



<http://dx.doi.org/10.11646/zootaxa.3949.2.1>

<http://zoobank.org/urn:lsid:zoobank.org:pub:28B64406-0249-4289-B4C5-66E794D5435D>

Revision of the genus *Aulacophora* from Taiwan (Coleoptera: Chrysomelidae: Galerucinae)

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Abstract

Ten species of the genus *Aulacophora* Chevrolat, 1836 are reported for Taiwan. Specimens of *A. opacipennis* Chûjô, 1962 collected from Southeast Asia were misidentified by Kimoto (1989) and should be identified as *A. apicipes* Jacoby, 1896. Color photos of habitus and drawings of male and female genitalia from eleven species (including *A. apicipes*) are presented. The following synonymies are proposed: *Aulacophora analis* (Weber, 1801) = *Galeruca quadraria* Olivier, 1808 (syn. nov.); *A. indica* (Gmelin, 1790) = *Rhaphidopalpa pubescens* Allard, 1888 (syn. nov.); *A. apicipes* Jacoby, 1896 = *A. nigripalpis* Chen and Kung, 1959 (syn. nov.). Lectotypes are designated for *Crioceris abdominalis* Fabricius, 1781, *C. testacea* Fabricius, 1787, *Galleruca bicolor* Weber, 1801, *Galeruca quadraria* Olivier, 1808, *Aulacophora semiopaca* Jacoby, 1886, *A. frontalis* Baly, 1888, *A. lewisii* Baly, 1886, *A. intermedia* Jacoby, 1892, *A. semifusca* Jacoby, 1892, *A. dohrni* Jacoby, 1899, *A. almora* Maulik, 1936, *A. apicipes* Jacoby, 1896, *A. tenuicincta* Jacoby, 1897, *Rhaphidopalpa pubescens* Allard, 1888, *R. bengalensis* Weise, 1892, *R. ceramensis* Weise, 1892, *R. chinensis* Weise, 1892, and *Orthaulaca (Ceratia) cattigarensis* Weise, 1892. A key to the Taiwanese species is provided.

Key words: taxonomy, new synonymy, lectotype designation, leaf beetles, Cucurbitaceae, Fabaceae

Discussion

Although some species of *Aulacophora* display variable color patterns, the morphology of genitalia is constant and in most cases largely different between the species. However, taxonomic problems still exist among species with yellow elytra and pubescent humera in males, such as *A. abdominalis*, *A. kotoensis* and *A. indica*. The recent descriptions of *A. fauveli* Beenen, 2008 and *A. sulaksonoi* Mohamedsaid, 2009 support the view that among species with a wide distribution within the genus *Aulacophora* also species occur with very restricted ranges. Characters hitherto not used might help to reveal more species. Secondary sexually characters, for example, the presence or absence of paired tubercles on the males pronotum, as used in the present study, are suggested to be investigated in other species too. Male specimens of *A. foveicollis* (Lucas, 1849) from Somalia showed paired tubercles, while specimens for example from India do not, although the external morphology of the aedeagus is identical. Study of the internal sac might reveal that more species are involved. Examination of large collection and applying other characters seems necessary.

Acknowledgements

We would like to thank all curators listed above for giving us the opportunity to study the material from their collections. We thank the Taiwan Chrysomelid Research Team for assistance in collecting material, including Jung-Chang Chen, Hou-Jay Chen, Yi-Ting Chung, Bo-Xin Guo, Hsueh Lee, Ta-Hsiang Lee, Wen-Chuan Liao, Weiting Liu, Mei-Hua Tsou, and Su-Fang Yu. We especially thank Ta-Hsiang Lee for photos of specimens, and Chih-Kai Yang for identification of host plants. We acknowledge the help of Jan Bezděk (Brno) in providing some literature and for discussion. This study was also supported by the Ministry of Science and Technology MOST 103-2313-B-055-001.

