POPULATION DYNAMICS OF SOME NOCTUID LEPIDOPTERAN SPECIES FROM THE BOTANICAL GARDEN, GALAȚI COUNTY

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Abstract. The paper describes the population dynamics of four noctuid Lepidoptera species – *Tyta luctuosa* (DENIS & SCHIFFERMÜLLER 1775), *Emmelia trabealis* (SCOPOLI 1763), *Hoplodrina ambigua* (DENIS & SCHIFFERMÜLLER 1775) and *Agrotis exclamationis* (LINNAEUS 1758). These species have been collected in the Botanical Garden Galați in a period of 4 years (2004-2009), using light traps.

Keywords: population dynamics, Lepidoptera, Botanical Garden Galați.

Rezumat. Dinamica populațiilor la unele specii de lepidoptere noctuide colectate în Grădina Botanică Galați, județul Galați. Lucrarea de față analizează dinamica populațiilor la patru specii de lepidoptere noctuide: *Tyta luctuosa* (DENIS & SCHIFFERMÜLLER 1775), *Emmelia trabealis* (SCOPOLI 1763), *Hoplodrina ambigua* (DENIS & SCHIFFERMÜLLER 1775) şi *Agrotis exclamationis* (LINNAEUS 1758). Speciile au fost colectate, folosind capcane luminoase în Grădina Botanică din Galați într-o perioadă de 4 ani (2004-2009).

Cuvinte cheie: dinamica populațiilor, Lepidoptera, Grădina Botanică Galați.

INTRODUCTION

The nocturnal macrolepidopterans have not been studied too much in Galați County. The programs of research have been made in Garboavele Forest (ALEXINSCHI & OLARU, 1967, OLARU & NEMEŞ, 1968, OLARU & NEMEŞ, 1969), Hanu Conachi (ALEXINSCHI, 1955, OLARU et al., 1968), Tecuci, Rogojeni, and Galați city (caught by OLARU, published by MARCU & RAKOSY, 2002).

The purpose of this paper is to bring new data regarding the nocturnal macrolepidoptera of the eastern part of Romania and to study how the fauna of lepidopterans has established here during the years and how the lepidopterans community will evolve hereafter.

The research has been made in the Botanical Garden of the Natural Sciences Museum Galați. The Botanical Garden Galați is placed in the NV of Galați city, near The Danube River. The climate is steppe typical with some Pontic and Mediterranean influences. The Botanical Garden is divided into six areas with different types of vegetation and spreads over 18 hectares.

In The Botanical Garden, there were identified 200 species of nocturnal Lepidoptera, 125 of them belonging to Noctuidae family. Only four noctuid species are dominant in the researched area: *Tyta luctuosa* (DENIS & SCHIFFERMÜLLER 1775), *Emmelia trabealis* (SCOPOLI 1763), *Hoplodrina ambigua* (DENIS & SCHIFFERMÜLLER 1775), and *Agrotis exclamationis* (LINNAEUS 1758). We analyzed the fluctuations of the species populations during the mentioned years. The flight dynamics of these species showed that the flight period, in some cases, differs from what it is known from the literature.

MATERIAL AND METHODS

In order to analyze the population fluctuations of the Lepidoptera, we chose three areas of the Botanical Garden – the Rose Garden, the Romanian Flora, and the Medicinal Flora. These areas have different types of vegetation: the Rose Garden (ornamental plants), the Romanian Flora (vegetation specific to the mountains, plains, sand dunes, and Dobrudja) and the Medicinal Flora (medicinal, economic plants and vegetables).

In order to collect the material we used three light traps which were installed in those three mentioned areas.

The light source was a 250W bulb emitting UV and visible light. The light traps were operational for 3 days per week, from dusk till dawn, during the whole period of flight (from March until November). The collecting of the material was made in 2004, 2005, 2008, and 2009.

RESULTS AND DISCUSSIONS

During the period of study there were collected 1,074 adults belonging to the dominant species mentioned above. More than 32% are individuals of *Tyta luctuosa* DEN. & SCHIFF., which was one of the best represented species. The effective of their populations was fluctuating during the years. Species like *Tyta luctuosa* DEN. & SCHIFF., *Emmelia trabealis* SCOP. and *Agrotis exclamationis* L. reached its numerical peak in 2009 and *Hoplodrina ambigua* DEN. & SCHIFF. in 2008 (Table 1).

Tyta luctuosa DEN. & SCHIFF. is a common species in Romania, frequently encountered from plain to 1,000 m height (RAKOSY et al., 2003). In the Botanical Garden Galați, the species has been present every year. If in 2004 there were

just 6 individuals, the population increased up to 205 individuals collected in 2009. The multiannual dynamics of this population is represented through the relative abundance values of caught adults in the same period every year (Fig. 1).

