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Revision of the genus *Mimesthes* (Coleoptera: Meloidae: Mylabrini)

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Abstract. The species of the mylabrine genus *Mimesthes* are revised and a new species (*M. karooensis*) is described from the South African Karoo. The systematic position of the genus is also discussed and an identification key to the species is proposed. Geographical distribution and habitat preferences, as well as other bionomic features, are summarised.

INTRODUCTION

The meloid tribe Mylabrini (as defined by Bologna, 1991) is the largest tribe of the subfamily Meloinae, includes approximately 750 described taxa and occurs only in the Old World. Recently, I have started a project addressed to the review of Mylabrini, primarily focused on the revision of the smaller genera and of single subgenera or groups of species of the large genera *Mylabris* F., 1775 and *Hycleus* Latreille, 1829.

All Mylabrini were referred by early taxonomists to the "collective" genus *Mylabris*. Since the primitive attempt of revision made by Billberg (1813), Marseul published two monographs on the Palaearctic (1870) and Old World (1872) species, and subdivided *Mylabris* into four subgenera, which are now considered as distinct genera (the nominate; two described in the first monograph: *Lydoceras*, *Ceroctis*; another described in the second monograph: *Mimesthes*). Marseul also considered three other genera previously described by other authors on the basis of the antennal segment number and shape (*Actenodia* Castelnau, 1840; *Coryna* Billberg, 1813; *Decatoma* Castelnau, 1840). The systematics of the tribe is still confused, and several taxa have been considered to a generic or subgeneric level, using different synonyms. The classification proposed in my recent contributions (Bologna, 1978, 1990, 1991; Bologna & Coco, 1990) is temporarily utilised in this paper.

The eleven genera included in the tribe (Bologna, 1991) are distributed throughout the Old World, particularly in Africa. The present arrangement of the genera (and synonymies), based on adult characters, is partially in disagreement with the more recent literature (Kaszab, 1969; Selander, 1991), but similar to that proposed by Pardo Alcaide (1950, 1954), who used a different nomenclature.

As recently emphasised (Bologna, 1991), larval morphology and biology greatly influenced the phylogenetic reconstruction of several groups of Meloidae. Recent research on larval morphology of Mylabrini (Bologna & Pinto, in press) partially clarifies the possible relationships among a few taxa. Unfortunately our knowledge on the mylabrine larval morphology and development is minimal: records of less than 60 species of 5 genera have been published, but only a few of these studies are exhaustive (e.g. Paoli, 1932, 1937). In the last ten years I obtained triungulins of about 25 additional species of Mediterranean and African *Mylabris*, *Hycleus*, *Ceroctis*, and *Paractenodia* Péringuey, 1904. Attempts to rear other genera (*Mimesthes*, *Lydoceras*, *Croscherichia* Pardo Alcaide, 1950 and *Actenodia* Castelnau, 1840) were not successful (see "Bionomics" for an additional note). The first instar larvae of the two last genera have been described in literature (cf. Bologna & Coco, 1990 for *Croscherichia*; Cros, 1930 for *Actenodia*), and are partially re-examined in the framework of a comparative study (Bologna & Pinto, in press).

The possibility of working on the revision of the tribe is greatly limited by the large number of species of some genera, especially *Hycleus* and *Mylabris*, and by the presence of numerous infraspecific taxa described on the basis of the very variable elytral colouring. Consequently my studies have been primarily addressed to the smaller groups of Mylabrini: I previously revised the Saharo-Sindian genus *Croscherichia* (Bologna & Coco, 1990) and I am presently working on *Lydoceras*, *Paractenodia*, *Actenodia*, and on some groups of species or subgenera of the large genus *Mylabris* (the nominate subgenus *Mylabris* and the subgenus *Calydabris* Kaszab, 1960).

The present paper is aimed at a revision of *Mimesthes*. This genus, endemic to southern Africa, and described by Marseul (1872) as a subgenus in his large revision of the genus *Mylabris*, originally included a single species, *Mylabris* (*Mimesthes*) *maculicollis* Marseul, 1872. Kaszab (1952, 1981) added two more species (*Mimesthes holgaticus* (1952) and *M. nigricollis* (1981), and a fourth species (*M. karooensis* sp. n.) is described in the present revision. After the original description, *Mimesthes* was considered at the generic level by Péringuey (1909) and by all other specialists of the family. The three species previously known were described in the literature more or less in detail, therefore, in the present contribution only a brief diagnosis is given while additional morphological characters are discussed and figured. Some ecological and faunistic records are also added, as well as a key to species.

