

Book review

GLASER, F. 2009: Die Ameisen des Fürstentums Liechtenstein (Hymenoptera, Formicidae)

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Lying on the east side of the river Rhine between Switzerland (cantons St Gall and Grisons) and Austria (state Vorarlberg), the Principality of Liechtenstein covers only 160 km² (Vorarlberg: 2602 km²), but offers a range of altitudes from 425 m to 2599 m a.s.l. Therefore, quite a diverse ant fauna could be expected, when in 2006 the author of this book, together with six biologist colleagues and supported by local rangers, started the first inventory ever for this country. In addition to hand collecting, the team set up pitfall traps (salt water; 55 sites) and bait traps (hard liquor; 18 sites).

By the end of 2008 a total of 1788 records (species per site) had been accumulated from rangers (38%), biologists (37%; 18 person-days of collecting), pitfall traps (22%) and bait traps (3%), representing 66 ant species. Seven of these species (*Lasius* cf. *citrinus*, *L.* cf. *psammophilus*, *L.* cf. *sabularum* and four still undescribed *Tetramorium* species) could not be unambiguously assigned names. Altitudes above 1900 m remained uninvestigated. Who knows, otherwise they might also have found *Formica exsecta*, established for Vorarlberg and Switzerland and especially numerous there in the subalpine zone between 1800 m and 2100 m. But even so, the detected species richness of Liechtenstein is impressive and trails that of the well-investigated, much larger Vorarlberg by a mere four species.

Twenty-one biotopes are discriminated for a habitat analysis. Not all of them are mutually exclusive. For example, the biotope "Magerwiesen" (oligotrophic meadows) is apparently a subset of "Wiesen/Weiden allgemein" (all meadows/pastures) which in turn appears to be a subset of "Offenstandorte allgemein" (open habitats in general). So in this case, why is *Tapinoma ambiguum* listed only for "oligotrophic meadows" and for "all meadows/pastures", but not for "open habitats in general"? Similarly, *Myrmica ruginodis* is listed for nearly all kinds of woods, but not for "woods in general". In contrast, *Formica selysi* and *Myrmica hellenica*, both listed as dwellers of extreme habitats with nearly bare ground, are also recorded for "Waldrandbereiche" (zones around edges of woods) and consequently also for "all woods". This could reflect situations where a bare river bank or a mudflow ("Rüfe") touches a wood edge, allowing the two species to climb trees in search of honeydew. In sum, the understanding of what constitutes a species' habitat is quite broad in the study and includes all kinds of marginal areas. This type of categorisation di-

lutes the picture of what are typical habitats for some specialised species. But it does not prevent recognition of what are the most important biotopes for ants in Liechtenstein in terms of species richness: oligotrophic meadows (35 species), grounds with ruderal flora ("Ruderal"; 35 species) and wood edges (34 species), to concentrate on biotopes that do not contain subsets.

The main part of the publication is dedicated to neatly arranged profiles for Liechtenstein for each of the 66 species, including distribution maps (often plotting two or three species for which a direct comparison is interesting), diagrams of altitudinal distribution, some habitat notes and remarks on possible threats to the ants. For many of the species, images of outstanding quality are also provided, of both the ant (by Hannes Müller) and its habitat (by the author). The language is readable for interested amateurs and therefore suitable for inspiring young readers. The same applies to the extensive but concise chapter about the general biology and ecology of ants. This accessibility does not compromise the information value for the specialist who will profit, especially from the profiles, by learning remarkable facts, such as that the only site (1500 m) of *Myrmica lobicornis* lies higher than the lowest (1180 m) of the four sites of *Myrmica lobulicornis*. We see that *Lasius emarginatus* has not yet entered villages or towns in Liechtenstein, while in Swiss towns such as Zurich it is one of the typical urban ants. Surprising from a Swiss point of view is the observation that *Formica pressilabris* is apparently much more frequent than *Formica sanguinea*. Hard to believe, however, is the extremely low site (450 m!) of the only individual ("Einzelfund") of "*Tetramorium* cf. sp. A" on a railway embankment. As the author claims to know other lowland occurrences in Tirol of that species otherwise considered to live only in subalpine or even alpine altitudes, I propose to conduct molecular genetic analyses of such lowland samples.

This truly congenial publication is concluded by an extensive discussion of recommended conservation measures for ants in Liechtenstein, specific for each of eleven biotopes. One of them, the woods ("Wälder"), is treated in detail. Here the recommendations culminate in the most basic of all: to facilitate that more light reaches the ground, for example by allowing cattle grazing of moderate intensity also in woods.

