STUDY ON THE EVOLUTION OF THE COLEOPTERA IN THE ALFALFA CROP IN THE SAG - TIMIŞ

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***Abstract*:** *The Sag town, village resident of the same name, is located in the south-west of Timis county, at a distance of about 12 km from Timisoara. From entomofauna feature alfalfa crops, the order Coleoptera is best represented, with the largest share. Investigated area was made up of five pieces of a 100 m^2 plot (25 x 4m) arranged in series next to one another; and samples were collected periodically with an entomological net. Study the evolution of the beetles in alfalfa crops undertaken in this work made contributions to knowledge through original research of the entomofauna harmful and useful beetles of the alfalfa crops in the west of the country - the Banat Plain. At the end of these studies, it was found that in terms of coleopteran pests, the most abundant were shown to be species belonging to the family Curculionidae. During the period studied, a high abundance showed a species Sitona, Apion, Phytonomus and Phytodecta subcoccinella.*

Keywords: *evolution, beetles, alfalfa pests*

INTRODUCTION

Lucerne is an exceptionally important forage crop in terms of both productivity and nutritive value, being one of the most prized fodder plants. Because of this, the crop protection of alfalfa is an objective for the researchs of entomology. [3,5].

Lucerne has high requirements with ground, and in this context, the Western Plain is an area with average favorability (reddish-brown soil zone) for this crop. [2].

The main pests that occur in a culture of alfalfa are: aphids (*Aphis medicaginis* and *Acyrthosiphon pisum*); alfalfa bug (*Adelphocoris lineolatus*); Field bug (*Lygus pratensis*); alfalfa weevils specific (*Hypera variabilis, Sitona sp., Otiorrhyncus ligustica*); ladybugs of the alfalfa (*Subcoccinella 24 points, Phytodecta fornicata*) [1,6,8]. From entomofauna feature alfalfa crops, the order Coleoptera is best represented, with the largest share.

Study on the species composition is a mandatory step and prior to study biology and ecology of insect pests

MATERIALS AND METHOD

Researched area administratively belongs to the cadastral territory of the commune Sag. Researched area falls in the Western Plain, the eastern section of the Pannonian Great Depression. The area under study falls in moderate continental climate, at the interference of the provincial climate with Mediterranean influence and the province with oceanic influences.

Development of the harmful entomofauna studies were performed in a culture of alfalfa in the third year of vegetation, considered to be stronger infested by various species of beetles. These investigations were conducted from April to July of the years 2011-2014.

Table 1

Monthly average temperatures recorded at the meteorological station in Timişoara period 2010 – 2014

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual average
2010	-0,3	2,80	6,70	12,0	16,60	20,40	23,1	22,40	17,00	9,1	9,0	0,6	**11,61**
2011	-0,7	-1,0	6,20	12,70	16,60	21,30	22,5	22,90	20,20	10,0	2,5	3,5	**11,39**
2012	0,7	-5,2	7,00	**13,20**	**17,10**	**22,60**	**25,30**	23,30	19,30	12,00	8	-0,2	**11,92**
2013	1,13	3,83	5,27	**13,46**	**14,22**	**20,30**	**23,23**	20,87	16,15	12,15	0,04	-0,37	**10,85**
2014	2,96	5,73	9,15	12,51	15,97	18,96	21,62	21,32	17,43	12,42	8,60	0,8	**12,28**

Table 2

Monthly amounts of precipitation in the period 2010-2014

Year	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Amount of precipitation
2010	64.7	76.5	32.9	56.6	118	131.3	25	81.8	40.5	40	48.1	74.6	**65.83**
2011	23.3	28.9	30.9	21.9	67.3	20.8	107.9	1.3	11.7	33	0.2	34.7	**31,82**
2012	50.6	54.3	4.6	72.4	55	57.1	89	6.4	17.1	69.4	19.2	57	**46,00**
2013	58.6	103.6	228.8	76.2	32.8	61.6	64.8	32.8	68	65.4	73.5	2	**72,34**
2014	28.0	24.0	52	104	168	176	95.49	32,78	63.24	84.07	26.50	42	**74,67**

To determine the insects collected were used entomological determinations of the pests [4,5,7].

To calculate the abundance of beetles pests and crop alfalfa useful to use formula (1):

$$A = (n/N) \times 100 \quad (1)$$

where: n = number of individuals of a species from total specimens of evidence;

N = total number of individuals in a sample.

The abundance of species of beetles pests was calculated in between April - July 2011 - 2014, in percent. For the calculation of the average density of the pests coleopteran, and useful in the culture of alfalfa using formula (2):

$$D = (N/S) \times 100 \quad (2)$$

where n = number of individuals of a species in a sample;

S = area of plots (100 m^2).

RESULTS AND DISCUSSIONS:

Following research on the family composition of species of insects of the order Coleoptera, in the period 2011-2014, according to data represented in Figure 1, showed that most represented was family *Curculionidae* (55.92%), followed by the family *Coccinellidae* (32.06%) and the least of the family *Chrysomelidae* (12.02%).

