

**TAXONOMIC REVIEW OF THE ANT GENUS *PSEUDOLASIUS*
(FORMICIDAE: FORMICINAE) IN THE AFROTROPICAL REGION**

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Abstract.—The ant genus *Pseudolasius* in the Afrotropical region is reviewed. Two species are considered valid, *P. bufonus* and *P. weissi*, and diagnostic morphological characters are provided for each. Scanning electron micrographs are provided for each species, and the male genitalia of *P. bufonus* are illustrated for the first time. Four species are synonymized with *P. weissi*: *P. bayonii* new synonym, *P. bucculentus* new synonym, *P. gowdeyi* new synonym, and *P. weissi sordidus* new synonym.

Key words: Afrotropical region, Formicidae, Formicinae, *Pseudolasius*.

Pseudolasius (Formicidae: Formicinae: Plagiolepidini; following Bolton, 2003) ants are found throughout the Old World tropics. They are perhaps best known for possessing a polymorphic worker caste, with most species possessing characteristic major and minor workers. The known diversity of *Pseudolasius* is greatest outside of Africa with 58 described species and subspecies, while prior to this study 6 species and subspecies were recognized from the Afrotropical region. Wheeler (1922) provided the only complete taxonomic review of the Afrotropical *Pseudolasius* and Menozzi (1924) provided the only key to species. Since then the fauna has received little taxonomic treatment. Weber described *P. myersi* in 1943 and Weber and Anderson (1950) later described a subspecies of *P. myersi* (*P. myersi occipitalis*). Both taxa were soon after synonymized by Brown (1957).

All of *Pseudolasius* is in serious need of taxonomic revision, and specimens cannot currently be identified to species without reference to type material. Furthermore, the number of synonyms and undescribed species in the genus is probably high. LaPolla (2002) recently addressed the status of *P. dodo*, and suggested the Afrotropical *Pseudolasius* form a monophyletic group within the genus. That hypothesis is based largely on one character, the extreme reduction in the size of the eyes of both majors and minors, though several *Pseudolasius* species in the Indo-Australian region have also been observed with extreme reduction in eye size. Clearly, to fully understand the origins of the Afrotropical fauna the entire genus must undergo a thorough phylogenetic analysis of species-level relationships.

The purpose of this study is to review the taxonomy of the Afrotropical *Pseudolasius*, and provide diagnostic morphological characters for the species in the region.

MATERIALS AND METHODS

Below follows the list of the institutions that contributed specimens to this study. Codes follow those proposed by Arnett et al. (1993), and are used throughout the rest of this work.

BMNH: Natural History Museum, London, UK

CASC: California Academy of Sciences, San Francisco, CA, USA

MCZC: Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA

MCSN: Museo Civico di Storia Naturale "Giamcomo Doria," Genova, Italy

USNM: National Museum of Natural History, Washington, DC, USA

Illustrations of species were completed using a scanning electron microscope (Hitachi S-510).

Measurements were made at various magnifications using a light microscope (Nikon SMU-Z) and were recorded to the nearest 0.01 mm. All measurements are given in millimeters. Morphological terminology employed throughout follows Bolton (1994), with modifications where noted. Anatomical definitions are elaborated here:

HL, Head Length: the length of the head proper, excluding the mandibles; measured in full-face view from the midpoint of the anterior clypeal margin to the midpoint of the posterior margin.

HW, Head Width: the maximum width of the head in full-face view.

SL, Scape Length: the maximum straight line of the antennal scape excluding the condylar bulb.

CI, Cephalic Index: $HW \cdot 100/HL$

SI, Scape Index: $SL \cdot 100/HW$

DESIGNATION OF LECTOTYPES

The International Code of Zoological Nomenclature requires that lectotypes designated after 1999 "contain an express statement of the taxonomic purpose of the designation" (ICZN, 1999). I have designated lectotypes from syntypic series in order to provide stability in *Pseudolasius* nomenclature. By providing a lectotype a single specimen is now associated with a published name. Lectotypes are designated for both *P. bufonus* and *P. weissi*. The specifics of each lectotype designation can be found in the systematic treatment section under the species in question.

SYSTEMATIC TREATMENT

Pseudolasius bufonus Wheeler, W.M.