References

- Allard, E. (1888) Synopsis des galerucines à corselet sillonné transversalement, 1e partie. *Annales de la Société Entomologique de France*, Series 6, 8, 305–332.
- Allard, E. (1889) Contributions à la faune indo-chinoise, 5e mémoire, galérucides et alticides. *Annales de la Société Entomologique de France*, Series 6, 9, 303–312.
- Allard, E. (1891) Collection d'insectes formée dans l'Indo-chine par M. Pavie consul de France au Cambodge. Coléoptères. Phytophages. *Nouvelles Archives du Muséum d'Histoire Naturelle*, Series 3, 3, 229–234.
- Anand, R.K. & Cox, M.L. (1986) Taxonomic revision of the genus *Aulacophora* Chev. I. Species with yellow elytra (Coleoptera, Chrysomelidae, Galerucinae). *Entomologische Abhandlungen Staatliches Museum für Tierkunde Dresden*, 50, 81–91.
- Aston, P. (2009) Chrysomelidae of Hong Kong Part 3 subfamily Galerucinae. *Hong Kong Entomological Bulletin*, 1, 6–25.
- Baly, J.S. (1879) List of the phytophagous Coleoptera collected in Assam by A. W. Chennell, Esq., with notes and descriptions of the uncharacterized genera and species. *Cistula Entomologica*, 2, 435–465.
- Baly, J.S. (1886) Descriptions of a new genus and some new species of Galerucinae, also diagnostic notes on some of the older described species of *Aulacophora*. *The Journal of the Linnean Society, Zoology*, 20, 1–27.
<http://dx.doi.org/10.1111/j.1096-3642.1886.tb01432.x>
- Baly, J.S. (1887) Notes on Galerucinae, and descriptions of two new species of Hispididae. *The Entomologist's Monthly Magazine*, 23, 268–270.
- Baly, J.S. (1888) Descriptions of some genera and species of Galerucinae. *The Journal of the Linnean Society (Zoology)*, 20, 156–188.
<http://dx.doi.org/10.1111/j.1096-3642.1888.tb01444.x>
- Barroga, G.F. (2001) The genus *Aulacophora* Chevrolat (Coleoptera: Chrysomelidae: Galerucinae) from Bali, Indonesia, with description of a new species. *Serangga*, 6, 37–50.
- Barroga, G.F. (2002a) *Aulacophora indica* (Gemelin), the correct name for the squash beetle in the Philippines (Coleoptera: Chrysomelidae: Galerucinae). *Philippine Entomologist*, 16, 25–32.
- Barroga, G.F. (2002b) Corrections to the article “Revision of the genus *Aulacophora* Chevrolat (Coleoptera: Chrysomelidae: Galerucinae) in Sundaland. *Philippine Entomologist*, 16, 185–194.
- Barroga, G.F. & Mohamedsaid, M.S. (2002) Revision of the genus *Aulacophora* Chevrolat (Coleoptera: Chrysomelidae: Galerucinae) in Sundaland. *Serangga*, 7, 15–194.
- Beenen, R. (2008) Contribution to the knowledge of Galerucinae (Coleoptera, Chrysomelidae) of New Caledonia. *Genus*, 19, 65–

