

## Incidence of Fruit Greening on Individual Citrus Trees in South Africa

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From 1938 to 1945, the incidence of citrus greening disease in certain parts of South Africa was extremely high; after 1945, it dropped so low as to suggest that greening had virtually disappeared. This paper presents informa-

tion showing that there are long-term fluctuations in incidence of greening.

An earlier paper traced the fluctuations from 1965 to 1968 (2). This report includes findings for the eight-year period, 1965 to 1972.

### EXPERIMENTS

In 1965, eight orchards in South Africa were surveyed for greening incidence based on greened fruit, and in 1966 the number was increased to 12. Assessment was based on four trees in each grove. Severity of infection was measured by harvesting all fruits, cutting them in half, and subjecting them to the albedo fluorescence test (1). Varying degrees of violet fluorescence were observed: (1) intensive; (2) partial but still noticeable, and (3) none. The number of greened fruit per tree was converted to a percentage of the total number of fruit per tree. During the first

four years of the survey, the fruit were also classified according to external symptoms (2). This test was found unreliable and inaccurate when compared with the fluorescence test, and was discontinued. Only fruit showing an intensive fluorescence are recorded as diseased (tables 1 and 2). Of the eight orchards tested over eight years and the 12 tested over seven years, two were in navel oranges and the others in Valencias. Three Valencia orchards in each group were in the Nelspruit district, the others were in the White River district, which lies 12 miles from Nelspruit and

TABLE 1  
COMPARISON OF INCREASE AND DECREASE IN FRUIT GREENING OVER AN EIGHT-YEAR PERIOD

Year	Total fruits*	Greened fruits	Percentage greened fruit	Percentage increase/decrease	
				From preceding year	From 1965
1965	12,985	6,240	48.05	....	....
1966	16,286	7,674	47.12	-0.93	-0
1967	17,860	9,016	50.48	+3.36	+2.43
1968	23,292	9,622	41.31	-9.17	-6.74
1969	24,869	10,036	40.36	-0.95	-7.69
1970	24,025	8,462	35.22	-5.14	-12.83
1971	26,915	8,071	29.99	-5.23	-18.06
1972	2,334	5,549	23.78	-6.21	-24.27

\* Crops from 32 trees in eight orchards.

TABLE 2  
COMPARISON OF INCREASE AND DECREASE IN FRUIT GREENING OVER A SEVEN-YEAR PERIOD

Year	Total fruits*	Greened fruits	Percentage greened fruit	Percentage increase/decrease	
				From preceding year	From 1965
1966	26,598	9,420	35.42	....	....
1967	32,247	11,138	34.54	-0.88	-0.88
1968	42,050	11,414	27.14	-7.40	-8.28
1969	35,903	11,294	31.46	+4.32	-3.96
1970	42,720	10,782	25.24	-6.22	-10.18
1971	41,470	9,419	22.71	-2.53	-12.71
1972	44,322	6,698	15.11	-7.60	-20.31

\* Crops from 48 trees in 12 orchards.

has a cooler climate. Since the orchards were situated on different farms, and received different insecticide treatments, psylla populations were not comparable. The over-all psylla situation for the area from 1965 to 1972 was as follows. Severe infestation in the 1964-65 season, medium to low populations in 1966-67, 1967-68 and 1971-72, and virtually no psylla build-up during the 1965-66, 1968-69, 1969-70 and 1970-71 seasons. The years between 1965 and 1972 were marked by low vector popula-

tions as compared with the period between 1958 and 1963, when psylla populations were high. High psylla infestations have been seen in single orchards during years of low psylla potential.

Data in table 1 are from eight orchards, for 1965 to 1972; and in table 2, from 12 orchards for 1966 to 1972. The increase/decrease in incidence of fruit greening is computed separately, and increases or decreases are computed against the incidence of the first year and that of the previous year.

## DISCUSSION AND CONCLUSIONS

The incidence of greening disease varies considerably, as does its intensity from season to season, when the data are considered as a composite. Under closer observation, however, certain trends in the incidence and variation of intensity of the disease can be seen.

For the eight orchards over an eight-year-period, the greatest average annual increase was 3.4 per cent as opposed to the greatest average annual decrease of 9.2 per cent. For the 12 orchards over a seven-year period, the greatest average annual increase was 4.3 per cent and the

greatest average annual decrease, 7.6 per cent.

The greatest increase in the incidence of greening for a single orchard from one season to the next was 24.3 per cent as compared with the greatest decrease, over the same period, of 25.6 per cent. In 1968, 1970, 1971, and 1972, the incidence of greening decreased; during 1966, 1967, and 1969, it either remained static or increased. The same applied to the seven-year period apart from the smaller decrease in 1971.

The apparent recovery of infected

trees is ascribed to the type of infection peculiar to greening disease. That is, it is common to find severely infected trees with one or more healthy branches. These healthy branches bear a larger proportion of the total crop, and thus give the illusion of recovery. Those parts of the tree affected with greening never recover from the disease, but because of a low psylla population during the period covered by our survey, little

of the healthy growth ever became infected from vector inoculation.

The greening disease occurring in the White River and Nelspruit areas seems not to move rapidly, but instead, in the absence of the psylla vector, progresses only slowly to encompass the tree. Healthy sectors of a tree then enlarge, seemingly outgrow the disease, and increase the bearing capacity of the tree.

#### LITERATURE CITED

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