Zootaxa 3874 (1): 001–084
www.mapress.com/zootaxa/

Monograph

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3874.1.1
http://zoobank.org/urn:lsid:zoobank.org:pub:8D4A224F-42A8-4B31-953E-D683C1AB63BE

ZOOTAXA

3874

Studies on the systematics and taxonomy of the genus *Hylaeus* F. (8) Revision of the Afrotropic subgenus *Hylaeus* (*Deranchylaeus*) Bridwell (Hymenoptera: Anthophila, Colletidae)

HOLGER H. DATHE
Senckenberg Deutsches Entomologisches Institut, Eberswalder Str. 90, 15374 Müncheberg, Germany. holger.dathe@senckenberg.de

Magnolia Press
Auckland, New Zealand

Accepted by C. Rasmussen: 4 Aug. 2014; published: 21 Oct. 2014

HOLGER H. DATHE
Studies on the systematics and taxonomy of the genus *Hylaeus* F. (8) Revision of the Afrotropic subgenus *Hylaeus* (*Deranchylaeus*) Bridwell (Hymenoptera: Anthophila, Colletidae)
(*Zootaxa* 3874)

84 pp.; 30 cm.

21 Oct. 2014

ISBN 978-1-77557-561-0 (paperback)

ISBN 978-1-77557-562-7 (Online edition)

FIRST PUBLISHED IN 2014 BY

Magnolia Press

P.O. Box 41-383

Auckland 1346

New Zealand

e-mail: zootaxa@mapress.com

http://www.mapress.com/zootaxa/

ISSN 1175-5326 (Print edition)

ISSN 1175-5334 (Online edition)

Table of contents

Abstract

The Afrotropic subgenus *Deranchylaeus* of the colletid bee genus *Hylaeus* is revised for the first time on the basis of all the available type material. Here, 28 **new synonymies** were detected: *Prosopis flaviscutum* Alfken and *Hylaeus graaffi* Cockerell = *H. curvicarinatus* (Cameron); *H. microstictus* Cockerell = *H. dregei* (Strand); *H. bequaertianus* Bridwell and *H. ogilviei* Cockerell = *H. gabonicus* (Vachal); *P. immarginata* Alfken and *H. abjunctus* Cockerell = *H. krebsianus* (Strand); *H. absonulus* Cockerell and *H. reditus* Cockerell = *H. lightfooti* Bridwell; *H. subreditus* Cockerell = *H. lineaticeps* (Friese); *H. tinctulus extensicornis* Cockerell = *H. perater* Cockerell; *P. corpana* Warncke and *H. rhodognathus* Cockerell = *H. promontorii* Meade-Waldo; *P. atriceps* Friese, *P. atriceps* var. *major* Strand, *H. sanctus* Cockerell, *H. sublucens* Cockerell, *H. varians* Cockerell, *H. tenuis* var. *dominae* Cockerell, *H. punctiferus* Cockerell, *P. totana* Warncke and *H. multifarius* Eardley & Urban = *H. robertianus* (Cameron); *H. simulans* Cockerell = *H. rugipunctus* (Alfken); *H. simplex* (Bingham), *H. simplior* Meade-Waldo, *H. perdensus* Cockerell and *P. postica* Warncke = *H. tenuis* (Alfken); *H. kasindensis* Cockerell = *H. xanthostoma* (Alfken). **Lectotypes** were designated for *Prosopis alfkeni* Friese, *P. atriceps* Friese, *P. curvicarinata* Cameron, *P. flaviscutum* Alfken, *P. gabonica* Vachal, *P. rugipuncta* Alfken, *P. tenuis* Alfken and *P. xanthostoma* Alfken. The following 12 **new species** are described: *H.* (*Deranchylaeus*) *amharicus* sp. n. ♀; *bernhardi* sp. n. ♂; *camerunensis* sp. n. ♂♀; *chimani* sp. n. ♂; *eardleyi* sp. n. ♂♀; *gessianus* sp. n. ♂♀; *izikosalis* sp. n. ♀; *nottoni* sp.

n. ♀; o*romialis* sp. n. ♂♀; *pamelae* sp. n. ♀; *paulyi* sp. n. ♂♀ and *venustus* sp. n. ♂. Keys for the identification of males and females of all species are provided.

