ASSESMENT OF POPULATION LEVEL OF THE INVAZIVE SPECIES *NEZARA VIRIDULA* IN DIFERENT CROPS FROM SOUTH WEST OF ROMANIA

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Abstract

Green bug (*Nezara viridula*) is a pest recently reported in our country (respectively in 2010, Timisoara). It is known to be present in different areas and different plants. It has a different food regime from one area to another. Therefore, in this paper we proposed an approach to knowledge the population size in Caras Severin County, from the South-West of Romania. The research covered all areas of the county and were carried out during the years 2015-2016. Observations were conducted in eight cities (Resita, Caransebes, Oravita, Anina, Bocsa, Moldova Noua, Herculane and Otelu Rosu). In each locality was determined several areas and observation points (ZO-5/OP-5) representing the previously established crops. Readings were performed monthly beginning in June and ending with October. The plants under the macroscopic observations were part of both agricultural area and the horticultural. The results of the monitoring and measurement of specimens found have shown an abundance of species in areas Bocsa, Oravita and Herculane. Maximum values recorded in observation points reached 80-100 individuals. Few individuals were made in Resita and Caransebes (8-12 individuals). Most specimens were observed during August-September. In all areas monitored prevailed larvae and nymphs. As regards the type of crop/plant, it can be noted that the higher presence was indicated on corn, beans, tomatoes, and berries. Bug has not been reported in towns: Anina, Moldova Noua and Otelu Rosu. The presence of the species was noted especially in the lowlands of the county and less or no in higher areas. Bug current state in the Caras-Severin County are of installation and ongoing monitoring.

Key words: *Nezara viridula*, level population, observation points, polyphagous

In recent years the species *Nezara viridula* (L.) (Insecta:Hemiptera) has become extremely dangerous for crops in Romania (Grozea I. *et al.*, 2016). Preferred common name is green stink bug (CABI, 2016). Seven years ago the insect was observed for the first time in the western part of the country (Grozea I. *et al.* 2012).

There are no known causes of clear abundance in certain regions or certain plants. Is considered highly polyphagous, from plants of Poaceae, Cruciferae, Malvaceae and Solanaceae to green vegetable bug (Panizzi A.R, Slansky F., 1991). Researches made in Asia shown that dry and hot summer contributes to good mating the following year and good cone production, in turn, contributes to the abundance of bugs in the third year (Kiritani K., 2006).

MATERIAL AND METHOD

The researches were made in South-West of country, during the years 2015-2016. These covered all county and were carried out in eight localities (Resita, Caransebes, Oravita, Anina, Bocsa, Moldova Noua, Baile Herculane and Otelu Rosu). In each locality was determined 5 zone and observation points (ZO/OP) like: locality nameZ01PO1.

Readings were performed monthly beginning in June and ending with October. The plants under the macroscopic observations (direct on the analyzed plant) were part of both agricultural (maize, beans) area and the horticultural (tomatoes, raspberry, mulberry, vine, lilac flower) (*table 1*). Analyzed spaces belonged to two categories, private gardens and green spaces.

RESULTS AND DISCUSSIONS

The results in this paper reveal that the invasive species is present in Caras Severin. Throughout the period under study were observed both mature and immature stages (larvae and nymphs). Not all the points / areas monitored (eight localities) in the county showed positive values such as Anina, Moldova Noua and Otelu Rosu. All registered individuals annually was 557 in 2015 and 114 in 2016 (*table 2, 3*). Greatest values recorded in observation points reached 80-100 individuals, in 2016 year, in August-September (*table 3*). The less individuals were made in Resita and Caransebes (4-12 individuals) in 2016 respectively 1-8 ind. (in 2015).

Table 1

Characteristics of research area

Nr.	Locality	Zone/Observation point	Type of the plant analyzed	Space analyzed
1	Resita	RSZ01PO1	Beans	Private garden
		RSZ01PO2	Tomatoes	Private garden
		RSZ01PO3	Lilac flower	Green space
		RSZ01PO4	Beans	Private garden
		RSZ01PO5	Lilac flower	Green space
2	Bocsa	BSZO3PO1	Tomatoes	Private garden
		BSZO3PO2	Tomatoes	Private garden
		BSZO3PO3	Tomatoes, beans	Private garden
		BSZO3PO4	Raspberry	Private garden
		BSZO3PO5	Beans	Private garden
3	Caransebes	CSZO2PO1	Lilac flowers	Green space
		CSZO2PO2	Beans, Raspberry	Private garden
		CSZO2PO3	Lilac flower	Green space
		CSZO2PO4	Mulberry	Green space
		CSZO2PO5	Beans	Private garden
4	Otelu Rosu	ORZO6PO1	Beans	Private garden
		ORZO6PO2	Raspberry	Private garden
		ORZO6PO3	Mulberry	Green space
		ORZO6PO4	Raspberry	Private garden
		ORZO6PO5	Beans, raspberry	Private garden
5	Oravita	ORZO4PO1	Beans, tomatoes	Private garden
		ORZO4PO2	Tomatoes	Private garden
		ORZO4PO3	Tomatoes	Private garden
		ORZO4PO4	Beans	Private garden
		ORZO4PO5	Mulberry	Green space
6	Moldova Noua	MNZO5PO1	Tomatoes	Private garden
		MNZO5PO2	Tomatoes, beans	Private garden
		MNZO5PO3	Tomatoes, beans	Private garden
		MNZO5PO4	Tomatoes	Private garden
		MNZO5PO5	Vine	Private garden
7	Baile Herculane	BHZO8PO1	Mulberry	Green space
		BHZO8PO2	Mulberry	Green space
		BHZO8PO3	Raspberry	Private garden
		BHZO8PO4	Beans	Private garden
		BHZO8PO5	Vine	Private garden
8	Anina	ANZO7PO1	Beans, tomatoes	Private garden
		ANZO7PO2	Beans, tomatoes	Private garden
		ANZO7PO3	Lilac flower	Green space
		ANZO7PO4	Beans, tomatoes	Private garden
		ANZO7PO5	Beans, maize	Private garden