Table 1. Numerical fluctuations of the species populations during the research period.
Tabel 1. Fluctuația numerică a populațiilor speciilor pe parcursul perioadei de studiu.

No.	Taxons	Relative abundance				Total
		2004	2005	2008	2009	
1	*Tyta luctuosa* (DENIS & SCHIFFERMÜLLER 1775)	6	39	94	205	344
2	*Emmelia trabealis* (SCOPOLI 1763)	22	22	53	171	268
3	*Hoplodrina ambigua* (DENIS & SCHIFFERMÜLLER 1775)	5	38	210	65	318
4	*Agrotis exclamationis* (LINNAEUS 1758)	0	12	31	101	144
Total						**1074**

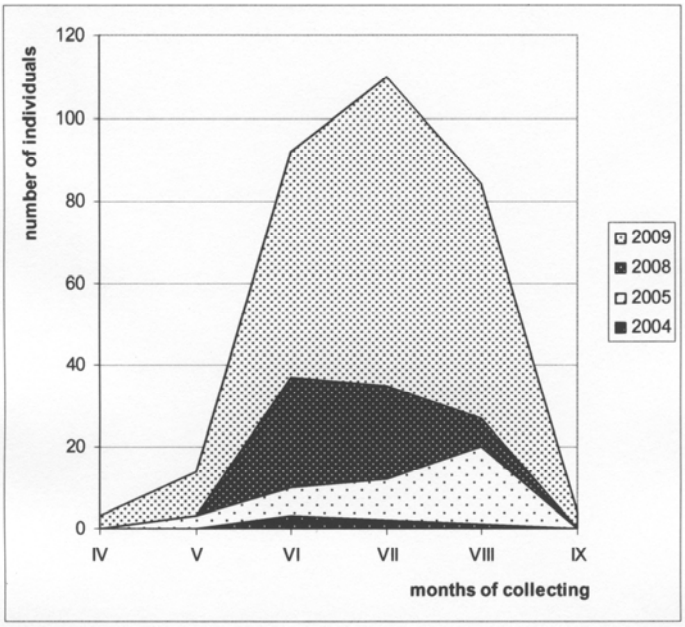

Figure 1. Multiannual dynamics of the species *Tyta luctuosa* DEN & SCHIFF.
Figura 1. Dinamica multianuală a speciei *Tyta luctuosa* DEN & SCHIFF.

The species has two generations per year: ½ April - July, May - ½ July (RAKOSY, 1996). According to the data obtained from the light traps, the first generation appeared later, in May, and adults from the second generation were caught until the end of August or the beginning of September. In 2008 and 2009, the first generation was more abundant, while in 2005, the individuals of the second generation were more numerous (Fig. 2).

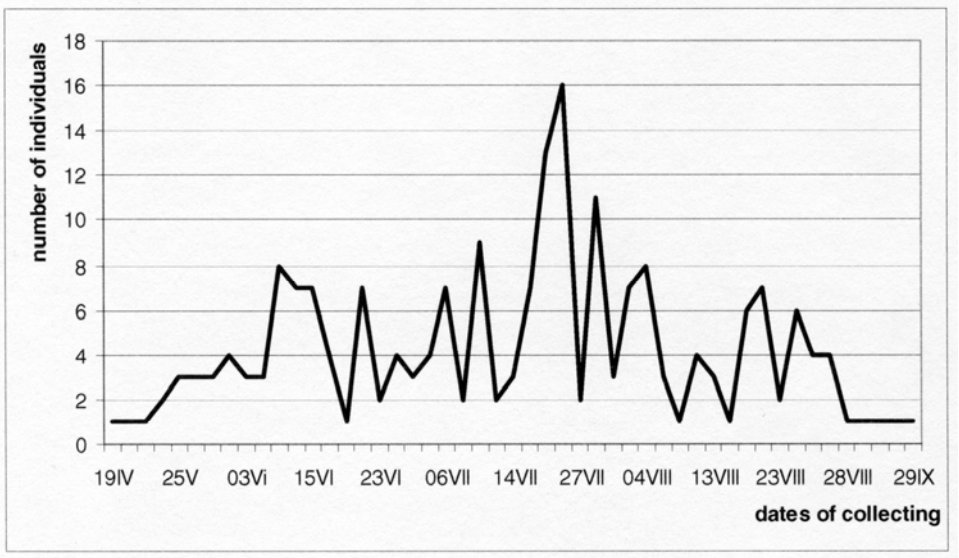

Figure 2. Flight dynamics in the species *Tyta luctuosa* DEN & SCHIFF. in 2009.
Figura 2. Dinamica zborului la *Tyta luctuosa* DEN & SCHIFF. în 2009.

