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PYRAMICA BOLTONI, A NEW SPECIES OF LEAF-LITTER INHABITING ANT FROM FLORIDA (HYMENOPTERA: FORMICIDAE: DACETINI)

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ABSTRACT

The dacetine ant *Pyramica boltoni* is described from specimens collected in leaf litter in dry and mesic forest in central and northern Florida. It appears to be closely related to *P. dietrichi* (M. R. Smith), with which it shares peculiar modifications of the clypeus and the clypeal hairs. In total, 40 dacetine species (31 native and 9 exotic) are now known from southeastern North America.

Key Words: dacetine ants, Hymenoptera, Formicidae

RESUMEN

Se describe la hormiga Dacetini, *Pyramica boltoni*, de especímenes recolectados en la hojarasca de un bosque méxico seco en el área central y del norte de la Florida. Esta especie está aparentemente relacionada con *P. dietrichi* (M. R. Smith), con la cual comparte unas modificaciones peculiares del clipeo y las cerdas del clipeo. En total, hay 40 especies de hormigas Dacetini (31 nativas y 9 exóticas) conocidas en el sureste de América del Norte.

The tribe Dacetini is composed of small ants (usually under 3 mm long) that generally live in leaf litter where they prey on small arthropods, especially springtails (Collembola). The tribe has been formally defined by Bolton (1999, 2000). Nearctic dacetines may be recognized by a combination of features exemplified in Fig. 1: expanded, lobed occipital area of the head, elongate, narrowed projection of the head beyond the eyes, and the elongate, narrow mandibles. Most species have enlarged, spoon-shaped or otherwise modified hairs on the head, especially on the clypeus, and whitish, spongy processes on the petiole and post-petiole, as in Fig. 1. In spite of their striking appearance, and a diversity of character states that allow easy recognition of most species, the dacetines remain poorly known. This can be attributed to their small size and cryptic habits.

There are only two Nearctic genera of Dacetini: *Strumigenys* and *Pyramica*. Other genera listed for this region, for example, in Bolton's 1995 catalog of ants, were synonymized by Bolton (1999) in his reclassification of the genera of the Dacetini. In addition, certain species that had been assigned to *Strumigenys* were referred to *Pyramica* on the basis of a series of fundamental character states. In practice, Nearctic *Pyramica* may be recognized by their broad, well separated mandibular bases, while *Strumigenys* have narrow mandibular bases that appear to be attached near the midline of the head (Bolton 1999). *Pyramica* species use their mandibles to seize and hold prey until it can be stung, while *Strumigenys* species are able to snap their mandibles shut with such force that the prey may be killed outright (Bolton 1999). Bolton (1999) presents a detailed

discussion of generic distinctions and the evolution of mandibular structure in the Dacetini.

Dacetine ants show their greatest diversity in moist tropical regions. The revision of the tribe by Bolton (2000) includes 872 species, only 43 of which occur in North America north of Mexico. Southeastern North America has the great majority of Nearctic species, including, by my count, 31 native species and 9 introduced species. The native species appear to represent a Nearctic radiation; only 1 native species has a range that extends into the Neotropics. It has been suggested (Deyrup 1988) that the diverse southeastern fauna is composed of species that persisted in mesic southeastern refuges during the climatic shifts of the Pleistocene, providing a partial glimpse of what was once a much richer Arctotertiary woodland fauna.

With this background, it is not surprising that additional species of dacetine ants are still being discovered in the Southeast. Not only are these ants small and cryptic, but some species may have relictual geographic distribution in isolated patches of habitat, or they may be dependent on a specialized microhabitat that remains unknown.

