


Scientific Note

Merocoris (*Corynocoris*) *distinctus* Dallas, 1852 (Coreidae: Meropachyinae: Merocorini): first record for Costa Rica with a unique case of thanatosis

Andrey J. Peraza-Sánchez 

Universidad Estatal a Distancia (UNED), Alajuela, Costa Rica.

 Corresponding author: andrey.peraza@uned.cr

Edited by: Talita Roell 

Received: April 12, 2024. Accepted: June 07, 2024. Published: June 20, 2024.

Abstract. The first record of *Merocoris* (*Corynocoris*) *distinctus* Dallas, 1852 (Coreidae: Meropachyinae: Merocorini) for Costa Rica here presented, thereby expanding its geographical distribution. Additionally, a unique case of thanatological behavior in this bug is documented, providing a new contribution to its biological understanding.

Keywords: Coreoidea, geographical distribution, behavior, defense mechanism, thanatological behavior.

The insects of the family Coreidae Leach (Hemiptera: Heteroptera), commonly known as squash bugs or Leaf-Footed bugs, although these terms are not appropriate for all species within the family. The family has a cosmopolitan distribution and widely abundant in tropical areas. Species range in size from 6 to 45 mm. All species are known as phytophagous, nymphs and adults stages feed on seeds, stems, or leaves of associated host plants, although other common behaviors predominately feeding on stems and fruits (Baranowski & Slater 1986; Schaefer & Panizzi 2000).

The subfamily Meropachyinae Stål, 1867 is restricted to the American continent, constituting a relatively small but highly diverse group. They are distinguished by their hind legs, which bear a short spine at the apex of the tibiae, curved, and strongly incrassate femora, and widely separated coxae (Brailovsky 1999; Schaefer & Panizzi 2000). Three tribes comprise this subfamily: Meropachyini Stål, 1868, Spathophorini Kormilev, 1954, and Merocorini Stål, 1870. The latter can be identified by the small size of its species, triangular and short scutellum not exceeding the base of the claval commissure, a raised vertex resembling a small protuberance, and circular abdominal spiracles located almost in the anterior third of each sternite (Packauskas 1994).

The genus *Merocoris* Perty, 1833 is divided into two subgenera *Merocoris* and *Corynocoris* Mayr, 1866. The latter is characterized by having antennal tubercles armed with a robust spine, the anterolateral edges of the pronotum bearing two or more tubercles, and the scutellar disk lacking a pronounced elevation. Species included in this subgenus: *Merocoris curtatus* McAtee, 1919 (United States); *Merocoris distinctus* Dallas, 1852 (Canada, United States, Mexico, and Panama); and *Merocoris typhaeus* (Fabricius, 1798) (Cuba and United States) (Brailovsky & Barrera 2009; Packauskas 2010).

Merocoris distinctus differs from *M. typhaeus* in having an almost square head, not prolonged front of bases of antennal tubercles; unarmed interocular space; robust first antennal segment, constricted at the base and densely pubescent with thick bristle-shaped hairs; and from *M. curtatus* by possessing an elongated fourth antennal segment, subequal to or longer than the second and third segments combined with obtuse humeral angles (Brailovsky & Barrera 2009).

Examined material. New records. COSTA RICA. a) ALAJUELA, Guatuso, Cote, Puesto Quebradón. 30-IV-1997. Rodríguez Gladys. 300 m. (1 male). (MNCR). **b) Poás,** Sabana Redonda, calle el Tajo.

