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A Dense Daytime Aggregation of Solitary Bees (Hymenoptera: Apidae: Centridini) in the Lesser Antilles

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Abstract.—A dense daytime aggregation of thousands of bees was present on at least six successive days on a large *Caesalpinia bonduc* (Caesalpinaceae) shrub on the island of Anguilla, Lesser Antilles. A sample consisted of both sexes of *Centris* (*Centris*) *decolorata*, *C.* (*C.*) *smithii* and *C.* (*Hemisiella*) *lanipes*, with the bulk of individuals being males of *C. decolorata*. The unusual features of the aggregation were its persistence during daylight hours, the presence of multiple species, and the presence of females. The three species are new records for Anguilla.

Key words.—Anguilla, Apoidea, bees, *Centris*, Lesser Antilles

Many solitary wasps and bees are known to form more or less dense clusters of individual during daily inactive periods (Evans and Linsley 1960; Linsley 1962; O'Neill 2001:293–296; Azevedo and Faria 2007; Alves-dos-Santos et al. 2009). Commonly known as “sleeping aggregations”, this phenomenon is so widespread that some authors (e.g. Gess 1966:63) make a point of noting species in which it is not observed. As a rule, aggregations each comprise a single species and sex, usually males, with some known exceptions (e.g. Evans 1966:429–431). Daytime aggregations during clement weather are almost unknown; in the one reported instance of which we are aware, Starr and Hernández (1995) reported a sunny-afternoon aggregation of male *Pepsis sericans* Lep. (Pompilidae) in Cuba. Evans and Linsley (1962) reviewed three possible explanations for wasp and bee aggregations given by Rayment (1935), Grassé (1942) and themselves: a) as a preliminary stage in the evolution of social habits, b) increased temperature through dense clustering, and c) improved vigilance against predators. Alcock (1998) suggested that in

Idiomelissodes duplocincta (Cockerell, 1905) (Apidae: Eucerini) aggregation could provide d) anti-predator benefits through a dilution effect.

Members of the genus *Centris* Fabricius, 1804 are solitary bees, well distributed in the northern Neotropics, including the West Indies (Snelling 1984; Moure et al. 2007; Genaro and Franz 2008). Nighttime aggregation of males are known for *C. adani* Cockerell, 1949, *C. fuscata* Lepeletier, 1841 (Frankie et al. 1980; Azevedo and Faria 2007) and *C. decolata* Lepeletier, 1841 (Alves-dos-Santos et al. 2009). Relationships between several species of *Centris* and plants of the genus *Caesalpinia* (Caesalpinaceae) have been reported. *Centris* spp. have been observed collecting nectar on *Caesalpinia* spp. (Vinson et al. 1996; Aguiar et al. 2003), and studies of nest resources have shown the presence of pollen from *Caesalpinia* spp. (Quiroz-García et al. 2001).

We describe here an especially large aggregation of *Centris* and report for the first time the presence of three species in Anguilla, Lesser Antilles.

All field observations (by CKS) are from 22–27 August 2006 (mid-rainy season) at

Windward Point on the island of Anguilla. Windward Point is a low, open area with a limestone substrate and sparse, cactus-dominated vegetation. Specimens collected in Anguilla 2006 and identified as *C. (C.) smithii* Cresson, 1879, *C. (C.) decolorata* Lepeletier, 1841 and *C. (H.) lanipes* (Fabricius, 1775) will serve as vouchers. These are at present deposited in the Land Arthropod Collection of the University of the West Indies (Trinidad & Tobago) and in the Bee Collection of the Pontificia Universidad Católica de Valparaíso (Chile).

During mid- to late-morning on each of six consecutive days, an extremely large, dense aggregation of *Centris* bees was observed in the crown of a dense blooming shrub of *Caesalpinia bonduc* (L.) Robx. (Caesalpinaceae), a common plant in dry environments near the beach. The shrub was about 1.5–1.8 m tall and covered an area of roughly 5 m². The bees were mostly a very few centimeters inside the outer layer of the shrub. While undisturbed, they moved very little, with almost no flying into or out of the aggregation. Shaking the shrub produced a furious swarming out and around the shrub for a few minutes, followed by a return to the aggregation.

Because the bees were mostly hidden in the shrub, we can only estimate the number of individuals at several thousands. A sample from the aggregation showed that most individuals (93%) were males of *C. decolorata*, with minor fractions of female *C. decolorata*, and *C. smithii* and *C. lanipes* of both sexes (Table 1).

Three features make this an unusual aggregation: a) it was present in the daytime, b) it comprised multiple species, and c) females were present among the males. Of the four suggested explanations for aculeate aggregations noted above, (a) can be rejected out of hand, and (b) makes little sense in the climate of Anguilla. The late morning is a relatively inactive time of day for many bees, so that it might have been a true resting aggregation. Under

Table 1. Composition of a sample from a dense aggregation of solitary bees on a *Caesalpinia bonduc* bush on Anguilla, Lesser Antilles.

