

## EVALUATION OF THE PRESENCE OF *EURYGASTER* AND *AELIA* SPECIES IN TIMIS COUNTY, DURING 2007-2009

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### Abstract

In our country, cereal bugs are spread in all counties where people grow wheat. The numeric level of the populations is different, according to the agri-climatic conditions and the breeds that are cultivated. In the attack area, the predominant species is *Eurygaster integriceps*, which represents over 85% of cereal bug species.[4,6]. In order to assess the biological reserve of cereal bugs and evaluating the attack they produce on wheat, we made diagonal probing (40 probings of 0,250 m<sup>2</sup> each), in autumn, in 14 forests in Timiș County, starting with September 10th – 15th 2007. For this, we used a metric frame of 0.5/ 0.5 m. We analysed the layer of leaves inside the frame, then the rot to the ground, recording the bugs we found alive and the ones we found dead. Examining the data obtained we could see that in autumn 2007 the average density in Timiș County was of  $0.49 \approx 0.5$  specimens/m<sup>2</sup>; in spring the average reserve in Timiș County was of  $0.36 \approx 0.4$  live bugs/m<sup>2</sup>; maximum values of the number of live bugs/m<sup>2</sup> were determined in Banloc forest in Banloc commune (0.9 bugs/m<sup>2</sup>), in Pădureni forest, Jebel commune (0.8 specimens/m<sup>2</sup>). Minimum values of the number of live bugs/m<sup>2</sup> were registered in Nemeșești forest, Margina commune (0.1 specimens/m<sup>2</sup>), in Cenad forest, Cenad commune (0.1 specimens/m<sup>2</sup>), in Pesac forest, Periam commune (0.1 specimens/m<sup>2</sup>); medium values of the number of live bugs/m<sup>2</sup> were determined in Sinersig forest, Boldur commune (0.4 specimens/m<sup>2</sup>); in autumn 2009 the average density in Timiș County was of 1,2 specimens/m<sup>2</sup>.

**Key words:** evaluation, cereal bugs, biologic reserve

In Banat, in Timis County, like in other regions of the country, cereal bugs attack crops year by year, causing significant losses. The population's numeric level differs with the agri-climatic conditions and with the cultivated breeds. Successive to the researches performed by Palagesiu I. et al during 1994-1998, the cereal bugs collected in Timis County belonged to the genera *Eurygaster* and *Aelia*; the first one were preponderant, especially the species *Eurygaster austriaca* (Pălăgeșiu I. et al., 1998, Pălăgeșiu I. Et al., 1999). Data analysis showed that, in the period of May, these pests caused attacks on areas that were in all cases 60% bigger than the control variants. In Timis County, the average viable cereal bug population in the spring of 2007 was 0.4 specimens/m<sup>2</sup>. The biggest population was recorded in the forests from Banloc, Banloc commune (10 specimens/m<sup>2</sup>), Birda, Gataia commune (6 specimens/m<sup>2</sup>) and Padureni, Jebel commune (6 specimens/m<sup>2</sup>) (Micu Lavinia et al, 2007). The hibernating adults and also larvae and the new-generation adults cause qualitative and quantitative losses on the wheat yield. The hibernating adults destroy stems and ears. The specialty literature mentions that 2 specimens of hibernating adults per m<sup>2</sup> may destroy 5-18% of

plants. At a density of 3-4 specimens/m<sup>2</sup>, the chemical control is compulsory. A new-generation specimen feeds on 40-55 wheat grains, causing either grain drying or dramatic gluten degradation, and even reduction of grain germination degree (Petanec D., 2004, Popovet al., 1982, Rădulescu E., 1957). All these show the importance of cereal bug supervision, for warnings and also for the assessment and application of treatments against hibernating adults and new individuals (larvae and adults) (Multon J.L., 1980).