14-VI-2021. Peraza Andrey. 1,480 m (1 male). (MIUCR). **c) CARTAGO,** Turrialba, Tayutic, Grano de Oro, Chirripó. 30-08-1992. Campos Priscilla. 1,120 m (1 male, 1 female). (MNCR). **d) GUANACASTE,** La Cruz, Santa Elena, P.N. Santa Rosa, Estación Murciélago, 8 km S.W. de Cuajiniquil. 04-VII-1993. Cano Carolina y Quesada Freddy. 100 m. (1 male, 2 female). (MNCR). **e) La Cruz,** La Garita, Est Los Almendros. 16-IX-1994. Lopez Elba. 300 m (2 male, 1 female). (MNCR). **f) Liberia,** Mayorga, Parque Nal Guanacaste, Est Mengo, Lado SW Volcán Cacao. 14-III-1988. Espinoza Marcial y Sihezar Javier. 800-1000 m (2 male, 3 female). (MNCR). **g) Santa Cruz,** Refugio Bosque Diria. 26-X-2001. Cárdenas Yow. 160 m (1 female). (MNCR). **h) Guanacaste,** Sector Las Pailas, 4.5 km SW del Volcán Rincón de la Vieja. 14-IX-1992. Rodríguez Gladys. 800 m (1 female). (MNCR). **i) PUNTARENAS,** Coto Brus, Sabalito, Finca Cafrosa, 2 Km NW de Mellizas. 30-IV-1991. Mora Gerardo. Coto Brus. 1,200-1,300 m. (1 male). (MNCR).

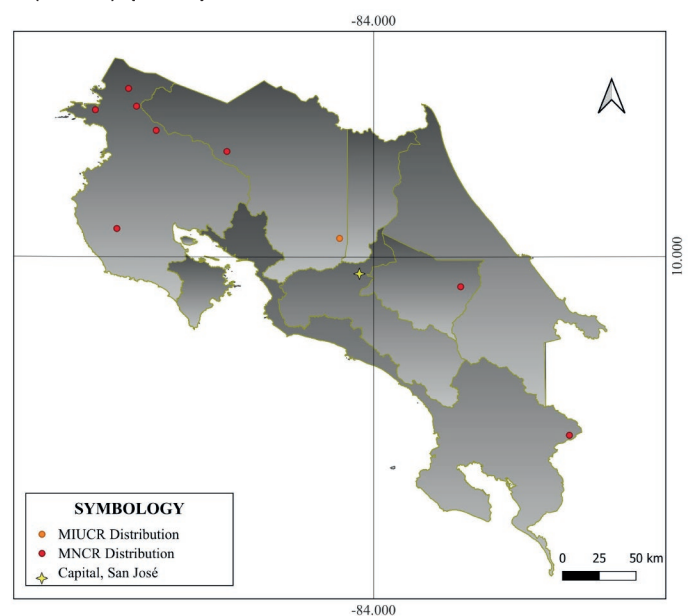


Figure 1. Geographic distribution in Costa Rica of *Merocoris* (*C.*) *distinctus* Dallas, 1852.

Many biological aspects within the subfamily are poorly understood (Baranowski & Slater 1986). Cervantes (1999) provides data on *Lycambes varicolor* Stål, 1862 (Meropachyinae: Spathophorini), feeding on *Lonchocarpus guatemalensis* Benth. and *Lonchocarpus cruentus* Lundell (Fabaceae). Venturing into the tribe, Blatchley (1926) cited *M. typhaeus* on *Persea* spp. (Lauraceae) and *Polygala lutea* L. (Polygalaceae), while *M. distinctus* feeds on the *P. nana*. Since initial report of Schaefer & Mitchell (1983) of *Polygala* spp. as a food source for *Merocoris*, no updated data had been reported.

Biological notes. Thanatosis (playing dead) is a state of immobility assumed by many animals in response to external stimuli and has been considered a defense mechanism against predators (Miyatake et al. 2004). According to Humphreys & Ruxton (2018) thanatosis has been described, however, often anecdotally in a wide range of taxa, with relatively few articles presenting accounts of the phenomenon.

The behavior observed in *M. distinctus* is quite remarkable. When disturbed, immediately drops down, assuming a ventral position and immobilizing entire body, arching the tibiae of three pairs of legs. Subsequently, once it feels the danger has passed, in an almost acrobatic manner, it uses its hind legs as levers to propel itself into a jump that returns it to its normal position (Fig. 2). Additionally, the dark brown dorsal coloration and whitish ventral coloration of its abdominal sternites seem to have a cryptic function, making it virtually imperceptible when blending into the environment or potentially mistaken for a dry log or bird guano, for example (Fig. 3).

