Scientific Papers, UASVM Bucharest, Series A, Vol. LIII, 2010, ISSN 1222-5339

RESEARCH REGARDING SPECIES OF SYRPHID FAUNA FROM MAIZE AGRO ECOSYSTEM

S.I. SAUCIUC, I. ROŞCA

University of Agronomic Sciences and Veterinary Medicine of Bucharest

Keywords: *maize, Syrphid fauna, biology*

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 Syrphid. Comparing proportion, it is noted that the most numerous are Coccinellidae, followed by Syrphid and finally Neuropterans. Analyzing data on time evolution of catches of Syrphid, it is noted that populations of Syrphid, develops digital in late July, when numbers reach a peak of development, then this reduces their agroecosistem easily (their continuing presence to be significant) and their number gradually reduce still registering a record growth towards the end of vegetation period of maize. Referring to specific composition, it is noted that the most common species in the maize agroecosistem are Sphaerophoria scripta and Syrphus ribesi, remarked the evolution of a population of each species depending on the analyzed period. There are no differences on the structure and quantity of wildlife Syrphid between different hybrids.

INTRODUCTION

Amazing evolution, from the last period of chemical treatments against pests and diseases, reflected through treated areas and quantity of used pesticides, together with interest of more people jointed in actions referring to protect environment conservation, aspect included in 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 done, in Romania about biology, ecology and control of maize insect pest [1-6], there are few knowledge 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 prey that have eaten maize or plant parts. Beneficial organisms include various insects, mites, nematodes, fungi, bacteria, and other micro organisms that feed on or parasitize pest species. Some of these species are well-known and have been researched in Europe as in Romania and other locations; however, many more are

lesser known species. The value of these organisms to agriculture and the environment are likely underestimated.

It is done a comparative study between Neuropteran fauna from different maize hybrids, and it is discussed role of these insects in maize agroecocenoses.
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 to maize cultivators in generally good income and kernels are used for feeding animals, in industry and in human alimentation.

Based on experiences which were done during the last 8 years, in Romania, in different crops which have offered to us the possibility to observe if there are some influence on existing fauna captured in Yellow Sticky Traps (Pherocone AM traps) in field.

Family Syrphidae or flower flies or syrphid flies, sometimes called hoverflies, are common insect and they are often seen feeding with flower's nectar pollen, while the larvae eat a wide range of foods, especially insectivores maggots are important predators of pests, such as aphids, scales, thrips, other plant-sucking insects, and caterpillars, and are rivaled only by lady-bird beetles and lacewings as predators useful for biological control. Syrphids are being recognized as important natural enemies of pests, and potential agents for use in biological control. Their size ranges from 4 mm to over 25 mm and their coloration from bright yellow or orange to dull dark black or gray with a few iridescent forms. Some adult syrphid flies are important pollinators. There are about 6,000 species in 200 genera which have been described. The family Syrphidae is broken down into 3 subfamily and 15 tribes and contains more than 6,000 described species.

MATERIAL AND METHODS

The experiment was in Borovce, Slovakia, where 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 $+4^0$C, as soon was possible were analyzed by taking out (with glue) and counting Syrphid specimens which were glued on paper sheet and put together in an envelope in refrigerator.

As non target organisms were taking into consideration specimens of Syrphid, under stereomicroscope or with loupe were registered specimens of this group.

Determination of the species were done for Syrphid after identification keys [7-9] Under stereomicroscope or with loupe were registered and determined specimens of Syrphid and after that tacking out from glue specimens belonging to this group, were glued on paper sheet and put together in an envelope in refrigerator.

RESULTS AND DISCUSSION

Were identified 14 species of Syrphidae [*Chrystoxum cautum* Harris*, Dasysyrphus albostriatus* Fall.*, Episyrphus balteatus* De Geer*, Eristalis arbustorum* L.*, Eristalis tenax* L.*, Eupeodes corollae* Fab.*, Melangyna umbellatarum* Fab.*, Meligramma guttata* Fall.*, Metasyrphus* (Eupeodes) *latifasciatus* Macquart*, Neoascia podagrica* Fab.*, Sphaerophoria menthastri* L.*, Sphaerophoria scripta* L.*, Syritta pipiens* L.*, Syrphus ribesii* L.] 3 groups of species belonging to genera *Didea* sp., *Melanostoma* sp., *Platycheirus* sp., and a category which it was imposible to be recognised (identified) and were denoted as Syrphid species. In Table 1 it is presented evolution of captures of Syrphid species identified, on yellow sticky traps, in maize fields at different data. It is possible to underline that flight of most Syrphid species is during June-July.

