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RESEARCH ON THE RELATIONSHIP BETWEEN SPECIES OF THE GENUS *EURYGASTER* AND THE ASSESSMENT OF THE DAMAGE CAUSED BY THEM IN SOME WHEAT CROPS IN IAȘI COUNTY

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ABSTRACT

The research was carried out during 2020-2021 in selected forest sectors from 10 localities in Iași County. The method for assessing the density of Stink bug of the genus Eurygaster was carried out based on soil surveys, carried out on areas of 1 square meter, this parameter being essential in ecology and plant protection, to determine the degree of infestation or the distribution of a population in a habitat. Analysis of the recorded data revealed significant variations in the distribution and abundance of the Eurygaster integriceps, Eurygaster maura and Eurygaster austriaca species.In 2020, the density per square meter of the Eurygaster integriceps species varied significantly from 2,9 to approximately 23 specimens, while the Eurygaster austriaca species recorded density values between 2,9 and 8,18 with a somewhat more uniform distribution. Following surveys conducted in the spring of 2021, a general decrease in the density of Stink bug was observed in most localities. With the highest density of 16,05 specimens/m^2, the Eurygaster integriceps species was also recorded, and Eurygaster maura recorded the maximum density of 6,65 specimens, while Eurygaster austriaca recorded the value of 1,78 specimens/m^2 as the maximum value. By correctly measuring these parameters, specialists can make informed decisions regarding the control of this species and how to optimize their production.

INTRODUCTION

In Moldova, more precisely in Iași County, as in other regions of the country, grain bugs attack crops year after year, causing significant losses. The numerical level of the population differs depending on the agroclimatic conditions and the breeds cultivated.

According to research conducted by Pălăgeșiu I. et al., the grain bugs collected in wheat crops belonged to the genus *Eurygaster*, the former were predominant, especially the species *Eurygaster austriaca* (Pălăgeșiu I. et al. 1998; Pălăgeșiu I. et al. 1999). Data analysis showed that, during May, these pests caused attacks on areas that were in all cases 60 % larger than the control variants.

The hibernating adults, as well as the larvae and adults of the new generation cause qualitative and quantitative losses on wheat production. The hibernating adults destroy the stems and spikes. The specialized literature mentions that 2 specimens of hibernating adults per m² can destroy 5–18 % of the plants. At a density of 3–4 specimens/m², chemical control is mandatory. One specimen of the new generation

feeds on 40–55 wheat grains, causing either drying of the grains or dramatic degradation of gluten and even a reduction in the degree of germination of the grains (Mocanu et al. 2017). All this demonstrates the importance of monitoring grain bugs, both for warnings and for the evaluation and application of treatments against hibernating adults and new individuals (larvae and adults) (Panuta 2018). Careful monitoring of populations and the correct application of phytosanitary measures can help reduce losses and maintain the quality of wheat production. In addition, the integration of biological control methods and modern surveillance technologies can ensure sustainable crop protection with reduced environmental impact.

MATERIAL AND METHODS

In order to analyze the structure, dynamics and evolution of the attack of harmful Stink bug on cereals, systematic observations were carried out in wheat crops in 10 localities of Iași County, over a period of five years (2020 – 2024).

The studies were carried out both in the field and in forests, where the Stink bug hibernate. In this regard, 10 forests were selected from the 10 localities, where surveys were carried out in autumn and spring, using a metric frame of 0.5 x 0.5 m, covering a total area of 10 sq m per survey.

Surveys will be carried out to identify and assess the numerical density of Stink bug in the soil.

The surveys were carried out according to a previously established plan, in which their exact position and number are marked. This allows mapping the distribution of pests in the field.

The insects collected from each survey were stored separately, in appropriately labeled jars. The labels, written in black pencil, contained essential information: the place and date of the survey.

The collected material was analyzed in the laboratory and the *Eurygaster* species were identified, and the numerical density will be calculated and expressed in relation to the area of one square meter.(Talmaciu 2017)

Depending on the number of specimens captured per square meter, the intensity of the damage could be calculated, expressed in number per square meter, plant, linear meter of sown row, kilograms of seeds, etc.

Numerical density represents the number of individuals of a species (insects, larvae, pupae, eggs, plants, microorganisms, etc.) that are found on a certain unit of surface or volume. This parameter is essential in ecology, agriculture and plant protection to determine the degree of infestation or the distribution of a population in a habitat.

Numerical density is expressed as follows: $D = S/N$

where:

D = numerical density (individuals/m^2 or individuals/m^3);

N = total number of individuals recorded;

S = surface (m^2) or volume (m^3) surveyed.

Numerical density is a fundamental indicator for the assessment of ecosystems and integrated crop management. By correctly measuring this parameter, farmers and specialists can make informed decisions regarding pest control and optimizing agricultural production.

