

RESEARCH REGARDING SPECIES OF COCCINELLIDAE FAUNA FROM MAIZE AGRO ECOSYSTEM

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Abstract

In the field, during the year 2009, in 4 variants with different hybrids of maize planted, specimens insects caught on yellow sticky traps were recorded taking into consideration specimens of Coccinellidae. Comparing the proportion, it is noted that the most numerous are Coccinellidae. It was found that the most widespread species of Ladybug is Propilea qatordecimpunctata, followed by Coccinella septempunctata. Coccinellidae populations are developed in late June, when numbers reach a peak of development, then this reduces their agroecosistem easily (their presence will continue to be significant), to record a maximum in late July and the number gradually reduces in the late vegetation period of maize. There are no differences in the structure and quantity of wildlife Coccinellidae.

INTRODUCTION

Amazing evolution, from the last period of chemical treatments against pests and diseases, reflected in the treated areas and quantity of used pesticides, together with interest of more people jointed in actions referring to protect environmental conservation, an aspect included in the countries legislation, made to increase interest for study of effects of different technologies of control pests and diseases on useful fauna from different agrocoenoses. If a lot of studies were performed, in Romania about biology, ecology and control of maize insect pest [1-6], is little information about useful fauna or “nontarget organisms” [nontarget organism = an organism which is affected by an interaction (for example, a pesticide application) for which it was not the intended recipient]. A large number of small creatures and micro-organisms live in the maize field. They form a species community and each has a place in the food chain. These organisms come into contact with the maize either directly by eating the plant, or indirectly, by eating or parasitizing the prey that has eaten maize or plant parts. Beneficial organisms include various insects, mites, nematodes, fungi, bacteria, and other microorganisms that feed on or parasitize pest species. Some of these species are well-known and have been researched in Europe, as well as in Romania and other countries; however, many more are less known species. The value of these organisms to agriculture and the environment are likely underestimated.

A comparative study is performed between *Coccinellidae* fauna from different maize hybrids, and the role of these insects in maize agroecosystems is discussed. Romania has a large area cultivated with maize (in average 3,000,000 ha/year), maize being most cultivated field cereal, easy to be cultivated for small farmers, being possible to be completely mechanized, offering maize cultivators a general good income while kernels are used for feeding animals, in industry and human feeding.

The possible impact of pesticide and GMOs crops on the trophic chains in agroecosystem is of concern to farmers, policy makers and organizations and societies interested in environmental conservation. Based on the experiments which were done during the last 8 years in Romania, in different crops which have offered us the possibility to observe if there are some influence on existing fauna captured in Yellow Sticky Traps (Pherocone AM traps) in field. Lady beetles, ladybugs, or ladybird beetles are among the most visible and best known beneficial predatory insects. Coccinellids are found worldwide, with over 5,000 species described [7]. Most lady beetles are beneficial as both adults and larvae, feeding primarily on aphids. They also feed on mites, small insects, and insect eggs. Lady beetles are voracious feeders and may be numerous where prey is plentiful and the broad-spectrum insecticide use is limited. Lady beetles need to eat many aphids per day so that they can lay eggs. The convergent lady beetle may eat aphids as much as its weight every day as a larva and consume as many as 50 aphids per day as an adult. Seven spotted lady beetle adults may consume several hundred aphids per day and each larva eats 200 to 300 aphids as it grows. Once the adults and larvae have eliminated an aphid colony, they will search additional food.

MATERIAL AND METHODS

The experiment was performed in Borovce, Slovakia, where there were cultivated 4 reference hybrids in 2009 (NK Cisko, NK Fortius, PR 36D79 and KWS 1393) maize plots. Maize plots were 36/30 m, 75 cm inter-row spacing (46 rows approximately 150 plants/row). Foliar non-target arthropod abundance was assessed using yellow sticky traps, type Pherocone AM trap, 3/plot (on 18, 27 and 35 row, on each plot). Yellow sticky traps were installed, harvested and replaced, weekly or biweekly by Prof. Ludovit Cagan, (in 2009 on 2, 16, 30 June; 14, 21, 28 July; 11, 25 August and 7 September). Yellow sticky traps were maintained till transportation and analyzing at +4°C, as soon as possible were analyzed by taking out (with glue) and counting *Coccinellidae* specimens which were glued on paper sheet and put together in an envelope in the refrigerator.

As non-target organisms, there were taken into consideration specimens of *Coccinellidae*, under stereomicroscope or with magnifying glass were registered specimens of this group. Determination of the species was done for *Coccinellidae* after: <http://www.coccinellidae.net> [8, 9] and Fauna Romanian-*Coccinellidae* [10].