On the assessment of observation zones can say that most individuals were present in BSZO3PO3 and BSZO3PO4, where the average values situated between 40.2 and 62.6 (in 2016) or 20.6-32 (in 2015).

It was found that period of favorability in dynamics of the species was August and September, when the total number of individuals observed were 219-117 for 2015 and 377-249 for 2016. In almost areas monitored prevailed larvae and nymphs (L, N) (*figure 1*).

Adults were present especially towards the end of the monitoring period (September - October). As regards the type of crop/plant, it can be noted that the higher presence was indicated on maize, beans, tomatoes and raspberries. Observation areas that prevailed in the ornamental greenery, the insect population level was lower than in areas with private gardens.

CONCLUSIONS

Nezara viridula (L) under research subject is far achieved extremely dangerous species with great expansion potential and a large area of plants attacked.

After monitoring activities found that the insect was present in 5 localities of 8. It was present in all areas and points studied in a locality. A prevalent mainly in private gardens and especially agricultural and horticultural plants (maize, bean, tomatoes, raspberry, mulberry and vine). Ornamental plants were uncommon except lilac flower.

All stages of development of the insect were observed on the plants damaging.

Table 2

Population level of *Nezara viridula* species in Caras Severin, during June-September, 2015

Nr. crt.	Locality	Zone/Observation point	Presence(+) Absence(-)	Total number of individuals					Average/ ZO/PO
				June	July	August	September	October	
1	Resita	RSZ01PO1	++(N,A)	0	0	0	4	11	3
		RSZ01PO2	-	0	0	0	0	0	0
		RSZ01PO3	+ ++(L,N,A)	0	3	8	9	3	4.6
		RSZ01PO4	+(A)	0	0	1	1	8	2
		RSZ01PO5	-	0	0	0	0	0	0
2	Bocsa	BSZO3PO1	-	0	0	0	0	0	0
		BSZO3PO2	-	0	0	0	0	0	0
		BSZO3PO3	+++(L,N,A)	0	11	37	39	16	20.6
		BSZO3PO4	+++(L,NA)	0	21	49	57	33	32
		BSZO3PO5	-	0	0	0	0	0	0
3	Caransebes	CSZO2PO1	-	0	0	0	0	0	0
		CSZO2PO2	++(N,A)	0	6	8	8	8	6
		CSZO2PO3	-	0	0	0	0	0	0
		CSZO2PO4	-	0	0	0	0	0	0
		CSZO2PO5	-	0	0	0	0	0	0
4	Otelu Rosu	ORZO6PO1	-	0	0	0	0	0	0
		ORZO6PO2	-	0	0	0	0	0	0
		ORZO6PO3	-	0	0	0	0	0	0
		ORZO6PO4	-	0	0	0	0	0	0
		ORZO6PO5	-	0	0	0	0	0	0
5	Oravita	ORZO4PO1	++(L,A)	0	0	1	4	5	2
		ORZO4PO2	+++(L,N,A)	0	0	22	29	25	15.2
		ORZO4PO3	-	0	0	0	0	0	0
		ORZO4PO4	-	0	0	0	0	0	0
		ORZO4PO5	-	0	0	0	0	0	0
6	Moldova Noua	MNZO5PO1	-	0	0	0	0	0	0
		MNZO5PO2	-	0	0	0	0	0	0
		MNZO5PO3	-	0	0	0	0	0	0
		MNZO5PO4	-	0	0	0	0	0	0
		MNZO5PO5	-	0	0	0	0	0	0
7	Baile H.	BHZO8PO1	-	0	0	0	0	0	0
		BHZO8PO2	-	0	0	0	0	0	0
		BHZO8PO3	++(L,N)	0	0	3	10	2	3
		BHZO8PO4	++(N,A)	0	4	47	58	6	23
		BHZO8PO5	-	0	0	0	0	0	0
8	Anina	ANZO7PO1	-	0	0	0	0	0	0
		ANZO7PO2	-	0	0	0	0	0	0
		ANZO7PO3	-	0	0	0	0	0	0
		ANZO7PO4	-	0	0	0	0	0	0
		ANZO7PO5	-	0	0	0	0	0	0
Total ind./month				0	45	176	219	117	Average/ ZO/PO
Total ind./year								557	

+++ (LNA)-larvae, nymphs and adults are present; ++ (LN/NA/LA)-larvae, nymphs/nymphs and adults/larvae and adults are present; + (A)-adults p.

