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THE LEOPARD MOTH BORER, *ZEUZERA PYRINA* L. (*LEPIDOPTERA: COSSIDAE*) – IMPORTANT PEST IN BULGARIA

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Abstract: The leopard moth borer, *Zeuzera pyrina* L., is a cossid moth whose larvae bore into twigs, branches and trunks of various woody species, weakening and sometimes killing trees or shrubs. Recently it caused serious losses of apple trees in Bulgaria. In a three-year-old non-protected apple orchard in the Plovdiv region more than 30% of trees perished due to damage by this pest. In the nursery and in commercial orchards up to 5% of branches were injured. Main damage was observed in August and September. Both cossids, *Zeuzera pyrina* and *Cossus cossus*, damaged 15–20% of the stems in old commercial orchards and more than 60–70% in orchards without regular plant protection. In this study flight dynamics of *Z. pyrina* was monitored by two types of pheromone traps: Pherocon (Trécé, USA) – traps with sticky changeable bottom and Mastrap (Isagro, Italy) – dry funnel traps. The second type was more effective. Flight of moths lasted from mid-June to the beginning of September. Pheromone traps may be helpful in IPM systems, for signalling optimal time for spraying against this pest. Further studies are needed to determine correlation between the catches in pheromone traps and appearance of injuries.

Key words: apple, leopard moth borer, *Zeuzera pyrina* L., flight dynamics, pheromone traps, damage, integrated fruit production

INTRODUCTION

The leopard moth borer, *Zeuzera pyrina* L. (*Lepidoptera: Cossidae*) is a pest with increasing importance in Bulgaria in last few years. Its larvae are woodborers affecting a wide variety of trees and shrubs – over 150 plant species of up to 20 taxonomic genera (Balachowsky and Mesnil 1935; Carter 1984; Gatwick 1992). In Bulgaria, the species was studied by Sengalevich (1972). According to him the preferred host is ash-tree (*Fraxinus* sp.) and among fruit trees – apple (*Malus* sp.). The species has one generation per two years, but moths and damages appear every year. Its monitoring and control are extremely difficult, because the flight period of the moths lasts about 3 months and larvae bore into twigs, branches and trunks. Newly established

orchards suffered the greatest damage, including the death of young trees. The visual method has been used mainly for monitoring of this pest. Pheromone traps were used with this aim in Bulgaria since 2002 and preliminary results were reported by Kutinkova et al. (2005).

In this paper, results of the recent monitoring of seasonal flight dynamics of male leopard moths by synthetic pheromone traps as well as of assessment of damage of apple shoots in the Plovdiv region are presented.

MATERIALS AND METHODS

The main observations were carried out in four apple orchards in the Plovdiv region in the years 2004–2005. Two of them belonged to the Fruit Growing Institute (FGI): 1.8-ha commercial orchard with Golden Delicious and Red Delicious as main cultivars and a young 1.5-ha apple orchard with 11 new scab resistant cultivars. The other two orchards were located at the Experimental Field of the Agricultural University (AU) of Plovdiv: a 0.5-ha apple orchard with different cultivars managed according to organic farming system (non-treated with chemical pesticides) and a 1.7-ha mixed commercial orchard including 1.2 ha of apples, where 10–12 pesticide treatments per year were applied.

Two types of pheromone traps were used: "Pherocon" (Trécé, USA) traps with sticky changeable bottom and dry funnel traps "Mastrap-L" (Isagro, Italy). The dispensers were made in Isagro, Italy and were replaced in traps every 6 weeks. Two traps of each type were hanged alternately on a diagonal in three of the observed orchards (young FGI excluded) at the end of May and removed at the end of September. The young orchard was monitored for damage only. However, it is worth mentioning that this young orchard was located close to the old 1.8 ha orchard, where traps were present. All traps were checked and the caught moths removed weekly. Damage on shoots in the young orchard of FGI was observed on 1000 randomly chosen trees for 2–3 weeks, starting from the middle of July. Damage in the AU orchards were counted only once, at the end of the season.

