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Endemic harvestmen and spiders of Austria (Arachnida: Opiliones, Araneae)

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Abstract: A comprehensive overview of plant, fungus and animal species of Austria revealed a total of 748 endemic and subendemic species, including, 11 harvestman and 46 spider species. Altogether two endemic harvestmen *(Nemastoma bidentatum relictum, Nemastoma schuelleri)* and 8 endemic spiders (*Abacoproeces molestus*, *Collinsia (caliginosa) nemenziana*, *Mughiphantes severus*, *Mughiphantes styriacus*, *Pelecopsis alpica*, *Scotophaeus nanus*, *Troglohyphantes novicordis*, *Troglohyphantes tauriscus*), beside 9 subendemic harvestman and 38 subendemic spider species have been recorded from Austria. Hot-spots of endemism in the Eastern Alps are the north-eastern (Ennstaler Alps) and southern Calcareous Alps (Karawanken, Karnische Alps) and the Central Alps (Hohe Tauern, Gurktaler Alps, Ötztaler and Stubaier Alps). Most of the endemic arachnid species occur from the nival down to the montane zone. Important habitats are rocky areas, caves and woodlands. High absolute numbers and percentages of endemics can be found within the harvestman families Cladonychiidae, Ischyropsalididae and Nemastomatidae and in the spider genera *Lepthyphantes* s. l. and *Troglohyphantes*. The conservation status of these highly endangered taxa – 85 % of the spider species and 100 % of the harvestman taxa are endangered in Austria – is poor.

Key words: conservation, Eastern Alps, endangering, endemism, ice age, massifs de refuge, nunataks, red list, subendemics, protection, vertical distribution

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.
Paolo Marcello BRIGNOLI (1983: 181)

The so-called Eastern Alps belong to the 30-35 million year old European Alpine system, and are largely contained within the national borders of Austria. Despite intensive research efforts by several Austrian zoologists in the past, like Rudolf Heberdey, Karl Holdhaus, Herbert Franz and Heinz Janetschek or the German Gustaf de Lattin as well as more recently renowned „Alpine-arachnologists" like Konrad Thaler and Jürgen Gruber, a comprehensive faunal catalogue for the region is lacking.

A recent study, co-ordinated by the Environment Agency Austria (Umweltbundesamt), aimed to fill this deficit. A comprehensive overview of plant, fungus and animal species, whose range lies entirely (endemics) or predominantly (subendemics) within the political borders of Austria, has now been completed (RABITSCH & ESSL 2009). Altogether 748 (sub)endemic animal and plant species have been identified. Among the 548 animal species in Austria 10 pseudoscorpion (7 endemic, 3 subendemic) (MAHNERT 2009), 11 harvestman (KOMPOSCH 2009a) and 46 spider species (KOMPOSCH 2009b) can be found (Fig. 1, 2). Scorpions (KOMPOSCH 2009c) and palpigrades (CHRISTIAN 2009) include no real (sub)endemic species of Austria, whereas 10 oribatid mites (SCHATZ & SCHUSTER 2009) are classified as endemic and subendemic; many more oribatids are pseudoendemics, i. e. the current taxonomy of faunistic knowledge is not sufficient and a wider distribution is assumed.

So why is it important to publish these data in addition to the endemics book? This is done for the following reasons: first the endemics book is of regional distribution, mainly spread in Austria, and due to the small print run it will soon be sold out (compare BLICK 2009). Second it is written in German, and for the relevant chapters even an English abstract is missing. The present publication closes this gap for the arachnological section. Furthermore it expands and updates the knowledge of the two treated arachnid groups.

Material and Methods

This paper deals with species and subspecies, whose ranges lie entirely (endemics) or predominantly (subendemics) within the political borders of Austria.

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Figure 1: Habitus of endemic and subendemic harvestmen of Austria. From left to right and from the top downwards: *Holoscotolemon unicolor, Paranemastoma bicuspidatum, Ischyropsalis kollari, Megabunus armatus, Leiobunum roseum, Leiobunum subalpinum*.

Subendemics are defined in this context as taxa with more than 75 % of their total range within Austria or if they are local or regional endemics with less than 10 known localities or if their area is restricted to less than 1000 km^2 respectively with less than 75 % of their total range in Austria (RABITSCH & ESSL 2009).

All available, published and unpublished, data on endemic and subendemic harvestmen and spiders have been collected, reviewed, geographically located, digitised and stored in a private database (data base ÖKOTEAM). Altogether more than 2250 data-sets were analysed (Araneae: 1050, Opiliones: 1200). The distribution maps (see appendix) – showing the natural zones as well as the political borders of the federal countries – have been printed by the Environment Agency Austria (UBA). All photos were taken by the author.

Results

The geographical localisation and digitalisation of all available data facilitated the present drawings of distribution maps (appendix 1, 2) and – for the first time – the clear identification of centres and hotspots of faunal endemism within the Eastern Alps.

A complete list of all endemic and subendemic harvestman and spider taxa is given in table 1, a selection of habitus photographs is presented in figure 1. Altogether two endemic (*Nemastoma bidentatum*

Figure 2: Habitus of endemic and subendemic spiders of Austria. From left to right and from the top downwards: *Mughiphantes variabilis, Xysticus secedens, Troglohyphantes tauriscus, Troglohyphantes noricus*.

relictum, *Nemastoma schuelleri*) and nine subendemic harvestmen are recorded from Austria (table 1, appendix 1). The spider fauna shows eight endemic (*Abacoproeces molestus*, *Collinsia* (*caliginosa*) *nemenziana*, *Mughiphantes severus*, *Mughiphantes styriacus*, *Pelecopsis alpica*, *Scotophaeus nanus*, *Troglohyphantes novicordis*, *Troglohyphantes tauriscus*) and 38 subendemic species (table 1, appendix 2). Therefore a total of 57 subendemic and endemic harvestman (11) and spider (46) species can be found within the Austrian Republic. Regarding the main vertical distribution of Opiliones and Araneae in the Eastern Alps the colline zone (115 up to ca. 250-400/500 m) harbours 2 harvestmen and 4 spider species, the submontane (up to ca. 350-500/700 m) 3 / 9, the montane (up to ca. 1500-2000 m) 10 / 21, the subalpine (up to ca. 1800-2100 m) 8 / 23, the alpine (up to ca. 2500-2800 m) 3 / 18, and the nivale zone (up to 3798 m) 1 / 6 species. Of the (sub)endemic taxa, 39 spider species (85 %) are "Critically Endangered" up to "Vulnerable" and two species (4 %) are placed in the category "Data deficient" (KOMPOSCH in press b). All 11 harvestman taxa are vulnerable or endangered in Austria (KOMPOSCH 2009d).

The horizontal distribution of arachnids shows major differences between the different natural areas in Austria. Rich in endemic spiders and harvestmen are the mountainous federal states of Styria (St), Carinthia (C), Tyrol (T) and Salzburg (S). MAURER & HÄNGGI (1990) pointed out, that endemics of the Northern Alps mostly show bigger areas than south-alpine ones. Concerning the fauna of the whole Alpine arc this is definitively correct. With respect to the distribution maps of Austrian (sub)endemics it could hardly be verified, as the political borders of Austria comprise a much bigger area of the Northern, as opposed to the Southern, Alps.

