IRGC NEWS

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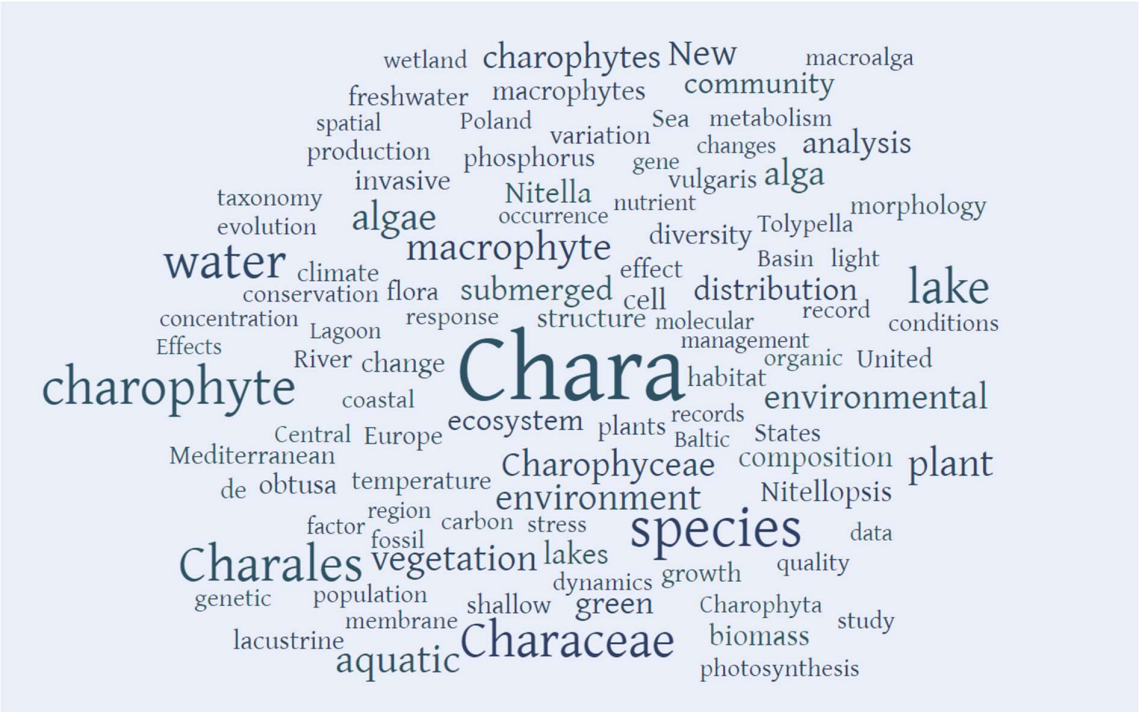

Word cloud created based on the titles and keywords of publications listed in Scopus from last 10 years.

Dear IRGC members,

Another year has passed, and it took from us our good friend, very nice colleague, respected scientist, and hard-working but at the same time cheerful IRGC vice-president, Andrzej Pukacz. Andrzej died much too early, and the IRGC not only lost one of its most active members, but also a very good friend. We are going to miss Andrzej, his friendly smile, his jokes, as well as his scientific contributions in form of posters and presentations at our conferences. He contributed substantially to increasing the knowledge on charophytes in Poland, Germany, and Europe, and in the last years he did some truly impressive work on carbon dynamics and calcium-carbonate precipitation. Andrzej, we miss you, and you will forever be in our hearts!

Looking forward, this year we will get the possibility to meet each other again. I am truly looking forward to the 8th IRGC symposium, which will be organized by Michelle Casanova in October in Melbourne, Australia. Michelle proposes an interesting program, with 3 days of plenary lectures, as well as pre- and post-symposium field trips! Please find more detailed information in these IRGC-News. I am looking forward to seeing many of you there, to interesting presentations and discussions about charophytes, and simply and honestly, I am looking forward to seeing you again. I hope many of you will be there. If you can imagine organizing an IRGC symposium or GEC meeting in the future, please let me know.

During the IRGC symposium, we will also have to elect a new IRGC-board, i.e. president, vice-president, treasurer, and secretary. We will send more information on the election by email to all IRGC-members, in due time before the conference. As always, all members will have the possibility to vote, either directly at the conference, or beforehand by email. According to our statutes, an IRGC-president can only serve for a maximum of 8 years. For this reason, my time as president is going to end in October this year. I would like to thank all of you for making the IRGC such an active, positive, enthusiastic, interdisciplinary, and international organization! An extra big “thank you” goes to Emile and Kaire, and to Andrzej, for always being supportive, engaged, and not at least for doing a great job!

Hoping to see many of you in Melbourne!

Susanne Schneider

OBITUARY

Dr. hab. Andrzej Pukacz, Professor at Adam Mickiewicz University, Poznań, Poland

02.02.1979 – 08.08.2023

Our colleague Andrzej Pukacz died tragically on August 8, 2023, at the age of 44. The premature death took a valued scientist, naturalist, teacher, colleague and friend. Andrzej devoted his entire scientific career to research on aquatic plants, in particular charophytes. Charophytes were the subject of the vast majority of his scientific publications. He was vice-president of the International Research Group on Charophytes, a scientific society particularly close to his heart, to which he had belonged since 2006.

In 2006, Andrzej was granted a PhD in biological sciences in the field of ecology-hydrobiology, based on a thesis entitled "Assessment of the ecological state of lakes of the Lubuskie Lake District" prepared and defended at the Faculty of Biology of the Adam Mickiewicz University in Poznań (AMU). His favourite area of research were the lakes of the Lubusz Land in western Poland, including the lakes of the Lubuskie Lake District, and the research conducted there resulted in first a bachelor's thesis, a master's thesis, then a doctoral dissertation and finally, in 2016, a habilitation dissertation entitled "The role of stoneworts in calcium carbonate precipitation and its consequences for the chemistry of lake waters". Throughout his entire student and professional career, Andrzej was associated with the AMU, and especially with the Collegium Polonicum in Słubice, where he lived and where in 1998 he began studies in environmental protection and where, after his doctorate, he worked as an assistant professor, and after his habilitation as a university professor. At CP, Andrzej was an employee and then director of the Polish-German Research Institute, a teacher at the University High School, and in recent years he was the AMU Rector's Plenipotentiary for teaching.

Andrzej's publication record includes 43 scientific publications, not including numerous conference reports, of which 34 articles were published in renowned international journals from the Journal Citation Report list. Among these publications, it is worth highlighting the co-authorship of three books, all of which concern charophytes. One of them is the Polish charophyte determination key, which is used by students of Polish universities and employees of institutions dealing with water monitoring and protection. The two remaining books are monographs of the charophytes of the Lubusz Land (Poland) and Brandenburg (Germany).

His passion for nature Andrzej shared not only in scientific publications, but also by popularizing knowledge of nature, especially among young people, his students and those under his care from the Korczakowo scout camp on his beloved Lake Grzybno.

Andrzej will be remembered not only as an excellent scientist and nature enthusiast, but also as a wonderful husband and father and an extremely nice colleague and friend, willing to help, supportive, a gentleman with a lovely smile...

Mariuz Pełechaty

Selected publication records of Andrzej Pukacz based on the AMU Research Portal

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Papers

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WELCOME TO NEW MEMBERS

It is great pleasure to welcome our new members: Carolin Heise (Germany) and Maria Groumpou (Greece).

