



# IRGC NEWS



INTERNATIONAL RESEARCH GROUP ON CHAROPHYTES

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# 24

## March 2013

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### EDITORIAL

The past year was very busy in our association, especially because of the celebration of the 6<sup>th</sup> IRGC Symposium in Mendoza (Argentina). During the General Assembly the Executive Committee was re-elected and I thank you for your support. The meeting was exquisitely prepared by Adriana García, Allan Chivas, Leandro Rojo and Eduardo Cáceres. As a consequence, it was easy to meet old friends and colleagues, to improve knowledge on charophytes, rethink how our association will work in the future and make scientific and professional contacts. We were especially fortunate that a large number of young charologists attended the meeting. Both PhD students and recent doctors presented their results and are a guarantee that our domain of research looks confidently into the future, in spite of the global economic crisis.

I am pleased to present you this 24<sup>th</sup> edition of the IRGC News which contains not only useful information about the activities related to charophyte research, but also a number of original research contributions. In spite of the available new technologies, our bulletin remains our most effective communication means between our quadrennial symposia and I encourage you to use it profusely by sending us your contributions and announcements.

**Carles Martín-Closas**

## **EXECUTIVE COMMITTEE**

**Carles Martín-Closas (President)**  
**Susanne Schneider (Vice-President)**  
**Adriana García (Secretary)**  
**Emile Nat (Treasurer)**

### *Members at large*

**Robin Scribailo (USA)**  
**Dominique Auderset-Joye (Switzerland)**

### *Regional Correspondents*

**Uwe Raabe (Europe)**  
**Simone Baecker-Fauth (South and Central America)**  
**Michelle Casanova (Austral-Asia)**

The task of the Regional Correspondents is to **collect relevant information about meetings, books, individuals etc. from their area and forward it to the IRGC Secretary** by February-mid-March every year.

## **WELCOME TO NEW IRGC MEMBERS**

It is a great pleasure to welcome our new members Mattia M. Azzella (Italy), Eduardo Cáceres (Argentina) and Joseph Hannibal (United States). Mattia and Eduardo are interested in living charophytes whilst Joe is working with fossil charophytes.

## **CELEBRATION IN MEMORIAM OF EDUARDO A. MUSACCHIO**

**Celebration of Eduardo Aldo Musacchio (1940-2011) and his contribution to charophyte research - 6<sup>th</sup> IRGC Symposium, Mendoza, Argentina**

Eduardo passed away on 18 May 2011 in an airplane accident when he was going home to Comodoro Rivadavia after visiting Mendoza for the organization of the 6<sup>th</sup> IRGC Symposium in 2012. However, we decided to continue with the organization of the meeting because it was important for the healthy functioning of the IRGC and its members, but also in order to recognise Eduardo's work on charophytes and finish something that he started and was very happy to pursue!



The celebration in memoriam of Eduardo was made at the beginning of the symposium on the 25 November 2012, in the presence of two of his children, Licia and Esteban Musacchio. We were lucky also to have a presentation about Eduardo's 'young' years by Prof. Wolfgang Volkheimer (IANIGLA, Mendoza, Argentina) who told us about their adventures while doing fieldwork or working at the Museo Nacional de Ciencias Naturales Bernardino Rivadavia (Buenos Aires, 1980s) or interesting conversations. Dr Carles Martin-Closas spoke about Eduardo's main contributions to charophytes, putting forward the international implications of Eduardo's research in relation to biostratigraphy and paleobiogeography of Cretaceous charophytes; and finally Dr Adriana Garcia, spoke as one of his students during his time at the Universidad Nacional de La Plata (at the end of the 1980s).



A 100:1 model of a fossil gyrogonite of the European and North African Eocene species *Raskyella peckii*, originally made by Louis Grambast, with a small inscribed plaque from the IRGC was given to Licia and Esteban Musacchio, and a special morning tea was served for everybody to share.

**Adriana García, Australia**

## REPORT OF PAST MEETINGS

2012

### **5-10 August** **34<sup>th</sup> International Geological Congress** **(IGC), Brisbane, Australia**

The five-day congress which was eight years in the planning, attracted 6,000 delegates from 112 countries, many of which sent large delegations to the IGC, the largest of which was the Chinese delegation of more than 800 members. Of course the congress received significant sponsorship from mining companies and governmental organisations. Although there were many papers on economic geology and hazards, some papers were dedicated to paleolimnology, and also included charophytes.

### **27-31 August** **International Symposium 'Plants in hydrosystems: from functional ecology to weed research', Poznań, Poland**

The International Symposium on Aquatic Plants was held in Poznań, Poland, as Combined EWRS & SIL Aquatic Plants Conference. The Symposium consisted of the 13<sup>th</sup> EWRS International Symposium on Aquatic Plants and the 2<sup>nd</sup> SIL International Workshop of Working Group on Macrophytes. The organizing committee was chaired by Krzysztof Szoszkiewicz from the Poznań University of Life Sciences, the institution that hosted the Symposium.

Eleven scientific sessions covered the diversity of aquatic plants, their ecological role, invasiveness and their use in biomonitoring, management and flood control.

One of the sessions was devoted to charophytes and was entitled 'Multifunctional charophytes: indicative value and environmental importance'. The person to organize this session was Mariusz Pelechaty from Adam Mickiewicz University and Kay Sand-Jensen from the University of Copenhagen kindly co-chaired it. An excellent introduction to this session was made by Irmgard Blindow from the University of Greifswald, who gave a keynote lecture on 'Charophytes as bioindicators'. The session consisted of five oral presentations

supplemented by four posters. This is the list of oral presentations:

'70-years change in the abundance of Danish characeans' (Lars Baastrup-Spohr, Lars Lønsmann Iversen, Jeppe Dahl-Nielsen, Kaj Sand-Jensen).

'Mechanisms accounting for the dominance of charophytes after re-oligotrophication in the littoral zone of a large pre-alpine lake' (Elisabeth M. Gross, Doreen Richter).

'Charophyte occurrence in *Ceratophyllum demersum* stands' (Mariusz Pelechaty, Eugeniuş Pronin, Andrzej Pukacz).

'Abundant charophyte vegetation and carbonate production in a shallow water body' (Andrzej Pukacz, Mariusz Pelechaty, Marcin Frankowski)

'Abundance of stoneworts (Characeae) in Scandinavian waters: Influence of species traits and global range size' (Kaj Sand-Jensen, Lars Baastrup-Spohr, Lars Lønsmann Iversen, Jeppe Dahl-Nielsen, Jens Borum)

The scientific sessions were preceded by four pre-symposium workshops on 25-26 August, covering identification of the main groups of aquatic macrophytes and training on the ecological status of a river combined with training on identification of local river and lake macrophytes. Among them, the workshop on identification of charophytes was performed by Mariusz Pelechaty and Andrzej Pukacz from Adam Mickiewicz University.

