

ORIGINAL PAPERS

ENTOMOPHAGE DYNAMICS ON NECTARIFEROUS PLANTS AND TOMATO-CROPS

Pantelei Vition

Key words: *entomophages, predatory, nectar plants, ecosystem, phytocenotic, species*

INTRODUCTION

The role of entomophages (parasites, predators) and functional biocenotic importance in terrestrial ecosystems consists in phytophage population density regulation. Formation of the beneficial entomofauna complex to a large measure depends and on cultivars [4].

One of the main factors both for maintaining at a high level the productivity of agricultural crops, and in pest population density regulation is the biological methods for plant protection with the help of natural entomophages [5].

The main crop pest on tomato plants in last years became tomato fruitworm (*Heliothis armigera* Hbn.), which causes large economical injuries yearly. Besides and aphid colonis are came across (*Maerosiphum eupherbiae* Thom.), which are more numerous during the first half of summer season.

The aim of present investigations was concentrated at the influence of the nectariferous plants, both as microrezervation for nutrition and attractively, and as special spreading of natural entomophages from the strips of nectariferous plants cultivated in the tomato agrobiocenosis.

MATERIAL AND METHODS

As a material for investigations some species of beneficial insects of (*Chrysopidae*, *Syrphidae*, *Tachindae*, and *Cantaridae*) families, which occur on nectariferous plants (*Anethum graveolens*, *Coriandrum sativum*, *Foeniculum vulgare*) and tomato culture. Investigations were carried out during 2011-2014 years in Central Zone (forest – steppe) of the Republic of Moldova in the tomato agrocenosis, which were sowed with strips of nectariferous plants a (c. Bacioi, SRL AGROBRIO and on experimental fields of the IGFPP of the ASM). Accounts were carried out and in adjacent strips to tomato field, cultivated with nectariferous plants of Apiaceae (*Anethum graveolens*, *Coriandrum sativum*, *Foeniculum vulgare*). During investigations the following methods were used. Thread method [2] of square area- entomophage number attributed to an area unit, method for accounting entomophages from 4 parcels by 25 plants [3]. Visual method [4].

Monitoring of the parasite entomophages was also carried out with the help of colored yellow traps. Taxonomic identification of the faunistic material were provided under the laboratory conditions. The quantitative account of the percentage relationship of entomophages was calculated proceeding from the total member of the captured insects in the bag, but the quality index – by species number in the whole composition of entomophages [1, 3]

RESULTS AND DISCUSSION

Investigations carried out on plants of nectariferous species (*Anethum graveolens*, *Coriandrum sativum*, *Foeniculum vulgare*) of some groups taxonomic of predator entomophages have observed presence of the following families: (*Chrysopidae*, *Syrphidae*, *Cantaridae*,) and among the parasite entomophages – fam. *Tachindae*). It was established that on (*Anethum graveolens*), crop the inflorescent phase began at first decade of July and lasted tile first decade of August, and on culture (*Coriandrum sativum*) – since second decade of July till the first half of august 2014 (Table 1).

Table 1. Taxonomic composition of the entomophage species depistated in the strips with nectariferous species (*Anethum graveolens*, *Coriandrum sativum*), adjacent to the tomato field

Taxonomic groups	<i>Anethum graveolens</i> (%)	<i>Coriandrum sativum</i> (%)
Fam. Chrysopidae	17	25
<i>Chrysopa carnea</i> Steph.	+	+
<i>Chrysopa perla</i> L.	+	+
<i>Chrysopa formosa</i> Br.	-	+
Fam. Syrphidae	42	34
<i>Sphaerophoria scripta</i> L.	+	+
<i>Syrphus ribesii</i> L.	+	+
<i>Syrphus corollae</i> F.	+	+
<i>Paragus tibialis</i> Fallen	+	+
<i>Epistrophe balteata</i> F.	+	-
Fam. Tachindae	25	17
<i>Compsylura consinnata</i> Mg.- Ichn.	+	+
<i>Tachina grossa</i> Lim.	+	+
<i>Tachina larvarum</i> L.	+	-
Fam. Cantaridae	9	9
<i>Cantaharis lateralis</i> L.	+	+