OVERVIEW OF PUBLICATIONS

Charophyte-News: An overview of noteworthy studies from 2023

Every year, I scour Web of Science (WoS) for the latest developments related to charophytes. However, this year I found myself a bit behind schedule, conducting my search in the end of January. Armed with the search terms “Chara” and “2023”, I was met with a staggering 219 hits! Now, that might seem like an abundance, but, as I found out last year, WoS has implemented some changes in their search algorithm. This means that a significant portion of the 219 hits in fact had little to do with “our” Chara. Among the hits, I encountered some curious cases: first, there were hits that seemed outright erroneous – no trace of “Chara” anywhere. Then, there were the usual publications on a stellar phenomenon called “Chara”, but also a publication on an Australian wheat variety called “Chara”. To my great amusement, there also seems to be some kind of choreography or “dance” called Chara. One of the 219 WoS hits boldly proclaimed “Chara”. A path for dance. 😊 And believe it or not, “Chara” in fact also is a surname! Among the 219 hits, many of which had nothing to do with “our” Chara, I found it quite hard to identify the truly relevant articles. So, if I inadvertently overlooked one of your papers, my sincerest apologies. Let’s hope I didn’t miss any gems!

As always, I was way over my head with the paleontological studies, so these are not included here. In 2023, quite many physiological studies were published, as well as many “hard-core” genetic studies, including analyses of the transcriptome, using *Chara* as a

model! Sorry folks, but I really was way over my head with these studies, so they are not included here. I would, however, appreciate if somebody made an effort to try and explain these papers in an “understandable” way.

Below I give an overview on 15 papers, which - as always - only represent my personal interests, not necessarily scientific consensus, or quality.

Several authors contributed to extending our knowledge on the worldwide distribution of charophytes. Romanov et al. surveyed charophytes in Dagestan (North Caucasus, Russia) and identified nineteen new localities for seven *Chara* and one *Tolypella* species. Unfortunately, Romanov et al. did not find any endemic charophyte species. I am guessing that this was a little disappointing for them because it contrasts with the flora of terrestrial magnoliophytes in Dagestan that is rich in species endemism. Casanova and Karol documented 15 species in Australia’s Northern Territory of which two are new for the Australian flora, five varieties were raised to species rank, and two species were newly described. Bellino and Baldantoni recorded charophytes in the southern Campania region in Italy, and recorded many opportunistic species that are able to thrive in temporary water bodies. Markovic et al. investigated 262 localities in the Vojvodina province, northern Serbia. They found seventeen charophyte species, in two main habitat types. On the one hand, small and shallow temporary habitats in river floodplains, at lower altitudes, with muddy and clayish substrate, were inhabited by either very tolerant species, such as *Chara vulgaris* and *C. globularis*, or the so-called "spring" species of the genera *Tolypella* and *Nitella*. On the other hand, deeper and more permanent habitats at higher altitudes with a sandy substrate were colonized by species such as *Chara papillosa*, *C. hispida*, and *Nitellopsis obtusa*. Nurashov et al. registered charophytes in 54 sites in south and southeast Kazakhstan. They related the species occurrence to environmental parameters and suggested a tentative red list for the study region.

With respect to red lists, Gruszka et al. discuss an interesting question regarding *Chara connivens* in the Baltic Sea. The first reports of *C. connivens* in the Baltic Sea are from the 1870s, yet it’s earliest known record traces all the way back to 1829. The type locality of *C. connivens* is from Morocco, but the species found its way to the Baltic region via Königsberg (now Kaliningrad, Russian Federation) and a coastal lake formed at the former mouth of the western Vistula branch—a strategic gateway to the harbour of Gdańsk/Danzig. Already then, the scientific community was well aware that the species hitchhiked there with ship ballast. Ships need ballast in order to be stable, and in earlier times, sand or rocks were used as ballast. Oospores, however, can continue to be viable even after many months of transport in wet sand. This is how *C. connivens* became established in the Baltic Sea. In recent decades, however, the species was considered rare in the Baltic Sea area and in Poland *C. connivens* is a protected species. The question Gruszka et al. asked, therefore, is whether or not an **introduced** species should be **red-listed**. Based on an in-depth revision of the historical and current distribution of *C. connivens*, Gruszka et al. suggest that *C. connivens*, as non-indigenous species, should not be red-listed in the Baltic Sea area.

Distribution of charophytes in any case is an interesting subject. Herkül et al. studied the distribution pattern of 11 charophyte and angiosperm species in the northern Baltic Sea, in order to better understand co-occurrence patterns. They found that species tended to co-occur more frequently within their taxonomic groups than between these groups. This means that charophytes occurred preferably together with charophytes, and angiosperms with angiosperms. The most extensive distribution overlap was observed between *C. aspera* and *C. canescens*, while *Zostera marina* had the largest share of single-species occurrences. In other words, *Zostera marina* likes to stay alone, while *C. aspera* and *C. canescens* like to play with each other!

But charophytes not only play with each other, they also interact with phytoplankton. Pelechata et al. studied phytoplankton biomass and composition in three *Chara* and three *Potamogeton* dominated lakes in each of two

climatically different regions in Poland. Multidimensional statistical analyses clearly distinguished between the *Chara* and the *Potamogeton* lakes. The *Chara* lakes had significantly lower total phytoplankton biomass, and specifically, the biomass of diatoms and cyanobacteria was lower in *Chara*- than in *Potamogeton*-lakes. In plain words: charophytes can effectively keep lake water "clean" from phytoplankton.

As you know, charophytes can reproduce both sexually and vegetatively, but some *Chara* species rely mainly on sexual reproduction. Wang et al. studied sexual reproduction of *Chara braunii* at different light and temperature levels in a factorial experiment. They found that at low light, as well as at low temperatures (20 degrees), gametangia developed some days later. At high temperatures (25 degrees), fewer whorls developed gametangia. When low light and low temperatures were combined, no gametangia were developed. These results are interesting in themselves, but luckily, they also match our field observations that charophytes generally do not fructify in deeper water (where light and temperatures generally are low).

Irrespective whether or not they fructify, charophytes often grow in dense patches and can build up considerable biomasses in lakes. When they grow in large biomasses, charophytes can significantly affect the nutrient and carbon cycling of lakes. Several *Chara* species, as well as *Nitellopsis obtusa* produce calcium carbonate encrustations, and calcium carbonate can constitute up to a whopping 86% of the summer dry weight of the standing crop. It was often assumed that this calcium carbonate simply is deposited in the sediment. Strzalek et al. set out to test this assumption and analysed what happened to the calcium carbonate in three different *Chara* species, and *Nitellopsis obtusa*. They found that up to almost 90% of the summer calcium carbonate content may indeed be buried in the sediment. There were large differences among species, however, and among localities. In some samples, up to half of the calcium carbonate produced in summer was "recycled", i.e. it was dissolved again. The authors speculate that the calcium carbonate may be dissolved due to a local decrease in pH, caused by dark respiration: the production of CO_2 locally decreases the pH, leading to the dissolution of calcium carbonate and a "recycling" of bicarbonate. The authors conclude that inorganic carbon cycling by charophytes involves both burial of calcium carbonate in the sediment but also "recycling", i.e. dissolution of calcium carbonate, and is therefore more complicated than previously thought.

