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NONTARGET LEPIDOPTERA SPECIES FOUND IN THE PHEROMONE TRAPS FOR SELECTED TORTRICID SPECIES IN 2002 AND 2003 YEARS

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Abstract

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Pheromone traps were used to monitor the following tortricid moths, i.e. *Adoxophyes orana*, *Archips podanus*, *A. rosanus*, *Hedya nubiferana*, *Pandemis heparana*, *Spilonota ocellana*, *Cydia pomonella*, *Cydia funebrana* and *Cydia molesta* in the localities Brno-Tuřany (Brno-město), Nebovidy (Brno-venkov) and Prakšice (Uherské Hradiště). Other Lepidoptera non-target species were present in these target-species pheromone traps, i.e. *Adoxophyes orana*, *Agrotis segetum*, *Amphipoea oculaea*, *Archips rosanus*, *Celypha striana*, *Cydia coronillana*, *Enarmonia formosana*, *Epiblema scutulanum*, *Epinotia huebneriana*, *Eucosma fervidana*, *Euxoa tritici*, *Hedya pruniana*, *H. nubiferana*, *Lymantria dispar*, *Noctua pronuba*, *Notocelia rosaecolana*, *N. roborana*, *Pammene albuginana*, *P. suspectana*, *Pandemis cerasana*, *Pyrausta rectefascialis*, *P. aurata*, *Spilonota ocellana*, *Yponomeuta malinellus* and *Zygaena purpuralis*.

fruit tortricid moths, pheromone traps, South Moravia, intensive orchard, extensive orchard, non-target moth species, *Noctuidae*, *Pyralidae*, *Yponomeutidae*

In practice the use of pheromone traps for tortricid moths is often complicated because also non-target species are captured. Especially the trapping of habitually similar species is important because their presence could distort the data used for treatment prediction. It is therefore important to know the spectrum of the non-target species and why they are attracted. Tortricid moths, i.e. summer fruit tortrix *Adoxophyes orana* (Fischer, 1834), fruit tree tortrix *Archips podanus* (Scopoli, 1763), rose tortrix moth *A. rosanus* (Linnaeus, 1758), green budworm *Hedya nubiferana* (Haworth, 1811), eye-spotted bud moth *Spilonota ocellana* (Denis & Schiffermüller, 1775), codling moth *Cydia pomonella* (Linnaeus, 1758), plum fruit moth *Cydia funebrana* (Treitschke, 1835) and oriental fruit moth *Cydia molesta* (Busck, 1916) are important pests of fruit trees of the *Rosaceae* family. HRDÝ *et al*. (1979) tested sex pheromones for *C. funebrana*, *C. molesta*, and *Anarsia lineatella* Zeller, 1839 and they found that also non-target species were captured in the traps (Tab. I). In Japan, while monitoring *C. pomonella*, HIRAMATSU *et al*. (1992) discovered that the pheromone of this species attracted males of the genera *Aterpia*, *Hedya*, *Eucosma*, *Grapholita* and *Pammene*. The species of the *Archipini* tribe have a common component of pheromone (Z)-11-tetradecenyl acetate (OKU, 1993).