Discussion

The number of endemic and subendemic arachnids within Austria is remarkably high and differs widely in the nine federal states (Bundesländer). Centres of arachnological and zoological diversity and endemism are, within the entire Alps, the Southern Calcareous Alps with their peak in the south-western parts (Mercantour National Park and Alpi Marittime NP) (MAURER & THALER 1988). The hotspot of arachnological endemism in Austria is situated in the Eastern Alps. Following the definitions of subendemism of RABITSCH & ESSL (2009) the arachnological hotspots in Austria are the central Hohe Tauern (C, S, T) and the Gurktaler Alps (C, S, St), but also the

Table 1: List of endemic (E), subendemic (S), and pseudoendemic (P) harvestmen (Opiliones) and spider (Araneae) species of Austria, related to the altitudinal zones of their main occurrence in the area (colline to nivale). RLA = Red List of endangered harvestmen and spiders of Austria (Komposch 2009d, Komposch in press). Categories of endangerment used: LC = Least Concern, NT = Near Threatened, DD = Data Deficient, VU = Vulnerable, EN = Endangered, CR = Critically Endangered. * *Tapinocyba affinis* is endemic to the alpine mountainous system (Thaler 1999). The subspecies *orientalis*, although not clearly shown up to now, seems to have a wider distribution in Slovakia, Czech Republic and Germany (Millidge 1979, Komposch 2009b, Blick in litt.); in this case it would lose the subendemic-status in Austria.

	family	taxon	E/S	RL A	colline	submontane	montane	subalpine	alpine	nival
		Opiliones (harvestmen)								
1	Cladonychiidae	*Holoscotolemon unicolor* Roewer, 1915	S	EN	1	1	1			
2	Nemastomatidae	*Mitostoma alpinum* (Hadzi, 1931)	S	EN				1	1	
3		*Nemastoma bidentatum relictum* Gruber & Martens, 1968	E	EN			1	1		
4		*Nemastoma schuelleri* Gruber & Martens, 1968	E	EN		1	1	1		
5		*Paranemastoma bicuspidatum* (C. L. Koch, 1835)	S	EN			1	1		
6	Ischyropsalididae	*Ischyropsalis hadzii* Roewer, 1950	S	EN			1			
7		*Ischyropsalis kollari* C. L. Koch, 1839	S	VU	1		1	1	1	
8	Phalangiidae	*Megabunus armatus* (Kulczynski, 1887)	S	EN			1	1	1	1
9		*Megabunus lesserti* Schenkel, 1927	S	VU			1	1		
10	Sclerosomatidae	*Leiobunum roseum* C. L. Koch, 1839	S	EN		1	1			
11		*Leiobunum subalpinum* Komposch, 1998	S	VU			1	1		
		Araneae (spiders)								
1	Linyphiidae	*Abacoproeces molestus* Thaler, 1973	E	CR			1			
2		*Centrophantes roeweri* (Wiehle, 1961)	S	EN		1	1			
3		*Collinsia (caliginosa) nemenziana* Thaler, 1980	E	VU				1		
4		*Diplocephalus rostratus* Schenkel, 1934	S	EN						1
5		*Incestophantes kotulai* (Kulczynski, 1904)	S	VU					1	
6		*Meioneta alpica* (Tanasevitch, 2000)	S	DD				1		
7		*Meioneta ressli* Wunderlich, 1973	S	VU				1		
8		*Metopobactrus nodicornis* Schenkel, 1927	S	EN					1	
9		*Micrargus alpinus* Relys & Weiss, 1997	S	VU				1		
10		*Mughiphantes armatus* (Kulczynski, 1905)	S	VU						1
11		*Mughiphantes rupium* (Thaler, 1984)	S	CR					1	
12		*Mughiphantes severus* (Thaler, 1990)	E	CR					1	
13		*Mughiphantes styriacus* (Thaler, 1984)	E	CR					1	
14		*Mughiphantes triglavensis* (Miller & Polenec, 1975)	S	EN				1	1	
15		*Mughiphantes variabilis* (Kulczynski, 1887)	S	NT				1	1	1
16		*Palliduphantes montanus* (Kulczynski, 1898)	S	LC			1	1		
17		*Pelecopsis alpica* Thaler, 1991	E	CR					1	
18		*Scotinotylus clavatus* (Schenkel, 1927)	S	EN			1	1		
19		*Silometopus rosemariae* Wunderlich, 1969	S	VU				1	1	
20		*Styloctetor austerus* (L. Koch, 1884)	S	VU					1	1
21		*Syedra apetlonensis* Wunderlich, 1992	S	CR	1					
22		*Tapinocyba affinis orientalis* Millidge, 1979	S*	NT			1	1		
23		*Tenuiphantes jacksonoides* (Van Helsdingen, 1977)	S	NT			1	1	1	
24		*Troglohyphantes fagei* Roewer, 1931	S	VU				1	1	

	family	taxon	E/S	RL A	colline	submontane	montane	subalpine	alpine	nival
25		*Troglohyphantes karawankorum* Deeleman-Reinhold, 1978	S	CR			1	1		
26		*Troglohyphantes latzeli* Thaler, 1986	S	CR		1	1			
27		*Troglohyphantes noricus* (Thaler & Polenec, 1974)	S	VU	1	1	1			
28		*Troglohyphantes novicordis* Thaler, 1978	E	CR		1				
29		*Troglohyphantes subalpinus* Thaler, 1967	S	VU		1	1	1		
30		*Troglohyphantes tauriscus* Thaler, 1982	E	EN			1	1		
31		*Troglohyphantes thaleri* Miller & Polenec, 1975	S	VU		1	1	1		
32		*Troglohyphantes typhlonetiformis* Absolon & Kratochvil, 1932	S	CR		1	1			
33	Tetragnathidae	*Pachygnatha terilis* Thaler, 1991	S	EN		1	1			
34	Lycosidae	*Arctosa renidescens* Buchar & Thaler, 1995	S	EN				1	1	
35		*Pardosa giebeli* (Pavesi, 1873)	S	VU					1	1
36		*Pardosa saturatior* Simon, 1937	S	VU			1	1	1	
37	Agelenidae	*Tegenaria mirifica* Thaler, 1987	S	CR			1			
38	Hahniidae	*Cryphoeca lichenum lichenum* L. Koch, 1876	S	NT			1	1		
39		*Cryphoeca lichenum nigerrima* Thaler, 1978	S	EN				1	1	
40	Gnaphosidae	*Haplodrassus aenus* Thaler, 1984	S	EN		1	1			
41		*Haplodrassus bohemicus* Miller & Buchar, 1977	S	CR	1					
42		*Scotophaeus nanus* Wunderlich, 1995	E?	EN	1					
43		*Zelotes zellensis* Grimm, 1982	S	VU			1	1		
44	Philodromidae	*Philodromus depriesteri* Braun, 1965	S	DD			1			
45		*Thanatus firmetorum* Muster & Thaler, 2003	S	VU				1	1	1
46	Thomisidae	*Xysticus secendens* L. Koch, 1876	S	VU			1	1	1	

Ötztaler and Stubaier Alps (T) as well as the Koralpe (C, St) (all Central Alps), the Gesäuse National Park (Ennstaler Alps, Northern Calcareous Alps, St) and in particular the Karawanken (Southern Calcareous Alps, C) with their massifs de refuge, marking the margin of the Würm-ice-shields (Fig. 3). Regions outside the Alps are poor in endemics. For spiders and harvestmen a maximum of 12 taxa per grid-cell was found in Austria. Concerning all animals, the maximum was 46 taxa in a grid cell in the Gesäuse NP (St). The Hochobir (Fig. 4) in the Karawanken (Southern Calcareous Alps, C) came second with 41 endemic taxa. A comparison between the arachnological hotspots (Fig. 5) and these of the whole fauna (RABITSCH & ESSL 2009: 882) reveals a quite similar picture. Differences can be found in the araneological hotspot in the Ötztaler and Stubaier Alps, intensively explored by Konrad Thaler and his students, and – probably a methodical artefact – the comparatively low frequency in the eastern parts of the Northern Calcareous Alps (Styria, Upper and Lower Austria). Regarding a wider definition of subendemism the Austrian number one would be the Southeastern Calcareous Alps with the Karawanken and Steiner Alps at the borderline between Carinthia/Austria and Slovenia, followed by the Karnische Alps, marking the border between Carinthia/Austria and Italy.

Without attempting to explain the origin of these endemics in detail, I would like to point out three main reasons for the richness of the small-scale distributed species in the Alps:

1) The recent climate history with large-scale expansion of the last ice-shields (Fig. 3 is of importance to understand today´s distribution ranges. Like other zoogeographers, DE LATTIN (1967) previously pointed out that the geological event with the strongest influence on the Holarctic faunas was irruption by the Pleistocene ice-ages. HOLDHAUS

(1954) wrote about the "rettungslose Vernichtung" [desperate devastation] of the Alpine fauna by the glaciations.