Calcium carbonate precipitation, however, also affects lake phosphorus cycling. Many *Chara* species seem to prefer hard water with low phosphorus concentrations. Charophytes, however, stabilize low water phosphorus concentrations by co-precipitating phosphorus with calcium carbonate (calcite). Li et al. grew *Chara vulgaris* in low P treatments (less than 6 µg P /L) and high P treatments (more than 100 µg P /L) and studied the allocation of phosphorus in *Chara*. They found that *C. vulgaris* grew faster in low P treatments than in high P treatments, and that the growth rate was significantly increased when *C. vulgaris* was transferred from the water with high P content to water with low P content. This is important because it would indicate that high water P contents inhibit the growth of *C. vulgaris*! At higher water P concentrations, the inorganic P content of *C. vulgaris* was increased fourfold, but the organic P content increased only little. At low water P concentrations, more than 70% of the total P accumulated in *C. vulgaris* was used for biomass growth. In contrast, at high water P concentrations more than 60% of the TP in *C. vulgaris* was precipitated into calcite encrustation. The authors therefore speculate that at high P concentrations, the Ca-P co-precipitation may be the reason for the observed inhibition in growth. These results seem a little surprising to me, and they indeed relate to "older" science. Similar growth experiments were done in the 1960s by Forsberg (who worked with *C. globularis*), and the 1980s by Irmgard Blindow (who worked with *C. tomentosa* and *C. hispida*). While Forsberg found reduced growth at high phosphorus concentrations, Blindow did not. I have a tendency to follow Irmgard

Blindows explanation, suggesting that the reduced biomass of *Chara* in lakes with high phosphorus concentrations is not a result of phosphorus toxicity, but of light limitation (caused by phytoplankton blooms in nutrient rich water). Consequently, I am wondering if light limitation due to increased calcification at high phosphorus concentrations might have caused the inhibited growth observed by Wang et al. This is, however, only my highly personal interpretation of the results, and I might very well be wrong. Maybe some of you can do some growth experiments to clarify this matter?

It is a well-established fact that charophytes can purify water, and charophytes indeed are used for treating polluted water. The Everglades Stormwater Treatment Areas are large freshwater wetlands constructed to reduce phosphorus in stormwater runoff discharged to the Everglades Protection Area. They consist of treatment cells, which are managed to promote either emergent aquatic vegetation (mainly *Typha*) or a mixed marsh of emergent vegetation and submerged aquatic vegetation. And guess what, the submerged vegetation consists mainly of *Chara*! The treatment cells perform quite well, this means the TP concentration in the outflow is below 20µg/l. Dombrowski et al. measured biomass and nutrient content in *Typha* and *Chara* growing in the treatment cells, mainly to support ongoing modelling efforts (I am guessing to model the performance of stormwater treatment areas). They found that N:P ratios at most *Typha* sites indicated N limitation while P limitation was observed primarily at *Chara* dominated sites. Since it is known that P is removed via co-precipitation by *Chara* species (see above), these results seem to indicate that *Chara* removes more P, and *Typha* more N from the water. This paper is anyway of value for those of you who are interested in nutrient budgets, because it contains good numbers for C, N and P in *Chara* biomass. The only disadvantage is that the *Chara* was not determined to species level!

As you know, charophytes are among the closest relatives of land plants. This means their ancestor performed a drastic adaptation in plant evolution around 500 million years ago: the conquest of land. Besides other adaptations, this step required changes in cell wall composition. Pfeifer et al. performed sequential cell wall extractions of four *Chara* species. They found that *C. globularis*, *C. subspinosa* and *C. tomentosa* had comparable cell wall compositions, with pectins, xylans and xyloglucans. *C. aspera*, however, was different! Its cell wall had higher amounts of uronic acids, as well as other substances. I found it interesting to learn that there are differences in cell wall composition among *Chara* species. Pfeifer et al. also searched for the presence of arabinogalactan-proteins (AGPs), important signalling molecules in all land plants. They concluded, however, that these AGPs were absent in the four species they studied. This seems to indicate that it was indeed a big step from *Chara* to land plants!

Finally, some authors contributed to unravelling some of the mysteries of *Chara* species delimitation. Romanov et al. compared *C. denudata* and *C. dissoluta*, two species that have imperfect cortication on stem and branchlets. The imperfect cortication makes them look similar, which made some scientists suspect that they were conspecific. Sequencing of the rbcL and matK genes, however, showed that both species were genetically distinct. Romanov et al. conclude that the 'unfinished' morphogenesis, i.e. the fact that the cortication never develops, results in morphological similarity of the two species, and this makes it difficult to see that these in fact are two different species. Personally, I think this is an issue which we should discuss further in the IRGC. The cortex and the spines of corticated *Chara* species give us lots of morphological traits. These traits are visible, and therefore we are happy to give different names to everything that looks slightly different. In contrast, ecorticated *Nitella* or *Tolypella* species often look “the same” to us, because there are so few traits which our eyes can see. Speciation, however, does not always result in **morphological** differences. For this reason, we have a tendency to describe many micro-species in *Chara*, while we accept much larger genetic variation in *Nitella* and *Tolypella*. I think this is an issue which we should discuss in greater detail.

With respect to that, here is the latest news on *Tolypella*: as mentioned above, morphological determination of *Tolypella* is tricky. To solve some of the mysteries in *Tolypella* species delimitation, Holzhausen et al. sequenced five morphologically determined species: *T. glomerata*, *T. hispanica*, *T. nidifica*, *T. normaniana* and *T. salina*, and analysed oospore morphology, including oospore wall ornamentation. Frankly, their results show that *Tolypella* determination is a **complete mess**!!!! Gene sequence data indeed identified five distinct clusters, but they were not consistent with the morphologically identified five taxa! Specimens normally identified as *T. glomerata* probably are two different taxa, *T. glomerata* and an unidentified (undescribed?) taxon. The same is true for *T. hispanica*, which comprises two different taxa. In contrast, *T. nidifica* and *T. salina* are not separate taxa, while *T. normaniana* is a diminutive variant of two different *Tolypella* taxa (one of them *T. glomerata*, and the other *T. nidifica/salina*). So, how about oospore morphology? Well, oospore morphology at least was able to distinguish *T. glomerata* from the other species. In a nutshell, this paper's message can be summed up as follows: Brace yourself for the intricate task of morphologically identifying *Tolypella* species! You'll require every ounce of luck at your disposal. 😉

Susi Schneider

Bellino and Baldantoni. Biodiversity, Ecology and Distribution of Mediterranean Charophytes in Southern Italy. Plants 12(19).

Casanova and Karol. Charophytes of Australia's Northern Territory - I. Tribe Chareae. Australian Systematic Botany 36(1).

Dombrowski et al. Biomass and nutrient storage of aquatic plants along phosphorus gradients in everglades stormwater treatment areas. Ecological Engineering 195.

Gruszka et al. Alien or endangered? Historical development of Chara connivens in the Baltic coastal waters and its implication for the species management. Journal for Nature Conservation 73.

Herkül et al. Distribution and co-occurrence patterns of charophytes and angiosperms in the northern Baltic Sea. Scientific Reports 13(1).

Holzhausen et al. Plastid DNA sequences and oospore characters of some European taxa of Tolypella section Tolypella (Characeae) identify five clusters, including one new cryptic Tolypella taxon from Sardinia, but they do not coincide with current morphological descriptions. Frontiers in Plant Science 14.

Li et al. Allocation of phosphorus (P) into biomass and calcite encrustation in Chara at high and low P availability. Aquatic Sciences 85(2).

Markovic et al. Diversity and Ecology of Charophytes from Vojvodina (Serbia) in Relation to Physico-Chemical and Bioclimatic Habitat Properties. Diversity 15(3).

Nurashov et al. Charophytes (Charophyceae, Charales) of South Kazakhstan: Diversity, Distribution, and Tentative Red List. Plants 12(2).