During mid-symposium and post-symposium excursions participants had the opportunity to see a variety of aquatic environments of Western Poland with diverse macrophytic vegetation, including well preserved charophytes. Scientific presentations, after standard peer-review procedure, will be considered for publication in a special volume of *Hydrobiologia*. More details on this meeting, its scientific context and keynote lectures and speakers are still available at [www.aquaticplants2012.pl](http://www.aquaticplants2012.pl)

**Mariusz Pelechaty, Poland**

25 - 27 November (22 November to 2 December with field-trips)

**6<sup>th</sup> International Symposium of IRGC,  
Mendoza, Argentina, 2012**

**Report of pre- 6<sup>th</sup> IRGC Symposium  
fieldtrip: extant sites  
22-24 November**

The pre-symposium excursion (22-24 November 2012) took participants into the arid shrublands south of Mendoza. This region, called the arid diagonal, receives less than 250mm annual precipitation and is covered by a very diverse vegetation consisting of *Neosparton*, *Senecio*, *Grindelia*, *Mulinum* and several other shrubs; trees can be found only within the few scattered villages.

Heading for the first site to be visited, a stop-over for lunch at the Regional Museum of Natural History in San Rafael allowed for an introduction into the history of human settlements in South America in general and of the development of agriculture in detail.

Leaving the main road and passing a spectacular scenario of hills exhibiting the signs of the various geological processes still going on in the pre-Andean region, the participants arrived at the Laguna Niña Encantada in the afternoon. This lagoon evolved by a volcanic eruption, when a stream of lava blocked a creek of the Rio Salado system. Dissolution of the calcareous walls formed a deep karstic lake with very rich charophyte vegetation.



Charophyte sampling at Laguna Niña Encantada  
(photo: Susi Schneider)

The *Chara* meadows (different morphotypes of *Chara vulgaris* s.l.) cover the whole littoral, and samples were taken down to about 5m depth with a tangle-fork. Charophytes were

also found and sampled in the outlet creek in two quite distinct morphotypes.

After sampling the excursion proceeded further south to the town of Malargüe, where we stayed at cabañas.

The next morning the participants visited the Laguna Llanquanelo catchment. Laguna Llanquanelo itself is an endorheic system, receiving its water mainly via the Río Malargüe, but being fed in addition by several minor creeks and springs on its western shore. It is an important Natural Reserve and of special importance for aquatic birds. Serving as a habitat for large populations of e.g. flamingos, it became a Ramsar convention site in 1995.

After a short stop at the Park Ranger's station, the Pozos de Carapacho, a permanent water body fed by springs, were first visited. The system of interconnected small lakes exhibited a rich charophyte-vegetation which was covered by filamentous green algae. Due to conservation measures, only two sites were allowed to be sampled, but delivered plenty of material to be checked.

The next leg drove the participants to the Laguna Llanquanelo itself. The beach already illustrated the precipitation regime. Visiting it in the summer, we had to walk several hundred metres on dry lakeshore before reaching the water. On the dry shore, clumps of charophytes could be found in shallow water, where these clumps of about 10 x 3 cm were rolling, still being green and alive, on the ground. The sediment was extremely muddy and consequently transparency was very low. However, at about 50 cm depth patches of growing charophytes firmly attached to their substrate (*Chara* sp.) could be found and sampled by feeling them under bare feet.

Meanwhile the bus got stuck in the soft sediments of the shore, resulting in a funny pattern of outbursting activities of digging and pushing it out, followed by phases of lethargy, waiting for external help. After a couple of hours an almost unexpected success was made when a 4x4 'camioneta' and a thin wire pulled the bus to safe grounds – so we were able to go to the next site!

This site, Bañado Carilauquen, is a system comparable to the Pozos de Carapacho, but less deep and totally covered by charophytes. In contrast to the Pozo-vegetation, no filamentous green algae cover was observed and, be-

ing very shallow, sampling was possible throughout the pond.



We managed to fill the hole left after the bus got stuck (in the background the Laguna Llanquanelo; photo: Susi Schneider)

The dinner planned for this evening started “Argentinian time“, i.e. very late, but was absolutely delicious because we all got very hungry (and sunburned) while waiting for the bus at the lakeshore.

The next day, which had to start according to the original schedule irrespective of the late dinner the day before, took the participants to the Castillos de Pincheira west of Malargüe city.

This area was in the past a refuge of Huarpe and Pehuenche native people; located in a very arid region the river and the surrounding swamps attract a large variety of wildlife. The site is used as a recreation area with a swimming pool and a set of cascading artificial lakes. The lower three of these lakes as well as the inlet- and outlet creeks exhibited a rich charophyte vegetation, at least three different morphotypes were sampled (the most abundant is typical *Chara vulgaris*).

Having still about 400 km to travel back to Mendoza city on time for the reception, the group left the place at around noon and arrived the same evening safely at the conference site. During the conference there were three binocular microscopes available which were intensively used for checking the material gathered. However, the competition for these microscopes was so strong that even postponing attendance at the general assembly did not leave enough time for working with the samples, also because several participants had taken material to be checked and discussed, so the determination of the fresh material gathered had to wait and could not be finished. Fortunately, herbaria sheets were prepared and, moreover,

being the subject of a PhD project, the identity of the morphotypes gathered will be reported in the future.

**Hendrik Schubert, Germany**

### **Scientific Report of 6<sup>th</sup> 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 Austra-

lian *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 Llanquanelo 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 Llançanelo area was introduced by **Adriana García** (Australia).

### **Kaire Torn, Estonia**

### **Minutes of the 2012 General Assembly, 26 November 2012**

The general assembly of the IRGC was held during the 6<sup>th</sup> IRGC Symposium in Mendoza, Argentina, on 26 November 2012.

#### *IRGC's president's report*

Carles Martín-Closas welcomed everybody, and distributed the minutes of the previous IRGC general assembly in Rostock 2008, which were published in the IRGC news 2009. The audience spent some minutes reading through the minutes, and approved them afterwards.

Following the proposal of the General Assembly held in Rostock in 2008 to change the

home of the association to Barcelona, the president informed about the present legal situation of the IRGC. The IRGC is still based in France despite the fact that nobody from the Executive Committee presently has a legal address in France. Although some processes like managing the IRGC account are not easy, it is nevertheless possible and easier than moving the organization to another country.

