

Nesting and Male Behavior in *Dynatus nigripes spinolae* (Lepeletier)

(Hymenoptera, Sphecidae)

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Dynatus nigripes spinolae (Lepeletier) is a very large impressive looking wasp in the family Sphecidae. It is quite rare in collections and until recently almost nothing was known of its biology. Males are readily distinguished from females by their oddly clubbed hind-femora and strongly produced nasiform clypeus.

Individuals were first observed flying about one portion of Snyder-Molino trail on Barro Colorado Island in the Canal Zone in Panama. Further examination showed that all activity was centered around a small dead tree (Fig. 3) on the right side of the trail in a section of secondary forest dominated by *Oenocarpus* palm. All of this activity was observed between September 12, 1977 and September 17, 1977. The previous year this same species of wasp was seen near the same tree during the same season but no further observations were made.

On the first day a female was seen working mud into a hole in the tree and removing material from inside the hole as well (Fig. 3a). She worked it into a ball with her mandibles and tossed it into the air with a flip of her head as far as half a meter away from the tree. Observations made the previous year showed that this same hole had been used by nesting *Centris vittata* Lepeletier (Anthophoridae) in July, though it had been considerably enlarged since then.

Two days later the hole was completely sealed and two *Dynatus* were observed mating on a lower part of the tree. The male sitting on top of the female grasped her around the prothorax with his mandibles (the strongly produced clypeus probably aids in this as well) curling the tip of his abdomen beneath hers (Fig. 4). The male remained on top of the female for five minutes with actual copulation occurring several times, each lasting about one minute. The female finally began moving restlessly and flew away. The male flew around the tree and then landed on the spot where the mating had occurred, about 15cm above the ground. This was next to two holes, one sealed and the other open (Figs. 3e, f). The male remained within 5-10cm of these holes for most of the rest of the day. A female landed on the tree and began inspecting holes, when she got near the male jumped at her and she flew away.

The next day observations were made for most of the day. The male was still sitting by the holes, though he flew at and around any large object approaching the tree. Another male landed on the tree and

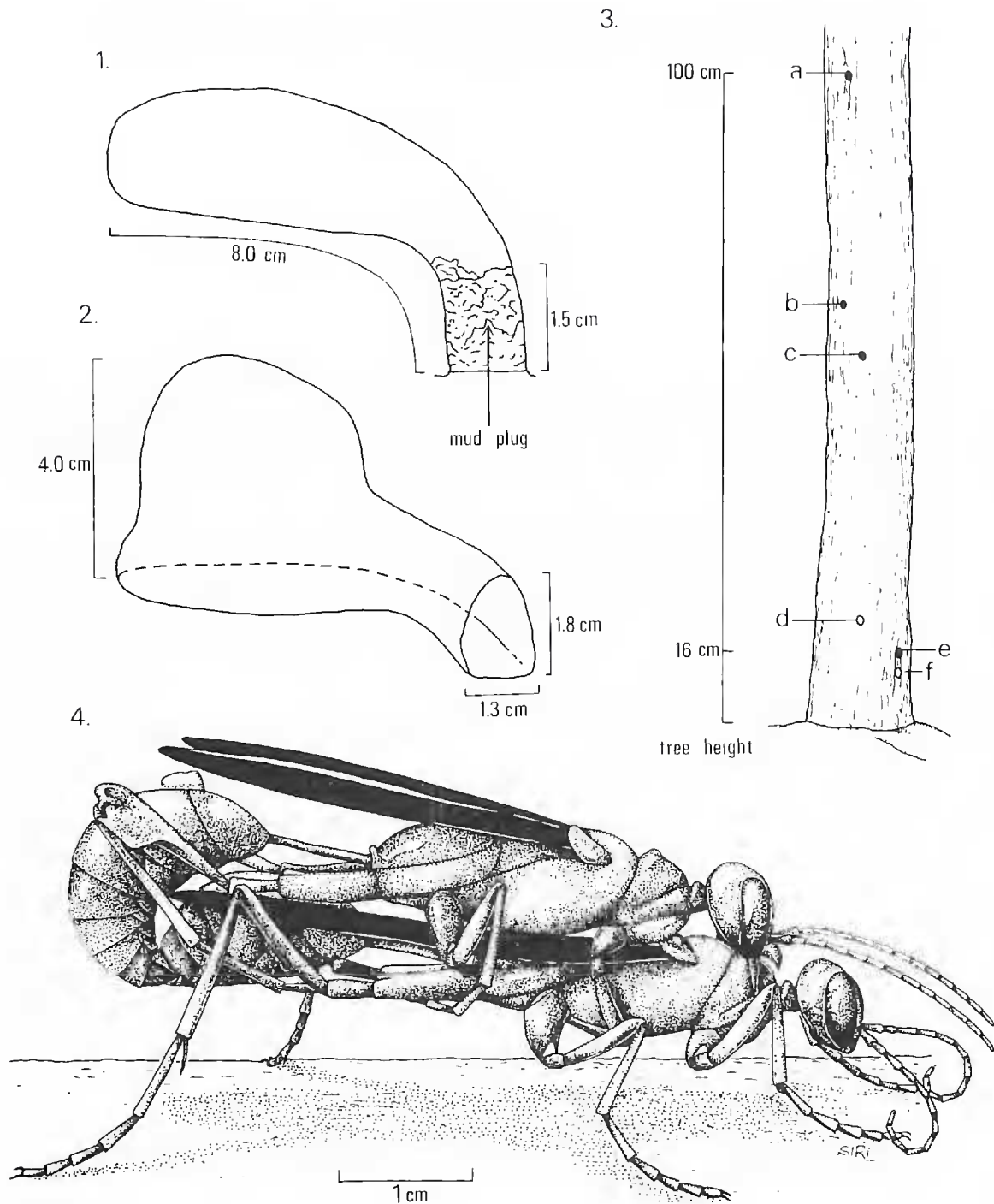


Fig. 1-2. Diagrams of *Dynatus* nest (a). 1, dorsal view. 2. lateral view. Fig. 3. Diagram of tree showing nest locations, *Dynatus* nests (a, e, f), nests of *Centris vittata* Lep. (b, c), nest of *Centris labrosa* Friese (d). Fig. 4. Mating position of *Dynatus nigripes spinolae* (Lep.).

walked down the trunk until it saw the resident male and then it flew away.

