

Time determination for controlling the chaff scale (*P. pergandii* and *P. cinerea*) and the citrus mussel scale (*Lepidosaphes beckii* NEWM.) in Israel.

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DETERMINATION DE LA PERIODE PROPRE A LA LUTTE
CONTRE LES COCHENILLES DIASPINES
(*PARLATORIA PERGANDII* ET *P. CINEREA*)
ET LA COCHENILLE VIRGULE DES CITRUS
(*LEPIDOSAPHES BECKII* NEWM.) EN ISRAEL.

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RESUME - Une méthode de détermination de la période propre à la lutte contre la cochenille diaspine *Parlatoria pergandii* est décrite. Il existe une corrélation intéressante entre l'apparition des cochenilles en été et leur nombre en automne. La détermination d'une période idéale de lutte contre les cochenilles *Parlatoria* permettra de faire les traitements avec un maximum d'efficacité.

INTRODUCTION

In the last years the Chaff scales (*Parlatoria pergandii* COMSTOCK and *P. cinerea*) became very important pests in Citrus groves in Israel (GERSON, 1977) and in Maroc, (ABBASSI, 1975). The *Parlatoria* scales attacks especially Valencia and Shamuti oranges (*Citrus sinensis*) (GERSON, 1967), and it seems that these scales take the place of the Red Scale (*Aonidiella aurantii*) which had in the last years a low importance as a pest in citrus.

In this work the Chaff scales appeared together with the Mussel scale (*Lepidosaphes beckii* NEWMAN) which in regular seasons had a very good biological control with *Aphytis lepidosaphes*, but in the seasons when this work had been done it appeared in a higher level.

The distribution of the Chaff scales is mostly on the Coastal plain of Israel, but in the recent years it appears also

in arid areas like Negev and Emek Hayarden.

The big problem of this scales in oranges is, that although the pesticides against these scales are effective and the scales were well controlled after using insecticides, the place where the scales were sucking, it leaves green spots which cause a great cullage of the fruits (BEDFORD, 1978). So it is very important to find an adequate time to spray against these scales before they begin to suck the fruits. The aim of this study was to find a minimum number of scales in the summer before it would be too late for spraying against them so as to prevent spraying against these scales when it was not necessary.

MATERIALS AND METHODS

In the summer of the 8th and 9th months, random samples of 50-leaves and 20-fruits were taken from 30-orange groves around the Coastal plain of Israel. The samples were taken only from Valencia groves and from 5-trees that were

* - Agricultural Extension Service, Raanana, Israël.

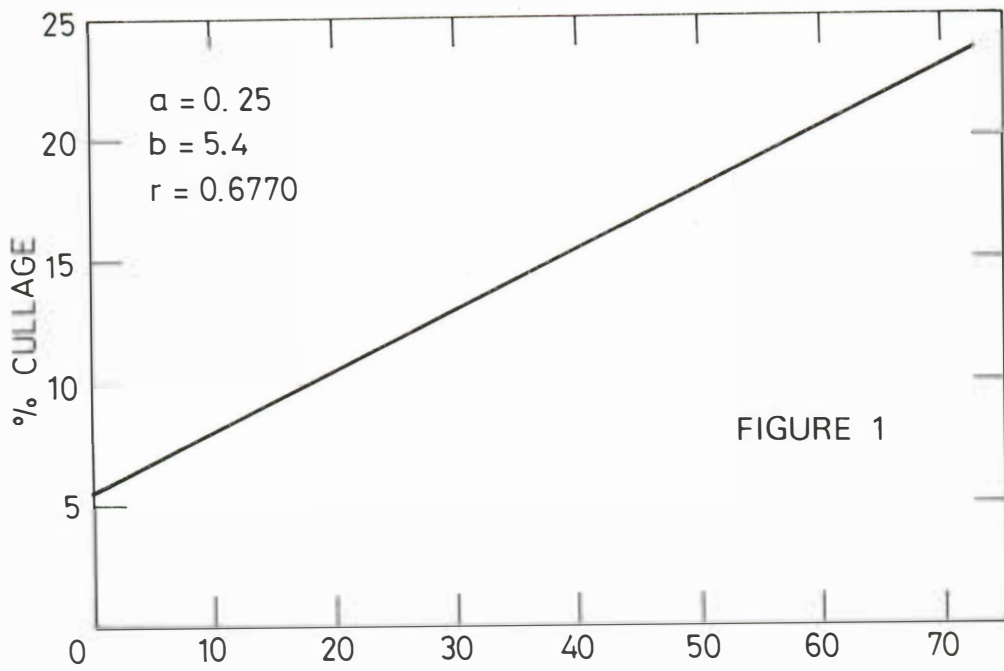


Figure 1. Live scales (chaff and mussel scales) on 20 fruits.

