

Scientific Report

ESF Exploratory Workshop: Pattern and Process in Balkan Biodiversity

Drs. B Kryštufek and H.I. Griffiths (*deceased*)

26-29 September 2001, Koper, Slovenia

1. Executive summary

The ESF Exploratory Workshop, *Pattern and Process in Balkan Biodiversity*, took place in the Faculty of Humanities, Science and Research Centre of the Republic of Slovenia, Koper, Slovenia, during 25-28 September, 2001. It was organised jointly by the University of Hull (UK) and the Koper Science and Research Centre (Slovenia), and convened by Dr Huw I. Griffiths (UK) and Dr Boris Kryštufek (Slovenia). The organising committee included two additional members: Prof. Dr. Darko Darovec (Science and Research Centre of the Republic of Slovenia, Koper) and Dr. Lovrenc Lipej (Slovenia).

Twenty of the 23 invited delegates (*cf.* pt. 5) attended the Workshop. Three missing delegates (P. Banarescu, G. Catsadorakis, and M. Kalezic) submitted abstracts for the meeting; M. Kalezic submitted a paper which was presented by a third party at the Workshop, while P. Banarescu subsequently submitted a written paper for publication. Five presentations were co-authored by researchers who were not present at the meeting. The actual number of people involved in the Workshop thus exceeded the number present, and also included: Dr. Richard C. Preece (Department of Zoology, University of Cambridge, UK), MS Rudi Verovnik (Department of Biology, University of Ljubljana, Slovenia), Dr. Martina Podnar (Institut Ruder Boškovic, Zagreb, Croatia; attended the Workshop), Dr. Werner Mayer (Naturhistorisches Museum Wien, Vienna, Austria), MS Eduard Kletecki (Croatian Natural History Museum, Zagreb, Croatia), Dr. Georg Džukic (Institute for Biological Research, Beograd, FR Yugoslavia), Dr. Tanja Pipan (Karts Research Institute, Postojna, Slovenia), and Dr. Jakov Dulcic (Institute of Oceanography and Fisheries, Split, Croatia).

The Workshop was attended by Prof. Gabor Vida, delegate of the European Science Foundation. The Slovene Science Foundation (SSF) were also invited; the representative sent apologies for his absence, and the SSF was sent instead a full copy of the Programme and Abstracts, published in the journal, *Annales* (see below).

The Programme and Abstracts were published in the journal, *Annales* (Annals for Istrian and Mediterranean Studies, Seria historia naturalis, 11, 1(23), 2001) and were distributed to all participants (copy enclosed). This included 19 abstracts by 28 authors.

Two short, guided excursions were organised in conjunction with the meeting. The delegates visited the historical centre of the town of Koper On Thursday, September 27th. A post-conference excursion took place on Saturday, September 28th, to the Škocjanske jame Caves (a UNESCO site) and included a tour of the karstic landscape of south-western Slovenia, with information provided by local scientists on the geography, geology, and vegetation of the region. Those accompanying delegates to the meeting were also offered daily short excursions in the vicinity of Koper.

The organisers provided transport to all delegates to and from airports and railway stations in Ljubljana or Trieste. The delegates were accommodated in the Hotel Koper, within five minutes' walking distance of the Faculty of Humanities building.

The Workshop attracted considerable public attention and was broadcast on a local and national level. An interview with the two main convenors, for example, was published as a two-page article focusing on Balkan biodiversity issues, in the scientific section of the main Slovenian daily newspaper, *Delo*, on December 5th, 2001 (copy enclosed).

2. Scientific content

The main objective of the exploratory workshop was to bring together workers from a particularly wide range of complementary specialist fields, to provide a new and synthetic overview of the underlying evolution, structure and function of Balkan biodiversity at a variety of different scales, and the effects and possible remedies of anthropogenic impact.

