Significant improvement of IPM strategies against the sugarcane stem borer, Chilo sacchariphagus, through long-term succesful storage of Trichogramma chilonis (Hymenoptera:Trichogramma)

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Abstract

The stem borer *Chilo sacchariphagus* is a key pest of sugarcane in Reunion Island and South-East Asia. Since 2002, an IPM strategy associating inundative release of an egg parasitoid, *Trichogramma chilonis* and conservation of a predatory ant, *Pheidole megacephala*, has been proposed. According to field experiments in Reunion Island, this reduced up to 50% of damage with financial gains ranging from 800 to 1800 dollars per ha.

To develop IPM strategies on a large scale, reducing the costs of beneficials and releasing field labour is necessary. **In this context, cold storage is a key step to the development of the sugarcane borer biocontrol, by improving production and release management.**

Thanks to a funding from the French Ministry of Agriculture (CASDAR), laboratory tests on cold storage of *T. chilonis* were first conducted, followed by field experiments on the performance of stored parasitoids.

Quality control after storage was performed several times (after mass production, before and after transport, after field release) in laboratory at 25 ± 1°C, RH 75 ± 5 % and 16L: 8hD to evaluate emergence rate of stored insects, fecundity during 7 days and survival at 7th day of *T. chilonis* females.

For the first time, a **long-term cold storage of *T. chilonis* was obtained without loss of physiological performance** (good emergence, fecundity, survival during 7 days). Results suggested a quiescence state because no loss was observed due to storage interruption.

Moreover, **the same efficacy of cold stored *Trichogramma* compared to non-stored individuals was obtained in the field** (experimental sites in Reunion Island).

These important results make possible a large-scale application of IPM strategies in sugarcane production.

Key words**:** *Chilo sacchariphagus*, *Trichogramma chilonis*, inundative release, cold storage, diapause, quiescence, mass production.