Pyramica boltoni Deyrup, **new species**

Diagnosis of Worker (Fig. 1) and Queen

Distinguished from all other *Pyramica* by the following combination of character states: clypeus obtusely pointed, with four radiating, subapical, and two decumbent, apical hairs; two large, curved standing divergent hairs at apical third of clypeus; mandibles with toothless area (= "diastemma") basal to apical series of teeth barely visible in dorsal view. Otherwise, it is generally similar to *P. di-*

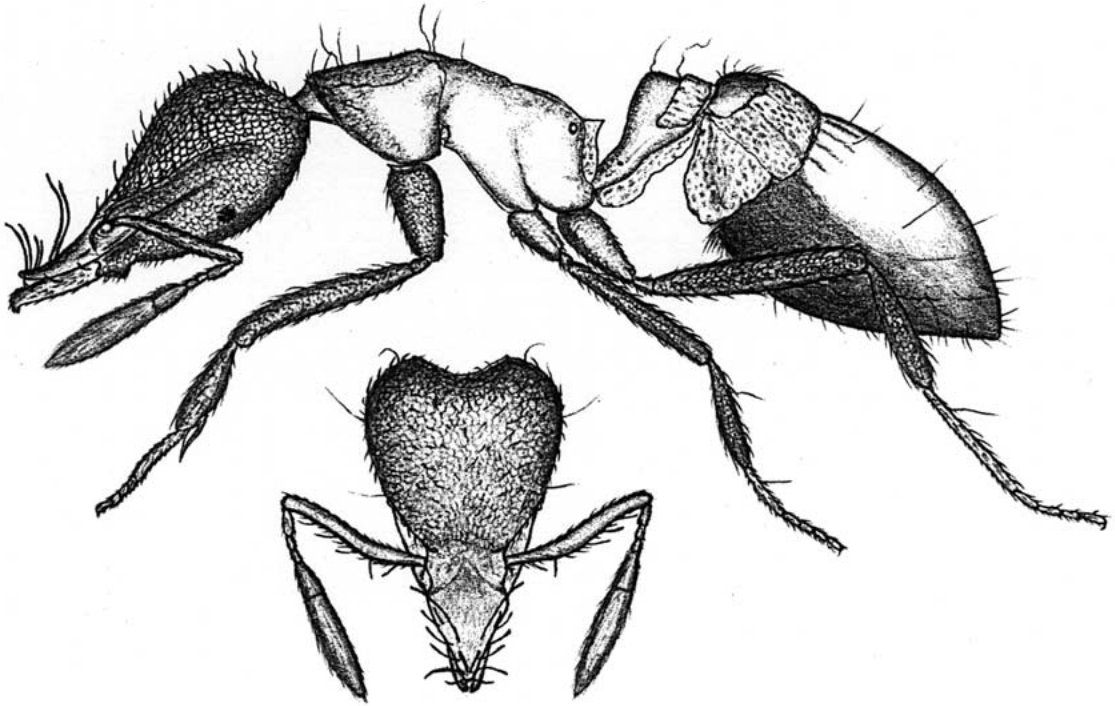


Fig. 1. *Pyramica boltoni*, new species, worker: lateral habitus view and frontal view of head; length: 1.6 mm.

etrichi (M. R. Smith) (see Discussion below and Fig. 2). On each mandible there are four enlarged subapical teeth, of which the first (basal) in the series is widest at the base, the third is about half the length of the two basal teeth, and the fourth is only slightly shorter than the first two.

Description of Holotype Worker

Measurements in mm: total length 1.66 (=length of head from clypeal apex to occipital margin + length mesosoma + length petiole, postpetiole, gaster); head length from clypeal apex to occipital margin: 0.47; maximum head width: 0.33; length of mesosoma: 0.45; length of petiole: 0.17; length of postpetiole + gaster: 0.57. The features described below are illustrated in Fig. 1: Clypeus in frontal view obtusely pointed, in lateral view slightly upturned apically; surface of clypeus smooth, without small discal hairs; large clypeal hairs as follows: two decumbent apical hairs extending laterally over mandibles; four radiating subapical hairs; five pairs of sublateral recurved hairs; one pair of stout, curved hairs, originating at apical third of clypeus, directed upward and outward. Frontal and occipital areas with sparse, suberect, curved hairs: one pair at apical quarter of antennal scrobe, one pair at sides of occipital lobes, one pair lateral, about midway between the other two. Mandibles with diastemma barely visible beyond clypeus in frontal view. Antennal

