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Carrion beetles (Col., Silphidae) of marginal habitats of south-eastern Poland.

SUMMARY

The silphids of Poland are relatively well known, but informations about the abundance of these beetles in agriculture ecosystems are still fragmented. Most data include wooded areas, f.e. forests, often covered by different nature conservation. On the other hand, valorisation researches of field groves and field shrubs usually they focus on other groups of animals, despite the importance of ecological Silphidae.

The aim of the study was to examine the qualitative- quantitative structure of carrion beetles occurrence in different types of crops. In addition, the species composition of Silphidae occurring on adjacent crops balks were compared. The study also attempted to assess the importance of field groves in agricultural landscape and former agricultural areas, as important reservoirs of biodiversity conservation. Based on the results of analyzes of chemical parameters of soils and habitat conditions, the impact of environmental factors on the occurrence of beetles in the natural landscape were specified.

Research on silphids fauna in variety areas used for agriculture and non-cultivated were investigated. Inventarisation of agrocenosis included: cultivation of potato *Solanum tuberosum* L., cultivation of beetroot *Beta vulgaris* L. and cultivation of cereal (equal proportions of *Avena sativa* L., *Hordeum vulgare* L., *Triticum aestivum* L.). To identify changes in qualitative- quantitative structure of carrion beetles occurrence in fields, comparative analysis in field margins were carried out. Field margins icluded: field margin between cultivations of cereal, field margin between cultivation of potato *Solanum tuberosum* L. and cultivation of wheat Triticum L., field margin between cultivation of cereal and meadow and field margin between cultivation of beetroot *Beta vulgaris* L. and cultivation of corn *Zea mays* L. In agricultural landscapes there are important elements such as field groves. These marginal habitats contribute to keep biodiversity. The wooded areas included areas used for agriculture (field groves and backyard orchard) and non-cultivated (field groves in suburban, cultivation of *Salix viminalis* and suburban park).

Carrion beetles (Col., Silphidae) belonging to the superfamily Staphylinoidea, are an important element of epigeic coleopterofauna. Dwelling in the outer layer of litter they are actively searching the ground to find food. The prey for predaceous beetles consists other insects, small invertebrates, very often important agrophagous pests. Necrophagous species

contribute to the biological utilization of a dead animal tissue, thus preventing the spread of pathogens. Silphids promote the breakdown of organic matter in terrestrial ecosystems and play important role in nutrient cycle. Biochemical processes that accompany the decomposition of dead animals, leads to increase the amount of humus. As a result of the decomposition, composite substances are decomposed into simple compounds, which in turn treated water are more readily absorbed by plants, which is particularly important in the context of crop plants. Directly related to the soil environment Silphidae by excavating tunnels and crypts, improve soil porosity and contribute to its aeration. Carrion beetles prey on other carrion inhabitans (necrophilous species) contribute to reduce the potential epidemiological risk associated with development of synantrophic Diptera.

Complementation of the current state of knowledge on this beetles family was a study on the two issues. The first was to investigate the phenomenon of phoresy between *Nicrophorus vespillo* and deutonymphs *Uroobovella nova*. The second issue involved to examine the intestinal and the outer layers of the body microflora for settlement of potential pathogens.

As a result of carried out investigation in selected crops and marginal habitats in south-western Poland, 11095 beetles were collected including 13 species and 5 genus.

The result of the study of occurrence carrion beetles in selected crops and a variety marginal habitats, demonstrated that the wooded areas characterized by the highest numerous catched beetles compared to other study areas. Smaller amounts of beetle recorded in field margins. The stands, which harvested the smallest number of Silphidae were areas used for agriculture. The species diversity was higher in field margins than adjancent fields, but the number of indivuals were lower. Compared to agrucultural areas (potato culture, beetroot culture and cereal), various wooded areas and field margins characterized by higher values of factors determining species diversity. This underlines the importance of habitats, reffered as marginal in the context of biodiversity conservation.

Isolated bacteria from the digestive tract constitute a symbiotic microflora. However, due to the possibility of transferring bacteria may cause opportunistic infections in humans and animals. Based on avalaible literature, 7 isolated bacterial species are probably the first statement of this case for this family of beetles. These species were *Bacillus altitudinis*, *B. megaterium*, *B. weiehenstephanensis*, *Carnobacterium maltaromaticum*, *Dietzia cinnamea*, *Staphylococcus equorum* and *S. hominis*.

Presented results constitute complement of the knowledge about Silphidae. Interdisciplinary approach to this case emphasize the importance role of carrion beetles in

various ecosystems. Lower sensibility to changes in habitats of these beetles can be considered as the resistance of environment. On the other hand, non-agricultural areas can be identifed as refuges of biodiversity.