Euphresco

Success story

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Biology of *Epitrix* (flea beetle) and techniques for detection

The genus *Epitrix* (Coleoptera: Chrysomelidae: Alticinae) comprises nearly 180 species worldwide. Most of the species occur in the neotropics (130) and only 12 and 17 species are known from North America and Europe, respectively. *Epitrix* species feed mainly on plants from the family Solanaceae, though they may feed on other plant families when their preferential host is not available (e.g. Chenopodiaceae, Cucurbitaceae, Fabaceae). The adults feed above-ground on the leaves of their host-plants. The females lay eggs at the base of the stem, and the larvae develop underground, on the root system. In the American continent, several *Epitrix* species which are very similar in appearance have been associated with potato damage. In Europe two species were introduced and have since become established, in Portugal and Northwest Spain (Galicia), which require control measures to be implemented to prevent economic damage.

The project '*Epitrix* (flea beetle) species, life cycles and detection method' aims to better understand the ecological constraints of the beetle and to develop reliable diagnostic techniques and coordinates the associated research.

The population dynamics and the lifecycle of the flea beetle are being investigated under Portuguese conditions as well as its cold hardiness under Northern European climatic conditions. This will determine its potential to survive under such conditions and to extend its distribution range. A short literature review has been completed to determine both the most appropriate chemical and ecological control methods currently employed. The prospects for the control of the beetle larvae with biological control agents is being investigated, as well as the potential of natural attractants for the detection of the adult beetles.

A morphological identification key of *Epitrix* species that develop on potato has been produced, along with a reference collection of different *Epitrix* species (voucher specimens).

The project has also developed a duplex real-time PCR identification method for *E. cucumeris and E. similaris* based on the amplification of two fragments from the Cytochrome c Oxidase Subunit I (*COI*) barcoding gene distinguishable by their melting temperature. The method has been shown to be rapid, sensitive (LOD= 1/10 number of individuals) and specific (no false positives or negatives). Overall, the identification procedure takes up to four hours. The results obtained with specimens collected in different Portuguese regions indicated that this technique is applicable over specimens collected in other areas and in any other molecular biology laboratory. We are also currently developing other identification methods in order to cover more species of the *Epitrix* complex. These include in-field applicable (LAMP technology) identification methods that will allow us to identify the presence of *E. similaris* or *E. cucumeris* in less than 30 minutes. The information on the newly developed methods will support the work on the EPPO Standard PM 7/ 109(1), currently under revision.

Project ID: *Epitrix* (flea beetle) species, life cycles and detection method (EPITRIX)