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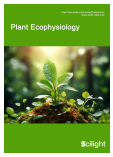

Editorial

On the Neglected Importance of Plant Ecophysiology: Time to Say We Are Here!

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'*For those about to rock … we salute you*!' I haven't found any better introduction to a new Aussie-based journal than the title of a song from the most famous Aussie rock & roll band: AC/DC. The cannonball sound at the end of the song adds solemnity, which is also appropriate because—let me state it from the very beginning—this is not only (although actually it is) the launching of a new scientific journal, a step forward for a young new scientific publisher as it is *Scilight Press*, a new opportunity for publishing good ecophysiology papers … yes, for sure, it is all of this and more, but most specially it is an EXULTATION and an EXALTATION. It is my exultation for having the opportunity of exalting a scientific discipline that possesses a ca. bi-centenary tradition, which is nowadays somehow—or perhaps even *more* than 'somehow'—neglected: *Plant Ecophysiology*, synonymous of Physiological Plant Ecology, Plant Physiological Ecology and, somehow, Plant Autoecology, which Margalef (1991) defined as 'outdoors physiology' meanwhile stating that 'a substantial part of Ecology is outdoors Physiology'. And because of this, the present Editorial aims being as well an exaltation of the great researchers who have kept this discipline alive over these ca. two centuries '*Against the wind*'—this time the title is from Bob Seger—i.e., even though it has seemingly lost 'fashion' over the last decades. To some extent, 'phenomics' may just be another word for something that was sinking into oblivion: high-throughput, but *Plant Ecophysiology* at the end. Some years ago, I quantified with Xurxo Gago this 'loss of fashion' by showing how some of the top journals where we the ecofizzers traditionally publish our results had monotonically decreased the % of papers published on *Plant Ecophysiology* over the last decades while, in parallel, they have almost exponentially increased the % of published works on different 'omics' (Flexas and Gago, 2019). Of course, this is just a verification not neglecting the fact that 'omics' can indeed be an amazing tool for *Plant Ecophysiology*. In fact, combining traditional and newly developed ecophysiological with omic tools is highlighted as the best strategy to advance on understanding plants. This—which, in simple wording, means coupling 'upgraded technology' with 'multidisciplinarity'—is as well the spirit of *Plant Ecophysiology*, *the journal*. The question arises as to whether a new journal on *Plant Ecophysiology* is necessary. And, most importantly, is *Plant Ecophysiology—the discipline*, not the journal—still necessary and important nowadays? Spoiler: I'm completely convinced that *Plant Ecophysiology* is currently more necessary than ever in the past, otherwise, I wouldn't have accepted helping to launch such a new journal.

To shed light on this issue, let me start with the origins of *Plant Ecophysiology*, a long-standing discipline very likely having its roots in the observation of morphological convergence among trees of different continents and of diverse phylogenetic backgrounds. This was already noticed by Fray Bernardino de Sahagún as early as in 1579, when he wrote about America "*Hay pinos en esta tierra como los de España. Hácense en ellos piñas y piñones. Sácanse de ellos las teas y la pez y la resina. Son muy poblados de hojas o de cabellos. Hacen un crujido con el aire como los de España*" (De Sahagún, 1579). Such kind of convergence was later notably highlighted by von Humboldt after his expedition spanning the transition years between the XVIII and XIX centuries, establishing the foundations of biogeography (Von Humboldt, 1805, 1859). The roots of *Plant Ecophysiology* can be traced from these early basements to intermediate necessary inputs in the late XIX century by people such as Gregor Mendel, Charles and Francis Darwin or Julius von Sachs. However, its definitive academic foundations were established on the very late XIX and early XX century. As early as in 1898, A.F.W. Schimper published a compendium book relating plant biogeography to physiology (Schimper, 1898). Almost coetaneous to Schimper was Blackman (1919), who established the 'limitation factor' concept. By the mid-XX century, Mason and Stout (1954), Thomas (1955), Walter (1955) and Billings (1957), among others, published important works of synthesis that helped reinforcing the roots for *Plant Ecophysiology*. They prepared the field for a visible flourishment of *Plant Ecophysiology* in the 60's of the past century, followed by its massive bloom in the 70's and 80's.