The production of unpleasant odors from odoriferous glands is a defense mechanism utilized by most Heteroptera. Hepburn & Yonke (1971) in their study on the metathoracic odoriferous glands of the superfamily Coreoidea, demonstrate that *M. distinctus* possesses a relatively undeveloped gland compared to many other members of the family Coreidae. This includes the absence of the disc or auricle of the peritreme, very small ostioles, absence of the vestibular duct, and absence of the deflector muscle of the reservoir, which is also absent in the family Rhopalidae (odorless bugs). This suggests that the thanatological behavior evidenced here may be an adaptation to the underdevelopment of one of the structures responsible for defense against potential predators.

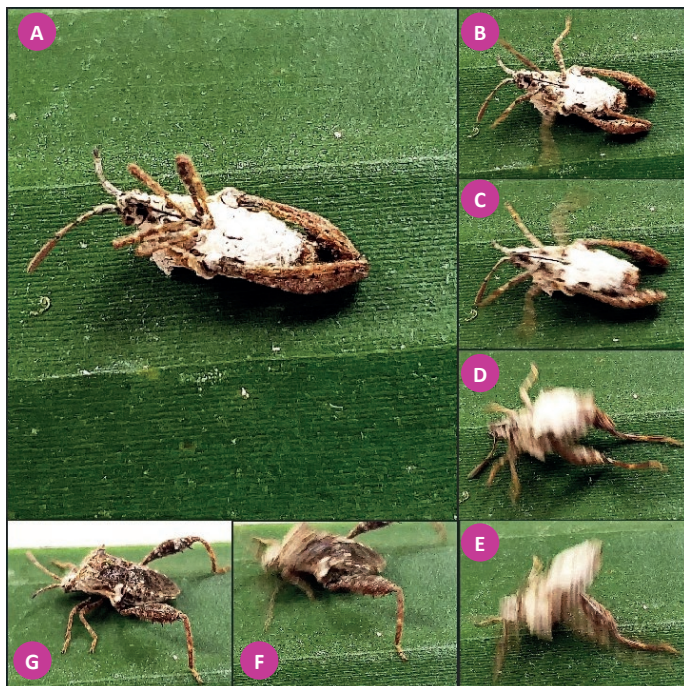


Figure 2. A-G Sequence of thanatological behavior in the bug *Merocoris (C.) distinctus*.

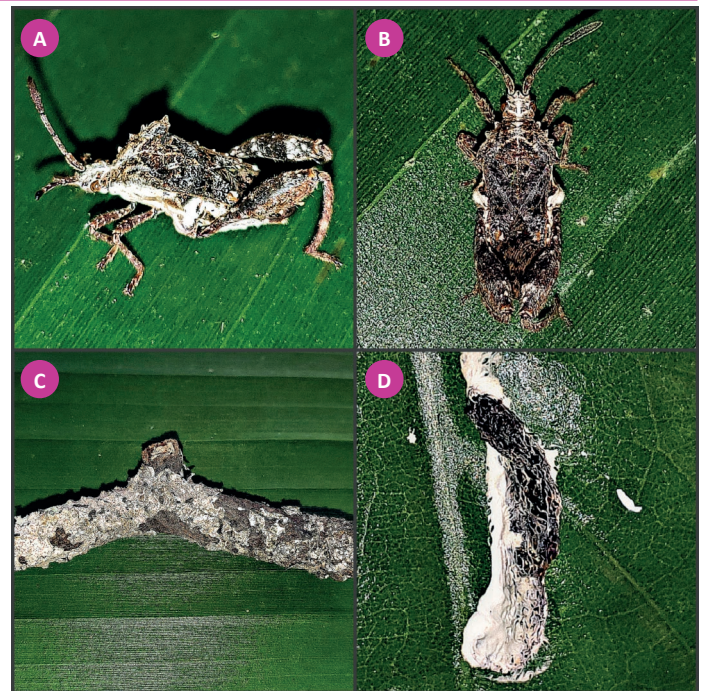


Figure 3. A) *Merocoris (C.) distinctus*: A) Lateral view, B) Dorsal view; C) Dry trunk covered with lichen; D) Bird guano.



Figure 4. A) Nymphal stage of *Merocoris (C.) distinctus* in lateral view; B) Host plant *Polygala* spp. (Polygalaceae). Photographs taken by © Isaac D. Arias Céspedes in Turruabares, San José, Costa Rica.

