IN MEMORIAM CARMEN ZAMORA-MUÑOZ (1964-2022)

On 29 March 2022, our dear friend and colleague Carmen Zamora-Muñoz passed away in Granada. She was born in Seville on 27 June 1964 and studied Biology at the University of Granada, graduating in 1987. In 1992 she received her doctorate, and in 2001 she was already a tenured professor in the Department of Zoology at the University of Granada, in which finally, in 2021, she obtained the position of Full Professor of Zoology. At the University, Carmen knew how to combine her intense research activity with her dedication to university teaching, involving herself, like everything she did, with enthusiasm and generosity, in the training of her students for more than 30 years.

She was a very prolific and versatile researcher, with an extraordinary spirit of collaboration and teamwork. She began her career with an interest in the taxonomy and ecology of aquatic invertebrates and the biological quality of river courses, topics on which she completed her undergraduate thesis and doctoral thesis. I met her in the 1990s, when she made a brief stay in my laboratory at the University of Santiago de Compostela, just at the moment when she was finishing her doctoral thesis, under the direction of Prof. J. Alba-Tercedor, concerning the macroinvertebrate communities of the upper Río Genil basin (Sierra Nevada, Granada). Between 1992 and 1995 she completed postdoctoral projects at the Universities of Uppsala (Sweden) and Copenhagen (Denmark), working on evolutionary biology research lines, mainly on life strategies of caddisflies. She continued to be particularly interested in studying this group, particularly the fauna of the running waters of southern Spain (Sierra Nevada and other Baetic Mountains), an interest that, over time, she expanded to include the study of other faunal groups. Indeed, he carried out numerous collaborations with specialists from very diverse faunal groups, mainly aquatic arthropods (Ephemeroptera, Plecoptera, Diptera, Megaloptera,

crustaceans...), and even vertebrates (birds and mammals), from highly varied approaches (taxonomy, biology, biological indicators, evolutionary ecology...). As a result, her scientific production is extensive (more than 100 contributions) and highly diverse. Due to the nature of this magazine, intended mainly for trichopterologists, in the following lines I will limit myself to commenting on some of their most relevant contributions in our field.

Carmen was a patient and careful observer, and she paid great attention to the study of caddisfly larvae and their life cycles. Her morphological and taxonomic observations on the larvae of various genera, including *Hydropsyche* and *Rhyacophila*, are notable, as are her works on the larvae of various Iberian endemics of other genera (*Annitella*, *Stenophylax*, and *Erotesis*). She described many previously unknown larvae and provided keys for their correct identification, which greatly facilitated research on the fauna of Iberian running waters. In recent years, she incorporated molecular information into her classical taxonomic work, which allowed her to contrast and complete the results of her studies.

With her work she also contributed to improving significantly the faunal knowledge of Iberian caddisflies, especially in Andalusia and Mediterranean Spain. She was also interested in the fauna of North Africa (Algeria and Morocco) and the Neotropical Pantepui biogeographical region (Venezuela), incorporating numerous new records and describing a dozen new species for science. Among them *Hydropsyche solerorum*, an Iberian species, particularly dear to Carmen, as she dedicated it to her husband Juan Soler, and daughters, Carmen and Cristina, as well as two American species, *Atopsyche carmenae* and *Atopsyche cristinae*, which she dedicated to her two daughters.

In addition to the fundamental faunal and taxonomic works, she made important contributions on the biogeography, biology, and ecology of caddisflies, providing interesting information on distribution patterns, biological traits, and responses to disturbances, including climate change. In this regard, it is worth mentioning, for example, the studies of the adaptations to drought of caddisfly species with different case morphologies, as well as the work conducted on the Iberian species of the genus *Annitella* and their potential vulnerability to climate change in Sierra Nevada, a territory whose fauna she knew perfectly well and to which she dedicated an important monograph. Also noteworthy are her works on the distribution of troglophilous caddisflies in Andalusian caves and especially her studies on the biology and behavior of *Mesophylax aspersus*.

But in addition to her investigative value, Carmen stood out for her extraordinary human character. Recently, with the invaluable help of my colleagues Nuría Bonada and J. Alba-Tercedor, who had great personal and professional contact with Carmen (see "In Memoriam: Carmen Zamora Muñoz, *Limnetica*, 2022, 42(1): i-iii), we tried to draw a brief personal profile, the content of which I will partially reproduce verbatim in these lines:

"Carmen was a loving person, smiling, friendly, thoughtful, and always willing to help. For those of us who, in addition to sharing professional experiences, have been lucky enough to meet their family, the four Soler-Zamora (Carmen, Juan, Carmen and Cristina) formed a unique, inseparable and generous family nucleus. But in addition to all her contributions in the academic and research world and the great scientific legacy she has left us, the most admirable thing about our friend was her courage, bravery and desire to fight for life, which a painful illness was taking from her, until the last moment. Wherever you are, thank you very much for all the knowledge, good work and laughter that you shared with all of us. We will always continue to see you through the frontoclypeus of the "aquatic souls" that our beloved *Hydropsyche* represent."

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TRICHOPTEROLOGICAL LITERATURE OF CARMEN ZAMORA-MUÑOZ*

**The scientific production of C. Zamora-Muñoz is extensive and includes more than 100 publications on very diverse topics. In the following list I have selected only those that are dedicated specifically to Trichoptera or that contain relevant information about this group.*

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TAXA PROPOSED BY C. ZAMORA-MUÑOZ

TRICHOPTERA

Allogamus kurtas Oláh & Zamora-Muñoz, 2014 (Limnephilidae)
Allogamus pohos Oláh & Zamora-Muñoz, 2014 (Limnephilidae)
Atopsyche (Atopsaura) carmenae Zamora-Muñoz & Derka, 2016 (Hydrobiosidae)
Atopsyche (Atopsaura) cristinae Zamora-Muñoz & Derka, 2016 (Hydrobiosidae)
Atopsyche (Atopsaura) inmae Zamora-Muñoz & Derka, 2016 (Hydrobiosidae)
Atopsyche (Atopsaura) svitoki Zamora-Muñoz & Derka, 2016 (Hydrobiosidae)
Hydropsyche fontinalis Zamora-Muñoz & González, 2002 (Hydropsychidae)
Hydropsyche solerorum Zamora-Muñoz & González, 2016 (Hydropsychidae)
Wormaldia granada Oláh & Zamora-Muñoz, 2019 (Philopotamidae)

EPHEMEROPTERA

Caenis nachoi Alba-Tercedor & Zamora-Muñoz, 1993 (Caenidae)

TAXA DEDICATED TO C. ZAMORA-MUÑOZ

Drusus carmenae Olah, 2015 (Trichoptera: Limnephilidae)
Oleiformis carmelae Soler Zamora, Useros, González Miguéns & Lara, 2023 (Rhizaria: Cifoderidae)

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