SHORT COMMUNICATION

FIRST DISCOVERY OF THE GENUS *Discothyrea* ROGER, 1863 (HYMENOPTERA: FORMICIDAE: PROCERATIINAE) FROM SUMATRA, INDONESIA

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Received: 15 August 2021 / Accepted: 10 June 2022

ABSTRACT

We herein report *Discothyrea clavicornis* Emery, 1897 from three localities of West Sumatra, as the first record of the genus from the island. This species was collected from the leaf-litter layer of the lowland and highland disturbed forests in West Sumatra Province.

Key words: Ants, Proceratiinae, *Discothyrea clavicornis*, Sumatra, new record

ABSTRAK

Kehadiran *Discothyrea clavicornis* Emery, 189 dari tiga lokasi di Sumatera Barat, Indonesia dilaporkan, yang mana ia adalah rekod pertama bagi genus ini di Pulau Sumatra. Spesies semut ini telah dikumpul dari serasah daun pada hutan tanah rendah dan tinggi yang terganggu di Provinsi Sumatera Barat.

Kata kunci: Semut, Proceratiinae, *Discothyrea clavicornis*, Sumatera, rekod baru

INTRODUCTION

The ant genus *Discothyrea* Roger, 1863 was established for a single species *D. testacea*. This genus belongs to the subfamily Proceratiinae, and is widely distributed throughout tropical and subtropical of the world (Bolton 1995; Janicki et al. 2016). Currently, this genus consists of 49 extant valid species and two fossil species was assigned to the genus (Bolton 2020), but there is no previous record of the genus from Sumatra Island of Indonesia (Guénard et al. 2017).

The worker of the genus *Discothyrea* can be easily recognized with a combination of the following features: the mandible in full-face view overhung by clypeus; masticatory margin edentate; apical antennal segment strongly bulbous; abdominal segment IV strongly down-curved with its sternite in lateral view triangular (Eguchi et al. 2014). The species of this genus are usually found in rotten wood, leaf litter, under stones, mounds of termites, and chimneys of earthworms in forests (Brown 1958; Eguchi et al. 2014).

The survey of ant diversity was done in several ecosystem previously (Alvareza et al. 2020; Fitri et al. 2021; Herwina et al. 2018; Herwina et al. 2020; Mohamed 2014; Mustafa 2018; Nadiah et al. 2016; Okanti et al. 2021; Stukalyuk et al. 2022). However, in our course of inventory and taxonomic studies of ants in Sumatra (Musfira et al. 2022; Satria et al. 2015; Satria et al. 2017; Satria &Yamane 2019; Satria & Herwina 2020; Satria & Jannatan 2021), we herein record *Discothyrea clavicornis* Emery, 1897 from three localities of W. Sumatra, as the first record of the genus from the island.

MATERIALS AND METHODS

Several workers of *Discothyrea clavicornis* Emery, 1897 were collected by using Winkler extraction method in the following three locations between September 2020 to January 2021: lowland disturbed forest near Sarasah Uwak waterfall, Padang, West Sumatra Province (0.913250° S, 100.481889° E, ca. 380 m asl.), the secondary forest of Tandikek Mountain, Padang Panjang, West Sumatra Province (0.430806° S, 100.319722° E, ca. 1400 m asl.), and soil sampling in the secondary forest of Marapi mountain, Agam, West Sumatra Province, Indonesia (0.389453° S, 100.437425° E, ca. 1986 m asl.).

Species identification of *Discothyrea clavicornis* Emery, 1897 were done by referring to the original description (Emery 1897) and an identification key to species of the genus *Discothyrea* by Xu et al. (2014) and Bharti et al. (2015), and the type material image of workers provided by Antweb (2021): CASENT0903858 (syntype, worker); CASENT0922241 (holotype, worker).

