

## SAPROXYLIC BEETLES

### Summary

The term "saproxylic beetles" refers to coleopterans directly or indirectly associated with dead wood (Table 1). There are approximately 1,500 species of saproxylic beetles in Europe. The present paper reviews this grouping on the basis of literature data and research by the author, with examples of great species diversity in different geographical regions and a discussion of the morphology, taxonomy and biology of these beetles, including life-cycle span (usually ranging from one to several years) and changes in the sex index in populations of selected species in relation to environmental factors. The feeding modes of various saproxylic beetles are presented together with their division into ecological groups, highlighting the particular importance for saproxylic beetles of continuous presence in the habitat of adequate quantity of thick, standing or lying dead trees as well trees with hollows. The paper points to natural forests, e.g. Białowieża Primeval Forest, as the habitat where the largest number of species of saproxylic beetles occur, at the same time noting that representatives of this grouping are also found in big cities.

The paper discusses interactions between saproxylic Coleoptera and other groups of living organisms that are very important for the well-being of ecosystems and for economy: mites, nematodes, bacteria and fungi, with particular attention given to the

last group. The beetles carry these organisms from tree to tree and from shrub to shrub, helping to disseminate them in the habitat. Fungi also constitute food for a number of beetle species, and, alongside bacteria, are unique in their role as endosymbionts of some Coleoptera, enabling the latter to digest otherwise poorly assimilable cellulose. The Polish saproxylic beetles include about 500 mycetophiles.

The topic of wood pests and Polish studies of *Hylotrupes bajulus* and *Ips typographus* are discussed at some length. The role of this group of insects in ecosystems is discussed, and their importance for decomposition of organic matter (wood) is emphasised.

Threats to saproxylic beetles are also discussed, with forest management practices regarded as the most important threat both in the past and, frequently, at present, since forest management leads to homogenisation and rejuvenation of forest stands and prevents the accumulation of dead wood in forests. Existing and proposed forms of protection of saproxylic beetle species, as many as about 40% of which are threatened with extinction, are also discussed. It is concluded that, alongside the establishment of protected areas (national parks and nature reserves), the most important protective measure is to increase the amount of dead wood in managed forests to about 20–30 m<sup>3</sup>/ha.