There were identified 1183 specimens belonging to Syrphid fauna. In Figure 1 it is presented the structure of Syrphid species found in maize field. The most common is *Sphaerophoria scripta* L., 353 specimens (30%) (Figure 2)*,* followed by *Chrystoxum cautum* Harris*,* 218 specimens (18%) (Figure 3) and some common species, between 10 and 5% [*Melangyna umbellatarum* Fab. (10%)*, Episyrphus balteatus* De Geer (9%), species belonging to genera *Melanostoma* (8%)*, Eupeodes corollae* Fab. (7%) and *Syrphus ribesii* L. (6%)].

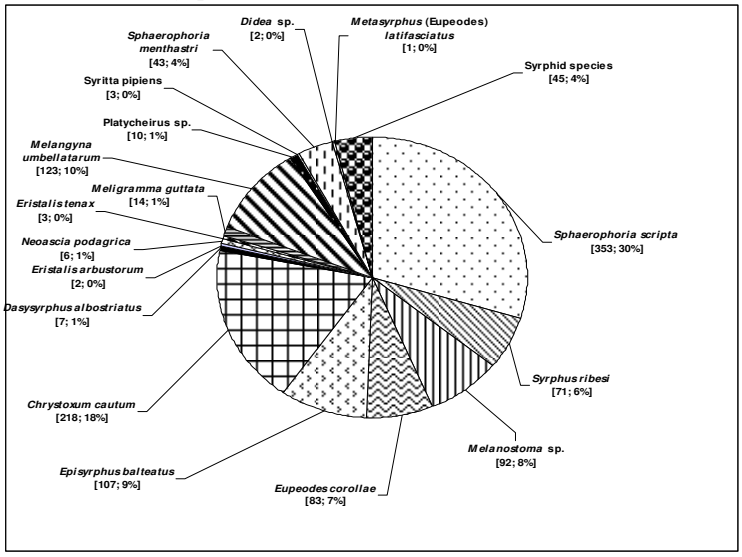

Fig. 1. Structure of *Syrphid* species found in maize field

Table 1

Syrphid species identified on yellow sticky traps in maize fields

	Sphaerophoria scripta	*Syrphus ribesii*	*Melanostoma* **sp.**	*Eupeodes corollae*	*Episyrphus balteatus*	*Chrystoxum cautum*	*Dasysyrphus albostriatus*	*Eristalis arbustorum*	*Neoascia podagrica*	*Eristalis tenax*	*Meligramma guttata*	*Melangyna umbellatarum*	*Platycheirus* **sp.**	*Syritta pipiens*	*Sphaerophoria menthastri*	*Didea* **sp.**	*Metasyrphus* (Eupeodes) *latifasciatus*	*Syrphid* species	TOTAL
2-VI	3	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	**4**
16 -VI	45	23	4	2	2	1	2	1	3	-	-	-	-	-	-	-	-	-	**83**
30 -VI	163	20	4	-	8	86	1	1	2	1	-	93	-	-	-	-	-	9	**388**
14 -VII	81	23	46	57	72	17	1	-	-	1	3	-	-	2	30	-	-	17	**350**
21-VII	30	-	18	13	5	72	1	-	-	1	-	25	2	-	-	-	-	7	**174**
28-VII	15	3	6	5	14	39	1	-	-	-	-	5	8	1	-	-	-	5	**102**
11-VIII	4	-	5	3	-	1	-	-	-	-	2	-	-	-	-	-	-	1	**16**
25-VIII	5	-	3	2	1	2	-	-	-	-	1	-	-	-	6	1	-	3	**24**
7-IX	7	2	6	1	5	-	1	-	-	-	8	-	-	-	7	1	1	3	**42**
TOTAL	**353**	**71**	**92**	**83**	**107**	**218**	**7**	**2**	**6**	**3**	**14**	**123**	**10**	**3**	**43**	**2**	**1**	**45**	***1183***

Fig. 2 ***Sphaerophoria scripta***
http://www.syrphidae.de

Fig. 3 ***Chrystoxum cautum***
http://www.syrphidae.de

In Table 2 it is presented evolution of captures at different data on different hybrids, of course it is possible to observe that there is no a significant difference between Syrphid species captures at a certain data and analyzed hybrids.

