

## THE DACETINE ANT GENUS MESOSTRUMA BROWN

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Text Fig. 1, a-c

### SUMMARY

The author describes the characteristics of the genus *Mesostruma* and of *M. laevigata* n. sp. (from the Victorian Mallee), and *M. turneri* (from the vicinity of Mackay, Queensland). The validity of the species *M. monstrosa* Viehmeyer is also discussed.

*Mesostruma* was erected in my preliminary revision (1948) to include *Epopostruma turneri* Forel and an undescribed species sent by Mr. John Clark. It is the purpose of the present paper to describe the essential features of *Mesostruma* and of both included species.

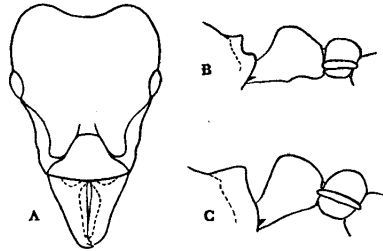


Fig. 1

a. *Mesostruma laevigata* n. sp., small worker paratype, head, dorsal view.  
b. same, lateral view of propodeal lamella and pedicel. c. *M. turneri* Forel, worker cotype, lateral view of propodeal lamella and pedicel.

### MESOSTRUMA Brown 1948

*Mesostruma* Brown 1948 Trans. Amer. Ent. Soc., 74, 118-119.

*Epopostruma* Forel 1895 Ann. Soc. Ent. Belg., 39, 424, as sub-genus of *Strumigenys*, part. Emery 1897 Term. Füzetek, 20, 573, part; *idem* 1922 Gen. Ins., Fasc. 174, 330, part.

*Worker and female*—With the general characteristics of the *Epopostruma* complex, i.e., with large, dorsolaterally placed compound eyes; broad tongue-shaped labrum covering entirely the lesser mouthparts and buccal aperture; palpal segmentation, maxillary five, labial three. Antennal funiculus with five segments, proportioned as in *Epopostruma*.

In generic characters intermediate between *Epopostruma* and *Alistruma* Brown, especially the following: head shape, mandibular form, appendages of petiole and postpetiole. Head with posterior excision less deep and lateral occipital lobes less broadly expanded than in *Epopostruma*, but in both respects less highly modified than in *Alistruma*. Mandibles not so elongate as in *Epopostruma*, with feebly concave external borders, the space between the shafts proper and the middle (line of closure) filled in entirely with a semi-transparent

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lamina, this lamina with straight, cultrate mesial (apical) margin and straight horizontal basal margin, these two margins meeting at the apex of the oblique, spiniform basal tooth. The basal tooth is similar to that of *Epopostruma* in form and position, but is entirely enclosed in the aforementioned lamina, through which it is clearly visible. The dentition of the apical border restricted to the stout acute apical tooth and a smaller subapical tooth dorsal to the apical and apparently representing the reduced dorsal tooth of the apical fork as seen in *Epopostruma*. Alitrunk much as in *Alistruma*, with or without subdentiform humeri; propodeal lamellae well developed, upper part without well defined internal tooth. Petiole with weakly defined peduncle, well developed node, and without lateral teeth or processes of any kind. Postpetiole transverse, with broad, flat, winglike lateral lamellate expansions resembling those of *Microdaceton* Santschi from the Ethiopian region.

Sculpture much like that of *Epopostruma*, the dorsum of the head and often other parts of the body with spaced circular foveolae or fossettes, each tuberculate and bearing a much reduced, scarcely detectable hair. These foveolae are smaller and more numerous than in *Epopostruma*. Pilosity appressed or subappressed, resembling a very dilute pubescence. Colour varying shades and combinations of ferruginous, but much darker colouration, may easily exist in members of this genus as yet unknown.

*Male* unknown.

*Genotype*: *Strumigenys* (*Epopostruma*) *turneri* Forel, designated by Brown, 1948.

