



<http://dx.doi.org/10.11646/zootaxa.3793.5.5>

<http://zoobank.org/urn:lsid:zoobank.org:pub:79C2E60E-4784-4C25-8B85-5296DDF477BD>

Review of the Gasteruptiidae (Hymenoptera: Evanioidea) from the territory of the former Yugoslavia, with three newly reported species

VLADIMIR ŽIKIĆ^{1,4}, CORNELIS VAN ACHTERBERG², SAŠA S. STANKOVIĆ¹, JOVANA BILA DUBAIĆ³ & ALEKSANDAR ČETKOVIĆ³

¹Faculty of Sciences, Department of Biology and Ecology, University of Niš, ul. Višegradska 33, 18000 Niš, Serbia.
E-mail: vzikic@yahoo.com; sasasta@gmail.com

²Department of Terrestrial Zoology, Naturalis Biodiversity Center, Postbus 9517, 2300 RA Leiden, Netherlands.
E-mail: Cees.vanAchterberg@naturalis.nl

³Faculty of Biology, University of Belgrade, Studentski trg 16, 11000 Belgrade, Serbia.
E-mail: acetkov@bio.bg.ac.rs; jovanabila@bio.bg.ac.rs

⁴Corresponding author. E-mail: vzikic@yahoo.com

Abstract

The results of more than 120 years of investigation of the fauna of Gasteruptiidae for the territory of former Yugoslavia (including Bosnia and Herzegovina, Croatia, FYR of Macedonia, Montenegro, Serbia and Slovenia) are summarized. Results from recently collected material and from unidentified specimens in collections are combined with those of published records. The total number of valid species of the genus *Gasteruption* Latreille for the area of former Yugoslavia is 22, which is more than in any country represented in Fauna Europaea database. One species is firstly recorded for the mainland Europe (*G. syriacum* Szépligeti), two more species are newly recorded for the investigated area and there are 23 first country-records for the involved countries (based on 17 species).

Key words: *Gasteruption*, distribution, former Yugoslavia, Bosnia and Herzegovina, Croatia, FYR of Macedonia, Montenegro, Serbia, Slovenia

Introduction

The family Gasteruptiidae is a small group of wasps comprising two subfamilies, Gasteruptiinae (four genera) (Crosskey 1962; Rasnitsyn 1991; Macedo 2011; Zhao et al. 2012) and Hyptiogastrinae (two genera) (Jennings & Austin 2002). Aguiar et al. (2013) noted a total of 496 species in six genera: Gasteruptiinae (four genera) and Hyptiogastrinae (two genera). They are easily recognized from the other apocritan hymenopterans by the elongated "neck" (propleuron), the swollen hind tibiae and the elongate and highly attached metasoma. Adults are free-living insects feeding on nectar mainly on flowers with easily accessible nectar such the families Apiaceae, Asteraceae or Euphorbiaceae, but likely at least some *Gasteruption* species feed on both nectar and pollen (Jennings & Austin 2004). Gasteruptiidae are also known by their hovering flight during inspection of bee nests (van Achterberg 2013). The larvae feed on the larval food of solitary bees, after consuming the egg or larva of the bee (Malyshev 1966). They select bees of the subfamilies Apinae, Colletinae and Megachilinae nesting in stems or in wood, and less often in clay banks or other vertical soil substrates (Zhao et al. 2012; van Achterberg 2013); as far as known, bees nesting in flat ground are far less attacked. In Australia members of the Hyptiogastrinae attend bee nests in the ground (Houston 1987). There is only indirect evidence that Gasteruptiinae attack wasp nests, e.g. Crabronidae, Sphecidae and solitary Vespidae (Eumeninae) (Crosskey 1951; Gauld & Hanson 1995; Jennings & Austin 1997a, 1997b, 2004). Metamorphosis takes place inside the host's nest where gasteruptiid pupa hibernates until the next spring or summer (He 2004; Jennings & Austin 2004). Gasteruptiidae are traditionally classified in the superfamily Evanioidea, along with two more families—Aulacidae and Evaniidae. All three families share the highly inserted metasoma and the mid-coxal articulation. However, the biology of each family is different as are the thoracic