It was stated, that on nectariferous species (*Anethum graveolens*) an important number of entomophages (42%) of *Syrphidae* and *Tachindae* (25%) families was depistated. On strip with (*Coriandrum sativum*) were depistated ca 59% of entomophages, which belong to *Syrphidae* and *Chrysopidae* families. In the agroecosystem of tomato field it was stated, that *Chrysopa carnea* (fam. *Chrysopidae*) is the edificator species. During the vegetation period entomophage species *Syrphus corollae*, *Epistrophe balteata*, were found, (*Syrphidae*,) at second half of summer species *Sphaerophoria scripta* being added. It was demonstrated, that in period of July-August months species *Syrphus ribesii* is dominated. At the same time it was stated that fam. *Tachindae* is represented by species *Compsylura consinnata* and *Tachina larvarum* (Fig. 1).

Of diagram it can be revealed, that on dill culture at inflorescent stage the predominant insects were *Tachindae* - 44,4%, *Coccinellidae* - 33,3%, *Syrphidae* - 22,0%. On coriander plants at this period were found *Syrphidae* - 40%, *Coccinellidae* - 20 %, *Tachindae* - 40%. In tomato agroecosystem were *Tachindae* - 50%, *Syrphidae* - 25%, *Coccinellidae* - 25% (Table 2).

From this is clear, that maximum dynamics curve of some natural entomophages in nectariferous plants strips was registered at inflorescence stage. So for *Tachindae* 6,9%, *Syrphidae* 12,8%, *Chrysopidae* 15,8% and *Cantaridae* 5,6%. Simultaneously, in tomato field agroecosystem at a distance of 50 m from nectariferous plants strips the following number of insects was registered: *Tachindae* 4,6%, at 100m distance -2,6%, 200m-1,9% and at 300 m distance-1,0%. At the distance of 50 m in the tomato field from nectariferous cultures *Syrphidae* - 7,9%, 100m- 4,9%, 200 m, - 3,6%, and at 300m distance - 1,3% were registered. The dynamics of entomophage species of *Chrysopidae* family in agroecosystem of tomato field at a distance of 50m from nectariferous plants strips was found to be 12,8%, at 100 m - 7,9% at 200 m - 9,4%, and at the distance of 300m - 1,98%. Entomophage species of *Cantaridae* family on tomato field at a distance of 50m of nectariferous plants strips the following quantity was found to be 2,3%, at 100 m - 1,6%, at 200 m - 1,0% and at 300 m distance - 0,3%. Because of increasing entomophage number, the aphid colonies on tomato field were reduced from 47% to 16% (Table 3).

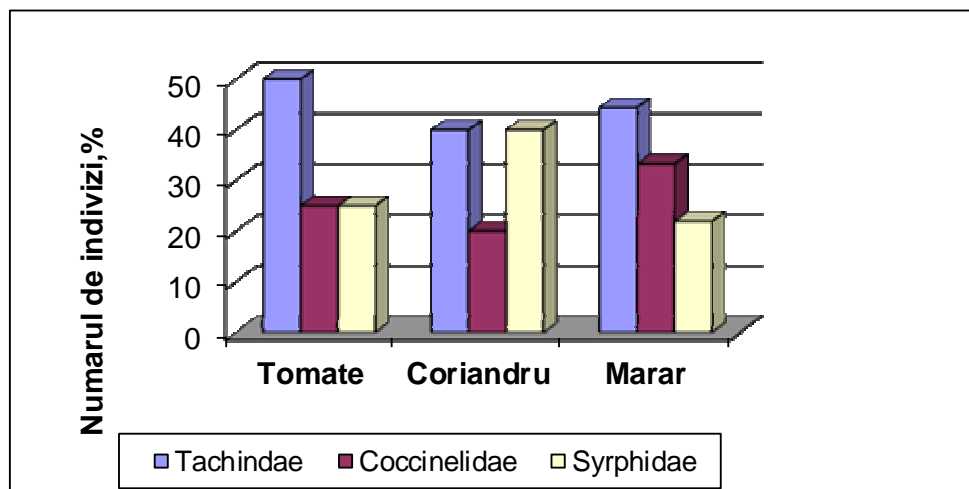


Fig. 1. Actual number of entomophages in nectariferous plants strips and on tomato field.