To quantify as many traits as possible for a complete vision of plant responses to the environment, methodological developments have been crucial for, and parallel to, the advance of the discipline. To mention just a few examples, advances in the design of new micrometeorological instruments were stimulated by Geiger's (1957) conceptual synthesis effort, and the development of pioneering portable systems for measuring leaf gas exchange (Gaasstra, 1959; Bosian, 1960; Eckardt, 1966) was an important impulse for field-based ecophysiology, as it was the building of pressure chambers for measuring water potential (Scholander et al., 1964). But for a discipline focusing on physiological processes and their response to the environment, based on well-established physical and chemical laws, besides developing suitable instruments it is also important to develop conceptual frameworks to integrate theories with empirical assessment, i.e., testable models. In this sense, and again to mention just some examples, Monsi and Saeki (1953) made the earliest efforts to describe and model light distribution within canopies, Gaastra (1959) established the conceptual basis of photosynthetic gas exchange under fluctuant environments, Slatyer (1967) developed the basis for the understanding of plant water relations and, retrieving and expanding early pioneer work by Blackman (1919), plant growth models were developed for both crops (Brouwer & de Wit, 1969) and wild vegetation (Miller & Tieszen, 1972), which were later strongly consolidated by e.g., Penning de Vries (1975).

As said, in the 70's and 80's there was a bloom of the discipline, and some recognizable groups or 'schools', which had been born in the previous decades, were especially visible by that time—please, allow me this license, keeping in mind that the different 'schools' I will mention are subjective and not watertight compartments. One of them is what I would call the 'German-Austrian' school, having been pioneer, since Schimper (1898), in the physiological analysis as a tool to interpret worldwide plant species distribution. Hence their focus had roots in Geobotany and Biogeography, and they provided *Plant Ecophysiology* scientists so much recognized as e.g., Otto L. Lange, Walter Larcher, R. Pisek, K. Raschke, O. Stocker, Walter Tranquillini, Heinrich Walter or H. Ziegler, among many others (see Larcher, 1977, for a detailed bibliography about these authors), plus more recent ones as Christian Körner, Ulrich Lüttge, E.-Detlef Schulze, Ulrich Schreiber, John D. Tenhunen, Klaus Winter, … It is to Heinrich Walter to whom we are probably indebted to the term "*Plant Ecophysiology*". In one of his early studies about the use of plant hydration measurements as physiological indicators, he used the term 'ecological physiology' ("*physiologisch-ökologische*", Walter, 1931). But later, Walter (1964) himself introduced the term 'ecophysiology' ("*ökophysiologischer*"). Parallel to the 'German-Austrian' group, a 'Scandinavian school' used a similar geobotany-rooted approach in, for instance, studies on the differentiation of ecotypes—introducing the concept 'ecotype' for the first time—in response to environmental conditions (Turesson, 1922) or the carbon economy in plant communities (Boysen-Jensen, 1932).

The 'Brittish school', on the contrary, originally focused mostly on crop physiology, contributing to knowledge on soil-plant relationships (Rorison, 1969) and to the development of rigorous micro-climatic assessment (Monteith, 1957, 1972, 1973). Some classical *Plant Ecophysiology* textbooks arose from this community (Milthorpe & Moorby, 1974; Bannister, 1976; Etherington, 1978; Jones, 1983, 2014; Gardner et al., 1985; Fitter & Hay, 1987; Hay & Walker, 1989; Willey, 2016), which have been and still are among the most used textbooks by *Plant Ecophysiology* researchers, teachers and students, alongside those of Larcher (1977, 1995), Nobel (1991, 2020), Lambers and co-workers (Lambers et al., 1998; Lambers and Oliveira, 2019), Atwell et al. (1999) and, of course, the four volumes of the Encyclopedia of Plant Physiology dedicated to Physiological Plant Ecology (2011, edited by Lange, Nobel, Osmond and Ziegler). The influence of British textbooks was so high that, in my own experience, in the late 80s and early 90s 'crop physiology' was very near to being synonymous with '*Plant Ecophysiology*'.

Additionally, it is possible to identify a 'US school' which, at its origins, was concentrated and recognizable in the '*Carnegie Institution desert group*' (Mooney et al., 1987). Somehow merging the geobotany-rooted and the micrometeorology approaches of the above communities, they developed an ample study of ecophysiological adaptations to the environment, together with a true exploring of the unknown with special emphasis to the desert and mediterranean biomes, without neglecting crops. The list of well-known US-based ecofizzers, many of them still active, is really ample. Just to mention just some amongst the most influencing, likely 'belling' your mind after hearing their names: W.W. Adams III, D. Baldocchi, J.A. Berry, O. Björkman, W.D. Billings, J.S. Boyer, M.M. Caldwell, T.E. Dawson, B. Demmig-Adams, C.B. Field, J.A. Gamon, A. Gibson, N.M. Holbrook, R.B. Jackson, J. Keeley, P.J. Kramer, R. Monson, H.A. Mooney, P.S. Nobel, C.B. Osmond, R.W. Pearcy, P.B. Reich, P. Rundel, J.S. Sperry, M.T. Tyree, M.H. Zimmermann, …. I could keep citing more for days!

