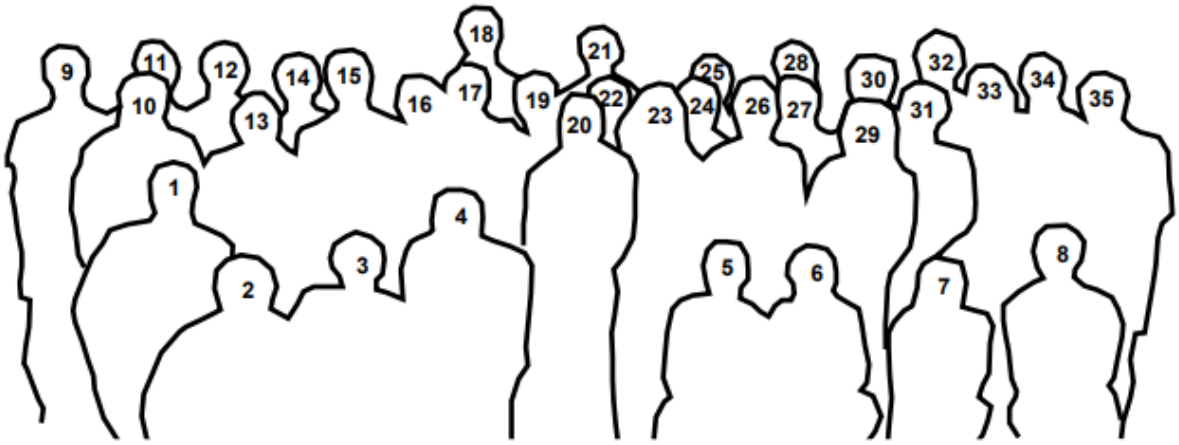
6th IRGC Symposium, Mendoza, Argentina



1. Josep Sanjuan 2. Esteban Musacchio 3. Licia Musacchio 4. Wolfgang Volkheimer 5. Johana Fernández 6. Eimi Font 7. Sheila Villalba-Breva 8. Cecilia Benavente 9. Leandro Rojo 10. Simone Baecker-Fauth 11. Joe Hannibal 12. Eduardo Cáceres 13. Aizhan Zhamangara 14. Irmgard Blindow 15. Carles Martín Closas 16. Ingeborg Soulié-Märsche 17. Kaire Torn 18. Hendrik Schubert 19. Thamis Meurer 20. Norma Bueno 21. Florian Dux 22. Aurelie Rey Boissezzon 23. María Rodrigo 24. Zofija Sinkevičieně 25. Sabina D'Ambrosio 26. Dominique Auderset-Joye 27. Mary Bison 28. Robin Scribailo 29. Petra Nowak 30. Jacob John 31. Mary Beilby 32. Michael Schudack 33. Susanne Schneider 34. Allan Chivas 35. Adriana García

Scientific Report of 6th IRGC Symposium

25 November to 27 November

The symposium was organized in the Conference and Exhibition Centre in Mendoza (Argentina) by Dr Adriana García with the help of Dr Leandro D. Rojo, Prof. Allan R. Chivas and Dr Eduardo J. Cáceres. It was dedicated to the memory of Prof. Eduardo A. Musacchio, who was a dedicated palaeontologist, the regional IRGC correspondent for South-America, and who intended to co-organize the symposium in Mendoza. The opening session started with welcoming words by Adriana García. Memories of Prof. Eduardo A. Musacchio and his work were shared by his colleague Prof. Wolfgang Volkheimer, IRGC President Prof. Carles Martín-Closas and his former student Dr Adriana García.

Three days (25-27 November 2012) were filled with 30 oral and many poster presentations about different aspects of charophytes. During the sessions about extant charophytes knowledge about new findings and ecological conditions suitable for charophytes from all over the world were presented. **Hendrik Schubert** (Germany) started with an overview about the targets, status, methods and some results obtained from the Rostock open access charophyte oospore databank. During monitoring studies in Lithuania, 12 species of charophytes were recorded from 33 lakes by **Zofija Sinkevičienė** (Lithuania). The life cycle of *Nitella gracilis* and *Nitella opaca* from three localities was recorded by **Dominique Auderset-Joye** (Switzerland) and **Aurélie Rey-Boissezon** (Switzerland). *N. gracilis* can survive the winter under the ice, while *N. opaca* disappeared after fructification. They also studied species-rich charophyte communities in a shallow lake in the Alps during four years. They highlighted that the coexistence of a large number of charophyte species is likely explained by the high variability of environmental conditions due to the very dynamic nature of the lake. **Kaire Torn** (Estonia) shared her results from experiments on the formation of extracellular sulphated polysaccharide mucilage on Australian *Lamprothamnium* in relation to habitat salinity. In contrast to the laboratory results, respective data from the field did not show a clear trend. With her very interesting talk **Petra Nowak** (Germany) won the first prize of the IRGC student presentations competition. She introduced a phylogenetic analysis of European charophyte species and discussed differences and similarities to morphologic traits.

