



# IRGC NEWS



INTERNATIONAL RESEARCH GROUP ON CHAROPHYTES

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**Edited by:** A. García (Wollongong, Australia), C. Martín-Closas and S. Schneider

**President:** Carles Martín-Closas (Barcelona) [cmartinclosas@ub.edu](mailto:cmartinclosas@ub.edu)

**Vice-President:** Susanne Schneider (Norway) [susi.schneider@niva.no](mailto:susi.schneider@niva.no)

**Secretary:** Adriana García (Australia) [adriana@uow.edu.au](mailto:adriana@uow.edu.au)

**Treasurer:** Emile Nat (Amsterdam) [e.nat@kranwieren.nl](mailto:e.nat@kranwieren.nl)

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## March 2011

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### EDITORIAL

The IRGC members showed an extremely strong vitality in 2010 with the celebration of three meetings directly linked with charophytes in Tallinn (Estonia), Borok (Russia) and Friesing (Germany). Also, several new young members joined our association in 2010 showing that charophyte research is very active in doctorate and post-doctorate research. In contrast to this good news, I am sad to communicate that Nicole Grambast-Fessard passed away last August. But how can we better honour our scientific predecessors than by developing their pioneering work? New charophyte meetings and other research activities are being prepared in 2011 and 2012. Please note in your agenda the change in date and locality of our next IRGC meeting, which will be celebrated in November-December 2012 in Mendoza, Argentina, organized by Eduardo Musacchio and Adriana García. These changes are intended to provide a more convenient venue for this next important event of our association.

Carles Martín-Closas



## EXECUTIVE COMMITTEE

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**Eduardo A. Musacchio (South- and Central America)**

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 (see also 'Regional Groups of the IRGC' in this issue).

## WELCOME TO NEW IRGC MEMBERS

Four new members joined our association in 2010 and beginning of 2011. They are Norma Catarina BUENO (Brazil), Joanna KRUPSKA (Poland), Petra NOWAK (Germany), Fidel RUBIO and Josep SANJUAN-GIRBAU (Spain). They are warmly welcomed. Please see their affiliation in the addresses section.

## RESEARCH ARTICLE

### *Enhanced UV-B radiation effects on Chara and Nitella species*

Increased levels of UV-B radiation (280-300 nm) have been detected reaching the Earth surface even at mid and high latitudes in the Northern Hemisphere during the past decades (Madronich *et al.* 1998). For this reason it is essential to increase the knowledge of the effects of UV radiation particularly in shallow freshwater systems where this factor may affect

the whole community (Scully & Lean 1994). Studies on the effects of UV radiation on plants show that UV-B may cause damage to DNA, affect growth and induce production of protective UV-B absorbing compounds (Rozema *et al.* 1997). Several studies have emphasized the need and importance of studying the ecological implications of UV-B radiation in aquatic systems (Arts *et al.* 2000). However, data are limited for submerged vegetation in freshwater ecosystems, especially for charophytes. On the other hand, the fact that charophytes contribute to increased water transparency suggests that UV-B radiation could penetrate to a greater depth in aquatic ecosystems.

As far as we know the only available literature on the UV radiation effects on charophytes is De Bakker *et al.* studies (2001, 2005), in which the authors performed experiments in greenhouses and the field about the UV-B radiation influence on growth, DNA damage and reproduction only on a single charophyte species, *Chara aspera*. Thus, we have performed, as a preparative step for more complex field experiments, a laboratory experiment to determine whether two species of charophytes, typical for shallow waterbodies, are negatively affected by UV-B radiation. We focused on the influence on growth rate, morphological features, final dry weight, photosynthetic pigment concentrations and ratios, the methanol-soluble UV absorbing compounds which can act as a screen preventing radiation damage and, finally, the reproductive allocation: asexual -formation of bulbils- versus sexual reproduction -formation of antheridia and oogonia.

*Chara polyacantha* (A. Braun in Braun, Rabenhorst und Stizenberg 1859) and *Nitella hyalina* (De Candolle, Agardh 1824) were initially collected from a newly created water spring fed by subterranean waters in *Tanquet de la Pipa* (Albufera de Valencia Nature Reserve, Valencia, Spain) and charophyte cultures were initiated and kept in a chamber at 20 °C and a light:dark cycle of 12:12 hours. The experimental cultures were initiated by vegetative reproduction cutting the apical

portions of the charophyte stocks for *C. polyacantha*, or else pulling up very young individuals for *N. hyalina* cultures –checking the sexual reproduction structures absence in both cases- and planting them in a substrate constituted by a mixture of sand and sediment. In the enhanced UV-B radiation experiment charophyte cultures were exposed to two treatments: (i) the photosynthetic active radiation (PAR) treatment (Control) in which charophycean algae mainly received PAR (mean irradiance was 70  $\mu\text{mol photons m}^{-2} \text{s}^{-1}$  at 10 cm of depth in the aquaria), and (ii) the PAR+UV-B treatment in which cultures also received radiation from an ultraviolet tube (Philips TL 40) with a dose of 3.6  $\text{kJ m}^{-2} \text{day}^{-1}$  (4 h  $\text{day}^{-1}$ ), which roughly represents a 20% ozone reduction scenario according to De Bakker *et al.* (2005). The charophyte cultures were followed for 120 days.

*Effects on length and other morphological variables.* We found significant growth reductions after four months of daily repeated exposure to UV-B radiation but only in *C. polyacantha*. This is consistent with the results for *C. aspera* (De Bakker *et al.* 2001; 2005), and it has also been reported for plant species from terrestrial and marine environments (Caldwell *et al.* 1998; Searles *et al.* 2001; Van de Poll *et al.* 2001) and macroalgae (Schmidt *et al.* 2010). According to De Bakker *et al.* (2001), an explanation might be that UV-B negatively affects cell elongation of the internodes. This negative consequence could have been the result of changes in metabolism and DNA damage. Studies on higher plants, marine phytoplankton and marine macroalgae also reported that reduced growth corresponded to accumulated cyclobutane pyrimidine dimers (CPDs) in the DNA (Buma *et al.* 2000; Van de Poll *et al.* 2001). Shorter size may affect nutrient uptake since charophytes take up nutrients via the rhizoids but also via the shoots and this can have repercussions at ecosystem level. *N. hyalina* growth rates, however, seem not to be affected by the UV-B dose used during our experiment. *N. hyalina* has a mucilage layer surrounding the tissue which is expected to have a protective important role (Ehling-Schulz *et al.* 1997; Oertel

*et al.* 2004). Secondly, ecological conditions in the natural environment are different: *N. hyalina* is usually found in shallower waters, until 4 metres of depth (so it could be better adapted to UV radiation), whereas *C. polyacantha* can grow until 14-18 metres deep (Krause 1997; Cirujano *et al.* 2008). Final dry weight was not affected by the UV-B treatment in both species. De Bakker *et al.* (2001) also did not find variations in final biomass in *C. aspera* in their experiments of enhanced UV radiation. Schneider *et al.* (2006) did not report significant affectation in final dry weight of *C. hispida* and *C. intermedia* in experiments where the two species were exposed to different intensities of PAR. It seems this variable is very conservative under different environmental conditions. Regarding the morphological variables considered in our experiment (number of nodes, number of branchlets per node, number of ramifications from the main stem, etc.), we did not find any statistical difference in *C. polyacantha* under enhanced UV-B radiation. However, exposed UV-B *N. hyalina* specimens had several morphological modifications such as higher number of ramifications from the main stem, lower number of nodes for a similar length, or lower number of secondary bifurcations in the branchlets.