Under stereomicroscope or with loupe specimens of *Coccinellidae* were registered and determined and after that tacked out from glue, specimens belonging to groups *Coccinellidae* were glued on paper sheet and put together in an envelope in the refrigerator.

RESULTS AND DISCUSSION

The Coccinellidae species founded on yellow sticky traps were noted as shown in the following images (*<http://www.coccinellidae.net>):

1-*Propylea quattuordecimpunctata* L.; 2-*Psilobora vigintiduopunctata* = *Thea 22-punctata* L.; 3-*Coccinella septempunctata* L.; 4-*Adalia bipunctata* L. (figure 1).

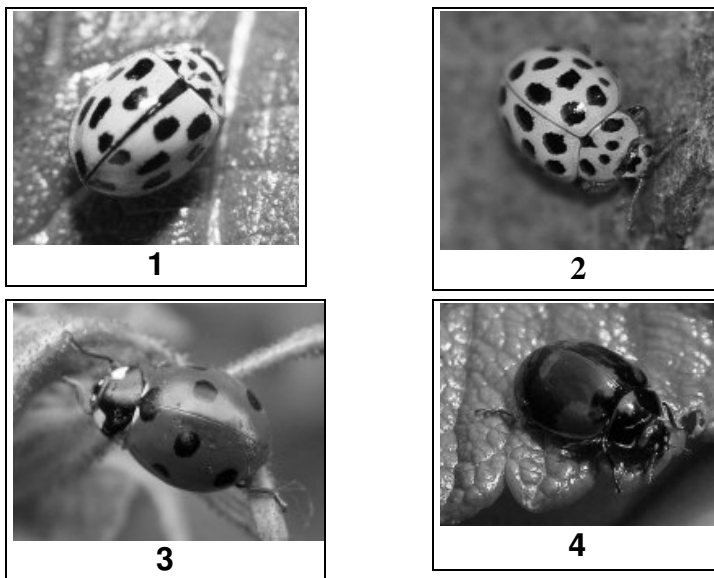


Fig. 1. *Coccinellidae* species

Table 1 presents the evolution of captures at different data on different hybrids, there are no significant differences between the captures at a certain data and the analysed hybrids.

Table 1

Evolution of captures at different data on different hybrids

Data	Hybrid	<i>Propilea qatordecempunctata</i>	<i>Psilobora vigintiduopunctata</i>	<i>Coccinella septempunctata</i>	<i>Adalia bipunctata</i>
1	2	3	4	5	6
2 June	PR36D79	0	0	0	0
	NK Fortius	0	0	0	0
	KWS 1393	0	0	0	0
	NK CISKO	0	0	0	0
	TOTAL	0	0	0	0
16 June	PR36D79	4	2	2	1
	NK Fortius	4	0	1	5
	KWS 1393	2	0	2	4
	NK CISKO	3	1	0	0
	TOTAL	13	3	5	10
30 June	PR36D79	4	1	2	7
	NK Fortius	6	0	1	7
	KWS 1393	6	1	1	4
	NK CISKO	6	1	0	1
	TOTAL	22	3	4	19
14 July	PR36D79	8	1	1	0
	NK Fortius	8	0	0	0
	KWS 1393	8	0	8	0
	NK CISKO	7	0	4	0
	TOTAL	31	1	13	0
21 July	PR36D79	34	0	3	0
	NK Fortius	17	0	3	0
	KWS 1393	36	0	2	0
	NK CISKO	17	1	3	0
	TOTAL	104	1	11	0
28 July	PR36D79	37	0	0	0
	NK Fortius	23	0	1	0
	KWS 1393	33	0	1	0
	NK CISKO	13	0	1	0
	TOTAL	106	0	3	0

11 August	PR36D79	5	0	0	0
	NK Fortius	2	0	0	0
	KWS 1393	3	0	0	0
	NK CISKO	3	0	0	2
	TOTAL	13	0	0	2
25 August	PR36D79	6	0	0	0
	NK Fortius	6	0	0	0
	KWS 1393	6	0	0	0
	NK CISKO	4	0	0	0
	TOTAL	22	0	0	0
7 September	PR36D79	8	0	0	0
	NK Fortius	4	0	1	1
	KWS 1393	11	0	1	0
	NK CISKO	6	0	0	0
	TOTAL	29	0	2	1
Total general		<u>340</u>	<u>8</u>	<u>38</u>	<u>32</u>

Taking into consideration the number of specimens from the total of 418, the most spreaded species was *Propylea quattuordecimpunctata* L. [340 specimens (81%)]; folowed by *Coccinella septempunctata* L. [38 specimens (9%)]; *Adalia bipunctata* L. [32 specimens (8%)] and *Psilobora vigintiduopunctata* = *Thea 22-punctata* L. [8 specimens (2%)] (Figure 2).