2) The Alpine inhabitants were pushed towards refugia by the glaciations (e.g. BRIGNOLI 1983, WEISS & FERRAND 2007), then underwent evolutionary processes and post-glacial re-immigration over both short and long distances (HOLDHAUS 1954, JANETSCHEK 1956, THALER 2003).
3) Survival was possible in massifs de refuge, i.e. unglaciated massifs at the periphery of the ice shields (e.g. Fig. 3), in caves and – quite rarely – on inner Alpine nunataks (MAURER & HÄNGGI 1990, HOLDEREGGER & THIEL-EGENTER 2009). Nunataks are steep mountain peaks free of ice, which appear through the ice crust.

Due to the particular forms of glaciation (Fig. 3), survival and re-wandering processes in the Eastern Alps the diversity of endemic and subendemic spiders and harvestmen shows a South-North and an East-West decline (cf. MUSTER 2001, 2002).

Most of the endemic arachnid species occur from the alpine down to the montane zone (table 1). 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-family Linyphiidae (*Lepthyphantes* spp. s. l. and *Troglohyphantes* spp.). Beyond these linyphiid taxa MAURER & HÄNGGI (1990) list *Coelotes*, *Cryphoeca*, *Cybaeus*, *Nesticus*, dysderids and leptonetids.

The threat status of endemic spider- and harvestman-species in Austria is in general high. The major threats are caused by forestry (old-growth forests are being replaced by common spruce monocultures), hydraulic engineering (large Alpine valleys are flooded and changed to hostile reservoirs), agriculture (intensification and biocide use) and tourism (devastating high Alpine and mountainous areas for building and expanding ski-regions; a big problem is the enormous need for water for ski cannons, which leads to the construction of water reservoirs, water diversion and the destruction of spring communities, brooklets and brooks). Furthermore climate warming leads to habitat loss and endangers cold stenothermic species inhabiting rather low peripheral mountain chains of the Alps, which were not glaciated during the Pleistocene; DIRNBÖCK et al. in press). Despite these various hazardous impacts on sensitive habitats and their species, endemic arachnids and insects are so far not protected by Austrian laws. The coverage of the distribution of endemics by nature reserves is rather poor. Firstly none of the Austrian nature conservation areas or National Parks has been established up to now in response to a high or even outstanding diversity among endemic invertebrates. Not more than 10 % of

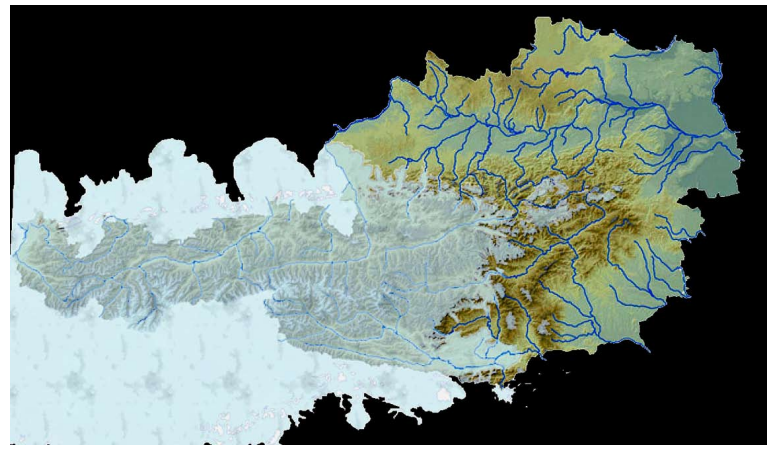

Figure 3: The eastern Alps at maximum glaciation during the last Ice Age (Würm): orography and political borders of Austria (modified after VAN HUSEN 1987, RABITSCH & ESSL 2009)

Figure 4: The Hochobir, an impressive peak and massif de refuge within the Karawanken (Southern Alps, Carinthia), is a well known hot spot of endemic arachnids.

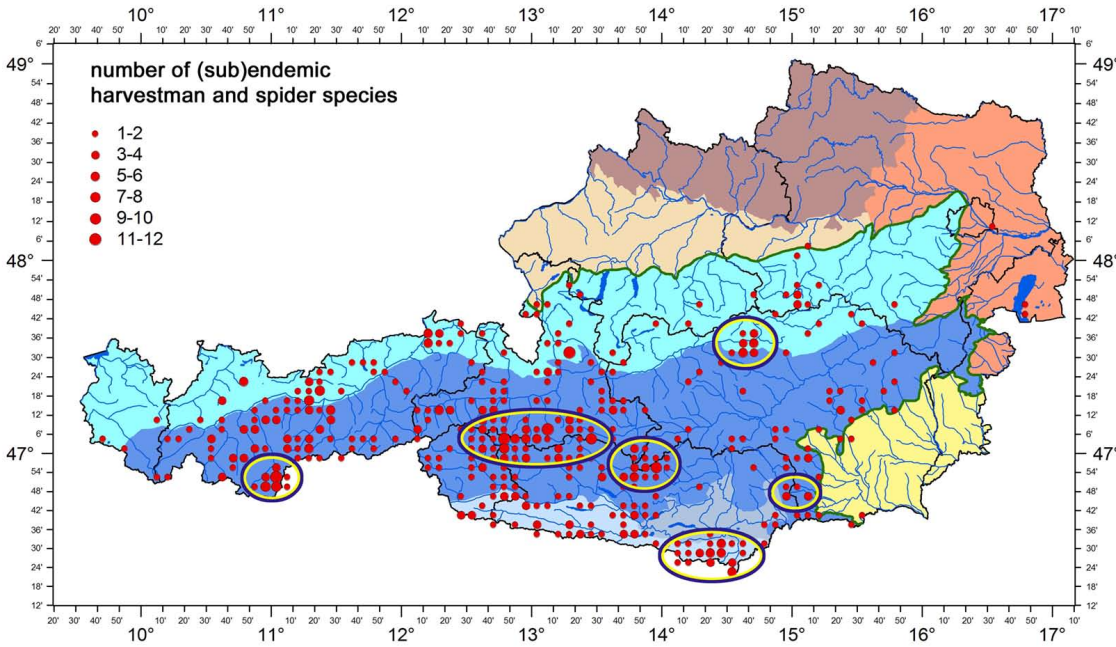

Figure 5: Cumulative distribution map showing all endemic and subendemic spiders and harvestmen in Austria (modified after KOMPOSCH 2009b). The main hotspots of arachnological endemism are encircled by rings and ovals.

the 16 quadrants with the highest number of endemic animals in Austria are covered by nature conservation areas. Secondly the coverage of large parts of the country by Natura-2000-areas rules out protection of the endemic species inside these areas as they are not regarded as conservation objects by the European Union.

It is quite astonishing that comparative data on endemic arachnids from other central European countries are missing or weak. Therefore a comparison to the Austrian results is hardly possible. This highly unsatisfactory situation is in need of change.

Available data refer to Romania: TATOLE (2006) carried out a zoogeographical analysis of the 961 hitherto registered spider species and identifies about 6 % as endemic. The spider fauna of Bulgaria is represented by 975 species, including "76 species (10 %) established in Bulgaria (35 species) and other territories of the Balkan Peninsula (41 species)" (DELTSHEV 2005: 309). Following this author, this phenomenon can be attributed to the relative isolation of the mountains compared with the lowlands in the context of paleo-environmental changes since the Pliocene. MAURER & HÄNGGI (1990) disclose in their catalogue of Swiss spiders a value of 7 % of merely alpine species – i.e. just partly endemic or subendemic taxa of Switzerland. The spider fauna of the Caucasus, comprising Armenia, Azerbaijan and Georgia as well as parts of the Iran, Turkey and Russia, is poorly known; the value of endemic spiders is 22 % (> 226 endemics from a total of 1022 species) (MARUSIK et al. 2006).

Conclusions

The presented results provide a valuable basis for both zoogeographical inferences involving glacial refugia and postglacial re-colonisation of the fauna of the Alps as well as conservation planning in Austria.

