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**TAXONOMY AND RELATIONSHIPS OF *MESOPALARUS* BRAUNS  
(HYMENOPTERA: SPHECIDAE, LARRINAE)**

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*Abstract.*—The taxonomy and relationships of the southern African genus *Mesopalarus* Brauns, 1899 are examined. *Mesopalarus turneri* Arnold, 1931 is synonymized with *M. mayri* Brauns, 1899, making the genus monotypic. The hitherto unknown male of the species is described and figured. A relationship between *Mesopalarus* to *Palarus* Latreille is supported.

*Key Words:* Hymenoptera, Sphecidae, *Mesopalarus*, synonymy, male, relationship, southern Africa

Fresh material of both sexes of the poorly known southern African genus *Mesopalarus* Brauns, 1899 has in recent years been collected near Prince Albert in the Cape Province and deposited in the Albany Museum. This has provided the incentive to gather together the small number of *Mesopalarus* specimens, including the types, housed in other collections, to reassess the status of the two described species, to describe the first male, and to examine the relationships of *Mesopalarus* within the Larrinae (*sensu lato*).

Acronyms of institutions housing examined material:

- AMG: Albany Museum, Grahamstown, South Africa.  
 BMNH: British Museum (Natural History) (= Natural History Museum), London, England.  
 SAM: South African Museum, Cape Town, South Africa.  
 TMP: Transvaal Museum, Pretoria, South Africa.

*Mesopalarus mayri* Brauns

*Mesopalarus Mayri* Brauns, 1899: 420, female, incorrect original capitalization.

Holotype: female, South Africa: Port Elizabeth (TMP).—Arnold, 1923: 16, (revision); Bohart and Menke, 1976: 306 (listed).

*Mesopalarus Turneri* Arnold, 1931: 205, female, incorrect original capitalization. Holotype: female, Namibia: Aus (BMNH), new synonym.—Bohart and Menke, 1976: 306 (listed).

*Mesopalarus* was described by Brauns (1899) for a single female collected by him on 25 December 1896 in the vicinity of Port Elizabeth, Cape Province, South Africa and named *M. mayri*. Apparently Arnold was unaware of the existence of any further material when he redescribed the species in 1923. Arnold (1931) described a second species, *M. turneri* from Aus, S. W. Africa (now Namibia), again from a single female. Other than for apparently minor differences given by him, Arnold stated it to be very similar to *M. mayri*. Bohart and Menke (1976) stated that they had seen an example of each species, that the two were very close structurally, and that *M. turneri* might prove to be only a color form of *M. mayri*.

Direct comparison by the present author of Brauns' and Arnold's holotypes has led

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to the conclusion that they are not specifically distinct and *M. turneri* Arnold is consequently placed in synonymy with *M. mayri* Brauns. Differences noted by Arnold, where not illusory, are considered to be merely expressions of individual variation. Study of four additional females has served to reinforce this conclusion.

*Male* (Figs. 1-7): Black. The following various shades of red: basal two-thirds of mandibles, sometimes medially produced free margin of clypeus, labrum, greater part of produced lower surface of flagellomeres I-VIII, sometimes postero-lateral flanges of scutellum and metanotum, distal parts of coxae of fore and middle legs, entire hind coxae and parts of sternum adjacent to them, greater part of rest of all legs including claws, most of abdomen. The following yellow: minute spots at centre of produced lower surface of flagellomeres I-VIII, pronotal lobes, anterior spot and inner margin of otherwise mostly hyaline tegulae, costal lamella, transverse bands on anterior half of terga I-V (fairly distinct on I, increasingly diffuse and indefinite on II-V), postero-lateral markings on tergum I, extreme apex of fore coxae, elongate mark on apical half of fore femora posteriorly, apex of middle and hind femora, streaks on tibiae dorsally, extreme base of first tarsomeres dorsally.

Wings hyaline, tinged with yellow; veins light red.

