

Scientific Note

New Records of *Syscia* Roger, 1861 (Hymenoptera: Formicidae: Dorylinae) in South AmericaItanna O. Fernandes^{1✉}, Jorge L. P. Souza^{1,2}

¹Instituto Nacional de Pesquisas da Amazônia – INPA. Coordenação em Biodiversidade. Coleção de Invertebrados. Av: André Araújo, 2936. Petrópolis. Manaus - AM. Brazil, 69067-375. ²Instituto Nacional da Mata Atlântica – INMA. Av. José Ruschi, Nº 4, Santa Teresa – ES. Brazil, 29650-000.

✉Corresponding author: itanna.fernandes@gmail.com

Edited by: Mabel Alvarado

Received: September 23, 2019. Accepted: November 11, 2019. Published: December 17, 2019.

Abstract. There are 11 genera of Dorylinae in the Neotropics, but *Syscia* Roger, 1861 is the only one with a discontinuous distribution between the Nearctic, Neotropical and Indomalayan regions. The present study reports a new record of *Syscia* in northern Brazil and confirms its distribution in South America, in accordance with previous reports. The *Syscia* specimens corresponds to an undescribed species and were collected along the margins of the Madeira River, in the National Forest of do Jamari, in the southwestern Brazilian Amazon.

Keywords: Amazon, ants, biomonitoring, *Neocerapachys*, taxonomy.

The genera members of *Syscia* Roger, 1861; *Neocerapachys* Borowiec, 2016 and *Cerapachys* Smith, 1857, were grouped into the single genus *Cerapachys* since the genus creation, although in 1972 Kempf synonymized *Syscia* under *Cerapachys*. The status of the genus *Cerapachys* was questioned and modified by Brady et al. (2014: phylogeny) and Borowiec (2016: genus review). Borowiec (2016) concluded that the species recorded in the Nearctic, Neotropical regions belonged to *Neocerapachys* and *Syscia*, making *Syscia* the only Dorylinae genus with a discontinuous distribution between the Nearctic, Neotropical and Indomalayan regions (except for *Ooceraea biroi* (Forel, 1907), which has non-native records in the West Indies). This is supported by molecular and taxonomic evidence that the Nearctic, Neotropical and Indomalayan species form a clade (Brady et al. 2014, Borowiec 2016).

The taxonomic situation has contributed to misunderstanding the distribution of some species; for a long time, the species belonging to *Syscia* were classified in *Cerapachys*, which today is only found in Indomalayan, and *Neocerapachys*, found in the Neotropics. In 1972 and 1978 W.W. Kempf recorded the species *S. tolteca* (Forel, 1909) in São Paulo (Brazil) and later, Silva & Silvestre (2000, 2004) and Ulyssea et al. (2011) recorded the same species in Santa Catarina (Brazil). In 2016, Souza et al. recorded the species *S. augustae* (Wheeler, 1902) and *N. splendens* (Borgmeier, 1957) (both species formerly belonged to *Cerapachys*) to Rondônia state (Brazil). After the generic revision done by Borowiec (2016), the presence of *S. augustae* was also confirmed in South America, in Rondônia state (Fernandes & Souza 2018). All those records were not considered by Borowiec (2016) in the recent revision, which emphasized the distribution of *Syscia* as present or likely present up to Antioquia (Colombia), although literature existed to confirm the distribution in other sites in South America.

Currently, five species are known to *Syscia*: *S. augustae* (USA and Mexico), *S. honduriana* (Mann, 1922) (Belize and Honduras), *S. humicola* (Ogata, 1983) (South Korea and Japan), *S. tolteca* (Forel, 1909) (Mexico to Colombia), and *S. typhla* (Roger, 1861) (Indomalayan). However, according to Borowiec (2016) and Longino (personal communication, September 14, 2017) at least fifteen additional morphospecies are present in collections from the Old World and more than 30 undescribed species are present in the New World. The only

recognized species on the continent is *S. tolteca*, recorded in Colombia (Vergara-Navarro & Serna 2013).