scapes each with five elongate, suberect hairs on leading edge: a subbasal hair directed apically, a hair at basal third directed slightly basally, three hairs on apical half directed apically; scape otherwise with shorter, subreclinate, apically directed hairs. Pronotum shining, slightly rugose dorsally along sides in front; a pair of elongate, irregularly curved, fine hairs on dorsolateral carinae, another pair on dorsal posterior angles. Mesosoma shining laterally, obscurely reticulate-rugose dorsally; propodeal teeth short, triangular, infradental laminae weakly emarginate just below teeth. Petiole and postpetiole with well developed subapical and inferior spongiform lobes. Gaster shining, dorsal surface with a few, elongate, fine, erect hairs.

Description of a Paratype Dealate Queen

Measurements in mm: total length (measured as in worker): 2.05; head length: 0.55; maximum head width: 0.37; length of mesosoma: 0.55; length of petiole: 0.25; length of postpetiole + gaster: 0.70. Structural character states similar to worker, except for presence of ocelli, large compound eyes, and modifications of the mesosoma associated with flight.

Type Material

Type localities and associated information, as appear on specimen labels. All specimens, as far

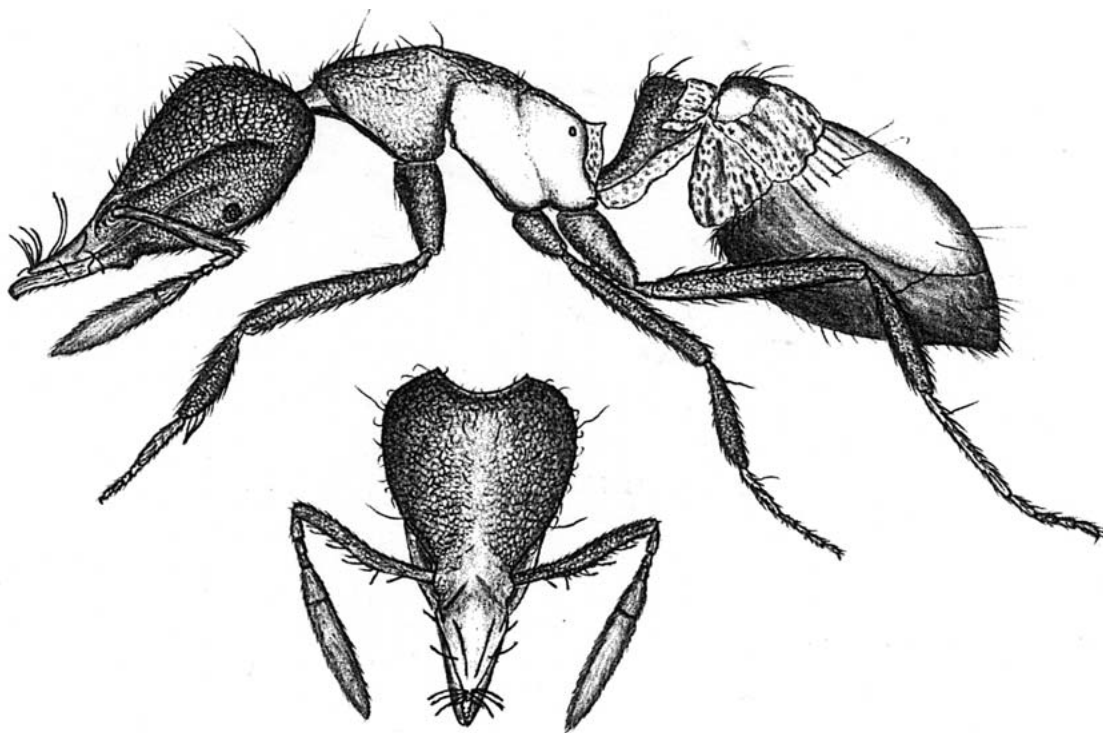


Fig. 2. *Pyramica dietrichi* (M. R. Smith), worker: lateral habitus view and frontal view of head; length: 1.8 mm.