Head (Fig. 1) wider ( $\times 1.15$ ) across eyes than long in the midline (measured from tip of clypeus to vertex). Eyes enlarged, glabrous, with facets progressively enlarged from bottom to top; inner orbits concave below and convex above, closely approaching each other above ocelli (shortest distance only slightly more than half the diameter of a hind ocellus). Ocelli lower on face than in female, cramped together due to inward enlargement of eyes; anterior ocellus transversely oval (1.33 wider than high), separated from inner orbits by slightly less than its width; hind ocelli subcircular, their diameter  $0.63\times$  anterior ocellus width, separated from each other by their

diameter and from anterior ocellus by half their diameter, barely separated from inner orbits.

Antennal sockets separated from fronto-clypeal suture by about half a socket diameter; distance between sockets about  $1.4\times$  that between socket and inner orbit. Face around the sockets appearing more deeply sunken than in female due in part to greater tumidity of face above each socket and the broadly bulbous appearance of the median part of the clypeus.

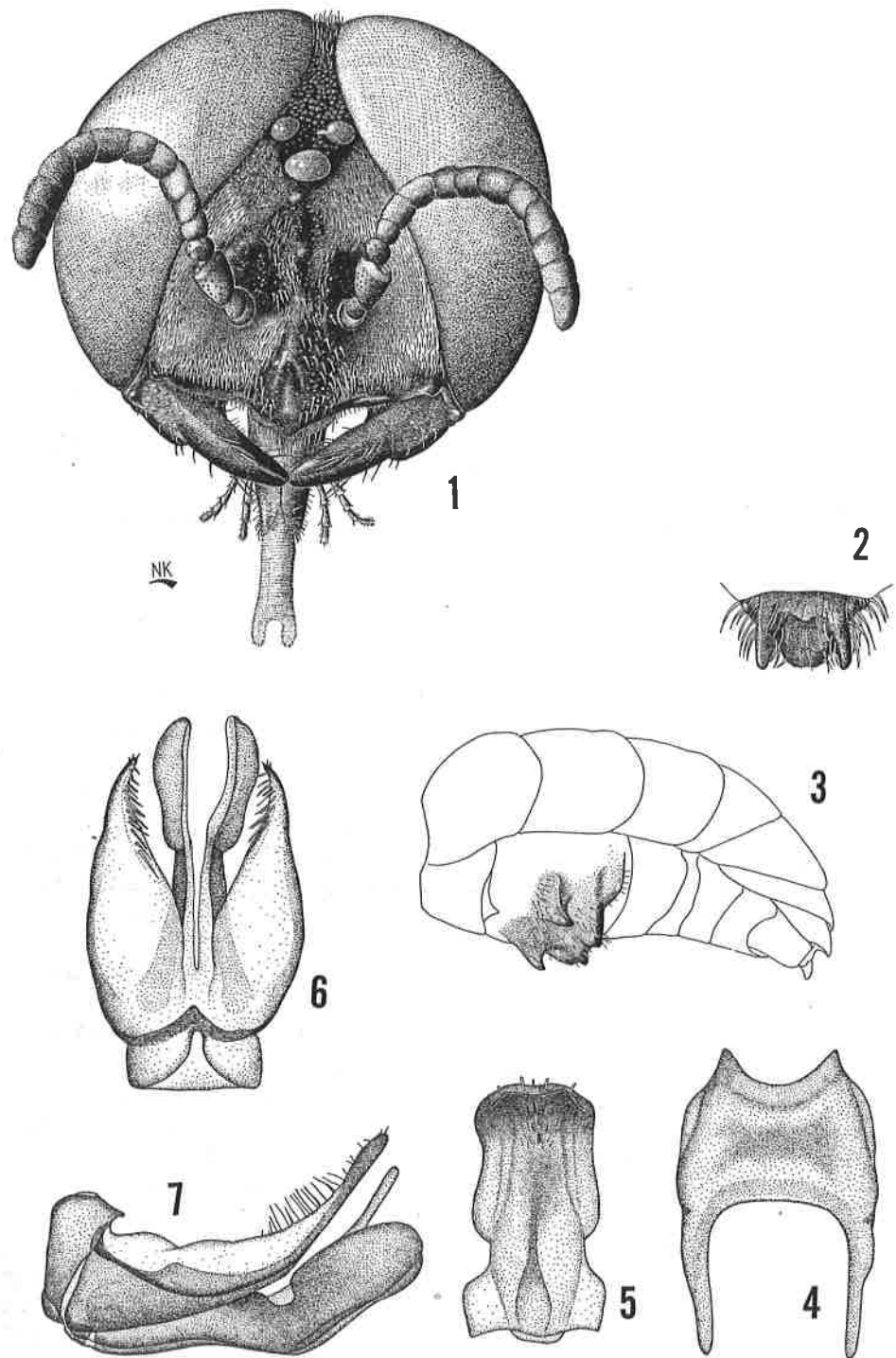
Clypeus as in female except that free margin is laterally somewhat more deeply swept back and is more strongly backwardly bent.