Although the distribution of *Neocerapachys* overlaps with that of *Syscia*, the former can be easily differentiated from *Syscia* by the presence of antennae with 12 segments, a pronotomesopleural suture either completely or partially fused, an abdominal tergite IV that does not fold over the sternite, and the anterior portions of the sternite and tergite being equally visible (Fig. 1), whereas in *Syscia*, the antennal segments are composed of 9–11 segments, the pronotomesopleural suture is present as a deep cut in the cuticle, the abdominal tergite IV folds over the sternite, and the anterior portion of the sternite conceals the tergite (Fig. 2).

The present study reports a new record of *Syscia* in northern Brazil and also confirms, following previous reports, its distribution in South America.

Syscia specimens were collected during a long-term monitoring program in the areas influenced by the Santo Antônio Hydroelectric Power Plant along the margins of the Madeira River, Rondônia state. The sites cover approximately 100 km of latitudinal gradient in the Brazilian Amazon Basin (Fernandes & Souza 2018). The sampling of ground-dwelling ants was based on the ALL (Ants of the Leaf Litter) protocol, which is globally standardized for inventories of ant fauna in litter (Bestelmeyer et al. 2000). We also obtained one specimen collected by direct sampling in the National Forest of Jamari (Flona Jamari), 190 km away from Porto Velho (Rondônia state). To identify the specimens we used an available taxonomic key (Borowiec 2016) and compared the *Syscia* individuals with specimens in collections previously identified by experts. Voucher specimens were deposited in the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia (INPA).

A total of four individuals of *Syscia* have now been documented in South America, in the Brazilian state of Rondônia. The material examined was labeled: BRAZIL, Rondônia, Módulo de Búfalos, Km 4, subparcela 250, 04.ix.2011, I. O. Fernandes leg., (1 worker); BRAZIL, Rondônia, Módulo de Pedras, Km 4, subparcela 50, 13.xi.2014, I. O. Fernandes leg., (1 worker); BRAZIL, Rondônia, Módulo de Teotônio, Km 2, subparcela 250, 23.xi.2014, I. O. Fernandes leg., (1 worker); BRAZIL, Rondônia, Floresta Nacional do Jamari, Mina 14 de Abril, 05.i.2018,

Floresta Madura 48°07'31" 89°99'89.9", D.C. Castro leg., Fernandes I.O. det. 2018 (1 worker) (Fig. 2). All the individuals recorded in the present study belonged to the same undescribed species, closely related to the *Syscia augustae* group, which possesses numerous undescribed species (Longino & Borowiec personal communications, September 14, 2017).