I: *Nontarget moths species refered by many authors*

Target species Cílový druh	**The target species pheromone Feromon cílového druhu**	**Nontarget species Necílový druh**	**Authors Autor**
Cydia funebrana	(Z)8-dodecenyl acetate (E)8- dodecenyl acetate	*Pammene aurana* (Fabricius, 1775)	Hrdý *et al*. 1979; Hrdý *et al*. 1997
		P. suspectana (Lng. & Zeller, 1849)	Hrdý *et al*. 1979; Hrdý *et al*. 1997
		P. fasciana (Linnaeus, 1761)	Hrdý *et al*., 1993
		P. amygdalana (Duponchel, 1842)	Hrdý *et al*. 1997
		P. aurita (Razowski, 1991)	Hrdý *et al*. 1997
		P. spiniana (Duponchel, 1843)	Mayer & McLaughlin in Hrdý *et al*. 1997
		Enarmonia formosana (Scopoli, 1763)	Hrdý *et al*. 1979; Hrdý *et al*. 1993
		Epiblema foenellum (Linnaeus, 1758)	Hrdý *et al*. 1979
		E. scutulanum (Den. & Schiff., 1775)	Hrdý *et al*. 1979; Hrdý *et al*. 1993
		Celypha striana (Den. & Schiff., 1775)	Hrdý *et al*. 1993
		Cnephasia genitalana (Pierce & Metcalfe,1922)	Hrdý *et al*. 1993
		C. stephensiana (Doubleday,1849)	Hrdý *et al*. 1993
		Cydia tenebrosana (Duponchel, 1834)	Hrdý *et al*. 1993
C. molesta	(Z)8-dodecenyl acetate E(8)- dodecenyl acetate (Z)-8- dodecen-1-ol	*Pammene fasciana*	Hrdý *et al*. 1993
		Enarmonia formosana	Hrdý *et al*. 1993
		Epiblema scutulanum	Hrdý *et al*. 1979
		Celypha striana	Hrdý *et al*. 1993
		Cnephasia stephensiana	Hrdý *et al*. 1979
		C. genitalana	Hrdý *et al*. 1993
		Cydia janthiana	Hrdý *et al*. 1997
		C. tenebrosana	Hrdý *et al*. 1993
		Hedya pruniana	Hrdý *et al*. 1989
C. pomonella		*Aterpia*, *Hedya*, *Eucosma*, *Grapholita*, *Pammene*	Hiramatsu *et al*., 1992
Anarsia lineatella (Zeller, 1839)	(E)-5-decene-1-yl acetate; (E)-5-decene-1-ol	*Diachrysia chrysitis* (Linnaeus, 1758) *Mesapamea secalis* (Linnaeus, 1758) *Lacanobia suasa* (Den. & Schiff., 1775) *Apamaea sordens* (Hufnagel, 1766)	Hrdý *et al*. 1993
Pandemis heparana		*Noctua fimbriata* (Schreber, 1759)	Hrdý *et al*. 1993
Hedya nubiferana (Haworth, 1811)	(E,E)-8,10-dodecadien-1-ol-acetate; (Z)-8-dodecenyl acetate ; dodecenyl acetate	*Cydia janthiana* (Duponchel, 1835)	Hrdý *et al*. 1997

MATERIAL AND METHODS

Delta-type pheromone traps were used to monitor the following important tortricid moths species *Adoxophyes orana*, *Archips podanus*, *A. rosanus*, *Hedya nubiferana*, *Spilonota ocellana*, *Cydia pomonella*, *Cydia funebrana* and *Cydia molesta*; in 2002 in the localities Brno-Tuřany (Brno-město district) and Prakšice (Uherské Hradiště district), and in 2003 in the Nebovidy locality. The traps were placed in the tree crowns at a height of 150 cm ca 20 m apart; in Tuřany (apple and peach trees) they were placed approximately in the middle of the tree crown, in Prakšice (apple and plum trees) and Nebovidy (apple, pear, plum and apricot trees) in the middle of the crown 1–2 m from the stem. In 2002 the commercial pheromone traps were obtained from ZD Farm Chelčice under the mark Biolatrap. The pheromone dispensers contained the following substances: for *A. orana* (Z)-11-tetradecenyl acetate, (Z)-9-tetradecenyl acetate, *A. podanus* (Z)-11-tetradecenyl acetate and (E)-11-tetradecenyl acetate, *A. rosanus* (Z)-11-tetradecenyl-acetate, (Z)-11-tetradecene-1-ol, *Hedya nubiferana* (E,E)-8,10-dodekadiene-1-yl-acetate, (Z)-8-dodecene-1-yl-acetate, *Spilonota ocellana* (Z)-8-tetradecene-1-yl-acetate, *Pandemis heparana* (Z)-11-tetradecene-1-yl-acetate, *Cydia pomonella* (8,10)-8,10-dodekadiene-1-ol, *Cydia funebrana* (Z)-8-dodecene-1-yl acetate, (E)-8-dodecene-1-yl acetate, (Z)-8-tetradecene-1-yl acetate and tetradecyl acetate and for *Cydia molesta* (Z)-8- dodecene-1-yl acetate, (E)-8-dodecene-1-yl acetate and (Z)-8-dodecene-1-ol (www.nysaes.cornell.edu)[1].

