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Preliminary Contributions toward a Revision of the Ant Genus *Pheidole* (Hymenoptera: Formicidae). Part I.[1]

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ABSTRACT: New synonymy is given for 7 *Pheidole* species, mostly neotropical. *P. punctatissima* (=subsp. *napaea*); subspp. or varr. *annectens, insulana, jamaicensis, barbouri,* and *praetermissa* are removed from *P. punctatissima* and are all considered temporarily as forms of *P. annectens*. *P. vafra idiota* var. *maculifrons* is placed as a junior synonym of *idiota*. *P. subarmata* (= *cornutula, s.* var. *elongatula, c.* var. *imbecillis, s.* var. *nassavensis, s.* var. *borinquenensis, hondurensis, s.* var. *nefasta, c.* var. *dentimentum*). *P. tristis* (=*fumipennis*); *P. fabricator* (=*nigriventris*). *P. ursus* (=*cressoni, u.* var. *gracilinoda*); *P. megacephala* (=*testacea*). *Ceratopheidole pergandei* is transferred to *Aphaenogaster*.

Pheidole is certainly one of the most important ant genera in the world. In tropical forests, arid scrub, grassland and warm deserts, it appears often to dominate the insect parts of communities, and it is clear that the genus will increasingly occupy the attention of ecologists in these biomes. Identification of *Pheidole* species has always been a problem. Partly, the difficulty can be laid to the very large number of described forms in the genus. More than 1050 species, subspecies and varieties have been named in it through 1975, including known and still undetected synonyms. Problems also arise from the poor quality of much of the taxonomic work done during the early, mainly descriptive phases of the investigation of the genus.

Pheidole is a young genus in geological scale (Brown, 1973:173), and most species-groups show appreciable phenotypic variation. This variation provided a happy hunting ground for describers of (mostly nongeographical) subspecies and varieties. Most of these forms were described in works that were "faunal" in nature; i.e., the papers dealt with the ants of one particular country or restricted part of a continent, and most authors tended to neglect the possibility that some species could occur over ranges nearly continent-wide. Also, it seems, most of the authors before 1950 spent relatively little

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time and effort finding out what the other ant specialists had in their collections. A limited amount of exchange and borrowing went on, but the specialists rarely visited one another in order to compare whole taxa in one another's collections. The result was a disastrous compartmentalization of ant taxonomy by political boundaries and by individual myrmecologists that developed increasingly into a mindless description derby.

By 1950, the reaction had set in, and W. S. Creighton and others began revisionary work based on neo-Darwinian species concepts that recognized formal taxa only at specific and subspecific (geographical race) levels. Soon even the subspecies category was disowned by many myrmecologists (Wilson and Brown, 1953), and most of these now require subspecific and varietal names to stand or fall as species names. What I do in effect is to consider each published name to represent an hypothetical species. The name remains in the species list until reasonable evidence is adduced to show that it is either a distinct species in its own right, or a junior synonym of some other species. The investigation of the validity of these hypothetical species usually involves the comparison of types and the evaluation of such differences as may exist by the study of augmented material. Such investigation almost always takes much more time, trouble and thought than was expended on the original description of the taxon concerned; in fact, original descriptions of many varieties, subspecies and even species of ants are extremely brief and casual, and doubtless they received no more than a few minutes' attention from their authors. Occasional modern authors are apparently equally offhanded about synonymizing taxa at and below species level; I deplore this tendency, because experience shows that some, even if only a few, of the poorly described subspecies and varieties are in fact good biological species, or that they are synonyms of species other than those to which they were originally assigned.

Pheidole includes so many species that a full-scale revision for any primary tropical area of continental dimensions might occupy half a lifetime. Acknowledging that full world revision is the desirable goal, I feel that well-considered synonymic studies now will help to bring the number of valid names down to a level reasonable for would-be revisers. The synonymy of some common and variable species is like an onion that must be peeled away carefully, layer by layer.

Probably not more than half the more than 1050 names I have listed for the world *Pheidole* will remain unsynonymized by the end of the century, but the tendency towards reduction of names will be partly countered by the description of new species, for there are hundreds of these awaiting characterization and naming. In adding the new species, authors should provide careful and reasonably full descriptions and illustrations, analysis of variation and relationships, and a statement of differences from related species.

To simplify and shorten this paper, I have used the reference indications to the Bibliografia of Kempf's (1972) *Catálogo abreviado das Formigas da Regiáo Neotropical,* Studia Entomol., (N.S.) 15:267–298. References for forms outside the neotropical region are given in full with the discussion of the names.