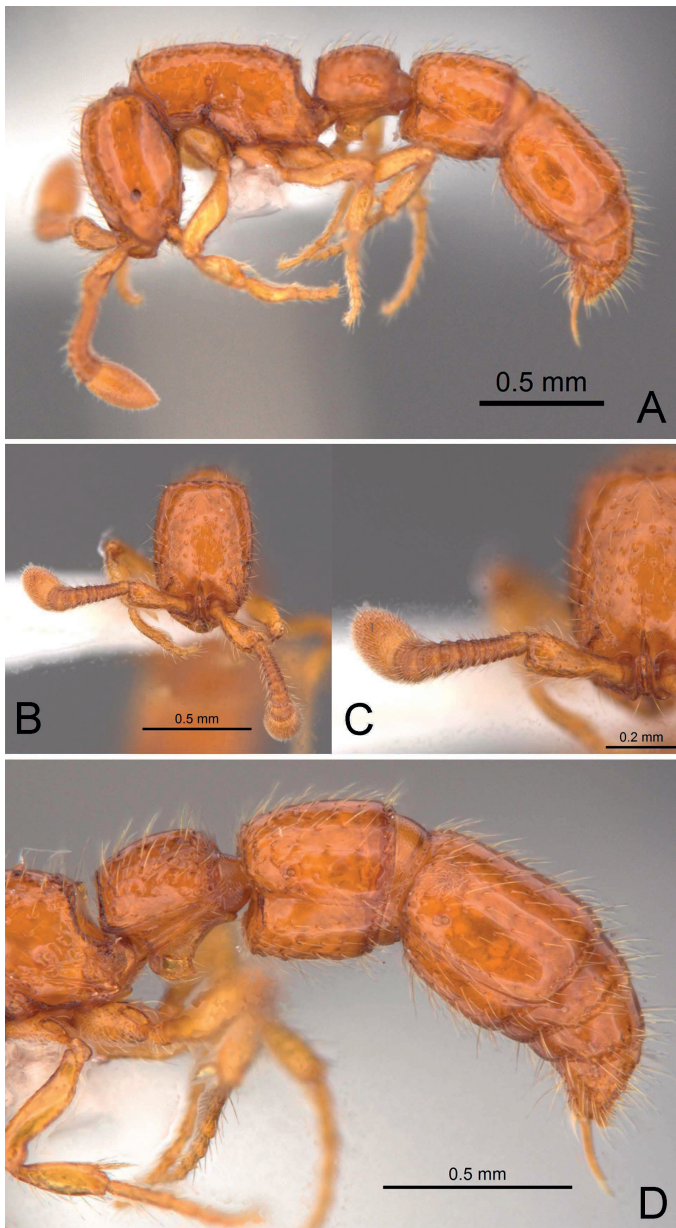


Figure 1. *Neocerapachys splendens*: Lateral view (A); Head front view (B); Antennae front view (C); Petiole, postpetiole and gaster in lateral view (D).

This is the first study, to the best of our knowledge, to reinforce and confirm the *Syscia* distribution in South America after the Borowiec (2016) generic revision.

The area where the workers were sampled is part of a conservation and monitoring project; at the time the ants were collected, the water level of the Madeira River had risen 19 m above the maximum limit for the first time in four years of monitoring. In the Amazon, the level of the water table is correlated with changes in the abundance, richness, and composition of ground-dwelling ants (Baccaro et al. 2013). Due to the rise in the water level of the river, the groundwater level also rose, perhaps forcing normally subterranean or cryptic species to the surface (Fernandes et al. 2015, Fernandes & Souza 2018). Following the risen of the river water, no additional specimens of *Syscia* were encountered in the same sites.