*Reproductive allocation.* The UV-B radiation enhancement did not affect either the number of sexual reproduction structures (antheridia and oogonia) or the bulbils formation (vegetative propagules) in *C. polyacantha*. However, the response of *N. hyalina* was a statistically significant reduction in the production of both oogonia and antheridia under enhanced UV-B (bulbils not observed in this species).

*Photosynthetic pigments and UV absorbing compounds.* *C. polyacantha* chlorophyll concentrations (*a* and *b*) were not affected by the enhanced UV-B treatment after 120 days of exposure. Protection and repair mechanisms may play an important role in this charophyte species. Investigations on *Chara aspera* (De Bakker *et al.* 2001) highlighted also the lack of effect of UV-B on chlorophyll concentrations. On the other hand, *N. hyalina* increased the chlorophyll concentrations (both, *a* and *b*) in the



PAR+UV-B treatment. According to Schmidt *et al.* (2010), UV-B can stimulate the synthesis of chlorophyll *a* in the red macroalga *Kappaphycus alvarezii*. Since chlorophyll *b* is an accessory light-harvesting pigment, the Chlor *a*/Chlor *b* ratio can be considered as an indicator of the relative proportion of antenna compounds (Schneider *et al.* 2006). We did not find a clear repetitive pattern of this ratio among treatments neither among species nor throughout time of exposure. The ratio between chlorophyll and carotene pigments content (Abs<sub>433</sub>) and chlorophyll content (Abs<sub>665</sub>) was the same in both species and also in both control and UV-B treatments indicating that UV-B radiation dose used during our experiment did not stimulate a higher production of antenna pigments which have been described to protect chlorophyll from photodamage. UV- absorbing compounds are important in screening UV-B (Rozema *et al.* 2002). By lowering UV-B levels within the plant tissues damage to DNA, membranes, proteins and photosynthetic tissue can be prevented or reduced (Meijkamp *et al.* 1999). In *C. polyacantha* no changes were observed in methanol-soluble UV absorbing compound content under PAR+UV-B treatment. This is in agreement with the results of De Bakker *et al.* (2001, 2005) for *C. aspera*. Surprisingly, we measured lower absorbance for this kind of compounds in *N. hyalina* tissues under UV-B treatment. The absence of increased UV-B absorbing compounds in charophytes exposed to enhanced UV-B is remarkable, since they are present in cyanobacteria, microalgae, macroalgae and in higher plants (Büdel *et al.* 1994; Karsten *et al.* 1999; Meijkamp *et al.* 1999), and among the green algae, charophytes appear to be most closely related to higher land plants (Devereux *et al.* 1990).

To sum up, the present study demonstrates that the UV-B stress was able to start changes in two species of charophytes where a combination of shorter size/different morphological traits and the remarkable no production of protective UV-B absorbing compounds would constitute a disadvantage in the competition capacity of charophytes growing in shallow and clear waterbodies under an scenario of ozone

depletion. The morphological changes registered in *N. hyalina* deserve a more detailed study. In terms of reproductive strategies, at least in *N. hyalina*, increased ultraviolet-B radiation could negatively affect dispersion due to the reduction of oospore formation (less investment in sexual organs production). Obviously, the essayed charophyte species may have suffered other kinds of alterations (in the ultrastructure, in DNA, in respiratory potential, etc.) by action of enhanced UV-B radiation that have not been evaluated in this study, and these issues will be resolved in future investigations.

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**María A. Rodrigo, José Sendra and Fidel Rubio**  
**Cavanilles Institute for Biodiversity and Evolutionary Biology**  
**University of Valencia, Spain**

#### IN MEMORIAM Nicole Grambast-Fessard

**Nicole Grambast-Fessard** (1927-2010) passed away in Montpellier on 10<sup>th</sup> August 2010. She was born in Paris and graduated from the *Ecole Normale Supérieure*, Paris. She joined the *Laboratoire de Biologie végétale de la Sorbonne* and the *Muséum National d'Histoire Naturelle (Anatomie comparée des Végétaux vivants et fossiles)* where she started her research on living and fossil plants. In 1953 her first paper was dedicated to epidermal characters of present tropical Moraceae. However, the second paper, which she published together with Louis Grambast, concerned Tertiary charophytes. In 1961 she followed Louis Grambast when he created the *Laboratoire de Morphologie végétale et Paléobotanique* at the Botanical Institute, University of Montpellier. She became an expert on Tertiary woods but, subsequently, she mainly published on fossil charophytes. Together with Louis Grambast's students she later continued the researches successfully developed in Montpellier on this group of algae. Nicole Grambast was an excessively discreet



person, very efficient and helpful with administrative duties of the laboratory life. She retired in 1992 but continued to come to the laboratory for many years. Her last contribution, in collaboration with Monique Feist, was the volume Protista-Charophyta of the Treatise of Invertebrate Palaeontology published in 2005. A number of reprints of her papers are still available upon request from [jean.galtier@cirad.fr](mailto:jean.galtier@cirad.fr).

**Jean Galtier, Montpellier**  
(published in IOP Newsletter 93, October 2010)

I first knew **Nicole Grambast-Fessard** when I began my PhD studies in Montpellier, in 1985. In the following years, Mme. Grambast guided me along the intricate pathways of clavatoracean utricle anatomy and evolution. As a good teacher, she had the rare ability of listening to her student's thoughts with real interest, to reorient them later discretely. The studies of Nicole Grambast-Fessard on fossil charophytes evolved through different well-marked phases. In the late 1950s she concentrated her attention on Paleogene-Neogene charophytes, which were the main subject of interest of her husband, Louis Grambast. Both authors settled down the bases of the modern knowledge on fossil charophyte systematics, evolution and biostratigraphy. After the early death of Louis Grambast in 1976, her interest shifted mainly to Lower Cretaceous charophytes, first with the main objective of completing the unfinished work of her husband about clavatoracean anatomy, taxonomy and biostratigraphy, and later because she was really interested in this plant group. During this period she collaborated with Monique Feist and other authors. The last years of Nicole's scientific activity were devoted to the elaboration of the volume on fossil charophytes of the Treatise on Invertebrate Paleontology. However, the most breathtaking work of Nicole Grambast-Fessard was a life-long achievement that has been never published and represents an extremely useful tool. I am

speaking about her exhaustive database on fossil charophytes, prepared in the form of card index containing hundreds of entries, with the complete reference and, sometimes, with the original text and illustration of all fossil charophytes described from the 18<sup>th</sup> Century to year 2000. This precious legacy is still in use in Montpellier and Barcelona.

**Carles Martín-Closas, Barcelona**

**Selection of publications on charophytes by Nicole Grambast-Fessard**

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**Nicole Grambast-Fessard with his PhD student Carles Martín-Closas, in 1987**

**REPORT OF PAST MEETINGS**

**2010**

**10-13 June**  
**7<sup>th</sup> Meeting of the AGCD (German Working Group on Characeae), Freising, south Germany**

Seventeen charophytists came together for three days of excursion coupled with determination sessions and oral presentations about genetics, floristic and distribution of charophytes in Germany.

Irmgard Blindow presented the draft of the forthcoming book «Monographie der Characeen Deutschlands» a collaborative project, coordinated by Irmgard Blindow and Hendrik Schubert.