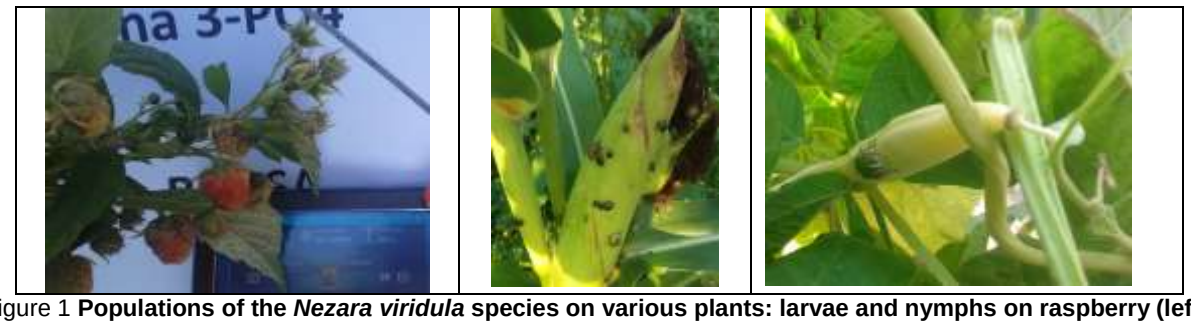

Figure 1 **Populations of the *Nezara viridula* species on various plants: larvae and nymphs on raspberry (left); larvae and nymphs on maize plant (middle); nymph on bean plant**

Table 3

Population level of *Nezara viridula* species in Caras Severin, during June-September, 2016

No. Crt.	Locality	Zone/Observation point	Presence(+) Absence(-)	Total number of individuals					Average/ ZO/PO
				June	July	August	September	October	
1	Resita	RSZ01PO1	-	0	0	0	12	23	7
		RSZ01PO2	-	0	0	0	0	0	0
		RSZ01PO3	+ (A)	0	3	6	8	8	5
		RSZ01PO4	-	0	0	0	3	4	1.4
		RSZ01PO5	-	0	0	0	0	0	0
2	Bocsa	BSZO3PO1	-	0	0	0	0	0	0
		BSZO3PO2	-	0	0	0	0	0	0
		BSZO3PO3	+ (L, N, A)	0	20	80	67	34	40.2
		BSZO3PO4	+ (L, N , A)	0	60	100	98	55	62.6
		BSZO3PO5	-	0	0	0	0	0	0
3	Caransebes	CSZO2PO1	-	0	0	0	0	0	0
		CSZO2PO2	+ (N)	0	8	2	12	0	5.5
		CSZO2PO3	++ (L, N)	0	0	0	7	11	3.6
		CSZO2PO4	+ (N)	0	0	0	1	1	0.4
		CSZO2PO5	-	0	0	0	0	0	0
4	Otelu Rosu	ORZO6PO1	-	0	0	0	0	0	0
		ORZO6PO2	-	0	0	0	0	0	0
		ORZO6PO3	-	0	0	0	0	0	0
		ORZO6PO4	-	0	0	0	0	0	0
		ORZO6PO5	-	0	0	0	0	0	0
5	Oravita	ORZO4PO1	+ (N)	0	5	3	11	22	8.2
		ORZO4PO2	++ (L,N)	0	0	80	43	48	34.2
		ORZO4PO3	-	0	0	0	0	0	0
		ORZO4PO4	-	0	0	0	0	0	0
		ORZO4PO5	+(L)	0	0	0	5	10	3
6	Moldova Noua	MNZO5PO1	-	0	0	0	0	0	0
		MNZO5PO2	-	0	0	0	0	0	0
		MNZO5PO3	-	0	0	0	0	0	0
		MNZO5PO4	-	0	0	0	0	0	0
		MNZO5PO5	-	0	0	0	0	0	0
7	Baile Herculane	BHZO8PO1	-	0	0	0	0	0	0
		BHZO8PO2	+(N)	0	0	0	7	7	2.8
		BHZO8PO3	+ (L)	0	1	0	15	6	4.4
		BHZO8PO4	+++(L,N,A)	0	20	100	88	20	45.6
		BHZO8PO5	-	0	0	0	0	0	0
8	Anina	ANZO7PO1	-	0	0	0	0	0	0
		ANZO7PO2	-	0	0	0	0	0	0
		ANZO7PO3	-	0	0	0	0	0	0
		ANZO7PO4	-	0	0	0	0	0	0
		ANZO7PO5	-	0	0	0	0	0	0
Total ind./month				0	117	371	377	249	Average /ZO/PO
Total ind./year								1114	

+++ (LNA)-larvae, nymphs and adults are present; ++ (LN)-larvae, nymphs are present; + (L/N/A)- larvae/nymphs/adults are present;

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