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ENTOMOFAUNA OF CENTAUREA SP. AND THEIR ECONOMIC IMPORTANCE

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Abstract

PERJU,T.,I.MOLDOVAN, 1991, Entomofauna of Centaurea sp. and their economic importance. Not.Bot.Hort.Agrobot. Cluj-Napoca, XX-XXI,45-53.The different species of Centaurea are host to numerous insects; among the most important some are pollinating(Apis melifica L.) leut the most of them are phytophagous(Larinus obtusus Gyll., Agonopterix liturella Den.et Schiff.,Chaetorellia jaceae R.D.,Urophora quadrifasciata Meig.) and others are zoophagous(Exeristes roborator F. and Zeuxie cinerea Meig.). The plant root is harmed by the larvae of Pelochrista medulana Stgr., the stalk is mined by the caterpillars of Agonopterix liturella Den.et Schiff., and the flowers and seeds are destroyed by the larvae of Larinus obtusus Gyll.,Eucosoma hohenwartiana Den.et Schiff.,E.aemulana Schläg.,Chaetorellia jaceae R.D. and Urophora quadrifasciata Meig. Due to the population density and to the caused damages, the species Agonopterix liturella Den.et Schiff.,Larinus obtusus Gyll.,Chaetorellia jaceae R.D. and Urophora quadrifasciata Meig., are these who present a practical importance as agents of biological control of the knapweed species, especially Centaurea phrygia. On the whole, considering the seed losses caused only by the seed weevil(Larinus obtusus Gyll.) and by tephritids flies of the knapweed seeds(Chaetorellia sp. and Urophora sp.) these are estimated to 50-60 %.

Key words: Centaurea entomofauna fitofagous, biological control.

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1. Centaurea sp. and their role in the agroecosystems

Centaurea sp. of our country are generally perennial plants, but also annual ones, spread in all the region. Among them, we notice: C.cyanus, C.scabiosa and C.spinulosa, dispersed in cereal cultures and C.phrigia, C.jacea, C.melanocalathia, C.micranthos, C.nigrescens and C.trinervia, dispersed on pastures. The complex of Centaurea was the object of a detailed botanical study, materialized in a "Monograph of Romanian

Centaurea" (PRODAN,1939). Other more recent researches provide explanations concerning the systematic position of some species, subspecies and their synonims belonging to this large genus(MULLER and col.,1989).

2. The Host plant - phytophagous relation

With regard to the relation between the host-plant and its phytophagous organisms, these species haves lately been worldwidely and well studied, essentially those reffering to the Curculionids(Larinus sp.), the butterflies(Agapeta zoegana, Metzneria paucipunctella) and tefritid flies(Urophora sp.) (ENGLERT,1971;GASSMAN and col.,1982;GROPPE and col.,1988;HARRIS 1980;KALTENBACH,1974;KAMENEVA and KORNEEV,1987;MULLER and col., 1983,1988;ROSE and FRASER,1978;SCHRODER,1985;SOBHIAN and PITTARA,1988;VOLOVIC,1989;ZWOLFER,1969;WATSON,1984)

In our country, too, the entomofauna of the knapweed has made the object of some research works, lately(PERJU,1986; PERJU and MOLDOVAN 1988,1989) especially those concerning the fauna of the tefritds(CEIANU,PERJU and col.,1988).

The research works concerning the fauna of Centaurea stirred up the interest of the entomologists in conjunction with the discovery of new means of their control, by having in some agroecosystems, as the cereal ones(Centaurea cyanus), or the natural grasslands(C.diffusa, C.maculosa, C.micranthos, C.phrigia), as problem weeds. The control of weeds in general, by unpolluting means, the biological ones - as well as those for insects and diseases - become of great up-to-dateness. In this respect through research works are undertaken all over the world, for the identification of phytophagous species which could be used in the biological control of the Centaurea diffuse and C.maculosa, speciesswhich are very harmful in the natural grasslands. Beside the numerous Centaurea species - the two abovo mentioned ones - are present in the flora of our country as well. Thence, our attention in treating this subject so important in practising an ecological agriculture.

