

In the experiments in which the crawlers settled in the absence of light, the females were evenly distributed between the two surfaces, whereas 76 percent of the males settled on the upper leaf surfaces. In the experiments to determine the effect of gravity, a fairly even distribution was secured for each sex. The experiments indicated that light is one of the most important factors influencing the distribution of the females, but no definite indications were secured for the male although, while it seems that both light and gravity affect their distribution, evidently other factors also exert influence.

SEASONAL HISTORY

Once each month from April 1942 through March 1943 a sample of 5 leaves was picked at random from each of 80 orange trees, and the numbers of scales in each stage were recorded. Table 2 gives the number of living scales and of ovipositing females found at each examination.

TABLE 2.—SEASONAL DISTRIBUTION OF THE FLORIDA RED SCALE ON CITRUS.

Date of Examination	Number of Scales on 400 Leaves	
	Living	Ovipositing
1942		
April	1,071	37
May	868	14
June	316	13
July	788	31
August	1,413	42
September	1,743	38
October	1,286	19
November	620	17
December	538	11
1943		
January	378	13
February	309	12
March	216	6

The number of living scales appears to be unusually high in April, but no explanation can be given for this. The number decreased in May and June, and this is believed to have been caused partially by the falling of the old, infested leaves. In June it was impossible to secure a randomized sample of fully matured leaves, because there was so much new growth, and probably the distribution of the scales was not general over the new growth. The number of living scales increased from June to September, when the peak was reached, and thereafter decreased each month.

The number of ovipositing females followed the same trend as the number of living scales, except that the peak was reached in August.

The percentage of parasitized scales was calculated from the number of settled scales, exclusive of those in the first instar, since only two first-instar scales were found with visible parasites in them. The percentage of

parasitized scales ranged from 7.4 in August, to 20.0 in November. The percentage of parasitization was also calculated separately for the males, for second-instar females, and for third-instar females. More males were parasitized than either instar of the females, 32.5 percent in November. Very few third-instar females were found with parasites, the highest parasitization being 5.6 per cent in February.

FACTORS INFLUENCING SCALE ABUNDANCE

Cultural Practices:

In recent years it has been the opinion of many investigators that the general condition of a grove influences the abundance of scales. Schweig and Grunberg (6) reported that a grove well supplied with water and fertilizer was likely to have a heavier infestation of scales than a poorly kept grove. Thompson (7) reported that populations of the purple scale were higher in groves in which the mineral deficiencies had been corrected, as more green leaves were produced and were retained longer.

Results of preliminary work at this laboratory seem to support these statements. In 1942 a comparison was made of Florida red scale infestations found on citrus trees growing in areas which were clean cultivated or contained a cover crop. The experimental arrangement consisted of 8 plots, each approximately 6 trees by 14 trees. Half of these plots were disked at intervals to keep them clean of all vegetation, and in the other half a cover crop was maintained and no cultivating was done. The first cultivating was done in March and the last in September. At monthly intervals from April through December, 200 leaves from each treatment were examined for scale infestations. Only the living, settled scales were used in comparing the infestations in the two treatments. The results of these examinations are summarized in table 3.

TABLE 3.—EFFECT OF GROVE CULTIVATION ON FLORIDA RED SCALE ABUNDANCE IN 1942.

Month	Average Number of Living Scales per Leaf	
	Cultivated Plots	Cover-Crop Plots
April	2.4	2.9
May	2.4	1.9
June9	.7
July	2.3	1.6
August	5.0	2.0
September	6.2	2.6
October	5.0	1.3
November	2.5	.6
December	2.1	.6

In April the average number of scales per leaf was practically the same in the two treatments, being only slightly higher in the cover-crop plots. In May and for the remainder of the year the average was slightly higher in the cultivated plots. When the data were analyzed statistically,