Multi-focused montage images were produced using Helicon Focus Pro. (Helicon Soft Ltd., http://www.heliconsoft.com/) from a series of source images taken by a Canon EOS KissX5 digital camera attached to a Nikon SMZ1270 stereomicroscope. Artifacts/ghosts and unnecessary parts (unfocused appendages, insect pin, etc.) surrounding or covering target objects were erased and cleaned up using the retouching function of Helicon Focus Pro, and the color balance, contrast and sharpness were adjusted using Adobe Photoshop CS6.

Taxonomy

***Discothyrea clavicornis* Emery, 1897** (Figure 1)

Discothyrea clavicornis Emery 1897: 593, pl. 15, figs. 39–40, worker, type locality: New Guinea (Papua New Guinea). Emery 1911: 52; Mann 1919: 288; Wheeler 1935: 11; Chapman & Capco 1951: 76; Smith & Wing 1955: 108; Brown 1958: 253; Bolton, 1995: 171; Sarnat & Economo 2012: 74; Liu et al. 2015: 30.

Materials examined. Indonesia: West Sumatra: Padang Panjang: Tandikek Mountain: 0°25'50.9"S, 100°19'11.0"E, ca. 1400 m asl., secondary forest, 25.viii.2020, individual code SEMUT8ix2020B, 1 worker, leg. S. H. Musfira, M. Rafi, & M. Gusti; Padang: Pauh: Limau Manis: Sarasah Uwak Waterfall: 0°54'47.7"S, 100°28'54.8"E, 6.ii 2021, ca. 380 m asl., individual code SEMUT1ii2021A, 1 worker, leg. R. Satria; Tanah Datar: X Koto: Koto Baru: Marapi Mountain: 1500–2000 m asl., 1 worker, leg. H.T. Sakdiah.

Remarks. *Discothyrea clavicornis* Emery, 1897 was recorded for the first time in Sumatra Island. This is also the first record of the genus *Discothyrea* in this island (Guénard et al. 2017). The worker of this species (Figure 1) is superficially similar to that of *Discothyrea diana* Xu, Burwell & Nakamura (2014), but it can be easily distinguished from the latter by the following characters: head in full-face view, posterior margin of head slightly and continuously convex medially (vs. weakly concave medially in the latter); antennae 9-segmented (vs. 7-segmented in the latter); propodeal declivity in lateral view more gradual (vs. abrupt in the latter); posterodorsal corner of propodeum rounded or forming a very blunt and obtuse angle much greater than 90° (vs. forming an acute angle equal to or smaller than 90°).

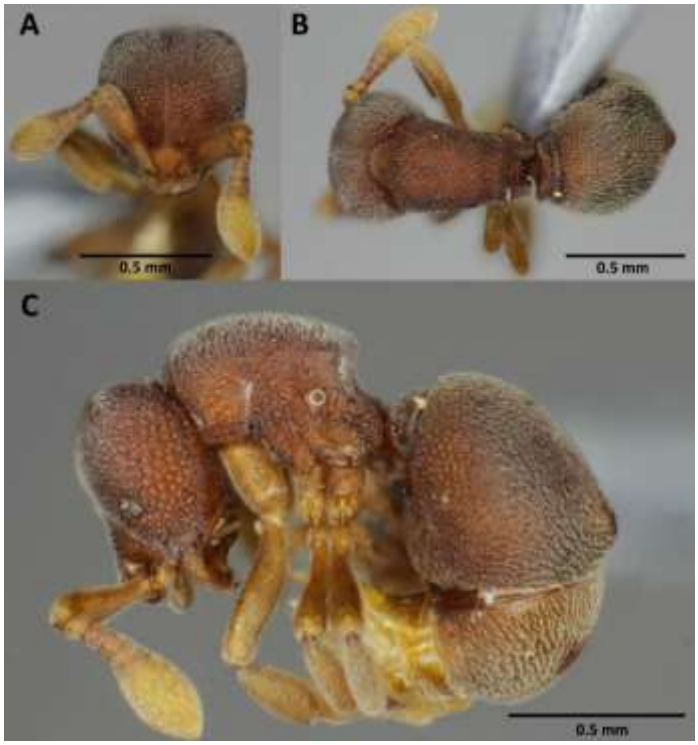

Figure 1. Worker of *Discothyrea clavicornis* Emery, 1897 (individual code: SEMUT1ii2021A): A — head in full-face view; B — body in dorsal view; C — body in dorsal view