### MATERIAL AND METHOD

To assess the numeric livestock went for hibernation in forests, we performed investigations starting with 10th-15th September 2007. The diagonal probing was carried out in 14 forests from Timis County: Banloc (Banloc), Birda (Gataia), Padureni (Jebel), Km 9-11 (Lugoj), Dealul Popii (Faget), Sinersig (Boldur), Nemesesti (Margina), Cenad (Cenad), Pesac (Periam), Bencec (Bencec), Pischia (Pischia), Green Forest (Timisoara), Bacova (Buzias) and Herneacova (Recas) (40 probings of 0.250 m<sup>2</sup> each). For this, we applied the metric frame of 0.5/0.5 m. Within the frames, we analyzed the leaf layer, then the rot to the ground, recording the live and the dead bugs. We

reported the number of live insects found to the controlled area in  $m^2$ , obtaining in this way the mean density per  $m^2$  (Musteață D. et al 1980, *Metodici de Prognoza și Avertizare*, București; 1980). Then we multiplied the mean density in  $m^2$  with forest's area, obtaining the population available in the forest. After that, we summed up the results obtained and divided the number of cereal bugs with the area of controlled forests, in  $m^2$ , and obtained the mean annual population of the county, per  $m^2$ . The hibernating cereal bugs leave forests when the mean daily temperatures constantly overtake  $10^\circ C$ . In maximum 4-5 days, it is necessary to perform crop controls and to begin treatments, where required (Popov, C. et al., 1989, Stănescu GH., 1968).

## RESULTS AND DISCUSSIONS

In the attack region, the predominant species is *Eurygaster intergriceps*, representing more than 85% of the cereal bug species.

In the autumn of 2007, the mean population in Timis County was of 0.5 specimens/ $m^2$ . The biggest number of live specimens/ $m^2$  was recorded in Banloc forest – Banloc commune (10 specimens/ $m^2$ ) and in Padureni forest – Jebel commune (0.9 specimens/ $m^2$ ) (table 1).

In the spring of 2008, the mean population in Timis County was of 0.4 live specimens/ $m^2$ ; the most reduced number of live cereal bugs/ $m^2$  was recorded in the forests from Nemesesti – Margina commune (0.1 specimens/ $m^2$ ), Cenad – Cenad commune (0.1 specimens/ $m^2$ ) and Pesac – Periam

commune (0.1 specimens/ $m^2$ ) (table 2). The biological reserve of hibernating cereal bugs, in the autumn of 2008, in Timis County, was comprised between 0.2 adults/ $m^2$  (Pischia forest – Pischia commune) and 1.8 adults/ $m^2$  (Padureni forest – Padureni commune); according to the calculations stipulated by the Prognosis and Warning Methodology, the mean annual reserve of this county/ $m^2$  was of 1.2 specimens/ $m^2$  (Metodici de Prognoza și Avertizare, București; 1980).

Successive to our investigations performed in forests, at hibernation places, we could conclude that in the autumn of 2009 the biological reserve of cereal bugs entered in diapause was between 0.4 adults/ $m^2$  (forests from Faget, Boldur and Margina) and 1.9 adults/ $m^2$  (Padureni forest) (table 3); the mean annual reserve of this county, resulted from calculations, was of 1.2 specimens/ $m^2$ , compared with the mean reserve recorded in the spring, with a value of 0.9 specimens/ $m^2$ . Consequently, the economic damage threshold was not overtaken.

In the climatic conditions of 2009, the biological reserve of cereal bugs in Timis County increased significantly from a mean density of 0.7 specimens/ $m^2$  to 1.2 specimens/ $m^2$ ; on the contrary, in 2008, the mean density increased from spring to autumn with 0.4 specimens/ $m^2$  (table 4).

