

Ground beetles in German oilseed rape fields and extensively used grasslands (Coleoptera: Carabidae)

Introduction

The study aimed at clarifying species composition and ecological structure of carabids associated with the oilseed rape (*Brassica napus* L.) during its flowering, ripening and after the harvest. The research also encompassed the adjacent extensively used grasslands.



Results

We collected 18633 adult carabid specimens. They belonged to 92 species from 33 genera and 17 tribes.

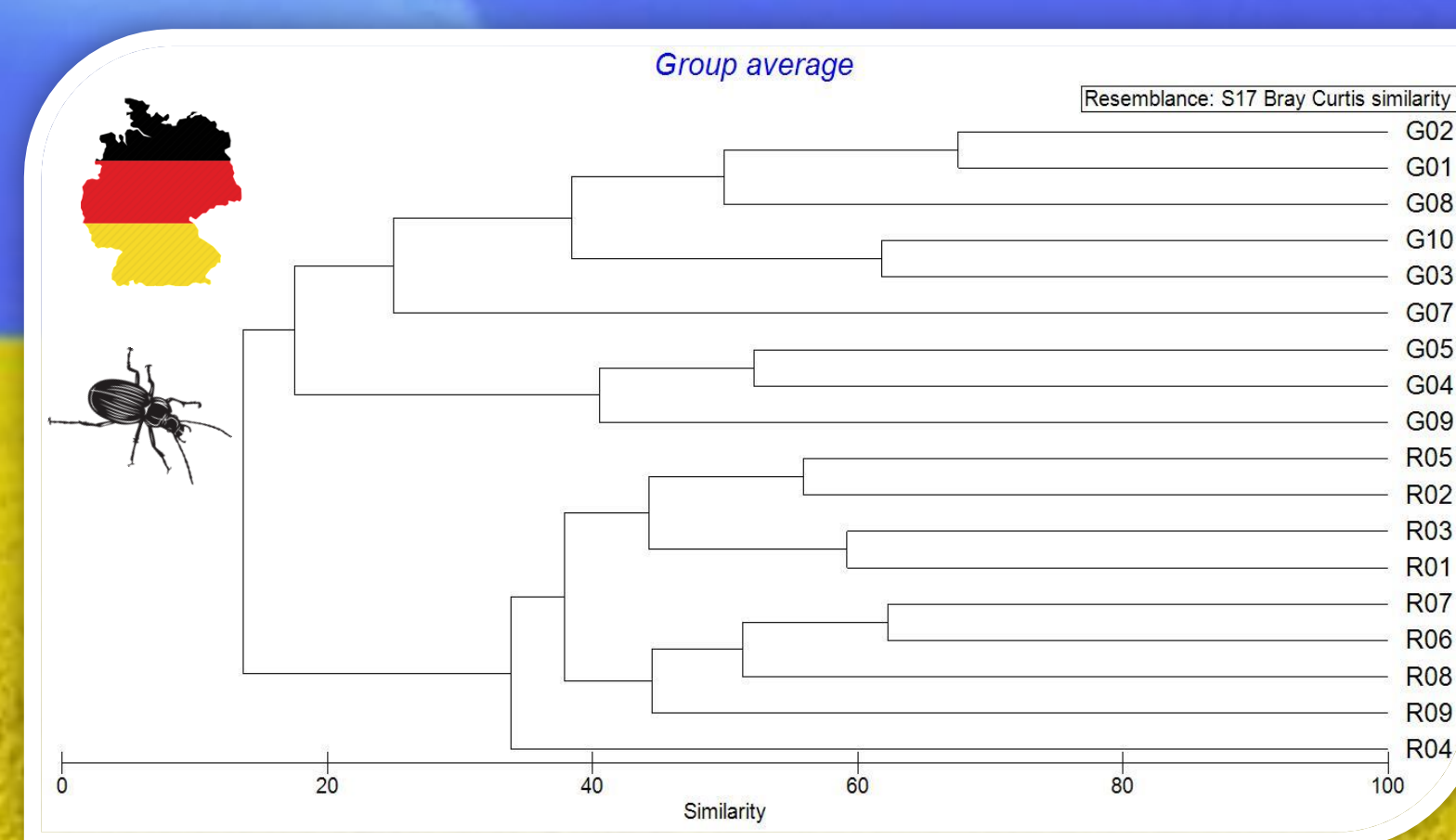
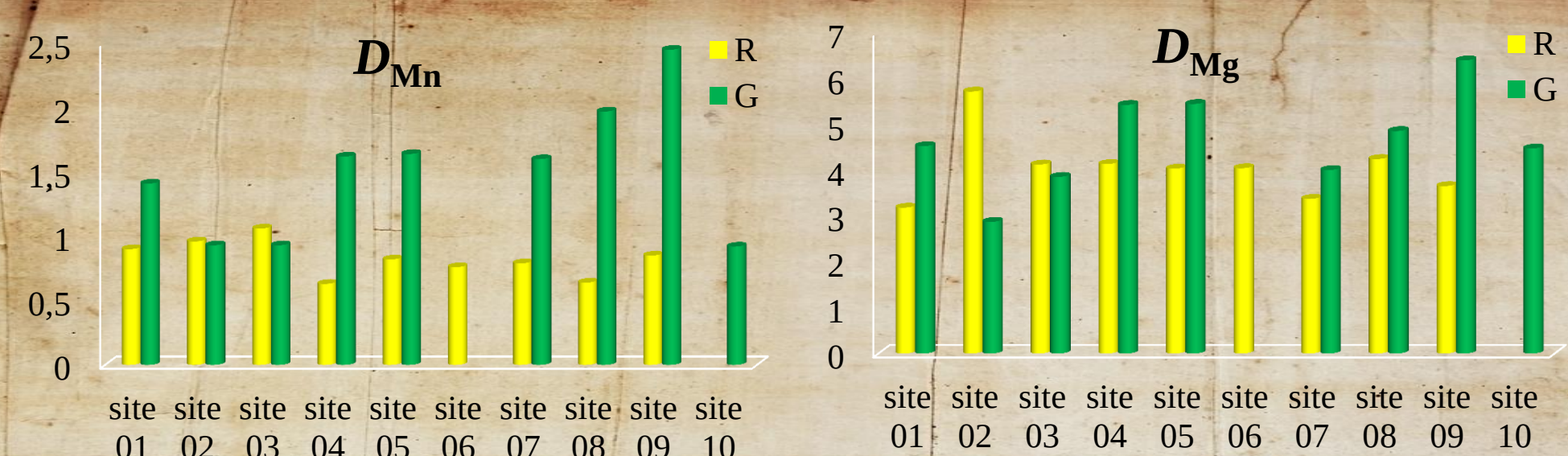
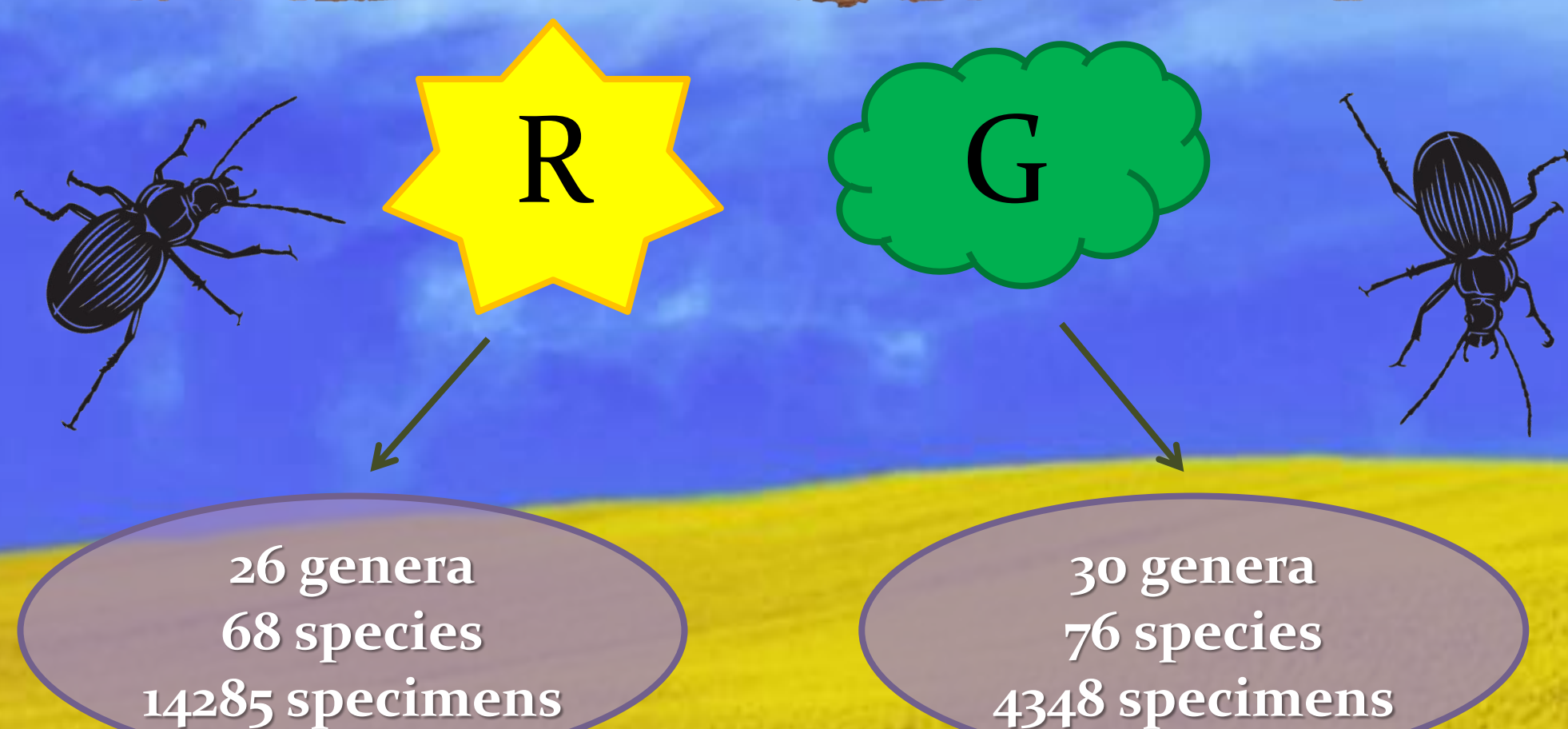
The richest tribes were Harpalini (22 species), Amarini (15 species), Pterostichini (12 species), Bembidiini (7 species), Carabini and Sphodrini (6 species each).

