2020

In Memoriam: Ignacio Ribera (1963–2020)

Emmanuel D. Delocado

Michael Balke

Hendrik Freitag

BRILL

Tijdschrift voor Entomologie 2020 DOI 10.1163/22119434-20192085

brill.com/tve

In Memoriam: Ignacio Ribera (1963–2020)

Emmanuel D. Delocado, Michael Balke & Hendrik Freitag

Keywords: aquatic beetle; biogeography; ecology; epitaph; evolutionary biology; subterranean beetle; systematics

Emmanuel D. Delocado, Biodiversity Laboratory, Department of Biology, School of Science and Engineering, Ateneo de Manila University, 1108 Quezon City, Philippines

Michael Balke, SNSB-Zoologische Staatssammlung München, Münchhausenstraße 21, 81247 Munich, Germany

Hendrik Freitag, Biodiversity Laboratory, Department of Biology, School of Science and Engineering, Ateneo de Manila University, 1108 Quezon City, Philippines. hfreitag@ateneo.edu

Ignacio Ribera Galán (Figs 1, 2) has left us after a long illness on April 15, 2020. Ignacio, or Nacho, as many friends and colleagues called him, dedicated his research life to aquatic and subterranean beetles, in particular tackling evolutionary biology questions from the point of view of systematics, ecology, and biogeography.

He was thus a rare type of entomologist, who gained great respect not only for his taxonomic expertise and achievements, but also for using the animals he loved the most to test many major hypotheses of evolutionary biology and to formulate new ones. While his studies were often concentrated on the Mediterranean region (e.g., Ribera et al. 1998), he also performed taxonomic revisions and described new species from South America, the Arabian Peninsula, Guinea, and the Pacific Islands; he worked on various beetle families such as Carabidae, Dytiscidae, Elmidae, Hydraenidae, Hygrobiidae, Hydrochidae, Leiodidae, Limnichidae, Malachiidae, Ptiliidae, Scirtidae and Staphylinidae.

Arising from a profound interest in Mediterranean coleopteran diversity, Ignacio studied the ecological restrictions of aquatic beetles and the implications for speciation rates and biodiversity conservation in the region (Ribera et al. 2001b, 2003a). Later, he wrote the chapter on habitat constraints in freshwater macroinvertebrate diversity in the seminal book *Aquatic Insects: Challenges to Populations* (Ribera 2008).

Ignacio's contributions to the field of insect systematics are varied and remarkable. For more than a decade, together with Carles Hernando, Ignacio made significant contributions on the family Limnichidae, including authoring different versions of the Limnichidae chapters in the *Handbook of Zoology* (Hernando & Ribera 2005a, 2016a), *Catalogue of Palearctic Coleoptera* (Hernando & Ribera 2006, 2016b), and *Water Beetles of New Caledonia* (Hernando & Ribera 2010). Aside from describing many new limnichid beetle species, he erected the genera *Geolimnichus*, *Pseudothryptus*, *Tricholimnichus*, and the extinct genus *Palaeoersachus* from Baltic amber (Hernando & Ribera 2001, 2003, 2005b, Pütz et al. 2004). Aside from his voluminous work on Limnichidae, together with Rolf Beutel and the second author he erected the adephagan family Aspidytidae (Balke et al. 2003), and wrote the chapter on the family in the *Guides to the Freshwater Invertebrates of Southern Africa* (Ribera & Bilton 2009); he also coauthored several editions of the chapter on Adephaga in the *Handbook of Zoology* (Beutel & Ribera 2005, 2016, Beutel et al. 2010) and the chapter on Coleoptera in *The Tree of Life* (Ribera & Beutel 2014).

Tijdschrift voor Entomologie 00: 1–5, Figs 1–2. [ISSN 0040-7496]. brill.com/tve

DOI 10.1163/22119434-20192085

*Corresponding author

Fig. 1. Ignacio Ribera (1963–2020). Photograph by Arnaud Faille.

Ignacio was also a recognized specialist in the molecular exploration of beetle evolution. He was part of a large collaborative effort to elucidate a comprehensive coleopteran phylogeny which gave insights on the super-radiation of insects (Hunt et al. 2007). Particular questions of interest to him were regional phylogenies of diving beetles (e.g., Ribera et al. 2001a, 2003b, Balke et al. 2007, Ribera & Faille 2010, Millán et al. 2013) and ground beetles (e.g., Faille et al. 2010, 2011, 2013), tracing the adaptations of insects to hypersaline environments (e.g., Arribas et al. 2014, Pallarés et al. 2017, Villastrigo et al. 2018) and investigating the rather wide distribution of the poorly dispersed lineages (e.g., Garcia-Vásquez & Ribera 2016, Sánchez-Fernández et al. 2016). Ignacio also contributed substantially to the volume of works evaluating COX1 and protein expression as bases for delineating and barcoding of insect species (e.g., Pons et al. 2010, Hidalgo-Galiana et al. 2016) and formulated very stimulating concepts on the evolutionary drivers of, and consequences for, lentic versus lotic insect communities (Ribera & Vogler 2000, Arribas et al. 2012, Lam et al., 2018).