This is the first of a projected series of papers on *Pheidole*, begun originally together with the late Frei Walter Kempf, who had already moved to clear up some of the confusion in neotropical *Pheidole* complexes.

Pheidole punctatissima

Pheidole punctatissima Mayr. 1870a:400, soldier ☿. Type loc.: Mexico.
Pheidole punctatissima subsp. *napaea* Wheeler, 1934b:165, soldier ☿. Type loc.: Mexico, Veracruz: Mirador. *N. syn.*

This is a very distinctive small species, commonly found in epiphytes, under bark, and in other arboreal nest sites in tropical Mexico and Central America. Most of the dorsal surface (vertex) of the head of the soldier is yellowish-white in life, contrasting with the dark brown color of the rest of the body. The whitish color often darkens somewhat in preserved specimens, but the contrast is still apparent. The erect hairs of the head and promesonotum are rather short (even the longest ones of promesonotum usually <0.12 mm long) and have truncate or blunt tips. The scrobal impressions (to receive the folded antennae) are fairly well developed, especially their inner margins. The sides of the postpetiole as seen from above are rounded, or at most bluntly angulate. The subspecies *napaea,* based on a very small series (MCZ), is just a minor variant within the *P. punctatissima* population of Veracruz. It is a little smaller than usual (soldier HW 0.85 mm vs. a usual head width of 0.87 to 0.95 mm or even more for *punctatissima* soldiers) but I am unable to appreciate the other differences described by Wheeler, even though I reviewed the material he had in his collection.

The other forms assigned to *punctatissima* as subspecies and varieties by Wheeler (*annectens*, *insulana*, *jamaicensis*, *j.* var. *barbouri* and *J.* var. *praetermissa*) do not belong to the same species as *punctatissima,* and will be dealt with later. These forms have a rather uniform ferruginous or brown body color without contrastingly lighter cranial disc, the erect hairs of head and promesonotum are longer and tapered to a fine point (longest promesonotal hairs 0.15–0.20 mm or more), and the sides of the postpetiole are produced as distinct conules. The heads of these forms also seem to be more evenly convex across the vertex because the antennal scrobes are a little less strongly marked than in *P. punctatissima,* but this is a very difficult character to judge, especially against different color backgrounds. They are attached temporarily as forms of *P. annectens*.

Pheidole vafra idiota

Pheidole idiota Santschi, 1923a:53, soldier ☿♀. Type loc.: Argentina, Córdoba: Alta Gracia.

Pheidole vafra idiota var. *maculifrons* Santschi, 1929b:284, soldier ☿. Type loc.: Argentina, Córdoba: Alta Gracia. *N. syn.* Not *P. maculifrons* Wheeler, 1928.

The types of *idiota* and its sympatric variety were compared in the Santschi Collection in Basel, and are judged to be conspecific; the fuscous spot in the middle of the head varies from present to absent even in these small series.

Pheidole subarmata

Pheidole subarmata Mayr, 1883:37, soldier ☿. Type loc.: Cayenne.

Pheidole cornuta Emery, 1890a:52, nota, soldier. Type loc.: Paraguay: Asunción. *N. syn.*

Pheidole subarmata var. *elongatula* Forel, 1893a:408, soldier ☿♀♂. Type loc.: West Indies: St. Vincent. *N. syn.*

Pheidole cornutula var. *imbecillis* Emery, 1905b:151, soldier ☿. Type loc.: Argentina: Corrientes. *N. syn.*

Pheidole subarmata var. *nassavensis* Wheeler, 1905a:92, soldier ☿. Type loc.: Bahamas, New Providence: Nassau. *N. syn.*

Pheidole subarmata var. *borinquenensis* Wheeler, 1908a:133, soldier ☿. Type loc.: Puerto Rico: San Juan. *N. syn.*

Pheidole (*Elasmopheidole*) *hondurensis* Mann, 1922:25, soldier ☿. Type loc.: Honduras: San Juan Pueblo. *N. syn.*

Pheidole subarmata var. *nefasta* Santschi, 1929b:285, soldier ☿. Type loc.: Brasil, Parana: Rio Negro. *N. syn.*

Pheidole cornutula var. *dentimentum* Santschi, 1929b:285, soldier ☿. Type loc.: Brasil, Parana: Rio Negro. *N. syn.*

The core synonymy here is *P. subarmata* (=*cornutula* = *hondurensis*), which E. O. Wilson (pers. commun.) had already noted in the late 1950's after comparing specimens he had collected at Palmar, Dept. Puntarenas, Costa Rica, with neotropical *Pheidole* in the Wheeler Collection (MCZ). While this synonymy seemed reasonable to me after reviewing the material, a complication appeared in the form of mixed species in the *subarmata* lot that Wilson had used for his comparison. Once the MCZ *subarmata* were sorted, it was found that two species were represented; one of these, from the vicinity of Belém, Pará, Brasil, is distinct from *subarmata* in having a shorter, darker, more nearly rectangular head, and other differences. The other is the true *subarmata*.