Key words: Africa, bee, taxonomy, new species, new synonyms, identification key, floral records

1. Introduction

The most recent definition of the subgenus *Hylaeus* (*Deranchylaeus*) was proposed by Snelling (1985: 6–8). This article is part of a comprehensively conceived revision of the Hylaeinae of the Afrotropical Region, of which only the first issue has been published. It comprised a general review of the hylaeine genera and subgenera, together with revisions of the smaller taxonomic groups. This state was largely taken over by Michener (2000, 2007). The large subgenera *H.* (*Nothylaeus*) and *H.* (*Deranchylaeus*) were omitted, as Snelling had not developed a critical review of the species at that time. For both subgenera he provided a formal list of hitherto assigned names only.

After 1985, Roy Snelling dealt especially with the revision of *H.* (*Nothylaeus*), in which the author was involved, but Snelling had also begun an extensive study of the original material of *H.* (*Deranchylaeus*). One sees "traces" of his work in the collections, for example in Berlin, where scheduled lectotypes had been labeled. Despite the kind support of the LACM, Dr. Brian V. Brown and Mr Gordon C. Snelling, no manuscript or records of these studies could be found.

The subgenus *Hylaeus* (*Deranchylaeus*) was established in 1919 by Bridwell when he structured the species inventory then known under the generic name *Hylaeus* Fabricius. It was a quite remarkable achievement, his groups have been largely preserved until today. Since then they have only been defined more precisely. According to Michener (2000, 2007), *H.* (*Metylaeus*) Bridwell and *H.* (*Nothylaeus*) Bridwell are still regarded as subgenera of *Hylaeus*, as well as *H.* (*Deranchylaeus*). Bridwell assigned 22 names to *H.* (*Deranchylaeus*). Snelling (1985) put two of them into *H.* (*Metylaeus*), one to *H.* (*Cornylaeus*) Snelling and one of these species, *H. arnoldi* (Friese), he regarded as uncertain in its subgeneric assignment to *H.* (*Alfkenylaeus*) or *H.* (*Deranchylaeus*). An other species is apparently incorrectly recorded from South Africa; Snelling (1985: 5) synonymized *H. albinasatus* (Strand, 1912) with *H.* (*Prosopis*) *signatus* (Panzer, 1798), a palearctic species which is highly unlikely to occur in South Africa. So finally 17 names will remain in the subgenus, three of which are junior synonyms.

One gets the impression that already Bridwell has set up his subgenus *H.* (*Deranchylaeus*) as a collective group for everything that did not fit into *H.* (*Nothylaeus*) and other well-defined taxa. Also Cockerell (1942: 2) noticed that. Snelling (1985: 18) does basically the same with *H. arnoldi* (Friese), a species that appears in his determination key at *H.* (*Alfkenylaeus*), where its placment is dubious, and so he appended it to *H.* (*Deranchylaeus*), where its placement is likewise inopportune. An only morphologically founded classification is obviously not satisfactory, and this species is excluded here.

Treatments with synoptic claim as Friese (1911) and Cockerell (1920, 1936e, 1942) have provided only fragmentary overviews. Because since the description of the first species of this group by Vachal (1900), *Prosopis gabonica*, no comparison of holotypes has been undertaken. One can state that the species of this *Hylaeus* subgenus were virtually unexplored and not available for practical purposes. For the present study, the accessible type material of 62 names was viewed. Thus, a significant gap in the knowledge of the African Anthophila can be closed, but, with certainty, there will be a number of further discoveries. For this reason, this work has placed particular emphasis on accurate documentation in order to improve the reliable determination of the species. This revision shall help to pave the way to new insights into systematic, zoogeographical and ecological relationships of these bees.

2. Methods and terminology

As part of this project, the relevant South African museums were visited in 2012. Practically all the material available there was studied and evaluated, supplemented by additional specimens from the Biozentrum Linz, the Royal Belgian Institute of Natural Sciences, Brussels, and the Natural History Museum London. In totally this study is based on approximately 1,600 specimens of *H.* (*Deranchylaeus*). Thanks to the support from numerous other museums, all types were re-examined, with the only exception of *Prosopis luctuosa* Benoist, 1944, which could not be found in the Natural History Museum of Paris.

