

## Zoogeographical features of the European Fauna of Salticidae (Araneae), an overview of 30 years of research

par  
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"... Sto mil od brzegu i sto mil za brzegiem ...  
... Nowi gdzieś ludzie w sto lat będą po mnie  
patrzący marli ..."  
[... Hundred miles to coast and hundred off coast  
..... New men somewhere hundred years later  
will die looking on ...]  
(Juliusz Słowacki, "Hymn", 1836-1837)

After two centuries of research, half way in study of taxonomy and zoogeography of *Salticidae*, how much have we progressed and what progress may be expected in the future?

We started endowed by our predecessors with a wealth of preliminary data and their numerous ... mistakes. How grateful we should be for these mistakes! Would we have an incentive for research if our predecessors were infallible? Just let us recollect our discussions running so often along the line: "species X differs from Y by character Z which was overlooked (or misinterpreted) by the ancestor A, ONLY I managed to put it straight". I suppose that our own mistakes may provide similarly valuable inheritance to the coming generations of Arachnologists!

When I got interested in zoogeography, in the middle of 1950ties, the standard procedure was defining species as the "zoogeographical elements", usually within limits of the known part of Europe. So "*Philaeus chrysops*" was considered either "Pontic" or "Mediterranean element" whilst some other species were Boreo-Alpine, there were even "Gondwanian" elements. I started from taxonomic recognition and geographical pinpointing of species. A simple statistics of distribution gave first ideas on grouping Salticidae over the continents and on faunal units we are to deal with (Prószyński 1975).

We can smile now on crude approximations, sometime erroneous, with incomplete data and misinterpretation of systematic relations; on controversies overlooking difference in time of evolutionary radiation and dispersal abilities of taxa. As I understand now, there is more than one type of distribution, so contradictory conclusions drawn from different taxa do not necessarily must be wrong.

Filling up a jigsaw puzzle of relationships of species and plotting their distribution on maps shown regularities in distribution of closely related species, assumedly due to geography of speciation and subsequent dispersal (Prószyński 1975, 1976, 1978b, 1980a, 1981a, b). Even more important seem significant departures from these regularities in Europe and Siberia (PROSZYNSKI 1983a, 1986a&b, 1988) due to Ice Age destruction of environments and subsequent recolonization.

And so the Salticidae fauna of Europe is an incidental assemblage of species, of "geographical elements", and not a natural "society", developed on the spot, comparable to those on "luckier" continents. The term "geographical element" is conceptually different here from that used in 1950ties, it defines species by their area of origin, or at least by the area they came from. No longer can the same species be labelled as different element at opposite ends of its distributional range: Mediterranean in Poland, Central European in Italy. What matters is *where it came from*, and *when*. The time aspect is of utmost importance in these considerations. The age of recent Central European Salticidae fauna is only 10,000 years, no species surviving the Glacials on the spot, in difference to the cold adapted groups; but some of these Salticidae could recolonize during subsequent Interglacials. Very old elements like Gondwanian (meaning arrived from Gondwana and survived since) seem improbable in Palaearctics, due to stormy history of environmental changes.

The time factor in evolution of Salticidae remains uncertain. What is the age of particular taxa? What time is needed for speciation of a single species? For developing of a large genus? For decline of taxa previously dominant? Answer to these questions calls for comparison of faunae of areas of known geological age outside Europe, too young for that purpose. We need also better knowledge of taxonomy of Salticidae of other continents. A task for years. One may envy relict families, where each distributional spot may testify to the history of hundred of millions of years and to planetary processes like plate tectonics. However, numerous and differentiated family like Salticidae offers definitive methodical advantages: broad scale of variation, wealth of cases for comparison, opportunities for testing hypotheses.

Lets' recollect current views on our young European fauna of Salticidae. European fauna is not a proper unit in faunal distribution; the real one seem to be Eurosiberian fauna, stretching from Atlantic to Pacific, limited in the South by the Mediterranean coast, as well as grassland and desert environments of Asia. Southern neighbors of our fauna seems different than heretofore accepted. Mediterranean fauna, from which so many species migrated to Eurosiberia, seems to be limited to coastal lowlands of Western Mediterranean, and only rudimentarily represented in the Near East. The dry parts of Near East and Africa are in fact populated by different fauna called Eremial (POR 1975), intergrading to the South with Ethiopian (Afrotropical). Southern Palaearctic fauna of grasslands, semideserts and deserts, of different origin, intermixed

with Eurosiberian one during postglacial Northern dispersal; contains also old Ice Age Eurosiberian relicts in the Middle and Central Asian Mountains, which produced local endemic species. The Oriental fauna is sharply separated along Southern slopes of Himalayas and connected mountains, but intergrading in Eastern China, Korea and Primore, its influences visible as far as Baical Lake.

The Eurosiberian fauna itself strikes by the similarity of ranges of many widespread species: once entered the Eurosiberian Zone they spread quickly from one end to the another. The postglacial colonists come from around the Zone and so we trace species of presumably N-American origin from E-Siberia to the Atlantic; the Mediterranean and Eremial elements reaching E-Siberia; Southern Palaearctic species spreading beyond the Arctic Circle. Of special importance is recolonization from warmer enclaves by Glacials survivors of various origin, presumably repeated during subsequent Interglacials, and a few autochthonic preglacial genera (*Sitticus*, *Euophrys*) and preglacial colonist from Africa (*Heliophanus*). There are almost no cases of speciation in the Eurosiberian zone itself (an exception is *Sitticus rupicola*), although there are some pairs of sister species in the peripheral areas.

The general feature of Salticidae in Europe is the South-North decrease of a number of species (over 100 species in the Mediterranean coastal area, 75 in Czechoslovakia, 51 in Poland and 12 beyond Arctic Circle in Scandinavia -PROSZYNSKI 1976), due to halt in spreading by gradually cooler climate. Current research (VILLEPOUX 1986) corrected suspicion on Northern origin of a peat bogs (hochmoors) dweller *Heliophanus dampfi*, found in the Massif Central and possible even in Spain, it may be also a Southerner. Little is known on distribution of local species in W-Europe.

My recent work on a *Key to European Salticidae* gave me a sense of limitation of our knowledge. Some species are known from a single or a few specimens only. Biology and environmental requirements of majority is virtually unknown; matching of sexes uncertain. Paradoxically enough, a distinct progress in research during last decade is visible in Siberia, Middle Asia and China, with a good potential for further development. There appeared a generation of talented researchers, not yet spoiled by a freedom of exotic travels. We may expect quite a lot from them.

What broadening of our knowledge may we expect in the future, apart from improving recognition of species, description of new taxa, new details of distribution? Will our generalizations stand the test of time? That's unknown, but even if they provide only a challenge, they shall be at least useful.

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