed out, the station plots form the only available feeding grounds for the birds.