In 2003 the same species of tortricid moths were discovered in the localities Tuřany, Prakšice and Nebovidy. The pheromones for *Adoxophyes orana*, *Archips podanus*, *A. rosanus* and *Hedya nubiferana* were obtained from ZD Farm Chelčice. The pheromones for *Cydia pomonella* – (E,E)-8,10-dodecadien-1-ol, *Cydia funebrana* – mixture of Z8-dodecene-1-yl acetate and E8-dodecene-1-yl acetate), *C. molesta* – a mixture of (Z)-8-dodecenyl acetate, (E)-8-dodecenyl acetate and (Z)-8-dodecen-1-ol, for *Spilonota ocellana* Z8-tetradecen-1-yl acetate, were supplied by Propher Březová near Zlín.

The morphology of male genitalia was studied to determine the caught moth species (RAZOWSKI, 2001; NOWACKI, 1998; SLAMKA, 1997). The study of male genitalia morphology was necessary especially for identification of *C. funebrana* and *C. molesta*. The names of moths follow LAŠTŮVKA (1998).

Characteristics of the localities under study

Prakšice is locality, which belongs to the Carpathian area, bioregion Zlín. Characteristic of this area is the thermophilic vegetation high in the mountains and the descent of mountain species into lower locations, which results in great species diversity. Dominant are flysch deposits. The climate is continental, with local differences dependent on the altitude and on the windward or leeward face of the slopes. The vegetation zones of the area are oak, beech-oak, oak-beech and beech stands. The locality is situated in the Nature Park Prakšická vrchovina (beech vegetation zone) and is slope exposed to the south, altitude 250 m. A beech forest (Fagetum) borders the southwest and north where oak (*Quercus* sp.), field maple (*Acer campestre* L.), common privet (*Ligustrum vulgare* L.) and dog rose (*Rosa canina* L.) are dominant species in the ecotone. It is an extensive plantation of fruit trees without chemical protection: apple-trees, pear-trees, cherry-trees, plum-trees and some service trees (*Sorbus domestica* L.) (apparently autochthonous), the undergrowth is mainly grass with admixture of herbs e.g. *Astragalus* sp., *Coronilla varia* L., *Inula ensifolia* L., *Rosa gallica* L.

Tuřany: biogeographically this is part of the North Pannonian area with upland topography and highlands character around Pálava. The biota is thermophilic; the area lies in the oak vegetation zone with *Quercus pubescens*, beech-oak vegetation zone with natural representation of hornbeam (*Carpinus betulus* L.) and scarce beech (*Fagus sylvatica* L.) on the border. Pheromone traps were placed in intensive orchards of the firm Novotný where chemical protection was carried out. It is a totally open and unprotected peneplain at altitude of 227 m, sum of precipitation 509 mm and average annual temperature 8.4 °C, with single bushes of rose (*Rosa canina* L.) and *Prunus* sp. The adjacent fields were used for the production of fodder plants (alfalfa). Apple-tree and peach-tree plantations were investigated. The grass undergrowth of the orchard consist of *Lolium perenne* L., *Dactylis glomerata* L. and *Taraxacum officinale* Zinn.

Nebovidy: the bioregion is an interface of the thermofyticum and mezophyticum.

Geologicaly this region is an armour massif with hornblende schist greenstone, with greenstone and old metabazits. The climate is relatively warm and dry, since the region lies in the moderate precipitation shadow of the Bohemian-Moravian Uplands (Česko-moravská vrchovina). The soils are orthic luvisols till luvisol chernozem on loess, with cambisol and albic luvisol on the slope and bottom spine. The primary vegetative cover was Querceto-carpinetum, less Carpathian and sporadically thermophilous oak woodlans. In higher altitudes mostly beech forests prevail, on southern slopes thermophilous oak woodlans on acid field. In general the biota of this region is well preserved, with a dense net of protected areas.