**Ingeborg Soulié-Märsche, Montpellier**



26-29 August

17<sup>th</sup> Symposium of the GEC (Group of European Charophytists) in Tallinn (Estonia) (Group Photo p. 24)

#### Minutes of the 17<sup>th</sup> GEC Meeting

The General assembly of the GEC was held on 26 August 2010 in the Estonian Marine Institute of the University of Tartu, Tallinn. Most of the 22 delegates who attended the meeting participated also in the assembly. They were coming from Australia (1), Estonia (5), Germany (4), Norway (1), Poland (4), Serbia (1), Spain (4) and Switzerland (1). The President of the IRGC, Carles Martín-Closas introduced the assembly by providing a short recapitulation of the GEC history and by thanking the wonderful organization by Kaire Torn and Georg Martin as well as the facilities provided by the Estonian Marine Institute. Also the presidency of the GEC was transferred to Kaire Torn. To symbolize this presidency transfer, Kaire received a large model of the fossil charophyte gyrogonite of *Maedleriella embergeri*, originally created by Louis Grambast in Montpellier. The discussions of the 17<sup>th</sup> GEC assembly were mainly devoted to the organization of the next GEC by Mariusz Pelechaty and Andrej Pukacz. The provisional programme was presented and many of the participants showed their willingness to attend this next conference.

#### 17<sup>th</sup> GEC Scientific Report

The first day and after the warm welcome opening ceremony, Georg Martin (Estonia) chaired the two first lectures.

Carles Martín-Closas, Benjamin Sames and Michael Schudack presented their results about **New Charophyte assemblages from the Lower Cretaceous of the United States: Palaeobiogeographic implications**. Carles described the Upper Berriasian to Valanginian time slice charophyte assemblages from the Lakota Formation (Black Hills, South Dakota)

and Cedar Mountain Formation (San Rafael Swell, Utah). This study opens a new insight in the biogeography of clavatoraceans, in particular in the species *Clavator grovesii*. After that, Josep Sanjuan and Carles Martín-Closas presented the talk **Harrisichara lineata Grambast 1959 and Harrisichara vasiformis-tuberculata Feist-Castel 1977 from the Upper Eocene of the north eastern margin of the Ebro basin (Catalonia, Spain): gyrogonite polymorphism and paleoecology**, which was a very interesting presentation about the relationship between morphology and ecology in fossil charophyte gyrogonites.

After the coffee break, a new lecture session started, chaired by Dominique Auderset-Joye (Switzerland). The first talk was presented by Petra Nowak: **Phylogeny of the genus Chara (Charophyceae)**. Petra talked about the results of nuclear and chloroplast DNA analysis of 13 *Chara* species from Sweden and their implications in the taxonomy of this genus. This lecture was followed by the research of Arne Wüstenberg, Yvonne Pörs & Rudolf Ehwald: **Suppression of microbial contaminants in hydrocultures of Chara hispida by an immobile underground source of phosphorus**. Arne showed that characean species can grow in P-deficient mineral solution when grown on quartz sand with tricalcium phosphate. This environment prevents possible phytoplankton blooms and the tricalcium phosphate act as P-source for characean species.

After the lunch break, the afternoon session began chaired by Susanne Schneider (Norway). The first session was **Taxonomy and ecology of Nitella congesta (R. Brown) A. Braunii in Western Australia**, presented by Jacob John and Isaac Annan. Jacob studied *Nitella congesta* in sand mine voids at Capel in Western Australia. This species colonized that system when pH was 5, functioning effectively as tools for phycoremediation. As pH increased to 8, this species continued its dominance in this lake. The next presentation was **The Red data List of Charophytes in Switzerland** by Dominique Auderset-Joye. Using criteria and categories conceived by the International Union for the Conservation of Nature (IUCN) described the

charophytes conservation status in Switzerland. In this country, there are 28 species of charophytes, the majority included in the Red List. Dominique also explained the reasons why most of the Swiss Characeae are endangered. The last lecture was **ROCHAD – Rostocks Open access Charophyte Oospore databank – target, state and first results** presented by Hendrik Schubert, Martin Feike and Claudia Niedrig. A charophyte oospore data bank is being constructed at Rostock University. Morphometry of oospores, and parent plant DNA samples and morphology are examples of the variables described in this data bank. Hendrik invited us to participate in this databank sending fresh material with some description of the habitat and plant morphology as well as the proposed species name.

When the lectures were finished, we went to the restaurant Kaerajaan where we could taste a delicious Estonian dinner in the very centre of Tallinn.

The second day of the 17<sup>th</sup> GEC Meeting (27 August 2010) was devoted to poster sessions. Chaired by Mariusz Pelechaty (Poland), Leeli Amon-Veskimeister presented the poster **The wall ornamentation of oospores of Chara species – could it have a palaeotaxonomic significance?** The morphology of oospores from *Chara contraria*, *C.globularis*, *C.intermedia*, *C.aspera* and *C. virgata* was analyzed using pictures taken by means of SEM (scanning electron microscope). Leeli described the wall ornamentation of these oospores and its application in taxonomic studies. The next poster presentation was **In situ production of charophytes communities under light conditions**, by Anastasiia Kovtun, Kaire Torn and Jonne Kotta. They evaluated how reduced light conditions affected the photosynthetic production and respiration of charophyte community. The conclusion of this work is that charophytes are able to adapt to low light environments and to recover their photosynthetic performance within a very short period of time. Aurélie Rey-Boissezon and Dominique Auderset-Joye carried out a study on the charophyte dynamics in a mesotrophic freshwater shallow lake in the Arve valley (Lac

du Bois d'Avaz, Haute-Savoie, France) whose results were shown in the poster **Charophyte community dynamics and distribution in relation with water level and temperature fluctuations in a shallow lake of French pre-Alps**. This lake has a high charophyte diversity (4 genera, 11 species), being the charophyte community dynamics dependent on the hydrological functioning of the lake.

Once the coffee break was finished, Hendrik Schubert (Germany) chaired the last poster session. Jelena Blaženčić, Aleksandra Vesić and Jasmina Šinžar-Sekulić presented **Preliminary data on distribution and ecology of Charophytes in Serbia**. Aleksandra exposed their results obtained from the literature, herbarium data, as well as field-gathered data, about the distribution of the 20 charophyte species in her country. The next poster communication entitled **Freshwater charophytes of Estonia – data from the last 40 years** was presented by Helle Mäemets. We were shown the charophyte diversity of Estonia (17 species) and the trends of the charophyte diversity and taxonomy studies from 1966 up to now. Fidel Rubio presented the poster **Effects of enhanced UV-B radiation on Chara hispida and Nitella hyalina laboratory experiments** on behalf co-authors José Sendra and María A. Rodrigo. The two species studied, when exposed to UV-B radiation, showed a reduction of plant length and chlorophyll concentration. In the last poster communication, José Luis Alonso-Guillén and María A. Rodrigo presented the poster **The natural and supported recovery of charophytes in a Mediterranean restored area**. José Luis explained the tasks in a restored area consisting of 3 different ponds. In one of them the charophyte vegetation recovered naturally the bottom of this system. In the other marshes the charophyte *Chara polyacantha* was successfully reintroduced.

I would like to thank the organizers Kaire Torn, Georg Martin and Anastasiia Kovtun for the warm welcome and the well done organization work. I also would like to thank all the participants for the quality of the lectures and poster communications.

