

**FORMING STRUCTURE OF THE HARMFULL ENTOMOCOMPLEX OF  
AGROCENOSSES SOYBEAN IN NORTHERN STEPPE OF UKRAINE**

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Refined diversity of insects species of soybeans in the northern steppe of Ukraine. Found 39 species of herbivores from 15 families and one species of spider mites. The peculiarities of formation of entomological complex in periods of soybean developing.

*Key words: soybean, phytophag, entomocomplex, vegetationIntroduction.*

Increases in production of soybean seeds is impossible without improving crop protection system from the group of pests based on biocenotical principle. This, above all, is possible when thorough study of the species of harmful entomocomplex soy agroecosis ,population dynamics, ecological and biological features, biocenotical links in this agroecosystem takes place, allowing rational to decide the optimal stabilization of the phytosanitary condition of sowing.

Harmful entomocomplex of soybean is almost formed. But its agrobiocenoses like an annual crop, is fragile and depends on various factors. Entomocomplex of the culture, despite the short existence of agrobiocenoses (70-120 days) compared with other crops, characterized by a significant diversity of species composition [1].

Extensive information about the species composition of soy agroecosis was described in the works of Hrykun O.A. [2, 3]. However, under the influence of intensive agricultural production arising profound change in the overall diversity agroecosis. Between species are new ratio, tunable food chains and there appear adaptations for existence in a modified environment [4]. Therefore, investigation

of adverse entomological complex in modern agrocenoses for ecological protection of plants and the environment becomes particular relevance.

The aim of our researches was studying of the species composition of herbivores and harmful entomological complex of soy agrocenosis in the conditions of northern steppes of Ukraine.

**Research methodology.** Accounting of insects and plants observation carried on soybean sowings in "Soy age" (Kirovograd region) during 2010-2012 years. The researches were conducted according to the conventional methods with using of soil excavation, mowing with entomological nets, as well as visual inspection of plants [5, 6, 7]. Formation of pests conducted based on the method of biological control (morphological analysis of plants) and interpreted for use in plant protection [8, 9]. Determination of taxonomic affiliation insects performed using determinants and insect collections of the Institute of Plant Protection NAASU and with the participation of the specialists of the Institute of Zoology of the National Ukrainian Academy of Sciences [10, 11,12].

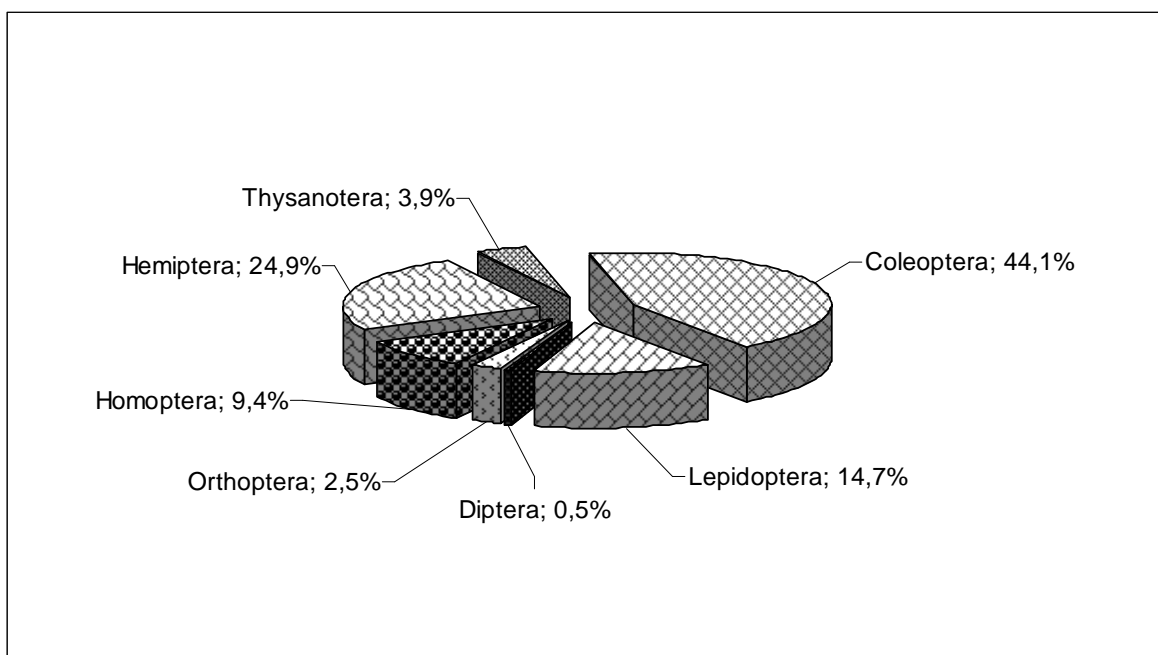
**Studies.**As a result of monitoring of entomocenosis in the northern steppes of Ukraine on soybean sowings found 39 species of insect pests with 7 rows and 15 families and one species of mites, which to some extent can damage soybeans (Table 1).