Emmelia trabealis SCOP. For this species the population reached a numerical peak in 2009, when 171 adults were captured with the light traps.The multiannual dynamics reveals that the adults of the first generation appeared in May, they had the maximum flight during July, and the second generation, according to literature (RAKOSY, 1996) had to be on wing between August and September, in the researched area the second generation was present only in August (Fig. 3).

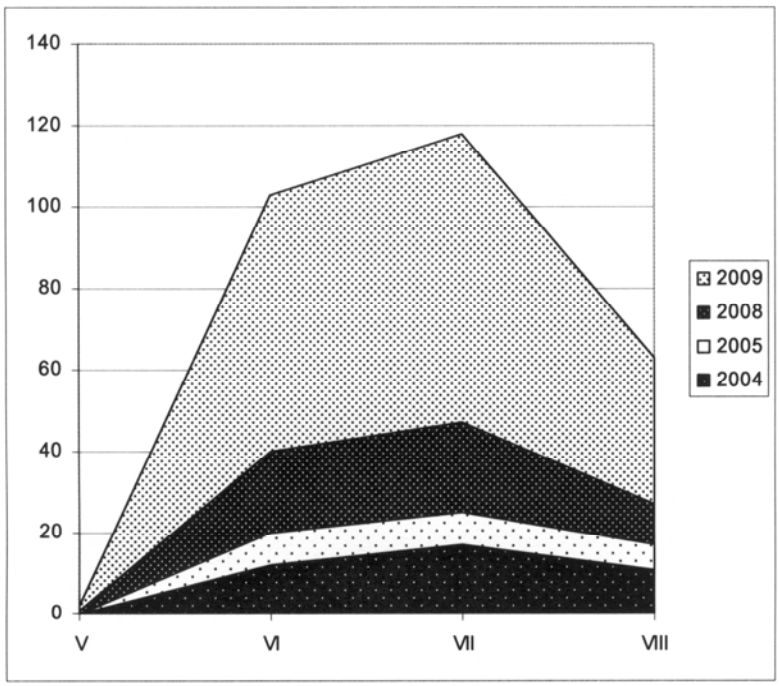

Figure 3. Multiannual dynamics of the species *Emmelia trabealis* SCOP.
Figura 3. Dinamica multianuală a speciei *Emmelia trabealis* SCOP.

Hoplodrina ambigua DEN & SCHIFF. The adults are on wing between ½ April-October (RAKOSY, 1996) in two un-separated generations. This species was more numerous in 2008 and in 2009 the population effective began to decrease.

In the Botanical Garden the adults started to fly every year in May and the last ones were caught in September (Fig. 4).

In 2008, when the species was abundant, there were two distinguished generations: 1st: May 20-June 24, 2008, and 2nd: August 14-September 30, 2008. The maximum flight for the first generation was registered at the beginning of June and for the second generation at the end of July. The second generation was more numerous – 139 individuals unlike 71 individuals in the first flight.

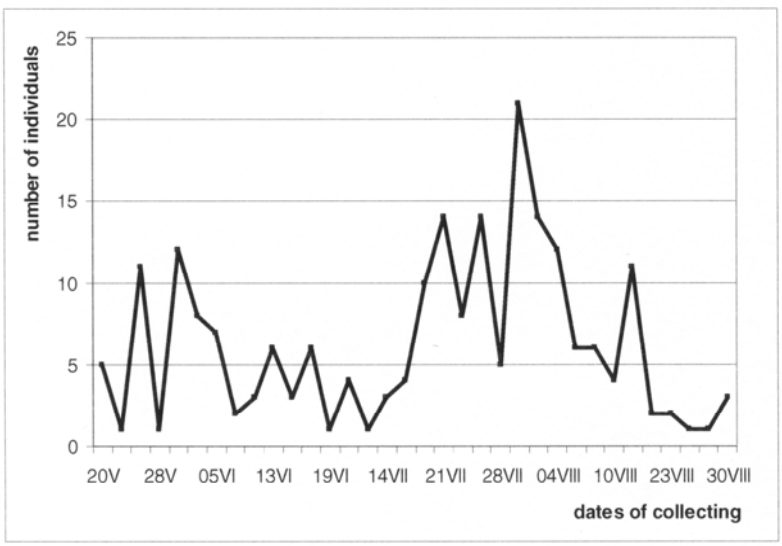

Figure 4. Flight dynamics in the species *Hoplodrina ambigua* DEN & SCHIFF. in 2008.
Figura 4. Dinamica zborului la specia *Hoplodrina ambigua* DEN & SCHIFF. în anul 2008.