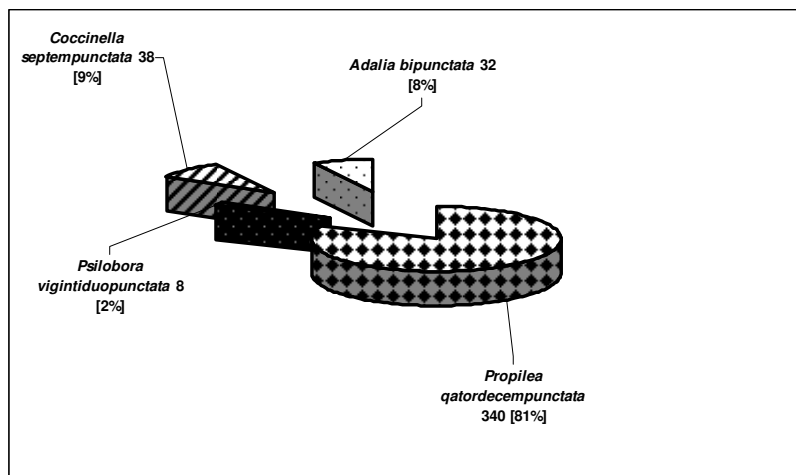
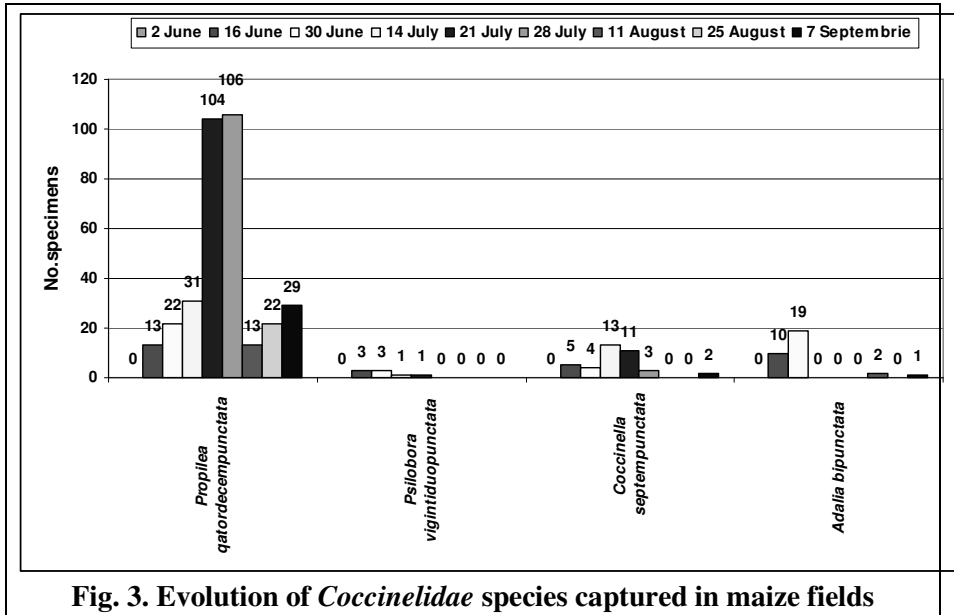


Fig. 2. Structure of *Coccinellidae* species captured in maize fields

The evolution of Coccinelidae species captured throughout the period in yellow sticky traps, in maize fields showed that *Propylea quattuordecimpunctata* L. and *Coccinella septempunctata* L. recorded the peak of captures in July, but *Adalia bipunctata* L. and *Psilobora vigintiduopunctata* = *Thea 22-punctata* L. had the largest number in June (Figure 3).



CONCLUSIONS

1. The most spreaded species which was found in yellow sticky traps in maize crops was *Propylea quattuordecimpunctata* L. folowed by *Coccinella septempunctata* L., *Adalia bipunctata* L. and *Psilobora vigintiduopunctata* = *Thea 22-punctata* L.
2. There are no significant differences between the captures at a certain data and the 4 hybrids grown and analysed (NK Cisco, NK Fortius, PR 36D79 and KWS 1393).
3. The evolution of Coccinelidae species captured throughout the period in yellow sticky traps, in maize fields showed that *Propylea quattuordecimpunctata* L. and *Coccinella septempunctata* L. recorded the peak of captures in July, but *Adalia bipunctata* L. and *Psilobora vigintiduopunctata* = *Thea 22-punctata* L. had the largest number in June.

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