Although known from other animal groups, the high diversity of endemic spiders and harvestmen from the Gurktaler Alps and the Gesäuse National Park (KOMPOSCH 2010) was surprising. Further faunistic and taxonomic work especially in these areas should bring forward new and undescribed species. As pointed out before, the status of subendemism strongly relates to its definition. A second step towards the recording and documentation of the subendemic fauna of Austria – and the endemic fauna of the Alps – is urgently needed. From the conservation perspective it is not acceptable to pay attention merely to species with a 75 % area-quotient within national borders. Taking into account the fact that several rare, small scale-distributed and endangered species share their area equally within two or three countries (e.g. within

the south-eastern Alps: Slovenia, Italy and Austria), only a percentage of about 20 clearly leads to a main distribution within each country and consequently to a main responsibility for each country.

The need for action is great, and the time pressure due to habitat destruction and climate warming is high. The following four steps should be rapidly undertaken:

1) Clarification of targets and general conditions of a national and international protection concept, including basic research, politics, protection measures, university training and public relations (KOMPOSCH in press a).
2) Identification and prioritisation of endemic taxa (local, regional and endangered endemics) and regions (hotspots of endemism) – with continuative and representative mappings – with a high need for protection.
3) Drafting of specific protection measures, showing deficits of knowledge and priorities of research. Stopping the loss of organismic biologists and specialists able to identify a species.
4) Implementation of the protection concept (e.g. KLAUSNITZER 2010) (anchoring the protection of endemics in federal conservation laws as well as in the FFH-directive of the European Union), accompanied by long-term monitoring and readjustment of measures.

Conservation efforts must focus on these unique treasure of our Alpine fauna.

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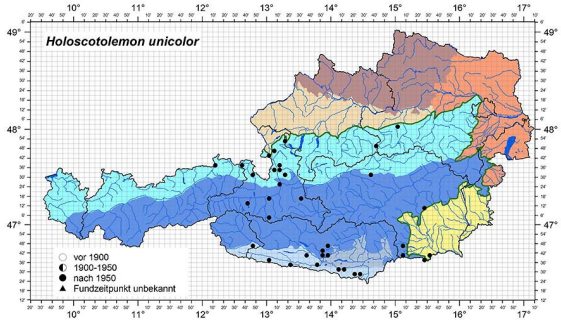
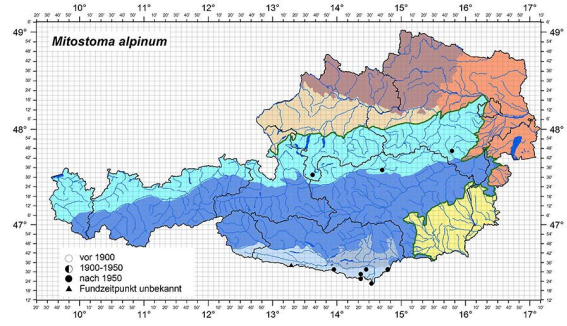
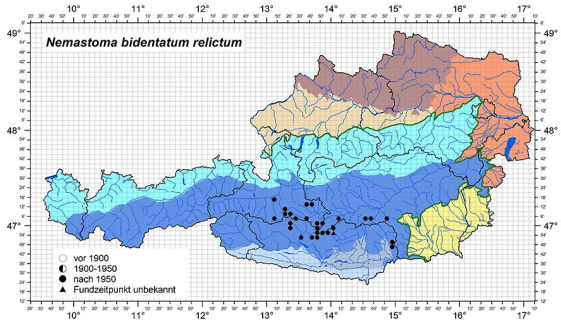
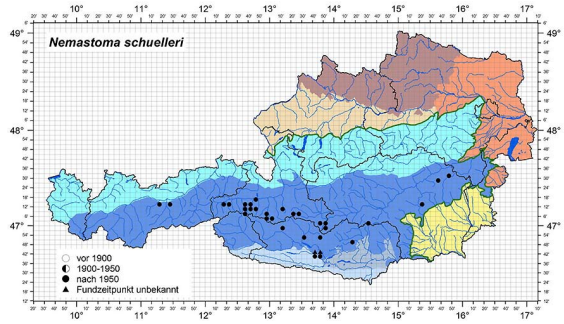
Appendix 1: Distribution patterns for endemic and subendemic harvestmen (Opiliones) in Austria – 11 maps.






Nemastoma bidentatum relictum
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Nemastoma schuelleri
vor 1900
1900-1950
nach 1950
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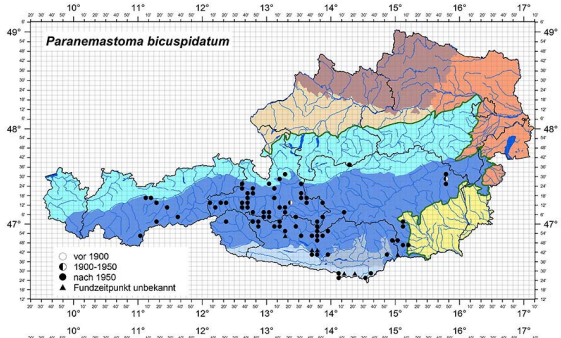
Paranemastoma bicuspidatum
vor 1900
1900-1950
nach 1950
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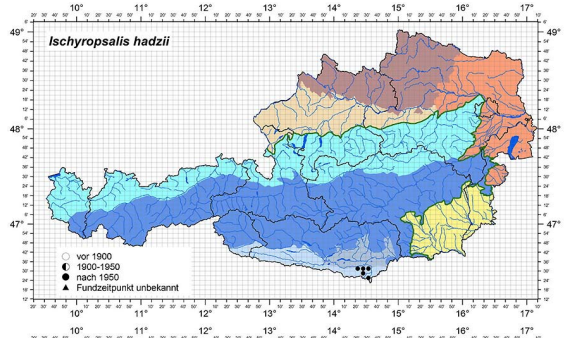
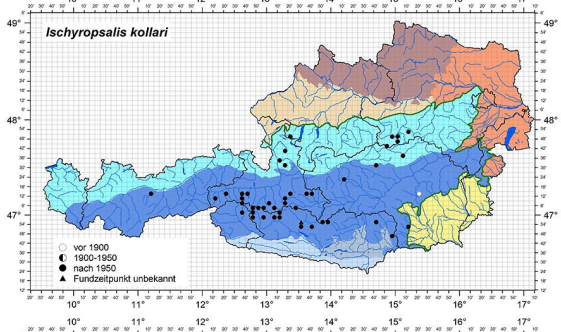
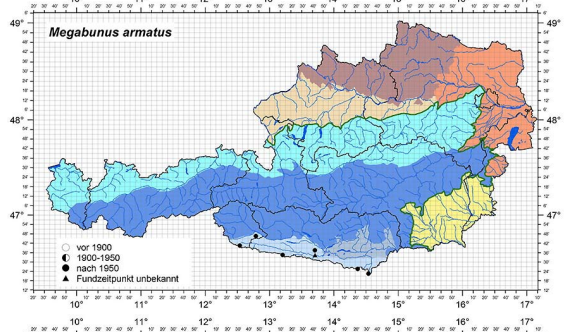
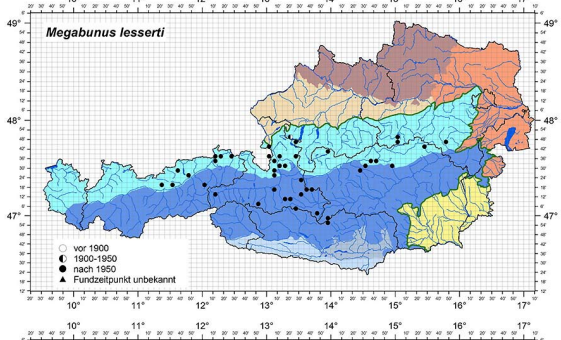
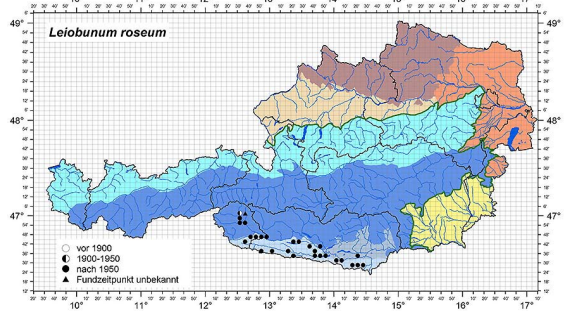
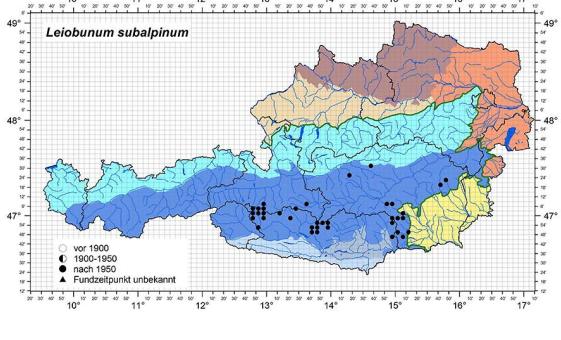