Without pretending to be exhaustive in listing past and current notorious ecofizzers, still it is worth highlighting the 'Australian ecophysiology hub'—with many excellent ecofizzers across the country (W.J.S. Downton, B.R. Loveys, Hans Lambers, Mark Westoby, Ian Woodrow …)—but with a remarkable concentration in Canberra (Research School for Biological Sciences; Australian National University) which, in the late 70's and along the 80's, encompassed a huge amount of well-recognized plant physiologists and ecofizzers: Jan Anderson, T.J. Andrews, Suzanne von Caemmerer, Wah Soon 'Fred' Chow, Ian Cowan, John Evans, Graham Farquhar, Paul Kriedemann, again Barry Osmond after his US years, John Passioura, Stephen Powles, Richard Richards, Neil Turner, Suan Wong … and many others, including *Plant Ecophysiology* Associate Editors Marilyn Ball and Rana Munns! If the list of 'resident' researchers was absolutely impressive, not least was the one of celeb visitors being around in those years: Bill Adams, Joe Berry, Gabriel Cornic, Barbara Demmig-Adams, Gunnar Öquist, Tom Sharkey, Ichiro Terashima … 'not bad' for a just 26 million people country nowadays! Later, in the late 90's, I had the great fortune and pleasure of developing a significant part of

my PhD at RSBS-ANU and, even then, that place was still the best environment that one could imagine for developing new scientific ideas and establishing collaborations and fruitful discussions. For instance, Steve Long was there for a short visit, and I could attend his vivid seminar talk together with just another 20 persons! While I used to visit Marylin Ball's lab to share coffee with her group—thanks Marylin for those coffee breaks, Katalapi times and for agreeing to become associate editor of the journal—at that time I was too shy for interacting with CSIRO researchers without having been introduced to them, even if I just needed to cross a single road from the apartment where I was living (yellow-crested cockatoo on the balcony included, courtesy—the apartment, not the cockatoo—of and likely the result of tedious paperwork and calls by Barry Osmond). Indeed I crossed that road several times to reach their offices' doors without having spirit enough to knock at them—Neil Turner, John Passioura and my nowadays associate editor, Rana Munns—thanks, thanks and thanks for accepting! Despite of it, I still interacted there at ANU with many incredible scientists. For sure with Barry Osmond, my scientific light and master, but also with many more, not necessarily 'pure ecofizzers', but certainly well-integrated with those (Murray Badger, Marylin Ball, 'Fred' Chow, Graham Farquhar, Adam Gilmore, Hideo Yamasaki, Tom Wydrzynski …). All these people were definitive crucial to me for mutating from a promising student into a true ecofizzer. Of course, such a mutation would have never happened without a previous and continued relationship with Hipólito Medrano, the person who introduced me the word 'ecophysiology' while teaching me an entire course on this subject, who supervised my undergraduate projects and my PhD thesis and who, now in his 'wine-making retirement', is still an ecophys and science reference to me and a good friend of mine. Or without the 'Orsay group', another mix of multi-disciplinary scientists including Ismael Moya—who was part of my 'PhD trinity' with Hipólito and Barry—Zoran Cerovic, Yves Goulas and Jean-Marie Briantais (who, strictly, was perhaps not an ecofizzer but he certainly was the best of persons) and, again 'just crossing the road', also Gabriel Cornic, Bernard Genty and others. My formation was completed thanks to interactive debates with Serge Rambal from France, Tom Sharkey from the US, Francesco Loreto and Mauro Centritto from Italy, Ichiro Terashima from Japan, Ülo Niinemets from Estonia, Manuela Chaves from Portugal … Those were the times—late nineteens of the past century—when *Plant Ecophysiology* was a mature, solid discipline, with multiple networking amongst its scientists and with other disciplines like remote sensing, ecology, molecular biology, biophysics and so on. Thirty years later I can still not imagine a better environment to grow as a scientist and as a person.