Additional observations of damages was periodically carried out in a private apple orchard in the Plovdiv region.

RESULTS AND DISCUSSION

Flight of the leopard moth was prolonged and depended on weather conditions. Moths appeared from the 1st to 3rd decade of June and the flight continued till mid-September. Mass flight was recorded in July and August, with two peaks observed in some orchards (Figs. 1, 2). Our data for flight dynamics, monitored by pheromone traps, corresponded, in general, with those reported by Sengalevich (1972) who used the method of isolation. In our observations, in the orchards of the Agricultural University, dry funnel traps caught 2.3–2.9 times more male moths than sticky traps. In the orchards of Fruit Growing Institute, in 2004 the catches were significantly higher on dry traps than the catches on sticky traps, whereas in 2005 catches were low and comparison of the two types of traps was not possible. The trend of seasonal flight, established by both types of traps, was similar. So, both can be successfully used for determining optimum dates of spraying against this pest in IPM systems.

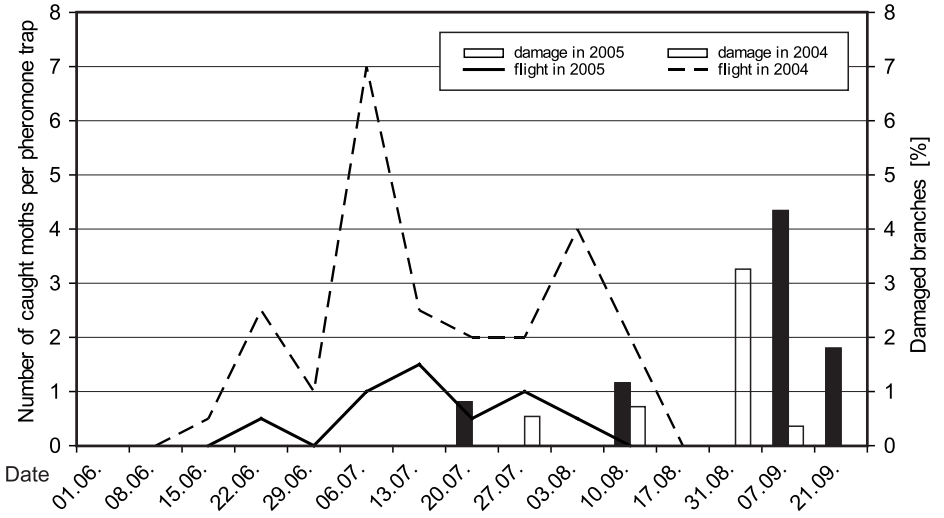

Fig. 1. Flight dynamics and damage caused in apple trees by the leopard moth borer (*Zeuzera pyrina* L.) in two orchards of the Fruit Growing Institute – Plovdiv in the years 2004 and 2005