RESULTS AND DISCUSSIONS

The ratio of *Eurygaster* Lap. species in the forests of the research area shows the density of Stink bug of the genus *Eurygaster* in different forests, based on

surveys carried out on areas of 1 square meter. Analysis of these data highlights significant variations in the distribution and abundance of the species *Eurygaster integriceps*, *Eurygaster maura* and *Eurygaster austriaca* (Tab. 1).

Table 1

The ratio between *Eurygaster* Lap. species, in the forests of the research area, through surveys carried out in the fall of 2020

Location	Soil sampling surveys 1m/1m	Total samples	Eurygaster spp Lap.					
			Eurygaster integriceps		Eurygaster maura		Eurygaster austriaca	
			Sunn pests	Samples /m^2	Sunn pests	Samples /m^2	Sunn pests	Samples /m^2
Prisăcani	40	914	457	22.9	327	8.18	130	3.25
Răducăneni	40	838	569	14.23	234	5.85	35	0.88
Dolhești	40	984	692	17.30	246	6.15	46	1.15
Moșna	40	942	771	19.28	135	3.38	36	0.9
Grozești	40	944	572	14.30	236	5.9	136	3.4
Țuțora	40	1038	694	17.35	297	7.43	47	1.18
Gorban	40	966	583	14.58	241	6.03	142	3.55
Comarna	40	980	790	19.75	145	3.63	45	1.13
Costuleni	40	877	638	15.95	219	5.48	20	0.5
Cozmești	40	864	732	18.3	116	2.9	16	0.4
TOTAL		9347	6498	17.39	2196	5.49	653	1.63

Regarding the total number of sunn bugs collected, the localities with the highest values are Țuțora (1038), Dolhești (984), and Comarna (980), indicating a high presence of these insects in these areas. Conversely, Cozmești (864) and Costuleni (877) recorded the lowest values.

The density per square meter for *Eurygaster integriceps* varies significantly, from 2.9 in Cozmești to 22,9 in Prisăcani, showing a non-uniform distribution of the species.

Eurygaster maura is less widespread, with a maximum density of 8,18 in Prisăcani and a minimum of 2,9 in Cozmești.

In the case of *Eurygaster austriaca*, the density is relatively low across all localities, ranging between 0,4 (Cozmești) and 3,55 (Gorban).

Overall, the data indicate a high presence of sunn pests throughout the region, with variations among localities probably influenced by environmental factors, vegetation type, and local climatic conditions. (Fig. 1).

Comparing the data obtained in 2021 from surveys on the ratio *of Eurygaster* species, conducted in the autumn of 2020, with the data from surveys carried out in the spring of 2021, a general decrease in the density of *Eurygaster* can be observed in most localities.

This reduction may indicate either the impact of climatic conditions or the implementation of more effective control measures against these insects. (Tab. 2).

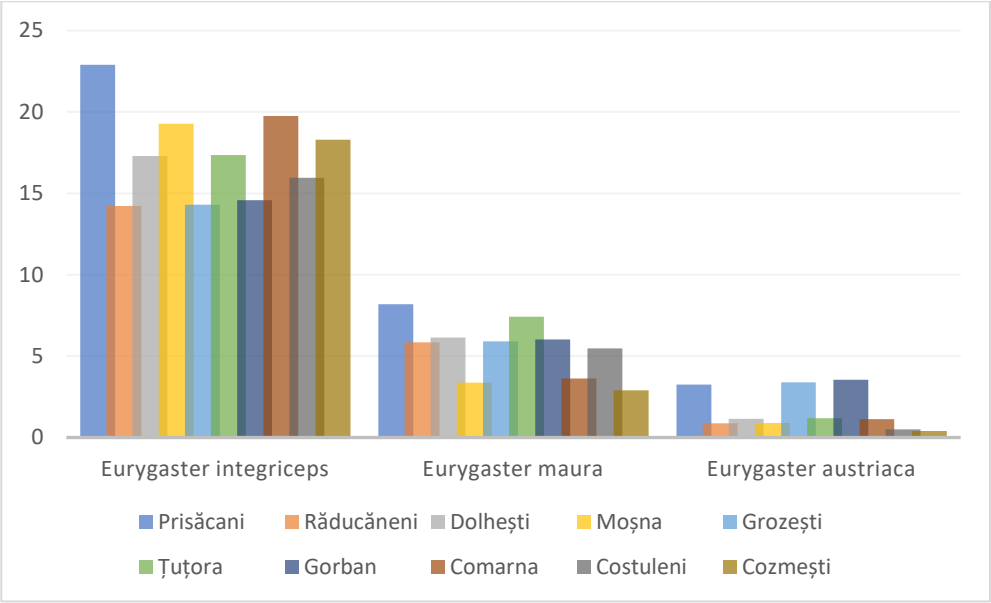

Figure 1. *Eurygaster* Lap species ratio in 2020

Table 2

The ratio between Eurygaster Lap. species, in the forests of the research area, through surveys carried out in the fall of 2021