It is well known that the biological diversity of the Balkan peninsula is extraordinary within Europe as whole, but collaboration between scientists from the various Balkan countries has traditionally been weak due to a tragic history of widespread ethnic, political and ideological division. In addition, access to many parts of the region for foreign researchers has been difficult until very recently. As a result, there have been no comprehensive studies of the Balkan biodiversity beyond that of the national level. Patterns of biodiversity remain poorly documented and the underlying process not adequately understood. Even in outstanding works, such as the recently published overview of the ecological history of Mediterranean Europe (Grove, A.T., and Rackham, O. 2001. *The Nature of Mediterranean Europe. An ecological history*. Yale University Press, London), the entire peninsula, with the exception of Greece, is simply left blank.

The workshop's primary aim was thus to develop a more full and integrated appreciation of patterns and process in Balkan biodiversity, from both evolutionary and phylogeographic perspectives. There was an additional emphasis on (palaeo-)anthropogenic impact, palaeogeography and palaeoclimatology as influences on the generation (or loss) of biodiversity.

Details of presentations are given in the *Annales* volume of programme and abstracts. Of the 23 presentations listed, two were cancelled (P. Banarescu, G. Catsadorakis); one of them was replaced by an additional, impromptu talk by the convenors on human – brown bear conflicts in Slovenia and GIS modelling of habitat suitability for the brown bear.

The majority of presentations (twelve) focused on modern patterns of biodiversity in flora (two presentations) and fauna (ten). The range of flora and fauna included both the macroscopic (e.g. mammals, vegetation distribution and history) and microscopic (e.g. molluscs, algae) scale. Six presentations were from a palaeoenvironmental perspective, and five concerned genetics, phylogeography and speciation. A single presentation was on anthropology. The talk by Frogley & Preece focused on both modern and fossil

assemblages, and is thus counted twice in the above statistics. The majority dealt with terrestrial and freshwater habitats, with a fairly even mix, and one presentation was on marine biota.

The scientific rigour of the great majority of presentations was high. Since contributors focused on patterns and process (ignoring taxonomy as much as possible), this generated discussion of broader topics than the participants' main areas of taxonomic expertise, and enabled us to achieve our objective of reaching general conclusions concerning pattern and process in Balkan biodiversity.

The main conclusions may be summarised as follows

The Balkans are the hot spot of European biodiversity.

- i. The biodiversity of the Balkans has not been stable, but has fluctuated over its recent geological history (last *ca.* 150,000 years).
- ii. Not all parts of the Balkans (or particular types of biota) exhibit the high degree of endemism that is commonly assumed.
- iii. A major focus of long term stability in biodiversity can be identified in the mountains of western Greece (the Pindos Mts.) and adjacent Albania, Macedonia and Montenegro.
- iv. An important influence on biodiversity has been the immigration of central Asian steppic elements during different interglacial periods. This has had a significant effect on both (a) Balkan biodiversity and (b) that of Europe as a whole.
- v. Accelerated human impact, particularly over the last *ca.* fifty years, will cause a significant loss of regional biodiversity if suitable environmental management policies are not maintained for both terrestrial and freshwater environments

3. Assessment of the results, contribution to the future direction of the field, outcome

Considering the enormity of biodiversity as an environmental issue on the one hand, and the fairly limited number of delegates on the other, we believe we achieved the best possible outcome from the Workshop, the results of which were very positive. The main achievements may be summarised as follows:

- i. a representative collection of academic papers which critically assess our current understanding of pattern and process in the Balkan biodiversity, including strengths and weaknesses of current approaches, and
- ii. definition of a framework for future research.

In regard to point (i), the convenors have signed a contract with Kluwer, Academic Publishers B.V. (on November 26th, 2001) to publish papers from the Workshop as a book, edited by the convenors (copy of the Editor's agreement enclosed). Following the death of H.I. Griffiths, and delays in editing caused by his illness, the current deadline for submission is March, 2003. We will achieve this deadline.

