

• PESTS OF OIL PRODUCING CABBAGE CROPS IN THE EASTERN FOREST-STEPPE OF UKRAINE

SERGIJ STANKEVYCH

V.V. Dokuchaev Kharkov National Agrarian University

Introduction

Today the major oil producing crops from the Brassicaceae family in the world and Ukraine are winter rape (*Brassica napus oleifera bienis* D. C.) and spring rape (*Brassica napus oleifera annua* Metzg.). At present the acreage of these crops in the world is over 40 million hectares, and in Ukraine there are more than 1 million hectares. The losses of the crops due to the pests are huge, especially during the mass reproduction of the insects. The entomocomplex of agroecosystems of oil producing cabbage crops is extremely rich and contains several hundred species. As a result of their vital functions more than 50% of the crops can be lost and as far as 25-55% growth increase in the yield can be reached due to the pollinating insects. Despite the short-term existence of agroecosystems of spring oil producing cabbage crops (90-120 days) their entomofauna is characterised by a considerable diversity of species composition.

Methods

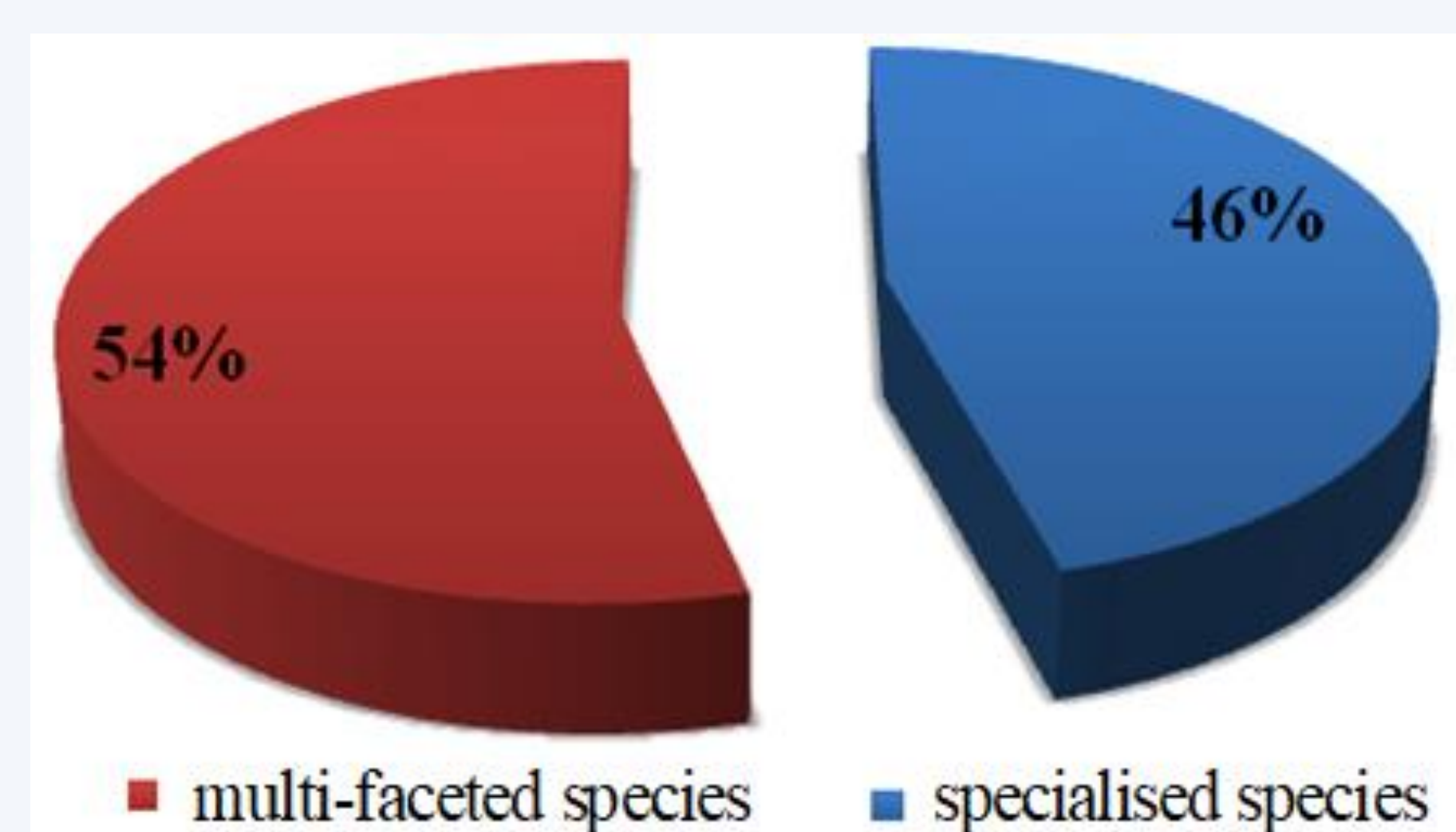
In 2007–2019 the species composition of the oil producing cabbage crops pests was investigated throughout the whole vegetation period by mowing with the entomological catching net, using the soil traps, the Petliuk box and hand collection. The researches were carried out on the crops of the oil producing cabbage plants in the fields of the Educational, Research and Production Centre “Experimental Field” of V.V. Dokuchaev Kharkiv National Agrarian University and the state enterprise “Research Farm “Elitne” of the V.Ya. Yuryiev Institute of Plant Growing of the National Academy of Agrarian Sciences of Ukraine. The collected entomological material was analysed and systematised; and the species composition of the insects was determined at the B.M. Lytvynov Zoology and Entomology Department of V.V. Dokuchaev Kharkiv National Agrarian University. The accuracy of the identification of certain harmful species of insects was confirmed by PhD in Biology V.M. Hramma, the head of the Laboratory of Insect Ecology of V.V. Dokuchaev Kharkiv National Agrarian University.

