Agrotis bigramma (Esper) – CAPTURES IN PHEROMONE TRAPS FOR *Spodoptera frugiperda* (J.E. Smith)

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ABSTRACT

The fall armyworm *Spodoptera frugiperda* (J.E. Smith) was monitored for the first time in Montenegro during 2023. Bucket trap with a specific sexual pheromone diffuser to attract males was used. Traps were set up in the second half of June at six localities in the southern part of Montenegro (area of Zeta and Malesia) in maize and sweet pepper crops and in the first half of July in three locations in the northern of Montenegro (area of Bijelo Polje) in corn crops. Traps were inspected at 15-20 days intervals. Monitoring lasted until the end of the first decade of October. In all localities traps captured various non-target insects (wasps, bumblebees, moths, beetles, flies) during summer time. At the beginning of September, presence of moths from family Noctuidae was noted in all localities in the area of Zeta and Malesia, and in one locality in the north. More than 20 specimens were captured in some traps. External morphological features indicated that all captured specimens belongs to the genus *Agrotis*. In order to identify the species, slide preparation of male genitalia were made from 15 moths. It was determined that all specimens belongs to the great dart, *Agrostis bigramma* (Esper) which was the first finding in Montenegro. Until end of monitoring there were no more captures of *A. bigramma* in localities in the northern part of Montenegro, while in the southern part occurred again in October. During this monitoring targeted *S. frugiperda* was not found, but non- target noctuid *A. bigramma* which could be confused with the target species was captured in substantial numbers during September and October.

Key words: monitoring, *Spodoptera frugiperda,* captures, *Agrotis bigramma*

1 INTRODUCTION

Monitoring for pests is a fundamental first step in creating a proper integrated pest management programme. Among the various methods and devices used in pest monitoring, the most popular and widely used are sex pheromone traps for selective monitoring of individual flying species and light traps for flying species that are attracted to light (Prasad and Prabhakar, 2012). Noctuidae are one of the world's most diverse, ecologically successful, and economically important animal lineages with over 12,000 species in ~1,150 genera (Keegan et al., 2021). The Noctuidae family are

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commonly known as owlet moths, cutworms or armyworms that attack a number of crops and may cause significant damage depending on severity of infestation.
The fall armyworm (FAW), *Spodoptera frugiperda* (J.E. Smith) is a well-known agricultural pest in its native range, North and South America, and has become a major invasive pest around the globe in the past decade (Tay et al., 2023). *Spodoptera frugiperda* is a regulated priority Union quarantine pest in the EU and Member States are therefore required to perform annual surveys. Emergency measures are in place to prevent the introduction into and the spread within the EU (Kinkar et al., 2020). Its appearance and rapid spread can be monitored with sex pheromone traps, but the catches can be confused by catches of non-target similar species (Szanyi et al., 2022). The fall armyworm *S. frugiperda* was monitored for the first time in Montenegro during 2023.

2 MATERIAL AND METHODS

The fall armyworm *S. frugiperda* was monitored for the first time in Montenegro during 2023. Bucket trap with a specific sexual pheromone diffuser (Sanidad Agrícola ECONEX, S.L) to attract males was used. Traps were set up in the second half of June at six localities in the southern part of Montenegro (area of Zeta and Malesia) in maize and sweet pepper crops and in the first half of July in three locations in the northern of Montenegro (area of Bijelo Polje) in maize (Table 1). Traps were inspected at 15-20 days intervals. Monitoring lasted until the end of the first decade of October.

Table 1: GPS coordinates of monitoring sites.

Locality	GPS coordinates
Golubovci 1	42° 19′ 19″ N, 19° 14′ 56″ E
Golubovci 2	42° 19′ 54″ N, 19° 13′ 53″ E
Mataguži 1	42° 19′ 30″ N, 19° 16′ 54″ E
Vranj	42° 19′ 12″ N, 19° 18′ 00″ E
Mataguži 2	42° 19′ 24″ N, 19° 17′ 05″ E
Vuksanlekić	42° 20′ 12″ N, 19° 20′ 10″E
Božovića Polje	42° 59' 08"N, 19° 41' 44"E
Sutivan	43° 05' 46 "N, 19°46' 17"E
Unevine	43° 06′ 48″ N, 19° 46′ 40″ E

3 RESULTS AND DISCUSSION

In all localities traps captured various non-target insects (wasps, bumblebees, moths, beetles, flies) during summer time (Fig. 1). At the beginning of September, presence of moths from family Noctuidae was noted in all localities in the area of Zeta and Malesia, and in one locality in the north. More than 20 specimens were captured in some traps

(Fig. 2). External morphological features indicated that all captured specimens belongs to the genus *Agrotis* (Fig 3). In order to identify the species, slide preparation of male genitalia were made from 15 moths. It was found that all specimens belongs to the great dart, *Agrostis bigramma* (Esper) (Fig.4). This was the first finding in Montenegro. In review of the genus *Agrotis* Feizpoor et al. (2014) present an identification key of external features 16 Iranian species and subspecies of genus *Agroti*s, including *A. bigramma.* In addition preparation of male genitalia of *A. bigramma* are available on https://mothdissection.co.uk/species.php?Tx=Agrotis_bigramma.
Until end of monitoring there were no more captures of *A. bigramma* in localities in the northern part of Montenegro, while in the southern part occurred again in October. Number of captured moths is presented in Table 2. We found that during monitoring period, particularly in October, in some localities traps were missed which coincidences with time when maize was harvested.

Table 2. Localities with captrured moths.

Locality	Crops	Date of monitoring	
		06-14.09.2023.	06-11.10.2023.
Golubovci 1	maize	3	Trap removed
Golubovci 2	maize	31	Trap removed
Mataguži 1	maize	46	130
Vranj	maize	4	Trap missed
Mataguži 2	sweet pepper	10	17
Vuksanlekić	sweet pepper	5	3
Božovića Polje	maize	-	-
Sutivan	maize	-	-
Unevine	maize	17	-

Similar with our results Szanyi et al. (2022) presented non-target catches of commercial pheromone traps of *S. frugiperda* in the Carpathian basin, which is a potential area of this pest. They found sizable catches of *Cucullia umbratica* (L.), *Agrotis bigramma* (Esper), and *Allophyes oxyacanthae* (L.), which are common noctuids in East-Central Europe.

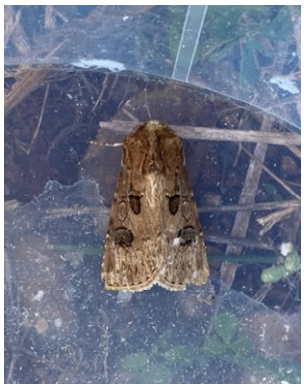

Fig. 3. Captured noctuide (assumption on *Agrotis* sp.).

Fig 4. *Agrotis bigramma* male genitalia.

4 CONCLUSIONS

During monitoring targeted *S. frugiperda* was not found, but non-target *A. bigramma* which could be confused with the target species was captured in substantial numbers during September and October.

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