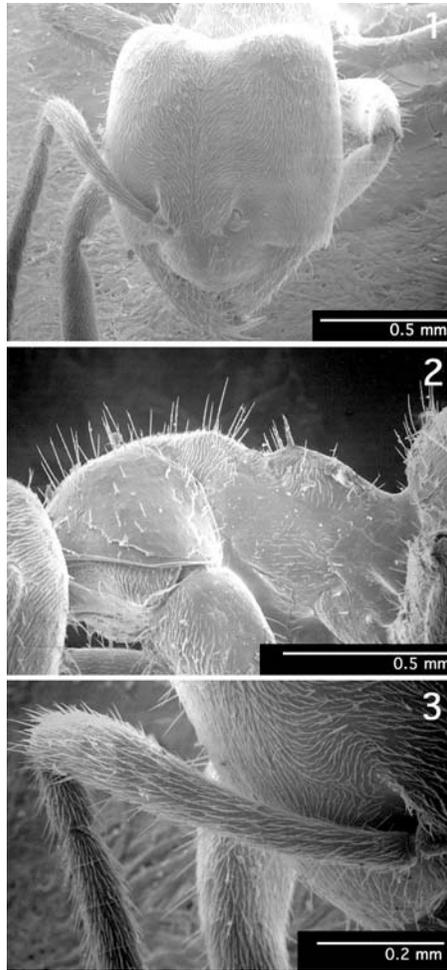
Figs. 1-3 (major worker); Figs. 4-7 (male)

Pseudolasius bufonus Wheeler, W.M., 1922: 220 (w.q.m.). 11 syntype minor workers, 4 syntype major workers, 3 syntype queens, 4 syntype males, CONGO (D.R.): Medje (H.O. Lang) (MCZC) (USNM) [7 syntype minor workers, 3 syntype major workers, 2 syntype queens, 4 syntype males examined; depository of remaining specimens unknown]. The designated lectotype is a major worker deposited at MCZC. The two examined queens in the syntype series are *P. weissi* queens and are therefore not considered paralectotypes.

Diagnosis. Workers (majors and minors): numerous erect hairs on head, scape, mesosoma, and legs, with appressed pubescence underneath; in full frontal view, frontal carinae short (Fig. 1). For morphological comparison with *P. weissi* see table 1.

Other material examined. CAMEROON: Etoud (M. Tindo) (BMNH).

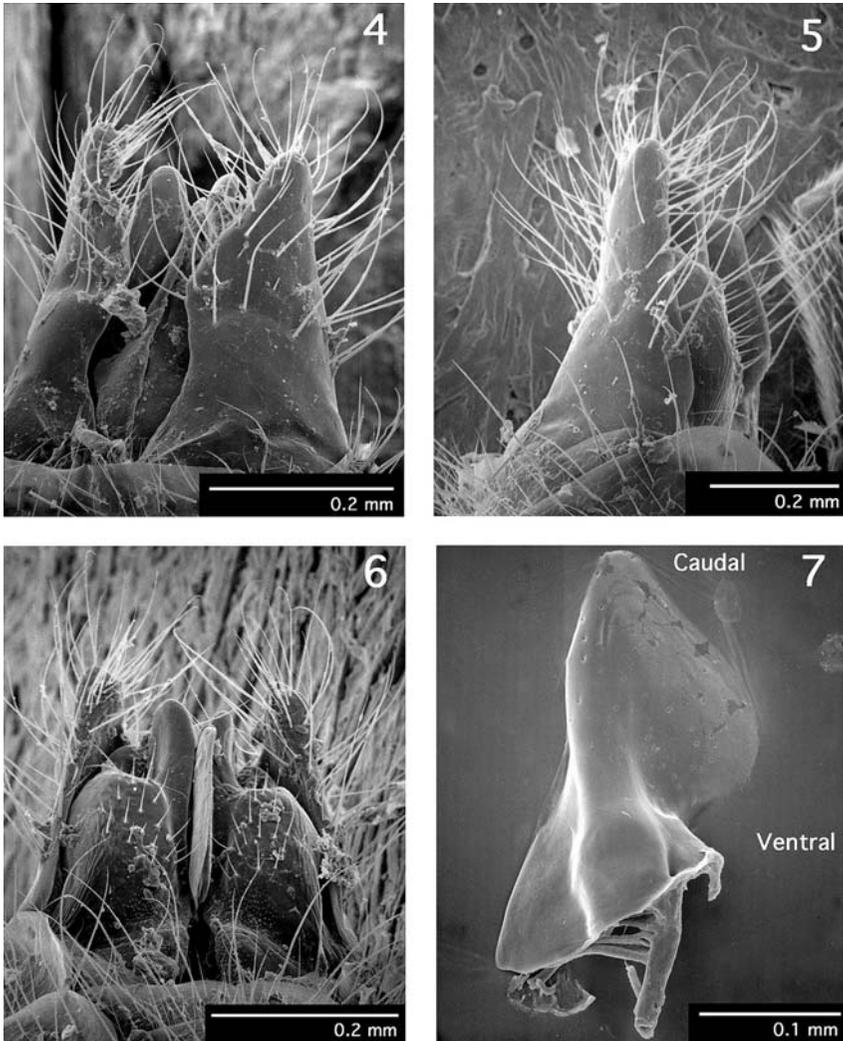
Discussion. This species is easily separated from *P. weissi* due to the presence of erect hairs on the head, scapes, mesosoma and legs. Males display similar pilosity as found in workers, but the queen remains unknown for this species. The queens Wheeler (1922) described as *P. bufonus* are in fact *P. weissi*. I strongly suspect queens will also be found to have numerous