Acknowledgements

The authors are thankful to the Ministry of Education, Science and Technological Development of Serbia which supported the research for this paper as project III 43001. Special thanks goes to colleagues who, over many decades, collected and donated some specimens used in this study (D. Pavićević, Lj. Mihajlović, G. Mesaroš, Ž. Tomanović, A. Mladenović, A. Petrović, M. Zečević † via G. Nonveiller †), as well as to curators of respective collections who kindly provided the specimens under their custody: Biologiezentrum, Oberösterreichischen Landesmuseums in Linz, Austria (F. Gusenleitner), Natural History Museum of Belgrade, Serbia (Lj. Protić via G. Nonveiller †), Hungarian Natural History Museum in Budapest, Hungary (Z. Vas), Naturhistorisches Museum in Wien, Austria (D. Zimmermann). We thank John Jennings, The University of Adelaide, for comments on the manuscript.

References

- Achterberg, C. van (2013) De Nederlandse Gasteruptiidae of Hongerwespen (Hymenoptera: Evanioidea). *Nederlandse Faunistische Mededelingen*, 39, 55–87.
- Achterberg, C. van & Saure, C. (in prep.) Revision of the West Palaearctic *Gasteruption* Latreille (Evanioidea: Gasteruptiidae: Gasteruptiinae). *ZooKeys*.
- Aguiar, A.P., Deans, A.R., Engel, M.S., Forshage, M., Huber, J.T., Jennings, J.T., Johnson, N.F., Lelej, A.S., Longino, J.T., Lohrmann, V., Mik, I., Ohl, M., Rasmussen, C., Taeger, A. & Yu, D.S.K. (2013) Order Hymenoptera. In: Zhang, Z.-Q. (Ed.) *Animal Biodiversity: An Outline of Higher-level Classification and Survey of Taxonomic Richness* (Addenda 2013). *Zootaxa*, 3703 (1), 51–62.
<http://dx.doi.org/10.11646/zootaxa.3703.1.12>
- Crosskey, R.W. (1951) The morphology, taxonomy and biology of the British Evanioidea (Hymenoptera). *Transactions of the Royal Entomological Society of London*, 102, 247–301.
<http://dx.doi.org/10.1111/j.1365-2311.1951.tb00749.x>
- Crosskey, R.W. (1962) The classification of the Gasteruptiidae (Hymenoptera). *Transactions of the Royal Entomological Society, London*, 114, 377–402.
<http://dx.doi.org/10.1111/j.1365-2311.1962.tb01071.x>
- Gauld, I.D. & Hanson, P.E. (1995) The evaniomorph parasitoid families. Chapter 8. In: Hanson, P.E & Gauld, I.D (Eds) *The Hymenoptera of Costa Rica*. Oxford University Press, Oxford, UK.