MATERIAL

Examined for the present study were 293 adult specimens of *Mimesthes maculicollis*, 18 of *M. karooensis*, 103 of *M. holgaticus*, and 31 of *M. nigricollis*, from the collections indicated in the text with the following abbreviations: CB – M. Bologna coll., Università di "Roma Tre", Rome; FSCA – Florida State Collection of Arthropods, Gainesville (the L.F. and R.B. Selander coll. of Meloidae); JP – J.D. Pinto coll., University of California, Riverside; HNHM – Hungarian Natural History Museum, Budapest; MCSN – Museo civico di Storia naturale "G. Doria", Genoa; MNHN – Muséum national d'Histoire naturelle, Paris; PPRI – National Collection of Insects, Plant Protection Research Institute, Pretoria; SAMC – South African Museum, Cape Town; SMWN – State Museum of Namibia, Windhoek; TMSA – Transvaal Museum, Pretoria.

Genus *Mimesthes* Marseul, 1872

Mylabris (*Mimesthes*) Marseul, 1872: 566.

Mimesthes: Péringuey, 1909: 220; Borchmann, 1917: 23; Kaszab, 1952: 51; Bologna, 1978: 146; Kaszab, 1981: 179; Bologna, 1991: 184; Selander, 1991: 72.

Type species: *Mylabris* (*Mimesthes*) *maculicollis* Marseul, 1872 (fixed by monotypy).

Adult morphology

A member of Mylabrini sensu Bologna (1991). Small-sized (length: 7–13.1 mm; width on elytra: 2.7–5.2 mm), short and sub-rectangularly shaped (Fig. 1); body black without metallic reflections, antennae black, partially or entirely rufous; elytra yellow-orange with black spots and bands. Head transverse, temple shorter than eyes, which are large and bulging; antennae with 11 visible segments, the last 3 very compressed and approached, or with 8 visible segments due to the complete fusion of the last 4 segments (*karooensis*), short and clavate, distinctly longer and more slender in the male, more enlarged apically in female; male maxillae and palpi unmodified. Pronotum transverse, subquadrate, not distinctly narrowing anteriorly; mesosternum without a definite shield or oblique furrows, with a large anterior smooth and glabrous area well demarcated from the remaining surface which is densely setose; mesepisterna narrow and only slightly bordered; elytra flat and large, subrectangular, subtransversely truncate at apex with sutural angle subquadrate. Male pro- and mesotarsi with thickly sericeous yellow pads and slightly enlarged segments, only with a few modified setae at apex of posterior tarsi; female tarsi normally setose, slender and with isolated elongate setae on external margin; segment I of tarsi longer than II + III together; female fore tibiae externally acutely protruded at apex; spurs of metatibiae both similar, elongate, pointed; tarsal claws normal, ventral blade about as long as dorsal. Parameres apically slender, more or less depressed on side; aedeagus apically subquadrate in lateral view, with a single hook (see notes on *M. nigricollis*), extremely far from apex, similar and probably homologous to the proximal hook of other Mylabrini; aedeagus gibbose near the ventral opening of the ductus ejaculatorius; hook of endophallus very elongate, slender, slightly curved at apex.

Fig. 1. Habitus of *Mimesthes karooensis* sp. n. (length 13 mm).

Relationships

Bologna (1978, 1991) and Bologna & Coco (1990) proposed a phylogenetic arrangement of Mylabrini and distinguished at least three possible phyletic lineages. One of these included *Mimesthes*, *Actenodia* and *Paractenodia* (considered as possible synonym of *Actenodia*). The recent study of numerous *Paractenodia* specimens and of the triungulin of *P. parva* Péringuey, 1904 (Bologna, unpubl.) confirmed the validity of this genus and clarified its true relationship with another lineage that includes the genera *Hycleus* and *Ceroctis*.

This phyletic lineage, containing only *Mimesthes* and *Actenodia*, is identified by the following characters: Mesosternum without a definite shield, mesepisterna scarcely bordered; aedeagal hooks positioned far from apex or reduced to a single hook; antennal apical segments compressed and progressively enlarged, completely or incompletely fused.

The genus *Actenodia* is well differentiated from other Mylabrini both by adult (pronotum, mesosternum, aedeagus, antennae) and larval features (leg structure). Some of the southern African species, included in this genus due to the presence of only 8 antennal segments, actually should be referred to *Hycleus* based on mesosternal and aedeagal structures (Bologna, unpubl.; cf. also Bologna, 1990 for other East African species with the same character). Unfortunately, the *Mimesthes* triungulin is still unknown (see "Bionomics" for an additional note); consequently the true affinities of this genus remain unclarified, and only a few unverified synapomorphies with *Actenodia* (pronotum transverse, mesosternum without a definite shield, aedeagus with proximal hook very far from apex) can be proposed.