**Species composition of the herbivores in agrocenoses of soybean in northern steppes of Ukraine ("Soy age" Kirovograd region., 2010-2012)**

Families	Species	Frequency appears
<i>Orthoptera</i>		
<i>Tettigoniidae</i>	<i>Tettigonia viridissima</i> L.	P
	<i>Decticus verrucivorus</i> L.	P
<i>Acrididae</i>	<i>Calliptamus italicus</i> L.	R
<i>Homoptera</i>		
<i>Cicadine</i>	<i>Empoasca pteridis</i> Dheb.	P
	<i>Psammotettix striatus</i> L.	R
<i>Hemiptera</i>		
<i>Miridae</i>	<i>Lygus pratensis</i> L.	D
	<i>Lygus rugulipennis</i> Popp.	D

	<i>Adelphocoris lineolatus</i> L.	R
<i>Pentatomidae</i>	<i>Carpocoris fuscispinus</i> Boh.	P
	<i>Piezodorus lituratus</i> F.	R
	<i>Dolycoris baccarum</i> L.	R
	<i>Palomena viridissima</i> Poda.	R
<i>Thysanoptera</i>		
<i>Thripidae</i>	<i>Thrips tabaci</i> Lind.	Sd
	<i>Haplothrips niger</i> Osborn.	R
	<i>Odontothrips phaleratus</i> Haliday.	R
	<i>Odontothrips intermedius</i> Uzel.	P
<i>Coleoptera</i>		
<i>Elateridae</i>	<i>Agriotes sputator</i> L.	P
	<i>Agriotes gurgistanus</i> Fald.	P
	<i>Selatosomus latus</i> F.	P
	<i>Agriotes obscurus</i> L.	R
<i>Curculionidae</i>	<i>Sitona crinitus</i> Hrbst.	D
	<i>Sitona lineatus</i> L.	D
	<i>Sitona humeralis</i> Steph.	D
	<i>Tanymecus palliatus</i> F.	P
	<i>Psalidium maxillosum</i> F.	P
	<i>Otiorrhynchus ligustici</i> L.	R
<i>Scarabaeidae</i>	<i>Melolontha melolontha</i> L.	P
<i>Tenebrionidae</i>	<i>Opatrum sabulosum</i> L.	P
	<i>Anisoplia austriaca</i> Hrbst.	R
<i>Lepidoptera</i>		
<i>Noctuidae</i>	<i>Autographa-gamma</i> L.	Sd
	<i>Amathes C-nigrum</i> L.	P
	<i>Agrotis (Scotia) segetum</i> Schiff.	P
	<i>Scotia exclamationis</i> L.	P
	<i>Scotia ipsilon</i> Hfn.	P
<i>Phycitidae</i>	<i>Etiella zinckenella</i> Tr.	Sd
<i>Pyraustidae</i>	<i>Ostrinia nubilalis</i> Hb.	P
	<i>Pyrausta sticticalis</i> L.	P
<i>Tortricidae</i>	<i>Archips podana</i> Scop.	P
<i>Diptera</i>		
<i>Anthomyidae</i>	<i>Delia platura</i> Mg.	P

Note: D - dominant (more than 5% of the total), Sd - subdominant (2 - 5%), P - permanent (0.5-2%), R - rare (less than 0.5%).



**Fig. 1. Taxonomic structure of harmful entomological complex of soybean in Northern Steppe of Ukraine ("Soy age" Kirovograd region., 2010-2012)**

In systematic relation the largest number of harmful species belongs to the number of beetles *Coleoptera* - 44,1% and *Hemiptera* - 24,9% of the total number of insect-herbivores (Fig. 1). Slightly smaller than the largest number of species appeared *Lepidoptera* - 14,7%. Less numerous are the representatives of a number of *Homoptera* - 9,4%, *Thysanoptera* - 3,9% and *Orthoptera* - 2,5%. In small quantities recorded representatives of the family of *Diptera*, representing 0,5% of the population (Fig. 1).