José Luis Alonso-Guillén, Spain



## 17<sup>th</sup> GEC Excursion Report

On 27 August 2010, the second day of the 17 GEC Meeting, after the morning session and the poster presentations, held at the Estonian Marine Institute, though a bit reduced but still enthusiastic, our small 'Group of European Charophytologists' departed from capital Tallinn and headed to a new adventure called Saaremaa excursion. Our destination was Saaremaa, one of about 1500 islands in Estonia. Not just one of, but the biggest one. First we needed to catch a ferry to a smaller island, called Muhu, and then to cross a causeway over 'Väike väin' (or a small strait) to get to Saaremaa.

We all enjoyed the ferry ride very much. The sea was peaceful, the air fresh, the view admirable and our little 'crew' had already bonded. Our first stop was on the **causeway over Small Strait**. The water was brackish because of the low salinity of the Baltic sea, and rather shallow, so we could easily take samples just by throwing in our 'hedgehog' tool. Later identification showed that several species of genus *Chara* can be found on this locality: *Chara baltica*, *Chara horrida*, *Chara tomentosa* and *Chara aspera*.

After the first stop on the causeway, we arrived to **Saaremaa**, an island located in western Estonia. Just like the entire northern and western Estonian coast it is surrounded by the Baltic sea. The first thing you notice about Saaremaa, just like elsewhere in Estonia, are the forests. Beautiful white pine and birch forests! That is, among many others, one of the greatest natural beauties of this lovely country. Almost a half of Estonian territory is covered by forests. Marvelous! At Saaremaa, besides white pine and birch you can also see oaks and, not to forget, the Saaremaa symbol – juniper bushes. Where there is no forest you can see junipers sprawl. And if you are to buy a Saaremaa souvenir it "must be" made of juniper.

One of Estonia's main characteristics, and Saaremaa's as well, as one would expect, considering the geographical altitude and proximity of the sea, is that more than a fifth of the land is filled with water and swampy habitats. That is why our next site was a marsh

called **Marjasso bog**. The water was fresh, dark coloured, and you could just smell the charophytes in it. At the depth of circa 1 metre, we found *Chara strigosa*, just like our host Kaire had told us we would. Our first day was nearing to its end as we were approaching our Kaali guesthouse. **Kaali** is a small village in the central part of Saaremaa, surrounded by forests and pastures, but Kaali is also the name of a lake located there. No, we did not sample charophytes in it, as you probably assumed, but this small lake is interesting for another reason. To quote the Excursion guide: "Lake Kaali is born from an explosion resulting from the meeting of a meteorite and the Earth", about 2000 years ago. It is one of the nine holes that appeared in this region, but the only one filled with water. With a diameter up to 110 metres, it is one of the biggest meteorite craters in Europe. We made a short tour around the lake, and then accommodated in our charming hotel. After a delicious fish dinner, and a "Vana Tallinn" toast, we gathered around our binoculars and microscopes and started working on our charophyte samples. The identification task for the first day was not difficult because there weren't a large number of specimens, but it was a nice warming up for the next day.

The second day of our excursion started with a visit to the **Muhu museum** located in Koguva village on Muhu Island. It is an ethno museum presenting a typical rural household. The village is almost 500 years old and under protection as architectural monument.

Just close to the village we did our first sampling for that day. **Koguva coast** was our next site. Again we took samples at a Small strait, between Muhu and Saaremaa, but this time it was not the causeway but NW coast of Muhu Island. The entire Small strait is a good habitat for charophytes due to its shallow water and sheltered conditions. Naturally, as a part of the Baltic Sea, the water was brackish.

No boats were necessary and samples were taken from the shore, by hand. All we needed was a pair of boots or for those who wanted to look a bit deeper, a special water-proof suit that our host colleagues provide us.

We found mostly *Chara aspera*, *Chara canescens*, *Chara horrida* and *C.baltica*, but also *Chara connivens* was present, a rather rare species in the Baltic Sea.



The beginning of the afternoon activities was at **Lake Nonni**, located on the SW of the Saaremaa Island. Again, the water was shallow, so we took the samples by hand. Three species were found: *Chara aspera*, *Chara intermedia* and *Chara polyacantha*.

Later on, we continued to a new locality, called **Kudjape bed**, near the town of Kuressaare ('capital' of Saaremaa). There were no paleontological studies of charophytes in Estonia so far, but this locality is considered to be the closest analog to the one in Gotland, Sweden – Sundre/Hamra beds.

These Silurian age beds in Gotland are famous for findings of the predecessor of recent Charales. *Moellerina laufeldi*, the oldest undoubted charophyte species, was found in those rocks. Leeli Amon organized this visit and presented an interesting lecture about the significance of this site. We took then parts of rocks as samples, so later in the lab our palaeontologist colleagues could look for gyrogonites.



Our next and last stop for that day was **Muratsi harbour**. Another beautiful Baltic sea site. We collected three stonewort species: *Chara aspera*, *Chara baltica* and *Chara connivens*.

The second evening we settled in a cosy hotel in the town of Kuressaare. After dinner and a short walk around the town, charophyte observation and identification occupied us again. The lively working atmosphere filled with vivid discussions lasted a few hours.

The third, and sadly the last day of our trip, started early on a Sunday morning at another fossil charophyte locality, **Kaugatoma cliff**. Kaugatoma formation is also in correlation with Gotland Sundre formation so we continued our search for fossil stoneworts. These cliffs are also very interesting because they consist of mass of remains of crinoids, and due to its very decorative appearance they are called 'ring' limestone. Here we could see other common fossils too, such as ostracods, brachiopods, corals etc.

Our excursion was nearing to its end, but before heading back to Tallinn, we had one more Saaremaa tourist attraction to visit. **Kuressaare Castle** is a representative medieval fortress with a castle, just on a shore of the Baltic sea. Once, one of over a thousand castles in the Baltic region and now, the only one fully preserved. The Regional Museum of Saaremaa is situated here. We only had time for a short guided tour around the castle, and a quick visit to the Nature History department. Unfortunately, we missed



seeing a wonderful view, of the Baltic sea, from the walls of the castle.

We said goodbye to Saareema and its beautiful sites at one, more than a suitable place, a small restaurant just on the Baltic shore. After a delicious lunch and the exquisite "kohupiim" dessert, our bus departed for Tallinn.

At the end of this report, the only thing left for me is to express acknowledgements to our hosts and the organizers of this lovely trip. Kaire, Georg, Anastasiia, Leeli and Helle, thank you very much for your hospitality! This meeting was another wonderful example of GEC members cooperation and fellowship, so I must say thank you to all the participants, as well. It was a pleasure to be part of this great consort. See you all next year in Poznan!

**Aleksandra Vesić, Belgrade**

#### References

1. Torn, K., Amon-Veskimeister, L., Martin, G., Kovtun, A., Mäemets, H. (2010): Excurison guide - 17th Meeting of the Group of European Charophytologists, pp.12
2. <http://www.einst.ee/publications/nature>

#### October 9-13

##### **Hydrobotany 2010, Borok, Russia**

The International Conference on Aquatic Macrophytes was held at the I. D. Papanin Institute for Biology of Inland Waters under the auspices of the Russian Academy of Sciences and the Russian Botanical Society. The venue had been announced during our GEC-Meeting in Ohrid, 2009 by **Elena Chemeris** as a co-organiser of the meeting.

The little town of Borok, c. 350 km northwest of Moscow, is located in the middle of beautiful nature. The Papanini Institute, one of the most important institution devoted to hydrology in Russia, has a long history of organising hydrobotanical meetings. Conferences on aquatic plants have taken place in this institute

in the former USSR since 1977. The 2010 meeting aimed at opening the conference to an international audience and was attended by c. 100 participants.