A brief account of the activities of the association during the 4-years interim was presented next. The proceedings of the last IRGC meeting in Rostock have been published in *Charophytes* thanks to the effective management of Michelle Casanova, Irmgard Blindow and Hendrik Schubert. The IRGC supported the GEC meetings (European branch of the IRGC) which have been held in Ohrid (Macedonia) in 2009, Tallinn (Estonia) in 2010, and Poznan (Poland) in 2011. Thanks to the organizers for three fruitful and well-organized meetings.

There are already a number of future events planned for our association. The next GEC meetings will be organized in Lithuania in 2014, by Zofija Sinkeviciene. There was a discussion about the activities of other regional groups, and Robin Scribailo wondered if an American group could be organized.

The IRGC president also thanked the organizers of the present meeting (Adriana García, Leandro Rojo, Allan Chivas and Eduardo Cáceres) for their efforts.

The membership of our organization is changing continuously but keeps a regular pool of about 80-100 members. 12 new members joined the IRGC since the Rostock meeting. They are from Brazil, Argentina, Estonia, Serbia, Spain, Germany, Poland, Latvia, Ukraine and the USA.

Four members passed away since the Rostock meeting. All of them were extremely significant regarding the activities of our association. They are Nicole Grambast (France), who was one of the co-founders of the IRGC, Eduardo A. Musacchio (who was regional correspondent for South America and planned to co-organize the meeting in Argentina), Joop van Raam (The Netherlands), who was member at large and took care of the bibliography of the IRGC, and Jean P. Berger (Switzerland), who was one of the founders of the IRGC and vice-president for a period.

Simone Baecker-Fauth (Brazil) agreed to become regional correspondent for South America taking over the task carried by Eduardo A. Musacchio whilst Dominique Auderset-Joye (Switzerland) agreed to take over the collection of the bibliography after J. van Raam.

Robin Scribailo informed us about the charophyte-L forum, a medium which is surprisingly little used. In other mailing lists, pictures are posted asking for help with species determination, and this definitively would work with charophyte-L as well. All members are encouraged to use the list for all it is worth.

A discussion followed about how to improve the visibility of the IRGC internationally. Common projects and the publication of special issues about charophytes were discussed as possibilities.

At the end of the session, the president announced that according to the proposal approved during the last general assembly in Rostock, an IRGC award for the best oral or poster presentation of a graduate-student delegate was due to be awarded during this symposium. The jury was formed by Mary Bisson, Eduardo Cáceres and Joseph Hannibal. The result was announced during the closing ceremony of the meeting on the 27 November and Petra Nowak was awarded the prize.

#### *IRGC's Treasurer report*

The IRGC balance (prepared by Emile Nat) was presented by Susanne Schneider and was unanimously approved.

	2008	2009	2010	2011
Bank credit on January 1st	€ 1,094.49	€ 1,351.91	€ 1,944.86	€ 1,829.43
<b>INCOME</b>				
- Individual membership fees	€ 1,245.00	€ 940.00	€ 980.00	€ 440.00
- Corporate membership (PA)		€ 90.00		
Total income	€ 1,245.00	€ 1,030.00	€ 980.00	€ 440.00
<b>EXPENDITURES</b>				
- IRGC-News copies & mailing costs	- € 394.28		- € 707.43	
- Bank and transfer charges, postal fees	- € 8.00	- € 8.50	- € 15.95	- € 39.64
- Support for IRGC Symposium Rostock	- € 585.30			
- Support for GEC meeting Ohrid		- € 312.70		
- Support for GEC meeting Tallinn			- € 300.00	
- Support for GEC meeting Poznan				- € 300.00
- EMS, contribution		- € 95.00		
- EMS, service costs		- € 14.85	- € 54.45	
- EMS, commission credit card endorsement		- € 6.00	- € 17.60	
Total expenditures	- € 987.58	- € 437.05	- € 1,095.43	- € 339.64
Yearly balance	+ € 257.42	+ € 592.95	- € 115.43	+ € 100.36
Total credit on December 31st	€ 1,351.91	€ 1,944.86	€ 1,829.43	€ 1,929.79

The membership fees are the only income of the IRGC, so regular payment by all members is necessary. The IRGC Committee invites everybody to pay the membership fee as early

as possible and encourages multi-year payment.

It was asked if there were any amendments of the IRGC statutes, but there were none.

#### *Election of the Executive Committee*

All of the current office-bearers were standing for re-election. Thirty-one ballots were received, and were counted by Sheila Villalba-Breva and Josep Sanjuan. The new IRGC committee was elected as follows:

President: Carles Martin-Closas (30 votes)  
 Vice-president: Susanne Schneider (30 votes)  
 Secretary General: Adriana García (31 votes)  
 Treasurer: Emile Nat (31 votes)

#### *Publication of the presentations given at the 6<sup>th</sup> IRGC meeting*

Adriana García announced that we received two offers for the publication of the presentations of the 6<sup>th</sup> IRGC meeting: from *Acta Botanica Gallica* (Taylor & Francis), and from *Aquatic Botany* (Elsevier). There was agreement amongst the members to publish in the second option. It was agreed that Adriana García will send an email to the participants asking for titles and abstracts for contributions to this special issue. Adriana also asked everybody for contributions to the IRGC website.

#### *Next IRGC symposium*

According to what has become an unofficial custom in the IRGC (i.e. rotation among continents), the next meeting is to be held in 4 years in Asia. Aizhan Zhamangara offered to organize the next IRGC meeting in Kazakhstan in 2016. This proposal received enthusiastic support from the audience.