Ischyropsalis hadzii
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Ischyropsalis kollari
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

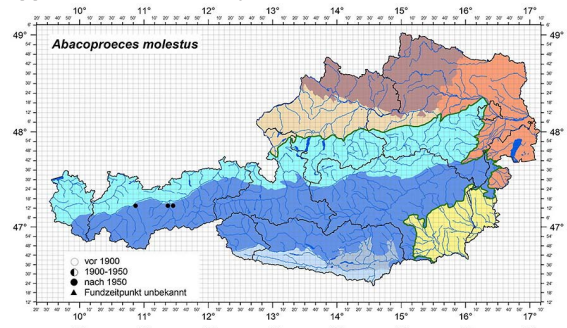

Megabunus armatus
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

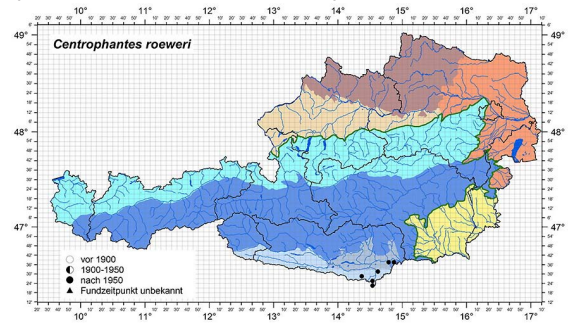

Megabunus lesserti
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

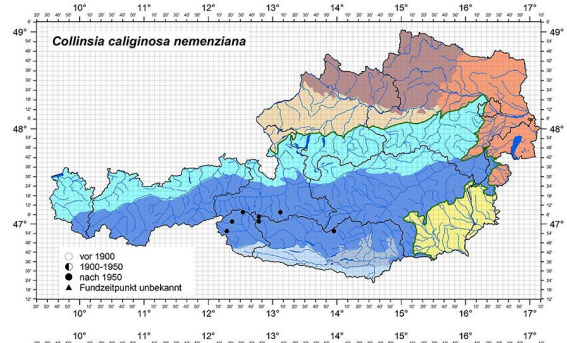

Leiobunum roseum
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

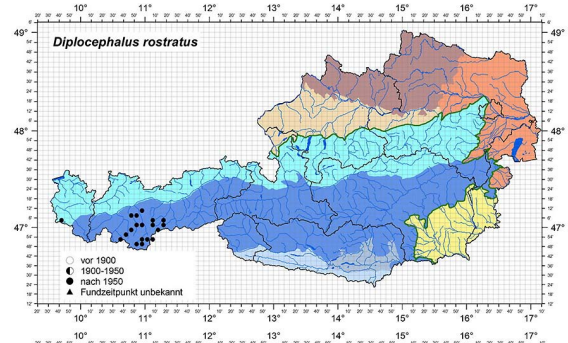

Leiobunum subalpinum
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

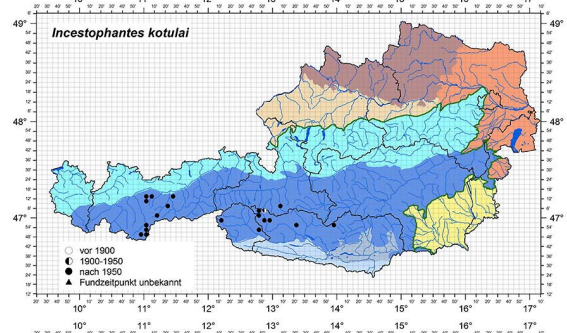
Appendix 2: Distribution patterns for endemic and subendemic spiders (Araneae) in Austria – 46 maps.