The abstract book provides more than 150 summaries of oral presentations and posters dealing with diverse fields of hydrobotany (biodiversity and ecology as well as pollution problems and methods in applied hydrobotany). Molecular approaches, ontogenesis and life cycle studies brought new and fundamental research to knowledge. The important role of charophytes in aquatic ecosystems was confirmed in many presentations. A small number of charophytists and IRGC-members had the pleasure to come together again.

The meeting was excellently organised by the staff of the institute, with special attention, I must say, to foreign attendants who were assisted in any possible way. Non-Russian speaking participants could benefit from individual very competent simultaneous translation.

The scientific part was followed by a one-day excursion to the UNESCO world heritage city of Yaroslavl. We became aware of the strength and width of the Volga-stream, even in its upper course. Under the perfect guidance of Elena Chemeris and her husband Alexander Bobrov, the group enjoyed the visit of marvellous orthodox churches, the museum and a XI<sup>th</sup> century monastery.



**IRGC-members at the Borok-meeting:  
Elena Chemeris; Laura Kyprianova; Ljubov  
Zakova; Zofija Sinkeviciene**

These Hydrobotany Conferences take place in a four-year turn; thus a committee had to choose the place for the next venue. After hours of discussion, it came out that Borok is, indeed, the best place for this type of meeting. I encourage you to possibly visit Borok for "Hydrobotany 2014".

**Ingeborg Soulié-Märsche, Montpellier**

#### **FORTHCOMING MEETINGS**

There is a large variety of meetings where Charologists can take an active part and promote the significance of our favourite plants. Make your choice:

#### **2011**

##### **27-29 May**

##### **Charophyte - workshop, Hilversum (Netherlands)**

The Dutch and the German Charophyte groups decided to have a joint meeting near Hilversum (Holland) to collect and determine Charophytes. The program previews three half-day collecting sessions (also with diving equipment), followed by determination sessions, discussion and presentations. Accommodation is organised in a hostel for "friends of Nature" and the costs are kept low.

**Contacts:** John Bruinsma <[bruinsma@dse.nl](mailto:bruinsma@dse.nl)> and Klaus van de Weyer <[klaus.vdweyer@lanaplan.de](mailto:klaus.vdweyer@lanaplan.de)>

##### **27 June-1 July**

##### **7<sup>th</sup> Symposium for European Freshwater Sciences, Girona, Spain**

This meeting can be of interest for some of our European researchers working on limnological

and palaeolimnological aspects. The meeting is organised by the **Iberian Limnological Association** in collaboration with **ICRA** (Catalan Institute for Water Research) and **UdG** (University of Girona).

**Contact:** Technical Secretariat, Viajes Iberia Congresos, [sefs2011@viajesiberia.com](mailto:sefs2011@viajesiberia.com)  
**Website:** <http://www.sefs2011.com/>

##### **21-27 July**

##### **XVIII INQUA, Bern, Switzerland**

The International Union for Quaternary Research organises this conference on human evolution, palaeoclimates and palaeoenvironments of the last 2.6 Ma. Palaeolimnological issues (lacustrine and fluvial) constitutes one of the main sessions of the meeting, including biological proxies such as Charales and macrophytes.

**Contact:** [office@inqua2011.ch](mailto:office@inqua2011.ch)

**Website:** [www.inqua2011.ch](http://www.inqua2011.ch)

##### **31 August-3 September**

##### **5<sup>th</sup> International Limnogeology Congress, Konstanz, Switzerland**

The focus of this meeting will be on integrative multidisciplinary and specialized contributions on ancient to recent lacustrine records, their settings and their palaeoenvironmental significance. Sixteen sessions are planned at present. The meeting will be held on the shores of Lake Konstanz, and is a nice opportunity to present our palaeontological research.

**Contact:** Prof. Dr Antje Schwalb, [antje.schwalb@tu-bs.de](mailto:antje.schwalb@tu-bs.de)

**Website:** <http://www.iug.tu-bs.de/limnokongress/general.html>



4-9 September

5<sup>th</sup> European Phycological Congress,  
Rhodes Island, Greece

The theme of this European meeting is "Exploring the phycocosmos: A European perspective", focusing on areas of taxonomy, genomics, biogeography and the effect of climate change on algae. There are eight different Symposia and Plenary talks, and Symposium 8 is expressly dedicated to 'Freshwater algal biogeography and biodiversity'. It can be a good opportunity to present charophyte research!

Website: [www.epcv.gr](http://www.epcv.gr)

12-18 September

10<sup>th</sup> International Symposium on Fossil Algae (International Fossil Algae Association), Cluj-Napoca, Romania

The Symposium will be organized by the Geological Department of the Babeş-Bolyai University, in collaboration with the Department of Geology-Paleontology, Bucharest University. Two field-trips are planned: a pre-symposium field trip to the East Carpathians, and a post-symposium field trip to the NW Transylvanian Basin. Scientific presentations on any aspect of calcareous algae and calcimicrobes are welcome, including: Biomineralization and algal- or microbe-induced sedimentation; Stromatolites; Taxonomy and Systematics; Evolutionary history; Living vs fossil; Biogeography and palaeoclimatology; Ecology and palaeoecology; Biostratigraphy; Taphonomy and diagenesis; Sedimentology: Algae and carbonate platforms; and Significance of algae in hydrocarbon and mineral resources formation.

Contact: Ioan I. Bucur, e-mail:  
[ioan.bucur@ubbcluj.ro](mailto:ioan.bucur@ubbcluj.ro)

Websites: <http://mepopa.com/isfa10> or  
<http://web.ku.edu/~ifaa/index.html>

15-18 September

18<sup>th</sup> Meeting of the Group of European Charophytologists (GEC), Poznań, POLAND

The next meeting of the Group of European Charophytologists will be organized by Mariusz Pelechaty, Andrzej Pukacz, Joanna Krupska, Maciej Gąbka and Jacek Urbaniak at the Department of Hydrobiology (in Poznań) & Collegium Polonicum (in Słubice), Faculty of Biology, Adam Mickiewicz University (AMU), Poland during September 2011. See page 22 for more information and registration details. The website will be active soon!

Contact: Mariusz Pelechaty, e-mail:  
[marpelhydro@poczta.onet.pl](mailto:marpelhydro@poczta.onet.pl)

Website: [www.gec.amu.edu.pl](http://www.gec.amu.edu.pl)

2012

25 November-27 December -  
6<sup>th</sup> International Symposium of IRGC,  
Mendoza, Argentina

During the last year a new time and locality was fixed for the celebration of the next IRGC Meeting. The last week of November 2012 is more appropriate to collect extant charophytes and Mendoza offers better facilities than Malargüe for the meeting venue. However, Malargüe will be visited during the field excursions.

Mendoza is a beautiful city at the base of the Andes, with all the necessary comfort and infrastructure to have a pleasant conference.

We will have a pre-symposium field-trip to visit localities with extant charophytes (22-24 November, visiting wetlands between Mendoza and Malargüe); Plenary Sessions (25-27 November); post-symposium field-trip to fossil sites (28 November-2 December); and a third touristic-scientific field-trip to southern Patagonia (3-7 December) which will be run if there are enough interested people.

Please find the Intention-to-Participate added on separate pages. You can replay to it electronically or using this hard copy; just follow the instructions.