The most species-rich were genera *Amara* and *Harpalus* (15 species each), and *Bembidion* and *Pterostichus* (6 species each).

Specific to the rapeseed fields were 16 species, and to the pastures – 24 species; 52 species were common for both types of habitats.

Dominance structure of the ground beetles found in both types of habitats

D = (n _i /N).100%	Oilseed rape fields		Pastures	
	Species	No	Species	No
Eudominant > 10%	<i>Calathus fuscipes</i> , <i>Nebria brevicollis</i> , <i>Poecilus cupreus</i> , <i>Pterostichus melanarius</i>	4	<i>Poecilus versicolor</i>	1
Dominant 5–10%	-	-	<i>Amara aenea</i> , <i>A. lunicollis</i> , <i>Calathus fuscipes</i> , <i>Harpalus latus</i> , <i>Poecilus cupreus</i> , <i>Pterostichus melanarius</i>	6
Subdominant 3–5%	<i>Loricera pilicornis</i>	1	-	-
Recedent 1–3%	<i>Amara ovata</i> , <i>A. similata</i> , <i>Anchomenus dorsalis</i> , <i>Calathus ambiguus</i> , <i>Harpalus rufipes</i> , <i>H. signaticornis</i> , <i>Trechus quadristriatus</i>	7	<i>Amara communis</i> , <i>Bembidion lampros</i> , <i>Harpalus affinis</i> , <i>H. subcylindricus</i> , <i>H. xanthopus</i> , <i>H. rufipes</i> , <i>Nebria brevicollis</i> , <i>Syntomus obscuroguttatus</i>	8
Subrecedent	all the rest	56	all the rest	61



Twenty-four species (35%) were present in all stages: *Amara aenea*, *A. familiaris*, *A. ovata*, *A. similata*, *Anchomenus dorsalis*, *Asaphidion flavipes*, *Bembidion lampros*, *B. properans*, *Calathus fuscipes*, *Carabus granulatus*, *Clivina fossor*, *Harpalus affinis*, *H. rufipes*, *Limodromus assimilis*, *Loricera pilicornis*, *Nebria brevicollis*, *Notiophilus aestuans*, *N. biguttatus*, *Poecilus cupreus*, *P. lepidus*, *P. versicolor*, *Pterostichus melanarius*, *Pt. strenuus*, *Trechus quadristriatus*.

Conclusions

Due to a various preconditions the oilseed rape seems to attract both grani- and herbivorous, and carnivorous species. The fact, that even mixophagous carabids are at least partly carnivores, and the large number of ground beetles species recorded in the rape fields within this research, present carabids' great potential in reduction of pests. Their use in the biological control could improve ecosystem conservation and sustainable development.

Further studies including analysis of different environmental factors as temperature and humidity of soil and air, precipitation, etc., or exploring the effect of insecticides and management practices on carabid assemblages, both in agroecosystems and grasslands, would provide valuable information about the connections and coexistence of ground beetles under different environmental conditions.