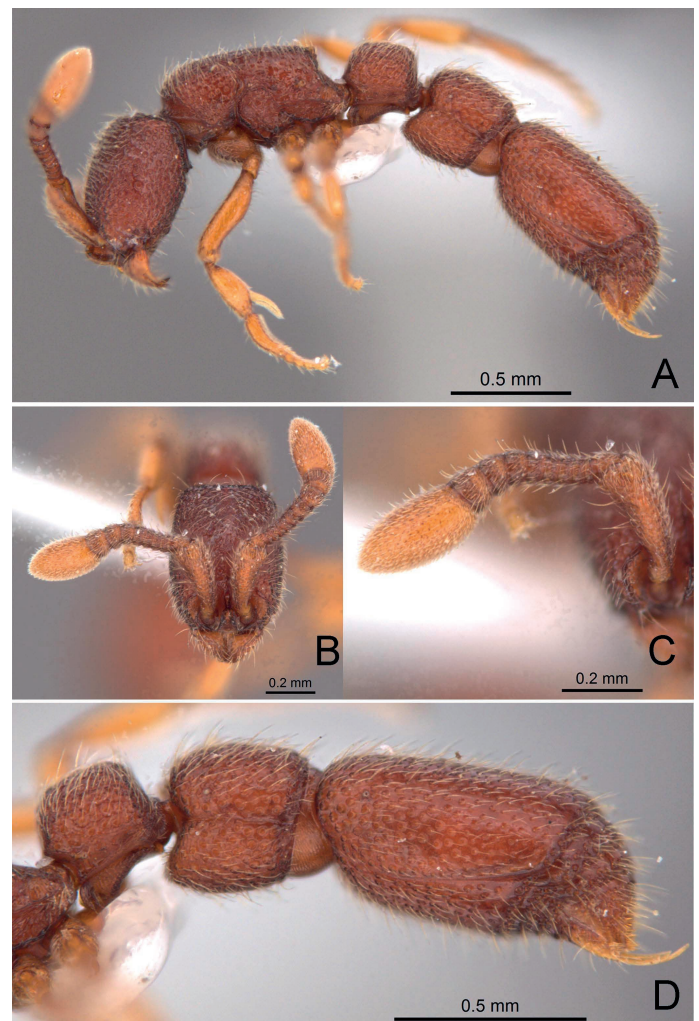


Figure 2. *Syscia* specimen: Lateral view (A); Head front view (B); Antennae front view (C); Petiole, postpetiole and gaster in lateral view (D).

Acknowledgments

Thanks are due to Invertebrate Collection of INPA for allowing the use of the photographic equipment (M 205A) used in this work and also for providing the facilities for the sorting and identification of the species, and to Maria Aurea Pereira Silveira for providing the ants from Flona do Jamari (Brascan Recuperação Ambiental). Thanks to John Longino for confirming the genus identification for this study. The concessionaires responsible for building and operating the Santo Antônio Hydroelectric Plant, SAE and Probiota Consultoria Ambiental, provided financial and logistical support. J.L.P.S. was supported by the CNPq and FAPEAM post-doctoral scholarship. I.O.F. was supported by the CNPq and CAPES doctoral and PNPd-CAPES scholarship. I.O.F. is also thankful to Paulo V. Cruz for the help with the figures edition.

References

- Baccaro, F. B.; Rocha, I. F.; Aguila, E. G.; Schiatti, J.; Emilio, T.; Pinto, J. L. P. V.; Lima, A. P.; Magnusson, W. E. (2013). Changes in ant functional groups are correlated with water-table level in an Amazonian terra firme forest. *Biotropica*, 45: 755-763. doi: [10.1111/btp.12055](https://doi.org/10.1111/btp.12055)
- Bestelmeyer, B. T.; Agosti, D.; Alonso, L. E.; Brandão, C. R. F. R.; Brown, W. Jr., Delabie, J. H. C.; Silvestre, R. (2000). Field techniques for the study of ground-living ants: an overview, description, and evaluation. In: Agosti, D.; Majer, J.; Alonso, E.; Schultz, T. R. (Eds.). *Ants, Standard Methods for Measuring and Monitoring Biodiversity*, p. 122-144. Washington, DC: Smithsonian Institution.
- Borgmeier, T. (1957). Myrmecologische Studien, I. *Anais da Academia Brasileira de Ciências*, 29:103-128.
- Borowiec, M. L. (2016). Generic revision of the ant subfamily