Extremely valuable and enjoyable for me was the contact with the natural history museums, especially with the South African institutions in Pretoria, Grahamstown and Cape Town, but also with colleagues in Berlin, Brussels, Linz, London, Los Angeles, New York, Oxford and Paris. They generously provided their unique specimens, so that this work could be based on a broad spectrum of material. Special thanks go to the collection managers, who were energetic in conducting difficult searches and solving numerous other problems, in particular to Dawn Larsen (Cape Town), David G. Notton (London), Viola Richter (Berlin), Agnièle Touret-Alby (Paris) and Eli Wyman (New York). I feel very much indebted also to the following colleagues (in alphabetical order of collection acronyms): Sarah K. Gess, Friedrich W. Gess†, John Midgley (AMG, Grahamstown), Jerome G. Rozen, (AMNH, New York), Brian V. Brown, Gordon C. Snelling (LACM, Los Angeles), Claire Villemant (MNHN, Paris), Frank Koch (MNHU, Berlin), Michael Kuhlmann (NHML, London), Fritz Gusenleitner (OLBL, Linz), James E. Hogan (OUMNH, Oxford), Alain Pauly (RBINS, Brussels), Simon van Noort (SAMC, Cape Town) and Martin Krüger (TMSA, Pretoria).

For various types of support, as also reliably given in the past, I thank the staff of the Senckenberg DEI Müncheberg, namely Christian Kutzscher, Andrew D. Liston, Gabriele Mirschel and Renate Riedelsheimer. Encouraging and helpful discussions with Michael S. Engel (Lawrence, Kansas) greatly advanced the project. Finally, I sincerely thank the reviewers Alain Pauly and Claus Rasmussen (University Aarhus) for their valuable comments and recommendations that helped substantially to improve this article. All persons mentioned have a large share in the success of this work.

References

This reference list indexes annual data as used by Eardley & Urban (2010), because this work serves as indispensable data source for studies of African bees.

Alfken, J.D. (1914) Zur Kenntnis der afrikanischen *Prosopis*-Arten. (Hym.). *Deutsche Entomologische Zeitschrift,* 2, 183–197. http://dx.doi.org/10.1002/mmnd.191419140213

APD (2014) African Plants Database (version 3.4.0). Conservatoire et Jardin botaniques de la Ville de Genève and South African National Biodiversity Institute, Pretoria. Available from: http://www.ville-ge.ch/musinfo/bd/cjb/africa/ (accessed 30 July 2014)

Benoist, R. (1944) Hyménoptères mellifères recueillis au Cameroun par MM. P. Lepesme, R. Paulian et A. Villiers. *Bulletin de la Société entomologique de France,* 49, 8–13.

Bingham, C.T. (1912) II. South African and Australian aculeate Hymenoptera in the Oxford Museum. *Transactions of the Royal Entomological Society of London*, 60 (2), 375–383. http://dx.doi.org/10.1111/j.1365-2311.1912.tb03096.x

Bridwell, J.C. (1919) Miscellaneous notes on Hymenoptera with descriptions of new genera and species. *Hawaiian Entomological Society, Proceedings,* 4, 109–165.

Cameron, P. (1905) On some new genera and species of Hymenoptera from Cape Colony and Transvaal. *Transactions of the South African Philosophical Society,* 15 (1), 195–257. [1904] http://dx.doi.org/10.1080/21560382.1904.9626440

Cameron, P. (1906) Descriptions of some new species of Hymenoptera from Pearston, Cape Colony. *Transactions of the South African Philosophical Society,* 16 (1), 323–333. [1905] http://dx.doi.org/10.1080/21560382.1905.9526067

Cockerell, T.D.A. (1920) On South African bees, chiefly collected in Natal. *Annals of the Durban Museum,* 2, 286–318.

Cockerell, T.D.A. (1932c) LIV.–Descriptions and records of bees.–CXXXIII. *Annals and Magazine of Natural History,* Series 10, 9 (54), 518–527. http://dx.doi.org/10.1080/00222933208673528

Cockerell, T.D.A. (1932e) XVIII.–Descriptions and records of bees.–CXXXV. *Annals and Magazine of Natural History*, Series 10, 10 (56), 166–176. http://dx.doi.org/10.1080/00222933208673558

Cockerell, T.D.A. (1936e) African hylaeine bees. *American Museum Novitates,* 847, 1–14.

Cockerell, T.D.A. (1936p) LXIV.–Descriptions and records of bees.–CLVIII. *Annals and Magazine of Natural History,* Series 10, 18 (108), 631–638. http://dx.doi.org/10.1080/00222933608655236

Cockerell, T.D.A. (1942) Bees of the family Hylaeidae from the Ethiopian Region. *Smithsonian Miscellaneous Collections,* 101, 1–15.