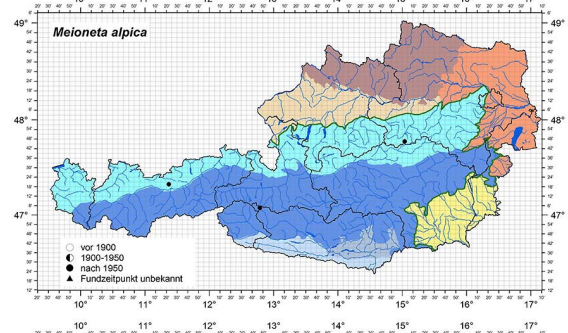


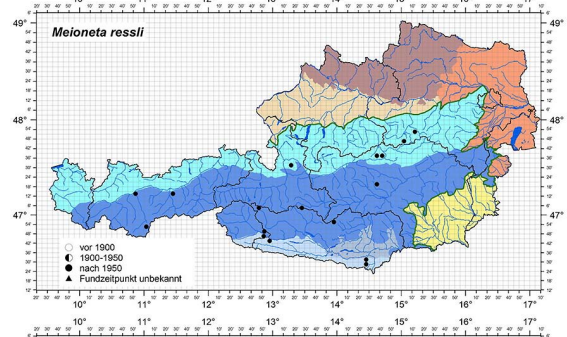


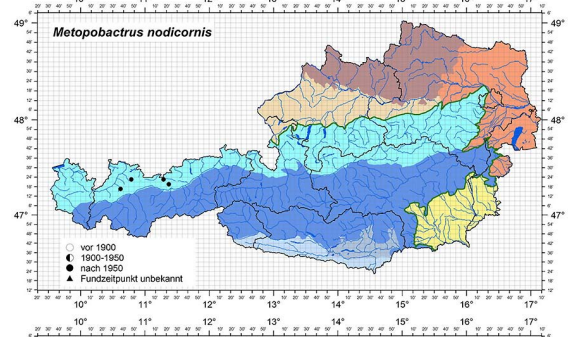


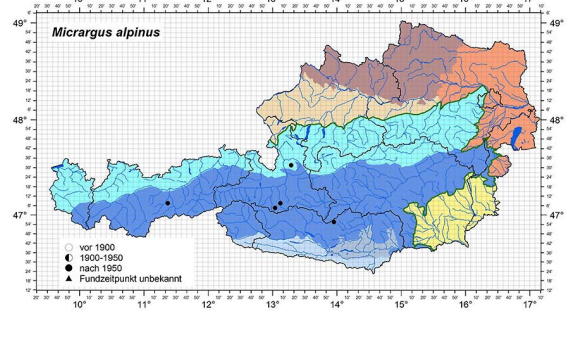


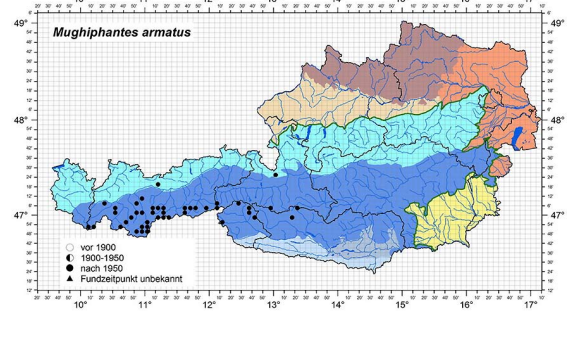


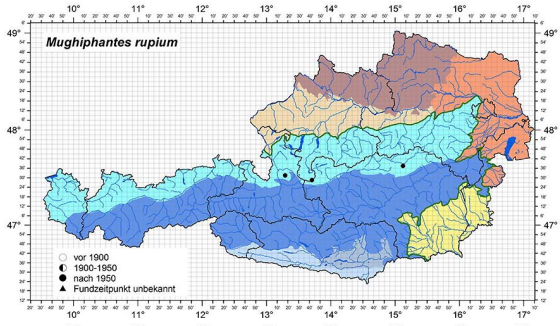


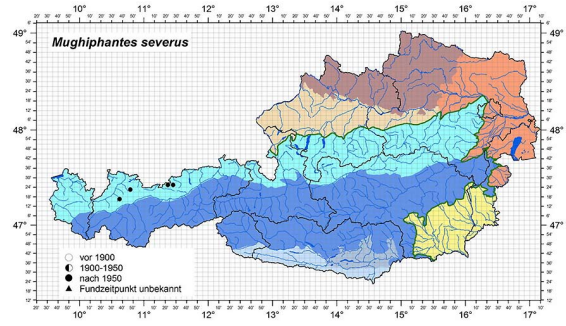









Mughiphantes rupium
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Mughiphantes severus
vor 1900
1900-1950
nach 1950
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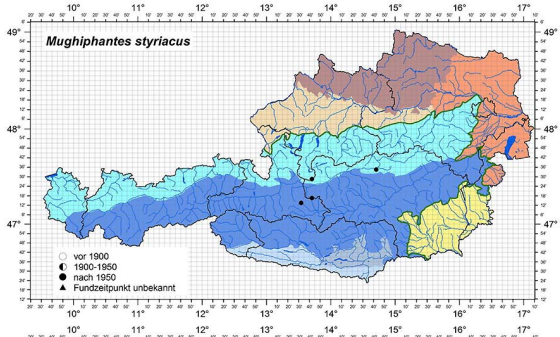
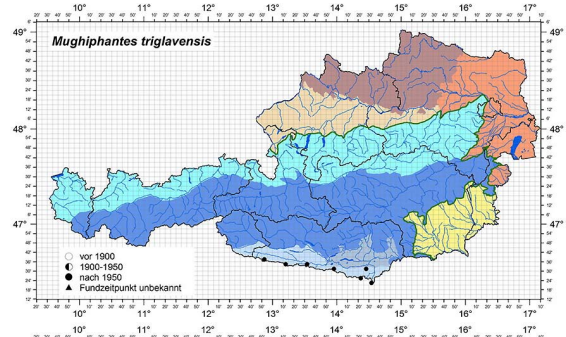
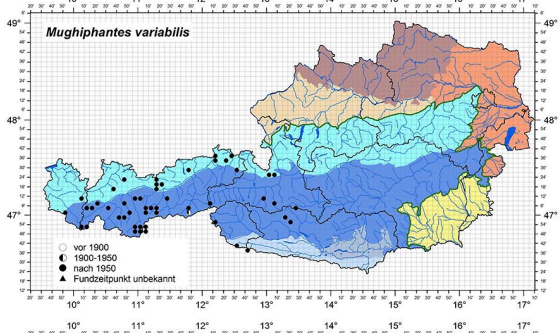
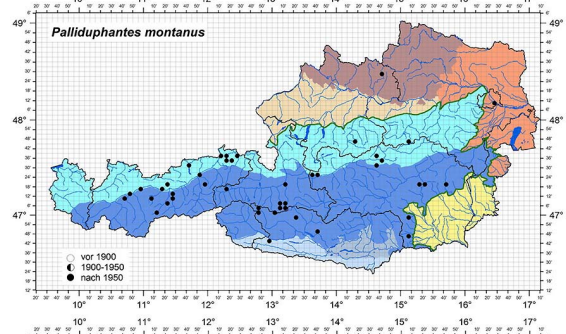
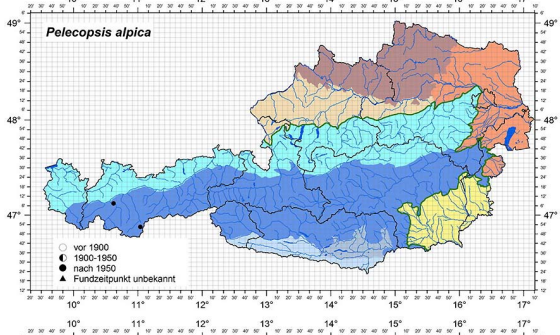
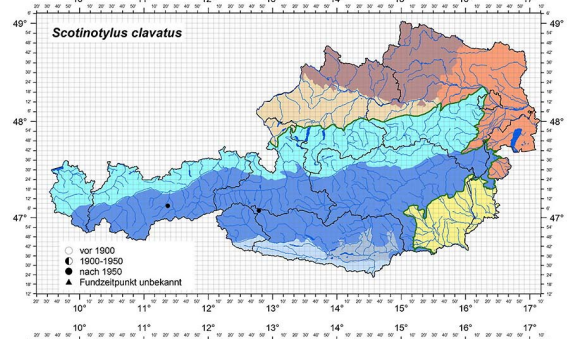

Mughiphantes styriacus
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Mughiphantes triglavensis
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Mughiphantes variabilis
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Palliduphantes montanus
vor 1900
1900-1950
nach 1950


Pelecopsis alpica
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Scotinotylus clavatus
vor 1900
1900-1950
nach 1950
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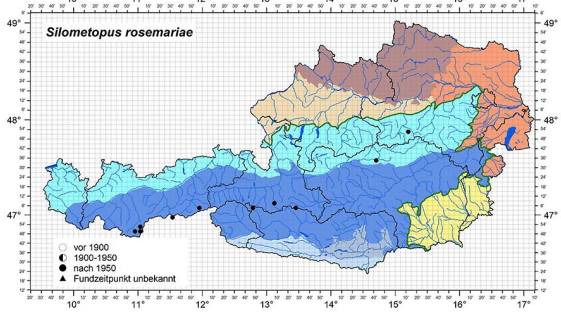
Silometopus rosemariae
vor 1900
1900-1950
nach 1950
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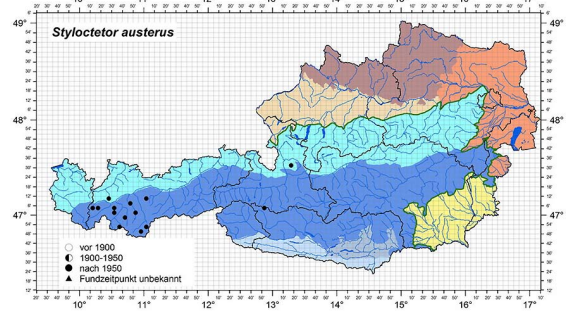
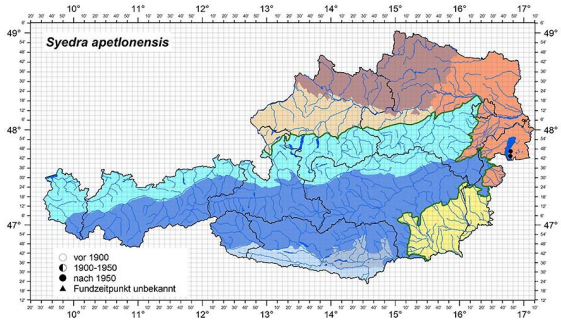
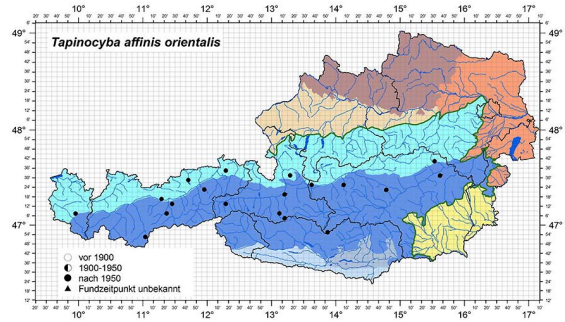