In Sumatra *Discothyrea clavicornis* has been collected from both lowland (Sarasah Uwak water fall, ca. 380 m asl.) and highland (Tandikek and Marapi mountains, ca. 1400–2000 m asl.), and from forest environments with different degrees of human disturbance: disturbed forest surrounded by Durian plantation (Figure 2A) and along the hiking trails in relatively well-developed secondary forests (Figure 2B-D). Therefore, it is expected that by further intensive sampling more species of the ant genus *Discothyrea* will be found from various localities of Sumatra.

Figure 2. Appearance of the habitat where *Discothyrea clavicornis* have been collected: A — The disturbed forest of Sarasah Uwak water fall (Photo by Rijal Satria); B — the hiking trails of Mt. Tandikek (Photo by Mahesa Rafi); C — the hiking trails of Mt. Marapi (Photo by Halimah Tus Sakdiah); D — soil shifting along the hiking trails of Mt. Marapi (Photo by Halimah Tus Sakdiah)

Distribution. *Discothyrea clavicornis* is widely distributed in the Malay Archypelago, i.e., Sumatra (new record), Borneo, Sulawesi, and Papua, Philippines, New Guinea, Solomon Islands, and Australia **(**North Western Australia, Northern Territory, and Queensland) (Guénard et al. 2017). The previous record of this species in China by Liu et al. (2015) was confirmed misidentified as *Discothyrea diana* Xu, Burwell & Nakamura, 2014 (see details in Liu et al. 2020).

CONCLUSION

The ant genus *Discothyrea* Roger, 1863 was discovered for the first time on the island of Sumatra, with the species *Discothyrea clavicornis* Emery, 1897. This species was collected from the leaf-litter of the lowland and highland of W. Sumatra Province.

ACKNOWLEDGEMENTS

We wish to thank Mr. Rudi Yuliandri, Mr. Fingki Alvia Chandra, Mr. Aditya Willy Putra, Mr. Farel Gusdiansyah, Mr. Ferdian Saputra, Mr. Rusydan Alfata, Mr. Katon Agusdi and Mrs. Tassya Awike Dwi Putri for their help in field research. Special thanks to Mr. Muhammad Nasarrudin (Ranger of Mount Tandikek) and Mr. Robby Susilo (KSDA Resort Tanah Datar) for permission to enter Mount Tandikek, to Dr. Katsuyuki Eguchi (Tokyo Metropolitan University) and one anonymous reviewer for their valuable comments. Dwi Hilda Putri and Rijal Satria would like to express their deepest gratitude to Dr. Ramadhan Sumarmin (Universitas Negeri Padang) for his comments, supports, and helps during this study. Halimah Tus Sakdiah during her study in Marapi Mountain was supported by the Directorat General of Higher Education of Indonesia through Hibah Magister Fund for Andalas University 2019 under contract Number 051/SP2H/LT/DRPM/2019 (Team leader: Mairawita). We also thank Dr. Henny Herwina (Universitas Andalas), and Dr. Mairawita (Universitas Andalas) for their helps and supports during field works at Marapi Mountain. This research was mostly financed by PNBP Research Grants of Universitas Negeri Padang under contract No.169/UN.35/LT/2021 (Team Leader: Dwi Hilda Putri).

REFERENCES

AntWeb. 2022. AntWeb. https://www.antweb.org/ [5 February 2022].