The studied locality is situated near the protected landscape area Bobravská vrchovina. Part of the

locality is an old orchard with apple-tree, cherry-tree and plum-tree with admixtures of rose (*Rosa canina*), hawthorn (*Crataegus*), blackthorn (*Prunus spinosa*) and strawberry (*Fragaria* sp.), and part is a garden colony with a broad spectrum of plants of the *Rosaceae* family. The locality is bordered by an oak (*Quercus* sp.) forest abundant in *Robinia pseudoacacia*, and elder (*Sambucus nigra*) and *Rubus* sp. in the sub-canopy.

II: *Basic characteristic of the studied localities*

	Tuřany	Nebovidy	Prakšice
altitude *	227	303	235
fauna square *	6865, 6866	6865	6971
sub-area **	Northpanonian	Hercynian	West Carpathian
bioregion **	Lechovice	Brno	Zlín
geologie **	gravel-sand loess-covered terraces	amfibolie granodiorites, diorites and oldmetabazits	flysch with sandstone ridge

* Pruner & Míka (1996)
** Culek *et al* (1995)

III: *Physical-geographical characteristic of the localities under study according to Demek et al. (1975)*

Studied locality	Geomorfological regions	Climatic regions	Vegetation tier
Tuřany (Brno- město)	of flat hilly lands of Outer Carpathian and Inner Carpathian depressions and the Central Polish Lowlands with accumulation surface	warm, very dry, with a moderately warm winter	oak
Nebovidy (Brno-venkov)	flat broken hilly lands of the Bohemian Highlands with erosion-denudation surface	warm, dry, with a moderately warm winter	beech-oak
Prakšice (Uherské Hradiště)	flat broken hilly lands of the Outer Western Carpathians with erosion-accumulation surface	warm, dry, with a moderately warm winter	beech-oak

IV: *Climatic conditions characteristic of the studied localities according to Quitt (1971)*

Studied locality	Nebovidy	Prakšice	Tuřany
Climatic region	**T2**	**T2**	**T4**
Number of summer days	50 - 60		60 - 70
Number of days with average temperature of 10°and more	160 - 170		170 - 180
Number of frosty days	100 - 110		100 - 110
Number of icy days	30 - 40		30 - 40
Average air temperature in January	–2 - –3		–2 - –3
Average air temperature in April	8 - 9		9 - 10
Average air temperature in July	18 - 19		19 - 20
Average air temperature in October	7 - 9		9 - 10
Average number of days with precipitation of 1 mm and more	80 - 100		80 - 90
Sum of precipitation in vegetation period	350 - 400		300 - 350
Sum of precipitation in winter period	200 - 300		200 - 300
Number of days with snow cower	40 - 50		40 - 50
Number of cloudy days	120 - 140		110 - 120
Number of bright days	40 - 50		50 - 60

V: *Exploatation of adjacent land*

Exploatation of adjacent land	Tuřany	Nebovidy	Prakšice
2000	alfalfa	gardens	forest, gardens
2001	alfalfa	gardens	forest, gardens
2002	alfalfa, sunflower	gardens	forest, gardens
2003	alfalfa	gardens	forest, gardens

RESULTS

In the course of monitoring tortricid moth species *Adoxophyes orana*, *Archips podanus*, *A. rosanus*, *Hedya nubiferana*, *Spilonota ocellana*, *Pandemis heparana* and *Cydia molesta*, *Cydia pomonella* and *Cydia funebrana* as references species, also other moth species were captured in the pheromone traps; in 2002 moths from the family *Tortricidae Pammene albuginana*, *Cydia coronillana*, *Notocelia rosaecolana*, *Spilonota ocellana*, *Adoxophyes orana*, *Pandemis cerasana*, *Archips rosanus* and *Hedya pruniana*, from the family *Pyralidae Pyrausta rectefascialis* and *P. aurata*, from the family *Noctuidae Noctua pronuba* and from the family *Yponomeutidae Yponomeuta malinellus* (Zeller, 1838).