A female was observed entering the open hole (Fig. 3f) carrying cockroach nymphs three times this day. She landed on the tree within 10cm of the open hole, walked down to it, entered it, dropped off the cockroach and left. The nymphs were held with the dorsum along the wasp's venter, their legs hanging down, grasped in the female's

mandibles by the base of their antennae. Each time the female approached the nest carrying a cockroach and the male was present he climbed on her back and attempted to mate with her. She brushed him off as she entered the nest but when she left it he again climbed on her back and they mated. Then she flew off and he remained by the nest. The female apparently spends no time at the nest aside from initial preparation, provisioning and closure.

A strange male approached the resident male, as it was sitting by the nest and the resident attacked it. They rolled off the tree grappling and buzzing into some leaves below but the strange male soon broke away and flew off. The resident male then returned to the nest, proceeded to groom and then wandered around the tree trunk investigating every movement, although curiously it never seemed aware of a *Centris labrosa* Friese nesting nearby in the tree (Fig. 3d).

The first sealed nest found (Fig. 3a) was opened to determine how many cells it contained and other data. Each nest, at least at this site, consisted of one cell (Fig. 1, 2). It contained 15 nymphal cockroaches ranging in size from 12 to 40 mm and weighing an average of 0.55g, giving a total of 8.2g of prey per egg. Two species of cockroaches were used, probably: 2 *Eublaberus distanti* Kirby and 13 *Archimandrita tessellata* Rehn (Blaberidae). Unfortunately the egg was never found. The cockroaches appeared to be unparalyzed and could move about freely in the cell except that they were packed in too tightly. The nest was never closed until finished so it is unclear what keeps the cockroaches in the nest. When the provisioning was completed, the female plugged the entrance tunnel with 1.5 to 2.0cm of mud of about the same color and texture as that on the adjacent trail. Apparently all the female does to initially prepare the nest is to enlarge it, no other modifications are made and mud is only used to plug the entrance. It takes her between three and four days to complete the nest.

The tree in which these nests were built had been dead for more than three years. Many animals were nesting in it aside from *Dynatus* including a large colony of *Nasutotermes* termites, an eumenid wasp and two species of *Centris*: *C. labrosa* Friese and *C. vittata* Lepeletier. Despite this the wood was still incredibly hard. The tree itself was 17cm in diameter and 3m tall.

Another interesting aspect noted was that this species excretes large amounts of water. This is not ordinarily reported in literature about sphecoid wasps but it is commonly seen in some bees. This could be due to the large size of these wasps which makes it more obvious. The male did leave the nest several times a day for half an hour or more, probably to visit nectar producing flowers. A. S. Menke collected individuals at the flowers of a specific shrub in Venezuela (Bohart and Menke, 1976).

Conclusion

The behavior of male *Dynatus nigripes spinolae* is much like the behavior of some *Trypoxylon* (Rau, 1928) and *Oxybelus* (Bohart and Marsh, 1960) males where the male remains at the nest while the female is out foraging. The male remains at the nest for as long as it takes for the female to complete it, except for occasional feeding excursions. The result is that the male mates repeatedly with a single female until the nest is completed, usually three to four days. If that female builds another nest nearby the male will stay with her. If she leaves to build a nest elsewhere the male will remain at the old nest for a few hours and then leave to look for another female.

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SCIENTIFIC NOTE

Observations on *Monarthrum dentiger* (Coleoptera: Scolytidae) and Its Primary Symbiotic Fungus, *Ambrosiella brunnea* (Fungi imperfecti), in California. The ambrosia beetle *Monarthrum dentiger* (LeConte) was collected in California during a study of the ectosymbiotic interrelationships of Western ambrosia beetles and their symbiotic fungi. This report records the association of the symbiotic fungus *Ambrosiella brunnea* (Verrall) Batra with *M. dentiger* for the first time. This fungus had previously been associated with *M. mali* (Fitch) and *M. fasciatum* (Say) in the Eastern United States (Batra, 1967. Mycologia, 59: 976-1017) and *M. scutellare* (LeConte) in British Columbia (Funk, 1965. Can. J. Bot., 43: 929-932). Doane and Guilliland (1929, J. Econ. Entomol., 22:915-921) probably observed this fungus in their study of the biology of *M. dentiger*.

Isolations of *A. brunnea* from tunnels, larval niches, and the forecoxal mycangia of the female beetles, were made on 0.6% malt extract agar and 3% malt extract — 1% yeast extract agar using techniques of Batra (1963, Kan. Acad. Sci., 66:213-236). Microscopic observations of dissected beetle and thin sections of wood from tunnels and larval niches were mounted in 1% KOH or 0.5% trypan blue stain.

Upon dissection of adult male (15) and female (20) beetles, fungal cells were found only in a forecoxal enlargement of the female beetle. This forecoxal mycangia of *M. dentiger* appeared similar in structure to those previously described by Batra (1963, Ibid.) for *M.*