**Susanne Schneider, Norway**

### **Report of post- 6<sup>th</sup> IRGC Symposium field excursion: fossil sites 28 November - 2 December 2012**

The four-day field trip to fossil sites of interest started at 9.00 a.m. from “Plaza de la Independencia” in Mendoza. Our group consisted of 16 participants with three nice and encouraging trip organizers (Adriana García, Leandro Rojo and Allan Chivas). We boarded our three

cars and started southwards to San Rafael town. During the trip we could observe wonderful steppe landscapes and the Andes mountains as a background. Our first stop was at the “Museo de Historia Natural” in San Rafael where we had lunch and could get an insight of the local fauna i.e. armadillo or tatú (tatous), and flora. The next stop was at “La Junta”, located ~125 km south-west from San Rafael, in the piedmont area of la Cordillera de Los Andes, at the confluence of the Río Atuel and Río Salado. The erosive action of the aforementioned rivers exposed several Quaternary sections that show spectacular channel-fill deposits. The organizers explained to us that Quaternary stratigraphic sequences are composed of fluvial and lacustrine facies with rich fauna (molluscs, ostracods) and flora (charophytes and pollen). At least, two fossil charophyte species, *Chara contraria* and *Chara cf. papillosa*, were found in this locality together with many ostracods species. In “La Junta” we could identify and photograph many steppe (‘Estepa’) plant species characteristic of the ‘Monte’ phyto-geographical province. We admired the yellow flowers of the Zygophyllaceae *Larrea divaricata*, accompanied by the Amaranthaceae species *Atriplex lampa*, many Fabaceae species such as *Prosopidastrum globosum*, *Prosopis flexuosa*, *Anathrophyllum rigidum*, many Asteraceae such as *Hyalis argentea*, *Senecio bracteolatus*, *Grindelia chilensis* and two Rhamnaceae: *Berberis empetrifolia* and *Condalia microphylla*. In humid areas, close to the river shore, the flora was dominated by one Asteraceae species of genus *Psila* and one characteristic Poaceae species *Cortaderia araucana*. On the way to our accommodation, we stopped for a short time close to a temporary pond where we collected young plants of *Chara cf. contraria*. Our final destination of the first day was the town of Malargüe where we had an enjoyable dinner and slept in charming and very cozy houses at “Cabañas El Coirón”.

Our second excursion day started at 9.00 a.m. About 35 km south-east of Malargüe, we stopped at the base of the Trapal volcano. In addition to the plants seen the first day, we identified and photographed other typical plant species of the ‘Monte’ and ‘Patagonian’ phyto-geographical provinces, i.e. *Denmoza rhodantha* and *Opuntia sulphurea* (Cactaceae), *Neospartum aphyllum* (Papillonaceae), *Schinus roigii* (Anarcadaceae), *Glandularia macrosperma*, *Acantholipia seriphoides* (Verbena-

cea), *Fabiana peckii* (Solanaceae), as well as *Bougainvillea spinosa* (Nictaginaceae) and one Fabaceae: *Hoffmanseggia trifoliata*. On top of the Trapal volcano a wonderful panoramic view over the Huarpes depression and Laguna Llanquanelo pleasantly surprised us. After a picnic stop close to Llanquanelo Lake, we stepped forward on the dry part of Laguna Llanquanelo. Here, the organizers dug a ~0.7 m deep hole, in order to show and sample the subfossil deposits of the lake. With the hand lens, we could see many fossil remains (charophyte gyrogonites and thalli, gastropods and ostracods). They are the topic of the PhD of Sabina d’Ambrosio (supervised by Adriana García) in order to reconstruct the palaeo-ecological changes of Laguna Llanquanelo. Two charophyte assemblages were recognised in previous studies. On the one hand, a charophyte assemblage composed of *Tolypella* sp. and *Chara contraria* was identified in sediments older than 20,000 years (pre- Last Glacial Maximum) indicating that freshwater was very abundant. On the other hand, a charophyte assemblage composed of *Chara halina*, *Chara hornemannii* was identified in younger sediments (post-Last Glacial Maximum) suggesting increase of salinity and aridity. Our final destination of the second day was in the “Cuyam-co trucha” restaurant-trout farm in Malargüe where we had a delicious dinner based on very fresh trout. Furthermore, in a pond adjacent to the restaurant, we found a well-preserved meadow of *Chara vulgaris*.

On Friday 30 November, at 9.00 am, we were prepared for a long ride to “El Zampal”. The Zampal area is located ~120 km southwards from Malargüe and is composed of Upper Cretaceous sedimentary units of the Neuquén Basin. During the trip we could see spectacular and coloured landscapes. A short stop close to the Río Grande allowed us to observe a Quaternary outcrop showing fluvio-lacustrine sediments interbedded between two basaltic lava flows. No charophyte remains were found within these fluvio-lacustrine materials. Furthermore, taking advantage of the stop, we could take pictures of amazing panoramic views of the volcanic province of “La Payunia”, and observe again abundant *Larrea nitida* (Zygophyllaceae). Then, we followed the Río Grande down to “La Pasarela”, an impressive cañon where the river has cut through a huge lava flow of Late Pleistocene age (~40,000 years old). At 2.00 p.m. we arrived at El Zampal. This locality was studied earlier by

Eduardo Musacchio who published its rich fossil charophyte flora of Late Cretaceous age. We met with the owner of the Zampal property, Sr. Roberto Balmaceda, who accompanied us for a one and half hour walk (one way) to reach the famous outcrop where exceptionally well preserved silicified *Nitella* oospores had been found. The combination of red and dark coloured sedimentary and volcanic rocks offered a spectacular view. The organisers referred to the paper by Musacchio (2010) who divided the Neuquén Group into several stratigraphical units and described many charophyte species in the Upper Cretaceous units i.e. *Lychnothamnus barbosai*, *Lychnothamnus (Pseudoharrisichara) tenuis*, *Tolypella grambastii* and *Nitella* sp. According to the stratigraphic log of Musacchio (2010), we sampled many rock intervals in order to find fossil charophytes. Indeed, some of us could already detect gyrogonites with hand lenses from grey and red mudstone intervals. In a very good mood we returned to the cars and went to Roberto's house where we enjoyed tasting "alfajores" and took many group photos. We came back to Malargüe at 10 p.m. for dinner.



Zampal area: Panoramic view from the Zampal Cretaceous outcrop; in the background the Payún Liso volcano stands out

Our last excursion day led us southwards to the Payunia Volcanic Province. The first stop was close to Laguna Llanquanelo where we observed a collapsed lava tube. We almost fell into a big hole in the middle of the pampa at 1,470 m altitude! Allan Chivas explained us the mechanism of the formation of lava tubes; and, some of us dared stepping down into the dark. A flat tyre of one of the cars (rapidly repaired by Allan and Florian), allowed others to recognise some more plants of the 'Patagonian' phytogeographical province such as *Adesmia boronoides* (Fabaceae), *Ephedra ocreata* (Gnetales) and *Stillingia patagonica* (Fabaceae).