- Dorylinae (Hymenoptera: Formicidae). *ZooKeys*, 608: 1-280. doi: [10.3897/zookeys.608.9427](https://doi.org/10.3897/zookeys.608.9427)
- Brady, S. G.; Fisher, B. L.; Schultz, T. R.; Ward, P. S. (2014). The rise of army ants and their relatives: diversification of specialized predatory doryline ants. *BMC Evolutionary Biology*, 14: 93. doi: [10.1186/1471-2148-14-93](https://doi.org/10.1186/1471-2148-14-93)
- Fernandes, I. O.; Souza, J. L. P.; Fernández, F.; Delabie, J. H. C.; Schultz, T. R. (2015). A new species of *Simopelta* (Hymenoptera: Formicidae: Ponerinae) from Brazil and Costa Rica. *Zootaxa*, 3956 (2): 295-300. doi: [10.11646/zootaxa.3956.2.10](https://doi.org/10.11646/zootaxa.3956.2.10)
- Fernandes, I. O.; Souza, J. L. P. (2018). Dataset of long-term monitoring of ground-dwelling ants (Hymenoptera: Formicidae) in the influence areas of a hydroelectric power plant on the Madeira River in the Amazon Basin. *Biodiversity Data Journal*, 6: e24375. doi: [10.3897/BDJ.6.e24375](https://doi.org/10.3897/BDJ.6.e24375)
- Forel, A. (1909). Ameisen aus Guatemala usw., Paraguay und Argentinien (Hym.). *Deutsche Entomologische Zeitschrift*, 1909: 239-269.
- Kempf, W. W. (1972). Catálogo abreviado das formigas da região Neotropical (Hym. Formicidae) *Studia Entomologica*, 15: 1-4.
- Kempf, W. W. (1978). A preliminary zoogeographical analysis of a regional ant fauna in Latin America. *Studia Entomologica*, 20: 43-62.
- Mann, W. M. (1922). Ants from Honduras and Guatemala. *Proceedings of the United States National Museum*, 61: 1-54. doi: [10.5479/si.00963801.61-2434.1](https://doi.org/10.5479/si.00963801.61-2434.1)
- Ogata, K. (1983). The ant genus *Cerapachys* F. Smith of Japan, with description of a new species (Hymenoptera, Formicidae). *Esakia*, 20: 131-137.
- Roger, J. (1861). Die *Ponera*-artigen Ameisen (Schluss). *Berliner Entomologische Zeitschrift*, 5: 1-54.
- Silva, R. R.; Silvestre, R. (2000). Diversidade de formigas (Hymenoptera: Formicidae) em Seara, oeste de Santa Catarina. *Biotemas*, 13(2): 85-105. doi: [10.5007/%25x](https://doi.org/10.5007/%25x)
- Silva, R. R.; Silvestre, R. (2004). Riqueza da fauna de formigas (Hymenoptera: Formicidae) que habita as camadas superficiais do solo em Seara, Santa Catarina. *Papéis Avulsos de Zoologia*, 44(1): 1-11. doi: [10.1590/S0031-10492004000100001](https://doi.org/10.1590/S0031-10492004000100001)
- Smith, F. (1857). Catalogue of the hymenopterous insects collected at Sarawak, Borneo; Mount Ophir, Malacca; and at Singapore, by A. R. Wallace. [part]. *Journal of the Proceedings of the Linnean Society*, 2: 42-88.
- Souza, J. L. P.; Baccaro, F. B.; Landeiro, V. L.; Franklin, E.; Magnusson, W. E.; Pequeno, P. A. C. M.; Fernandes, I. O. (2016). Taxonomic sufficiency and indicator taxa reduce sampling costs and increase monitoring effectiveness for ants. *Diversity and Distributions*, 22: 111-122. doi: [10.1111/ddi.12371](https://doi.org/10.1111/ddi.12371)
- Ulyssea, M. A.; Cereto, C.E.; Rosumek, F. B.; Silva, R. R.; Lopes, B. C. (2011). Updated list of ant species (Hymenoptera, Formicidae) recorded in Santa Catarina State, southern Brazil, with a discussion of research advances and priorities. *Revista Brasileira de Entomologia*, 55(4): 603-611. doi: [10.1590/S0085-56262011000400018](https://doi.org/10.1590/S0085-56262011000400018)
- Vergara-Navarro, E. V.; Serna, F. (2013). A checklist of the ants (Hymenoptera: Formicidae) of the department of Antioquia, Colombia and new records for the country. *Agronomía Colombiana*, 31(3): 324-342.
- Wheeler, W. M. (1902). An American *Cerapachys*, with remarks on the affinities of the Cerapachyinae. *Biological Bulletin*, 3: 181-191. doi: [10.2307/1535872](https://doi.org/10.2307/1535872)