*Mesostruma turneri* and *M. laevigata* spp. nov. are quite distinct from each other, but preserve the essential generic characters in unequivocal form. The genus is of great interest in its clearcut intermediate phylogenetic position, connecting *Epopostruma*, with strumigeniform head and mandibles, to *Alistruma*, which has the head and mandible form, as well as other striking characters of a convergent nature, similar to those of *Smithistruma*. It now seems clear that *Epopostruma*, *Hexadaceton* Brown and the Ethiopian *Microdaceton* are the primitive members of the *Epopostruma* complex, since the general head form and gnathal apparatus which I call "strumigeniform" occurs in all four recent dacetine lines (subtribes) or complexes; it is the only one known in the *Orectognathus* complex (*Arestognathiti*<sup>(4)</sup>) and the *Daceton* complex (*Dacetiti*), of which the latter group is to be regarded as the most primitive surviving dacetine line on the basis of obvious characters.

Among the *Epopostrumiti*, the genus *Alistruma* occupies a central position in the derived half of the subtribe having triangular mandibles with serially denticulate apical margins and aliform expansions of both petiole and postpetiole. *Colobostruma* Wheeler and *Clarkistruma* Brown are aberrant derivatives of *Alistruma*, as is evident from their structure. *Mesostruma* therefore appears to link the "higher" and "lower" halves of the subtribe. Disregarding the extra-Australasian *Microdaceton*, we see a truly remarkable series of "step genera" among the living *epopostrumites*. All of these steps are existing today in Australia and New Guinea (the latter region supports one species of *Alistruma* as

<sup>(4)</sup> The four recent and one fossil complexes within the tribe Dacetini may be treated as subtribes. I prefer to use the suffix "-iti" rather than "-ina" because the latter is too much like a great many (nominative singular) generic name endings. The suffix here used is extremely rare as a termination for generic names, and has the further advantage of differing from the vernacular expressions used for taxonomic groups in all common languages employed in the modern literature. The subtribal names in the Dacetini, with their type genera in parentheses, are as follows: *Dacetiti* (*Daceton*); *Orectognathiti* (*Orectognathus*); *Epopostrumiti* (*Epopostruma*); *Strumigeniti* (*Strumigenys*); *Hypopomyrmiciti* (*Hypopomyrmex*). All of these subtribal names are here proposed for the first time.

so far known), and there is no reason to accept them as other than the actual surviving stages in the evolution of the group. This evolution is all the more remarkable when one considers its trend. The most derivative of the genera, *Clarkistruma*, is remarkably convergent in structure, habits and habitat to *Smithistruma* Brown, a genus derived from *Strumigenys*-like ancestors which is particularly well developed in the warmer parts of the North Temperate Zone. *Smithistruma* is absent from Australia so far as is known; it has reached certain mountainous regions of western New Guinea, but has not yet been found on the eastern half of that island, in spite of some very thorough dacetine collecting by Biró and others. One is tempted to draw the conclusion that the elongation of the head, shortening of the mandibles, and development of the extraordinary aliform structures of the pedicel, which are in many respects similar to the spongiform appendages so well developed in *Smithistruma* of cooler regions, are all modifications which have developed in response to the stimulation of an unfilled ecological niche. That the short-mandibulate forms are best developed and most numerous in species and individuals in the cooler parts of Australia and Tasmania certainly is a fact, and one strengthening the belief that these species were developed to meet the challenge of the same sort of opportunity which led to the evolution of *Smithistruma*.

Several stocks of the apparently more efficiently competing *Strumigeniti* have reached Australia from the direction of New Guinea, but it is evident that these migrants have come into the continent relatively recently, for they have failed in all cases to produce forms sufficiently different to merit recognition of even separate species-groups from those known in the Indo-Papuan region, and the total number of species is few. *Strumigenys perplexa* (Fred. Smith) is the only *strumigenite* known to have reached Victoria and Tasmania, and this species is an efficient tramp through commerce. Had *Strumigenys* arrived earlier in Australia, the evolution of the *epopostrumites* would probably have taken a very different course. As it is, the *Epopostrumiti* present one of the most perfect living evolutionary series imaginable, with *Hexadecton* near the base and *Clarkistruma* at the apex. The latter genus has strongly fused second, third and fourth funicular segments, a condition also found in some *strumigenite* genera, particularly the probably recently evolved *Micostruma* of the Ethiopian region.

