

## Bioecology of *Pseudococcus viburni* (Signoret) in the Azores

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**Abstract:** This work complements a primary study of virus transmission among some cultivars of grapevines by the vector *Pseudococcus viburni* (Signoret), which was identified as one of the most common mealybugs in vineyards on Pico and Terceira islands, Azores. In this Archipelago, there is no accurate information about the bioecology of *P. viburni*, and therefore we conducted a study to determine the duration of each instar and the fecundity/fertility of adults. Eggs were placed on potato sprouts, and the emergence times and duration of developing nymphs were recorded daily. At the same time, the rate of fertility/fecundity was determined by placing virgin adult females and male cocoons on potato sprouts. The oviposition and incubation periods, and the percent emergence were recorded.

**Key words:** *Pseudococcus viburni*, Terceira Island, Pico Island, Azores.

### Introduction

The mealybug *Pseudococcus viburni* (Signoret) (Hemiptera: Pseudococcidae) was first recorded in Pico and Terceira vineyards in 2005. As there is no accurate information about this insect's bioecology it was considered necessary to study it under local environmental conditions.

*P. viburni* is sexually dimorphic. The adult females have the same appearance as the nymphs and the males are winged, with three distinct body regions (Franco *et al.*, 2000).

The female life cycle consists of three nymphal stages and an egg-laying adult. During the first instar there is no difference between male and female. Second-instar male and female nymphs are similar but males are normally slightly narrower. Subsequently, the male develops into a third (prepupal) and fourth (pupal) stage and the female into a third-nymphal stage, and then to adulthood. Full sexual maturity is reached a few days after moulting to adulthood (Franco *et al.*, 2000).

*P. viburni* is polyphagous, feeding on about 47 plant families (Ben-Dov, 1994), including grapevines. It may have several overlapping generations per year, and it is possible to find all stages under the bark (Franco *et al.*, 2000). The females are oviparous, with an ovisac in which the eggs are laid and covered with wax filaments to protect them from predators and the environment (Foldi, 1983; Cox & Pearce, 1983). Damage to host plants can be caused by both the adult females and the nymphs.

This study measured the life cycle and fecundity/fertility of the female of *P. viburni* at local temperatures and humidity.

### Materials and methods

Eggs were placed on potato sprouts, and the emergence times and duration of each developmental stage were recorded daily.

At the same time, the rates of fecundity and fertility were determined by placing virgin adult females and male cocoons on potato sprouts. The oviposition period, percentage emergence and duration of incubation were recorded.

Mean fecundity (mean number of eggs laid by female in its life), mean daily fecundity (number of eggs laid per female per day) and mean fertility (rate of hatched eggs) were

determined according to the methods of Franco & Pereira (1992). Oviposition period, fecundity and fertility were based on data from 30 females.

All data were determined at mean temperatures between 19 and 23°C and 59 to 67% R.H.

## Results and discussion

The duration of the first-, second- and third-instar stages of female *P. viburni* was measured. The duration from neonate nymph to emerged adult female was determined by summing of the duration of the different instars (Table 1).

The mean oviposition period was  $7.90 \pm 3.02$  days, ranging from 4 to 13 days.

The mean fecundity, mean daily fecundity and mean fertility were estimated to be  $173.8 \pm 83.8$  eggs/female,  $22.4 \pm 7.4$  eggs/day/female and  $58.4 \pm 16.4\%$ , respectively.

The mean egg incubation period was  $13.5 \pm 2.4$  days, with a maximum of 19 days and minimum of 8 days.

**Table 1.** Duration of *Pseudococcus viburni* nymphal stages (N=30).

Duration (days)	1° instar	2° instar	3° instar	Total nymph stage
Mean	$14.0 \pm 3.7$	$8.6 \pm 2.1$	$10.1 \pm 2.8$	$32.7 \pm 5.4$
Maximum	23	14	18	46
Minimum	6	4	4	20

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