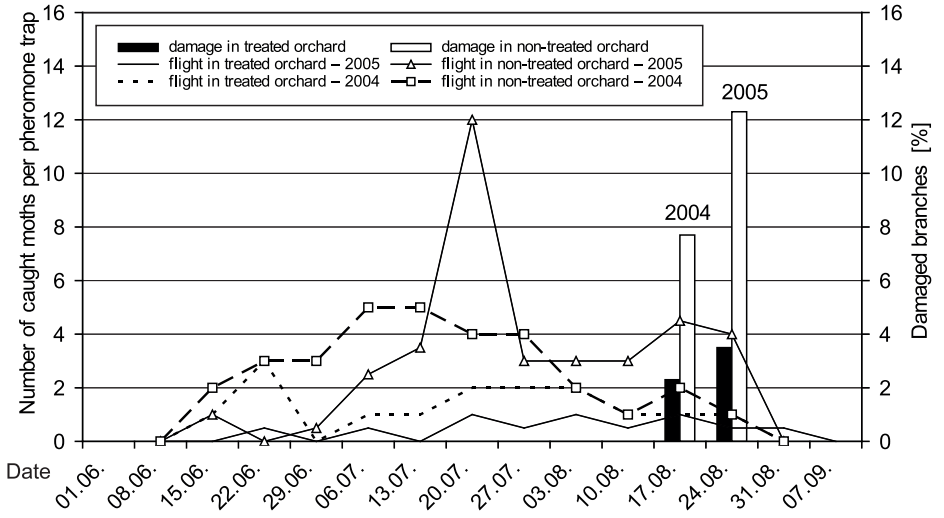

Fig. 2. Flight dynamics and damage caused in apple trees by the leopard moth borer (*Zeuzera pyrina* L.) in two orchards of the Agricultural University – Plovdiv in the years 2004 and 2005

In the FGI-orchard first damage on shoots was observed in the second half of July. Later, damage increased and a maximum of them was recorded at the end of August and beginning of September. Young larvae, boring into the peaks of the shoots, were observed till the second half of September. The intensity of damage varied depending on the season. The damages were 3–3.5 times lower in the AU-orchard, where chemical control with codling moth was applied than in the AU-orchard without chemical control. More than 30% of trees perished in a 3 year-old apple non-protected orchard, due to injuries caused by the pest.

Correlation between the catches in pheromone traps and damage of the trees should be studied, aimed at prediction of the risk of injury to the wood by the pest. However, the above needs additional observations.

CONCLUSIONS

The leopard moth borer, *Zeuzera pyrina* L. (*Lepidoptera: Cossidae*) has become an important pest in Bulgaria. Flight dynamics of this pest can be successfully monitored using pheromone traps. Damages in conventionally protected orchards are lower than in the untreated ones. In IPM systems, pheromone traps can be successfully used for determining optimum time of spraying against this pest. Further studies are needed to determine correlation between the catches in pheromone traps and appearance of injuries.

ACKNOWLEDGEMENTS

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POLISH SUMMARY

TORZYŚNIAD KASZTANÓWKA, *ZEUZERA PYRINA* L. (*LEPIDOPTERA: COSSIDAE*) – WAŻNY SZKODNIK SADÓW W BUŁGARII

Torzyśniad kasztanówka, *Zeuzera pyrina* L., jest motylem z rodziny trociniarkowatych (*Cossidae*), którego larwy drążą korytarze wewnątrz pędów, gałęzi i pni wielu gatunków drzew i krzewów, powodując ich osłabienie, a niekiedy nawet całkowite zamieranie. W ostatnich latach, szkodnik ten wyrządzał w Bułgarii poważne szkody, niszcząc w niechronionych sadach ponad 30% jabłoni w wieku do 3 lat. W szkółkach i sadach towarowych uszkodzonych było do 5% gałęzi. Większość uszkodzeń obser-

wowano w sierpniu i wrześniu. Dwa szkodniki, należące do trociniarkowatych, tj. torzyśniad kasztanówka i trociniarka czerwica (*Cossus cossus* L.), uszkadzały 15–20% pni drzew w starych sadach towarowych i ponad 60–70% w sadach, w których nie prowadzono regularnej ochrony. Dynamikę lotu motyli *Z. pyrina* monitorowano odławiając motyle w pułapki feromonowe. Stosowano pułapki lepowe Pherocon (prod. Trécé, USA) z wymienną podłogą oraz pułapki suche – kominowe Mastrap (prod. Isagro, Włochy). Suche pułapki Mastrap okazały się bardziej efektywne. Lot motyli badanego gatunku trwał od połowy czerwca do początku września. Pułapki feromonowe mogą być pomocne w systemach IPO, dla sygnalizacji optymalnych terminów zabiegów ochronnych. Pożądane są dalsze badania dla określenia korelacji pomiędzy odłowami szkodnika na pułapkach feromonowych a występowaniem uszkodzeń.