Aside from his copious work on aquatic beetles, Ignacio was also deeply interested in morphological and physiological evolutionary convergence in cave coleopteran fauna. By using morphological, physiological,

Fig. 2. Ignacio during field work. Photograph by Arnaud Faille.

and molecular data, he took part in tracing the origin of cave beetles in the Pyrenees back into the Late Miocene (Faille et al. 2010, 2014, Rizzo et al. 2013). He appeared in the "Evolució, rere els passos de Darwin" ("Evolution, following in Darwin's footsteps") episode of the programme *Quèquicom* to discuss his findings on cave beetles. Last year, he and Javier Fresneda published a summary of the subterranean fauna in the Pyrenees and Iberian Peninsula (Fresneda & Ribera 2019).

Ignacio received his PhD in Biology from the Universitat de Barcelona in 1992 with his study on the diversity, morphology, and ecology of Hydradephaga of the Pyrenees (Ribera 1992). Soon after, he joined the Scottish Agricultural College where he studied ecological models of spider populations and the impact of land use on plant diversity in Scottish agricultural lands. In the late 1990s, he worked at the Imperial College and the Department of Entomology of the Natural History Museum, London where he was one of the pioneers in molecular phylogenetics of beetles. In 2003, he moved back to Spain to join the Departamento de Biodiversidad y Biología Evolutiva of the Museo Nacional de Ciencias Naturales in Madrid. More than a decade ago, he joined Institut de Biología Evolutiva (IBE) of the Consejo Superior de Investigaciones Científicas-Universitat Pompeu Fabra (CSIC-UPF) in Barcelona where he headed several projects of the Water and Cave Beetle Evolution Lab and worked energetically, despite severe health problems.

More than all his discoveries, countless publications, and involvement in scientific circles, Ignacio will be remembered by all of those who had the honour to know him, and in particular his fellow entomologists, as a nurturing mentor and caring friend. He will be remembered as a lab head who provided growth opportunities for his students; who asked after them when joining them for lunch; and as a senior researcher who motivated budding scientists to pursue their field and as a mentor who extended his kind assistance to them.

Given his untimely passing amid the pandemic, his colleagues at IBE dedicated a round of applause for the remarkable life Ignacio lived. While his friends were not able to join his immediate family for the funeral service due to the imposed health measures, Ignacio will be very fondly remembered and missed, not only for his contributions to the field, but for his very good-hearted nature.

References

Arribas, P., J. Velasco, P. Abellán, D. Sánchez-Fernández, C. Andújar, P. Calosi, A. Millán, I. Ribera & D.T. Bilton, 2012. Dispersal ability rather than ecological tolerance drives differences in range size between lentic and lotic water beetles (Coleoptera: Hydrophilidae). – Journal of Biogeography 39: 984–994. doi: 10.1111/j.1365-2699.2011.02641.x.

Arribas, P., C. Andújar, P. Abellán, J. Velasco, A. Millán & I. Ribera, 2014. Tempo and mode of the multiple origins of salinity tolerance in a water beetle lineage. – Molecular Ecology 23: 360–373. doi: 10.1111/mec.12605.

Balke, M., I. Ribera & R.G. Beutel, 2003. Aspidytidae: on the discovery of a new beetle family: detailed morphological analysis, description of a second species, and key to fossil and extant adephagan families (Coleoptera). – In: M.A. Jäch & L. Ji (Eds), Water Beetles of China, Vol. 3, pp. 53–64. Zoologisch-Botanische Gesellschaft in Österreich and Wiener Coleopterologen Verein, Vienna, Austria. Available at http://molevol.cmima.csic.es/ribera/pdfs/WB_China_3_0053-0066.pdf.

Balke, M., G. Wewalka, Y. Alarie & I. Ribera, 2007. Molecular phylogeny of Pacific Island Colymbetinae: radiation of New Caledonian and Fijian species (Coleoptera, Dytiscidae). – Zoologica Scripta 36: 173–200. doi: 10.1111/j.1463-6409.2006.00265.x.

