Prospects for Biological Control of Pepper Weevil with a Parasitic Wasp (*Triaspis eugenii* Wharton & Lopez-Martinez) from Mexico

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Although biological control is considered an integral component of IPM, no viable control strategy for pepper weevil has evolved during the one hundred years that have elapsed since the pest was firs reported in United States in 1904Furthermore, natural enemies of pepper weevil in USA have not been shown to play an important role in the control of this insect. C*atolaccus hunteri* (Hymenoptera: Pteromalidae), a generalist and cosmopolitan parasitoid of the pepper weevil, and other 17 species of Coleoptera, is ineffective under most circumstances because it only attacks mature larvae that are inaccessible deep in the fruit. A more diverse parasitoid fauna of pepper weevil occurs in Mexico (Mariscal, E., J. Leyva, and R. Bujanos 1998. Parasitoides del picudo del chile en Nayarit, Mexico. Vedalia 5: 39-46), where this insect and *Capsicum annuum* L. likely evolved.

Nine parasitoids have been reported from the western coast, in the Mexican state of Nayarit (Mariscal *et al.* 1998), with *Triaspis eugenii* (Hymenoptera: Braconidae) being the most abundant. *T. eugenii* is a solitary endoparasitoid of egg-prepupa. It parasitizes the egg of the pepper weevil and develops as endoparasitoid until the host finishes the pupal cell, then emerges from the prepupa and feeds as ectoparasitoid leaving nothing but the head capsule of the host. It then spins its cocoon and completes the rest of the life cycle in 14-20 days. Because these endoparasitoids can reach the host before the larva burrows into the fruit, it could attack the pepper weevil in any cultivar regardless of fruit size and therefore should be amenable to augmentative biological control programs. We have developed a rearing methodology for this wasp using pepper weevil and fresh Jalapeño peppers, and we will begin field cage evaluations for this year.

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Activity of Bumblebees (*Bombus terrestris*, L.) on the Pollination of Sweet Pepper (*Capsicum annum*, L.) Flowers and Fruit Set

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An experimental culture of two pepper cultivars of "California" type has been carried out, with a treatment by bumblebees and a control without bees. The culture was developed during the autumn campaign, in a plastic greenhouse without heating. The whole experiment was repeated twice, in 2002-2003 and in 2003-2004.

Pollination treatment gave a higher production than the control one (between 5 and 6% depending on the cultivar and the year). The fruit quality was always better in the pollination tratment, according to the statistical tests applied. Fruit length, weight, numbers of seeds, calibre and pericarp thickness were always greater in the pollination trearment compared with the control.

Bumblebees activity, pollen viability and floral abscission were studied during the experiments. Bumblebee activity was enough to give a pollination rate between 51% in cultivar Bárdenas and 42% in Vergasa, having a pollination rate in the control treatment of 29% and 27% respectively. Pollen viability and floral abscission were affected by temperatures. Pollen viability decreased along the culture, approximately at the same rate that the temperatures. Floral abscission was affected by pollination treatment, taking place less abscission with pollination, but the differences between the treatments were not statistically significant.

Correlation tests were performed between the main variables studied. Pollination rate was correlated with the number of bumblebee visits to the flowers, seeds per fruit, number of pollen grains on stigma and the quality fruit traits. The number of pollen grains was correlated with the number of seeds per fruit. All these correlation coefficients were statistically significant.

According to our data, the introduction of the bumblebee colonies should be done at an optimal temperature because an early introduction did not produce any improvement of the floral abscission or fruit set, even it can be detrimental to the culture.

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