Autapomorphic characters distinguishing *Mimesthes* as monophyletic group are: Antennal segments apically compressed but antennae not clubbed, only clavate; strongly transverse pronotum; elytra flat, subrectangular,

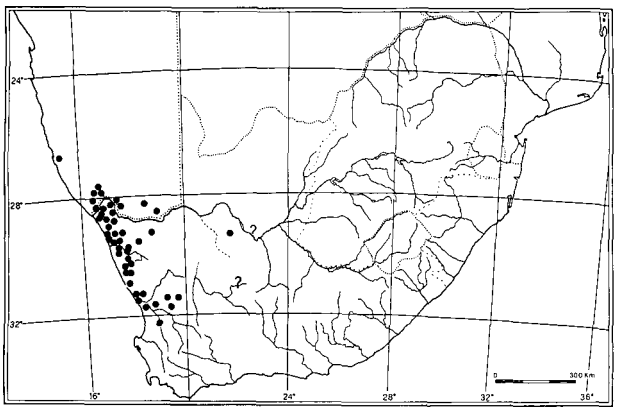


Fig. 2. Distribution of *Mimesthes maculicollis* Marseul.

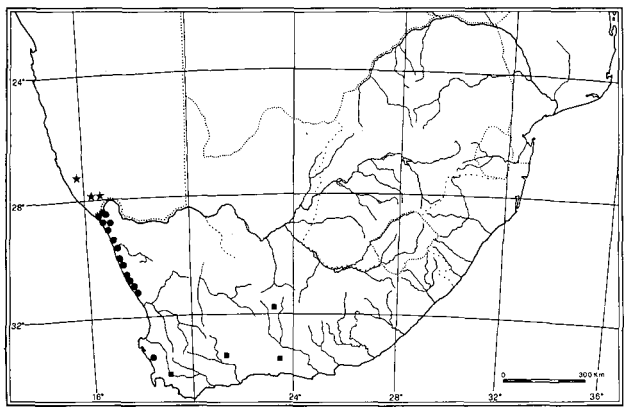


Fig. 3. Distribution of *Mimesthes karooensis* sp. n. (squares); *M. holgaticus* Kaszab (circles); *M. nigricollis* Kaszab (asterisks).

transversely truncate at apex; only proximal hook of aedeagus present. Similarly shaped elytra occur in one Namibian species of *Hycleus* and three other undetermined Mylabrini from the same region.

Bionomics

Zoogeography. *Mimesthes* is endemic to the "Karoo-Kalahari" zoogeographical subregion, restricted to southern Namibia and western South Africa. The range of the genus (Figs 2, 3) includes a coastal and subcoastal area in Namibia and Namaqualand, between about 26° on North and 33°30′ to South, the Bushmanland and northern Karoo (from Aggeneys to Putsonderwater, and from Vanrhynsdorp to Carnarvon and Prieska), the southern and central Karoo (from Stellenbosch to Willowmore and Victoria West) to East. This range is more or less paralleled by several other insect genera, including some Meloidae: *Iselma* Haag-Rutenberg, 1879, *Paractenodia*, and an undescribed lyttine genus (Bologna, unpubl.). It is generically referable to the distribution of the "Cape-Namaqua elements" (Holm, 1990; see also the "Cape-western extension" proposed by Endrödy-Younga, 1978), or, more extensively, to the "Karoo-Namib regional centre of endemism" proposed by White (1983) for plants.

Only one species, *M. maculicollis*, has an extensive geographical range in Namib, Namaqualand and Karoo. This range overlaps completely with those of *M. nigricollis* (strictly endemic to the extreme southern Namib desert) and *M. holgaticus* (endemic to a narrow coastal strip along Namaqualand), while *M. karooensis* is endemic to the Little Karoo and southern Great Karoo (Figs 2–3).

Except for *M. maculicollis*, other species are allopatric and perhaps represent primarily vicariant elements derived from speciation events in original isolated xeric areas. The recent strong modifications of the original habitats caused by grazing (see Acocks, 1988: maps 1 and 2) perhaps produced a recent extension of the range of the more euryoecious species (*M. maculicollis*). *M. nigricollis* is syntopic and synchronic only with *M. maculicollis* in a single locality (Obib dunes); *M. holgaticus* is syntopic and more or less completely synchronic with *M. maculicollis* only in a few localities of the Namaqualand coast (Jakkalsputs, Holgat and environs, Oograbies, Porth Nolloth, Buffelsrivier, Dembergsdraai, Kotzesrus).