Beutel, R.G. & I. Ribera, 2005. Adephaga Schellenberg, 1806. – In: R.G. Beutel & R.A.B. Leschen (Eds), Handbook of Zoology, Vol. IV, Part 38, Coleoptera, Beetles. Vol. 1: Morphology and Systematics (Archostemata, Adephaga, Myxophaga, Polyphaga partim), pp. 53–55. Walter de Gruyter, Berlin, Germany. doi: 10.1515/9783110904550.53.

Beutel, R.G. & I. Ribera, 2016. 7. Adephaga Schellenberg, 1806. – In: R.G. Beutel & R.A.B. Leschen (Eds), Handbook of Zoology, Arthropoda: Insecta. Coleoptera, Beetles. Vol. 1: Morphology and Systematics (Archostemata, Adephaga, Myxophaga, Polyphaga partim). 2nd ed., pp. 77–79. Walter de Gruyter, Berlin.

Beutel, R.G., I. Ribera & M. Balke, 2010. 3. Adephaga (Addendum). Introduction and phylogeny. – In: R.A.B. Leschen, R.G. Beutel & J.F. Lawrence (Eds), Handbook of Zoology, Arthropoda: Insecta. Coleoptera, Beetles. Vol. 2: Morphology and Systematics (Elateroidea, Bostrichiformia, Cucujiformia partim): p. 21. Walter de Gruyter, Berlin, Germany. Available at https://www.researchgate.net/publication/332707625_Adephaga_Addendum.

Faille, A., I. Ribera, L. Deharveng, C. Bourdeau, L. Garnery, E. Quéinnec & T. Deuve, 2010. A molecular phylogeny shows the single origin of the Pyrenean subterranean Trechini ground beetles (Coleoptera: Carabidae). – Molecular Phylogenetics and Evolution 54: 97–106. doi: 10.1016/j.ympev.2009.10.008.

Faille, A., A. Casale & I. Ribera, 2011. Phylogenetic relationships of Western Mediterranean subterranean Trechini groundbeetles (Coleoptera: Carabidae). – Zoologica Scripta 40: 282–295. doi: 10.1111/j.1463-6409.2010.00467.x.

Faille, A., A. Casale, M. Balke & I. Ribera, 2013. A molecular phylogeny of Alpine subterranean Trechini (Coleoptera: Carabidae). – BMC Evolutionary Biology 13: 248. doi: 10.1186/1471-2148-13-248.

Faille, A., C. Andújar, F. Fadrique & I. Ribera, 2014. Late Miocene origin of an Ibero-Maghrebian clade of ground beetles with multiple colonizations of the

subterranean environment. – Journal of Biogeography 41: 1979–1990. doi: 10.1111/jbi.12349.

Fresneda, J. & I. Ribera, 2019. Fauna subterránea de los distritos biospeleológicos pirenaico y catalán. – Boletín de la Sociedad Española de Espeleología y Ciencias del Karst 14: 97–112. Available at http://molevol.cmima.csic.es/ribera/pdfs/Fresneda&Ribera_2019_SEDECK.pdf.

García-Vázquez, D. & I. Ribera, 2016. The origin of widespread species in a poor dispersing lineage (diving beetle genus *Deronectes*). – Peer J 4: e2514. doi: 10.7717/peerj.2514.

Hernando, C. & I. Ribera, 2001. *Tricholimnichus* gen. n. and three new species from Borneo (Coleoptera: Limnichidae). – Koleopterologische Rundschau 71: 153–161. Available at https://www.researchgate.net/publication/242385871_Tricholimnichus_genn_and_three_new_species_from_Borneo_Coleoptera_Limnichidae.

Hernando, C. & I. Ribera, 2003. *Geolimnichus* n. gen., a new apterousforest floor litter Limnichidae from South Africa (Coleoptera). – Annales de la Société Entomologique de France (N.S.) 39: 385–389. doi: 10.1080/00379271.2003.10697395.

Hernando, C. & I. Ribera, 2005a. 18.5. Limnichidae Erichson, 1846. – In: R.G. Beutel & R.A.B. Leschen (Eds), Handbook of Zoology, Vol. IV, Part 38, Coleoptera, Beetles. Vol. 1: Morphology and Systematics (Archostemata, Adephaga, Myxophaga, Polyphaga partim): pp. 512–518. Walter de Gruyter, Berlin, Germany.

Hernando, C. & I. Ribera, 2005b. *Pseudothryptus*, a new genus of Limnichidae (Coleoptera) for *Caccothryptus multiseriatus*. – Entomological Problems 35: 131–135. Available at https://www.researchgate.net/publication/267398084_Pseudothryptus_a_new_genus_of_Limnichidae_Coleoptera_for_Caccothryptus_multiseriatus.