- Chapuis, F. (1876) Diagnoses des espèces du genre *Aulacophora* recueillies aux îles Philippines par le Dr Semper. *Comptes-Rendus des Séances de la Société Entomologique de Belgique*, 19, 98–101.
- Chen, S.H. & Kung, Y.T. (1959) Notes on Chinese cucumber beetles of the genus *Aulacophora* Chevrolat. *Acta entomologica Sinica*, 9, 373–387.
- Chûjô, M. (1935a) Chrysomelidae of Loo-Choo Archipelago (I). *Transactions of the Natural History Society of Formosa*, 25, 69–90.
- Chûjô, M. (1935b) Chrysomelidae of Loo-Choo Archipelago (III). *Transactions of the Natural History Society of Formosa*, 25, 203–211.
- Chûjô, M. (1935c) H. Sauter's. Formosa-Ausbeute: Subfamily Galerucinae (Coleoptera: Chrysomelidae). *Arbeiten über Morphologische und Taxonomische Entomologie*, 2, 160–174.
- Chûjô, M. (1938) H. Sauter's Formosa-collection: Subfamily Galerucinae (Coleoptera: Chrysomelidae). Second part. *Arbeiten über Morphologische und Taxonomische Entomologie*, 5, 135–152.
- Chûjô, M. (1941) Chrysomelid-beetles from Kore (IV). *Transactions of the Natural History Society of Formosa*, 31, 155–174.
- Chûjô, M. (1962) A taxonomic study on the Chrysomelidae from Formosa Part XI. Galerucinae. *The Philippine Journal of Science*, 91, 1–239.
- Chûjô, M. (1963) Chrysomelid-beetles from Formosa, preserved in the Hungarian Natural History Museum, Budapest. *Annales Historico-Naturales Musei Nationalis Hungarici*, 55, 379–402.
- Dejean, P.F.M.A. (1837) *Catalogue des coléoptères de la collection de le M. le Comte Dejean*. Troisième édition, revue, corrigée et augmentée. Livraisons 5. Méquignon-Marvis père et fils, Paris, pp. 385–503.
- Duvivier, A. (1884) Cinq espèces nouvelles du genre *Aulacophora*, Chev. (Coléoptères Phytophages). *Notes from the Leyden Museum*, 6, 119–125.
- Duvivier, A. (1891) Les phytophages du Chota-Nagpore (1e note). *Bulletin ou Comptes-Rendus des Séances de la Société Entomologique de Belgique*, 1891, 145–156.
- Duvivier, A. (1892) Les phytophages du Chota-Nagpore (2e note). *Annales de la Société Entomologique de Belgique*, 36, 396–449.
- Fabricius, J.C. (1781) *Species insectorum exhibens eorum differentias specificas, synonyma auctorum, loca natalia, metamorphosis, adiectis observationibus*. Tome I. Carol Ernest Bohni, Hamburgi et Kilonii, 552 pp.
- Fabricius, J.C. (1787) *Mantissa insectorum, sistens eorum species nuper detectas adiectis characteribus genericis, differentiis specificis, emendationibus, observationibus*. Tomus I. C. G. Proft, Hafniae, 348 pp.
<http://dx.doi.org/10.5962/bhl.title.36471>
- Fabricius, J.C. (1792) *Entomologia systematica emendate et aucta, secundum classes, ordines, genera, species, adjectis, synonymis, locis observationibus, descriptionibus*. Tomus I. Pars II. Hafniae, 538 pp.
<http://dx.doi.org/10.5962/bhl.title.36532>
- Fabricius, J.C. (1801) *Systema Eleutheratorum secundum ordines, genera, species adiectis synonymis, locis, observationibus, descriptionibus*. Tomus I. Bibliopolii Academici, Kiliae, 506 pp.
- Fabricius, J.C. (1803) [new taxa]. In: Illiger, K. (Ed.), *Abänderungen der in Fabricii Systema Eleutheratorum doppelt vorkommenden Namen*. *Magazin für Insektenkunde*, 2, 292–293.
- Fairmaire, L. (1883) Essai sur les coléoptères de l'Archipel de la Nouvelle-Bretagne. *Annales de la Société Entomologique de Belgique*, 27, 1–58.
- Gistel, J.N.F.X. (1857) *Achthundert und zwanzig neue oder unbeschriebene wirbellose Thiere*. Verlag der Schorner'schen Buchhandlung, Straubing, 92 pp.
- Gmelin, J.F. (1790) *Caroli a Linné systema naturae per regna tria naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis*. Editio decimal tertia, aucta, reformata. Tom I. Pars IV. Classis V. Insecta. Georg Enmanuel Beer, Lipsiae, 708 pp. [pp. 1517–2224]
- Gressitt, J.L. (1955) Insects of Micronesia Coleoptera: Chrysomelidae. *Insects of Microensia*, 17 (1), 1–60.
- Gressitt, J.L. & Kimoto, S. (1963) The Chrysomelidae (Coleopt.) of China and Korea. Part 2. *Pacific Insects Monograph*, 1B, 301–1026.
- Jacoby, M. (1883) On some new species of phytophagous Coleoptera from the island of Saleyer. *Notes from the Leyden Museum*, 5, 197–203.
- Jacoby, M. (1884a) Descriptions of new genera and species of phytophagous coleopteran from Sumatra. *Notes from the Leyden Museum*, 6, 9–70.
- Jacoby, M. (1884b) Descriptions of new genera and species of phytophagous Coleoptera collected by Dr. B. Hagen at Serdang (East Sumatra). *Notes from the Leyden Museum*, 6, 201–232.
- Jacoby, M. (1886) Descriptions of new genera and species of phytophagous Coleoptera from the Indo-Malayan and Austral-Malayan subregions, contained in the Genova Civic Museum. Third Part. *Annali del Museo Civico di Storia Naturale di Genova*, 24, 41–121.
- Jacoby, M. (1889) Viaggio di Leonardo Fea in Birmania e regioni vicine.—List of the phytophagous Coleoptera obtained by Signor L. Fea at Burmah and Tenasserim, with descriptions of the new species. *Annali del Museo Civico di Storia Naturale di Genova*, 27, 147–237.
- Jacoby, M. (1892) Description of the new genera and species of the phytophagous Coleoptera obtained by Sign. L. Fea in

