

## POSSIBILITIES FOR USE OF FLORAL BAITED COLOUR TRAPS FOR DETECTION OF SCARABAEID BEETLE (COLEOPTERA: SCARABAEOIDEA) PESTS

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### ABSTRACT

One of the possibilities for detection (as well as a rough estimation) of the scarabaeid beetle pests in specific areas are the CSALOMON<sup>®</sup> VARb3 floral baited colour traps (produced by Plant Prot. Inst., HAS, Budapest, Hungary). These traps, offered for the pest species *Tropinota (Epicometis) hirta* (Poda, 1761), *Oxythyrea funesta* (Poda, 1761) and *Cetonia aurata* (Linnaeus, 1761) were used for detection and seasonal monitoring of the above mentioned pests in different regions of Bulgaria in 2009 and 2010. Besides the target species, the following species of the superfamily Scarabaeoidea were caught also: *Protaetia (Netocia) cuprea* (Fabricius, 1775) – in Troyan and, as single specimens, in Dryanovo, Knezha and Plovdiv; *Valgus hemipterus* (Linnaeus, 1758) – in Dryanovo, Gabrovo, Karnobat, Knezha, Kyustendil, Petrich, Plovdiv and Troyan; *Blitopertha lineolata* (Fischer von Waldhein, 1824) – in Dryanovo, and as single specimens in Karnobat and Kyustendil, and *Anisoplia (Autanisoplia) austriaca* (Herbst, 1783) - in Knezha. All these species, with the exception of *P. cuprea* and *A. austriaca*, were caught by means of the same traps, in orchards in the region of Sofia earlier.

**Key words:** Bulgaria, distribution, floral baited traps, scarabaeid pests

### 1 INTRODUCTION

Scarabaeids are important group of beetles in regard to both systematics and economics. Adults of many species are polyphagous and feed on leaves and flowers of cultural plants (Hurpin, 1962). One of the possible tools for detection, seasonal monitoring and even direct control of the scarabaeid pest beetles are colour traps baited with synthetic floral compounds. Recently such effective tools comprising of specific colour trap and floral bait have been developed for such important pest as *Tropinota (Epicometis) hirta* (Poda, 1761) (Tóth *et al.*,

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2003; Tóth *et al.*, 2004; Schmera *et al.*, 2004; Vuts *et al.*, 2010c), *Oxythyrea funesta* (Poda, 1761) (Tóth *et al.*, 2005; Vuts *et al.*, 2008) and *Cetonia aurata* (Linnaeus, 1761) (Tóth *et al.*, 2005; Vuts *et al.*, 2010b).

Here we report on the results of our field investigations on the distribution of some of the main beetle pests belonging to the subfamily Scarabaeoidea by means of floral baited colour traps organized in several regions in Bulgaria during 2009-2010.

## 2 MATERIALS AND METHODS

Commercially available VARb3k traps and baits for *P. hirta*, *O. funesta* and *C. aurata* were purchased from "Csalomon" (Plant Protection Institute, Budapest, Hungary) and used in our field work. The composition of each bait is presented on Table 1; for *T. hirta* and *C. aurata* we used blue traps while for *O. funesta* – fluorescent yellow ones. Two traps for each species were set in eight sites in different regions in Bulgaria during 2009 and/or 2010 in: Dryanovo (mixed orchard), Gabrovo (mixed orchard; only 2009), Karnobat (mixed park vegetation trees and bushes), Knezha (mixed cereals; only 2010), Kyustendil mixed orchard), Petrich (peach orchard; only 2009), Plovdiv (mixed orchard) and Troyan (mixed orchard). The traps, installed on the ground or at a height of 50-100 cm above the ground level, were visited weekly and the beetles caught were collected and identified later in the laboratory. Only in Gabrovo the traps were visited irregularly at 10-15 day intervals. In both years, the observations started in the second half of March and lasted till the end of July.

The scarabaeid specimens caught were identified using Baraud (1992) and Medvedev (1965).

## 3 RESULTS AND DISCUSSION

As a result of our field observations during 2009 and 2010 all target species *T. hirta*, *O. funesta* and *C. aurata* were recorded in the sites of observations. The only exceptions were: Troyan with no catches of *T. hirta* in 2009 (total of 33 *T. hirta* caught in 2010) and Dryanovo with no catches of *C. aurata* in 2010 (only three *C. aurata* caught in 2009). Besides the target species, the following species of the superfamily Scarabaeoidea were caught also: *Protaetia (Netocia) cuprea* (Fabricius, 1775) – in Dryanovo, Knezha, Plovdiv and Troyan; *Valgus hemipterus* (Linnaeus, 1758) – in Dryanovo, Gabrovo, Karnobat, Knezha, Kyustendil, Plovdiv and Troyan; *Blitopertha lineolata* (Fischer von Waldhein, 1824) – in Dryanovo, Karnobat and Kyustendil, and *Anisoplia (Autanisoplia) austriaca* (Herbst, 1783) – in Knezha. The most numerous catches in our investigations were recorded for *T. hirta* following by *O. funesta* and *C. aurata*. Among not target species the most numerous were the catches of *B. lineolata* in Dryanovo in 2009, and the most distributed species missing only in Petrich - *V. hemipterus* (Table 2). All these species, with the exception of *P. cuprea* and *A. austriaca*, were caught by means of the same traps, in orchards in the region of Sofia earlier (Vuts *et al.*, 2010a; unpublished data for *V. hemipterus* and *B. lineolata*). *T. hirta* and *C. aurata* were recorded earlier during similar investigations performed in Kyustendil (Vuts *et al.*, 2010a).