as I know, were extracted from leaf litter, with various types of Berlese funnels. I have not seen any living specimens. Holotype worker: Florida: Highlands Co., Archbold Biological Station, 8-X-2004, M. Deyrup, at base of *Pinus elliotii* in pine and oak copse near cottage one. Paratype dealate queen used in description of queen: same site, habitat, collector as paratype, 14-X-2004. Additional paratype material: all paratypes from Florida; collector's initials: L. D.: Lloyd R. Davis, Jr.; M. D.: Mark Deyrup; C. J.: Clifford Johnson. Three workers: same locality as types, 6-II-1984, M. D., *Quercus geminata* and *Q. myrtifolia* litter; 1 worker: same locality as types, 26-I-1984, M. D., *Quercus laevis* litter; 1 worker: same locality as types, 18-I-1984, M. D., *Carya floridana* litter; 1 worker: same locality as types, 3-IX-1993, M. D. Indian River Co.: Vero Beach, 7-II-1993, M. D., pine and oak hammock, 20 workers, 1 queen; Martin Co.: Jonathan Dickinson State Park, 2-X-1988, M. D., 1 queen, 2 workers; Gilchrist Co.: Trenton, 1-X-1993, L. D., 1 worker; Dixie Co.: Old Town, 8 mi. north and 1.3 mi. east of Rt. 349, 11-V-1993, L. D., 2 workers; Old Town, 11-X-1993, L. D., 1 queen; St. John's Co.: St. Augustine, 1 mi. southwest on Rt. 207, 9-IV-1993, L. D. 1 worker; Favor-Dykes State Park, 3-V-1987, C. J., xeric upland with *Quercus laevis* and *Q. myrtifolia*, 1 worker; Favor-Dykes State Park, 21-III-1987, C. J., *Quercus laevis* leaf litter, 1 worker; Favor-Dykes State

Park, II-11-1994, M. D., mesic forest near campground, 2 workers; Citrus Co.: Holden, 5 mi. west, 25-IX-1993, L. D., 1 worker; Wakulla Co.: Ochlocknee State Park, 7-III-1986, C. J., oak leaf litter sample 637, 1 worker; Polk Co.: The Nature Conservancy Tiger Creek Preserve, 5-X-1989, M. D., leaf litter from *Quercus laevis* habitat, 2 workers; Jackson Co.: Florida Caverns State Park, 30-5-1988, Paul Skelley, 1 worker; Brevard Co.: Titusville, State Rd. 405, 10-IV-2003, Zachary Prusak, Enchanted Forest, leaf litter, 1 worker; Marion Co.: Ocala, 2.5 mi. north on Rt. 441, 13-VI-1993, L. D., 2 workers; Ocala, 9 mi. south southwest, 21-II-1993, M. D., sand pine scrub habitat, Ocala Waterway Scrub, 4 workers; Ocala National Forest, 23-VII-1992, M. D., sand pine scrub, 3 mi. south Big Scrub Campground on Rd. 588, 1 worker; Ocala National Forest, 2-IX-1985, C. J. 1 mi. west of Juniper Springs on Rt. 40, sand pine scrub, 2 queens, 1 worker; Ocala, 1-II-1994, Zachary Prusak, State Rd. 484, 1.3 mi. west of I-75, sand pine scrub habitat, 1 queen; Volusia Co.: Spruce Creek Nature Conservancy Preserve, 22-X-1994, M. D., 2 workers; Putnam Co.: Rodman Reservoir, 3-IV-1988, C. J., scrub just west of dam, sample 831, 4 workers; Ordway Preserve, 20-XI-1993, L. D., 0.5 mi. from main entrance, 1 worker; Ordway Preserve, 27-I-1995, L. D., Berlese funnel OK-012795, 1 worker; Florahome, 20-XII-1987, C. J., *Quercus laevis* sandhill 5 mi. north of Florahome, Rt. 100, 1 queen;