Finally, we reached the lava flows of the Payunia volcanic province. At 2060 m altitude, we faced a moonlike landscape, all of black scoria with scarce vegetation. In these "Pampas Negras", we were surrounded by different volcanoes i.e. Santa Maria volcano with its lava flow, the Payún Matrú (3700 m), and the Payún Liso volcano. The contrast between the dark coloured volcanic rocks and the yellowish coloured plants such as *Stipa speciosa* (coirón), *Atriplex lampa* and a pillow-shaped cactus *Maihuenia patagonica* was beautiful. Although the weather was cloudy and windy, we wouldn't have missed these strange surroundings, a black desert, far from civilisation except some oil pumps moving slowly up and down. Through a huge volcanic bomb field with black shining volcanic bombs as if fallen from the sky, we reached "La Calle". This locality offers the contact between two ancient lava-flows: a 200 metres thick trachitic lava flow coming from the Payún Matrú volcano in the west, and a 12 m thick basaltic lava flow coming from the Pampas Negras region in the east. We also admired the skyline of the Payún Liso volcano.

On the way back we drove through the Payunia Natural Reserve and met many wild guanacos (*Lama guanicoe*) grazing among an ocean of yellow flowers (*Grindelia chilensis* and *Senecio*). All of a sudden, Leandro stopped the car, jumped out and succeeded in catching an armadillo (tatou or piche), just to show us this strange animal. Fully blue sky accompanied us on Sunday on the way back to Mendoza.



Participants of the post-meeting fieldtrip, from left to right, back row (standing): Sabina D'Ambrosio, Cecilia Benavente, Josep Sanjuan, Florian Dux, Michael Schudack; middle row (standing): Adriana García, Aizhan Zhamangara, Zofija Sinkevičienė, Rimantė Guobytė, Allan Chivas, Ingeborg Soulié-Märsche, María Rodrigo; front row (sitting): Carles Martín-Closas, Lina Laurinavičiūtė, Sheila Villalba-Breva and Leandro Rojo (photo Ingeborg Soulié-Märsche)

Special thanks to Adriana and Allan, who, early in the year, had spent four days among the volcanoes, in order to select the best places for our excursion.

On behalf of all the participants, we would like to thank the organizers, and all those who acted so efficiently to make this excursion an unforgettable event.

**Josep Sanjuan (Spain) and Ingeborg Soulié-Märsche (France)**

## FORTHCOMING MEETINGS

### 2013

#### **7 - 9 June** **German charophyte working group**

The meeting will take place on the island of Rügen, NE Germany. It will start with an excursion during 7 June on Rügen. During the evening, the group will take the ferry to the island of Hiddensee for the main part of the meeting, starting on 8 June with a determination workshop followed by presentations and discussions about the future book on German charophytes. The meeting will close with an excursion on Sunday and finish around 2 pm.

Everybody is welcome, but please make contact with Hendrik or Irmgard as soon as possible as we have to book accommodation. Please also let us know if you want to give a presentation, and if you want to participate in the excursion on 7 June (in this case, we will book accommodation for you the night before), or if you will join the group during the evening.

**Contacts:** Prof. Hendrik Schubert, e-mail: [hendrik.schubert@uni-rostock.de](mailto:hendrik.schubert@uni-rostock.de); Dr Irmgard Blindow, e-mail: [blindi@uni-greifswald.de](mailto:blindi@uni-greifswald.de)

#### **4 – 10 August** **10<sup>th</sup> International Phycological Congress,** **Orlando, Florida, USA**

The 10<sup>th</sup> International Phycological Congress (IPC 10) will continue a tradition that began in 1982 at the first IPC in St. Johns, Newfoundland, Canada. The proposed theme of the IPC

10, is *Algae in a Changing World*, recognising the roles of algae in a world where environmental changes are rapidly accelerating.

Sponsorship for the congress is provided by the International Phycological Society, website: <http://www.intphycsoc.org/>.

There are also possibilities for students to apply for funds. Please check the website for more details.

**Website:** <http://ipc10.intphycsoc.org>

**Contacts:** Dr M. Dennis Hanisak, e-mail: [dhanisak@hboi.fau.edu](mailto:dhanisak@hboi.fau.edu); Dr Akshinthala K.S.K. Prasad, e-mail: [prasad@bio.fsu.edu](mailto:prasad@bio.fsu.edu)

### 2014

#### **28 September - 3 October** **IV International Palaeontological Congress,** **Mendoza, Argentina**

The 4<sup>th</sup> International Palaeontological Congress, will be held in Mendoza, Argentina, from 28 September to 3 October, 2014, hosted by the Centro Científico Tecnológico CONICET Mendoza and partner organizations.

This international meeting is devoted to Palaeontology and convenes every four years under the aegis of the International Palaeontological Association. Following three previous meetings in Sydney (2002), Beijing (2006) and London (2010), it will now come to the American continent for the first time.

The congress will be accompanied by field excursions before and after the meeting, still not defined. Please check the website for details.

**Website:**

<http://www.ipc4mendoza2014.org.ar/>

**Contact:** [secretary@ipc4mendoza2014.org.ar](mailto:secretary@ipc4mendoza2014.org.ar)

**Alternative contacts:** Dr Claudia V. Rubinstein, e-mail: [crubinstein@mendoza-conicet.gov.ar](mailto:crubinstein@mendoza-conicet.gov.ar); and, Dr Beatriz G. Waisfeld, e-mail: [bwaisfeld@efn.uncor.edu](mailto:bwaisfeld@efn.uncor.edu)

#### **19<sup>th</sup> Meeting of the GEC (Group of European Charologists),** **Vilnius (Lithuania)**

The GEC meeting provisionally announced to be held in Innsbruck during 2013 has been cancelled.

Therefore, the 19<sup>th</sup> meeting of the Group of European Charophytologists (GEC 19) is planned to be held in Vilnius (Lithuania) or its close vicinity. The preliminary date is 11-14 September 2014. Traditionally the meeting will include presentations and excursions. There is still time to modify the proposed date of the meeting and organise the excursions (eastern or southern lake-lands).

Please contact: Prof. Zofija Sinkevičienė, e-mails:

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### **PUBLICATION OF THE PROCEEDINGS 6<sup>TH</sup> IRGC, MENDOZA**

As voted in the General Assembly on 26 November 2012, Mendoza, (see p. 8) we opted to publish the proceedings of the 6<sup>th</sup> IRGC in *Aquatic Botany*. The Guest Editors of this Special Issue are Carles Martín-Closas, Susanne Schneider, Allan R. Chivas and Adriana García. We have received 15 abstracts and contacted the Editors of AQBOT and the authors with a first round of comments. The deadline proposed for sending the complete manuscripts is 30 June 2013, whereupon they will be sent for reviewing.

Hopefully, the Special Issue will be published within 18 months from now!

