

# Eastern Alpine endemic arachnids

(Arachnida: Araneae, Opiliones)



## STARTING POSITION AND OBJECTIVES

The so-called Eastern Alps belong to the 30-35 million year old European Alp system, and are largely contained within the national borders of Austria. Despite to the intensive research efforts of several Austrian zoologists in the past, like Karl Holdhaus, Herbert Franz and Heinz Janetschek as well as more recently renowned „Alpine-arachnologists“ like Konrad Thaler and Jürgen Gruber a comprehensive faunal catalogue of the region is lacking. The present study, coordinated by the Austrian Environmental Agency (Umweltbundesamt Wien) aims at filling this deficit.

Raised questions are:

- Where are the centres and hot-spots of faunal endemism of Austria?
- Are endemic arachnids endangered?
- Are these hot-spots covered by protected areas?

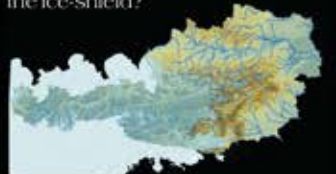
## TERMINOLOGY

Endemic taxa are those restricted to a specified geographical area, in this case the Austrian Republic. The area of subendemic species lies primarily (75 %) within the national borders.

## THE ORIGIN OF ALPINE ENDEMIC ARACHNIDS

Das geologische Ereignis, das die rezente zoogeographische Situation der holarktischen Faunen wohl am stärksten und am nachhaltigsten beeinflusst hat, war das Hereinbrechen der pleistozänen Eiszeiten. [Gustaf De Lattin 1967]

Half a century ago Karl Holdhaus (1954) talked about a „rettungslose Vernichtung“ of the fauna by the glaciations. But is there definitively no chance to survive inside the ice-shield?



The Eastern Alps during the last ice age (Würm) source: Van Hoesen, 1987 & CIA, 2009

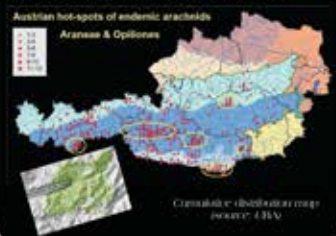
Eastern Alpine endemics are:

- Re-wanderer of short or long distance or
- Survivors in refugia
  - Marginal alpine Massifs de refuge
  - Inneralpine nunataks (Nunatakker)
  - Subterranean habitats



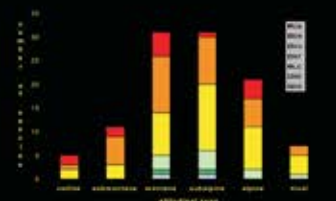
## RESULTS

Altogether 748 (sub)endemic animal and plant species have been identified within the political borders of Austria (RABITSCH & ESSL, 2009). Within the 548 animal species 10 pseudoscorpion-, 11 harvestman- and 46 spider-species can be found. Highest arachnid diversity is reached in the central Alps (Hohe Tauern NP), the north-eastern Calcareous Alps (Gesäuse NP) and in particular in the southern Alps (Karawanken) with their massifs de refuge, marking the margin of the Würm-ice-shields. For animals, a maximum of 46 endemic taxa was found in a grid cell in the Gesäuse NP; and the Hochobir in the Karawanken came second with 41 endemic taxa. Spiders and harvestmen reach up to 12 endemic taxa.



## RESULTS

As expected, most of the endemic species occur in the montane, subalpine and alpine zone. The most important habitats are rocky areas, caves and woodlands.



High absolute numbers and percentages of endemics can be found within the soil-inhabiting harvestman-families Cladonychiidae, Ischyropsalididae and Nemastomatidae and the spider-genera Lepthyphantes and Troglodyphantes.



„Zoogeography appears to be one of the most amusing and stimulating of the natural sciences: every few years its fundamental concepts change and one can begin anew.“

Piolo Brignoli (1983)



## ENDANGERING

The threat status of endemic spider- and harvestman-species is in general high. Despite to the big threats caused by forestry, hydraulic engineering, tourism and climate change up to now no endemic arachnids and insects are protected by law. The coverage of the distribution of endemics by nature reserves is rather poor (national parks: 9 %, nature-conservation-areas: 28 %). Conservation efforts must focus on these unique tesserae of our fauna.

## BENEFITS & RESUMÉ

All available data of endemic arachnids have been geographically located, digitalized and condensed for the first time; the endemic species have been characterized accurately, the hot-spots of their occurrence is known henceforward and should be regarded urgently at environmental impact assessments. The data have been incorporated into the actual red list of endangered harvestmen and spiders of Austria. Furthermore we are working on an implementation of the protection by law of these highly endangered species in the federal countries Carinthia and Styria. Two endemic spider species new to science have been discovered within these investigations.



The presented results should provide a valuable basis for both zoogeographical inferences involving glacial refugia and postglacial recolonization of the fauna of the Eastern Alps as well as conservation planning in Austria. A concept concerning (sub)endemic species in the national parks and other protected areas – with the exception of the Gesäuse NP – as well as for Austria is still lacking!

## LITERATURE

- BRIGNOLI, P. (1983): Die Spinnen der Fauna der Tiroler Tauern – eine zoogeographische Studie. (Zool. Jb. Anat. 101: 1-124)
- DE LATTIN, G. (1967): Die Tierwelt der Alpen. (Zool. Jb. Anat. 101: 1-124)
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