- Burma. *Annali del Museo Civico di Storia Naturale di Genova*, 32, 869–999.
- Jacoby, M. (1896) List and descriptions of the phytophagous Coleoptera obtained by Dr. Modigliani from Mentawai islands. *Annali del Museo Civico di Storia Naturale di Genova*, 37, 126–148.
- Jacoby, M. (1897) List of the phytophagous Coleoptera obtained by Mr. H. Raap in the Batu Islands with descriptions of the new species. *Annali del Museo Civico di Storia Naturale di Genova*, 38, 405–411.
- Jacoby, M. (1899) Descriptions of the new species of phytophagous Coleoptera obtained by Dr. Dohrn in Sumatra. *Entomologische Zeitung* (Stettin), 60, 259–313.
- Kimoto, S. (1964) The Chrysomelidae of Japan and the Ryukyu Islands. VI. Subfamily Galerucinae I. *Journal of the Faculty of Agriculture, Kyukyu University*, 13, 287–308.
- Kimoto, S. (1966) A list of the chrysomelid specimens of Taiwan preserved in the Zoological Museum, Berlin. *Esakia*, 5, 21–38.
- Kimoto, S. (1970) A list of the Nepalese chrysomelid specimens preserved in the Zoologische Sammlung des Bayerischen Staates, München. *Khumbu Himail*, 3, 412–421.
- Kimoto, S. (1977) Ergebnisse der Bhutan-Expedition 1972 des Naturhistorischen Museums in Basel. Coleoptera: Fam. Chrysomelidae. Subfam. Galerucinae. *Entomologica Basiliensia*, 2, 351–392.
- Kimoto, S. (1989) Chrysomelidae (Coleoptera) of Thailand, Cambodia, Laos and Vietnam. IV. Galerucinae. *Esakia*, 27, 1–241.
- Laboissière, V. (1929) Observations sur les Galerucini asiatiques principalement du Tonkin de du Yunnan et descriptions de nouveaux genres et espèces. *Annales de la Société Entomologique de France*, 98, 251–288.
- Laboissière, V. (1932) Galerucinae. *Mémoires du Musée Royal d'Histoire Naturelle de Belgique Hors Série*, 4 (4), 143–184.
- Laboissière, V. (1935) Rectifications au mémoire de E. Allard. Contribution à la faune indo-chinoise. Galérucides et alitcides. *Annales de l'Association des Naturalistes de Levallois-Perret*, 21, 139–145.
- Laboissière, V. (1940) Observations sur les galerucinae des collections du Musée royal d'Histoire naturelle de Belgique et descriptions d'espèces nouvelles. 2e note. *Bulletin du Musée Royal d'Histoire Naturelle de Belgique*, 16 (3), 1–31.
- Lee, J.E. & An, S.L. (2001) Family Chrysomelidae. Economic Insects of Korea 14. *Insecta Koreana Supplement*, 21, 1–231.
- Maulik, S. (1936) *The Fauna of British India, including Ceylon and Burma. Coleoptera. Chrysomelidae (Galerucinae)*. Taylor & Francis, London, 648 pp.
- Miwa, Y. (1931) *A systematic catalogue of Formosan Coleoptera*. Department of Agriculture, Government Research Institute, Rep. No. 55, Taihoku, 359 pp.
- Mohamedsaid, M.S. (1994) The genus *Aulacophora* Chevrolat from Peninsular Malaysia (Coleoptera: Chrysomelidae: Galerucinae). *Malayan Nature Journal*, 47, 375–392.