Figs. 1–3. *P. bufonus* major worker: 1. Head in full-face view; 2. Mesosoma in lateral view; 3. Scape.

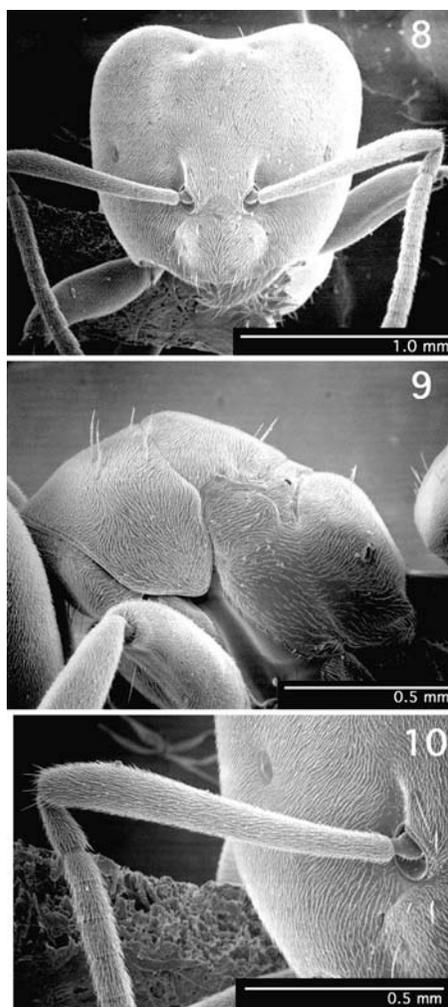
erect hairs as in the workers and males. The majors of *P. bufonus* are smaller than those of *P. weissi*, but I suspect a maximum size major remains to be discovered for this species, because such size variation occurs in *P. weissi*, with smaller and larger majors observed (see *P. weissi* discussion for more details).

The specimens examined from Cameroon conform to the lectotype of *P. bufonus* in all ways except that they do not have erect hairs on the sides of the pronotum. This is probably intraspecific variation, but as more material becomes available they should be reexamined. The natural history of this species remains unknown, but the fact that both workers (majors and minors) and males were eaten by a toad (given by Wheeler as *Bufo superciliaris*) is interesting as it indicates that workers do occasionally come to the surface. Weber and Anderson (1950) found *P. weissi* to be extremely photophobic, and their morphology suggests



Figs. 4-7. *P. bufonus* male genitalia: 4. Dorsal view of genitalia; 5. Lateral view of genitalia; 6. Ventral view of genitalia; 7. Penis valve.

a largely hypogaecic existence, as does the morphology of *P. bufonus*. Perhaps the toad-eaten ants were around a nest entrance as reproductives emerged for their mating flights. Eberhard (1978) found in the hypogaecic ant genus *Acropyga* that workers do come to the surface occasionally, but only briefly, moving about small nest openings as reproductives flew off. Similar behavior may be displayed by hypogaecic *Pseudolasius*. Interestingly, the queens originally described for this species were eaten by a different toad species (given by Wheeler as *Bufo polycercus*).