Styloctetor austerus
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Syedra apetlonensis
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Tapinocyba affinis orientalis
vor 1900
1900-1950
nach 1950
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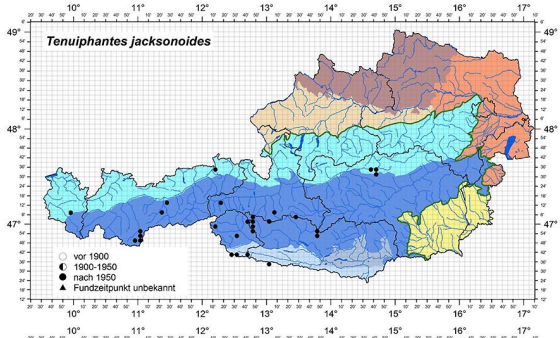
Tenuiphantes jacksonoides
vor 1900
1900-1950
nach 1950
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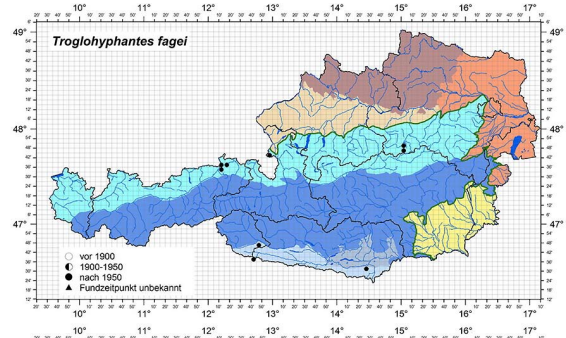
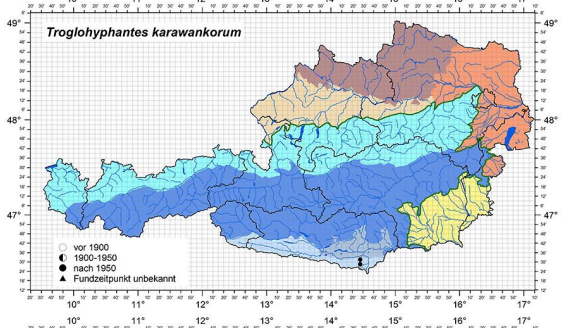

Troglohyphantes fagei
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Troglohyphantes karawankorum
vor 1900
1900-1950
nach 1950
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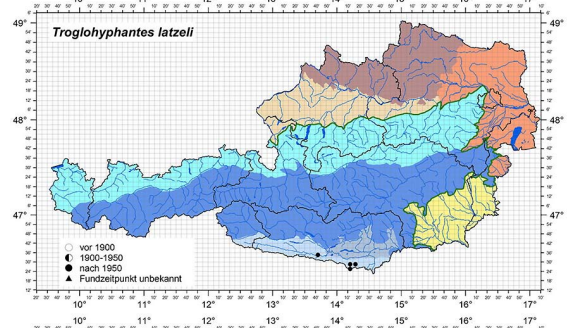
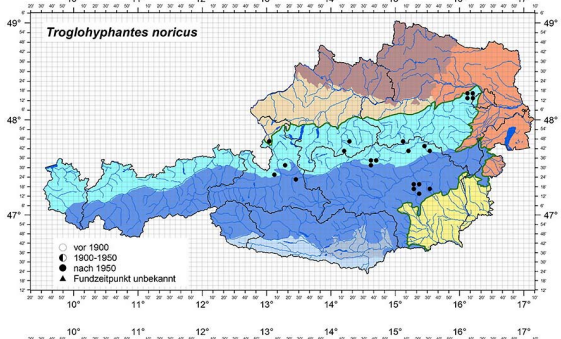

Troglohyphantes latzeli
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Troglohyphantes noricus
vor 1900
1900-1950
nach 1950
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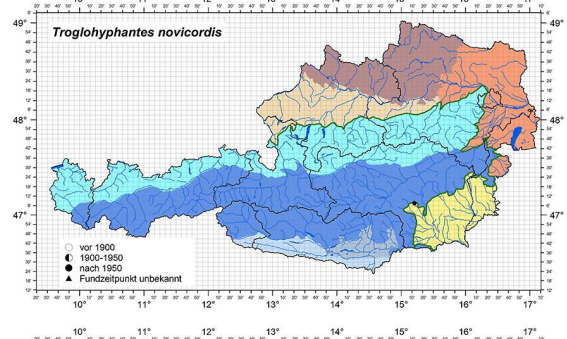
Troglohyphantes novicordis
vor 1900
1900-1950
nach 1950
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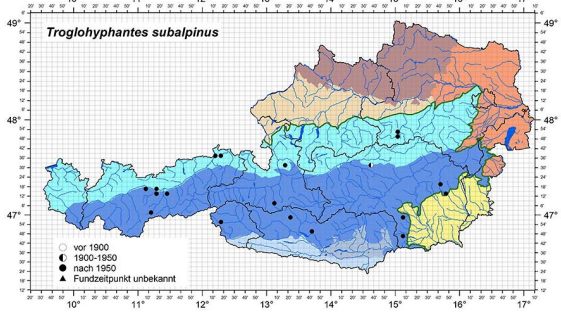
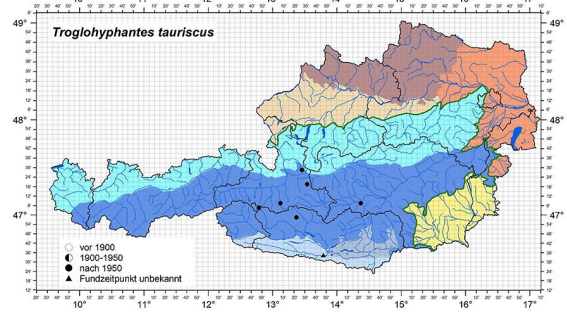

Troglohyphantes subalpinus
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Troglohyphantes tauriscus
vor 1900
1900-1950
nach 1950
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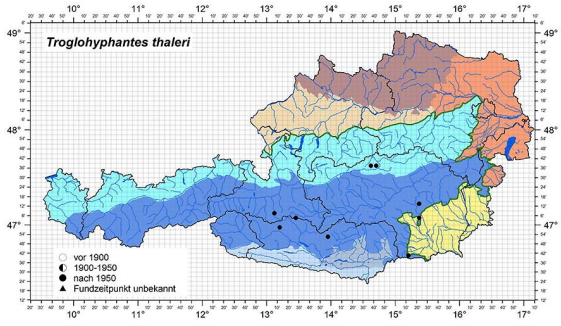
Troglohyphantes thaleri
vor 1900
1900-1950
nach 1950
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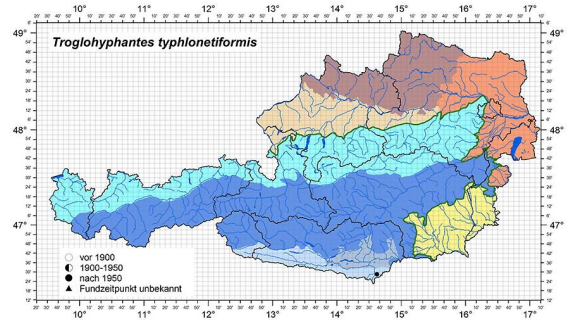
Troglohyphantes typhlonetiformis
vor 1900
1900-1950
nach 1950
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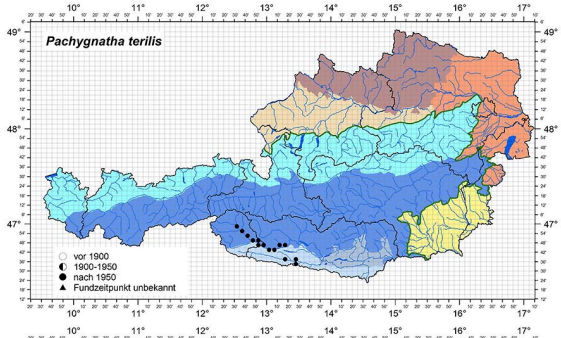
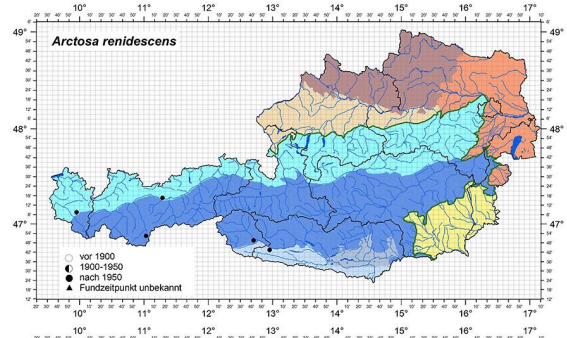
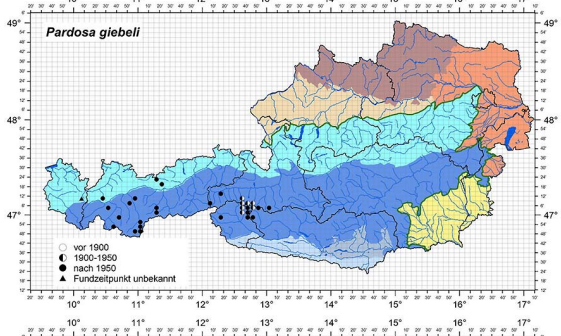
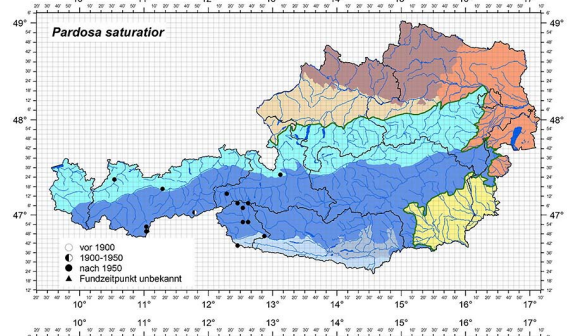
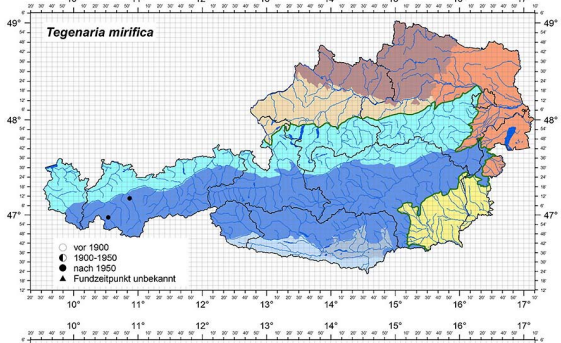
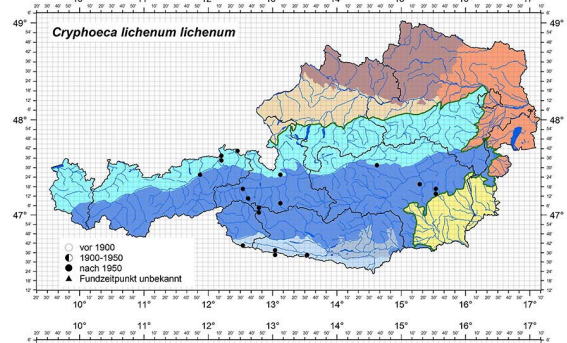

