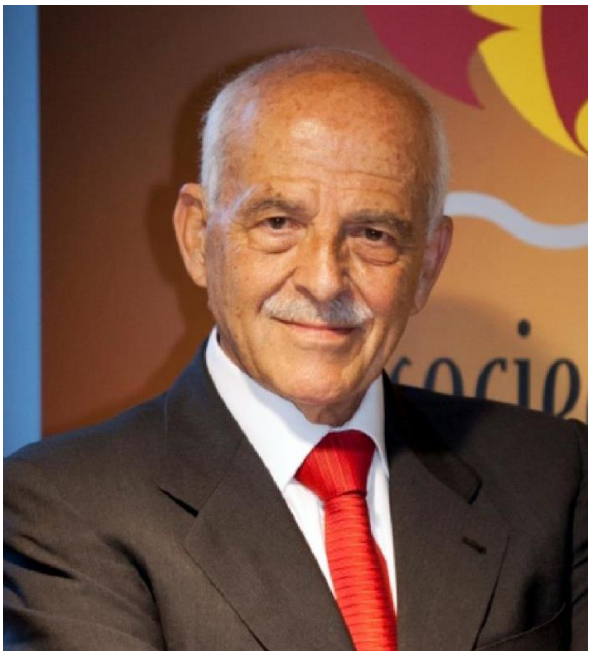
Contribuţii Botanice – 2020, LV: 175-178
Grădina Botanică "Alexandru Borza"
Cluj-Napoca

IN MEMORIAM

Salvador RIVAS-MARTÍNEZ
(16th July 1935 – 27th August 2020)



With the unexpected and sudden death of Prof. Salvador Rivas-Martínez, which occurred in Madrid on 27th August 2020, a fruitful period in the history of European Phytosociology, marked by his personality and thinking, comes to an end.

Salvador Rivas-Martínez was born in Madrid on 16th July 1935, as a "son of art", because his father, Salvador Rivas-Goday, was also a botanist, phytogeographer, and professor of Botany, first in Granada and then in Madrid. He graduated in Pharmacy in 1961 and in Biological Sciences in 1967. After a first position held at the University of Barcelona, he was a full professor for the rest of his life in the Faculty of Pharmacy of the Universidad Complutense in Madrid. For his vast scientific output in the fields of Phytosociology, Phytogeography and Bioclimatology, he was appointed a member of the Royal Academy of Exact, Physical and Natural Sciences. In 1993 he founded the *Centro de Investigaciones Fitosociologicas* (CIF) in Los Negrales. Along with other Spanish botanists, he was editor of the *Itinera Geobotanica*, *Global Geobotany* and *International Journal of Geobotanical Research* journals. Most of his former students are now professors at various Spanish universities. Five different universities, those of Pais Vasco (Bilbao), Granada, Lisbon, Ancona and Léon, awarded him the title of *Doctor Honoris Causa*.

Salvador Rivas-Martínez was involved since his early years in his father's school of classical Phytosociology. At that time the main objectives of Phytosociology were the description

of plant associations, the drafting of monographs on the vegetation of particular areas, the compilation of prodromi of the plant associations in certain regions, research on soil-vegetation relationships and other general topics. From 1959, Rivas-Goday authored several papers along with his son and disciple, Salvador. Over the following years Salvador successfully developed the Madrid school of Phytosociology created by his father.

Since the 1970s, Salvador Rivas-Martínez applied his research on vegetation with reference to landscape phytosociology, a science that developed after 1975 "at the instigation of Reinhold Tüxen". Rivas-Martínez's [2] first contribution on this topic, entitled *Sinfitosociologıa, una nueva metodologia para el estudio del paisaje vegetal*, was published only two years after the first paper (by Jean-Marie Géhu) dealing with a similar topic. However, in 1981 both authors signed off jointly a milestone review [1], which contained a section dedicated to *Notions de Symphytosociologie ou Phytosociologie paysagère*.