Alvareza, M., Nugraha, F.A.D., Leilani, I. & Satria, R. 2020. Diversity of ground-foraging ants (Hymenoptera: Formicidae) in Bukit Kasang and Lubuk Bonta, Padang Pariaman District, West Sumatra. *Jurnal Biology Universitas Andalas* 8(2): 54–60.

Bharti, H., Akbar, S.A. & Singh, J. 2015. *Discothyrea periyarensis* sp. n., a new Proceratiine ant species (Hymenoptera: Formicidae: Proceratiinae) from India. *Caucasian Entomology Bulletin* 11:121–124.

Bolton, B. 1995. *A New General Catalogue of the Ants of The World*. Cambridge: Harvard University Press

Bolton, B. 2020. Online Catalogue of the Ants of the World. https://www.antwiki.org/wiki/Online_Catalogue_of_the_Ants_of_the_World [15 February 2020].

Brown, W.L.Jr. 1958. Contributions toward a reclassification of the Formicidae. II. Tribe Ectatommini (Hymenoptera). *Bulletin of the Museum of Comparative Zoology* 118: 173–362.

Chapman, J.W.; Capco, S. R. 1951. Check list of the ants (Hymenoptera: Formicidae) of Asia. *Monographs of the Institute of Science and Technology, Manila* 1:1-327

Eguchi, K., Bui, T.V. & Yamane, S. 2014. Generic synopsis of the Formicidae of Vietnam (Insecta: Hymenoptera), Part II - Cerapachyinae, Aenictinae, Dorylinae, Leptanillinae, Amblyoponinae, Ponerinae, Ectatomminae and Ponerinae. *Zootaxa* 3860: 1–46.

Emery, C. 1897. Formicidarum species novae vel minus cognitae in collectione Musaei Nationalis Hungarici quas in Nova-Guinea, colonia germanica, collegit L. *Biró. Természetr. Füz.* 20: 571–599.

Emery, C. 1911. Hymenoptera. Fam. Formicidae. Subfam. Ponerinae. *Genera Insectorum* 118: 1-125.

Fitri, R.Z., Putri, I.L.E., Nugraha, F.A.D. & Satria, R. 2021. Diversity of ants (Hymenoptera: Formicidae) in mangrove forest of Pariaman. Proceeding of The 4th International Conference on Mathematics, Science, Education and Technology (ICOMSET). *IOP Conference Series: Earth and Environmental Science* 1940: 012069.

Guénard, B., Weiser, M., Gomez, K., Narula, N. & Economo, E.P. 2017. The Global Ant Biodiversity Informatics (GABI) database: A synthesis of ant species geographic distributions. *Myrmecological News* 24: 83–89.

Herwina, H., Satria, R., Yaherwandi & Sakamaki, Y. 2018. Subterranean ant species diversity (Hymenoptera: Formicidae) in educational and biological research forest of Universitas Andalas, Indonesia. *Journal of Entomology and Zoology Studies* 6(1): 1720−1724.

Herwina, H., Sakamaki, Y., Satria, R. & Janra, M.N. 2020. Ground-dwelling ants species diversity (Hymenoptera: Formicidae) at conservation forest and oil-palm plantation in Sumatra, Indonesia. *Journal of Entomological Research* 44(1): 113–120.

Janicki, J., Narula, N., Ziegler, M., Guénard, B. & Economo, E.P. 2016. Visualizing and interacting with large-volume biodiversity data using client-server web-mapping applications: The design and implementation of antmaps.org. *Ecological Informatics* 32: 185–193.

Liu, C., Guenard, B., Hita Garcia, F., Yamane, S., Blanchard, B., Yang, D-R. & Economo, E. 2015. New records of ant species from Yunnan, China. *ZooKeys* 477: 17–78.

Liu, C., Fischer, G., Hita, Garcia, F., Yamane, S., Liu, Q., Peng, Y.Q., Economo, E.P., Guénard, B. & Pierce, N.E. 2020. Ants of the Hengduan Mountains: A new altitudinal survey and updated checklist for Yunnan Province highlight an understudied insect biodiversity hotspot. *ZooKeys* 978: 1–171.