- Mohamedsaid, M.S. (2000) List of Malaysian Chrysomelidae (Coleoptera) in the collections of UKM. *Serangga*, 5, 343–360.
- Mohamedsaid, M.S. (2009) *Aulacophora sulaksonoi*, a new species of chrysomelid beetle from Sumba, Indonesia (Coleoptera: Chrysomelidae: Galerucinae). *Genus*, 20, 335–339.
- Mohamedsaid, M.S. & Contant, J. (2007) Chrysomelid beetles of the subfamily Galerucinae from Thailand and Cambodia in the collections of the Royal Belgian Institute of Natural Sciences (Coleoptera: Chrysomelidae). *Bulletin de l'Institut Royal des Sciences Naturelles de Belgique*, 77, 163–177.
- Monrós, F. & Bechyně, J. (1956) Über einige verkannte Chrysomeliden-Namen. *Entomologischen Arbeiten aus dem Museum G. Frey*, 7, 1118–1137.
- Motschulsky, V. de (1858) Insectes du Japon. *Études Entomologiques*, 6, 25–41.
- Ogloblin, D.A. (1936) *Listoedy, Galerucinae. Fauna SSSR. Nasekomye Zhestkokrylye [Chrysomelidae, Galerucinae. Faune de l'URSS, Insectes Coléoptères]*, s. s. 8, 26 (1). Moskva-Leningrad, Izdatel'stvo Akademii Nauk SSSR, 455 pp.
- Olivier, A.G. (1791) *Encyclopédie méthodique, ou par ordre de matières; par une société de gens de letters, de savans et d'artistes; precede d'un vocabulaire universel, servant de table pour tout l'ouvrage, ornée des portraits de Mm. Diderot et d'Alembert, premiers éditeurs de l'Encyclopédie. Histoire Naturelle. Insectes. Tome sixième. Pars I.* Panckoucke, Paris, 704 pp.
- Olivier, A.G. (1808) *Entomologie, ou histoire naturelle des insects, avec leurs caractères génériques et spécifiques, leur description, leur synonymie et leur figure enluminée, Coléiotères. Tome sixième. [4].* Desray, Paris, 492 pp. [pp. 613–1104]
- Schaller, J.G. (1783) Neue Insecten. *Abhandlungen der Hallischen Naturforschenden Gesellschaft*, 1, 217–318.
- Schönfeldt, H. (1890) Ein Beitrag zur Coleopterenfauna der Liu-Kiu-inseln. *Entomologische Nachrichten*, 16, 168–175.
- Weber, F. (1801) *Observationes entomologicae, continens novorum quae condidit generum characters, et nuper detectarum specierum descriptiones*. Bibliopoli Academici Novi, Kiliae, 116 pp.
- Weise, J. (1892) Chrysomeliden und Coccinelliden von der Insel Nias, nebst Bemerkungen über andere, meistens südostasiatischen Arten. *Deutsche Entomologische Zeitschrift*, 1892, 385–400.
- Weise, J. (1922) Chrysomeliden der indo-malayischen Region. *Tijdschrift voor Entomologie*, 65, 39–130.
- Wilcox, J.A. (1972) Chrysomelidae: Galerucinae (Luperini: Aulacophorina, Diabroticina). In: Wilcox, J.A. (Ed.), *Coleopterorum Catalogus Supplementa. Pars 78(2). 2nd Edition*. W. Junk, 's-Gravenhang, pp. 221–431.
- Zimsen, E. (1964) *The type material of J. C. Fabricius*. Munksaard, Copenhagen, 656 pp.