CONTROL OF FALSE CHILEAN MITE (*Brevipalpus chilensis*), WITH A PHOSPHINE AND COLD STORAGE

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Abstract

The false Chilean Mite is a quarantine pest for different Chilean fruit markets. Therefore it is important to find a method and /or viable product, that is able to control this pest, without damaging the treated fruits.

This specie over winters as a adult female, under the bark, bud and other protected parts and lays their eggs later in spring. In the field it is practically impossible to get a total control of this mite, therefore there is a high probability that at the moment of export of the fruit, the fruit is still contaminated with the mite.

The host of this mite are grapes, kiwifruit, cherimoya, citrus and other fruit and ornamental species.

The damage that this species can cause, is the wrinkling and the dehydration of the grape leaves for example, but the main problem is that this is a quarantine pest for some markets, like the US market, where the presence of this mite causes the rejection of the exported shipment.

In tests made by FOSFOQUIM S.A. the false Chilean mite was controlled effectively at ambient temperature with exposures to 1,500 ppm of phosphine during 72 hours. At the end of 12 days of periodic examinations, no live specimens were found, which allows to assume that the control is complete, for the all the stages. Afterwards in an other study (Report 2, 1/6/05), Fosfoquim S.A. determined that a phosphine treatment at 0ºC of temperature during 72 hours realized at a concentration of 2,500 ppm, was not enough to control by itself the false Chilean mite.

Now a new study made by Fosfoquim S.A. showed that a combined treatment of an exposure during 72 hours to a concentration of 2,500 ppm of phosphine at 6ºC during the fumigation, and then a cold treatment during 10 days at 0ºC is effective to control the false Chillean Mite.

For this test, samples of *Brevipalpus chilensis* naturally grown on *Ligustrum spp* at the plant of FOSFOQUIM, located in Padre Hurtado, Santiago, Chile, were used and Steel drums of 60 liters, prepared for the gas injection, were used as fumigation chambers.

To maintain the temperature at 6ºC in the chambers, the non treated samples and the drum to be fumigated were placed in a cooling chamber with temperature control.

After achieving the final temperature inside the chamber (drum), phosphine was injected into the chamber to be fumigated until a concentration of 2500 ppm phosphine was achieved. Afterwards, both drums, the non-treated sample and the fumigated sample, were sealed. The phosphine gas used for this test was pure phosphine diluted to 2% in volume with nitrogen.

After 72 hours of treatment at 6°C, both, fumigated and non-fumigated chambers, were aerated. The final concentration in the fumigated chamber was 2,200 ppm phosphine

One part of the fumigated sample was placed together with part of the non-fumigated sample in separate drums in the refrigeration chamber and the temperature was regulated to 0ºC, maintaining this temperature for the cold treatment during the next 10 days. The other part of each samples was evaluated during the next 12 days.

The samples exposed to the cold treatment, were evaluated for first time after completing the 10 days at 0ºC. After completing the cold treatment both, fumigated and non fumigated samples, were maintained at ambient conditions and evaluating the samples at 3 days, 6 days and 11 days of finishing the treatment.

Conclusions:

Phosphine exposure at 6ºC during 72 hours at 2,500 ppm by itself is not enough to effectively control the mite.

But it could be concluded that the phosphine treatment at 2,500 ppm during 72 hours at 6ºC of temperature combined with a cold treatment after fumigation is sufficient to obtain an effective control of *Brevipalpus chilensis*.

This form of combined treatment results in interest for the Chilean fruit export market, since a fumigation with phosphine in Chile and then a cold treatment during voyage fits perfect into the export schedule. In any case the fruit is maintained cold during the freight to the final market, which last about 12 days to U.S.A.

According to the information obtained from the tests, a preliminary conclusion is that the cold treatment of 10 days at 0ºC itself does not control the *Brevipalpus chilensis*, since the non-fumigated sample, that also was exposed to a cold treatment, showed a high rate of survival.

It could also be observed that in both treatments, phosphine alone and combined with cold treatment, under the evaluated conditions, the eggs were still not developing at ambient temperature 12 days after the aeration in the first case and 11 days after combined treatment in the second case, which shows that the eggs were controlled effectively and which also shows that the adult females are more resistant to this phosphine treatments.