Habitat preferences. The range of *Mimesthes* includes different types of habitats, but particularly the Succulent-Karoo semidesert, and in part the Namib desert and Main Karoo deserts and semideserts (Little Karoo, Great Karoo, Central Upper Karoo, Northern Karoo, etc.). For habitats details see White, 1983; Acocks, 1988; Seehly, 1990; and Rutherford & Westfall, 1994. In the coastal southern Namib, Richtersveld and Namaqualand, these xeric habitats are characterised by very scarce rains, usu-

TABLE 1. Distribution of records of *Mimesthes* species for Habitats (South Africa) and Biomes (Namibia).

Habitats and Biomes (no. of records)	*maculicollis*	*karooensis*	*holgaticus*	*nigricollis*
Strandveld	9	–	18	–
Succulent Karoo	23	–	–	–
Namaqualand broken veld	15	–	–	–
Orange river broken veld	1	–	–	–
Western Mountain Karoo	3	–	–	–
Arid Karoo	2	–	–	–
Karroid broken veld	–	2	–	–
Central upper Karoo	1	1	–	–
Coastal Renosterveld	–	1	–	–
Namib Desert Biome	8	–	–	1
Succulent Karoo Biome	3	–	–	2
Nama Karoo Biome	2	–	–	–
Total no. of records	63	4	18	3

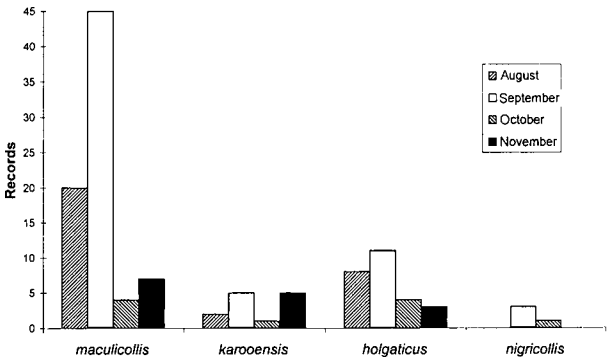


Fig. 4. Seasonal distribution of adults of *Mimesthes*.

ally restricted to July and August in the last two regions, and almost absent in Namib, where humidity is derived almost completely by fog condensation produced by the cold Benguella current. Also, the Main Karoo habitats are extremely arid. With the exception of the Little Karoo, the rains are concentrated in the summer season (December–February).

In Table 1, the distribution of records for the different habitats (according to the South Africa veld types proposed by Acocks, 1988) is represented. No similarly detailed habitat division is available for Namibia; in Table 1, the distribution of Namibian records are summarised, separated into the biomes proposed by Ruthenford & Westfall (1994) and slightly modified according to J. Irish (unpubl.).

M. nigricollis Kaszab is particularly related to the Namib Desert Biome and the Succulent Karoo Biome; the original labels indicate that type specimens were collected on dunes. *M. holgaticus* is totally restricted to coastal sand flat or subcoastal sand hills ("Strandveld"); labels of several specimens indicate as habitat red dunes (Holgat, Manganese mines), white dunes (Kotzerus, Zwartduine), generically "dunes" (Rooidam Farm), or also "sand hill" (Buffelsrivier, Dembergsdraai). Also some specimens of *M. maculicollis* have labels indicating "red dunes" (Holgat; Roudabel Farm), but this is a more euryoecious species, associated particularly with several "velds" types of the Succulent Karoo and Nama Karoo Biomes. Finally, *M. karooensis* also is associated with different "velds" types of the Succulent Karoo Biome

All species are apparently restricted to low and middle elevations: *M. holgaticus* is distributed from sea level to 200 m a.s.l.; *M. nigricollis* perhaps reaches slightly more elevated areas; *M. maculicollis* is more euryzonal, from sea level to about 1,000 m a.s.l. of elevation in the Springbok and Hantamberge areas (Namaqualand); *M. karooensis* probably occurs at intermediate elevations in the Karoo (250–1,000 m), and perhaps is marginally distributed at lower elevations near Stellenbosch.

Food plants of adults. No records of adult host plants have been published. I have repeatedly collected *M. maculicollis* in Namaqualand on Asteraceae and Mesembryanthemaceae flowers (once on an unidentified Zygophyllaceae), the dominant plant families flowering in this area during the spring; original and museum records of *M. maculicollis* are detailed in Table 2. The preponderance of *Arctotis* and *Osteospermum* records suggests that these genera are preferred over other Asteraceae, as well as *Cephalophyllum* vs. other Mesembryanthemaceae. Some *M. maculicollis* specimens were maintained by the author on Asteraceae flowers of different species.