Table 2. Dynamics and spreading radius of entomophages in nectariferous plants strips to agroecosystem of tomato field

Entomophage taxonomic groups	On nectariferous plants strips at inflorescence stage, (%)	Distance of 50 m from nectariferous plants (%)	Distance of 100 m from nectariferous plants (%)	Distance of 200 m from nectariferous plants (%)	Distance of 300 m from nectariferous plants (%)
<i>Chrysopidae</i>	15,8	10,8	7,2	4,6	1,98
<i>Syrphidae</i>	12,8	7,9	4,9	3,6	1,3
<i>Tachindae</i>	6,9	4,6	2,6	1,9%	1,0
<i>Cantaridae</i>	5,6	2,3	1,6	0,9	0,3

Table 3. Ratio between *Aphidoidea* pests and entomophage groups on tomato field in dependence on distance from nectariferous species strips

Taxonomic groups	Distance of 100 m (%)	Distance of 200 m (%)	Distance of 300 m (%)
Pests of <i>Aphidoidea</i> family	17,0	36,0%	47,0%
Entomophages of <i>Chrysopidae</i> <i>Syrphidae</i> , <i>Coccinellidae</i> families	57,0	25,0%	18,0%

CONCLUSIONS

For zooimprovement and nutrition of entomophages the strips of nectariferous plants and aromatic are sowed with rows of 50cm and at interval between rows of 100m or as a band with a width of 1m in the vegetable fields.

Due to biological efficiency of Aphidiidae and predator entomophages of (*Syrphidae*), (*Coccinellidae*), (*Chrysopidae*), families. *Nabidae*, *Anthocoridae*, *Orius niger* Wolff, *Miridae*, and (*Aranei*), (*Lycosidae*), (*Araneidae*), families, which from May to August have reduced the aphid colonies on tomatoes from 47% to 16%.

The phenotological observations carried out have stated, that maximal dynamics of the entomophage majority was registered on nectariferous plants at the inflorescence stage during 15 – 17 days on dill, coriander 12-14, fenhel – 8-10 days.

ABSTRACT

Cultivation of entomozones, microreservations with nectariferous and aromatic plants which contain in their pollen glucides and extrafloral nectar in adjacency with agroecosystems of annual agricultural crops and enoses of perennial plantations increases biological reproduction of entomophages by 3-5 times, and longevity in case of minimal quantities of food.

REFERENCES

1. MEINANDER M. 1962 - The Neuroptera and Neuroptera of Eastern Fennoscandia. Fauna Fennica Helsinki, v 13. P.1-96;

2. TJEDER B. Neuroptera, 1966.– Planiptnnia, The lacewings of Sonther Africa, 5 family Chrysopidae, South African, Animal Life Uppsala, p. 228-534;
3. COSTAMAGNA C., ALEJANDRE, LANDIS A, DOUGLAS, 2006 - Predators exert top – down control of soybean aphid across a gradient of agricultural management systems. Ecological Applications, 16, (4). p. 16 – 28;
4. VITION P., 2014 - Rolul culturilor de câmp furagere și nectarifere în dinamica entomofagilor Ministerul Agriculturii și Industriei Alimentare al Republicii Moldova Academia de Științe a Moldovei Institutul de Cercetări pentru Culturile de Câmp “ Selecția” Materialele Conferinței Științifice-practice consacrate aniversării a 70-a a fondării I.C.C.C. “ Selecția” Rezultatele și perspectivele cercetărilor la cultura plantelor de câmp Bălți, 20 iunie 2014 Chișinău, 2014. p. 354–459;
5. ВИТИОН П., 2014 - Сукцессия энтомофагов в нектараносных и овощных культур. Защита растений и экологическая устойчивость агробиоценозов. Материалы Международной научной конференции. г. Алматы, Стр. 51-53.

AUTHOR' S ADDRESS

VITION PANTELEI - The Institute of Genetics, Physiology and Plant Protection of the ASM Republic of Moldova, e-mail: vitionpantelei@yahoo.com