*Mesostruma*, to return to the original subject of this paper, is a rare and little-known group. Both *laevigata* and *turneri* are known only from the type collections, and neither collection was accompanied by ecological data. *Laevigata* certainly, and *turneri* probably, were taken in rather dry, warm areas, where probably they were found under stones or logs. Since both *Epopostruma* and *Alistruma* are predatory upon *Collembola* (Brown, unpublished notes), it seems probable that *Mesostruma* also follows this very deep-seated dacetine mode of living.

#### MESOSTRUMA TURNERI (Forel)

(Text fig. 1, c)

*Strumigenys* (*Epopostruma*) *turneri* Forel, 1895, Ann. Soc. Ent. Belg., 39, 424, worker.

*Epopostruma turneri* Emery 1922, Gen. Ins., Fasc. 174, 330.

*Mesostruma turneri* Brown, 1948, Trans. Amer. Ent. Soc., 74, 119.

*Worker*—A cotype sent by Mr. Clark measured 3.0 mm. in synthetic aggregate length (TL-).<sup>(2)</sup> Head length (HL) 0.76 mm.; mandibular extension (ML)

<sup>(2)</sup> Measurements and indices used here are essentially as in my other papers on the dacetine ants. For explanations, see Mushi, xx, 2 (1949). A much more thorough explanation will appear in a forthcoming article soon to be published in the American Midland Naturalist.

0.34 mm.; maximum measurable length of alitrunk (WL) 0.84 mm.; cephalic index (CI) 100; mandibulo-cephalic index (MI) 45. A second cotype sent by Mr. H. Donisthorpe from the British Museum had an HL of 0.80 mm.; MI 43, CI 98. Two or three other cotypes seen in Australian museums were close to these in size and proportions, but were not actually measured. Sufficient material is not available for me to say much about the degree of polymorphism in the worker caste of this species.

Distinguished by the broad, convex head, with very convex, protruding eyes. Humeri broadly and evenly rounded, without traces of angulation or dentation. Propodeal lamellae and petiole as in fig. 1c. Body in general rather opaquely sculptured, with spaces between foveolae mostly minutely reticulate, coriaceous or subgranulose; segment I of gaster with dorsum finely striate longitudinally and subopaque for more than the basal half of its length. Head ferruginous in colour, darker than the rest of the body, which is ferruginous yellow, gastric segment I dorsally lighter yellow.

Female and male unknown to me.

*Type locality*—Mackay, Queensland (Gilbert Turner, May 1894). Cotypes in the Forel Collection, British Museum (Natural History), J. Clark collection, and in several of the larger Australian museums. The locality near Mackay, where Turner probably collected this ant, is now apparently under cultivation. Originally, it was more than likely dry, low woodland like that covering most of the coastal strip of Queensland.

#### *Mesostruma laevigata*, n. sp.

(Text fig. 1, a, b)

*Worker*—Holotype and 14 paratypes. Weakly polymorphic. TL 2.9 to 4.2 mm.; HL 0.66 to 0.89 mm.; WL 0.72 to 1.12 mm.; CI 85 (smaller individuals) to 93 (larger individuals); MI 37 to 44 (70% of individuals 39 to 41, mean 40, no correlation between MI and HL or CI). Present series, from a single nest, too small and so not suitable for statistical analysis, but shows slight tendency toward division into large, broad-headed and small, narrow-headed castes.