Table 1

**Determination of cereal bug reserve in hibernation locations, in the autumn of 2007, in forests from Timis County**

No.	Commune	Forest	Area ( $m^2$ )	Live cereal bugs /10 $m^2$	Total number of live cereal bugs in forest	Live cereal bugs density/ $m^2$	Live cereal bug reserve in forest
1.	BANLOC	Banloc	$700 \cdot 10^4$	10	$7000 \cdot 10^3$	1,0	$700 \cdot 10^4$
2.	GĂTAIA	Birda	$260 \cdot 10^4$	8	$2080 \cdot 10^3$	0,8	$208 \cdot 10^4$
3.	JEBEL	Pădureni	$400 \cdot 10^4$	9	$3600 \cdot 10^3$	0,9	$360 \cdot 10^4$
4.	LUGOJ	Km 9-11	$60 \cdot 10^4$	6	$360 \cdot 10^3$	0,6	$36 \cdot 10^4$
5.	FĂGET	Dealul Popii	$580 \cdot 10^4$	6	$3480 \cdot 10^3$	0,6	$348 \cdot 10^4$
6.	BOLDUR	Sinersig	$1200 \cdot 10^4$	4	$4800 \cdot 10^3$	0,4	$480 \cdot 10^4$
7.	MARGINA	Nemeșești	$350 \cdot 10^4$	2	$700 \cdot 10^3$	0,2	$70 \cdot 10^4$
8.	CENAD	Cenad	$300 \cdot 10^4$	1	$300 \cdot 10^3$	0,1	$30 \cdot 10^4$
9.	PERIAM	Pesac	$600 \cdot 10^4$	2	$1200 \cdot 10^3$	0,2	$120 \cdot 10^4$
10.	BENCEC	Bencec	$100 \cdot 10^4$	5	$500 \cdot 10^3$	0,5	$50 \cdot 10^4$
11.	PIȘCHIA	Pișchia	$970 \cdot 10^4$	4	$3880 \cdot 10^3$	0,4	$388 \cdot 10^4$
12.	TIMIȘOARA	Pădurea Verde	$700 \cdot 10^4$	6	$4200 \cdot 10^3$	0,6	$420 \cdot 10^4$
13.	BUZIAȘ	Bacova	$720 \cdot 10^4$	4	$2880 \cdot 10^3$	0,4	$288 \cdot 10^4$
14.	RECAȘ	Herneacova	$340 \cdot 10^4$	3	$1020 \cdot 10^3$	0,3	$102 \cdot 10^4$
<b>TOTAL</b>			$7280 \cdot 10^4$	<b>TOTAL</b>			$3600 \cdot 10^4$
MEAN RESERVE IN TIMIS COUNTY = $\sum$ cereal bugs from each forest / total area of forests						<b>0,49 <math>\approx</math> 0,5</b>	

Table 2

**Determination of cereal bug reserve in hibernation locations, in the spring of 2008, in forests from Timis County**

No.	Commune	Forest	Area (m <sup>2</sup> )	Live cereal bugs /10 m <sup>2</sup>	Total number of live cereal bugs in forest	Live cereal bugs density/m <sup>2</sup>	Live cereal bug reserve in forest
1.	BANLOC	Banloc	700 *10 <sup>4</sup>	9	6300 *10 <sup>3</sup>	0,9	630 *10 <sup>4</sup>
2.	GĂTAIA	Birda	260 *10 <sup>4</sup>	7	1820 *10 <sup>3</sup>	0,7	182 *10 <sup>4</sup>
3.	JEBEL	Pădureni	400 *10 <sup>4</sup>	8	320 *10 <sup>3</sup>	0,8	32 *10 <sup>4</sup>
4.	LUGOJ	Km 9-11	60 *10 <sup>4</sup>	5	300 *10 <sup>3</sup>	0,5	30 *10 <sup>4</sup>
5.	FĂGET	Dealul Popii	580 *10 <sup>4</sup>	6	3480 *10 <sup>3</sup>	0,6	348 *10 <sup>4</sup>
6.	BOLDUR	Sinersig	1200 *10 <sup>4</sup>	4	4800 *10 <sup>3</sup>	0,4	480 *10 <sup>4</sup>
7.	MARGINA	Nemeșești	350 *10 <sup>4</sup>	1	350 *10 <sup>3</sup>	0,1	35 *10 <sup>4</sup>
8.	CENAD	Cenad	300 *10 <sup>4</sup>	1	300 *10 <sup>3</sup>	0,1	30 *10 <sup>4</sup>
9.	PERIAM	Pesac	600 *10 <sup>4</sup>	1	600 *10 <sup>3</sup>	0,1	60 *10 <sup>4</sup>
10.	BENCEC	Bencec	100 *10 <sup>4</sup>	3	300*10 <sup>3</sup>	0,3	30 *10 <sup>4</sup>
11.	PIȘCHIA	Pișchia	970 *10 <sup>4</sup>	2	1940*10 <sup>3</sup>	0,2	194 *10 <sup>4</sup>
12.	TIMIȘOARA	Pădurea Verde	700 *10 <sup>4</sup>	5	3500 *10 <sup>3</sup>	0,5	350 *10 <sup>4</sup>
13.	BUZIAȘ	Bacova	720 *10 <sup>4</sup>	3	2160 *10 <sup>3</sup>	0,3	216 *10 <sup>4</sup>
14.	RECAȘ	Herneacova	340 *10 <sup>4</sup>	2	680*10 <sup>3</sup>	0,2	68 *10 <sup>4</sup>
		TOTAL	7280 *10 <sup>4</sup>	TOTAL			2685 *10 <sup>4</sup>
		MEAN RESERVE IN TIMIS COUNTY = $\sum$ cereal bugs from each forest / total area of forests				0,36 $\approx$ 0,4 live cereal bugs /m <sup>2</sup>	