In 2003 the other species captured in the pheromone traps were moths of the family *Tortricidae Epiblema scutulanum* (Den. & Schiff. 1775); *C. funebrana*, *Celypha striana* (Den. & Schiff. 1775), *C. molesta*, *C. pomonella*, *Pammene suspectana* (Lng. & Zeller, 1846), *C. coronillana* (Lng. & Zeller, 1846), *Enarmonia formosana* (Scopoli, 1763), *Notocelia roborana* (Den. & Schiff. 1775), *N. rosaecolana* (Doubleday, 1850), *Epinotia huebneriana* Koçak, 1980, from family *Noctuidae Noctua pronuba*, *Agrotis segetum* (Den. & Schiff. 1775), *Euxoa tritici* (Linnaeus, 1761), *Amphipoea oculaea* (Linnaeus, 1761), from family Lymantriidae *Lymantria dispar* (Linnaeus, 1758) and from Zygaenidae *Zygaena purpuralis* (Brünnich, 1763).

The occurrence of non-target species was either regular (R) (specimens of non-target species were captured in the pheromone traps in large numbers, or in a 14-day interval) or sporadic (S) (the individual specimens of non-target species were captured in the pheromone traps). Reciprocal attractiveness of the pheromones for the species *C. funebrana* and *C. molesta* was observed in both localities. Catching *C. coronillana* to the pheromone traps for *C. funebrana* is not possible, due to the large number of caught individuals and the length of the period when these species were present in traps; it is considered as accidental. The situation was similar for pheromones of *Pandemis heparana*, whose pheromone attracted *Noctua pronuba*. The pheromones of *C. funebrana* and *C. molesta* attracted *Notocelia rosaecolana*, probably there is a common pheromone compound, this theory is supported by the reciprocal attractiveness of pheromones of *C. funebrana* and *C. molesta*. An admixture in the pheromones for target species might be the reason for the attractiveness of these pheromones for *N. rosaecolana*.

VI: *The presence of non-target lepidoptera species in pheromone traps for tortricid moths in the Prakšice and Tuřany localities in 2002*

Locality	Target species	Non-target species	Regularity of occurrence/ number of individuals
Brno-Tuřany	***Pandemis heparana***	*Noctua pronuba*	R / 28
	Cydia funebrana	*Notocelia rosaecolana*	R / 8
	C. molesta	*Notocelia rosaecolana*	S / 3
		Spilonota ocellana	S / 3
		Adoxophyes orana	S / 2
		Archips rosanus	S / 1
		Pandemis cerasana	S / 2
	C. pomonella	*Hedya nubiferana*	S / 1
	Spilonota ocellana	*Hedya pruniana*	S / 2
	Hedya nubiferana	*Pammene albuginana*	S / 1

Prakšice	***C. pomonella***	*Pammene albuginana*	S / 2
	Cydia funebrana	*Cydia coronilana*	R / 13
	P. cerasana	*Yponomeuta malinella (Yponomeutdae)*	S / 4
		Pyrausta rectefascialis (Pyralidae)	S / 3
		Pyrausta aurata (Pyralidae)	S / 1

VII: *The presence of nontarget lepidoptera species in the pheromone traps for tortricide moths in localities of Prakšice and Tuřany in 2003*

Locality	Target species	Non-target species	Regularity of occurrence/ number of individuals
Tuřany	***C.molesta***	*Epiblema scutulanum*	R / 15
		C. funebrana	R / 71
	C. funebrana	*C. molesta*	R / 56
		Celypha striana	R / 9
		E. scutulanum	R / 20
		Agrotis segetum	S / 1
		Pammene suspectana	S / 1
	Pandemis heparana	*Noctua pronuba*	R / 9
Nebovidy	***C. funebrana***	*C. molesta*	R / 15
		C. coronillana	R / 7
	C. molesta	*C. funebrana*	R / 27
		Enarmonia formosana	S / 3
	Adoxophyes orana	*Lymantria dispar*	S / 3
	Hedya nubiferana	*Hedya pruniana*	R / 5
Prakšice	***Adoxophyes orana***	*Lymantria dispar*	S / 2
	C.molesta	*Enarmonia formosana*	S / 4
		Notocelia roborana	S / 1
		Notocelia rosaecolana	S / 1
		C. funebrana	R / 61
	C. funebrana	*N. roborana*	S / 3
		C. coronillana	R / 11
		C. molesta	R / 48
		S. ocellana	S / 1
	C. pomonella	*N. roborana*	S / 1
		Amphipoaea oculaea	S / 1
	H. nubiferana	*C. pomonella*	S / 1
		Eucosma fervidana	S / 1
		C. funebrana	S / 1
	A. orana	*Zygaena purpuralis*	S / 1
	S. ocellana	*Epinotia huebneriana*	S / 1
		Euxoa tritici	S / 1

