Ants as bioindicators in land management

The Issue

Land managers are increasingly looking for reliable indicators of ecosystem health that can be used to assess the ecological sustainability of land management practices. Throughout the world, invertebrates are often used for this purpose, because they are so diverse and play such crucial roles in the functioning of ecosystems. If an ecosystem's invertebrates are in good shape, then this indicates that the ecosystem in general is likewise in good shape. The extent to which land management affects the richness and composition of invertebrate assemblages is used as a general measure of ecological impact. In Australia, ants are the most widely used invertebrate indicators in land management.

CSIRO Research

CSIRO has played a key role in validating the effectiveness of ants as bioindicators, in establishing protocols for their use, and promoting and implementing these protocols. In northern Australia, ants are widely used by the mining industry to assess the extent to which minesites have been successfully rehabilitated. More recently, ants have been used as indicators of off-site impacts of mining, and of the sustainability of fire and grazing management in savannas.

The use of ants as bioindicators is founded on three decades of research by CSIRO and collaborators on the dynamics of Australian ant communities, and particularly their responses to disturbance. In this context, ants are the best known insect group in Australia, which means that the effects of disturbance on them can be clearly distinguished from natural background variability. Subsequent CSIRO research has been directed at examining the extent to which the responses of ants to management reflect that of the ecosystem more generally, and developing cost-effective protocols for using ants as indicators. Much of this work has been done through the Tropical Savannas CRC, particularly in collaboration with the Biodiversity Unit of the Northern Territory Department of Infrastructure, Planning and Environment.

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