Dung beetles' plasticity of trophic preference in 50 years old multispecies pastures

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Résumé

Scarabaeinae dung beetle species are well known for feeding on feces at all stages of their life. In Europe most of these species, called generalists, feed on different resources, in opposition to specialists, and dung from ruminant or omnivorous mammals show a higher attractiveness to them. In southern France, where several dung beetles are reaching the northern limit of their distribution, pastoral activity has declined considerably over the last fifty years. This decline induces a local switch in the resource (e.g. from sheep to wild boar). In such a context, plasticity of trophic preference can be advantageous for dung beetles. The "Réserve Africaine de Sigean" zoo was set up fifty years ago in an area where agricultural land use was entirely dedicated to vines (with grazing having previously disappeared). With almost thirty species of ungulates living on 300 ha, all fed the same food, the park is one of the few last local refuge for dung beetles within a radius of more than ten kilometers. In this study, we sampled dung beetles inside the zoo and nearby outside with 64 pitfall traps, baited with different combinations of droppings from herbivore species living in the respective areas. We tested whether a) the park was an active refuge for dung beetles, b) the plasticity was the rule or, alternatively, c) the diversity of trophic resources facilitated species coexistence through active segregation between dung types. The sampling revealed 442 dung beetles belonging to 18 species. Abundance was three times higher inside the zoo than outside. The most abundant species Onthophagus vacca (N = 188) is known to prefer Bovinae's droppings. But for this species, as for the other dung beetles in the zoo, a significant preference was observed for Equidae's droppings, i.e. for the most abundant resource in the zoo. Our observations, in contrast with previous studies, imply an intraspecific variation of dung beetle's trophic preferences that might depend on local factors. Thus, herd management in agriculture plays a decisive part in dung beetle species' conservation.

Mots-Clés: Scarabaeinae, trophic choice, pastures, zoo, pitfall trap

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