	Males	Females	Total
<i>Centris decolorata</i>	241	5	246
<i>Centris smithii</i>	4	7	11
<i>Centris lanipes</i>	1	1	2
Total	246	13	259

these circumstances, it is plausible that aggregation served a defensive function through (c) improved vigilance and/or (d) dilution. The swarm-flying response of the bees to disturbance is consistent with this hypothesis. The present observations were made incidental to quite a different study restricted to morning hours (about 09:00–12:00), so we do not know whether the same site served as a roost at other times of the day or night.

We have found no report of any *Centris* species from the island of Anguilla. All three species are evidently new records.

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LITERATURE CITED

- Aguiar, C. M. L., F. C. V. Zanella, C. F. Martins, and C. A. L. de Carvalho. 2003. Plantas visitadas por *Centris* spp. (Hymenoptera: Apidae) na Caatinga para obtenção de recursos florais. *Neotropical Entomology* 32: 247–259.
- Alcock, J. 1998. Sleeping aggregations of the bee *Idiomelissodes duplocincta* (Cockerell) (Hymenoptera: Anthophorini) and their possible function. *Journal of the Kansas Entomological Society* 71: 74–84.
- Alves-dos-Santos, I., M. C. Gaglianone, S. R. C. Naxara, and M. S. Engel. 2009. Male sleeping aggregations of solitary oil-collecting bees in Brazil (Centridini, Tapinotaspidini, and Tetrapedini; Hymenoptera: Apidae). *Genetics and Molecular Research* 8: 515–524.
- Azevedo, A. A. and L. R. R. Faria. 2007. Nests of *Phacellodomus rufifrons* (Wied, 1821) (Aves: Fur-

- nariidae) as sleeping shelter for a solitary bee species (Apidae: Centridini) in southeastern Brazil. *Lundiana* 8: 53–55.
- Evans, H. E. 1966. *The Comparative Ethology and Evolution of the Sand Wasps*. Cambridge: Harvard University Press, 526 pp.
- and E. G. Linsley. 1960. Notes on the sleeping aggregation of solitary bees and wasps. *Bulletin of the Southern California Academy of Sciences* 59: 30–37.
- Frankie, G. W., S. B. Vinson, and R. E. Coville. 1980. Territorial behavior of *Centris adani* and its reproductive function in the Costa Rican dry forest (Hymenoptera: Anthophoridae). *Journal of the Kansas Entomological Society* 53: 837–857.
- Genaro, J. A. and N. M. Franz. 2008. The bees of Greater Puerto Rico (Hymenoptera: Apoidea: Anthophila). *Insecta Mundi* 40: 1–24.
- Gess, S. K. 1996. *The Pollen Wasps*. Cambridge: Harvard University Press, 340 pp.
- Grassé, P.-P. 1942. Les rassemblements de sommeil des Hyménoptères et leur interprétation. *Bulletin de la Société Entomologique de France* 47: 142–148.
- Linsley, E. G. 1962. Sleeping aggregations of solitary Hymenoptera – II. *Annals of the Entomological Society of America* 55: 148–164.
- Moure, J. S., G. A. R. Melo, and F. Vivallo. 2008. Centridini Cockerell & Cockerell, 1901. In Moure, J. S., D. Urban, and G. A. R. Melo, eds. *Catalogue of Bees (Hymenoptera, Apoidea) in the Neotropical Region*. <http://www.moure.cria.org.br/catalogue>. Accessed 10 May 2009.
- O'Neill, K. M. 2001. *Solitary Wasps*. Ithaca: Cornell University Press, 406 pp.
- Quiroz-García, D. L., E. Martínez-Hernández, R. Palacios-Chávez, and N. E. Galindo-Miranda. 2001. Nest provisions and pollen foraging in three species of solitary bees (Hymenoptera: Apidae) from Jalisco, Mexico. *Journal of the Kansas Entomological Society* 74: 61–69.
- Rayment, T. 1935. *A Cluster of Bees*. Endeavour, Sydney 752 pp.
- Snelling, R. R. 1984. Studies on the taxonomy and distribution of American centridine bees (Hymenoptera: Anthophoridae). *Contributions in Science* (Los Angeles) 347: 1–69.
- Starr, C. K. and L. R. Hernández. 1995. A daytime resting aggregation of male *Pepsis sericans* (Pompilidae). *Sphecos* 29: 12–13.
- Vinson, S. B., G. W. Frankie, and H. J. Williams. 1996. Chemical ecology of bees of the genus *Centris* (Hymenoptera, Apidae). *Florida Entomologist* 79: 109–129.