3. Material and research methods

The research works were carried out along 1980 through 1990, mainly in 1988-1990, both in the Botanical Garden of the Agricultural Institute of Cluj-Napoca and Bucharest, and in field, in the natural grasslands of the districts Cluj, Bihor,

Sălaj and Constanţa. Insects from the plants were collected, affected organs were sampled and the infestant insects from stalks, roots, flowers and seeds were bred. The most samples reffer to the manual capture of the Coleoptera from the hibernating generation establishing the average number of collected insects the hour, different periods of time and the breeding of the insects from the affected organs, as well as infested by the larvae of different phytophagous species. The attacked leaves, as well as the ifested flowerheads were preserved in perforated paper bags or fine linen bags, in plastic boxes, covered with stainless sieve lid, and in case of need, they were preserved in a cold storage room, in order to maiintain a constant temperature and a favorable humidity for the development of the infestant stages, to take them out of the diapause. The insects brought in this way to their complet development - phytophagous and zoophagous species - have been separated and identified, and on the basis of the number of samples of each species at the average test of affected organs, appreciations have been made concerning the frequency and the intensity of the attack or of the parasitism degree forthe entomophagous species. The data served to appreciate too, the role which every species plays in the respective biocenosis, the economical importance these specie present.

3. Results obtained

3.1. Obtained results concerning the entomofauna of the Centaurea species.

The results of the undertaken research work concerning the entomofauna of the knapweed species are presented in the tables no. 1-2.

3.1.1. The entomofauna collected from plants distinguishes itself by some species of spittlbugs(Philenus spumarius), bugs(Carpocoris purpureipennis, Dolycoris baccarum, Palomena prasiana, Pentatoma rufipes, Sciocoris microphthalmus, Platyplax salviae), beetles(Cryptyrea funesta, Alophus triguttatus, Agapantia sp., Malachinus aeneus, Meligethes aeneus, Agriotes sp., Otiorrhynchus orbicularis, Tanymecus palliatus), butterflies(Pocris statices, Zygaena philipendule, Z.malilotti, Z.carniolica) and pollinating hymenopterous(Apis mellifera) Tab.1.

Tabl. 1

Insects species collected on the plants of Centaurea sp.

Nr.	Insects sp.	Family	Ord.
1.	Thrips sp.	Thripidae	Thysanoptera
2.	Aphis cardui L.	Aphididae	Homoptera
3.	Phylaenus spumarius L.	Aphrophoridae	"
4.	Oxycarenus pallens Wolf.	Lygaeidae	Heteroptera
5.	Platyplax salviae Schill.	"	"
6.	Carpocoris purpureipennis Deg.	Pentatomidae	"
7.	Sciocoris macrophthalmus Fl.	"	"
8.	Orius niger Wolf.	Anthocoridae	"
9.	Chlorophorus viridis Host.	Cerambycidae	Coleoptera
10.	Eassida atrata L.	Chrysomelidae	"
11.	Cryptocephalus aureolus Sffr.	"	"
12.	Eucomus ovulum Germ.	Scydmenidae	"
13.	Agriotes sp.	Elateridae	"
14.	Oxythyrea funesta Poda.	Scarabaeidae	"
15.	Alophus triguttatus F.	Curculionidae	"
16.	Otiorrhynchus orbicularis Hbst.	"	"
17.	Tanymecus paliatus L.	"	"
18.	Apis melifera L.	Apidae	Hymenoptera
19.	Zygaena carniolica L.	Zygaenidae	Lepidoptera
20.	Pocris statices L.	"	"
21.	Chaetorellia jaceae R.D.	Tephritidae	Diptera

3.1.2. The entomofauna obtained through cultures of attacked organs

The roots of the host plants are hermed by the larves of the lepidopterous: Pelochristus medulana Stg.; the stalks of the plants are mined by the larves of the lepidopterous: Agapeta zoegana L. and the leaves are eaten up by the larvae of some coleoptera species (Tanymecus paliatus, Otiorrhynchus sp.) and of lepidoptera (Coleophora conspiciuella Z., Agonopterix liturella Den.et Schiff.) and s.o. Table 2.

From the data presented in table no.2 there results that from the flowerheads of 15 knapweed species, collected at different locations and time, and which are in an incomplete ripeness stage, there have been obtained species that harm the flower and seeds; these belong to Thysanoptera, Coleoptera, Lepidoptera and Diptera(phytophagous) and Hymenoptera and Diptera(entomophagous) orders. Most of the obtained samples

Tabl. 2

Phytophagous insect species obtained from infested organs of Centaurea phrygia L.