Antennal scape (without radicle) subtriangular, a little longer than wide; pedicel symmetrical, one and two-thirds times wider than long; flagellomeres I-X wider than long, I-IX of gradually increasing width, X as wide as VIII, XI slightly longer than wide at base, widely rounded apically, unmodified. Flagellomeres I-VIII on underside each roundly produced medially (transversely so on wider more distal units) and falling away to basal and apical articulations, together in profile appearing smoothly and regularly undulate and with the surface smooth and shiny, contrasting with the matt surface of the rest of the flagellum.

Thorax and propodeum in all respects like those of female.

Fore trochanter, seen from below, with anterior margin progressively rising from base to a narrowly rounded projection at three-quarters of its length and then falling markedly to the apex. Fore tibia with a row of three short, stout setae dorsally in distal third. Fore basitarsus as in female with well-developed tarsal rake composed of about 18 long, fine, close set, gently curved setae, and in addition with a small number of similar setae arising dorsally and subapically. Tarsomeres II and III also with dorsal subapical setae.

Tergum VI on each side with small longitudinal tubercle. Tergum VII (Fig. 2) with dorsal and lateral surfaces almost at right



Figs. 1-7. *Mesopalarus mayri* Brauns, male. 1, Head. 2, Tergum VII. 3, Metasoma showing details of modifications to sternum II (ventro-lateral view). 4, Sternum VII (ventral view). 5, Sternum VIII (ventral view). 6, Genitalia (ventral view). 7, Genitalia (lateral view).

angles, with median, flattened, subtruncate pygidial plate flanked on each side by strongly raised longitudinal projection; free distal part of projections in dorsal view of roughly even width and apically rounded, in lateral view somewhat downcurved and apically acutely pointed; sides of tergum VII with posteriorly directed, depressed, subacute tooth basad of origin of dorso-lateral projections and with ventral margins heavily sclerotised and bearing downwardly directed tooth (fitting into slight lateral emargination of sternum VIII).

Sternum II (Fig. 3) with the disk raised and bearing the following modifications, starting proximally and proceeding distally: on middle third a pair of widely separated transverse carinae strongly produced into acute and posteriorly curved processes; on middle third a strongly raised curved transverse carina sharply emarginate medially and produced and angular on each side of emargination; on lateral third on each side a low transverse ridge. Sterna V and VI respectively with postero-lateral corners bearing a small number of short, stout, posteriorly pointing setae and with many such setae closely set and forming a stiff raised brush. Sternum VII (Fig. 4) unmodified. Sternum VIII (Fig. 5) heavily sclerotised, bituberculate subapically, fitting between downwardly directed teeth of tergum VII.

Genitalia (Figs. 6, 7). Volsella absent; gonostyle with distal half narrowed and downcurved; aedeagus in lateral view markedly angled and downwardly bent at midlength where deeply emarginate ventrally, its distal half expanded and apically smoothly rounded.

Length 8–11 mm, average length of 14 specimens: 10 mm.