- Györfi, J. & Bajari, E. (1962) Magyarországi Allatvilága (Fauna Hungariae 61), Stephanidae, Aulacidae, Gasteruptionidae, Evaniidae., *Akadémiai Kiadó*, 11 (15), 35–53. [in Hungarian]
- He, J.H. (2004) Hymenopteran Insect Fauna of Zhejiang. *Science Press, Beijing, China*, 1373 pp.
- Hedquist, K.-J. (1973) Notes on the superfamily Evanioidea in Sweden with keys to families, genera and species (Hymenoptera: Apocrita). *Entomologisk Tidskrift*, 94, 177–187.
- Heraty, J., Ronquist, F., Carpenter, J.M., Hawks, D., Schulmeister, S., Dowling, A.P.G., Murray, D., Munro, J., Wheeler, W.C., Schiff, N. & Sharkey, M.J. (2011) Evolution of the hymenopteran megaradiation. *Molecular Phylogenetics and Evolution*, 60, 73–88.
<http://dx.doi.org/10.1016/j.ympev.2011.04.003>
- Houston, T.F. (1987) A second contribution to the biology of *Stenocolletes* bees (Hymenoptera: Apoidea: Stenotritidae). *Records of the Western Australian Museum*, 13, 189–201.
- Jennings, J.T. & Austin, A.D. (1997a) Revision of the Australian endemic genus *Hyptiogaster* Kieffer (Hymenoptera: Gasteruptiidae), with descriptions of seven new species. *Journal of Natural History*, 31, 1533–1562.
<http://dx.doi.org/10.1080/00222939700770821>
- Jennings, J.T. & Austin, A.D. (1997b) Revision of *Aulacofoenus* Kieffer (Hymenoptera: Gasteruptiidae), hyptiogastrine wasps with a restricted Gondwanic distribution. *Invertebrate Taxonomy*, 11, 943–976.
<http://dx.doi.org/10.1071/it97003>
- Jennings, J.T. & Austin, A.D. (2002) Systematics and distribution of world hyptiogastrine wasps (Hymenoptera: Gasteruptiidae). *Invertebrate Systematics*, 16, 735–811.
<http://dx.doi.org/10.1071/it01048>
- Jennings, J.T. & Austin, A.D. (2004) Biology and host relationships of aulacid and gasteruptiid wasps (Hymenoptera: Evanioidea): a review. In: Rajmohana, K., Sudheer, K., Girish Kumar, P. & Santhosh, S. (Eds.), *Perspectives on Biosystematics and Biodiversity*. University of Calicut, Kerala, India, pp. 187–215.
- Macedo, A.C.C. (2011) A revision of *Gasteruption* Latreille (Hymenoptera: Gasteruptiidae) in the Neotropical region. *Zootaxa*, 3030, 1–62.
- Madl, M. (1987a) Gasteruptiidae from Lower Austria Insecta Hymenoptera Evanioidae. *Faunistische Abhandlungen des Staatlichen Museums für Tierkunde, Dresden*, 15, 21–26.