This species has the soldier head much longer than broad, though the

proportions vary slightly from series to series. Color in this caste varies from ferruginous yellow to reddish-brown, and in the worker minor, the head is often more brownish than is the rest of the yellowish-ferruginous body. The soldier mandibles also vary in color from yellow to piceous. Part of the color differences appear to be due to varying quality of preservation of the tissues under the integument. One of the distinctive characters of the species is the enlarged and uptilted frontal lobes of the soldier, which stand out in side-view silhouette to different degrees as the viewing angle changes slightly. There is also some real variation in the prominence of the lobes, and it is easy to see why, with the very restricted samples then available, Emery (1890a:Pl. 5, figs. 12–14) saw fit to set up *cornutula* as a species apart from *subarmata*.

Forel had a sample with more elongate head than usual when he described var. *elongatula,* but in this respect, as well as in pilosity and color, a type soldier (MCZ) falls within the variation we now know to hold for this species. There is little excuse for Wheeler's slight color varieties *nassavensis* and *borinquenensis,* judging from types in MCZ, and types of Mann's *hondurensis* fit well in *subarmata* also; obviously, Mann failed to compare his types with *subarmata* or *cornutula* samples, because he thought he had in *hondurensis* a member of the *aberrans* group ("subgenus *Elasmopheidole*").

The types of *P. subarmata* var. *nefasta* and *P. cornutula* var. *dentimentum* were reviewed briefly by Brown in the Santschi Collection (Basel) in 1973. Var. *nefasta* is a slightly larger, somewhat more brownish variant, and var. *dentimentum* is like the ordinary *subarmata* in size and color. Types of *cornutula* var. *imbecillis* in the Santschi Collection appear to belong to the same species as the *dentimentum* types, and *P. cornutula* and var. *elongatula* in the same collection.

Pheidole tristis

Myrmica tristis F. Smith, 1858b:132, ☿. Type loc.: Tijuca (Rio de Janeiro), Brasil.

Atta fumipennis F. Smith, 1858b:169, ♀ ☿. Type loc.: Brasil, Rio de Janeiro. *N. syn.*

In his revisionary note of 1965, Kempf showed that *Pheidole tristis* is the senior synonym of *Atta rubra* and *Pheidole emeryi,* and he further stated his belief that, "It is possible that *fumipennis* [will] fall eventually as a synonym of *tristis.*" He had based his opinion on a hasty examination of a type queen of *fumipennis* in the British Museum, reserving final judgement because he found that this type had the lateral postpetiolar conules somewhat shorter and more obtuse than in *tristis*.

The *fumipennis* queen is large and stout, with brownish wings and a

ferruginous orange body, with a vague effect of dark stripes across the posterior margins of gastric terga I and II. The integument is opaque, reticulate-punctulate, with superimposed rugulae (costulae), longitudinal on the head, reaching back past, but slightly diverging laterad on each side of, the ocelli. Similar rugulae are found, lying close and straight, on the mesonotum, converging caudad on the scutellum, and (less distinct) on the postpetiole. Gastric tergum I is finely striolate over the basic punctulate sculpture, becoming sericeous caudad; the rest of the terga are smooth and shining.

In many ways, this queen agrees with the *tristis* queen, and corresponds to the worker and soldier syntypes of *emeryi* in the British Museum. Furthermore, the worker of *fumipennis*, on a pin separate from the queen, is indistinguishable from the *emeryi* worker type. It seems to me likely that the *fumipennis* types are just part of the normal variation of *tristis*.

Pheidole fabricator

Atta fabricator F. Smith, 1858b:167, soldier ☿ ♀ ♂. Type loc.: Rio de Janeiro, Brasil.