Alachua Co.: Hawthorne, 8-VI-1986, C. J., sand pine scrub 2.4 mi. east of town, 1 worker; Kanapaha Lake, 2-XI-1988, C. J., park near lake, oak litter, 1 worker; Cross Creek, 4-IV-1988, C. J., open xeric pine forest 2-3 mi. north of Cross Creek, 1 worker; Cross Creek, 2 mi. southeast, 7-IX-1986, C. J., hardwood litter sample 656B, 1 queen, 4 workers; Cross Creek, 4-VII-1985, C. J., 2 mi. southeast of Cross Creek, oak-palmetto litter, sample 370, 1 queen; Cross Creek, 4-VIII-1985, C. J., 6 mi. north of town, sample 425B, 1 queen; Gainesville, 31-XII-1988, C. J., flatwoods, county fairgrounds, sample 790, 1 queen; Gainesville, 13-VIII-1989, C. J., county fairgrounds, pine and palmetto litter, sample 1000, 1 worker.

Deposition of Type Material

Holotype, 13 workers, 2 queens: Museum of Comparative Zoology, Harvard University, Cambridge, MA; 8 workers, 2 queens: Florida State Collection of Arthropods, Gainesville, FL; 12 workers, 1 queen: Los Angeles County Museum of Natural History, Los Angeles, CA; remaining paratypes: collection of the Archbold Biological Station, Lake Placid, FL.

Etymology

The species is named for Barry Bolton, whose revisions of dacetine ants, culminating in his re-

vision of the tribe (2000) have brought organization and logic to the group. He has enormously increased the number of identified specimens in collections, and has personally described several hundred species. His work on dacetines is presented with easily used keys and numerous illustrations, so that the group is, for the first time, accessible to a wide range of entomologists.

DISCUSSION

Members of the genus *Pyramica* are usually most easily identified by characters of the head, especially the structures of the clypeus and mandibles and the modifications of the setae of the clypeus and antennal scapes. *Pyramica boltoni* shares clypeal character states with *P. dietrichi*, including the pointed clypeal shape with the tip turned up away from the plane of the mandibles, the decumbent apical setae, the set of radiating subapical setae, and the pair of elongate, curved setae arising near the apical third of the clypeus (Fig. 2). A third species, *P. ornata* (Mayr), shares these clypeal features, but the subapical setae are short and strongly expanded apically (Fig. 3). *Pyramica boltoni* is distinguished from *P. dietrichi* by having four, rather than six, radiating subapical setae, and by having the jaws protruding a shorter distance beyond the clypeus, so that the diastemma is barely visible in frontal view (Figs. 1 and 2). In addition, the sides of the pronotum of