**Guest Editors (A. García, C. Martín-Closas, S.C. Schneider & A.R Chivas)**

### **RESEARCH ARTICLE**

#### ***Lychnothamnus barbatus* rediscovered in Germany**

*Lychnothamnus barbatus* was first described in 1827 by Franz Julius Ferdinand Meyen as *Chara barbata* from Germany. The locus typicus is the Plötzensee in Berlin. Until the end of the 19<sup>th</sup> century some more populations were found, most of them in lakes. The last known observation dates from 1891 (for details see Raabe et al. 2013). Since the end of the 19<sup>th</sup> century *Lychnothamnus barbatus* was thought to be extinct in Germany. Its former distribution was limited to the states of Berlin, Brandenburg and Mecklenburg-Vorpommern. After

several other species, among these *Chara baueri*, were already rediscovered during the last several years *Lychnothamnus* was the only charophyte still regarded as extinct in Germany.

So it was a great pleasure to rediscover this remarkable species in September 2012. *Lychnothamnus barbatus* was found in the Obersee near Lanke north of Berlin.

It was first found in this lake in 1855 and was regularly collected from this lake until 1873, although there are no subsequent reports of it. The conditions in the lake appear relatively unchanged since the 1950s and the Obersee (ca. 12 ha, max. depth 10 to 11 m) is still relatively clear (Secchi depth in September 4.1, in October 3.0 m) and rich in calcium. The lake is mesotrophic or weakly eutrophic. *Lychnothamnus barbatus* grows at a depth of 1.6 to 4.0 m, at some places as the dominant species. The plants reach a length of up to 1.4 m.



Andrzej Pukacz with *Lychnothamnus barbatus* at lake Obersee

Other charophytes found in the Obersee are *Chara contraria*, *C. globularis*, *C. virgata*, *Nitella flexilis*, *N. mucronata* and *Nitellopsis obtusa*. Beside these the following species were listed in the lake: *Fontinalis antipyretica*, *Ceratophyllum demersum*, *Elodea canadensis*, *Myriophyllum spicatum*, *M. verticillatum*, *Najas marina*, *Nymphaea alba*, *Potamogeton lucens*, *P. pectinatus*, *P. pusillus* agg., *Ranunculus circinatus*, *Stratiotes aloides* and *Utricularia vulgaris* agg.

*Lychnothamnus barbatus* is now regarded as endangered in Germany. There are currently no

special measures in place to protect the species or the lake. It is proposed to incorporate the Obersee into one of the two immediately adjacent Natura 2000 areas and nature reserves.



*Lychnothamnus barbatus* from lake Obersee (photo: H. Korsch)

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**Uwe Raabe, Germany**  
**Andrzej Pukacz, Poland**  
**Tim Peschel, Germany &**  
**Reinhard Müller, Germany**

#### REFERENCE ARTICLE: A BIBLIOGRAPHIC ACCOUNT

#### What's new about *Chara*? – A short and highly selective story about charophyte studies published in 2012

Just for the fun of it, I tried to get an overview of last year's published charophyte studies. A search on ISI Web of Science using "Chara OR charophytes" as search terms for "topic", and "2012" for "year published" returned 103 hits. They range from the "CHARA Array interferometer" which seems to be something in astrophysics to charophytes being recognized for delivering important ecosystem services e.g. in ponds which are used for irrigation. They also range from paleolimnologic studies using gyronites to descriptions of suggested new species (e.g. *Chara kohrangiana* from Iran). In addition, many physiological studies have been published, using *Chara* cells for studying

transport of different substances across cell walls and membranes.

I here try to summarize some of the findings. This is of course a highly selective choice, represents mainly my personal interests and is by no means meant to give an exhaustive overview. Neither did I try to select the "best" manuscripts (whatever that is supposed to mean). I also could have used different terms for searching Web of Science (like *Nitella*, Charales, Charophyceae etc.) for getting a broader overview. However, time is – as always – limited. My intention is merely to share some of last year's findings with you, simply because I think they might be interesting for you as well. But this contribution is meant as nothing more than an appetizer to dive into charophyte literature yourself. After all, I might have misunderstood some of the details or - not at least - overlooked some important contributions.

Many studies have investigated the uptake or sorption of different substances in and on *Chara*. Pörs & Steinberg investigated the effects of humic substances on *Chara hispida* photosynthesis. They showed that *C. hispida* can adsorb or even uptake humic substances, and that the *Chara* did show physiologic reactions to them. They also found that the photosynthetic apparatus seemed to age more slowly when exposed to humic substances, and that this seemed to be a direct response to humic substances, not only a reaction to the reduced light conditions which also are a natural consequence of humic waters. The adsorption or uptake of humic substances into *C. hispida* seems to fit with our own results (Schneider & Nizzetto). We also could show an uptake of large molecules (in this case the hydrophobic hexachlorobenzene) into *Chara rudis* cells (and results presented by Petra Nowak at the IRGC meeting in Mendoza point into the direction that *C. hispida* and *C. rudis* are very similar, they might even be the same species).

But also metals can be accumulated on or in *Chara*. There is presently a debate about the environmental consequences of oil sand exploration in Canada. The remaining material from these explorations ("petroleum coke") contains elevated concentrations of sulfur and several trace metals like e.g. Ni. Nevertheless, this material may be used in the construction of reclaimed wetlands. Baker et al. investigated how these materials would affect sediment pore water, plants and benthic invertebrates, and found elevated concentrations of Ni and

other trace metals in *Chara* sp. The finding that *Chara* can accumulate metals is supported by Gao & Yan, who found that *C. globularis* can bioaccumulate lead (Pb) but that the activity of antioxidant enzymes was severely inhibited at higher Pb concentrations. Their results indicate that *C. globularis* would have difficulties growing in a habitat with Pb-concentrations > 40 mg L<sup>-1</sup>.

A really “en vogue” topic is nanoparticles, and many studies deal with their effects on the environment, among them a study which included *Chara*. Silver nanoparticles have antimicrobial properties and are today the most widely used nanomaterial in consumer products. Dash et al. investigated their impact on the growth of *Chara vulgaris* and found that higher nanosilver concentrations were associated with lower algal chlorophyll content, and that high concentrations even can lead to morphological malformations. Although the authors point out that their findings underscore the severe deleterious effects of nanosilver on the aquatic environment, they also speculate about the use of nanosilver for controlling unwanted algal growth in municipal water supply and water channels.

The above described accumulation of metals and hydrophobic substances in charophytes raises questions if these may be passed on through the food web. Talking about this ... who is actually foraging on our beloved charophytes? Matuszak et al. investigated the effect of summering and moulting waterbirds on macrophyte biomass in Lake Constance and found that these waterbirds (mainly Eurasian Coots) were responsible for a loss of more than 40% of the total charophyte biomass in shallow water! Meanwhile, the good news is that no grazing effect was found in greater depths (more than 2 m).