Pachygnatha terilis
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

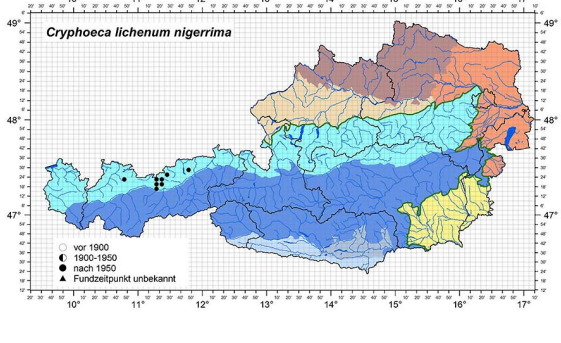

Arctosa renidescens
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

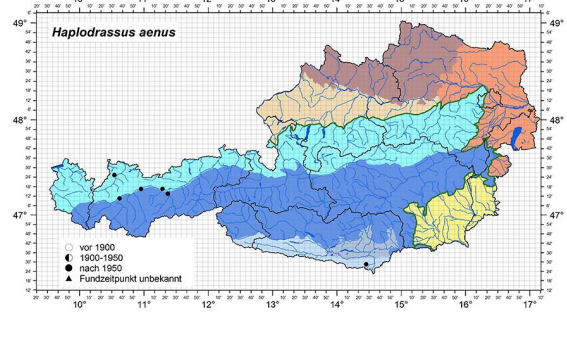

Pardosa giebeli
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

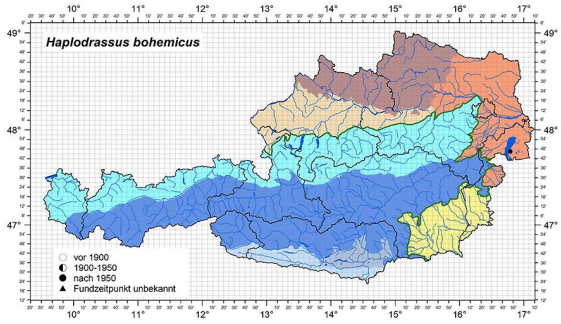

Pardosa saturatior
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

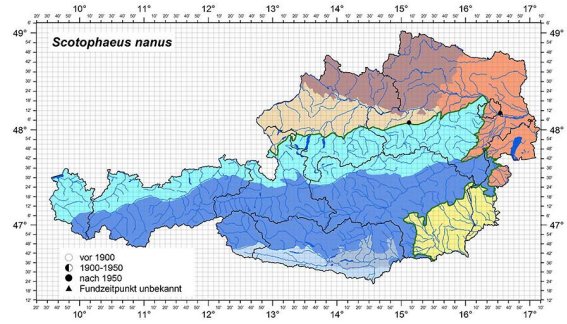

Tegenaria mirifica
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

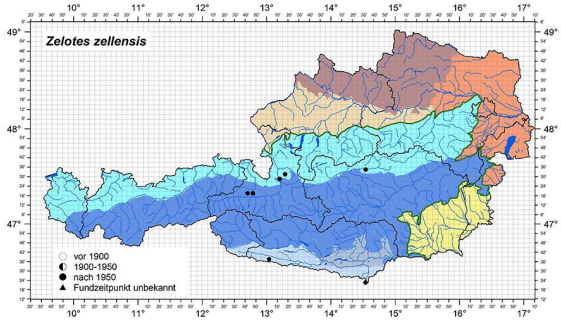

Cryphoeca lichenum lichenum
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

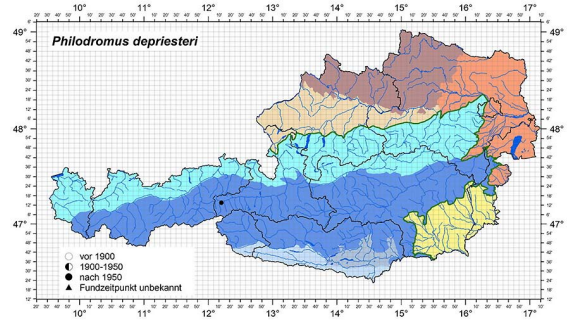

Cryphoeca lichenum nigerrima
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

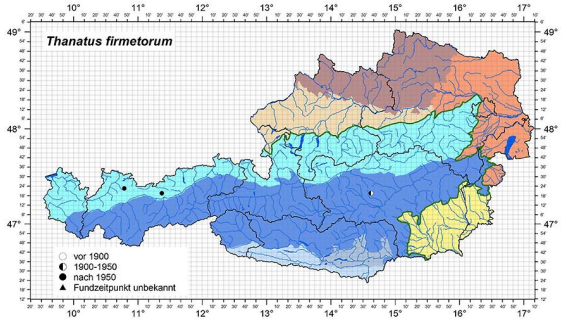

Haplodrassus aenus
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt

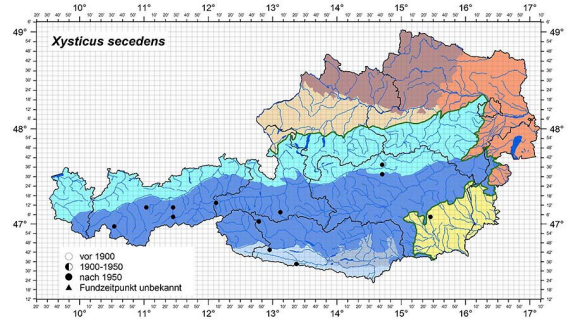

Haplodrassus bohemicus
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Scotophaeus nanus
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Zelotes zellensis
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Philodromus depriesteri
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Thanatus firmetorum
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt


Xysticus secedens
vor 1900
1900-1950
nach 1950
Fundzeitpunkt unbekannt