Hernando, C. & I. Ribera, 2006. Family Limnichidae Erichson, 1847. – In: I. Löbl & A. Smetana (Eds), Catalogue of Palaearctic Coleoptera Vol. 4, Elateroidea, Derodontoidea, Bostrichoidea, Lymexyloidea, Cleroidea, Cucujoide a: pp. 443–446. Apollo Books, Stenstrup, Denmark.

Hernando, C. & I. Ribera, 2010. Limnichidae: description of a new species from New Caledonia, and checklist of the taxa recorded from the Australian/Pacific Region (Coleoptera). – In: M.A. Jäch & M. Balke (Eds), Water Beetles of New Caledonia, part 1: pp. 439–449. Zoologisch-Botanische Gesellschaft in Österreich and Wiener Coleopterologen Verein, Vienna, Austria. Available at https://www.researchgate.net/publication/283047712_LIMNICHIDAE_Description_of_a_new_species_from_New_Caledonia_and_checklist_of_the_taxa_recorded_from_the_AustralianPacific_Region_Coleoptera.

Hernando, C. & I. Ribera, 2016a. 19.5. Limnichidae Erichson, 1846. – In: R.G. Beutel & R.A.B. Leschen (Eds), Handbook of Zoology, Arthropoda: Insecta. Coleoptera, Beetles. Vol. 1: Morphology and Systematics (Archostemata, Adephaga, Myxophaga, Polyphaga partim). 2nd Edition: pp. 605–612. Walter de Gruyter, Berlin, Germany. Available at https://www.researchgate.net/publication/303483413_Limnichidae_in_Handbook_of_Zoology_Ed_2.

Hernando, C. & I. Ribera, 2016. Family Limnichidae. – In: I. Löbl & D. Löbl (Eds), Catalogue of Palaearctic Coleoptera: Volume 3. Scarabaeoidea – Scirtoidea – Dascilloidea – Buprestoidea – Byrrhoidea. Revised and Updated Edition: pp. 607–610. Brill, Leiden, The Netherlands.

Hidalgo-Galiana, A., M. Monge, D.G. Biron, F. Canals, I. Ribera & A. Cieslak, 2016. Protein expression parallels thermal tolerance and ecologic changes in the diversification of a diving beetle species complex. – Heredity (Edinb.) 116: 114–123. doi: 10.1038/hdy.2015.80.

Hunt, T., J. Bergsten, Z. Levkanicova, A. Papadopoulou, O. St John, R. Wild, P.M. Hammond, D. Ahrens, M. Balke, M.S. Caterino, J. Gómez-Zurita, I. Ribera, T.G. Barraclough, M. Bocakova, L. Bocak & A.P. Vogler, 2007. A comprehensive phylogeny of beetles reveals the evolutionary origins of a superradiation. – Science 318: 1913–1916. doi: 10.1126/science.1146954.

Lam, A.W., M. Gueuning, C. Kindler, M. Van Dam, N. Alvarez, R. Panjaitan, H. Shaverdo, L.T. White, G.K. Roderick & M. Balke, 2018. Phylogeography and population genomics of a lotic water beetle across a complex tropical landscape. – Molecular Ecology 27: 3346–3356. doi: 10.1111/mec.14796.

Millán, A., F. Picazo, H. Fery, J.L. Moreno & D. Sánchez-Fernández, 2013. *Stictonectes abellani* sp. n. (Coleoptera: Dytiscidae: Hydroporinae) from the Iberian Peninsula, with notes on the phylogeny, ecology and distribution of the Iberian species of the genus. – Zootaxa 3745: 533–550. doi: 10.11646/zootaxa.3745.5.3.

Pallarés, S., P. Arribas, D.T. Bilton, A. Millán, J. Velasco & I. Ribera, 2017. The chicken or the egg? Adaptation to desiccation and salinity tolerance in a lineage of water beetles. – Molecular Ecology 26: 5614–5628. doi: 10.1111/mec.14334.

Pons, J., I. Ribera, J. Bertranpetit & M. Balke, 2010. Nucleotide substitution rates for the full set of mitochondrial protein-coding genes in Coleoptera. – Molecular Phylogenetics and Evolution 56: 796–807. doi: 10.1016/j.ympev.2010.02.007.

Pütz, A., C. Hernando & I. Ribera, 2004. A new genus of Limnichidae (Coleoptera) from Baltic amber. – Insect Systematics and Evolution 35: 329–334. doi: 10.1163/187631204788920257.