Figs. 8–10. *P. weissi* major worker: 8. Head in full-face view; 9. Mesosoma in lateral view; 10. Scape.

Pseudolasius weissi Santschi

Figs. 8–10 (major worker)

Pseudolasius weissi Santschi, 1910: 391 (w.q.). 1 syntype minor worker, CONGO: Brazzaville (Weiss) (MCZC) [1 minor worker examined; depository of remaining specimens unknown]. The designated lectotype is a minor worker deposited at MCZC.

Pseudolasius weissi sordidus Santschi, 1914: 378 (w.). 4 syntype workers, IVORY COAST: Abury (depository unknown) [not examined]. **New synonym.**

Pseudolasius bucculentus Wheeler, W.M., 1922: 222 (w.m.). Holotype major worker, CONGO (D.R.): Medje (H.O. Lang) (MCZC) [examined]. **New synonym.**

Pseudolasius gowdeyi Wheeler, W.M., 1922: 223 (w.). 16 syntype minor workers, 2 syntype

major workers, UGANDA: Entebbe (C.C. Gowdey) (MCZC) [15 syntype "minor" workers examined; depository of remaining specimens unknown]. **New synonym.**

Pseudolasius bayonii Menozzi, 1924: 224 (w.). 3 syntype major workers, UGANDA: Victoria, Nyanca, Rcip di sessse, Bugala, (E. Bayon) (MCZC) [2 syntype major workers examined; remaining specimen may be in MCSN]. **New synonym.**

Pseudolasius myersi Weber, 1943: 389 (w.). 2 syntype minor workers, SUDAN: Imatong Mountains, Equatoria, Anglo-Egypt (N.A. Weber) (MCZC) [examined]. Synonymized with *bayonii* by Brown (1957) (here synonymy confirmed, but now under *weissi* with the synonymy of *bayonii*).

Pseudolasius myersi occipitalis Weber & Anderson, 1950: 2 (w.1.). Syntype minor and major workers, UGANDA: Busnia (depository unknown, not in MCZC) [not examined]. Synonymized with *bayonii* by Brown (1957) (here synonymy confirmed, but now under *weissi* with the synonymy of *bayonii*).

Diagnosis. Workers (majors and minors): head with abundant appressed pubescence, with sparsely scattered short erect hairs; posterior margin with erect hairs; scapes, mesosoma and legs with abundant appressed pubescence; frontal carinae long, nearly parallel with lateral margins of head (Fig. 8). For morphological comparison with *P. bufonus* see table 1.

Other material examined. CONGO (D.R.): Akengi (H.O. Lang) (MCZC); Ituri Forest vicinity Epulu B. (T. Gregg) (MCZC); Irang, Luhoho River, elev. 900 m (E.S. Ross and R.E. Leech) (MCZC). GABON: Plateau d'Ipassa (J.A. Barra) (MCZC); Prov. Woleu, Ntem, 31.3 km 108° ESE Minvoul, 2°04.8'N, 12°24.4'E, elev.600 m (B.L. Fisher) (CASC); La Makande, Foret de Abeilles (S. Lewis) (BMNH); Prov. Ogooue, Maritime Res., Monts Doudou, 24.3 km 307° NW Doussala, 2°13.4'S, 10°24.4'E (B.L. Fisher) (CASC). GHANA: Eastern Bunso near Tafo (R. Belshaw) (BMNH); Tafo (B. Bolton) (BMNH). IVORY COAST: Banco Forest near Abidjan (W.L. Brown) (MCZC); Teke Forest, Angana (T. Diomande) (BMNH); Tai Forest (T. Diomande) (BMNH). KENYA: S.A.L. (no specific locality provided) (J.F. Graham) (BMNH). UGANDA: Buyobo (BMNH).