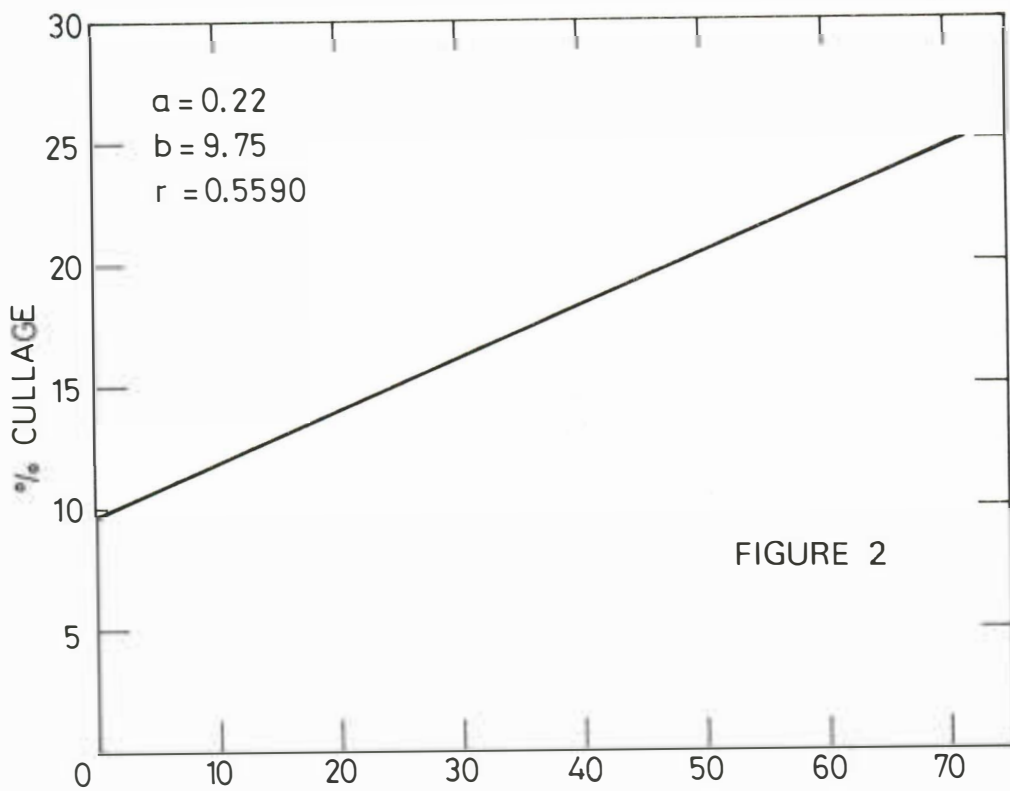


Figure 2. Live scales (chaff and mussel scales) on 50 leaves.

TABLE 1 - The correlation between cullage fruit (parameter 3) against other parameters which were done with binocular in the summer.

parameters	percent of cullage fruits (X)
all live scales (y)	a* = 0.25 b** = 5.4 r*** = 0.68
all scales (y)	a = 0.08 b = 0.8 r = 0.79

* : the slope of the straight line ** : the intercept of the straight line
 *** : the correlation coefficient.

selected also at random from a grove of 10 dunams. The fruits and leaves were taken from all sides of the tree from the canopy to the bottom. The samples were taken to the laboratory and the Chaff scales and Mussel scales were counted under binocular for these parameters : a) live scales (Chaff or Mussel scales), b) dead scales (Chaff or Mussel scales) separately for leaves and fruits.

Six months later when the time of picking the fruits has arrived, 500 fruits from the same trees as were selected in the summer were picked and every fruit was examined separately for the appearance of Chaff and Mussel scales.

The scales on the fruits were divided into three parameters 1) 0-5 scales in a fruit, 2) 6-10 scales in fruit, 3) more than 10 scales in fruit. These parameters were determined according to the fruits of inferior quality, while the third parameter are the worst fruit, sometimes the second also, and the first is adequate for export. In this work only the third parameter was taken into consideration.

RESULTS AND DISCUSSION

Fig. 1 describes the number of live scales (Chaff or Mussel scales) on 20 fruits against the percentage of the fruit of inferior quality (parameter 3). The correlation coefficient was 0.6770 and the equation of the straight line is $y = 5.41 + 0.25 x$, which showed a very practical line to work with, for controlling these scales.

Fig. 2 describes the correlation between live scales (Chaff or Mussel scales) on 50-leaves according to the percentage of fruits of inferior quality, in this case the correlation coefficient is much less by 0.5590 but it could be practical to use this parameter in some cases in the beginning of the season when the fruits are small in size-not attractive to the scales.

Table 1 describes the correlation coefficient between other parameters which were used in this work, it could be seen that the best correlation is between all the scales against the fruits of cullage, but the work which must be done to count the scales is not practical and not useful, so the live scales could show quite suitable correlations which could be used.

The results are similar to those that were found a year later. The correlation coefficient of all scales against fruit of cullage quality that was measured in the same method was 0.9622 and the equation of the straight line was $y = 0.8 + 0.17 x$.

It must be emphasized that there might be fluctuations in the appearance of these scales from year to year. The data could be changed according to changes in the biological control or using new insecticides but as a basis to start, the correlation which was found here is very useful.

ACKNOWLEDGEMENTS

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