DISCUSSION

The reciprocal attractiveness of the pheromone for *C. funebrana* and *C. molesta* is known. HRDÝ *et al*. (1997) reported the presence of the species *Pammene amygdalana*, *P. aurita* and *P. suspectana* in pheromone traps for *C. funebrana*. In these pheromone traps HRDÝ *et al*. (1993) discovered *Celypha striana* (Den. & Schiff., 1775), a species attracted by the pheromone for *C. funebrana* in Tuřany in 2003. The pheromone of *C. striana* consist of Z 8-12 OH (www.nysaes.cornell.edu). The species of the tribe *Archipini* have a common component of pheromone (Z)-11-tetradecenyl acetate (OKU, 1993). *Pammene spiniana* was also caught into pheromone traps for *C. molesta* a *C. funebrana* (MAYER & MCLAUGHLIN in HRDÝ *et al*. 1997) while the pheromone for *C. funebrana* was an attractant for the species *Pammene aurana* (HRDÝ *et al*. 1997). HRDÝ *et al*. (1989) detected the presence of *Hedya pruniana* in pheromone traps for *C. molesta*. In Tuřany *Hedya pruniana* was attracted by the *S. ocellana* pheromone, where the nutritive plants for this tortricid species (family *Rosaceae*) grow on the edge of the plantation. The species *C. molesta* and *S. ocellana* have common components of the pheromone (Z)-8-dodecenyl acetate and (E)-8-dodecenyl acetate (MC BRIEN *et al*. 1992). (Z)-8-dodecenyl acetate is the component of the sex pheromone of *Hedya* (FRÉROT *et al*. 1979). The pheromone of *P. heparana* attracts *Noctua fimbriata* (*Noctuidae*) (HRDÝ *et al*. 1989). In Tuřany the species *Noctua pronuba* was caught in the traps for *P. heparana*, a commonly spread species living on a wide spectrum of nutritive plants. HRDÝ *et al*. (1979) reported the presence of *Epiblema scutulana* in pheromone traps for *C. funebrana* and *C. molesta*. When monitoring of *C. pomonella* in Japan HIRAMATSU *et al*. (1992) dicovered that the pheromone of this species was an attractant for males of the genera *Aterpia*, *Hedya*, *Eucosma*, *Grapholita* and *Pammene*. These data correspond with findings of *Pammene albuginana* in pheromone traps of *C. pomonella* in Prakšice. The pheromone for *Hedya nubiferana* and *C. molesta* attracted *Cydia janthiana* (HRDÝ *et al*., 1997). The pheromone of *Hedya nubiferana* was an attractant for *Pammene albuginana* in Tuřany, where oaks grow in the nearest wind-break. This effect could be caused by (Z)-8-dodecenyl acetate, a common component of sex pheromones of both these species (FRÉROT *et al*. 1979). The reciprocal presence of *C. funebrana* and *C. molesta* in pheromone traps for both of these species was recorded in both localities. The average representation of *C. funebrana* in pheromone traps for this species was 79.4 %, the representation of *C. molesta* in pheromone traps for *C. molesta* was 62.5 % in year 2002, and 78.1 % and 67.7 % in 2003 respectivelly. RAULEDER (2002) reported an average of 97.4 % males of these species in the traps for *C. funebrana*. In the extensive orchard in Prakšice 7 non-target lepidopteran species were captured in the pheromone traps for target species of the family *Tortricidae*, out of which *Cydia coronillana*, *Pammene albuginana*, *Pyrausta rectefascialis* and *P. aurata* are not pests of fruit trees of the family *Rosaceae* and their presence is dependent on ecological conditions, especially on the presence of host plants. In Tuřany, 12 non-target species were caught, out of which only *Noctua pronuba*, *Notocelia rosaecolana*, *Hedya pruniana* and *Pammene albuginana* are not pests of fruit trees.