Considering the plotting from Figure 4 shows that in 2012 were collected from alfalfa under study most insects (30%) and in 2013 the lowest percentage (19%), explained by the fact that in the period from April to July of 2012 recorded higher temperatures and less precipitation amount compared to the months from April to July of 2013, when the average temperature was lower and much higher precipitation amount (Figure 2 and 3).

In 2014 (April to July), beetles in alfalfa were the families *Curculionidae* (57.48%), *Coccinellidae* (34.65%) and *Chrysomelidae* (7.87%) (Table 3 and Figure 1).

The year 2011, a year characterized as being warm, with average annual 11,39 (Table 1) and dry (Table 2), in the period from April to July were collected 54,55% *Curculionidae*, 33,76% *Coccinelidae* and 11,69% *Crysomelidae* (Table 3 and Figure 1).

As regards the representation of the proportion of harmful and useful pests collected from alfalfa Sag , throughout the period studied (2011 - 2014), it was found that in 2012, harmful pests were represented in 30%, and the useful in equal proportion (Figure 5), because there were made a year before treatment plant.

But in 2013, these percentages were modified: 19,55% harmful pests and 15,6% of useful insects (Figure 5). Treatments performed are required to maintain pest populations below a certain level, but it takes their sound implementation given the negative effect that they have on populations of useful insects.

Of the pests alfalfa crop in Table 3 is observed that during the period from April to July of the genus predominated *Sitona sp., Apion sp., Hyper variabilis* and *Phytodecta fornicata*.

During the last four years, the genus was represented Sitona 40%, such as *Apion* in a proportion of 23%, and the like *Hypera variabilis* about 20% (Figure 6).

Table 3

The Structure on family of the species of beetles in the alfalfa crop, in the period 2011 – 2014

Family	Specie	2011	2012	2013	2014
Curculionidae	*Sitona sp.*	34	38	20	33
	Otiorrhynchus ligustici	10	12	10	15
	Hypera variabilis	22	25	10	8
	Apion sp.	18	20	15	17
Coccinelidae	*Subcoccinela 24 punctata*	17	15	15	20
	Coccinela sp.	15	10	5	7
	Chilocorus sp.	5	7	4	4
	Tytthaspis sp.	7	5	6	5
	Hypodamia sp.	4	7	1	3
	Propylea sp.	4	4	1	5
Chrysomelidae	*Phytodecta fornicata*	18	22	16	10

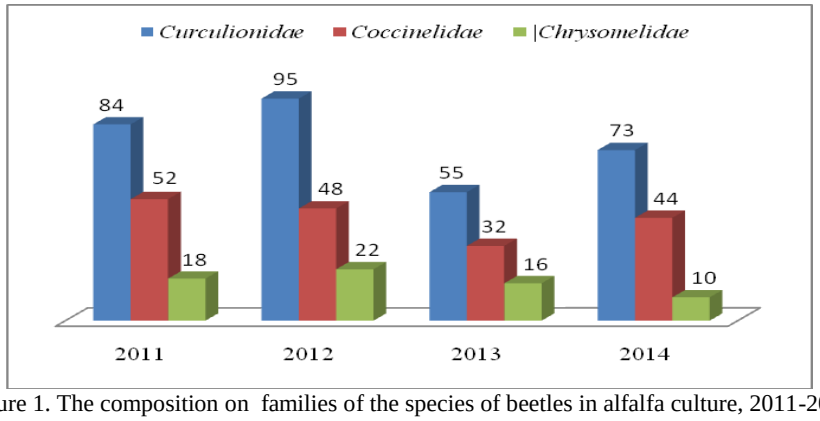

Figure 1. The composition on families of the species of beetles in alfalfa culture, 2011-2014

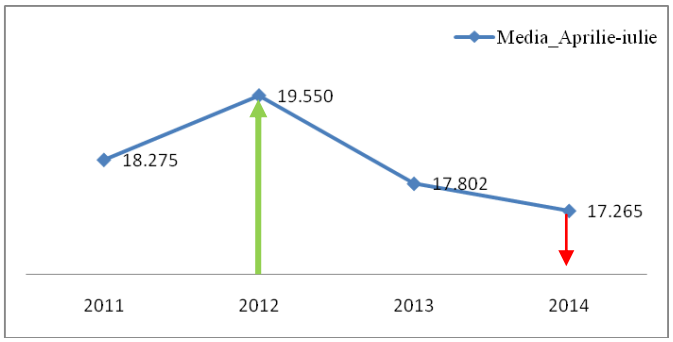

Figure 2. Average temperatures in April and July of the years 2011-2014

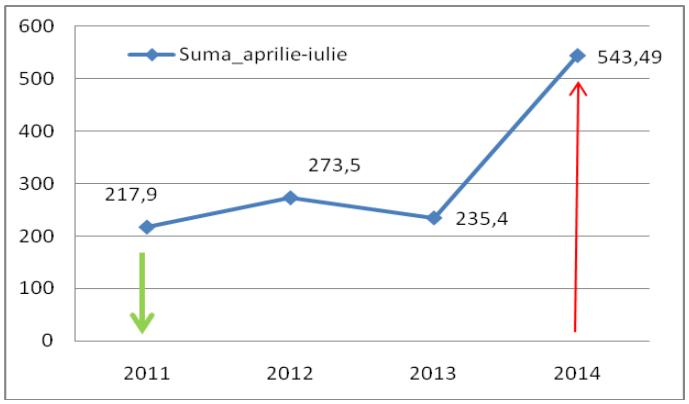

Figure 3. Amount of precipitation for the months April to July, the years 2011 to 2014