Table 3

**Determination of cereal bug reserve in hibernation locations, in the autumn of 2009, in forests from Timis County**

from Timis County							
o	Commune	Forest	Area (m <sup>2</sup> )	Live cereal bugs /10 m <sup>2</sup>	Total number of live cereal bugs in forest	Live cereal bugs density/m <sup>2</sup>	Live cereal bug reserve in forest
1.	BANLOC	Banloc	700 *10 <sup>4</sup>	15	10500 *10 <sup>3</sup>	1,5	1050 *10 <sup>4</sup>
2.	GĂTAIA	Birda	260 *10 <sup>4</sup>	14	3640 *10 <sup>3</sup>	1,4	364 *10 <sup>4</sup>
3.	JEBEL	Pădureni	400 *10 <sup>4</sup>	19	7600 *10 <sup>3</sup>	1,9	760 *10 <sup>4</sup>
4.	LUGOJ	Km 9-11	60 *10 <sup>4</sup>	6	360 *10 <sup>3</sup>	0,6	36 *10 <sup>4</sup>
5.	FĂGET	Dealul Popii	580 *10 <sup>4</sup>	4	2320 *10 <sup>3</sup>	0,4	232 *10 <sup>4</sup>
6.	BOLDUR	Sinersig	1200 *10 <sup>4</sup>	4	4800 *10 <sup>3</sup>	0,4	480 *10 <sup>4</sup>
7.	MARGINA	Nemeșești	350 *10 <sup>4</sup>	4	1400 *10 <sup>3</sup>	0,4	140 *10 <sup>4</sup>
8.	CENAD	Cenad	300 *10 <sup>4</sup>	6	1800 *10 <sup>3</sup>	0,6	180 *10 <sup>4</sup>
9.	PERIAM	Pesac	600 *10 <sup>4</sup>	9	5400 *10 <sup>3</sup>	0,9	540 *10 <sup>4</sup>
10.	BENCEC	Bencec	100 *10 <sup>4</sup>	5	500*10 <sup>3</sup>	0,5	50 *10 <sup>4</sup>
11.	PIȘCHIA	Pișchia	970 *10 <sup>4</sup>	7	6790 *10 <sup>3</sup>	0,7	679 *10 <sup>4</sup>
12.	TIMIȘOARA	Pădurea Verde	700 *10 <sup>4</sup>	9	6300 *10 <sup>3</sup>	0,9	630 *10 <sup>4</sup>
13.	BUZIAȘ	Bacova	720 *10 <sup>4</sup>	7	5040 *10 <sup>3</sup>	0,7	504 *10 <sup>4</sup>
14.	RECAȘ	Herneacova	340 *10 <sup>4</sup>	7	2380 *10 <sup>3</sup>	0,7	238 *10 <sup>4</sup>
		TOTAL	7280 *10 <sup>4</sup>	TOTAL			5883 *10 <sup>4</sup>
		MEAN RESERVE IN TIMIS COUNTY = $\sum$ cereal bugs from each					0,8

Table 4

**Evolution of the mean cereal bug biological reserve during 2007-2009, in forests from Timis County**

Spring 2007	Autumn 2007	Spring 2008	Autumn 2008	Spring 2009	Autumn 2009
0,4	0,5	0,4	0,8	0,7	1,2