In regard to point (ii), the convenors prepared a preliminary draft of future priorities for field and laboratory research, together with a framework within which this is to be organised. The objectives of this framework were to build upon the achievements of the Workshop by setting up a series of key thematic projects to investigate the topic of pattern and process in Balkan biodiversity in more detail. To this end three multinational working groups were established, whose broad areas of remit are modern biological diversity, past biological diversity and the phylogeography of key evolutionary groups, respectively. Each working group was led by a recognised authority in the field and the overall thrust of the combined research effort was to be co-ordinated and monitored by a ten-person scientific panel consisting of working group members representing the constituent disciplines and nations involved. The convenors stayed in contact with Prof. Vida as an ESF representative, with a view to carrying out this project within the ESF exploratory network. Funds were sought to (i) operate

feasibility studies for three focused research modules, and (ii) to arrange a meeting of all collaborators to establish work domains, harmonise laboratory and field protocols and establish administrative structures. This initial framework for future research was as follows:

Working group I: Modern biodiversity

Group leader: Boris Krystufek (Slovenia)

1. David Watts (UK) – vegetation community structure
2. Tone Wraber (Slovenia) – plant taxonomy
3. Alexei Kornushin (Ukraine) – malacology
4. Zoltan Vargo (Hungary) – entomology
5. Christo Deltchev (Bulgaria) – invertebrate predators
6. Vladimir Vohralik (Czech Republic) - small terrestrial mammals
7. Boris Krystufek (Slovenia) – biogeographic patterns
8. Giorgos Catzadorakis (Greece) – ornithology
9. Yilmaz Camlitepe (Turkey) - entomology
10. Graham Ferrier (UK) – GIS and remote sensing

Topic 1: elevational distributions

Topic 2: mountains as islands

Topic 3: interrelations between habitat complexity and community structure

Topic 4: relict groups

Topic 5: hot spots

Working group II: Paleoecology

Group leader: Huw I. Griffiths (UK*). New leader to be appointed.

1. Nina Galanidou (Greece) – archaeology
2. Chronis Tzedakis (UK) – palaeoclimatology
3. Warren Eastwood (UK) – palynology
4. Jane Reed (UK) – palaeolimnology
5. Mick Frogley (UK) – palaeomalacology
6. Huw I. Griffiths (UK) - palaeobiogeography
7. Melanie Leng (UK) – stable isotope analysis

8. Popov (Bulgaria) or Gerhard Storch (Germany) – Fossil mammals

Topic 1: palaeoclimatic and palaeovegetational records from Lake Prespa and other suitable water bodies

Topic 2: assessment of palaeoanthropogenic impact

Topic 3: palaeoclimatology

Topic 4: temporal fluctuations in biodiversity

Topic 5: colonisation and migration

Topic 6: human dispersal

Working group III: Phylogeography

Group leader: Jan Zima (Czech Republic)

1. Angus Davison (UK) – molecular phylogeography

2. Martina Podnar (Croatia) – molecular phylogeography

3. Jan Zima (Czech Republic) – cytogenetics

4. Czech Republic- additional collaborators to be arranged

Topic 1: molecular phylogeography of *Dinaromys bogdanovi* and integration of molecular, morphological and parasitological data.

Topic 2: chromosomal speciation in *Nannospalax leucodon* group and microtectonics

Topic 3: mound building house mice

Topic 4: microvicariance and speciation in wall lizards genus *Podarcis*

*On 12 June, 2002, Huw Griffiths died of cancer at the age of 44. Since he was a keystone of the research group, plans for future research have obviously been delayed, and will undoubtedly change somewhat. In his own words, Huw regarded this research enterprise as 'a testimony to my life's work'. As noted, an extension for the book has been granted by Kluwer and this is currently our top priority. We are determined to continue in future research, partly as a tribute to Huw.