Agrotis exclamationis L. The species was not present in 2004. According to literature this is a bivoltine species with two un-separated generations between ½ April-October (RAKOSY, 1996). Our data obtained from the light traps show that first adults appeared at the end of April and the period of flight was until the end of August. The light traps did not record any individuals for the other months mentioned in the literature (Fig. 5). In 2009, the population reached a numerical peak. The maximum flight was on June 10, 2009 for the first generation and on August 11, 2009 for the second one (Fig. 6).

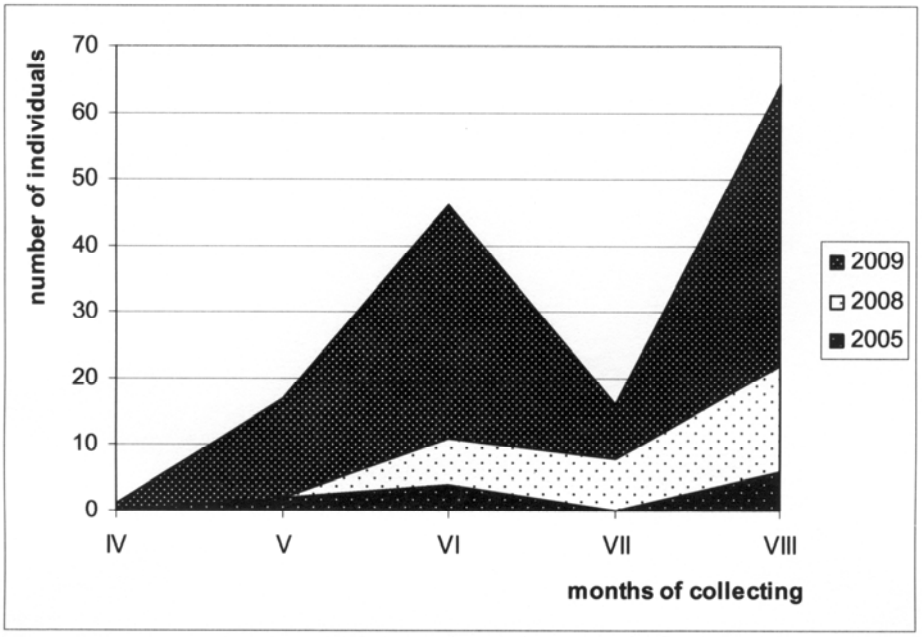

Figure 5. Multiannual dynamics in the species *Agrotis exclamationis* L.
Figura 5. Dinamica multianuală la specia *Agrotis exclamationis* L.

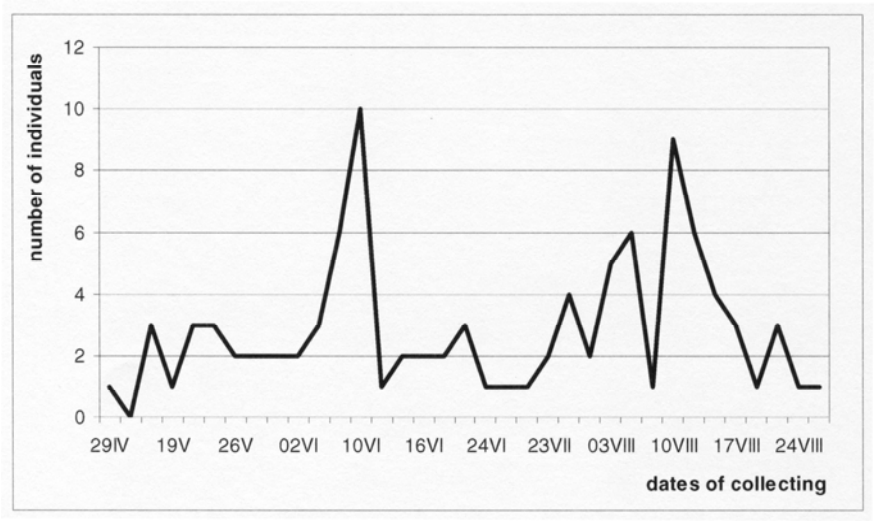

Figure 6. Flight dynamics in the species *Agrotis exclamationis* L. in 2009.
Figura 6. Dinamica zborului la specia *Agrotis exclamationis* L. în 2009.

CONCLUSIONS

1. *Tyta luctuosa, Emmelia trabealis, Holplodrina ambigua* and *Agrotis exclamationis* are the dominant species in the Botanical Garden Galați. They represent 62.5% of the total number of individuals collected in four years of study.

2. The multiannual dynamics revealed the numerical fluctuations of the populations of these species and in the years when they were more abundant.

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Received: February 27, 2010
Accepted: June 02, 2010