Discussion. The scarcity of erect hairs on the head, and complete lack of erect hairs on the scapes and legs separates this species from *P. bufonus*. Unfortunately, although Wheeler (1922) described a male for this species (under the synonym *P. bucculentus*) the specimen could not be located for this study.

This species has a large range west from the Ivory Coast east to Uganda and southeastern Sudan. Weber and Anderson (1950) found this species in leaf-litter, nesting around roots. Label data also indicates the species is found in rotten wood.

As discussed above, *Pseudolasius* ants are polymorphic, with the possible exception of *P. dodo* (LaPolla, 2002), and although there are clear size differences between the extremes among workers, blending of the major and minor castes occurs (Figs. 12 and 13); this fact has caused confusion when elucidating species boundaries. For example, Wheeler (1922) based *P. gowdeyi* on minor workers that display variation in overall size. He took this variation to be indicative of the presence of majors and minors, and based the species on possessing a smaller major caste than other Afrotropical species. I conclude, however, that *P. gowdeyi* "majors" are simply large minors and therefore consider the species a synonym of *P. weissi* since there are no other morphological characteristics to separate them. Figs. 12 and 13 demonstrate that there is considerable morphological variation in *P. weissi* majors and minors. When morphological characters such as head length and width are plotted against each other,

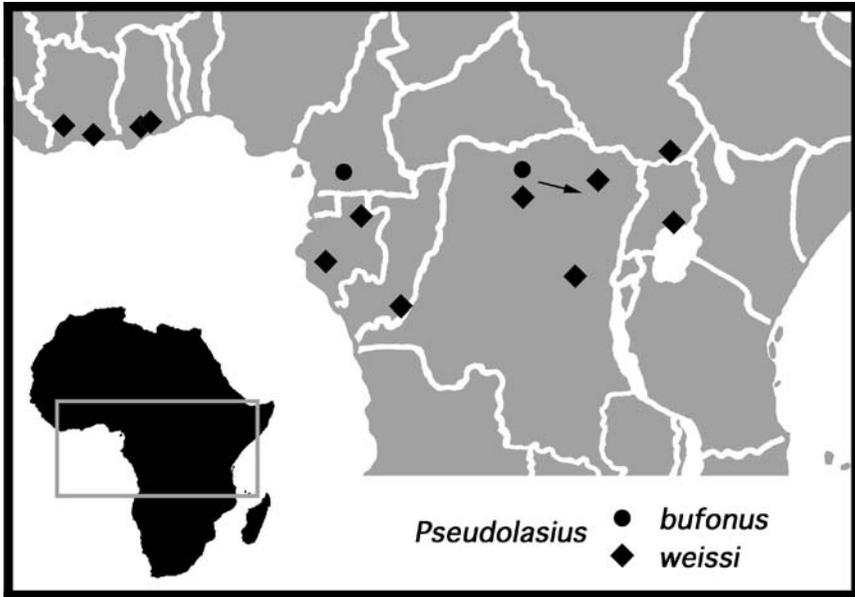
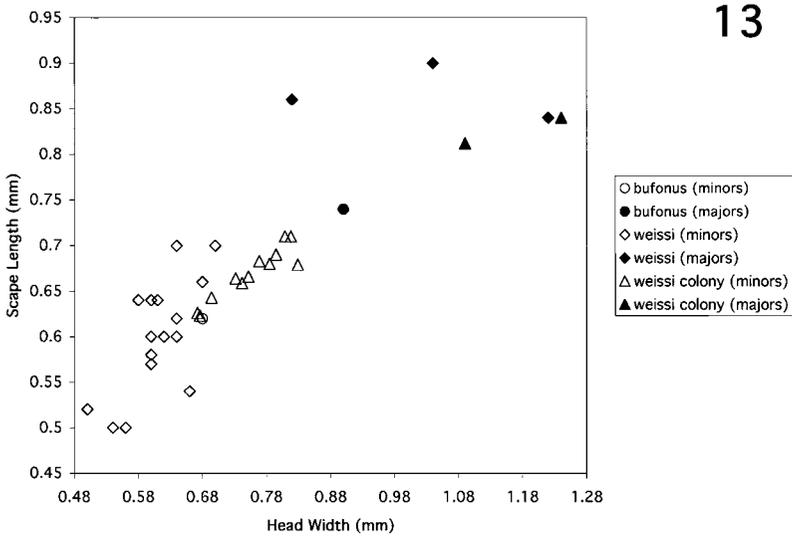
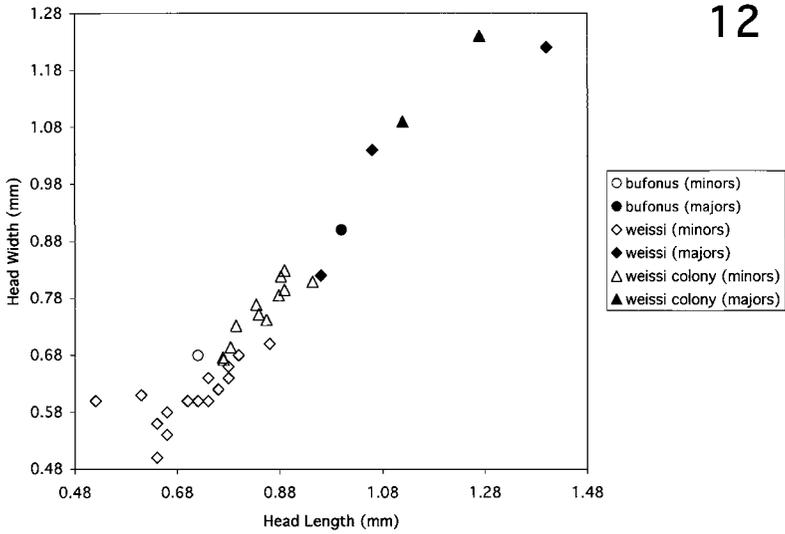