Nr.	Insects sp.	Family	Ord.	Organ infested
1.	Thrips sp.	Thripidae	Thysanoptera	capitulum
2.	Larinus obtusus Gyll.	Curculionidae	Coleoptera	capitulum
3.	Coleophora conspicuella Z.	Coleophoridae	Lepidoptera	leaf
4.	Agonopteryx liturella Den.et Schiff.	Oecophoridae	"	leaf
5.	Aphelia viburniana F.	Tortricidae	"	leaf/capitulum
6.	Pelochrista medulana Stg.	"	"	roots
7.	Agapeta zoegana L.	Cochylidae	"	stalk
8.	Metzneria neuropterella L.	Gelechiidae	"	capitulum
9.	Eucosoma hohenwartiana Den.et Schiff,	Tortricidae	"	seed
10.	Eucosoma aemulana Schläg.	"	"	seed
11.	Eucosoma albidulana Schläg.	"	"	seed
12.	Eucosoma obumbratana Lien.Zell.	"	"	seed
13.	Ancylopera badiana Den.et Schiff.	"	"	seed
14.	Emmelina monodactyla L.	Pterophoridae	"	leaf/seed
15.	Isocolus jaceae Schrnk.	Cynipidae	Hymenoptera	seed
16.	Acanthophilus helianthi Rossi.	Tephritidae	Diptera	capitulum
17.	Chaetorellia jaceae R.D.	"	"	"
18.	Chaetorellia loricata Rond.	"	"	"
19.	Orellia colon Meig.	"	"	"
20.	Orellia tussilaginis F.	"	"	"
21.	Torellia virens Iw.	"	"	"
22.	Urophora affinis Fr.	"	"	"
23.	Urophora quadrifasciata Meig.	"	"	"
24.	Urophora styleta F.	"	"	"

belong to some seminiphagous species of Coleoptera(Larinus obtusus Gyll., Lepidoptera(Metzneria neuropunctella and Eucosoma sp.) and Diptera, especially tefritids(Chaetorellia jaceae R.D. and Urophora quadrifasciata Meig.). The numerical density of the phytophagous and zoophagous insects at the average test of 100 flowerheads varies between 5-85 samples, which is in fact one insects/flowerheads. The mostly infested species of Centaurea seem to be C.arenaria, C.austriaca, C.diffusa, C.micranthos, C.nigrescens and C.scabiosa.

From the data presented and from the accomplished determinations carried out there results that the inflorescences of the most spread species of Centaurea in grasslands, in general are harmed by the same species as those mentioned in table 1 but distinguishing the fact that the seeds of this host plant are eaten-up by Coleoptera(Larinus obtusus Gyll.), by Lepidoptera (Eucosoma hohenwartiana Den.et Schiff., E.aemulana Schlag., Cochylis posterqua D., C.hybridella, Emmelina monodactyla L.) and by Diptera, especially by Acanthophylus helianthi Rossi., Chaetorellia jaceae R.D. and Urophora quadrifasciata Meig.

In total, the losses of seed production caused by the seminiphagous insects(Lariaus obtusus Gyll., Eucosoma sp., Cochylis sp., Acanthophylus helianthi Rossi., Chaetorellia jaceae R.D., and Urophora quadrifasciata Meig.) varies between 50-60 %.

Of the identified species harming the different vegetative or fruit bearing organs of the host-plant, a practical importance presenthe leave moth(Agonopterix liturella Den.et Schiff.), the seed weevil(Larinus obtusus Gyll.) and the tefritids flies of the seeds(Chaetorellia jaceae R.D. and Urophora quadrifasciata Meig.)

Rezumat

PERJU,T., I.MOLDOVAN, 1991, Entomofauna speciilor de Centaurea şi importanţa lor economică. Not.Bot.Hort.Agrobot. Cluj-Napoca, XX-XXI, Diferitele specii de Centaurea constitue gazde pentru numeroase insecte, printre cele mai importante se numără unele polenizatoare(Apis melifica L.), cele mai multe fiind fitofage (Larinus obtusus Gyll., Agonopterix liturella Den.et Schiff., Chaetorellia sp.,Urophora sp.), iar altele sînt zoofage(Zeuxia cinerea Meig.,Exeristes roborator P.)

Rădăcina plantelor este dăunată de larvele lepidopterului Pelochrista medulana Stgr., tulpina este minată de larvele lepidopterului Agapeta zoegana L., aparatul foliar este ros de omizile tortricidului Agonopterix liturella Den.et Schiff., iar florile şi seminţele sînt distruse de larvele gărgăriţei Larinus obtusus Gyll., ale lepidopterelor Eucosoma hohenwartiana Den.et Schiff. şi E.aemulana Schläg. şi ale muştelor pestriţe Chaetorellia sp. şi Urophora sp.

Prin densitatea populaţiilor şi dăunările cauzate, speciile Agonopterix liturella Den.et Schiff., Larinus obtusus Gyll. Urophora quadrifasciata Meig. şi Chaetorellia jaceae R.D., sînt cele ce prezintă importanţă practică în calitate de agenţi de combatere pe cale biologică a speciilor de Centaurea.

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