Eduardo A. Musacchio, Argentina  
Adriana García, Australia-Argentina

2014

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

The next IPC will be held in Mendoza, Argentina, with the organizers of the Congress promising a very exciting meeting, so please make a note of the dates and start planning to participate! The Congress will be accompanied by field excursions before and after the meeting, still not defined.

Contacts: Dr. Claudia V. Rubinstein;  
[crubinstein@mendoza-conicet.gov.ar](mailto:crubinstein@mendoza-conicet.gov.ar) and Dr.  
Beatriz G. Waisfeld: [bwaisfeld@efn.uncor.edu](mailto:bwaisfeld@efn.uncor.edu);

NEWS FROM THE REGIONAL GROUPS  
AND INDIVIDUALS

News from South America

Brazil - extant charophytes

The group of Charophyceae research of the State University of Western Paraná – UNIOESTE (BRAZIL) formed by Norma Catarina Bueno ([ncbueno@unioeste.br](mailto:ncbueno@unioeste.br)) and Thamis Meurer ([thamismeurer@gmail.com](mailto:thamismeurer@gmail.com)) are investigating the Characeae flora and the relation of spatial dynamics of the genus *Chara* and *Nitella* with environmental variables measured on the Brazilian margin of Itaipu reservoir. The research is financed by the Technological Park

of Itaipu Foundation ([www.fpti.br](http://www.fpti.br)). The flora of *Chara* and *Nitella* from other regions, such as Paraná, Santa Catarina, Rio Grande do Sul, Mato Grosso and Mato Grosso do Sul are in press. Recently, a checklist of Brazilian Flora was published, including the Characeae, available on:

[http://floradobrasil.jbrj.gov.br/2010/index?mode=1&group=Flora.Algas&family=Flora.Algas.Charophyceae&genus=&species=&author=&common=1&region=&state=&phyto=&endemic=-1&nativa=-1&last\\_level=25](http://floradobrasil.jbrj.gov.br/2010/index?mode=1&group=Flora.Algas&family=Flora.Algas.Charophyceae&genus=&species=&author=&common=1&region=&state=&phyto=&endemic=-1&nativa=-1&last_level=25)

Finished project: Bueno, N.C., de Mattos Bicudo, C.E. Karol, K.G., Monografia das Charophyceae neotropicais

Current project: Meurer, T. 2011. Variação da Composição, Distribuição espacial e Influência dos Fatores Ambientais sobre a ocorrência de Characeae em um reservatório subtropical. Universidade Estadual do Oeste do Paraná, Toledo, Paraná, Brasil).

Publications: Bueno, N.C., Prado, J.F., Meurer, T., and Bicudo, C.E.M. New Records of *Chara* (Chlorophyta, Characeae) for Subtropical Southern Brazil. Systematic Botany (*in press*).

Araújo, A; Bueno, N.C.; Meurer, T; Bicudo, C.E.M. Charophyceae. In. v.1. Catálogo de plantas e fungos do Brasil, volume 1 [organização Rafaela Campostrini Forzza... et al.]. -Rio de Janeiro: Andrea Jakobsson Estúdio: Instituto de Pesquisas Jardim Botânico do Rio de Janeiro, 2010. 2.v.: il.

Bueno, N.C.; Bicudo, C.E.M.; Biolo, S.; Meurer, T. Levantamento florístico das Characeae (Chlorophyta) de Mato Grosso e Mato Grosso do Sul, Brasil: *Chara. Revista Brasileira de Botanica* [online]. 2009, vol.32, n.4 [cited 2011-01-18], pp. 759-774. Available from: [http://www.scielo.br/scielo.php?script=sci\\_arttext&pid=S0100-84042009000400014&lng=en&nrm=iso](http://www.scielo.br/scielo.php?script=sci_arttext&pid=S0100-84042009000400014&lng=en&nrm=iso).

Brazil - fossil charophytes

The colleagues, Simone Baecker Fauth, Mauro Daniel Rodrigues Bruno, Fernando Marcanth Lopes and Rafael Souza de Faria, are still working on charophytes from Bacia de Santos. They are also writing a chapter for on fossil Charales for a book on Paleontologia edited by Prof. Ismar Carvalho (Vol. 1 has been published



in 2010 and Vol. 2 dedicated to Micropaleontology will be edited in 2011).

#### Venezuela

During 2010, Dr Julio Rodriguez and colleagues started a project on "Charophyta (Characeae, Streptophyta) en aguas continentales de la Isla Margarita, Venezuela, como indicadores de la calidad del agua", in order to study taxonomical and ecological aspects. The environments sampled are lentic and lotic, including a karstic (ponor) pond. The species found are: *Chara zeylanica* in Río Caracas, *Chara haitensis*, *Nitella translucens* and *Nitella sp.* in the karstic lake Hato, and *Nitella sp.* in the lake Boca de Río. The sampling of biota and water chemistry will be followed for at least 2 years.

The group is based at the Centro Regional de Investigaciones Ambientales (CRIA), Univ. de Oriente, Nucleo de Nueva Esparta, Isla de Margarita, Estado de Nueva Esparta, Venezuela.

#### Argentina

Eduardo A. Musacchio (University of Patagonia, Argentina) has published in *Cretaceous Research* (2010, 31: 461-472) a note dealing with Upper Cretaceous gyrogonites assigned to the living genera *Tolypella*, *Nitella* and *Lychnothamnus* from Zampal, Mendoza Province, Argentina. He is now devoted to the Systematics of Lower Cretaceous gyrogonites and utricles from the San Jorge Gulf Basin in Chubut Province. Adriana García and Allan Chivas (Australia) have been sampling the south of Mendoza area, completing collection of data in the area of Lake Llanquanelo, as well as collecting fluvial deposits from Río Tunuyán, with Dr Leandro Rojo, in order to study charophytes and ostracods. Sediment cores of ~ 10 m collected from Lake Llanquanelo, will be opened in April 2011, and will be studied by the above-mentioned colleagues and Sabina D'Ambrosio (PhD student at La Plata, but currently in Australia for one year).

**Eduardo A. Musacchio, Argentina**

#### News from Individuals

##### The stonewort (Characeae) herbarium of the Botanical Institute Greifswald

The Botanical Institute (now the Institute of Botany and Landscape Ecology, see <http://www.mnf.uni-greifswald.de/institute/fr-biologie/institut-fuer-botanik-und-landschaftsoekologie.html>) with its Botanical Garden was founded in the 18<sup>th</sup> century; around 1850 a botanical museum was added. A number of prominent early botanists of the institute were specialists for various groups of algae, e.g. Erich Leick, Robert Bauch, and Franz Schütt. In the late 19<sup>th</sup> century the focus of research moved to vascular plants and vegetation ecology; names like Heinrich Borriss, Werner Rothmaler and Franz Fukarek mark this period. Today, most research work is done in landscape and restoration ecology; other fields are climate change and plant population biology.

Among the collections in the botanical museum (Starke & Schnittler 2009) we also inherited a remarkable collection of algae. Comprising more than 30,000 accessions, this collection holds a number of type specimens, together with several exsiccate series

([http://geobot.botanik.uni-greifswald.de/portal/index.php?option=com\\_content&task=blogsection&id=9&Itemid=86](http://geobot.botanik.uni-greifswald.de/portal/index.php?option=com_content&task=blogsection&id=9&Itemid=86)).