But even nowadays, I'm sure that most of us, if not all, are pretty convinced that *Plant Ecophysiology* is certainly a well-defined scientific discipline with deep roots and solid foundations, but still let me come back to 'emotional' Ecophysiology for another while. To me at least, as it is likely evident from previous paragraphs, the ecophysiology people is also a family. This feeling is reinforced by my devotional belonging to two standing well-defined *Plant Ecophysiology* communities: the Katalapi community in Chile and the Coloquio community in Spain. The Katalapi Colloquium, named after its hosting institution, the Parque Katalapi, (https://english.parquekatalapi.cl/, accessed on 20 May 2025) has been held without interruption (except for the pandemic years) since 2008 thanks to the generosity of an outstanding ecoffizzer (formerly a plant biochemist!): Luis Corcuera, '*el Doc*'. I am glad to have attended this colloquium many years, meeting there outstanding Chilean ecoffizzers—many of them having become our most frequent scientific collaborators—as Lucho Corcuera himself, Luisa Bascuñán, León Bravo, Lohen Cavieres, Rafa Coopman, Nicolás Franck, Enrique Ostria-Gallardo, Claudio Pastenes, Frida Piper, Alejandra Zúñiga, and so many others, including, of course, our *Plant Ecophysiology* Associate Editor Patricia 'Patty' Sáez! Sorry for not mentioning each and every one, the amazing thing is that we are so many people that I can easily miss some. The Katalapi Colloquium is international, and it has hosted relevant international ecofizzers such as John Bishop, Tim Colmer, Ingo Ensminger, Norman Huner, Alex Ivanov, Christian Körner, Adrienne Nicotra, Ülo Niinemets, Rafael Oliveira, Mark Olson, Michael Shane, Robert Turgeon, Matthew Turnbull, and many others (I met there another of my current Associate Editors, Paulo Marchiori, thanks for being there and here!), together with many Spanish researchers including Pere Aguiló-Nicolau, Marc Carriquí, Xisco Castanyer, María J Clemente, Antonio Diaz-Espejo, Xurxo Gago, Jeroni Galmés, Leopoldo García-Sancho, Conchi Íñíguez, Melanie Morales, Miquel Nadal, Alicia Perera-Castro, Miquel Ribas-Carbo, …. and the 'almost every-year' participants, Nacho Garcia-Plazaola, Bea Fernandez-Marin and myself. Besides the three of us, and among the 'internationals', I must highlight another three people that have repeated many times, becoming 'whole-right-Katalapiers': Marylin Ball, Hans Lambers and Bruce Osborne. Judging just by the names and the year-to-year fidelity of quite some of the participants, you can imagine how special is the Katalapi Colloquium for creating a real community and pushing up *Plant Ecophysiology*, from which many international collaborations have emerged. So special that Nacho, Bea and myself decided years ago to plagiarize the idea and create a similar one in Spain, i.e., to bind a restricted group of plant ecoffizzers that meet every year for several days, in this case in rotating remote places in Spain, sharing not only science but also excursions (most to the field, but also to the closest pubs, I must say). This one, the 'Coloquio', is mostly Spanish-based and hosted in Spanish, but still you can find there—some of them more usually, and some more sporadically—well-reputed ecofizzers as the Chilean Daniela Aros, Luis Corcuera, Rafa Coopman and Enrique Ostria-Gallardo, and the Spanish Ismael Aranda, Javier Cano, Marc Carriqui, Miquel A. Conesa, Antonio Diaz-Espejo, Raquel Esteban, Bea Fernandez-Marin, Xurxo Gago, Jeroni Galmés, Nacho Garcia-Plazaola, Eustaquio Gil-Pelegrin, Águeda González, Javi Gulías, Rosana López, Jordi Martinez-Vilalta, Enrique Mateos-Naranjo, Fermín Morales—the only one having attended every single edition!—Sergi Munne-Bosch, 'Jota'

Peguero-Pina, Nacho Querejeta, Fernando Valladares, Albert Vilagrosa, ... Starting from the pioneering introduction of *Plant Ecophysiology* in Spain by few people like e.g., Enar Alegre, José Luis Araus, Luis Ayerbe, Carles Gràcia, Maria Soledad Jimenez, José Alberto Pardos, Manuel Sanchez-Diaz, Robert Savé, Arturo Torrecillas or Hipólito Medrano, the Coloquio has now created a real scientific community around *Plant Ecophysiology*, from which many collaborations and visitor exchanges have arisen and, most importantly, it has generated in all of us the awareness of belonging to a family.