Pelechata et al. Climate features or the composition of submerged vegetation? Which factor has a greater impact on the phytoplankton structure in temperate lakes? Ecological Indicators 146.

Pfeifer et al. The cell walls of different Chara species are characterized by branched galactans rich in 3-O-methylgalactose and absence of AGPs. Physiologia Plantarum 175(4).

Romanov et al. The Charophytes (Charophyceae, Characeae) from Dagestan Aquatic Habitats, North Caucasus: Biogeographical and Barcoding Perspectives. Environments 10(9).

Romanov et al. 'Unfinished' Morphogenesis Hides Different Speciation Pathways in Charophytes: Evidence from the 190-Year-Old Original Material of Chara denudata (Charales, Charophyceae). Diversity 15 (2).

Strzalek et al. Recycling and deposition of inorganic carbon from calcium carbonate encrustations of charophytes. Limnology and Oceanography.

Wang et al. Distinct responses in sexual reproduction onset and growth of Chara braunii Gmelin to light level and temperature: evidence from a greenhouse experiment. Journal of Freshwater Ecology 38 (1).

Study on and about charophytes

In the list below you will find the newest articles related to charophyte research, for 2023 and the beginning of 2024, compiled in February 2024, using database search and the references you all have sent to us. The ones Susi has already nicely elaborated on or listed last year are not included. The search was done using Google Scholar, Scopus and Web of Science databases and the most common terms related to charophytes such as

charophyte, stonewort, gyrogonite, Charophyceae, Charales, Characeae, Chara, Nitella, Tolypella, Nitellopsis, Lychnothamnus and Lamprothamnium. We hope you will find some interesting articles for you and help share and spread the news about the newest publications related to our dear charophytes.

Aleksandra Marković

Adimulam & Sujathamma (2023). 18S rRNA Approach for Identification of *Chara* L. Species. Biosciences Biotechnology Research Asia, 20(3), 1039-1045.

Afanasyev et al. (2023). Syntaxonomy of Charophyte Algal Communities in the Northeastern Part of the Black Sea (Russia). Environments, 10(9), 154.

Alegro et al. (2023). The Plitvice Lakes—An Interplay of Moss, Stonewort and Marshland Vegetation. In Plitvice Lakes (pp. 215-242). Cham: Springer International Publishing.

Bajcz et al. (2024). A within-lake occupancy model for starry stonewort, *Nitellopsis obtusa*, to support early detection and monitoring. Scientific Reports, 14(1), 2644.

Benyó-Korcsmáros et al. (2023). Identification and environmental background of Chara remains in the Holocene sequence of Lake Peţea (NW Romania) and the possibilities of using the results in archaeobotany. Archeometriai Műhely, 20(2), 119-125.

Borja et al. (2023). Water ecological requirements of Characeae taxa in eastern Spain. Notulae Botanicae Horti Agrobotanici Cluj-Napoca, 51(4), 13483-13483.

Borysova (2023). Distribution pattern of *Nitellopsis obtusa* (Desv.) J. Groves (Charophyta, Charales) in Ukraine. Algologia, 33(4), 309-323.

Burghal & Al-Bidhani (2023). A Biodiesel production by *Chara vulgaris* isolated from freshwater of Basrah province, Iraq. Journal of Survey in Fisheries Sciences, 2515-2527.

Casanova & Karol (2023). Charophytes of Australia's Northern Territory–II. Tribe Nitelleae. Australian Systematic Botany, 36(4), 322-353.

Cohen et al. (2022). Late Quaternary climate change in Australia's arid interior: Evidence from Kati Thanda – Lake Eyre. Quaternary Science Reviews, 292: 107635.

De Sosa Tomas et al. (2023). Charophytes from the Pozo D-129 Formation (lower Aptian, Lower Cretaceous), source rock in the Golfo San Jorge Basin, Patagonia, Argentina. Cretaceous Research, 151, 105652.

Fox & Stīpniece (2023). Interactions between stoneworts (Charales) and waterbirds. Biological Reviews.

Gargiulo et al. (2023). Genome size and DNA endoreplication pattern of non-generative cells in the antheridia of *Chara connivens* Salzmann ex A. Braun from Northern Morocco. Flora, 309, 152421.

Gottschalk et al. (2024). We do not see evidence for the presence of female gametangia (oospores) in North American *Nitellopsis obtusa* (Desvaux) J. Groves. Botany, 102(2), 52-55.

Groumpou et al. (2023). Subrecent charophyte flora from the Pheneos palaeolake (Greece): Palaeoecological implications. Review of Palaeobotany and Palynology, 318, 104973.

Haram & Wersal (2023). Seasonal starch allocation of starry stonewort (*Nitellopsis obtusa*) growing in lake Koronis, MN. Journal of Freshwater Ecology, 38(1), 2211086.

Haram & Wersal (2023). Simulated mechanical control of *Nitellopsis obtusa* under mesocosm conditions. Invasive Plant Science and Management, 16(3), 191-195.

Harrow-Lyle et al. (2023). First report of female gametangia in the invasive macroalga starry stonewort (*Nitellopsis obtusa*) in North America. Botany, 101(2), 61-64.

Herkül et al. (2023). Distribution and co-occurrence patterns of charophytes and angiosperms in the northern Baltic Sea. Scientific Reports, 13(1), 20096.

Hess et al. (2023). The impact of salt stress on the physiology and the transcriptome of the model streptophyte green alga *Chara braunii*. Physiologia Plantarum, 175(6), e14123.

Imran et al. (2023). Exploring the hidden treasures of *Nitella hyalina*: A comprehensive study on its biological compounds, nutritional profile, and unveiling its antimicrobial, antioxidative, and hypoglycemic properties. World Journal of Microbiology and Biotechnology, 39(12), 345.

Kolada et al. (2024). Minor effect of wind exposure and littoral slope on macrophyte characteristics in non-impacted lowland lakes of Poland. Frontiers in Plant Science, 14, 1307453.

Koroliesova (2023). Restoration of the *Chara aculeolate* Kützing phytocenosis in the Tendrovsky Bay (Black Sea). Marine Biological Journal, 8(4), 110-115.

Krings & Cabrera (2023). The bulbils of *Palaeonitella cranii* (Charales, Charophyceae) revisited, with notes on other inflated cells of this alga that are not bulbils. Review of Palaeobotany and Palynology, 318, 104987.

Mondal & Keshri (2023). On the occurrence of *Nitella myriotricha* A. Braun ex Kützing, 1857 ssp. acuminata D. Subramanian, 1999 (Charophyceae: Charales: Characeae), from eastern India. Journal of Threatened Taxa, 15(6), 23436-23440.

Moore et al. (2023). Modeling of suitable habitats for starry stonewort (*Nitellopsis obtusa*) in inland lakes in the Midwest and northeast USA. Biological Invasions, 1-16.

Naz et al. (2023). Study of *Nitella hyalina* (Charales) Based on Oospore Wall Ornamentation. Bangladesh Journal of Plant Taxonomy, 30(2), 283.

Ojdanič et al. (2023). Distribution of Aquatic Macrophytes in the Littoral of Lake Bohinj (Slovenia). Diversity, 15(11), 1115.

Pełechata et al. (2023). Climate features or the composition of submerged vegetation? Which factor has a greater impact on the phytoplankton structure in temperate lakes?. Ecological Indicators, 146, 109840.

Pérez-Cano et al. (2023). Upper Barremian− lower Aptian charophyte biostratigraphy from Arrifes section (Algarve Basin, Southern Portugal): correlation with dinoflagellate cyst biostratigraphy. Cretaceous Research, 150, 105575.