*T. hirta* is a widely distributed in Bulgaria major polyphagous pest feeding on orchard species, vegetable and cereal crops as well on some flowers, including *Rosa x damascena*, vine, some technical crops etc. (Chorbadjiev, 1932; Buresh, & Lazarov, 1956; Popova, 1962; Nikolova, 1968; Grigorov, 1972). According to Zashev & Keremedchiev (1968) this pest damages also forest trees.

*O. funesta* is a closely related to *T. hirta* species damaging the same food plants being, however, less dangerous as a pest (Buresh & Lazarov, 1956; Popova, 1961a; Nikolova, 1968; Grigorov, 1972).

Table 1: Composition of the baits for the three target species, *Tropinota hirta*, *Oxythyrea funesta* and *Cetonia varata*.

Species	Compound present in the bait				
	Trans-cinnamyl alcohol	trans-anethole	(1)-Lavandulol	1-Phenyl ethanol	2-Phenyl ethanol
<i>Tropinota hirta</i>	+	-	-	-	-
<i>Oxythyrea funesta</i>	+	-	+	-	-
<i>Cetonia varata</i>	+	-	-	-	-

Table 2: Total catches of seven scarabaeid species in floral baited traps in eight sites in Bulgaria. Blank test was not performed, - no catches; \* - 1-3 beetles caught; \*\* - 4-30 beetles caught; \*\*\* - 31-300 beetles caught; \*\*\*\* - 301-3000 beetles caught; \*\*\*\*\* - > 3000 beetles caught.

Site	Species caught													
	<i>Tropinota hirta</i>		<i>Oxythyrea funesta</i>		<i>Cetonia varata</i>		<i>Protaetia cuprea</i>		<i>Valgus hemipterus</i>		<i>Blitopertha insensata</i>		<i>Anisoplia unistriata</i>	
	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010	2009	2010
Dryanovo	***	***	***	***	*	*	*	*	**	**	***	***	-	-
Gabrovo	*	***	***	***	**	**	**	**	**	**	**	**	-	-
Karnikuh	***	***	***	***	**	**	**	**	**	**	**	**	-	-
Knezha	***	***	***	***	***	***	***	***	***	***	***	***	***	***
Kyustendil	***	***	***	***	*	*	*	*	*	*	*	*	-	-
Peirich	***	***	***	***	***	***	***	***	***	***	***	***	-	-
Plovdiv	***	***	***	***	***	***	***	***	***	***	***	***	-	-
Froyan	-	***	***	***	***	***	***	***	**	**	*	*	-	-

*C. aurata* is widely distributed in Bulgaria minor pest damaging mainly in orchards, but found also on cabbage, maize, vine, *Rosa* sp. etc. (Buresh & Lazarov, 1956; Nikolova, 1968; Grigorov, 1972). This species is known also as a forest pest feeding on flowers, unripe fruits and young leaves of the forest trees (Zashev & Keremedchiev, 1968).

*P. cuprea* is another minor pest found on *Rosa damascena*, cherries and other orchard crops (Buresh & Lazarov, 1956; Nikolova, 1968; Grigorov, 1972).

*V. hemipterus* is widely distributed in Bulgaria but never reach a high population level. The beetles of this species feed on strawberries, plum, apple and other orchard crops (Buresh & Lazarov, 1956; Popova, 1961b; Grigorov, 1972). *B. lineolata* was found on vegetable crops, pear, plum, vine, alfalfa, *Rosa x damascena* (Buresh & Lazarov, 1956; Nikolova, 1968) but never reported as a serious pest in Bulgaria.

*A. autriaca* is a serious and widely distributed pest on different cereals in Bulgaria (Buresh & Lazarov, 1956; Grigorov, 1972). However, the catches of this species in our traps is most probably occasional and due only to the fact that the traps were situated in cereal field.

#### 4 CONCLUSIONS

CSALOMON<sup>®</sup> VARb3 floral baited colour traps are very effective tool for detection of the target species: *T. hirta*, *O. funesta* and *C. aurata*. The target species are widely distributed in Bulgaria with *E. hirta* being found in a highest population level. Besides the target species CSALOMON<sup>®</sup> VARb3 floral baited color traps used in the recent investigations attracted also the following scarabaeid pest species: *P. (Netocia) cuprea*, *V. hemipterus* and *B. lineolata*.

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