- Madl, M. (1987b) A new *Gasteruption*-sp. from Burgenland Austria Hymenoptera Gasteruptionidae. *Zeitschrift der Arbeitsgemeinschaft Oesterreichischer Entomologen*, 39, 37–38.
- Madl, M. (1987c) Über Gasteruptionidae aus Oberösterreich (Hymenoptera, Evanioidea). *Linzer Biologische Beiträge*, 19, 401–405.
- Madl, M. (1989a) On Gasteruptionidae of Tyrol and Voralberg Austria Hymenoptera Evanioidea. *Berichte des Naturwissenschaftlich-Medizinischen Vereins in Innsbruck*, 76, 159–162.
- Madl, M. (1989b) Über Gasteruptionidae aus Jugoslawien (Hymenoptera, Evanioidea). *Nachrichtenblatt der Bayerischen Entomologen*, 38, 40–45.
- Madl, M. (1990a) Contribution to knowledge of the Gasteruptionidae of Greece Insecta Hymenoptera Evanioidea. *Faunistische Abhandlungen, Dresden*, 17, 127–130.
- Madl, M. (1990b) Über Gasteruptionidae aus Karnten und Steiermark (Hymenoptera, Evanioidea). *Carinthia II*, 180, 479–484.
- Madl, M. (2004) Fauna Europaea: Gasteruptionidae. In *Fauna Europaea: Hymenoptera: Apocrita excl. Ichneumonoidea*. Noyes, J.S. (Ed.), Fauna Europaea version 1.1. Available from: <http://www.faunaeur.org/> (accessed 20 January 2014)
- Maidl, F. (1923) Beiträge zur Hymenopterenfauna Dalmatiens, Montenegros und Albaniens. II. Teil: Tenthredinoidea und Evaniidae. *Annalen des Naturhistorischen Museums in Wien*, 36, 25–35.
- Malyshev, S.I. (1966) *Genesis of the Hymenoptera and the phases of their evolution*, 5, London, 319 pp.
- Nonveiller, G. (1984) [Ernst Friedrich Germar: 'Reise nach Dalmatien und in das Gebiet von Ragusa', Leipzig 1817, eine Besprechung des Buches sowie eine vergleichende Artenübersicht.] [In Serbo-Croatian, with English abstract and German summary] *Acta Entomologica Jugoslavica, Zagreb*, 20 (Suppl.), 91–119.
- Pagliano, G. & Scaramozzino, P.L. (2000) Gasteruptionidae italiani (Hymenoptera: Evanioidea). *Bolettino del Museo Regionale di Scienze Naturali di Torino*, 17, 5–38.
- Quicke, D.L.J. (1997) *Parasitic wasps*. Chapman & Hall, London, UK, 470 pp.
- Rasnitsyn, A.P. (1991) Early cretaceous evaniomorphous hymenopteran families Stigmaphronidae and Cretevaniidae and the subfamily Kotujellitinae (Gasteruptionidae). *Paleontological Journal*, 25, 172–179.
- Saure, C. (2006) *Gasteruption phragmiticola* sp. n., eine neue *Gasteruption*-Art aus Deutschland (Hymenoptera: Evanioidea: Gasteruptionidae). *Beiträge zur Entomologie*, 56 (1), 125–132.
- Schletterer, A. (1885) Die Hymenopteren-Gattung *Gasteruption* Latr. (*Foenus* aut.). *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien*, 35, 267–326.
- Schletterer, A. (1889) Die Hymenopteren-Gruppe der Evaniiden. *Annalen des Kaiserlich-Königlichen Naturhistorischen Hofmuseums*, 4, 373–546.
- Schletterer, A. (1894) Zur Hymenopteren-Fauna von Istrien. *Jahresbericht des Kaiserlich-Königlichen Staats-Gymnasiums in Pola*, 4, 1–36.
- Schletterer, A. (1901) Beitrag zur Hymenopteren-Fauna von Süd-Istrien. *Verhandlungen der Kaiserlich-Königlichen Zoologisch-Botanischen Gesellschaft in Wien*, 51, 215–220.
- Sharkey, M.J., Carpenter, J.M., Vilhelmsen, L., Heraty, J., Liljeblad, J., Dowling, A.P.G., Schulmeister, S., Murray, D., Deans, A.R., Ronquist, F., Krogmann, L. & Wheeler, W.C. (2012) Phylogenetic relationships among superfamilies of Hymenoptera. *Cladistics*, 28, 80–112.
<http://dx.doi.org/10.1111/j.1096-0031.2011.00366.x>
- Szépligeti, V. (1903) Neue Evaniiden aus der Sammlung der ungarischen National-museums. *Annales Musei Nationalis Hungarici*, 1, 364–395.
- Tölg, F. & Fahringer, J. (1911) Beitrag zur Dipteren- und Hymenopterenfauna Bosniens, der Herzegowina und Dalmatiens. II. Hymenoptera. *Mitteilungen des Naturwissenschaftlichen Vereins an der Universität Wien*, 9, 23–28.
- Wall, I. (1994) Seltene Hymenopteren aus Mittel-, West- und Südeuropa (Hymenoptera Apocrita: Stephanoidea, Evanioidea, Trigonalioidea). *Entomofauna*, 15 (14), 137–184.
- Zhao, K-X., Achterberg, C. van & Xu, Z.-F. (2012) A revision of the Chinese Gasteruptionidae (Hymenoptera, Evanioidea). *ZooKeys*, 237, 1–123.
<http://dx.doi.org/10.3897/zookeys.237.3956>