Luckily, charophytes can regrow, and they often do so vegetatively. Bociag & Rekowska found that true clonal growth (which is defined as 1) horizontal and vertical axes occur in the architecture of an individual, and 2) the upright axes can function independently and regenerate a new thallus) occurs in *C. aspera*, *globularis*, *rudis* and *tomentosa*. However, thallus fragments of *C. aspera* have a lower capacity to resume growth than the other species. This is interpreted as *C. aspera* being a typical shallow water species, and thus its habitat is prone to wave action, freezing and periodic drying (and they forgot water birds; see the results by Matuszak et al. described above). In such an

environment, the life span of thallus fragments is limited, so clonal regeneration may be less worthwhile. Vice versa is the production of gametangia limited in deeper sites, such that clonal regeneration may enhance the persistence of deep populations.

But also the sexual reproduction of charophytes is of interest. *Chara canescens* has both parthenogenetic and sexually reproducing populations, and it has been observed that the parthenogens occupy a broader geographical and ecological range than their sexual counterparts. Two possible hypotheses may explain the broad range of parthenogens: the occurrence of one or several parthenogens with wide niches, or of many parthenogens that are restricted to narrow ecological niches. To test these hypotheses, Schaible et al. investigated physiological parameters of two parthenogenetic *C. canescens* populations in response to light and salinity. They found that these populations were locally adapted to light, thus maybe pointing towards the second hypothesis.

That light impacts *Chara* growth seems obvious, but how does it interact with other environmental parameters? Frankovich et al. measured *Chara hornemannii* cover over a 3-year period in two adjacent mangrove sub-estuaries in Florida Bay. They found that in one of the two sub-estuaries, the more eutrophic and phytoplankton rich one, *Chara* cover did follow a seasonal pattern which coincided with seasonal changes in water transparency. In the other one, the more oligotrophic and clearer one, there was no repeatable seasonal pattern, but *Chara* cover was negatively correlated with salinity and water depth. They suggest that water transparency determines the importance of the salinity driver. In other words: only in clear water does salinity impact *Chara* cover.

All of us have probably seen in the field that a charophyte collected from a river looks differently than the same species collected from a lake. The same is true for the morphology of charophytes collected from shallow, wave exposed sites compared to specimen from deep sites. Ellawala et al. measured this phenomenon by exposing *Chara fibrosa* to different water turbulence conditions. They found that plants exposed to higher turbulence were shorter and took up fewer nutrients. They also found that turbulence impacted plant nitrogen and carbon stable isotope ratios. As a consequence, for ecosystem studies using stable iso-

tope signatures it is important to take water turbulence or water flow into account.

Surprisingly, charophytes are used for many different tasks in science. For example, Foissner and Wasteneys, describe plant wound healing processes based on studies from characean internodal cells. Charophytes can close wounds (which can be induced e.g. mechanically, or by chemicals or UV) by different mechanisms, probably reflecting the extent of damage.

That most *Chara* species prefer Ca-rich waters is not new, but Proseus & Boyer propose and describe a mechanism why and how Ca<sup>2+</sup> is necessary for the growth length of *Chara* cells. They found that growth of *Chara* cells ceased when the medium was deprived of Ca<sup>2+</sup> and explain this by its interaction with pectin, a normal constituent of cell walls of green plants.

A practical problem for charophytists was elucidated by Gregor et al., who clarified that the correct name of *Nitella gracilis* (Sm.) C. Agardh var. *confervacea* Brebisson is *Nitella confervacea* (Brebisson) A. Braun ex Leonhardi. So, take this into account in your further studies!

Lastly, and sadly, disappointing news (from the viewpoint of *Chara*) was published by Timme et al. We probably all liked to think that our “stoneworts”, or Charales, are the sister lineage to land plants. However, alternative hypothesis have instead supported the Zygnematales as the sister lineage. Timme et al. investigated a huge number of genes, and unfortunately conclude that Zygnematales (which they – with good cause! - refer to as “pond scum”) most likely are the closest living relatives to land plants. Well, do not get too disappointed, Zygnematales also are “charophytes”, though not “Charales”.

**Susanne Schneider, Norway**

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## NEWS FROM THE REGIONAL GROUPS AND INDIVIDUALS

### News from regional groups

#### Brazil

**Rafael Faria** and co-authors have presented the results of a study about the Permian *Leonardosia* oospores from the Teresina formation, Paraná basin and discussed the phylogeny of the family Stellatocharoideae. Faria, R.S., Ricardi-Branco, F. & Cortez, I. 2013. Permian *Leonardosia* organic oospores from Southern Brazil. *Palaeontology* 56: 1-9.

**Simone Baecker-Fauth** continues to study the Santonian-Campanian charophytes from the Santos Basin and the biostratigraphical results are presented in the 6<sup>th</sup> IRGC Symposium in Mendoza. A forthcoming publication is Fauth, G. et al. (2013). Bioestratigrafia integrada do Cretáceo Superior da Bacia de Santos: ostracodes, carófitas e palinomorfos. *Boletim de Geociências da Petrobras*, in press.

#### Argentina

**Adriana García, Allan Chivas** and collaborators (**Leandro Rojo, Sabina D'Ambrosio**) continue to work on limnological and palaeolimnological aspects of Laguna Llanquanelo, Mendoza, Argentina, including charophytes, pollen, ostracods, geochemistry, sedimentology. Several associations of charophytes are present along the cores and in the modern environments. Sabina D'Ambrosio (UNLP, La Plata, Argentina) is close to completing her PhD, which is focused on ostracods (papers in preparation).

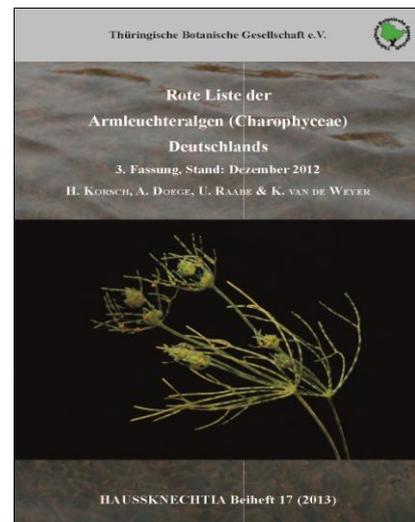
**Simone Baecker-Fauth, Brasil**

### News from Individuals

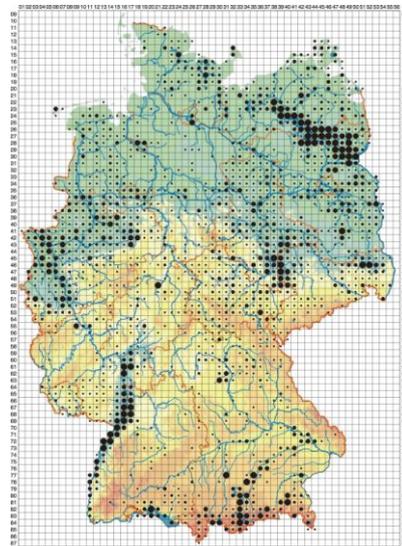
#### Publication: Red List of the Charophytes (Charophyceae) of Germany (in German)

3. Version, December 2012, 36 pp. by H. Korsch, A. Doege, U. Raabe & K. van de Weyer

The approach of classifying charophyte species in the Red List will be illustrated following a short overview about the state of knowledge concerning charophytes in Germany.