Mann, W.M. 1919. The ants of the British Solomon Islands. *Bulletin of the Museum of Comparative Zoology* 63: 273-391.

Mohamed, M., David, M.C., Razali, N.A.B.M & Rajini, F.A. 2014. Inventory of insects groups in Gunung Ledang, Johor, Malaysia. *Serangga* 19(2): 1–29.

Musfira, S.H., Rafi, M., Gusti, M., Putri, D.H. & Satria, R. 2022. New data on the genus *Strumigenys* (Hymenoptera: Formicidae) from Sumatra. *Zoosystematica Rossica* 31(1): 74–86.

Mustafa, N.Z.A. 2018. Ants as indicator tools for tropical forest regeneration: A case study from Ulu Muda Forest Reserve. *Serangga* 23 (3): 84–97.

Nadiah, S., Hazmi, I.R. & Idris, A.B. 2016. Diversity of ants across growth stages and months in research field, FASSB P. P.P Tun Razak, Ulu Tekam, Pahang. *Serangga* 21(2): 33–24.

Okanti, J.R., Herwina, H. & Satria, R., 2021. Ant Diversity in campus Universitas Negeri Padang, Padang, West Sumatra. *IOP Conference Series: Earth and Environmental Science* 757: 012078.

Roger, J. 1863. Die neu aufgeführten gattungen und arten meines Formiciden-verzeichnisses nebst ergänzung einiger früher gegebenen beschreibungen. *Berliner entomologische Zeitschrift* 7: 131–214.

Sarnat, E. M. & Economo, E. P. 2012. The ants of Fiji. *University of California Publication in Entomology* 132: 1–398.

Satria, R., Kurushima, H., Herwina, H., Yamane, S. & Eguchi, K. 2015. The trap-jaw ant Genus *Odontomachus* Latreille from Sumatra, with a new species description. *Zootaxa* 4048: 1–36.

Satria, R., Viet, B.T. & Eguchi, K. 2017. New synonymy and redescription of *Anochetus mixtus* Radchenko, 1993, and distinction from the other members of the *Anochetus rugosus* group (Hymenoptera: Formicidae: Ponerinae). *Asian Myrmecology* 9(e009006): 1–16.

Satria, R., & Yamane, S. 2019. Two new species of the ant Genus *Myrmecina* (Hymenoptera: Formicidae: Myrmicinae) from Sumatra. *Zoosystematica Rossica* 28(1): 183–193.

Satria, R., & Herwina, H. 2020. New distribution record of ant's species (Hymenoptera: Formicidae) to the fauna of Sumatra island, Indonesia. *International Conference on Biology, Sciences, and Education* (ICoBioSE 2019) 10: 82–84.

Satria, R., & Jannatan, R. 2021. Dealate queens of the ant genus *Eurhopalothrix* Brown et Kempf, 1961 (Hymenoptera: Formicidae: Myrmicinae) from Sumatra. *Far Eastern Entomologist* 430: 11–16.

Smith, M.R. & Wing, M.W. 1955. Redescription of *Discothyrea testacea* Roger, a little-known North American ant, with notes on the genus (Hymenoptera: Formicidae). *Journal of the New York Entomological* Society 62: 105-112.

Stukalyuk, S., Akhmedov, A., Stelia, V., Shymanskyi, A. & Netsvetov, M. 2022. Nuptial flight in ants (Hymenoptera: Formicidae). *Serangga* 27(1): 152–179.

Xu, Z., Burwell, C.J. & Nakamura, A. 2014. Two new species of the Proceratiine ant genus *Discothyrea* Roger from Yunnan, China, with a key to the known Oriental species. *Asian Myrmecology* 6: 33–41.

Wheeler, W.M. 1935. Checklist of the ants of Oceania. *Bernice P Bishop Museum Occasional Papers.* 11(11): 3-56