In soybean plants, as in other crops allocate 12 stages of organogenesis and each of them formed a certain element of plant productivity. Analysis of aggregate dynamics of herbivores and monitoring after plant phenology helped to reveal complex types of harmful insects, related to certain stages of organogenesis of the culture. Changing of the number of herbivores during ontogeny allowed to separate two critical periods of development of plants with inherent specific stable complex types of pests: flowering and formation of beans (Table 2).

№	The phase of plant growth	Species
1.	Stairs	<i>Delia platura</i> Mg., <i>Melolontha Melolontha</i> L., <i>Sitona</i> spp., <i>Agriotes</i> spp.
2.	2-3 true leaves	<i>Agriotes</i> spp., <i>Sitona</i> spp., thrips
3.	Budding	<i>Sitona</i> spp., thrips, <i>Etiella zinckenella</i> Tg., <i>Lygus</i> spp., <i>Tetranychus urticae</i> K.
4.	Flowering	Thrips, <i>Etiella zinckenella</i> Tg., <i>Lygus</i> spp., <i>Tetranychus urticae</i> K.
5.	Formation of beans	<i>Etiella zinckenella</i> Tg., <i>Lygus</i> spp., <i>Tetranychus urticae</i> K.
6.	The seeds poured	<i>Etiella zinckenella</i> Tg., <i>Lygus</i> spp., <i>Tetranychus urticae</i> K.

**Table 2. Formation of harmful entomological complex of soybean depending on the phase of plant growth and development**

Thus, during the phase of stairs and 2-3 true leaves was found the larvae *Delia platura* Mg., *Melolontha Melolontha* L., *Sitona crinitus* Hrbst. and *Sitona lineatus* L. Thrips: *Thrips tabaci* Lind. and *Odontothrips intermedius* Uzel. Among soil munching herbivores: *Agriotes sputator* L., *Agriotes gurgistanus* Fald., *Agriotes lineatus* F. and *Scotia segetum* Schiff. and *Scotia exclamationis* L.

Second period - budding - flowering is characterized by increased of vegetative mass of the culture and forming the first beans. Entomocomplex of soybeans in this period adding new types of herbivores. Noted the appearance of rare species of *Etiella zinckenella* Tg. and *Tetranychus urticae* K. Appears larger number of species of weevils - *Sitona humeralis* Steph., *Psolidium maxillosum* L. There is increasing of varieties of family Hemiptera: *Miridae*, *Pentatomidae* - *Lygus pratensis* L., *Lygus rugulipennis* Popp., *Carpocoris fuscispinus* Boh. and *Palomena viridissima* Poda.

During the formation of beans - the seeds poured it is observed saturation as most species and quantitative variety of entomocomplex. Most in this period harms *Etiella zinckenella* Tg. and *Tetranychus urticae* K.

**Conclusions.** In the central steppes of Ukraine in soybean sowings were found 39 species of insect herbivores with 7 rows and 15 families and one species of mite. The highest species diversity was characterized by a number of *Coleoptera*, species which share in the structure of the harmful entomological complex constituted 44,1% of all, the least - a number of *Diptera* (0,5%). Each species is adapted to a certain stage of organogenesis culture. Established two critical periods of plant development, which are associated with the most dangerous types of herbivores: flowering and formation of beans.

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## **ОСОБЛИВОСТІ ФОРМУВАННЯ СТРУКТУРИ ШКІДЛИВОЇ ЕНТОМОФАУНИ АГРОЦЕНОЗУ СОЇ У ПІВНІЧНОМУ СТЕПУ УКРАЇНИ**

*М.П. Секун, В.В. Березовська - Бригас*

Уточнено видову різноманітність комах на посівах сої в Північному Степу України. Виявлено 39 видів фітофагів з 15 родин і один вид павутинного кліща. Встановлено особливості формування ентомокомплексу у періоди розвитку сої.

*Ключові слова: соя, фітофаг, ентомофауна, вегетація*

## **ОСОБЕННОСТИ ФОРМИРОВАНИЯ СТРУКТУРЫ ВРЕДНОСНОЙ ЭНТОМОФАУНЫ АГРОЦЕНОЗА СОИ В СЕВЕРНОЙ СТЕПИ УКРАИНЫ**

*Н.П. Секун, В.В. Березовская-Бригас*

Уточнено видовое разнообразие насекомых на посевах сои в Северной Степи Украины. Обнаружено 39 видов фитофагов, которые относятся к 15 семействам и один вид обычного паутинного клеща. Установлены особенности формирования энтомокомплекса в периоды развития сои.

***Ключевые слова:*** соя, фитофаг, энтомофауна, вегетация