References

- Stankevich S.V. (2015). Zmina paradigmi u zahisti olijnih kapustjanyh kultur vid hrestocvitih blishok za ostanni 130 rokiv. Visnik HNAU im. V. V. Dokuchayeva. Ser. "Fitopatologiya ta entomologiya", № 1–2, 156–180. (in Ukrainian).
- Stankevich S.V. (2018). Zmina paradigmi u zahisti olijnih kapustjanyh kultur vid ripakovogo kvitkoyida za ostanni 140 rokiv. Visnik HNAU im. V.V. Dokuchayeva. Ser. "Fitopatologiya ta entomologiya", 1–2, 127–145. (in Ukrainian).
- Yevtushenko M. D., Stankevich S.V. & Vilna V.V. (2014). Hrestocviti blishki, ripakovij kvitkoyid na ripaku yaromu j girchici u Shidnomu Lisostepu Ukrayini, Harkiv, 170. (in Ukrainian).
- Yevtushenko M. D., Vilna V. V. & Stankevich S. V. (2016). Hrestocviti klopi na ripaku yaromu j girchici u Shidnomu Lisostepu Ukrayini, Harkiv, FOP Brovin O.V., 184. (in Ukrainian).

Results

During the vegetation periods of 2007–2019 in the fields we have identified 54 species of specialised and multi-faceted pests of the oil producing cabbage crops belonging to 8 orders and 22 families. Among them 29 species are specialised pests and 25 species are multi-faceted ones.



Trophic structure of oil producing cabbage crops pests in the Eastern Forest-Steppe of Ukraine

The frequency of the pest species occurrence on the rape and mustard crops is the following: species that populate the crops on a mass scale — 8 (14,8%), the moderately spread species — 6 (11,1%), species that have the insignificant population density — 40 (74,1%). The cabbage bug, mustard bug, cabbage aphid, rose chafer, rape blossom beetle, mesographe flea beetle, flea beetle and diamond black moth belong to the species that populate the crops on a mass scale. Among them 4 species belong to the Coleoptera order, 2 species belong to the Hemiptera order 1 species belong to the Homoptera order and 1 species belong to the Lepidoptera order.

Taxonomic structure of oil producing cabbage crops pests in the Eastern Forest-Steppe of Ukraine

Order	Species number	Order part in entomocomplex, %
Sheath-winged (Coleoptera)	26	48
True bugs (Hemiptera)	10	18
Scale-winged (Lepidoptera)	8	15
Straight-winged (Orthoptera)	5	9
Two-winged (Diptera)	2	4
Membrane-winged (Hymenoptera)	1	2
Uniform-winged (Homoptera)	1	2
Fringe-winged (Thysanoptera)	1	2

The representatives of the Coleoptera line are the dominant species; their part in the entomocomplex structure is 48% (26 species).

Discussion

The economic importance of these pests is not the same and greatly depends on the population density, phenophase of the crop as well as on weather conditions. For example hot and dry weather is favourable for the cruciferous fleas when the plants are more weakened and the fleas are more voracious. The cabbage aphids like warm weather.

In the phase of sprouting (up to 4 true leaves) the complex of the cruciferous fleas, tenebrionid beetle and earth-boring dung beetle are the most dangerous pests. The latter can be found along the perimeter of the field.

In the phase of the rosette formation the cruciferous bugs, other multi-faceted species of bugs, cabbage aphids, cruciferous fleas, leaf beetles, the caterpillars of butterflies and moths as well as the larvae of turnip fly cause the greatest damage to the crops. The *Ceutorrhynchus*, *Barids* and *Lixus ascanii* L. are especially dangerous during the period of the stalk formation

In the phase of budding the rape blossom beetle and cabbage aphid cause the considerable damage.

During the stage of plant flowering the especial damage is caused by the rape blossom beetle, chafers and cabbage aphid.

The cabbage seed-pod beetle, Brassica pod midge, cruciferous bugs and cabbage aphid are especially dangerous in the phases of the pod formation and ripening.

The oil producing cabbage crops have 2 critical periods, they are the phenophases of sprouting and flowering. The complex of the cruciferous fleas and rape blossom beetle are especially dangerous in these phenophases. This thesis is devoted to studying the biological and ecological peculiarities of the pests, their harmfulness as well as the effective ways in order to protect the spring rape and mustard crops from the harmful insects.

Conclusion

In the phase of sprouting (up to 4 true leaves) the complex of cruciferous fleas.

In the phase of the rosette formation the greatest damage to the crops is caused by the cruciferous bugs, other multi-faceted species of bugs, cabbage aphids, cruciferous fleas.

In the phase of budding the rape blossom beetle and cabbage aphid cause the considerable damage. During the stage of plant florescence the especial damage is caused by the rape blossom beetle, chafers and cabbage aphid.

The cabbage seed-pod beetle, Brassica pod midge, cruciferous bugs and cabbage aphid are especially dangerous in the phases of the pod formation and ripening

Acknowledgement

Thank for the accuracy of the identification of certain harmful species of insects was confirmed by PhD in Biology V.M. Hramma, the head of the Laboratory of Insect Ecology of V.V. Dokuchaev Kharkiv National Agrarian University.