Among the macroscopic algae, the stoneworts (Characeae) are represented best in our collection, since the Baltic Sea with its coastal lagoons is a centre of diversity in this group, which comprises about 40 taxa in Germany. The stonewort collection was curated and digitized by our late colleague Christian Blümel (1971-2006) in the framework of the ELBO-Project (Development of guidelines for quality assessment of brackish waters of the German Baltic Sea coast according to the EC water quality guideline).

An Excel-File with data of all 1272 specimens, among them 22 isotypes, can be downloaded from the homepage of the Botanical Institute, following the link Collections -> Herbaria -> Algae or following the link at the web page of the Geobotanical Working Group M-V

(<http://geobot.botanik.uni-greifswald.de/sammlungen/>). The most comprehensive contribution is from Ludwig Holtz; further important collectors are C. Baenitz, A. Braun, T.F. Marsson, W. Migula (well known by his multi-volume flora about cryptogamic plants), J. Münter, R. Ruthe, C.A. Seehaus, F. Schütt, P. Sydow, K.-A. Wegener and H. Zabel.



**Chara horrida, a rare charophyte in Germany, found in a brackish water lagoon off the isle of Hiddensee. Photo by S. Dahlke**

#### Contact

Collection Manager: S. Starke, Institute of Botany and Landscape Ecology, Grimmer Str. 88, D-17487 Greifswald, Email [susanne.starke@uni-greifswald.de](mailto:susanne.starke@uni-greifswald.de)

Specialist for stonewort algae at the University of Greifswald: I. Blindow, Biological Station of Hiddensee, D-18565 Kloster / Hiddensee, Email [blindi@uni-greifswald.de](mailto:blindi@uni-greifswald.de)

#### Literature

Starke, S. & Schnittler, M (2009): Die Sammlungen des Botanischen Institutes der Ernst-Moritz-Arndt-Universität Greifswald. In: Obst, K., Reinicke, G.-B., Richter, S. & Seemann, R. [Hrsg.] Schatzkammern der Natur – Naturkundliche Sammlungen in Mecklenburg-Vorpommern.-100 S, ISBN: 978-3-00-025888-6.

**M. Schnittler and S. Starke (sent by I. Blindow), Germany**

#### PROCEEDINGS OF THE IRGC ROSTOCK CONFERENCE

Presentations from the IRGC conference held 2008 in Rostock are being published as a special issue in the electronic journal *Charophytes*, volume 2, issues 1 and 2. The special issue includes charophyte studies from the USA to Siberia and Bangladesh, and deals with fields from morphology and distribution of charophytes to genetics and photosynthesis measurements. A list of paper titles, authors and free abstracts can be downloaded at [www.charophytes.com](http://www.charophytes.com) (go to journal, then volume 2 issues 1 and 2). A printed version of the combined issues 1 and 2 is not available yet, but is expected to appear by April 2011. The costs for this special issue will be 65 Australian dollars, in addition to postage and handling. A pre-print order form is included in the IRGC news (p. 21) and can be used for ordering.

Other news from the *Charophytes* journal is that papers are now being accepted for a special issue on charophyte conservation. Case-studies on charophyte conservation are welcome, so if you have a study you think is relevant, please make contact with Michelle Casanova at [amcnova@netconnect.com.au](mailto:amcnova@netconnect.com.au).

**Michelle Casanova and Susanne Schneider**

#### NEW IRGC MEMBERS AND CHANGES OF ADDRESS

Dr Norma Catarina BUENO  
Conselheira do CRBio 07  
Mestrado Conservação e Manejo de Recursos Naturais  
UNIOESTE- Herbario UNOP/CCBS  
Rua Universitaria 2019  
Jardim Universitário  
85 819-110 CASCAVEL/PARANA  
Brazil  
[normacatarina@hotmail.com](mailto:normacatarina@hotmail.com)  
Joanna KRUPSKA



Department of Hydrobiology,  
A. Mickiewicz University  
Umultowska 89  
61-614 POZNAN,  
Poland  
[jkrupska@poczta.onet.pl](mailto:jkrupska@poczta.onet.pl)

Petra NOWAK  
Universität Rostock, Biowissenschaften  
Albertstein Strasse 3  
18053 ROSTOCK,  
Germany  
[petra.nowak@uni-rostock.de](mailto:petra.nowak@uni-rostock.de)

Fidel RUBIO  
Carrer Blasco Ibáñez 22  
12220 ARTESA, CASTELLON  
Spain  
[fidel.rubio@uv.es](mailto:fidel.rubio@uv.es)

Josep SANJUAN-GIRBAU  
Dept. d'Estratigrafia, Paleontologia i  
Geociències marines  
Facultat de Geologia, Univ. Barcelona  
08028 BARCELONA  
Catalonia, Spain  
[josepst.juan@hotmail.com](mailto:josepst.juan@hotmail.com)

**CHAROPHYTE DISCUSSION FORUM**

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

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

**How to suscribe to charophyte-L?**

Just send the message to the listserver:  
[listserv@pnc.edu](mailto:listserv@pnc.edu)

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 it to all subscribers.

**CHAROPHYTES ON THE WEB**

The **IRGC** homepage is hosted at:  
<http://irgc.uow.edu.au/>

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 18<sup>th</sup> GEC website will be soon available.

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>

**MEMBERSHIP FEES**

Please **do not forget** to send your membership fee payment for 2011. Multiple-year payments are encouraged!

**20 Euros (c. US\$25) per year**

Thanks to the efforts of our treasurer the payment can be done by credit card.

Please find enclosed membership form (p. 23) or download the payment form from the IRGC-website at:

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**E-MAIL ADDRESSES OF IRGC MEMBERS**

Please check the e-mail list and address directory carefully. **We particularly urge members to send any address changes (both surface mail and e-mail) to the IRGC-Secretary, Adriana García [adriana@uow.edu.au](mailto:adriana@uow.edu.au)** to ensure you will receive forthcoming information. **Updated March 2011.**

ALONSO-GUILLEN, J-L.	<a href="mailto:j.luis.alonso@uv.es">j.luis.alonso@uv.es</a>
ANADON, P.	<a href="mailto:panadon@ija.csic.es">panadon@ija.csic.es</a>
ASAEDA, T.	<a href="mailto:asaeda@post.saitama-u.ac.jp">asaeda@post.saitama-u.ac.jp</a>
AUDERSET-JOYE, D.	<a href="mailto:Dominique.Auderset@unige.ch">Dominique.Auderset@unige.ch</a>
BAECKER-FAUTH, S.	<a href="mailto:SBFauth@unisinios.br">SBFauth@unisinios.br</a>
BASSLER, B.	<a href="mailto:b.bassler@lrz.uni-muenchen.de">b.bassler@lrz.uni-muenchen.de</a>
BEILBY, M. J.	<a href="mailto:mjb@newt.phys.unsw.edu.au">mjb@newt.phys.unsw.edu.au</a>
BENGTSSON, R.	<a href="mailto:Roland.bengtson@mikroalg.se">Roland.bengtson@mikroalg.se</a>
BERGER, J. P.	<a href="mailto:Jean-Pierre.Berger@unifr.ch">Jean-Pierre.Berger@unifr.ch</a>
BHATIA, S. B.	<a href="mailto:sudhashi0903@hotmail.com">sudhashi0903@hotmail.com</a>
BISSON, M.	<a href="mailto:bisson@buffalo.edu">bisson@buffalo.edu</a>
BLAZENCIC, J.	<a href="mailto:jblaz@eunet.rs">jblaz@eunet.rs</a>
BLINDOW, I.	<a href="mailto:blindi@uni-greifswald.de">blindi@uni-greifswald.de</a>
BOCIAG, K.	<a href="mailto:dokkb@univ.gda.pl">dokkb@univ.gda.pl</a>