Combined treatment of phosphine fumigation at 6ºC during 72 hours at 2,500 ppm and exposure to cold treatment of 10 days to 0ºC after fumigation and incubation at room temperature.

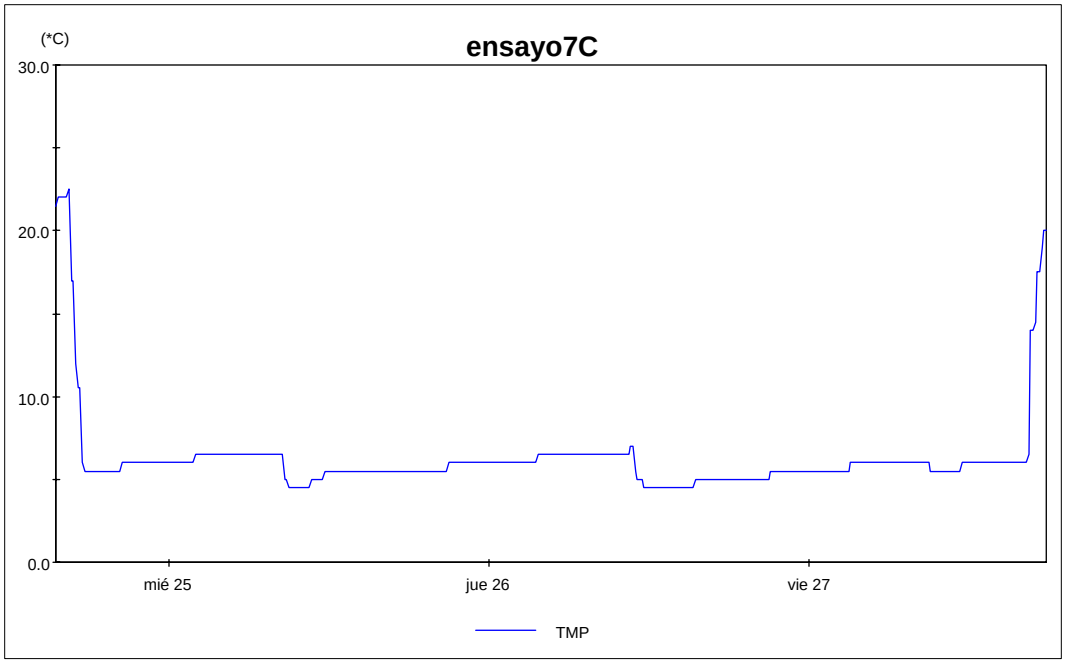
Original Population on each evaluation: Approximately 250 specimens

	1st evaluation 1 hour after treatment	2nd evaluation 3 days after treatment	3rd evaluation 6 days after treatment	4th evaluation 11 days after treatment
Treated sample	One alive specimen was found, which is about 0.5 % survival.	One alive specimen was found, which is about 0.5 % survival.	One alive specimen was found, which is about 0.5 % survival.	No alive specimens were found
Non-treated sample	No dead specimens found on leaves. Estimated survival: 90 %	No dead specimens found on leaves. Estimated survival: 85 %	No dead specimens found on leaves. Estimated survival: 80 %	75 % alive specimens still on the leaves

Phosphine fumigation at 6ºC during 72 hours at 2500 ppm.

Original Population on each evaluation: Approximately 250 specimens

	1st evaluation 2 hours after aeration	2nd evaluation 5 days after aeration	3rd evaluation 8 days after aeration	4th evaluation 12 days after aeration
Treated sample	90 % mortality.	90 % mortality.	95 % mortality.	95 % mortality.
Non-treated sample	Estimated Survival: 98 %	Estimated Survival: 98 %	Estimated Survival: 90 %	75 % alive specimens still on the leaves



Graph 1; Temperature during the test, were the start of the fumigation can be identified as a temperature decrease and the end of the test as an increase of the temperature.

Picture 1; Fumigation drum