Atta nigriventris F. Smith, 1858b:169, ☿. Type loc.: Rio de Janeiro, Brasil. *N. syn.*

In the British Museum, 2 workers on one card bearing the number "57/68" and the blue label, "Atta/nigriventris/Smith" are apparently types of that species. On another card with the number "79.22" is an additional worker and a soldier; the soldier is the same as the *Pheidole fabricator* type soldier in the same collection, and appears to correspond well to the worker.

The *Pheidole fabricator* type card, however, also bears, to the right of the soldier, a worker of a *Solenopsis* of the *saevissima* group. The accompanying queen is also a *Solenopsis*. The lectotype of *Pheidole fabricator* is therefore hereby selected as the left-hand soldier specimen on the pin bearing the blue label "Rio" (on the reverse side, "57/63"). *Pheidole nigriventris* thus falls into the synonymy of *fabricator*, and is based on the true worker of the latter species.

Pheidole ursus

Pheidole ursus Mayr, 1870b:986, soldier ☿. Type loc.: "Mexico . . . Prof. Bilimek."

Macromischa Cressoni Ern. André, 1887:296, ☿. Type loc.: "Mexico." *N. syn.*

Pheidole ursus var. *gracilinoda* Forel, 1904b:172, ☿. Type loc.: "Mexico." *N. syn.*

A worker specimen of *P. ursus*, evidently from the original collection (leg. Bilimek) compares well with the worker type of *cressoni* in the Paris

Museum. The same specimen of *ursus,* from the Museum of Comparative Zoology at Harvard University, also agrees well enough with Forel's description of var. *gracilinoda.* It is doubtful whether Forel ever saw any other material of *ursus,* and his description of the variety, drawn up as a comparison with the "typical" *ursus,* does not in fact depart much from either Mayr's description or the actual Bilimek specimen, allowing for the usual imprecision of characterizations of earlier times. The type of all three taxa may in fact have come from the same collection, since some Bilimek ant material found its way into several widely separated institutions, including the Academy of Natural Sciences at Philadelphia, from which Cresson probably sent the specimen described by André.

Aphaenogaster pergandei new combination

Ceratopheidole perganderi (!) Donisthorpe, 1950, Ann. Mag. Nat. Hist. (12)3:639, ☿. Type loc.: Gaziantep, southern Turkey.

Ceratopheidole pergandei; Donisthorpe, 1950, Ann. Mag. Nat. Hist. (12)3:1060, emendation of spelling.

The types, reviewed in 1978 in the British Museum, are workers of one of the yellowish-colored species of *Aphaenogaster* from the Middle East, so they should be transferred from *Pheidole* (or its subgenus *Ceratopheidole,* apparently treated as a genus by Donisthorpe). Unfortunately, the specific name *pergandei* is preoccupied in *Aphaenogaster* by *A. pergandei* Mayr (1886b:444), original name of the ant now called *Veromessor pergandei.* I think the substitution of a new name for Donisthorpe's species should be postponed until the yellow *Aphaenogaster* of the Levant can be revised, since there is a good possibility that a senior synonym exists for the preoccupied name.

This case is one more illustration of the nomenclatorial problems that can be caused by the use of patronyms, especially patronyms honoring specialists or collectors in a species-rich taxon. Species named for such personages as Mayr, Forel, Emery, Wheeler, Frederick Smith, M. R. Smith (and several other Smiths), Silvestri, Arnold, Arnoldi, Froggatt, Pergande, various Hewitts, and so on, are probably the most frequent source of homonyms, especially in cases where a genus is split into subgenera, or when two genera are merged by synonymy. Even ignoring questions of taste, pronounceability, and the mnemonic qualities of newly coined species names, patronyms must be considered as inefficient and potentially counter-productive in insect taxonomy.

Pheidole megacephala

Formica megacephala Fabricius, 1893:361, soldier. Type loc.: "Isle de France" (=Mauritius).

Atta testacea F. Smith, 1858b:168, soldier ☿. Type loc.: Rio de Janeiro, Brasil. *N. syn.*

The type pin, with label "53/81," is in the British Museum. I compared it hastily with specimens of *Pheidole megacephala* from Darwin, Northern Territory, Australia, with which it was found to be nearly identical. I have asked Barry Bolton to check the identity of the *P. testacea* type once more, and he agrees that this species is the same as the tropicopolitan *P. megacephala*.

Specimens in the British Museum bearing the label "88/10," found with the label, "*Pheidole omnivora* Kirby," from Fernando Noronha Island in the South Atlantic, are also *P. megacephala*. I have been unable to locate any *Pheidole omnivora* described by Kirby in the literature.

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