Dathe, H.H. (1980) Die Arten der Gattung *Hylaeus* F. in Europa (Hymenoptera: Apoidea, Colletidae). *Mitteilungen aus dem*

Zoologischen Museum in Berlin, 56, 207–294.
Dathe, H.H. (2011) Studies on the systematics and taxonomy of the genus *Hylaeus* F. (7). *Indialaeus* sgen. nov., a new subgenus of *Hylaeus* from the Oriental Region (Hymenoptera, Anthophila, Colletidae). *Beiträge zur Entomologie*, 61, 243–258.
Eardley, C. & Urban, R. (2010) Catalogue of Afrotropical bees (Hymenoptera: Apoidea: Apiformes). *Zootaxa*, 2455, 1–548.
Friese, H. (1909) Die Bienen Afrikas nach dem Stande unserer heutigen Kenntnisse. *In*: Schultze, L. (Ed.), Zoologische und anthropologische Ergebnisse einer Forschungsreise im westlichen und zentralen Südafrika, ausgeführt in den Jahren 1903–1905, Band 2. *Denkschriften der Medizinisch-naturwissenschaftlichen Gesellschaft zu Jena,* 14, 83–476, pls. ix–x.
Friese, H. (1911) Die Maskenbienen der äthiopischen Region (*Prosopis*, Hym.). *Archiv für Naturgeschichte,* 77, 120–134.
Friese, H. (1913a) II. Nachtrag zu 'Bienen Afrikas'. *Zoologische Jahrbücher, Abteilung für Systematik, Geographie und Biologie der Tiere,* 35, 581–598.
Friese, H. (1913b) Neue Bienenarten aus Afrika. *Deutsche Entomologische Zeitschrift,* 1913, 573–578.
Friese, H. (1916) Hymenoptera V: Apidae. *In*: Michaelsen, U. (Ed.), *Beiträge zur Kenntnis der Land- und Süßwasserfauna Deutsch-Südwestafrikas. Ergebnisse der Hamburger Deutsch-Südwestafrikanischen Studienreise 1911. Vol. 4*. Friederichsen & Co., Hamburg, pp. 414–452.
http://dx.doi.org/10.5962/bhl.title.7352
Friese, H. (1941) Apidae aus Süd-Ost-Afrika gesammelt von Missionar Henri A. Junod Dr. phil. h.c. (1863–1934) (Hym. Apid.) *Eos Madrid,* 15 [1939], 95–107.
Gess, S.K. & Gess, F.W. (2003) *A catalogue of flower visiting records for aculeate wasps and bee in the semi-arid to arid areas of southern Africa*. Albany Museum, Grahamstown, 529 pp.
Gess, S.K. & Gess, F.W. (2004) A comparative overview of flower visiting by non-*Apis* bees in the semi-arid to arid areas of southern Africa. *Journal of the Kansas Entomological Society*, 77 (4), 602–618.
http://dx.doi.org/10.2317/e7.1
Gess, S.K. & Gess, F.W. (2006) Survey of flower visiting by aculeate wasps and bees in the semi-arid to arid areas of southern Africa. *Annals of the Eastern Cape Museums*, 5, 1–51.
Gess, S.K. & Gess, F.W. (2014) *Wasps and bees in southern Africa. SANBI Biodiversity Series 24*. South African National Biodiversity Institute, Pretoria, 320 pp. [with database on CD]
Houston, T.F. (1975) A revision of the Australian hylaeine bees (Hymenoptera: Colletidae). I. Introductory material and the genera *Heterapoides* Sandhouse, *Gephyrohylaeus* Michener, *Hylaeoides* Smith, *Pharohylaeus* Michener, *Hemirhiza* Michener, *Amphylaeus* Michener and *Meroglossa* Smith. *Australian Journal of Zoology,* Supplementary Series, 23 (36), 1–135.
http://dx.doi.org/10.1071/ajzs036
IPNI (2014) The International Plant Names Index. Available from: http://www.ipni.org (accessed 29 July 2014)
Kuhlmann, M. & Eardley, C.D. (2012) Pollen resources of non-*Apis* bees in southern Africa. *In*: Patiny, S. (Ed.), *Evolution of plant-pollinator relationships.* Cambridge University Press, Cambridge, pp. 439–457.
http://dx.doi.org/10.1017/cbo9781139014113.017
Meade-Waldo, G. (1923) Hymenoptera, fam. Apidae, subfam. Prosopidinae, fasc. 181. *In*: Wytsman, P. (Ed.), *Genera Insectorum*. Louis Desmet-Verteneuil, Bruxelles, pp. 1–45.
Michener, C.D. (1997) Genus-group names of bees and supplemental family-group names. S*cientific Papers, Natural History Museum, The University of Kansas,* 1, 1–81.
http://dx.doi.org/10.5962/bhl.title.4052
Michener, C.D. (2000) *The Bees of the World*. The Johns Hopkins University Press, Baltimore and London. 913 pp.
Michener, C.D. (2007) *The Bees of the World.* Second Edition. The Johns Hopkins University Press, Baltimore and London. 953 pp.
Pauly, A. (1984) Mission entomologique en Afrique Occidentale (1979–80) : Renseignements eco-biologiques concernant les Hyménoptères. *Notes fauniques de Gembloux* 11, 1–43.
Pauly, A. (1998) Hymenoptera Apoidea du Gabon. *Annales Sciences zoologiques, Musée royal de l'Afrique centrale, Tervuren,* 282, 1–121.
Pauly, A. (2011–2012) Localities of collecting trips in Ethiopia, GTI projects 1–3 (October 2010–September 2012). Available from: http://zoologie.umh.ac.be/hymenoptera/page.asp?ID=168 (accessed 30 April 2014)
Pérez, J. (1903) Espèces nouvelles de Melliféres. *Comptes Rendus des Séances de la Societé Linnéenne de Bordeaux, Procés-verbaux,* 58, 208–236.
Perkins, R.C.L. (1899) Hymenoptera Aculeata. *In*: Sharp, D. (Ed.), *Fauna Hawaiiensis being the Landfauna of the Hawaiian Islands. Vol. I (1)*. Cambridge University Press, Cambridge, pp. 1–115, 2 pls. [Anthophila, pp. 75–115].
Rasmussen, C. & Ascher, J.S. (2008) Heinrich Friese (1860–1948): Names proposed and notes on a pioneer melittologist (Hymenoptera, Anthophila). *Zootaxa,* 1833, 1–118.
Sandhouse, G.A. (1943) The type species of the genera and subgenera of bees. *Proceedings of the United States National Museum*, *Washington*, 92 (3156), 519–619.
http://dx.doi.org/10.5479/si.00963801.3156.519
Snelling, R.R. (1985) The systematics of the hylaeine bees (Hymenoptera: Colletidae) of the Ethiopian zoogeographical region: The genera and subgenera with revisions of the smaller groups. *Contributions in Science, Natural History Museum of Los*