The characteristics of non-target species

Celypha striana (Den. & Schiff., 1775) is widely spread in Central Europe. The caterpillars lives on *Taraxacum officinale* (*Asteraceae*) and *Plantago lanceolata* (Plantaginaceae) from September to May, the moths fly from June to August (RAZOWSKI, 2001). The pheromone of this species consist of (Z)-8- dodecen-1-ol (www.nysaes.cornel.edu) .

Cydia coronillana (Lienig & Zeller, 1846) (*Grapholitini*): caterpillars appear from June to September, moths fly from the late April to July. It is a relatively abundant species on meadows, on forest edges and other localities where *Coronilla varia* (*Fabaceae*) occurs (RAZOWSKI, 2001).

Enarmonia formosana (Scopoli, 1763) is pest of stems of *Prunus avium*, *P. domestica*, *P. armeniaca*, *P. persica*, *Cerasus*, *Pyrus communis*, *Malus sylvestris*, *Sorbus* and other species of the *Rosaceae* family. The caterpillars feed on nutritive plants from September to May and from mid- May (June) to July (August). (RAZOWSKI, 2001)

Epiblema scutulanum (Den. & Schiff., 1775) occurs in open habitats. The catterpillars feed from June to April on *Carduus nutans*, *Cirsium vulgare*, *Arctium* and *Centaurea*. The moths fly from mid-April to August (RAZOWSKI, 2001).

Epinotia huebneriana Koçak, 1980 is local and not abundant species. Caterpillars feed on *Rubus* e.g. *R. fruticosus*) from May to June and moths fly from June to July. (RAZOWSKI, 2001).

Eucosma fervidana (Zeller, 1847) is not abundant species. The caterpillars feed on Aster amellus and *Solidago virgauraea* (*Asteraceae*) from April to May, the moths fly from June to August (RAZOWSKI, 2001).

Hedya pruniana (Hübner, 1799); the caterpillars feed from June (August) to April (May), the moths fly from May to August. The nutritive plants are *Prunus spinosa*, *Crataegus*, *Rosa*, *Sorbus* and *Corylus avellana* (Corylaceae). This species is widely spread in Central Europe (RAZOWSKI, 2001).

Pammene albuginana (Guenée, 1845) (*Eucosmini*): The caterpillars feed from September and Octo-

ber to March on oak (*Quercus*: Fagaceae) in galls of *Hymenopteran* insects (*Hymenoptera*). This moth occurs locally in oak forests of Central Europe (RAZOWSKI, 2001).

Pammene suspectana (Lng. & Zeller, 1846) is rarely occurring species feeding on *Fraxinus excelsior*. The moth fly mid-April to June (RAZOWSKI, 2001).

Notocelia rosaecolana (Doubleday, 1850) (*Tortricidae*, *Eucosmini*): caterpillars appear from May to June, the moths fly from late May to July, sometimes untill August. The nutritive plant is rose (*Rosa*: Rosaceae). This species is relatively abundant on the edges of parks, forests, in shrubby biotopes and in gardens (RAZOWSKI, 2001).

Notocelia roborana (Hübner, 1796) is spread in Central Europe. Catterpillars appear on *Rosa* sp., *Rubus*, *Prunus spinosa*, *Crataegus* and *Quercus* untill June. The moths fly from June to mid-August. (RAZOWSKI, 2001).

Noctua pronuba (Linnaeus, 1758) (*Noctuidae*) is a euryoecous species spread in open habitats, including anthropogenic-affected ones. The caterpillars feed on different herb species. The moths fly from June to September (NOWACKI, 1998).

Euxoa tritici (Linnaeus, 1761) occurs in areas from lowlands to middle altitudes, on the edges of forest and fields; catterpillars feed on Poaceae from September to May, the moths fly from June to September (NOWACKI, 1998).