*Material examined:* South Africa: Cape Province: Algoa Bay ["in der Nähe von Port Elizabeth," 33.58S, 25.42E], 25.xii.1896 (Dr. H. Brauns) Holotype female of *M. mayri* Brauns (TMP); Willowmore [33.10S, 23.37E], 15.xii.1899 (Dr. H. Brauns) 1 female (TMP); Venterstad [30.47S, 25.48E] Region, x.1935 (Mus. Staff) 1 male (SAM);

Malmesbury [33.28S, 18.43E], 27.i.1947 (Dickson) 1 female (SAM ex National Museum, Bulawayo); Oudtshoorn [33.32S, 22.08E]—Zebra [33.45S, 22.18E], x.1951 (Mus. Expd) 1 male (SAM); Prince Albert Dist., Tierberg, 33.10S, 22.16E, 26.xi.–5.xii.1987 (F. W. Gess, S. K. Gess & R. W. Gess) 1 female and 10 males (female and 4 males on flowers of *Asclepias buchenaviana* Schinz, Asclepiadaceae, and 1 male on flowers of *Acacia karroo* Hayne, Mimosaceae), same locality, 16.xi.1994 (F. W. Gess & S. K. Gess) 1 female and 2 males (on flowers of *Asclepias buchenaviana* Schinz, Asclepiadaceae) (all AMG).

Namibia (formerly South West Africa): Aus [26.43S, 16.12E], xii.1929 (R. E. Turner, Brit. Mus. 1930—113) Holotype female of *M. turneri* Arnold (BMNH).

The holotype female *M. mayri* bears two labels additional to the locality label: a black-edged white label with the words "Type Brauns" written in red ink, and a red type label with the handwritten numeral 146. The specimen is in very poor condition, lacking the metasoma and having both wings of the right side detached and mounted between two strips of celluloid transfixed by the pin. The left fore- and hindlegs lack some tarsomeres. The second female in the Transvaal Museum, from Willowmore, also bears two additional labels: a light red label with "Type female Mesopalarus Mayri Brauns" written in black ink in Brauns' handwriting, and a red type label with the handwritten numeral 145. This specimen is not a type as it is not listed in Brauns' paper. It too is in very poor condition, lacking the metasoma and some tarsomeres of three legs. The head has furthermore been eaten out by dermestids. The holotype female of *M. turneri* bears three labels additional to the two data labels: a red-edged circular type label; a red rectangular printed G. Arnold type label with Mesopalarus Turneri written in Arnold's handwriting; and a white rectangular label reading B.M.TYPE HYM. 21.1,570. The