After this very personal and emotional dissertation, please understand that I was not trying to be exhaustive in listing prominent ecofizzers, as certainly each of you may have your own list of 'inspiring ecofizzers'. Besides my personal feelings, my intention was to simply make visible a sufficiently large list of well recognizable names that most of us, current ecofizzers, have in mind as acknowledged references for our own work, to demonstrate that *Plant Ecophysiology* do has solid foundations and for reminding plant scientists that providing a genome or a transcriptome is undoubtfully a powerful analytical tool, but is not the only way of making good science, advancing in our understanding of how plants function, acclimate and adapt to a continuously changing environment.

Nevertheless, and while certainly it is not compulsory to do molecular and genetical analysis for producing good *Plant Ecophysiology*, perhaps it is in general a good idea! In fact, from the late XX century and through the present *Plant Ecophysiology* has incorporated more and more molecular biology knowledge and techniques. According to De Lucia et al. (2001), this approximation of *Plant Ecophysiology* to molecular biology (and, particularly, to molecular genetics and phylogenetics) was what defined the most the evolution of our discipline over the late decades of the XX century. Together with the increasing interest for ecolophysiological approaches to assess whole plant, population and community processes—aided again by technological developments such as Eddy covariance or satellite- and drone-based remote sensing, to mention just spread ones—they have consolidated plant ecolophysiology as a discipline, in De Lucía et al. (2001)'s own words, "*linking the organism to scales above and below*". Years later, Xurxo Gago and myself were further to propose that nowadays ecophysiology is so impregnated of molecular biology that we are entering an "*ecophysiolomics era*" (Flexas & Gago, 2018). And, in fact, as I stated earlier, combining traditional and newly developed ecophysiological with omic tools is envisaged as the best strategy to advance on understanding plants and this is as well the spirit of *Plant Ecophysiology*, the journal.

Yes, we still can publish our work in top plant science journals—and it is something that for sure we must keep on doing. Additionally, some journals are actually quite focused on ecophysiology studies, at least in specific aspects of ecophysiology (e.g., *Journal of Plant Hydraulics*) or specific groups of species (e.g., *Tree Physiology*). But up to now many of us have been missing a journal focused on the globality of aspects of the discipline. This is why I believe *Plant Ecophysiology* deserves to start its journey "*from Mulga to Mangoes*" (as Aussie's songwriter John Williamson would say), a journey that many of us believe should have started decades ago! Therefore, it is for strenghthen the discipline, but also for honoring the ecofizzers' family, that following *Scilight* offer I decided to place 'oh, no! another journal in the science publishing market!'. But this is not 'another journal', this is *Plant Ecophysiology*! It is born to honor the pioneers like Walter, Gaastra or Mooney; to recognize those who consolidated the discipline like Berry, Farquhar or Osmond; and—following the spirit of the Katalapi and Coloquio 'tribes'—to regroup the community around a new fire where to share our stories. This is why I am convinced that *Plant Ecophysiology* is here for lasting.

I am proud of initiating the very first scientific journal fully focused on *Plant Ecophysiology*, and the very first one (to the best of my knowledge) that aims to economically compensate reviewers for they work. It aims providing the plethora of "heirs" of the pioneering ecofizzers a high standard journal that they can consider THEIR journal.

I acknowledge *Scilght* for hosting this initiative, including accepting all my business-breaking crazy initiatives. I also acknowledge the many ecofizzers who interacted with me upon my initial consultation to ca. 350 potential users of the new journal. A particular acknowledgement to Hendrik Poorter and Diego Marquez for their continuous dedication to help improving this journal's manuscript and web designs, and to Diego also for his detailed decalogue of reviewers' good practices, which we have simply adopted without any change. And to the very few (you know who you are) that strongly advertised me against creating a new journal: you are among the most admired ecofizzers to me, and I honestly hope I will keep your friendship even if I did not follow your advice.

You may have noticed that I have mentioned many names—and very likely missed many other important ones—but I have referred briefly to just some of the journal's initial Associate Editors—a list that I expect to enlarge in the next years. This is not because they are not among the most excellent plant ecofizzers, it is because I wanted to very specially highlight them here at last, but for sure not least: Marylin Ball, Sigfredo Fuentes, Diego Márquez, Paulo R. Marchiori, Rana Munns, Miquel Nadal, Patty Sáez, Lou Santiago, Erik Veneklaas and Dongliang Xiong. Isn't it an impressive list? You ARE among the greatest ecofizzers, and I'm so proud and thankful of having you on board. Thank you guys for getting involved in this adventure!

And a very last consideration for everyone: remember, this is not a new journal, this is just the journal we all ecofizzers had in mind for long and were somehow astonished that it did not exist in practice. It is simply that now, YES, it exists. Hope to meet you all here!

Conflicts of Interest

The author declares no conflict of interest.

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