Pronin et al. (2023). Do stable carbon and nitrogen isotope values of *Nitella flexilis* differ between softwater and hardwater lakes?. Aquatic Sciences, 85(3), 79.

Ravera et al. (2023). Notulae to the Italian flora of algae, bryophtes, fungi and lichens: 16. Italian Botanist, 16, 105-120.

Ravera et al. (2023). Notulae to the Italian flora of algae, bryophtes, fungi and lichens: 15. Italian Botanist, 35-47.

Romanov & Abdullin (2023). Charophytes (Charales, Characeae) of the Republic of Bashkortostan (South Ural). Botanicheskii Zhurnal, 108(7), 628-640.

Romanov et al. (2023). New species records of charophytes (Charophyta, Characeae) for Ivanovo and Penza regions (Russia). Bulletin of Moscow Society of Naturalists. Biological Series. 128 (3), 66–69.

Romanov et al. (2023). The Charophytes (Charophyceae, Characeae) from Dagestan Aquatic Habitats, North Caucasus: Biogeographical and Barcoding Perspectives. Environments, 10(9), 153.

Sabovljević et al. (2023). New records and noteworthy data of plants, algae and fungi in SE Europe and adjacent regions, 15. Botanica Serbica, 47(2), 361-374.

Sakayama et al. (2023). New Distribution and DNA Barcoding of the Endangered Alga *Lamprothamnium succinctum* (Charales, Charophyceae) in Tottori Prefecture, Japan. The Journal of Japanese Botany, 98(5), 247-253.

Scherman et al. (2023). Upper Triassic–to Lower Cretaceous Slovenian Basin successions in the northern margin of the Sava Folds. Geologija (0016-7789), 66(2).

Stanković et al. (2023). The need for unique international legal protection of pond habitats. Aquatic Conservation: Marine and Freshwater Ecosystems, 33(11), 1369-1386.

Tomović et al. (2023). New records and noteworthy data of plants, algae and fungi in SE Europe and adjacent regions, 14. Botanica Serbica, 47(2), 347-359.

Trabelsi et al. (2024). The Lower Cretaceous charophyte flora from the Cuchía section (Cantabrian Basin, North Spain): Biostratigraphy and palaeobiogeography. Cretaceous Research, 155, 105774.

Vicente et al. (2024). A bioprovince for the Barremian–Aptian charophytes of the Central Tethyan Archipelago. Cretaceous Research, 154, 105752.

Wojtczak (2023). Differentiation Disorders of *Chara vulgaris* Spermatids following Treatment with Propyzamide. Cells, 12(9), 1268.

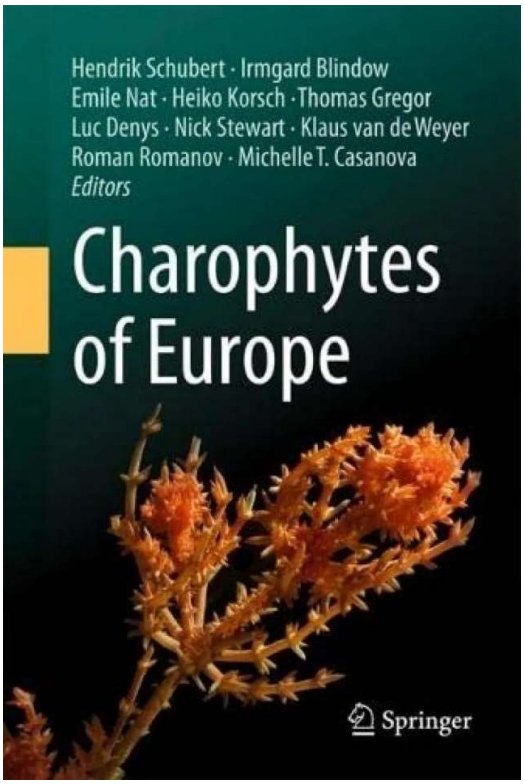
Xaitbayev & Xaydarova (2023). Extraction and properties of alginates from charophyceae. Scientific Journal of the Fergana State University, 29(4), 81.

Xing et al. (2024). Middle to late Eocene charophytes from the Gaize Basin in central Tibet. Review of Palaeobotany and Palynology, 321, 105024.

NEWS FROM MEMBERS

Charophytes of Europe – status and "trends"

More than a year ago, in November 2022, we thought that the intense work of more than 5 years has come to an end by submitting the manuscript to Springers production department. Six meetings, two of them being large workshops allowing for detailed and intense discussions of the authors, were needed to get an agreement about taxonomic problems, several more to discuss problems of special interest. The publisher expected printing in March 2023 and even started advertising, therefore the cover is already available online.



But the book was more than the production department could handle – more than 800 pages of manuscript plus about 700 illustrations, authored by 69 charophytologists were above the limits they had seen before. It should be acknowledged that Springer (after some negotiations) accepted this unforeseen size and they tried their best to get it processed. But it became, again, more difficult than expected. A new structure was required in order to have all species-chapter authors granted with an own DOI and especially the glossary layout was a challenge their typesetters couldn't handle.

But now we are close to the final target. All chapter proof-prints, except for 3 (31.01.24) are submitted and just one of them (the glossary, still) is a problem. On the other hand this part is a milestone and John Bruinsma, supported by a large team of co-authors and an ever-helpful Dietmar Jäger, providing excellent drawings on short notice, deserve a special thank you for providing a complete set of definition of terms in charophytology. So, the editors will do their best to come to a good end with respect to the layout too irrespective of the problematic negotiations on this issue.

So, let's hope that the work will be finished the coming weeks, a long list of "things to be taken care of during final proof" is awaiting the editorial team for the final check, but we'll manage this too.

At this place, a big thank you to all of the authors and the great editorial team from my side and let's hope that this book will fuel the interest in charophytes for the coming decade(s).

Hendrik Schubert

The role of charophytes in greenhouse gases balance, such as CH_4, in lakes

Submerged vegetation, from which charophytes are a very relevant component, plays many important roles in the aquatic ecosystems where they live. One of these roles, which has been largely understudied, is their participation in the production, consumption and transport of greenhouse gases (GHGs), such as methane (CH_4). Charophytes and other macrophytes can be important controlling the CH_4 flux, mainly regulating its diffusion and that of oxygen from the sediment to the atmosphere and influencing the microbial environment for both production and consumption of CH_4 (i.e., oxygen release into the sediment can hamper methane production and enhance methane oxidation thereby limiting its emission, or promoting methano-

genesis supplying dissolved organic matter from litter to microorganisms). But CH_4 emissions vary among macrophyte species (phanerogams versus charophytes) which is likely related to their differential effects on the processes driving these emissions (for example, litter decay). Furthermore, a coupling between denitrification and methane oxidation has recently been discovered in freshwater ecosystems, with macrophytes being presumably pivotal. This is paramount particularly in eutrophic aquatic ecosystems, such as many of those existing in the Mediterranean region in particular and in the world in general. **DAMOLAKE**- Oxidation of methane coupled to denitrification in lakes is a coordinated project funded by the Spanish Ministry of Science and Innovation and leaded by the Spanish Natural Sciences Museum in Madrid (CSIC). Subproject 2 (PID2020-116147GB-C22), Role of the aquatic plants and implications of the associated trophic web, leaded by the Cavanilles Institute for Biodiversity and Evolutionary Biology (University of Valencia), assesses the effects of different species of submerged vegetation (charophytes *versus* vascular plants) on GHGs processes in aquatic ecosystems under two climatic scenarios (temperate vs tropical) and two trophic states (oligotrophic vs eutrophic) using microcosm and mesocosmos approaches and field studies. We have analysed the transformation of macrophyte-derived organic matter to GHGs (including *Chara* and *Nitella* detritus), and we are currently characterizing the role of *Chara hispida* and *Myriophyllum spicatum* in the GHGs balance.