4. FINAL PROGRAMME

Tuesday, September 25th

19.00 Formal address by the organising committee and the Deputy Mayor of Koper

Wednesday, September 26th

09.45 Flecker, R.: Evaluating marine connections between Paratethys and the Mediterranean in the Late Miocene

11.00 Galanidou, N.: The environmental impact of prehistoric human groups on the Balkan landscape

11.45 Sket, B.: An alternative biogeographical regionalization of Slovenia

14.00 Eastwood, W.J.: Late quaternary climate change in the Eastern Mediterranean

14.45 Watts, D.: Biotic interactions and environmental change in the Balkans during the Holocene

16.00 Wraber, T.: Dinaric floral diversity.

16.45 Tzedakis, P.C.: Response of glacial tree populations in Greece to orbital and suborbital climate variability

Thursday, September 27th

09.00 Frogley, M.R. & Preece, R.C.: A faunistic review of the modern and fossil molluscan fauna from Lake Pamvotis, Ioannina, an ancient lake in NW Greece: implications for endemism in the Balkans

09.45 Griffiths, H.I. & Frogley, M.R.: Fossil ostracods and faunistics: what they tell us about the evolution of regional biodiversity

11.00 Storch, G.: Pleistocene mammal dispersal

11.45 Reed, J.M.: Diatoms as biodiversity indicators in lakes of the circum-Mediterranean

14.00 Zima, J.: Small mammal biodiversity and cytogenetics

14.45 Trontelj, P., Verovnik, R. & Sket, B.: Cryptic speciation in Dinaric karst waters: molecular approaches reveal a new dimension of diversity

16.00 Podnar, M., Mayer, W., Tvrkovic, N. & Kletecki, E.: Phylogeny and biogeography of Adriatic lizards – a contribution to the Dinaric (Western Balkan) phylogeographic scenario

16.45 Economidis, P.: Speciation in Balkan loaches

Friday, September 28th

09.00 Korniushev, A.V.: Bivalve molluscs fauna of ancient lakes in the context of historical biogeography in the Balkan region

09.45 Đžukic, G. & Kalezic, M.: Diversity of amphibians and reptiles on the Balkan Peninsula (read by Griffiths, H.I.)

11.00 Deltchev, C.: A zoogeographical review of the spiders (Araneae) of the Balkan Peninsula

11.45 Kryštufek, B.: Mammal biodiversity in the Balkans

14.00 Kryštufek, B. & Griffiths, H.I.: Brown bear conservation in Slovenia: conflicts and GIS modelling of habitat suitability

14.45 Brancelj, A. & Pipan, T.: Micro and macroscale diversity of copepods in the subterranean realm of Slovenia

15.30 Podnar, M. & Mayer, M.: Intraspecific mtDNA variation in *Podarcis* lizards

16.15 Lipej, L. & Dulcic, J.: Factors affecting the diversity of the Adriatic ichthyofauna

5. Final list of participants

Prof. Petru Banarescu (not in attendance due to travel problems)

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6. STATISTICAL INFORMATION ON PARTICIPANTS

Gender

The Workshop was biased towards males, which reflects to a large extent the reality of gender division in macroscopic faunal studies in the Balkans; female delegates were specialists in microscopic or archaeological fields.

Sex	No.	Percentage
Female	3	13%
Male	20	87%

Age

The majority of participants were either between 40 and 50 years of age (thus at the peak of their research activity), or between 60 and 70 years (thus well established authorities). The average age of participant was *c.* 45 years.

Age (years)	No.	Percentage
> 70	1	4.3%
60 – 70	6	26.1%
50 – 60	2	8.7%
40 – 50	8	34.8%
30 – 40	6	26.1%

Nationality

Participants were from ten European countries. Half the delegates came from the UK and Slovenia. Other delegates came from six out of the total of ten Balkan countries.

Nationality	No.	Percentage
UK	6	26.1%
Slovenia	6	26.1%
Greece	4	17.6%
Bulgaria	1	4.3%
Croatia	1	4.3%
Czech Republic	1	4.3%
Germany	1	4.3%
Romania	1	4.3%
Ukraine	1	4.3%
Yugoslavia	1	4.3%