CONCLUSIONS

1. The most common is *Sphaerophoria scripta* L., 353 specimens (30%), followed by *Chrystoxum cautum* Harris, 218 specimens (18%) and some common species, between 10 and 5% [*Melangyna umbellatarum* Fab. (10%), *Episyrphus balteatus* De Geer (9%), species belonging to genera *Melanostoma* (8%), *Eupeodes corollae* Fab. (7%) and *Syrphus ribesii* L. (6%)].
2. There is no a significant differences between *Syrphid* captures at a certain data and analysed hybrids where were cultivated 4 hybrids (NK Cisko, NK Fortius, PR 36D79 and KWS 1393).
3. There is no a significant difference between *Syrphid* species captures at a certain data and analyzed hybrids.

ACKNOWLEDGEMENTS

The research was supported by the Contract 2072/2009 "Analysis nontarget organisms in experimental field with transgenic Monsanto maize, Slovakia"

REFERENCES

1. Čamprag D., R. Sekulić, T. Kereši, F. Bača, 2004. *Cucuruzna sovica (Helicoverpa armigera Hübner) i integralne mere suzbijanja*. Poljoprivredni fakulted, Feljton, Novi Sad.
2. Barbulescu Al. et all., 2000. *Protectia culturilor de camp impotriva bolilor si daunatorilor*. Agentia Nationala de Consultanta Agricola, Bucuresti.
3. Paulian Fl. & Maria Pana, 1972. *Insecticidele granulate si tratamentul semintei ca procedee noi in protectia culturilor de porumb impotriva gargaritei Tanymecus dilaticollis Gyll*. An. I.C.P.P., vol. 38, Seria C (pp. 412-418).

4. Perju T. et all., 1988. *Entomofagii si utilizarea lor in protectia integrata a ecosistemelor agricole*. Ed. Ceres, Bucuresti.
5. Voinescu I., 1985. *Tratamentul semintelor de porumb cu insecticide carbamice-metoda eficace de combatere a gargaritei Tanymecus dilaticollis Gyll*. Probl. Prot. Plant., XIII, 2 (pp. 19-28).
6. Voinescu I. & Al. Barbulescu, 1986. *Eficacitatea unor insecticide granulate in combaterea sfredelitorului porumbului (Ostrinia nubilallis Hb.)*. An. I.C.C.P.T., 1986, vol. LIII (pp. 149-154).
7. http://www.syrphidae.de
8. Ernst T., 1994. *Danmarks Svirrelfluer (Diptera:Syrphidae)*. Danmarks Dyreliv Bind 6. Apollo Books Stenstrup
9. Bradescu V., 1991. *Les Syrphides de Roumanie (Diptera Sirphidae) cles de determination et repartition*. Trav. Mus. Hist. nat. "Gr. Antipa". Vol. XXXI (pp. 7-83).