Fig. 11. Known distribution of Afrotropical *Pseudolasius* species. Arrow indicates both species were found at the same locality.

specimens from the same nest series clustered together with a gap between the major and minor workers. However, what would be called minors (see below) from other non-related nests come very close to some of the majors from the nest series.

The question then arises as to what exactly constitutes a major worker. The distinction of major/minor among worker specimens is sometimes difficult to make, but for identification purposes I define the major as an individual worker that possesses a much wider, larger head proportionate to the mesosoma than is otherwise observed in workers (the minors). Among Afrotropical *Pseudolasius*, this means that the head of a major has a roughly heart-like shape, with the posterior margin medially impressed. However, what Wheeler (1922) considered to be majors for *P. gowdeyi* do not match the definition provided here.

The other synonyms for *P. weissi*, *P. bayonii* and *P. bucculentus*, were species based on only slight head and mesosomal shape differences that can be accounted for as intraspecific variability. Among *P. weissi* specimens from nest series, I have observed the range of head and mesosomal shape differences used to define *P. bayonii* and *P. bucculentus*, indicating such differences are the result of intraspecific variation, and therefore the two species are now considered synonyms. *Pseudolasius weissi sordidus* was a subspecies based on specimens that were only slightly darker than the “typical” *P. weissi*. Small differences in color are not enough to warrant recognition of a separate species, especially when such small color differences might be explained by the age of specimens when collected, by the conditions under which specimens were stored, and/or by intraspecific variation.



Figs. 12-13. Morphometric data for *Pseudolasius* workers. 12. Bivariate plots of head width versus head length of *Pseudolasius* workers; 13. Bivariate plots of scape length versus head width of *Pseudolasius* workers. The symbols for "weissi colony" indicate specimens from a nest series.

CONCLUSION

Afrotropical *Pseudolasius* range centrally across the continent in tropical areas (Fig. 11). It appears that outside of Africa the genus is similarly restricted to tropical areas with abundant rainfall and year-round warm temperatures.

An important finding of this study is that the use of overall size (as Wheeler did for *P. gowdeyi*) is probably not enough to delimit species boundaries in *Pseudolasius*. The extent and form of polymorphism in *Pseudolasius* deserves further attention. A range of sizes from the minor to the major caste is observed among Afrotropical species. This fact has in the past led to specimens of *P. weissii* being described several times as representing separate, distinct species.

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