María A. Rodrigo, Eric Puche, Javier Armengol, Manuel Muñoz and Salvador Sánchez-Carrillo

An ongoing research project on *Chara canescens*

Chara canescens is a particular charophyte mostly recorded from asexually reproducing populations, but also from a few sexually reproducing ones. The asexual populations are widespread throughout Europe and occur also in North America, Australia and Central Asia, whereas the bisexual populations are very rare and scattered in very restricted areas of central and southern Europe. **ProPartS**-Developing strategies for the protection of taxa consisting of interconnected sexual and parthenogenetic reproducing strains is a project of the European Biodiversity Partnership (Biodiversa+), co-funded by the European Commission and by the respective national science funding organisations of the following partners: University of Rostock (Germany), University of Valencia (Spain), University of Sevilla (Spain), University of Palermo (Italy), and University of Natural Resources and Life Sciences, Vienna (Austria).

The project aims to clarify to what extent *Chara canescens* populations from the different regions and with different reproductive strategies (parthenogenetic or bisexual) are connected or whether genetic exchange takes place, with the ultimate goal of developing transnational conservation strategies and to establish a network for the sustainable preservation for this particular and interesting charophyte species. Some of the key activities of the project are: to identify former and recent inland brackish water sites suitable for sexually and parthenogenetically reproducing populations, to gain knowledge on recent and past (herbarium material) genetic diversity of *C. canescens,* to evaluate the potential of a few sexual populations in sustaining the genetic diversity of the widespread parthenogenetic populations, to determine the niche structure differences between parthenogens and bisexuals, and to assess the role of the oospore sediment bank in the restoration suitability of lost habitats.

As good news for the species and for the project, during the course of our investigations in Spain, in June 2023 we detected two bisexual populations of *C. canescens* in which male individuals were not observed (possibly overlooked) in the past. They were found in the small endorheic brackish lakes Laguna de la Iglesia and Laguna Caballo Alba, in the province of Segovia. Therefore, for the moment, Spain hosts the largest number of bisexual

populations of *C. canescens* in Europe, with four populations in central Spain (in Bodón Blanco, La Iglesia, Caballo Alba and Las Eras lakes, Castilla-León region) and at least one in Andalusia (Doñana National Park).

Further information available here: https://proparts.unipa.it/

This research was funded by Biodiversa+, the European Biodiversity Partnership under the 2021-2022 BiodivProtect joint call for research proposals, co-funded by the European Commission (GA N°101052342) and with the funding organisations Deutsche Forschungsgemeinschaft e.V. (Germany), Agencia Estatal de Investigación, Fundación Biodiversidad (Spain), Ministry of Universities and Research (Italy), Österreichischer Wissenschaftsfonds FWF (Austria).

María A. Rodrigo (Spain), Adriana Arnal, Karl-Georg Bernhardt, Pablo García-Murillo, Riccardo Guarino, Karin Tremetsberger, Angelo Troía, Barbara Turner, Johanna Weitzel and Hendrik Schubert

Amendment to the ProPartS project on *Chara canescens*

In its role as ProPartS project partner in Germany, the team at the University of Rostock is responsible for identifying potential sites for the occurrence of *Chara canescens*. For this purpose, in the second half of 2023, herbaria were searched for historical and recent records of the species. The investigations included specimens in the Haussknecht Herbarium Jena, the Bavarian State Collection for Botany Munich as well as in the botanical collections of the Hungarian Natural History Museum Budapest, the Natural History Museum London and the Naturalis Biodiversity Center Leiden. In addition, inland brackish sites were identified by literature research, which are also potential locations for *Chara canescens*. Besides the project partners' territories, France and Romania emerged as countries with promising geological conditions. In spring and summer 2024, the compiled sites will be examined for the actual occurrence of *Chara canescens* populations and, where applicable, their propagation strategy.
The second focus of the German project partner is to analyse the niche structure of the species. Thereby, the focus is on water chemistry investigations and on answering the question of whether the microbiome present in the sediment influences the occurrence of (sexual) *Chara canescens* populations. Furthermore, it was hypothesized that the species could have a symbiotic relationship with aquatic fungi. To address these questions, taxonomic microbial and fungal composition will be determined using metagenomic sequencing. In addition, microscopic methods for fungal identification are being discussed.

This research was funded by Biodiversa+, the European Biodiversity Partnership under the 2021-2022 BiodivProtect joint call for research proposals, co-funded by the European Commission (GA N°101052342) and with the funding organisations Deutsche Forschungsgemeinschaft e.V. (Germany), Agencia Estatal de Investigación, Fundación Biodiversidad (Spain), Ministry of Universities and Research (Italy), Österreichischer Wissenschaftsfonds FWF (Austria).

Johanna Weitzel

News from Poland

In early December, I embarked on a new venture—a three-year project at Poznań University of Life Sciences, funded by the Polish National Science Center (NCN). This project, which falls under the auspices of the NCN SONATINA 7 program, is titled "Climate warming negatively affects submerged aquatic vegetation through shading by periphyton". The project entails investigating the effects of periphyton shading on aquatic vegetation in the heated Konin lakes, as well as examining periphyton biomass in lakes where charophytes and vascular plants predominate. I have attached a popular science summary of the project for your perusal. The project's duration is from December 1, 2023, to November 30, 2026.

I am also delighted to share that last year, I was honoured with the Main Award in the XXV nationwide competition in Poland for the best doctoral thesis that utilizes statistical tools and data analysis from the Statistica suite of programs. This accolade was awarded by StatSoft Polska for my doctoral thesis on the Recovery of the population of an endangered charophyte species *Lychnothamnus barbatus* in the context of climate change.

Michał Brzozowski

New scholarship

During the last 2 years I have worked in the Instituto Politecnico Nacional, at the CICIMAR of La Paz (Baja California Sur) working with marine extinctions. During these years I quite put aside my charophyte work, for that reason my publications on the subject were quite low. However, I recently won a 3-year Beatriu de Pinós postdoc position at the Institut Català de Paleontologia (ICP) with a project entitled "Impact of the Mid-Miocene global warming on Iberian freshwater ecosystems". I will work again with fossil charophytes, especially with the Miocene charophyte flora from the Vallès-Penedès Basin. My new scholarship will begin on the 1st of March.

Alba Vicente Rodriguez

Sufficient proof or not?

We can all appreciate the difficulties of characeaen morphology: they're small, they're cryptic, they're diverse. Which is why careful documentation – especially with high quality imagery and, perhaps more importantly, herbarium vouchers – is necessary. In our paper (see Gottschalk et al., page 10 or QR code below left), we contest a recent article (see Harrow-Lyle et al., page 10 or QR code below right) at the reference list above) claiming to have found the first evidence of female *Nitellopsis obtusa* in North America. This type of discovery would have important implications for the invasion biology and management of *N. obtusa* in North America. We encourage you to look at the contested paper and ask "Is this sufficient evidence?". We think not.