Salvador Rivas-Martínez envisaged two important concepts, i.e. "tesela", which is the elementary phytogeographical unit of vegetation landscape, and "vegetatio series" or "sigmetum", which is the geobotanical unit including the set of successionally linked plant communities from the most pioneer to the climax vegetation. Each sigmetum is described with reference to the corresponding seral communities (including the mature stage or "series head"), bioclimate, edaphic factors and biogeographical context. Salvador Rivas-Martínez's intuition was to integrate space and time, and to link and interpret jointly the phytocoenotic (the floristic composition of the seral plant associations), dynamic (their succession over time) and biogeographical (synchorologic) aspects of sigmeta.

In a speech delivered in the Aula Magna of the University of Camerino in 1992, Salvador Rivas-Martínez summarized the transition between classical and modern Phytosociology with these words [3]: "After the initial success of the Zürich-Montpellier school, which is synonymous with Braun-Blanquetian Phytosociology, a fruitful path on which we are now has opened by developing and integrating other concepts such as dynamics (Symphytosociology), chorology (Biogeography), climate (Bioclimatology) and evolution history (Paleosymbiology)."

Almost ten years later, Rivas-Martínez [5] refined the definition of vegetation series as the basic typological unit of dynamic phytosociology (i.e. the science of vegetation series and its component syntaxa). He also proposed some fundamental principles of landscape phytosociology, or dynamic-catenal phytosociology [5].

Jean-Marie Géhu distinguished two periods in the history of Phytosociology: the *Braun-Blanquetian Phytosociology*, developed starting from 1910–1917 by Josias Braun-Blanquet, and the *Braun-Blanqueto-Tüxenian Phytosociology*, largely influenced by the thinking of Reinhold Tüxen, starting from 1949. However, in Spain and France, starting in the 1970s, Phytosociology has undergone further development thanks to Salvador Rivas-Martínez and Jean-Marie Géhu. This third historical period of Phytosociology has been promoted by the rich and valuable scientific output of these two botanists and their students. For this reason, I would refer to this third historical period as to G*éhu-Rivasmartínezian Phytosociology*, which was essentially focused on the advance of Symphytosociology and Geosymphytosociology. Some of his recent impressive achievements, such as the map of the series, geoseries and geopermaseries of vegetation of Spain [6, 7] and the worldwide bioclimatic clasification system [9], are all the demonstration of Rivas-Martinez's important scientific contributions to progress in vegetation science.

On the occasion of an OPTIMA congress held in Florence many years ago I presented a

poster on the vegetation map of the coastal lake of Burano in Tuscany. Salvador Rivas-Martínez asked me various questions and we had a very interesting discussion. Then I met him several times at conferences and excursions held in Spain, France, Italy (Central Apennines) and Romania (he was present together with Prof. Manolo Costa in Cluj-Napoca for my honorary degree in Biology). In Brussels, we attended together various meetings of the Commission of Experts for the Habitats Directive.

In Bolivia we participated along with other colleagues (e.g., Gonzalo Navarro and Roberto Venanzoni) in a long excursion, guided by Prof. Maximo Libermann Cruz from the Universidad Mayor de San Andrés (La Paz), to Las Yungas on the eastern side of the Andes, towards the Amazon, and on the Bolivian plateau. Rivas-Martínez produced (together with his co-workers) the biogeographical map of South America [8] and several papers on the vegetation of the Peruvian and Bolivian Andes. In addition, he published a synthetic monograph on the vegetation and biogeography of North America [4].

Salvador Rivas-Martínez (right) and Franco Pedrotti (left) at the opening of the 26th Jornadas Internacionales de Fitosociología held in Mexico City in 2018 (Photo *Edmir Murrja*).

I met him for the last time in Mexico City on the occasion of the 26th Jornadas Internacionales de Fitosociología, organized by Prof. Alejandro Velásquez in August 2018. Salvador Rivas-Martínez was on great form, his comments being (as always) aimed at emphasizing

the importance of landscape Phytosociology, which I now call *Géhu-Rivasmartínezian Phytosociology.* His clear and firm lecture and comments inspired the audience with sympathy and confidence in a manner that was specific to his personality as a man, professor and scientist.

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