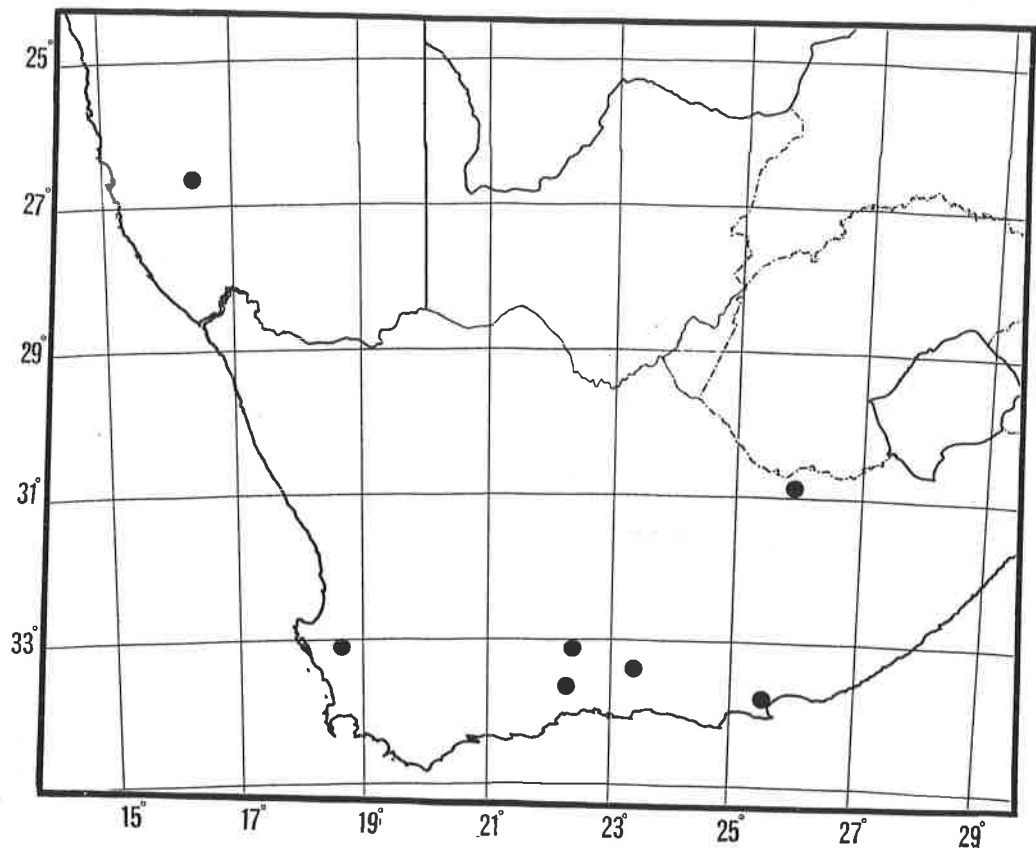


Fig. 8. Map of part of southern Africa indicating collecting localities of *Mesopalarus mayri* Brauns.

specimen which is pinned to a rectangular card is in excellent condition.

*Distribution:* The collecting localities of *M. mayri* are shown in Fig. 8. It may be of significance that all are in areas with low scrub vegetation and that the mean annual rainfall of these localities does not exceed 571 mm (Port Elizabeth) and ranges down to 94 mm (Aus).

#### DISCUSSION

The relationships of *Mesopalarus* have been a matter of debate. Brauns (1899) thought that the genus was to be positioned near *Palarus* Latreille whereas Kohl, in a footnote to Brauns' paper, downgraded it to a subgenus of *Helioryctes* F. Smith (currently a junior synonym of *Paranysson* Guérin-Meneville). Arnold (1923) initially treated *Mesopalarus* as a subgenus of *Par-*

*anysson* but later (1931) reinstated it to generic rank.

Bohart and Menke (1976) assigned *Mesopalarus* to Miscophini (*sensu lato*). Although expressing doubts about Arnold's opinions (page 306), they placed the genus close to *Paranysson* on their dendrogram (Fig. 82). They regarded the Miscophini to be the least homogeneous tribe in the Larrinae as, for example, "it contains several genera (*Larrisson*, *Mesopalarus*, and *Auchenophorus*), the affinities of which are not entirely clear." They also predicted that the discovery of the male of *Mesopalarus* might shed more light on its affinities.

Lomholdt (1985) combined the Larrinae and the Crabroninae of Bohart and Menke into a single subfamily (Larrinae), reduced Miscophini to nine genera only, and assigned *Mesopalarus* (as well as *Plenoculus*

and *Paranysson*) to the lineage corresponding to Crabroninae of Bohart and Menke. He considered the lack of knowledge of the male of *Mesopalarus* as an impediment in his cladistic analysis.

Discovery of the male of *Mesopalarus* makes it possible to reassess the affinities of the genus. A specialization that is shared with *Palarus* and that is unique within the Larrinae is the position of the antennal sockets, separated from the frontoclypeal suture by 0.3–0.5 of the socket diameter. Two conspicuous male apomorphies found only in these genera are: a strongly modified pygideal plate and the lack of a volsella. A transverse carina on sternum II found in *Mesopalarus* and some *Palarus* may have been acquired independently because it is also found in *Larrisson* (Miscophini, *sensu lato*) and in *Heliocausus* (Nysoninae). By contrast, the male genitalia of *Mesopalarus* have none of the specializations (Lomholdt 1985) uniting *Plenoculus* and *Paranysson*: gonostyli constricted subapically, aedeagus dilated apically, aedeagal valves coalesced.

In conclusion, discovery of the male of *Mesopalarus* precludes a close relationship of *Mesopalarus* to *Paranysson* but it does support a relationship to *Palarus*.

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