Stephen D. Gottschalk

Report about the 8th Agora Paleobotanica Meeting (Bellver de Cerdanya, 4-8th August 2023)

This meeting was organized by Josep Sanjuan, AixaTosal and myself in the beautiful Pyrenean valley of La Cerdanya. Up to 30 participants from 7 countries presented their results on fossil plants. Many of the participants were young researchers developing their PhD theses or postdoctoral projects. Four presentations were devoted to charophytes. Maria Groumpou, Josep Sanjuan and collaborators documented the charophyte vegetations that lived in different stages of the Holocene lake of Pheneos (Peloponnese, Greece), which is an important lake for ancient Greek mythology due to their abrupt water table fluctuations, attributed once to Hercules. The charophyte assemblages showed different trophic and depth situations based on the occurrence of *N. obtusa, Chara vulgaris, Chara* sp., and *Sphaerochara prolifera*. Elvan Demirci, Josep Sanjuan and collaborators reported the rich *Lamprothamnium papulosum* populations from the Izmir Gulf (Turkey) during the Holocene, now being completely marine. Josep Sanjuan, E. Demirci and collaborators exposed some of the results of Elvan's thesis, devoted to the Miocene and Pliocene of the Ilgin and Yalvaç Basins in central Anatolia (Turkey). These basins are rich in fossil charophyte remains but the floras were poorly known so far. The results revealed high biodiversity and affinity with other peri-Mediterranean basins by that time. Finally, Martín-Closas and collaborators updated the results about their project on fossil charophyte biogeography within the Cretaceous Tethyan Archipelago. The islands of this basin showed a high

biodiversity and many unique species of the extinct charophyte family Clavatoraceae.

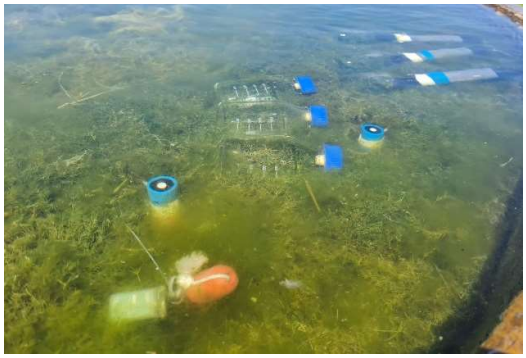
Carles Martín-Closas

Collaboration in Australia

In October 2023, I had the opportunity to collaborate with Michelle T. Casanova, Westmere, Australia. Together, we collected charophytes from Western Australia. For this purpose, we travelled by camper van for 12 days covering ca 900 km. There's nothing better than charophytes with great company and good Australian wine! As a result, we found charophytes in a total of 52 ponds, lakes, rivers, and brooks. The salinity of the locations ranged from 0.1 to 15.4, with pH levels between 6.3 and 9.8. Of the findings, 35 were from genus *Nitella*, 19 from genus *Chara*, and 4 from genus *Lamprothamnium*. We pressed herbarium sheets and made characteristic pictures of the charophytes. Further work on species identification continues. Michelle is confident that we have also discovered new species.

Chara protocharoides

The work continued in the state of Victoria, in Michelle and Anthony Casanova's farm. Their home was an excellent refuge for scientists. At the same time, a student studying frogs from wetlands was accommodated. Many thanks to them! My work continued by measuring the primary production of different charophyte species under changing light conditions.



The species under investigation were *C. globularis*, *C. gymnopitys*, *C. australis*, *L. macropogon*, *L. compactum*, *N. gelatinosa*, and currently unnamed *Nitella* species. My favourite charophyte in Australia is *C. australis*, which can be seen during the field trip of next IRGC meeting, it's so beautiful. I highly recommend participating in the meeting and fieldwork, as you'll see a variety of species you've never seen before.

Kaire Torn

Lychnothamnus in Australia

Michelle Casanova was funded by the Mohamed Bin Zayed Conservation Fund to look for *Lychnothamnus* in south-east Queensland (Australia) in November and December 2023. Rob Casanova and Abby Gilmore did the field work, documenting the abundance and distribution of the species in known sites, and exploring a further 50 new sites. Unfortunately, from the three sites where *Lychnothamnus* has occurred in the past, it remains in only one site in December 2023. As a result, Agatha Dolan from the Queensland Herbarium is preparing a nomination to change its status from *Vulnerable* to *Critically Endangered* in Australia! We hope to obtain more funding, so we can find a place in Queensland where the species is not threatened.

Michelle Casanova

FORTHCOMING MEETINGS

VIII International Symposium on Extant and Fossil Charophytes

Mueller Hall, Royal Botanic Gardens, South Yarra, **Melbourne, Australia, 9 – 11 October 2024**

(**5 – 12 October** including both field trips)

It is a pleasure to invite the scientific community around the world to participate in the 8th IRGC symposium in Melbourne.

Timetable
31 March 2024: this circular and details, Registration opens.
31 May 2024: Deadline for early registration payments (later payments will incur a 20% surcharge).
30 June 2024: Deadline for payment of pre- and post-symposium field trips.
30 August 2024: Deadline for Abstract submission.

Program (please note that the time has changed from the first circular)
8 October: Afternoon reception (3 -5 pm) at the National Herbarium of Victoria, Birdwood Avenue, South Yarra.
9 – 11 October: Plenary Sessions (talks and posters), Symposium Dinner, General Assembly and Election of the Executive Committee.
Symposium Reception: the ice-breaker will be held in Mueller Hall (the venue for the symposium) in the National Herbarium of Victoria, at the Royal Botanic Gardens Melbourne, starting at 3pm with registration and set up of posters.
Symposium Dinner: We will celebrate our symposium with a dinner at The Terrace by the lake in the Royal Botanic Gardens from 6:30 pm on 11 October at the conclusion of the symposium.

Abstracts

The abstracts need to be in English, saved as a word-document in Arial 12 point font, at 1.5 spacing, a maximum of 1 page A4 size with margins of 3cm. Send electronically to mt.casanova@federation.edu.au. They will be reviewed by the Organising Committee and the IRGC Executive Committee.

TITLE IN BOLD CAPS
Space
Author(s) Surname, and initials (superscript numbered on left if multi-authored and authors have different affiliations, **presenter** in bold.
Space
Affiliation(s): Complete addresses (referring to superscript number of each author if multi-authored); email of presenter.
Space
Text: the text should have an introduction, results and discussion/conclusions. Only one graph or illustration can be accepted, and only if it is within the page limit.

Abstracts will be published in the abstract volume for the meeting.

Fees
(to be paid in Australian dollars (AUD).
Approximate exchange rate (at 18 Jan 2024) 1 AUD = 0.6 Euro; = 0.66 US$.

Full member registration: early bird registration **AUD $300** (includes attendance at symposium, Reception, Symposium Dinner and Abstracts booklet)

Student registration: AUD $200 (includes attendance at symposium, Reception, Symposium Dinner and Abstracts booklet)

Accompanying person: AUD $100 (includes Reception and Symposium Dinner. **Field excursions have to be paid in full, separately.**

Pre-symposium Field Trip: 5 – 8 October. Cost: AUD $600.
Pre-symposium reception: 8 October 3 – 5 pm, cost included in registration.
Symposium proceedings: 9 – 11 October, cost included in registration.
Symposium Dinner: 11 October 6:30 pm, cost included in registration.
Post-symposium Field Trip 12 October. Cost: AUD $100.

Field Trips

We suggest that if you have a lap-top computer, that you obtain a portable USB microscope for examination of specimens. A couple of these will be available, but no other microscopes will be available at the field site (Lake Fyans Caravan and Camping Park).