Angeles County, no. 361, 1–33.
Spinola, M. (1806) *Insectorum Liguriae species novae aut rariores, quas in agro Ligustico nuper detexit, descripsit et iconibus illustravit Maximilianus Spinola, adjecto Catalogo specierum auctoribus iam enumeratarum, quae in eadem regione occurrunt. Vol. 1*. Gravier, Genua, 13 pp. [pp. 106–119]
Strand, E. (1912) Neue und wenig bekannte afrikanische Bienen der Gattungen *Eriades, Steganomus* und *Prosopis*. *Societas entomologica, Stuttgart,* 27 (1–7), 6–7, 11, 15–16, 20, 27, 30–31, 33–34.
Strand, E. (1927) Verzeichnis der Hymenoptera, die bis zum Jahre 1926 beschrieben wurden in den Arbeiten von Professor Embrik Strand (an der Universität Riga, Lettland). *Entomologische Zeitschrift, Frankfurt*, 41, 112–115.
Struck, M. (1994) A check-list of flower on insects and their host plants of the Goegab Nature Reserve, Northwestern Cape, South Africa. *Bontebok,* 9, 11–21.
USNM (2014) Smithsonian National Museum of Natural History, USNM Bee Collection, Database Apidoidea Types. Available from: http://collections.nmnh.si.edu/search/ento/ (accessed 30 June 2014)
Vachal, J. (1900) Contributions hyménoptériques. III.—*Prosopis* nouvelles de l'Afrique équatoriale occidentale. *Annales de la Société Entomologique de France*, 68 (1899), 535–536.
Vachal, J. (1903) Hyménoptères du Congo français rapportés par l'ingénieur J. Bouyssou. Mellifera. *Annales de la Société Entomologique de France,* 72, 358–400.
Warncke, K. (1972) Beitrag zur Systematik und Verbreitung der Bienengattung *Prosopis* F. in der Westpaläarktis (Hymenoptera, Apoidea, Colletidae). *Bulletin des Recherches agronomiques de Gembloux N.S.*, 5 (1970), 745–768.