Table 2

Evolution of *Syrphid* species captures at different data on different hybrids

Date	Hybrid	*Sphaerophoria scripta*	*Syrphus ribesii*	*Melanostoma* sp.	*Eupeodes corollae*	*Episyrphus balteatus*	*Chrysotoxum cautum*	*Dasysyrphus albostriatus*	*Eristalis arbustorum*	*Neoascia podagrica*	*Eristalis tenax*	*Meligramma guttata*	*Melangyna umbellatarum*	*Platycheirus* sp.	*Syritta pipiens*	*Sphaerophoria menthastri*	*Didea* sp.	*Metasyrphus* (Eupeodes) *latifasciatus*	Syrphid species
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
	PR36D79	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
	NK Fortius	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	KWS 1393	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NK CISKO	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2-VI	**TOTAL**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	PR36D79	15	4	2	2	-	-	-	1	2	-	-	-	-	-	-	-	-	-
	NK Fortius	15	5	-	-	2	-	-	-	1	-	-	-	-	-	-	-	-	-
	KWS 1393	10	8	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
	NK CISKO	5	6	2	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-
16-VI	**TOTAL**	**45**	**23**	**4**	**2**	**2**	**1**	**2**	**1**	**3**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	PR36D79	36	6	1	-	8	12	1	-	1	-	-	12	-	-	-	-	-	5
	NK Fortius	41	10	2	-	-	22	-	-	-	-	-	27	-	-	-	-	-	1
	KWS 1393	35	3	1	-	-	24	-	-	-	-	-	28	-	-	-	-	-	2
	NK CISKO	51	1	-	-	-	28	-	1	1	-	-	26	-	-	-	-	-	1
30-VI	**TOTAL**	**163**	**20**	**4**	**-**	**8**	**86**	**1**	**1**	**2**	**1**	-	93	-	-	-	-	-	9
	PR36D79	32	8	12	19	22	4	-	-	-	1	-	-	-	-	15	-	-	5
	NK Fortius	20	6	6	15	17	3	1	-	-	-	3	-	-	2	6	-	-	6
	KWS 1393	19	7	16	22	24	7	-	-	-	-	-	-	-	-	9	-	-	3
	NK CISKO	10	2	12	1	9	3	-	-	-	-	-	-	-	-	-	-	-	3
14-VII	**TOTAL**	**81**	**23**	**46**	**57**	**72**	**17**	**1**	**-**	**-**	**1**	3	-	-	2	30	-	-	17
	PR36D79	17	-	5	1	2	19	-	-	-	-	-	9	1	-	-	-	-	2
	NK Fortius	5	-	5	2	1	17	1	-	-	-	-	3	-	-	-	-	-	1
	KWS 1393	4	-	6	10	2	28	-	-	-	-	-	6	1	-	-	-	-	3
	NK CISKO	4	-	2	-	-	8	-	-	-	1	-	7	-	-	-	-	-	1
21-VII	**TOTAL**	**30**	**-**	**18**	**13**	**5**	**72**	**1**	**-**	**-**	**1**	-	25	2	-	-	-	-	7
	PR36D79	4	-	1	3	8	13	-	-	-	-	-	1	6	1	-	-	-	2
	NK Fortius	2	3	1	1	3	10	-	-	-	-	-	3	-	-	-	-	-	1
	KWS 1393	5	-	2	1	3	7	1	-	-	-	-	-	1	-	-	-	-	2
	NK CISKO	4	-	2	-	-	9	-	-	-	-	-	1	1	-	-	-	-	-
28-VII	**TOTAL**	**15**	**3**	**6**	**5**	**14**	**39**	**1**	-	-	-	**-**	**5**	**8**	**1**	**-**	**-**	**-**	5
	PR36D79	1	-	1	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	NK Fortius	1	-	2	-	-	1	-	-	-	-	1	-	-	-	-	-	-	-
	KWS 1393	2	-	1	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
	NK CISKO	-	-	1	2	-	-	-	-	-	-	-	-	-	-	-	-	-	1
11 VIII	**TOTAL**	**4**	**-**	**5**	**3**	**-**	**1**	-	-	-	-	2	-	-	-	-	-	-	1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
	PR36D79	1	-	1	1	1	2	-	-	-	-	-	-	-	-	2	-	-	2
	NK Fortius	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
	KWS 1393	-	-	1	-	-	-	-	-	-	-	-	-	-	-	3	1	-	-
	NK CISKO	1	-	1	1	-	-	-	-	-	-	1	-	-	-	1	-	-	-
25-VIII	**TOTAL**	**5**	**-**	**3**	**2**	**1**	**2**	-	-	-	-	1	-	-	-	6	1	-	3
	PR36D79	1	1	2	-	1	-	1	-	-	-	3	-	-	-	2	1	-	-
	NK Fortius	2	1	3	-	2	-	-	-	-	-	3	-	-	-	2	-	1	-
	KWS 1393	3	-	1	-	1	-	-	-	-	-	1	-	-	-	2	-	-	1
	NK CISKO	1	-	-	1	1	-	-	-	-	-	1	-	-	-	1	-	-	2
7-IX	**TOTAL**	**7**	**2**	**6**	**1**	**5**	**-**	**1**	**-**	**-**	**-**	8	-	-	-	7	1	1	3