If you plan to collect specimens you will need to be accompanied by a permit-holder or have a permit to collect. It will be necessary for a duplicate to be lodged in an Australian herbarium (in effect this will be simple, as Michelle Casanova has a permit and will collect at the same time). You should bring your own plastic bags, containers and herbarium sheets, but there will be some limited supplies of these available on the excursion.

Pre-symposium Field Trip: 5 – 8 October 2024.

This will be a combination of scientific sites and tourist sites in the west of Victoria. We will leave from the Royal Botanic Gardens Melbourne, and travel by bus to Apollo Bay on the Great Ocean Road (5 Oct. 2024). There will be some stops to investigate extant charophytes on the way. We will stay in The Apollo Bay Youth Hostel (sheets and towels provided) and there are many eating venues near the accommodation. From there we will travel to the Grampians National Park (Gariwerd) via Lake Bolac, and stay in self-contained share cabins at the Lake Fyans Caravan and Camping Park (6 and 7 Oct. 2024). Lake Fyans has at least 9 species of *Chara* and *Nitella*, and adjacent saline wetlands have both *Lamprothamnium* and *Tolypella*. We have two nights at Lake Fyans, and access to a gathering place for group examination of specimens. The first evening meal will be at a restaurant in near-by Halls Gap, the second evening meal will be self-catered with provisions provided. Lunches and breakfasts will be provided.

Degree of difficulty: Easy access, large bus, walking short distances. At Lake Fyans there is the possibility of wading and swimming for collecting. Longer walks can be undertaken at Lake Fyans, with the possibility of bus travel to Lake Wartook or other sites in the nearby mountains.

Clothing: October in Victoria can be changeable, average high temperature of 20˚C, average low 11˚C, about 8 rain-days for the month on average. Apollo Bay is on the coast at the Southern Ocean and can be very windy. Expect mild days and cool nights, bring a raincoat, hat and sunscreen (sunburn is a real issue in Australia). Gum-boots or waders are also an advantage, water temperatures can be quite cold.

Post-symposium field trip: 12 October, day-trip to sites near Melbourne.

Fossil charophytes have been collected only once in Victoria (Feist et al. 2006 *Crypt. Algol.* 27: 381-389) at Buchan which is c. 4.5 hours from Melbourne. If there is sufficient interest, we can run a field excursion to other fossil sites near Melbourne (Beaumaris Beach or Fossil Beach at Mornington).

INFORMATION FOR PARTICIPANTS

Please check your visa requirements before planning travel, as visas might be required for travel from certain countries: Entering Australia (homeaffairs.gov.au). Please also be aware that Australia has strict biosecurity regulations, food items (particularly meat, dairy, honey) and wood are not usually allowed and you will be asked to declare any suspect items.

Flights can arrive in Melbourne Airport (International and Domestic), and there are buses every hour or so to the city centre (about 50 minutes). Vehicle hire is available at the airport, through many companies, if you hire a car you will need your own country driver's licence and an international drivers licence. We drive on the **Left**-hand side of the road in Australia (the same as in England).

Melbourne is a cosmopolitan city in the south-east of Australia, the capital of the State of Victoria. It surrounds Port Phillip Bay and is bounded by the Dandenong Ranges to the northeast and the Victorian Volcanic Plain to the west. The locality is central to the whole state, so it is well-placed for participants who would like to visit other tourism sites in Victoria. The Melbourne Zoo has many Australian animals (including Platypus) and Healesville Sanctuary is also accessible from the city. There is abundant public transport (trams, trains, buses) as well as hire-scooters available in the city centre. The Royal Botanic Gardens are famous for their layout and plant diversity and are close to the city centre, and well-served by public transport.

The Royal Botanic Gardens is in South Yarra (Birdwood Avenue) near the heart of the city of Melbourne, easily reached by public transport/hire scooter/uber/taxi. There is a steep 10 minute walk past the Shrine of Remembrance from the closest tram stop on St Kilda Road. There is car parking along Birdwood Avenue, but this can be expensive, it is better to attend via public transport. There are lunch venues (from c. $10 - $50) in the gardens, as well as along Domain Rd nearby. The gardens houses the National Herbarium of Victoria (https://www.rbg.vic.gov.au/science/herbarium/about-the-herbarium/), which holds a large proportion of the Sonder Herbarium, along will other substantial collections. If you plan to visit the herbarium before or after the symposium you can contact the collections manager alison.vaughan@rbg.vic.gov.au.

There are a variety of accommodation options (check Booking.com; Trip Advisor) and prices range from $40/night in a backpacker dorm, to budget hotels (< $100/night), to luxury accommodation. I have stayed in The Hotel Claremont Guesthouse in South Yarra (just a short tram ride away from the symposium venue), and City Square Hotel in Swanston Street (again, just a short tram ride away from the symposium venue), but there are a variety of hotels and hostels of all qualities near the city centre. Public transport is accessed through a MyKi Card, which can be bought at major stations and grocery shops and recharged in train and tram stations. Trams are free within the city centre (the symposium venue is just outside the free zone).

Other meetings

27 – 31 May 2024
XV International Palynological Congress
XI International Organization of Palaeobotany Conference
200 Years of Palaeobotany
Prague, Czech Republic
https://prague2020.cz/

2 – 7 June 2024
ASLO Summer Meeting
Madison, Wisconsin, USA
https://www.aslo.org/madison-2024/

26– 31 March 2025
ASLO Aquatic Sciences Meeting
Charlotte, North Carolina, USA
https://www.aslo.org/meetings/

IRGC webpage

The IRGC webpage is not currently active. We will relocate the webpage, most probably to Norway within the domain of the Norwegian Institute for Water Research, www.niva.no. We are hoping that the website will be active by April 2024, so please try to google it.

We are looking for pictures for the new webpage! Our idea is to announce an annual "charophyte of the year" award. The winning picture will be used as an intro picture on the "home" site of the IRGC web profile for an entire year, and the author will of course be fully acknowledged. We are also planning to publish the pictures on the IRGC website, together with a short story on the species, and some information where the picture was taken.

So, if you have a nice picture of a charophyte or a charophyte patch, and would like to contribute to the new IRGC website, please send your picture to susi.schneider@niva.no, together with a short paragraph explaining the species and the site where the picture was taken.

IRGC in Facebook

We have our own group in Facebook – International Research Group on Charophytes. This is an unofficial group for IRGC members to share information. The group is closed, so only IRGC members can see the posts.

You are welcome to share your photos, field works, research questions etc. among our community. We are looking forward to see your photos from the past meetings or getting information/photos about your current activities.

MEMBERSHIP FEES

Please do not forget to send your membership fee for 2023. Multiple year payment is encouraged to reduce banking costs.

INTERNATIONAL RESEARCH GROUP ON CHAROPHYTES

Membership fee annual amount – € 20
Multiple-year payment is encouraged to reduce mailing and banking costs.
Any questions about membership fees should be addressed to:
IRGC Treasurer Emile Nat, e.nat@kranswieren.nl

Bank to bank transfer
Please pay to the IRGC account at Banque La Poste, France, and then send the receipt of your payment to Dr Emile Nat (The Netherlands), IRGC Treasurer, for our records (e-mail address: e.nat@kranswieren.nl)
When doing the bank transfer please ensure that your name and years of membership paid are included in the payment form.
To do the bank transfer, please give the following information to your bank:

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BIC (International ID of Bank): PSSTFRPPMON
IBAN: FR 76 20041 01009 0350328M030 21

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Please **send any address changes (both surface mail and e-mail)** to the IRGC-Secretary, Kaire Torn (kaire.torn@ut.ee) to ensure you receive forthcoming information. Updated March 2024.

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