Agrotis segetum (Den. & Schiff., 1775) is an euryecous species spread in forest edges, shrubby biotopes, lowlands, fields and gardens. Caterpillar feed on grass (Poaceae) from September to April and from July to August, the moths fly from May to June and from August to October (NOWACKI, 1998).

Amphipoea oculaea (Linnaeus, 1761) a species abundant from lowland to mountain localities, catterpillars feed on grass (Poaceae) from May to July and the moths fly from June to September (NOWACKI, 1998).

Yponomeuta malinellus (Zeller, 1838) (*Yponomeutidae*) moths fly from June to August. Caterpillars spin nests from leaves of apple-trees. They may cause clear-eatings during mass outbreaks (HLUCHÝ *et al*. 1997).

Pyrausta rectefascialis Toll, 1936 (*Pyralidae*) is a species spread in Central Europe in Moravia, Slovakia, in Poland, Austria, Hungary, Romania and Bavaria. It occurs in dry and warm habitats and on open land. Caterpillars supposedly live on plants of the family *Lamiaceae* (SLAMKA, 1997).

Pyrausta aurata (Scopoli, 1763) (*Pyralidae*) is a moth spread in dry habitats on open agricultural land. It has two generations per year and the moths fly from April to September. Caterpillars live between spinned leaves from June to May of the following year on plants of the genus *Thymus*, *Origanum*, *Mentha* and *Salvia* (SLAMKA, 1997).

Zygaena purpuralis (Brünnich, 1763) is common widely spread euryecous species. Caterpillars feed on the thyme (*Thymus serpyllum*) from August to May, the moths fly from June to August (KOCH, 1984).

Lymantria dispar (Linnaeus, 1758) is abundant from lowlands to warmer mountain localities in deciduous forest, gardens, orchards, alleys and parks. Caterpillars are calamity pests in oak forests. They feed on *Quercus* sp., *Carpinus betulus* and *Salix* spp. and appear from April to June; the moths fly from June to September (KOCH, 1984).

CONCLUSION

The presence of non-target tortricid moths in the pheromone traps, which are habitually similar to the pest, is of particular importance because it may distort the data used for treatment prediction. During the monitoring of the tortricid bud moths, the species *Pammene albuginana*, *Cydia coronillana* and *Notocelia rosaecolana* from the family Tortricidae were found in pheromone traps for target tortricid species. The presence of non-target species in the pheromone traps (e.g. *Noctua pronuba*) may even cancel out the sticky board. *Pyrausta rectefascialis* and *P. aurata* have no practical value. Therefore it is important to know what pheromone is able to attract non-target species and what is the cause of this effect. One reasons may be the presence of common components in pheromones prepared for the individual investigated species. These components may be natural ingredients of the pheromone or impurities from the production process. Another reason for the presence of non-target species in pheromone traps may be the false response of males of non-target species to synthetic pheromones for the studied species.

SOUHRN

Necílové druhy motýlů přítomné ve feromonových lapačích pro vybrané druhy obalečů v letech 2002 a 2003

Přítomnost necílových druhů motýlů ve feromonových lapačích, zvláště těch, které jsou habituálně podobné sledovaným druhům škůdců, může zkreslit data získávaná pro signalizaci ošetření. Při

monitorování pupenových obalečů byly ve feromonových lapačích přítomny další druhy z čeledi *Tortricidae*: *Pammene albuginana*, *Cydia coronillana* a *Notocelia rosaecolana*. Necílové druhy mohou také zničit lepové desky (např. *Noctua pronuba*). *Pyrausta rectefascialis* a *P. aurata* praktický význam nemají. Důležité je zjištění, který feromon může být atraktantem pro necílové druhy. Důvodem atraktivity feromonu může být přítomnost složky společné pro více druhů motýlů, přítomnost nečistoty vzniklá při výrobě, nebo špatná odpověď samců necílových druhů na podnět syntetického feromonu.

pupenoví obaleči, feromonové lapače, Jižní Morava, intenzivní sady, extenzivní sady, neúčelové druhy, *Noctuidae*, *Pyralidae*, *Yponomeutidae*

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