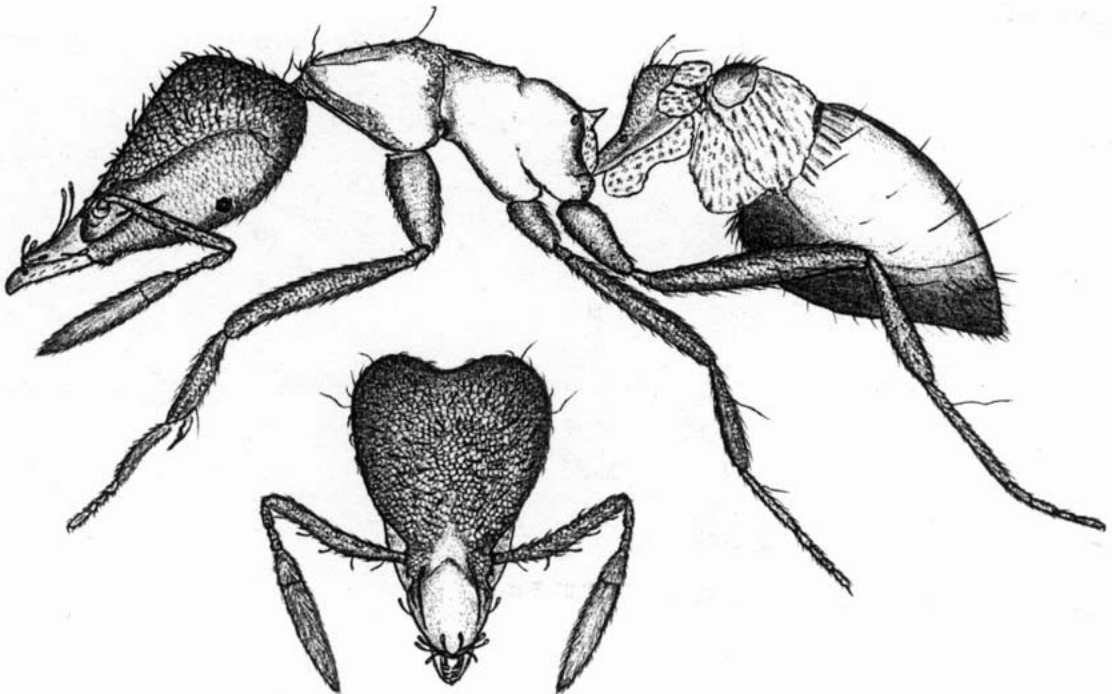


Fig. 3. *Pyramica ornata* (Mayr), worker: lateral habitus view and frontal view of head; length: 1.8 mm.

P. boltoni are primarily shiny, not reticulate as in *P. dietrichi* (Figs. 1 and 2). The pair of enlarged, upturned discal setae at the apical third of the clypeus are conspicuously larger than those of most *P. dietrichi*, but the size of these setae in *P. dietrichi* is somewhat variable, and it is possible that there might be overlap with those of *P. boltoni* in some populations. *Pyramica boltoni* keys to *P. dietrichi* in Bolton's (2000) key.

Several lines of evidence strongly suggest that *P. boltoni* is not a variant of *P. dietrichi*. The diagnostic features listed above are consistent in all the specimens examined from 38 separate collections spread over northern and central Florida. *Pyramica boltoni* is sympatric with *P. dietrichi*; there is no intergradation, and there are five known sites where both species occur. The diagnostic character states of the clypeal setae and the length of the mandibles relative to that of the clypeus are the kinds of character states that have been used in distinguishing many species of *Pyramica*, for example, in Bolton's key (2000). Unfortunately, these characters have not been associated with any natural history traits, but it is likely that such traits exist, given the consistency of the character states within each species of *Pyramica*.

Pyramica boltoni is known only from Florida, ranging from Highlands and Martin Cos. in the south-central Peninsula, north into St. John's Co. in the northeast corner of the state, and west into Jackson Co. in the central Panhandle. It might well occur in southern Georgia near the Florida border, but there are no known Georgia specimens. In Florida this species does not seem to be as widespread or abundant as *P. dietrichi*, which occurs throughout the state, including the Keys, north into Maryland and Illinois, and west into eastern Texas. I have examined 307 specimens of *P. dietrichi* from Florida, Georgia, Alabama, Arkansas, Oklahoma, Texas, and Illinois. Within the area where both species are known to occur, there is some evidence that *P. dietrichi* may occupy a wider range of habitats, specifically habitats that are wet, such as low flatwoods and swamp forest. Habitat information is available for 28 collections of *P. boltoni* and 49 collections of *P. dietrichi*; all

specimens were extracted from leaf litter. Habitats of *P. boltoni* include xeric forest: 16 (57.1%); mesic forest: 11 (39.2%); wet forest, wet flatwoods: 1 (3.6%). Habitats of *P. dietrichi* include xeric forest: 23 (46.9%); mesic forest: 15 (30.6%); wet forest, wet flatwoods: 11 (22.4%). *Pyramica dietrichi* shows a significant difference in its greater preference for, or tolerance of, wet habitats (Chi square = 4.83, *P* value = 0.03).

Although the known distribution of *P. boltoni* is restricted relative to those of most native southeastern *Pyramica* species and it is not particularly common within this range, it cannot be considered a species that is rare or endangered. It is known from a series of sites where its habitat might be expected to be protected including four state parks, one county park, two Nature Conservancy preserves, the Archbold Biological Station, the Ordway Preserve (managed by the University of Florida), and several sites in the Ocala National Forest.

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