BOISSEZON, A.	<a href="mailto:Aurelie.Boissezon@unige.ch">Aurelie.Boissezon@unige.ch</a>
BREITHAUPT, C.	<a href="mailto:Christian.breithaupt@web.de">Christian.breithaupt@web.de</a>
BRUINSMA, J.	<a href="mailto:bruinsma@dse.nl">bruinsma@dse.nl</a>
BUENO, N.C.	<a href="mailto:normacatarina@hotmail.com">normacatarina@hotmail.com</a>
CASANOVA, M. T.	<a href="mailto:amcnova@netconnect.com.au">amcnova@netconnect.com.au</a>
CHEN, Jing	<a href="mailto:chenjing_24@163.com">chenjing_24@163.com</a>
CHEMERIS, E.	<a href="mailto:elchem@ibiw.yaroslavl.ru">elchem@ibiw.yaroslavl.ru</a>
CHIVAS, A. R.	<a href="mailto:toschi@ow.edu.au">toschi@ow.edu.au</a>
CHOU, Jui-Yu	<a href="mailto:jackyjau@yahoo.com.tw">jackyjau@yahoo.com.tw</a>
CHRYSULA, C.	<a href="mailto:xchristi@UPATRAS.GR">xchristi@UPATRAS.GR</a>
COMPERE, P.	<a href="mailto:P.Compere@BR.fgov.be">P.Compere@BR.fgov.be</a>
COOPS, H.	<a href="mailto:hugo.coops@wldelft.nl">hugo.coops@wldelft.nl</a>
DAMINO, S.	<a href="mailto:sara.damino@tin.it">sara.damino@tin.it</a>
DEREKE, Zane	<a href="mailto:zdekere@email.lubi.edu.lv">zdekere@email.lubi.edu.lv</a>
DOEGE, A.	<a href="mailto:adoege@pinzigberg.de">adoege@pinzigberg.de</a>
DU, Pin-de	<a href="mailto:dupinde@hotmail.com">dupinde@hotmail.com</a>
ELKHIATI, N.	<a href="mailto:nelkhiati@gmail.com">nelkhiati@gmail.com</a>

<http://irgc.uow.edu.au/>

(click on Membership, then Payment Form Download)

Any questions about membership fees should be addressed to:

**IRGC-Treasurer Dr Emile Nat:**  
[e.nat@kranswieren.nl](mailto:e.nat@kranswieren.nl)



## 18<sup>th</sup> Meeting of the Group of European Charophytologists 15-18 September 2011, Poznań-Słubice, POLAND

The 18<sup>th</sup> GEC Meeting will be held at the Adam Mickiewicz University (AMU) in Poznań, Poland, organized by the Department of Hydrobiology (Faculty of Biology) in collaboration with *Collegium Polonicum* in Słubice, Poland. Honourable patronage: Rector of Adam Mickiewicz University and Dean of Faculty of Biology.

### Organizers:

Mariusz Pełechaty (Dept. of Hydrobiology), Andrzej Pukacz (*Collegium Polonicum*).  
Joanna Krupska (Dept. of Hydrobiology), Maciej Gąbka (Dept. of Hydrobiology) from AMU and Jacek Urbaniak (Dept. of Botany and Plant Ecol., Wrocław University of Life Sciences).

**Contact person:** Mariusz Pełechaty, e-mail: marpelhydro@poczta.onet.pl

### Preliminary programme:

**14 September (Wednesday):** informal meeting in Poznań Old Town & city tour.

**15-16 September (Thursday and Friday):** oral and poster sessions at the *Collegium Biologicum* building, Faculty of Biology, AMU campus in Poznań.

**17-18 September (Saturday and Sunday):** field excursion, charophyte collection and determination at the *Collegium Polonicum* building in Słubice, return to Poznań on Sunday evening.

### Registration fees for meeting (excursion not included):

IRGC-Members: 40€

Non IRGC-Members: 50€

Students: 30€

### Fee for field excursion:

About 120€ (depending on the number of participants)

### Deadlines:

**15 June 2011:** final registration, abstract submission and fees payment

### Payment:

By bank transfer only, by 15 June 2011

Bank account number: BZ WBK 77 1090 1362 0000 0000 3601 7903

SWIFT: WBKPPLPP Bank address: VI O/Poznań, Plac Wolności 15, 60-967 Poznań

NOTE: For those, who for serious reason cannot pay by bank transfer, there is still possibility to pay by cash upon arrival

Please **indicate** the Meeting subaccount number 711 067 and your surname in the title of the bank transfer!

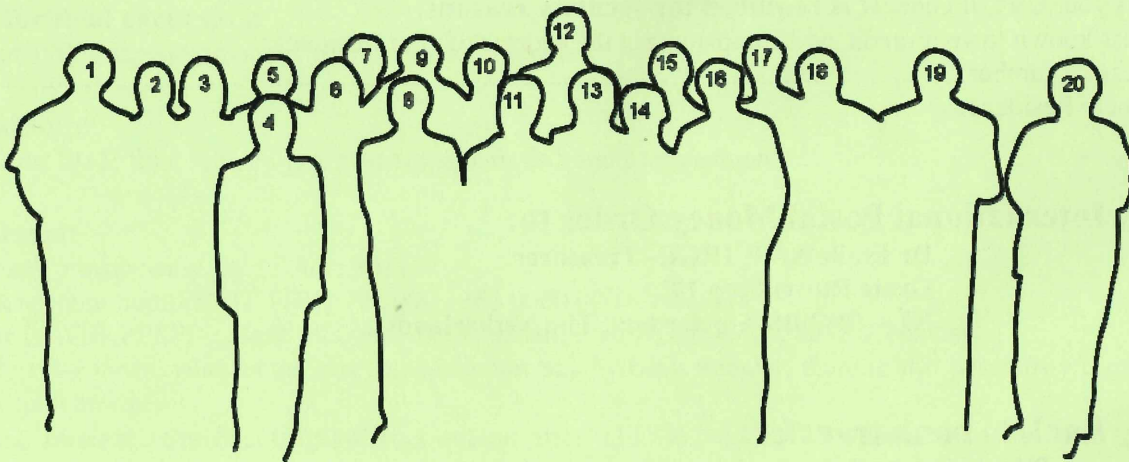
**Final registration and abstract submission**, as well as more details look at [www.gec.amu.edu.pl](http://www.gec.amu.edu.pl) and in the second circular to be sent soon.

If you have any questions please send an e-mail to the contact person

**Looking forward to seeing you in Poland!**



## 17<sup>th</sup> GEC Meeting, Tallinn, Estonia Group Photograph, 2010



1. Mariusz Pelechaty 2. Anastasiia Kovtun 3. Kaire Torn 4. Petra Nowak 5. Piotr Skurzynski  
6. Paulina Brzeska 7. Georg Martin 8. Joanna Krupska 9. Jose Luis Alonso-Guillén 10. Fidel Rubio  
11. Dominique Auderset-Joye 12. Hendrik Schubert 13. Susanne Schneider 14. Aleksandra Vesić  
15. Carles Martín-Closas 16. Lothar Ratai 17. Josep Sanjuan Girbau 18. Rudolf Ehwald 19. Jacob  
John 20. Helle Mäemets