Information regarding abundance and threat of Charophyceae in Germany is summarized in the Red List. Recent records exist for all of the 36 currently taxonomically accepted species in Germany, indicating that no species is extinct. However, of those 36 species 7 are classified as not endangered (least concern, *Chara contraria*, *C. globularis*, *C. virgata*, *C. vulgaris*, *Nitella mucronata*, *Nitellopsis obtusa* and *Tolypella glomerata*), 15 as vulnerable, 9 as endangered and 5 species (*Chara connivens*, *C. horrida*, *C. tenuispina*, *Lamprothamnium papulosum* and *Nitella hyalina*) are critically threatened.



Number of charophyte species recorded since 1990 in the MTB-grid in Germany (state November 2012). Smallest circle = 1 or 2 species, largest circle = more than 10 species. The area covered by one grid is about 120 km<sup>2</sup>

Reasons of endangerment and potential protection measures for charophytes are described and future research needs are outlined.

Information for ordering is available under <http://www2.uni-jena.de/biologie/spezbot/tbg/>

**Keywords:** Threatened species, Characeae, stoneworts, *Chara*, *Lamprothamnium*, *Lychnothamnus*, *Nitella*, *Nitellopsis*, *Tolypella*.

**Uwe Raabe, Germany**

### New project: Characeae in Austria

Austria has many interesting habitats for stoneworts like its multitude of alpine lakes, many barely explored. Famous is *Lychnothamnus barbatus* in St. Kanzian in Carinthia. Special features are sub-saline ponds in Burgenland with species like *Chara canescens*.

After intensive study in the 19<sup>th</sup> century, interest in stoneworts nearly came to a standstill. But in the last decades interest revived, often stirred by the EU. After completion of "Catalogue and Red List of stoneworts of Upper Austria" (Hohla & Gregor 2011) we started the project "Stoneworts of Austria" with a projected time period for 2013 to 2018. Objectives of this project are the collection of records, the production of distribution maps and the compilation of a Red List. Regular workshops and field trips will be organized and are open to everyone interested in stoneworts. The documentation of the large collections of public herbaria will be an important part of the project.



Lake Hinterer Langbathsee, Upper Austria – habitat of *Chara strigosa*

The next edition of "Exkursionsflora für Österreich, Liechtenstein und Süd-Tirol" will include *Characeae*; this will probably foster general interest in this group.

M. Hohla & T. Gregor 2011: Katalog und Rote Liste der Armeleuchteralgen Oberösterreichs. – Stapfia reports (Linz) 95, 110-140.

**Authors:** Michael Hohla, Therese-Riggler-Str. 16, 4982 Obernberg am Inn, Austria.

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**Contact:** Michael Hohla - m.hohla@eduhi.at

**Michael Hohla, Austria**

### PhD THESIS COMPLETION

**Sheila Villalba, University of Barcelona**

**PhD Title: "Charophytes from the terrestrial and transitional facies from the Lower Garumnian (Upper Cretaceous) of the Eastern Pyrenees"**

After 3 year research granted by the Catalan government and within the frame of a project from the Spanish Ministry of Science, Sheila Villalba defended her PhD Thesis on 27 March 2012. She obtained the congratulations of the jury, formed by Ingeborg Soulié-Märsche (Montpellier), Véronique Daviero-Gomez (Lyon) and Ferran Colombo (Barcelona). Sheila's thesis was devoted to the study of charophytes from the Uppermost Cretaceous (Campanian-Maastrichtian boundary) of the Pyrenees. She found that by that time, clavatoraceans still dominated the shallowest parts of the lakes whilst characeans were already well diversified and dominated most other niches, except the brackish lagoons, colonized by porocharaceans. A new whole plant fossil characean was described, bearing *Clavatoraxis* thalli and *Microchara* gyrogonites. This species looks quite like a chimera since these two parts of the plant were formerly thought to belong to two different charophyte families. The biostratigraphic results showed that the passage from marine to terrestrial domains in the Upper Cretaceous Pyrenean basin progressed from an east to west and from south to north. The PhD thesis is available as a PDF online from the University of Barcelona site and the three ISI-indexed papers which resulted from the thesis can be obtained also as PDF from the authors.

**Carles Martín-Closas (Catalonia, Spain)**

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## **CHAROPHYTE DISCUSSION FORUM**

Dr Robin Scribailo (USA) has established **charophyte-L**, our quick and new way of communication.

<*charophyte-L*> is an open forum for discussion about all aspects of Charophyte research.

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Just send the message to the listserver:  
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In the body (not the subject) of the message type: *subscribe charophyte-L your name*. **Leave the subject blank. Also make sure your signature is turned off for this email. It must be sent as a text message.** You will receive an automatically generated message telling you how to make use of the list. Once you are subscribed, you can send messages to the list server which will distribute them to all subscribers.

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Members who would like to have their personal homepage connected with the IRGC-website please send relevant information to Adriana García.

The **GEC** homepage is the responsibility of the organizers of the successive GEC meetings. The last GEC homepage was: <http://www.gec.amu.edu.pl/>

Landelijk Informatiecentrum voor  
Kranswieren (LIK): <http://www.kranswieren.nl> (in dutch)

The International Fossil Algae Association (**IFAA**): <http://www.ku.edu/~ifaa/>

The Charophycean Green Algae Home Page: <http://www.life.umd.edu/labs/delwiche/Charophyte.html>

Homepage of the German Working Group on Characeans (**AGCD**): <http://www.biologie.uni-rostock.de/oekologie/agcd>

Homepage of the electronic journal *Charophytes*: <http://www.charophytes.com>

International Phycological Society (**IPC**): <http://www.intphycsoc.org/links.lasso>

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