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Attract and Kill for the control of olive fruit fly in Alto Garda Trentino

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Abstract

Alto Garda Trentino, in northern Italy, is an important economic touristic area characterized by the insubric climate typical of Lake Garda basin. Good quality oil production came from the local olive groves and the olive fruit fly (*Bactrocera oleae*, Rossi) represent the most serious and potentially devastating treat. IPM as control strategy was largely adopted with positive results but during the last decade the frequency of the *B. oleae* heavy attacks increased generating a general concern. The technological-scientific progress, the social environmental issues awareness, the massive use of chemical pesticides and their regulations enforced by the laws were drivers of the pest management.

One objective of the project named “Innovazione e Ricerca per l'Olio Extravergine dell'Alto Garda Trentino” funded by Agraria Riva del Garda and Provincia Autonoma di Trento, was the transfer of knowledge about the reliability strategies for the management of the olive fruit fly with modern tools. A three years experiment (2016-2018) was carried out to evaluate the effectiveness of different Attract and Kill approaches, mass trapping and “Lure and Kill” tactics. During 2016 and 2017 were compared two “Lure and Kill” bait station products; Eco-Trap (Vioryl), a bag treated with contact insecticide (deltamethrin) containing ammonium bicarbonate and provided with a sexual pheromone (1,7-dioxaspiro[5.5]undecane) dispenser and Spintor Fly (Dow AgroSciences), a sprayable bait protein-specific with ingestion insecticide (spinosad). In 2017 it was added to compare a trap for mass trapping made of a conic plastic body containing specific food and sex attractant and a cover internally treated with deltamethrin, Flypack (SEDQ). The insects inside traps were counted to follow density of the population. In 2018 Flypack and Eco-Trap comparison was repeated. The trial was set up in a hilly olive Casaliva orchard (around 100 hectares) located in monte Brione (Riva del Garda, TN). The experimental design, according to European Plant Protection Organisation (EPPO) standards, consisted of adjacent large plots per types of treatment (around 3 hectares/plot) subdivided in three subplots size (at least 1 hectare each with a net areas of 0.1 hectare or 20 trees at least, separated by a minimum of 100 m) at different altitude. Untreated plots were selected outside the trial area with conditions closely similar. The experiments started every year in July during the phenological phase of pit hardening (BBCH 75), when the olives were susceptible to egg laying, until harvest. The Eco-Trap and Flypack were hung with a density of 100 and 70 traps per hectare/year respectively. Spintor Fly was applied before the fruit first punctures and following the insect infestations (with maximum of eight treatments/year) at dosage of 1 L of product diluted in 4 L water/hectare (half of total number of the trees were treated on a small part of foliage by backpack sprayer).

The first year of study, 2016, was characterized by average of 30% of olives total infested on the untreated area. Spintor Fly, in particular, with eight applications during season, showed the best protection results (6% fruit damaged). In the next two years the damages at harvest in the untreated trial area gradually lowered (from 24% to 15% in 2017 and 2018 respectively) and all products tested (Eco-Trap, Spintor Fly and Flypack) showed similar good results (below of 5% olives total infested).

Attract and Kill, as alternative IPM, solved in part important problems about pollution, residues, resistance, drift and side effects on beneficial. From our experience some considerations can be made; the best results were obtained in case of low infestations and when the applications were repeated during years. It needed area-wide applications to guarantee success of the technique as replacement of insecticides based strategy. Spintor Fly provided good protection, use flexibility and fewer residues on the fruit but it was necessary consider its cost, risk of wash off and low persistence. The Eco-Trap allowed adequate protection and when it needed, especially during seasons with high infestations and near harvest when olives was more vulnerable to attack, could be combined with bait spray (*e.g.* Spintor Fly) or insecticide applications. Flypack, when commercially available, for mass trapping could represent a valid alternative to chemical insecticides and bait applications especially in heavy anthropized and touristic sites where treatments were not possible. When the risk of immigration of mated females was low as in our study area, we could confirm Flypack to be a useful device for spring captures of overwintering adult flies lowering their potential of generating the future population. A constant *B. oleae* monitoring and the adoption of the good agronomic practices, such as anticipating the harvest in case of high infestations, still remain of fundamental importance for preservation of the good effectiveness results obtained with the Attract and Kill method.

Key words: olive fruit fly, Integrated Pest Management, semiochemical-based control