Acknowledgments

A heartfelt thank you to all the collectors of the material examined in this article. A special gratitude to Dr. Harry Brailovsky for his valuable comments on early draft which greatly enriched this contribution. To Gabriela Carmona, Maricelle Méndez, and Marianela Cambronero from the National Museum of Costa Rica (MNCR), as well as to Humberto Lezama from the Museum of Insects at the University of Costa Rica (MIUCR), for facilitating access to the materials and samples considered in this work. Finally, thanks to my friend and colleague Isaac D. Arias Céspedes for the in-situ photographs in figure 4.

Funding Information

No funding received.

Conflict of Interest Statement

No conflict of interest to be declared.

References

- Baranowski, R. M.; Slater, J. A. (1986) 12 *Arthropods of Florida and Neighboring Land Areas: Coreidae of Florida (Hemiptera: Heteroptera)*. 1st ed. Gainesville FL: Florida Department of Agriculture and Consumer Services.
- Blatchley, W. S. (1926) *Heteroptera, or true bugs of eastern North America, with especial reference to the faunas of Indiana and Florida*. Indianapolis: The Nature publishing company. <https://www.biodiversitylibrary.org/bibliography/6871>. Access on: 1.ii.2024.
- Brailovsky, H. (1999) The tribe Merophachydini with descriptions of five new genera, synonymical notes, and a key to the genera (Heteroptera: Coreidae: Meropachyinae). *Proceedings of the Entomological Society of Washington*, 101(3): 573-594.
- Brailovsky, H.; Barrera, E. (2009) New Species of *Merocoris* (Merocoris) Perty from Brazil, with Keys to Known Subgenera and Species of the Tribe Merocorini (Hemiptera: Heteroptera: Coreidae: Meropachyinae). *Florida Entomologist*, 92(1): 134-138. doi: [10.1653/024.092.0120](https://doi.org/10.1653/024.092.0120)
- Cervantes, L. (1999) Description of the Immature Stage, Adult Morphology and Biology of *Pantochlora vivida* Stal (Heteroptera: Pentatomidae: Edessinae). *Journal of the New York Entomological Society*, 107: 372-285.
- Hepburn, H. R.; Yonke, T. R. (1971) The Metathoracic Scent Glands of Coreoid Heteroptera. *Journal of the Kansas Entomological Society*, 44: 187-210.
- Humphreys, R. K.; Ruxton, G. D. (2018) A review of thanatosis (death feigning) as an anti-predator behaviour. *Behavioral Ecology and Sociobiology*, 72(2). doi: [10.1007/s00265-017-2436-8](https://doi.org/10.1007/s00265-017-2436-8)
- Miyatake, T., Katayama, K., Takeda, Y., Nakashima, A., Sugita, A.; Mizumoto, M. (2004) Is death-feigning adaptive? Heritable variation in fitness difference of death-feigning behaviour. *Proceedings of the Royal Society of London. Series B: Biological Sciences*, 271(1554): 2293-2296. doi: [10.1098/rspb.2004.2858](https://doi.org/10.1098/rspb.2004.2858)
- Packauskas, R. J. (1994) Key to the Subfamilies and Tribes of the New World Coreidae (Hemiptera), with a checklist of Published Keys to Genera and Species. *Proceedings of the Entomological Society of Washington*, 96(1): 44-53.
- Packauskas, R. J. (2010) *Catalog of the Coreidae, or Leaf-Footed Bugs, of the New World*. Fort Hays Studies Series, 269.
- Panizzi, A. R.; Grazia, J. (2015) *True Bugs (Heteroptera) of the Neotropics*. Dordrecht: Springer Netherlands. doi: [10.1007/978-94-017-9861-7](https://doi.org/10.1007/978-94-017-9861-7)
- Schaefer, C. W.; Mitchell, P. L. (1983) Food Plants of the Coreoidea (Hemiptera: Heteroptera). *Annals of the Entomological Society of America*, 76(4): 591-615. doi: [10.1093/aesa/76.4.591](https://doi.org/10.1093/aesa/76.4.591)
- Schaefer, C. W.; Panizzi, A. R. (2000) *Heteroptera of economic importance*. CRC Press LLC.