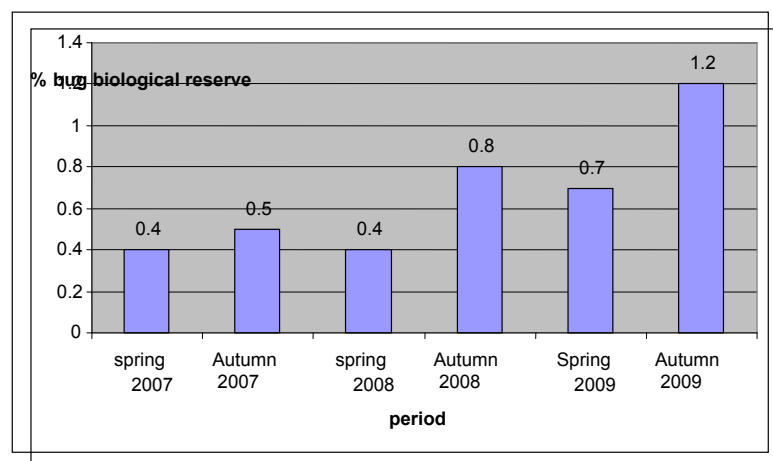


Figure 1 Proportion of the mean cereal bug biological reserve during 2007-2009, in Timis County

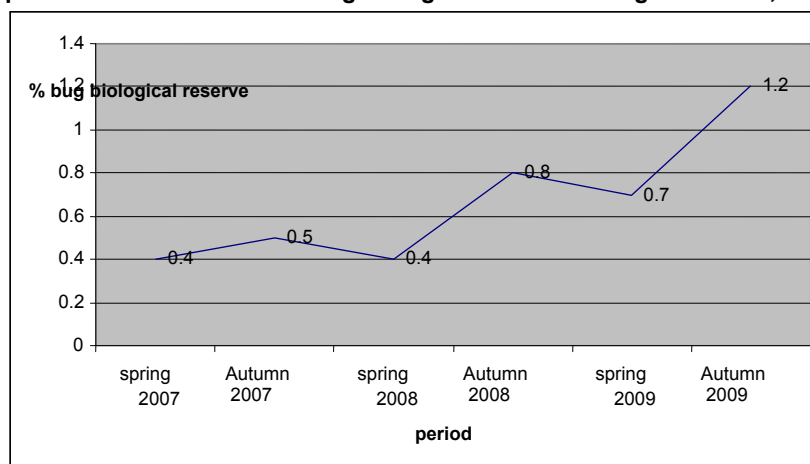


Figure 2 Dynamics of the cereal bug biological reserve in forests from Timis County, during 2007-2009

The biggest mean difference of biological reserve was observed in the spring of 2009, compared with the autumn of 2009, when the density increased with 0.5 specimens/m<sup>2</sup>. In the autumn of 2008, we recorded 0.8 live specimens/m<sup>2</sup>, while in the spring we identified a density of 0.4 specimens/m<sup>2</sup>; consequently, we determined an increase of 0.4 specimens/m<sup>2</sup> during the summer season, generated by much good-quality food that allowed the survival of as many as possible hibernating adults, and also by the climatic conditions favouring hibernation (*figure 1*). The dynamics of the mean cereal bug biological reserve in Timis County (*figure 2*) reflects the increasing tendency of this. In these terms, in the autumn of 2008, the biological reserve was 0.3 specimens/m<sup>2</sup> bigger than in the autumn of 2007; the same tendency could be observed in the autumn of 2009 compared with the autumn of 2008. On the whole, during the three experimental years, the biological reserve of cereal bugs was maintained between acceptable limits, without remarkable attacks that could affect very

significantly the amounts of straw cereals harvested in Timis County.

## CONCLUSIONS

Successive to our investigations performed in forests, we identified a big number of specimens belonging to the species *Eurygaster intergriceps* and a few adults belonging to *Aelia rostrata*; we did not identify specimens belonging to the other species of *Eurygaster* and *Aelia*.

Cereal bug mortality, in the winter of 2007/2008, was much reduced due to the mild climatic conditions. The same observations are available for the winter of 2008/2009, too. During the entire period analyzed in spring and autumn, as well (2007-2009), the biggest densities were observed in Banloc forest, Banloc commune, and in Padureni forest, Jebel commune, showing the absence of chemical treatments in these regions; consequently, the wheat crops in these areas record significant cereal bug attacks year by year.

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