Location	Soil sampling surveys 1m/1m	Total samples	Eurygaster Lap.					
			Eurygaster integriceps		Eurygaster maura		Eurygaster austriaca	
			Sunn pests	Samples /m^2	Sunn pests	Samples /m^2	Sunn pests	Samples /m^2
Prisăcani	40	714	507	12.68	153	3.83	54	1.35
Răducăneni	40	638	419	10.48	159	3.98	60	1.5
Dolhești	40	884	642	16.05	171	4.28	71	1.78
Moșna	40	642	421	10.53	160	4.0	61	1.53
Grozești	40	744	522	13.05	161	4.03	61	1.53
Țuțora	40	588	344	8.6	172	4.30	72	1.8
Gorban	40	666	333	8.33	266	6.65	67	1.68
Comarna	40	780	540	13.50	170	4.25	70	1.75
Costuleni	40	577	388	9.79	144	3.60	45	1.13
Cozmești	40	564	382	9.55	141	3.60	41	1.03
TOTAL		6797	4498	11.26	1697	4.25	602	1.51

At the opposite pole, Țuțora (8,6 inhabitants/sq. km) and Gorban (8,33 inhabitants/sq. km) have the lowest population densities.

The species *Eurygaster maura* shows a maximum density in Gorban (6,65 individuals/m²), making it significantly more numerous in this area compared to other localities, where the values range between 3,6 and 4,3 individuals/m².

For the species *Eurygaster austriaca*, densities are generally low, but slightly higher values are observed in Dolhești (1,78 individuals/m²) and Țuțora (1,8

individuals/m²), while Costuleni (1,13 individuals/m²) and Cozmești (1,03 individuals/m²) recorded the lowest values.

Overall, the data reflect a downward trend in the bug population compared to previous records, suggesting possible environmental influences or management interventions applied in the affected areas. Nevertheless, the differences between localities indicate that certain areas remain more vulnerable to infestation by these species (Fig. 2).

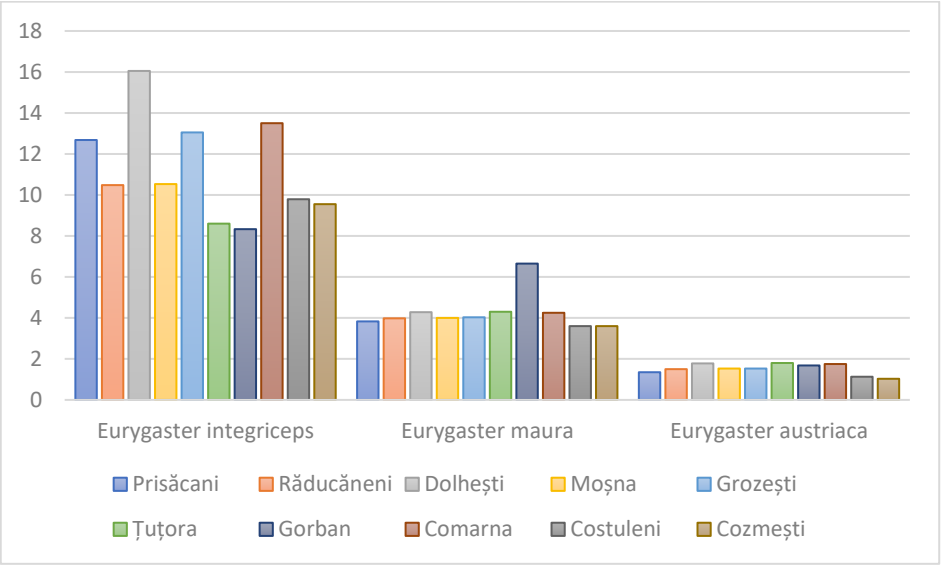

Figure 2. *Eurygaster* Lap species ratio in 2021

CONCLUSIONS

The *Eurygaster* spp. Lap. populations in the forests of Iași County showed relative stability during the 2020–2024 period, with moderate fluctuations in the number of specimens captured in most localities.

In certain localities, such as Prisăcani, Răducăneni, and Dolhești, captures varied slightly, suggesting a stable dynamic or minor fluctuations in *Eurygaster* populations.

The localities of Costuleni and Cozmești showed higher *Eurygaster* densities, with percentages of 10.70 % and 10.86 %, respectively, indicating a greater concentration of this species in these areas.

The ratio of *Eurygaster* spp. Lap. species in the forests of the research area showed that in the autumn of 2020, the proportions of *Eurygaster* species differed significantly depending on the forest and locality. Thus, *Eurygaster integriceps* was the most frequently encountered species, with high densities in most forests, while *Eurygaster maura* and *Eurygaster austriaca* were less common but varied by location, with higher densities in the forests of Prisăcani and Dolhești.

Compared to the autumn of 2020, a significant decrease in density was observed in the spring of 2021, with a much smaller number of specimens collected. This decline may be attributed to harsher weather conditions during the overwintering period. The forests of Dolhești, Comarna, and Grozești showed higher

densities for most species, while Cozmești and Costuleni had lower densities, which may have been influenced by local factors such as microclimate, vegetation type, and soil conditions.

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