Head shape as in fig. 1a; narrower than in *turneri*, with larger but only weakly convex eyes. Humeral angles acutely subdentate. Propodeal lamellae as in figure, the upper and lower angles varying slightly in prominence; translucent, without distinct trace of solid tooth in upper angle. Petiole narrower and relatively less massive than that of *turneri*; posterior descending face of node weakly or not at all convex seen in profile.

Body over-all much more smooth and shining than in *turneri*, with the spaces between the foveolae, especially on the thorax, petiole and postpetiole wider and smooth and polished for the most part. Gastric dorsum smooth and shining, with a few minute, indistinct vestiges of longitudinal costulae or striae in the articular groove between postpetiole and gaster. Colour medium ferruginous yellow, gaster lighter, clear honey-yellow.

*Female*—Gynetype and one paragynetype. TL 4.7, 5.4 mm.; HL 0.92, 0.93 mm.; WL 1.36, 1.40 mm.; CI 91, 93; MI 37, 39. Dealate. Differing only in the usual features of full sexuality from the workers.

*Type locality*—Sea Lake, Victoria (J. C. Goudie). Sea Lake is in north-western Victoria, in the dry Mallee District. Dominant vegetation in this region is the shrubby mallee (*Eucalyptus dumosa* and related forms), but I have no information as to the precise type of nest site.

The holotype and gynetype, pith paratypes, returned to Mr. John Clark, for eventual placement in the Commonwealth Scientific and Industrial Research

Organization collection at Canberra; paratypes also in the collections of the Museum of Comparative Zoology, Harvard University, the U.S. National Museum, the South Australian Museum, and elsewhere.

? MESOSTRUMA MONSTROSA

*Mesostruma monstrosa* Viehmeyer *incertae sedis* *Epostruma monstrosa* Viehmeyer, 1925, Ent. Mitt., 14, 30-31, female?

? *Mesostruma monstrosa* Brown, 1948, Trans. Amer. Ent. Soc., 74, 119. gynandromorph?

This species was described from a specimen showing right-left asymmetry of the mandibles; from the somewhat vague details given, one would assume it to be a gynandromorph. Viehmeyer compared it with *turneri* and with *Epostruma quadrispinosa* Forel. Adapted extracts from the original description:

"Length 4.5 mm. Reddish-brown, gaster dark brown. Mandibles basically as in *turneri*, with the same basal tooth. Right shorter, a bit broader than the left, and with a more convex (mehr gebogen) outer border. The left with two quite similar acute teeth at least three times as long as broad. The right has only the under one similarly formed; the upper one is only a short, truncate piece (as in *Odontomachus*) in appearance."

"Head longer and more slender than in *turneri*, more deeply excised behind."

Viehmeyer mentioned that the closest form is *E. quadrispinosa*, and the description of the left mandible, especially the (apical?) teeth, seems to bear this out. However, the description as a whole is confused and vague and seems to show that the author had no clear idea of either of the two species against which comparison was made. This form can only be considered hopelessly uncertainly placed until it is critically re-examined by a competent worker. The locality given is Trial Bay, but Mr. Clark (in litt.) questions the accuracy of this and other Australian locality citations of Viehmeyer. After having dealt with this and other examples of Viehmeyer's systematic publication, I am inclined to the opinion that not only the genus and type locality are to be questioned, but perhaps even the tribal placement in the Dacetini. It is unfortunate that this apparently abnormal specimen was ever formally named.

Key for the separation of the two adequately known *Mesostruma* species, based on the workers.

Humeri acutely subdentate; gaster largely smooth and shining (Victorian Mallee) .....	<i>laevigata</i> n. sp.
Humeri gently rounded; gaster finely longitudinally striate over the basal half or more of the dorsum of segment I (vicinity of Mackay, Queensland) .....	<i>turneri</i> (Forel)

REFERENCES CITED

BROWN, W. L. 1948 A preliminary generic revision of the higher Dacetini (Hymenoptera: Formicidae) Trans. Amer. Ent. Soc., 74, 101-129, figs.