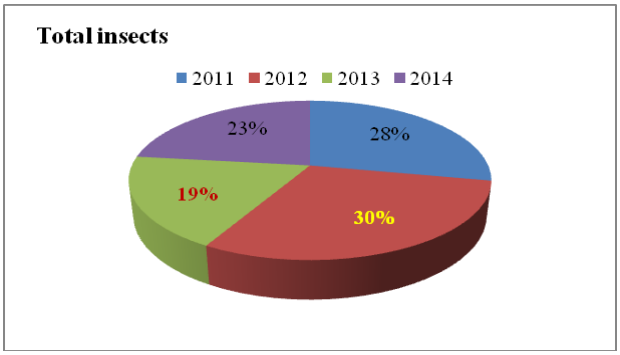

Figure 4. Evolution of entomofauna in 2011-2014

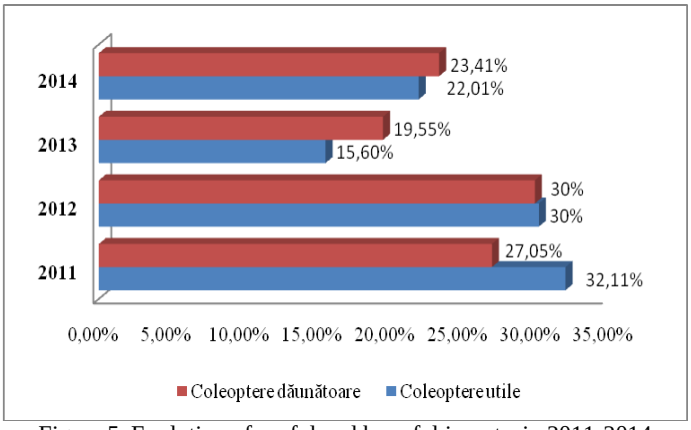

Figure 5. Evolution of useful and harmful insects, in 2011-2014

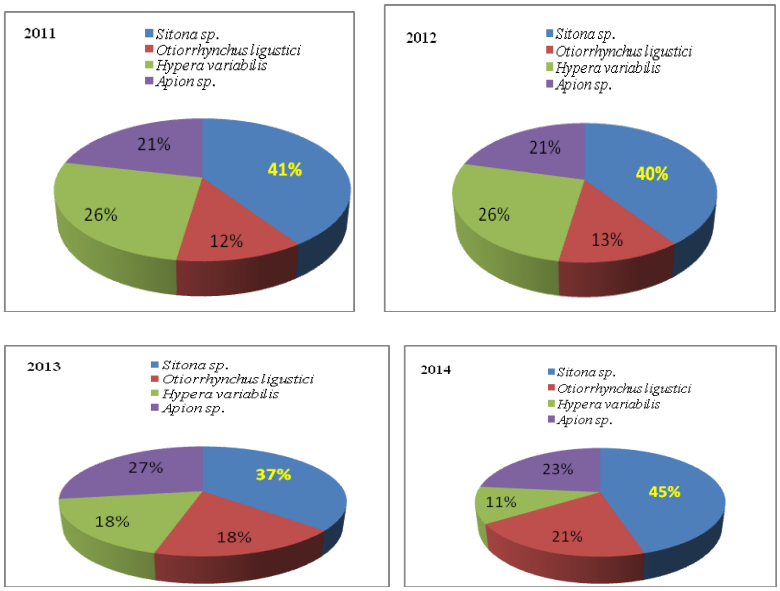

Figure 6. The composition in species the family *Curculionidae* in the alfalfa crop, in the period 2011 - 2014

CONCLUSIONS

Given alfalfa crop, from Sag, Timis County, was found a entomofauna varied of Coleoptera.

Among the harmful insects were most abundant species belonging to the families *Curculionidae*, *Chrysomelidae* and *Coccinellidae*.

In the period studied showed a high abundance in a species *Sitona* genre, *Apion* and *Phytonomus* and the species in the genus *Phytodecta* and *Subcoccinella*.

Some useful insects, the most abundant species were: *Coccinella septempunctata* of 50%, followed by species *Thytaspis* in the procente of 26%.

Examining changes in mean abundance and mean density of species of insects found in alfalfa crop on farm Sag found that the species most common and economically important, do what part the and the specie *Phytodecta fornicata*.

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