Ribera, I., 1992. Estudio de los Hydradephaga (Coleoptera) del pirineo y prepirineo: morfometria y ecologia.– Ph.D. dissertation, Universitat de Barcelona, Barcelona, Spain.

Ribera, I., 2008. Chapter 15: Habitat constraints and the generation of diversity in freshwater macroinvertebrates. – In: J. Lancaster & R.A. Briers (Eds), Aquatic Insects: Challenges to Populations: pp. 289–311. CAB International, Wallingford, UK. doi: 10.1079/9781845933968.0289.

Ribera, I. & R.G. Beutel, 2014. Chapter 33: Coleopterans: Beetles. – In: P. Vargas & R. Zardoya (Eds), The Tree

of Life: pp. 409–418.Sinauer Associates, Sunderland, MA. Available at http://molevol.cmima.csic.es/ribera/pdfs/Ribera&Beutel2014_TOLbeetles.pdf.

Ribera, I. & D.T. Bilton, 2009. Chapter 7: Aspidytidae. – In: R. Stals & I.J. de Moor (Eds), Guides to the Freshwater Invertebrates of Southern Africa. Volume 10: Coleoptera: pp. 85–88. Water Research Commission Report No. TT 320/07, Pretoria, South Africa. Available at https://www.academia.edu/3080452/STALS_R._and_DE_MOOR_I.J._Eds_._2007(2008)._Guides_to_the_Freshwater_Invertebrates_of_Southern_Africa._Volume_10_Coleoptera._Water_Research_Commission_Gezina_Pretoria_South_Africa.

Ribera, I. & A. Faille, 2010. A new microphthalmic stygobitic *Graptodytes* Seidlitz from Morocco, with a molecular phylogeny of the genus (Coleoptera, Dytiscidae). – Zootaxa 2641: 1–14. doi: 10.11646/zootaxa.2641.1.1.

Ribera, I. & A.P. Vogler, 2000. Habitat type as a determinant of species range sizes: the example of lotic-lentic differences in aquatic Coleopera. – Biological Journal of the Linnean Society 71: 35–52. doi: 10.1006/bijl.1999.0412.

Ribera, I., C. Hernando & P.A. Aguilera, 1998. An annotated checklist of the Iberian water beetles (Coleoptera). – Zapateri Revista aragonesa de entomología 8: 43–111. Available at https://www.researchgate.net/publication/283081876_An_annotated_checklist_of_the_Iberian_water_beetles_Coleoptera.

Ribera, I., C. Hernando & P. Aguilera, 2001a. *Agabus alexandrae* n.sp. from Morocco, with a molecular phylogeny of the western Mediterranean species of the *A. guttatus* group (Coleoptera: Dytiscidae). – Insect Systematics and Evolution 32: 253–262. doi: 10.1163/187631201X00191.

Ribera, I., T.G. Barraclough & A.P. Vogler, 2001b. The effect of habitat type on speciation rates and range movements in aquatic beetles: inferences from species-level phylogenies. – Molecular Ecology 10: 721–735. doi: 10.1046/j.1365-294x.2001.01218.x.

Ribera, I., G.N. Foster & A.P. Vogler, 2003a. Does habitat use explain large scale species richness patterns of aquatic beetles in Europe? – Ecography 26: 145–152. doi: 10.1034/j.1600-0587.2003.03271.x.

Ribera, I., D.T. Bilton, M. Balke & L. Hendrich, 2003b. Evolution, mitochondrial DNA phylogeny and systematic position of the Macaronesian endemic *Hydrotarsus* Falkenström (Coleoptera: Dytiscidae). – Systematic Entomology 28: 493–508. doi: 10.1046/j.1365-3113.2003.00226.x.

Rizzo, V., J. Comas, F. Fadrique, J. Fresneda & I. Ribera, 2013. Early Pliocene range expansion of a clade of subterranean Pyrenean beetles. – Journal of Biogeography 40: 1861–1873. doi: 10.1111/jbi.12139.

Sánchez-Fernández, D., V. Rizzo, A. Cieslak, A. Faille, J. Fresneda & I. Ribera, 2016. Thermal niche estimators and the capability of poor dispersal species to cope with climate change. – Scientific Reports 6: 23381. doi: 10.1038/srep23381.

Villastrigo, A., H. Fery, M. Manuel, A. Millán & I. Ribera, 2018. Evolution of salinity tolerance in the diving beetle tribe Hygrotini (Coleoptera, Dytiscidae). – Zoologica Scripta 47: 63–71. doi: 10.1111/zsc.12255.