Quantifying the Compromise

Developing the Road Map and Protecting the Forest Network

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Conservation policy is necessarily imperfect, as it always targets a compromise between the contrasting needs of nature and society. A frequent source of conflict is how to develop a traffic network while trying to minimise its negative effects on the connectivity of natural habitats. Roads must be frequently considered as impenetrable barriers for many species, while migration is important for these species, if not the only remaining key to their survival. Both the traffic system and the landscape inhabited by various species may be regarded and analysed as large-scale units. Network analysis provides various tools for providing quantitative, measurable compromises. It helps in setting conservation priorities objectively by ranking each forest patch according to a measure of importance.

The reason why connectivity is essential for many species is that isolated populations face a number of dangerous effects, including genetic and demographic mechanisms, that could possibly lead to extinction.

Connectivity can guard against extinction due to genetic or demographic causes by ensuring the possibility of migration, and thus, gene flow. After all, this is the major mechanism counteracting the loss of diversity—first at the level of the genes, then at the level of species.

In a recent study, the expected effects of a planned highway were assessed from the viewpoint of how the connectivity of a forest habitat network will be reduced. The highway would connect Hungary and Ukraine, forming a strategically important transport route in the European system. The forest network was evaluated based on ground beetles, typical and representative members of forest communities.

Photo: Béla Tallósi

Carabus intricatus, inhabiting closed canopy deciduous forests of hills and mountains. In the Bereg plain, it lives only in a few forest fragments.

The present structure of the forest network was characterised and the importance of forest patches in maintaining connectivity was quantified by network analysis. Then, the authors compared the effects of the three planned tracks on forest connectivity and suggested a fourth, less deteriorating solution.

Of course, many viewpoints must be considered when a traffic network is designed. Legal, logistic, and financial analyses are unavoidable. Yet, protecting nature calls for one more aspect: studying the landscape ecological effects of highways. Network analysis offers a tool for comparing different solutions objectively, from a large-scale perspective, in a quantifiable way. It can only be hoped that decision-makers will also consider this very biological aspect.

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