Charophytes show species-specific optima with respect to environmental conditions. Different responses to UV-B radiation were described based on experiments with four charophyte species (presented by **Maria A. Rodrigo** (Spain) on behalf of **Fidel Rubio** (Spain)). In addition, species-specific allelopathic effects of charophytes were detected by **Maria A. Rodrigo** (Spain). *Chara hispida*, for example, revealed higher inhibitory effects compared to other tested macrophytes and charophytes. **Jacob John** (Australia) talked about artificial wetlands which were dominated by *Nitella* when then pH was neutral to alkaline. Due to changes in rainfall and temperature the lakes became acidic and charophytes declined drastically while the pH went down to less than 4.

Monday 26 November was started by **Robin W. Scribailo** (USA), who introduced the North American endemic species *Chara brittonii*. This species is one of the rarest charophytes in the world and is currently known only from three populations. The populations of *Chara brittonii* have low genetic diversity and may have been established by a small number of individuals. **Sabina D'Ambrosio** (Argentina) introduced the charophyte and ostracod distribution in the Laguna Llancanelo catchment. This lake is now familiar to most of us because of the field trips before and after the symposium. Intensive sampling of charophytes and measuring of environmental data from Paraná River which is on the border between Brazil and Paraguay allowed concluding that environmental factors can be used as predictor of charophytes presence or absence (presented by **Thamis Meurer** (Brazil). Light availability had the strongest influence on presence of *Chara* and *Nitella*. **Hendrik Schubert** (Germany) and **Irmgard Blindow** (Germany) improved remarkably the knowledge about the distribution of charophytes in Chile. Several herbaria were checked and over 200 field sites were visited. Up to now 26 taxa of charophytes were determined.

In the afternoon, **Susi Schneider** (Norway) presented results about the uptake and intracellular storage of hexachlorobenzene, a hydrophobic chemical, in *Chara rudis*. The ability of charophytes to adsorb chemicals was also discussed by **Robin W. Scribailo** (USA). Investigations were made to test the feasibility to develop a bioremediation system for removal of selenium from coal mining effluents based on charophytes. **Mary J. Beilby** (Australia) introduced a study about melatonin content and its effect on photosynthesis of *Chara australis*. The efficiency of photosynthesis increased remarkably after supplying exogenous melatonin to *Chara*. **Allan R. Chivas** (Australia) presented the work they have done to find biomarkers for charophytes based on extant *Lamprothamnium succinctum*. The same species was also used in experiments where the use of trace elements in gyrogonites

was tested, presented by **Florian W. Dux** (Australia). Calcium carbonate has the potential to preserve the hydrochemical signature of the environment. Several important relationships between trace-element composition and oxygen stable isotope fractionation in gyrogonites and habitat salinity and temperature were established.

The last day was dedicated to fossil charophytes. During the first talk **Ingeborg Soulié-Märsche** (France) pointed out that gyrogonites (calcified oospores) are the only means to establish the link between living and fossil charophytes. It is essential to investigate the life cycle of extant species in order to determine when, how, and under which conditions gyrogonites are produced. **Joe T. Hannibal** (USA) studied millstones. Fossil charophytes are a reliable tool to identify the origin of millstones exported from France to other countries all over the world. Biogeographic trends and evolution of charophytes from the Cretaceous to the Miocene were presented by **Carles Martín-Closas** (Spain). In the investigated area, the Upper Cretaceous charophyte flora was dominated by characeans and cosmopolitan species were absent. From the Miocene to the present the number of cosmopolitan species appeared to have increased steadily. New information about redefined biozones of the European Charophyte Biozonation was presented by **Josep Sanjuan** (Spain) based on data from the Upper Eocene to the Lower Oligocene. The onset of the first non-marine Upper Cretaceous deposits in the Pyrenees was characterized by **Sheila Villalba-Breva** (Spain) based on charophyte taxonomy, biostratigraphy and paleoecology. **Simone Baecker-Fauth** (Brazil) introduced the Santonian-Campanian charophytes of the Santos Basin. Two charophyte assemblages were recognized. The first one belongs to the *Lychnothamnus* (*Pseudoharrisichara*) *tenuis* zone, and the second to the zone *Lychnothamnus* (*Pseudoharrisichara*) sp. 1. **Cecilia Benavente** (Argentina) presented the finding of charophyte remains in the Cerro Puntudo Formation, which constitute the first record of the group for Gondwana in the Triassic. Previously, all registrations of charophytes for the Triassic were made in the northern hemisphere. The presentation of **Michael Schudack** (Germany) focused on temperature changes and microfossil evolution across the Eocene-Oligocene transition, with special emphasis on charophytes. Fossil charophytes were found in the Kebar Formation of Central Tunisia, presented by **Carles Martín-Closas** (Spain). These findings are interesting as they allow dating of a major stratigraphic gap related to subaerial exposure of this part of Tunisia during the Lower Cretaceous. Preliminary results of paleoecological investigations based on calcareous microfossil records from the late Quaternary alluvial deposits were presented by **Leandro D. Rojo** (Argentina), and the Late Quaternary history of the Laguna Llancanelo area was introduced by **Adriana García** (Australia).

Kaire Torn, Estonia