As regards to other species, the museum label of one *holgaticus* specimen from Hoekbai River (TMSA) indicates "on Mesembryanthemaceae". A single specimen of *M. karooensis* was personally collected near Ladismith on a yellow unidentified species of *Osteospermum* (Asteraceae); the single specimen from Victoria West is labelled "from flowers". No information is available on *M. nigricollis*.

Behaviour and general adult activity. No behavioural information is available; only defence behaviour with thanatosis and autohaemorrhagy, on flowers or on ground, was personally observed in *M. maculicollis* and *M. karooensis*. Adult *Mimesthes* are, from personal observations and the apparent complete lack of records at lights, strictly diurnal.

Records of seasonal adult activity are summarised in Fig. 4: all species have a very restricted period of activity during spring (particularly after the winter rains in September).

According to museum labels, specimens of *M. maculicollis* were collected using "faeces bait 76 days traps" (Vredendal, TMSA), or "ground traps with meat bait" (Stinkfontein, TMSA); probably in both cases the bait humidity attracted a few specimens.

Mimicry. Possible cases of Müllerian mimicry concern the sympatric populations of different *Mimesthes* species as well as three sympatric undescribed mylabrine species perhaps referable to a new genus (Bologna, unpubl.), distributed along the Namib desert. Mimicry is assumed on the basis of museum specimens sympatric with *M. maculicollis*, and the extreme phenotypical resemblance. One species of undescribed mylabrine was collected in syntopy with *M. nigricollis* and shows similar red colour of antenna and similar elytral colouring. All these mylabrine species have orange lateral spots on pronotum, similar elytral colouring, and subrectangular shape of elytra; the presence of red-orange colouring on pronotum is very uncommon in the Mylabrini. They clearly differ from *Mimesthes* by the antennae, pronotum, and the aedeagus (distal hook only, at least in two of the three species).

Larval biology. No information on larval biology and morphology is available. Rearing attempts of *M. maculicollis* from three different Namaqualand localities (September 1994) have been unsuccessful. (Note: While this paper was in press, I obtained the triungulin of *M. maculicollis*, which will be described in a separate paper.)

Species taxonomy

The species of this genus are phenetically very similar, and form a well-isolated monophyletic group. Only possible autapomorphies but no synapomorphies among species have been identified, and consequently no phylogenetic inferences are proposed here. Phenetic similarities or differences involve antennal, pronotal and setal colour-

TABLE 2. Food plant records of *Mimesthes maculicollis*.

Plant	Locality	Collector
Mesembryanthemaceae		
Cephalophyllum sp.	Aninaus Pass	M. Bologna
Cephalophyllum sp.	18 km N of Grootmis	M. Bologna
Cephalophyllum sp.	15 km N of Garies	M. Bologna
Mesembryanthemaceae indet.	Clanwilliam	L. Schulze (Transvaal Museum)
Zygophyllaceae		
Zygophyllaceae indet.	Aninaus Pass	M. Bologna
Asteraceae		
Arctotis sp.	3 km S of Steinkopf	M. Bologna
Arctotis sp.	3 km NW of Springbok	M. Bologna
Arctotis sp.	1 km S of Nuwerus	M. Bologna
Arctotis sp.	Spectacle Pass	M. Bologna
Arctotis sp.	3 km E of Kleinsee	M. Bologna
Berkheya sp.	Spectacle Pass	M. Bologna
Castalis sp.	20 km N of Clanwilliam	M. Bologna
Osteospermum sp.	Spectacle Pass	M. Bologna
Osteospermum sp.	Messelpad Pass	M. Bologna
Osteospermum sp.	5 km W of Springbok	M. Bologna
Helichrysum sp.	10 km N of Garies	M. Bologna
Dimorphoteca sp.	5 km SW of N7, S of Springbok	M. Bologna
Orsinia sp.	10 km E of Calvinia	M. Bologna
Asteraceae indet.	Strandfontein	M. Bologna
Asteraceae indet.	10 km N of Bristown	M. Bologna

ing, shape of antennal segments and pronotum, and body puncturation. The aedeagal and mesosternal features are only slightly diagnostic and the elytral colour pattern is similar.

Probably two phenetic groups of species can be distinguished: The first includes *M. maculicollis* and *M. karooensis*; the second includes *M. holgaticus* and *M. nigricollis*, characterised by the pronotum more transverse and the shape of parameres similarly depressed on the side.

M. karooensis is particularly differentiated by the fusion of the last four antennal segments. Other *Mimesthes* species have the apical antennal segments very approached but not fused. The tendency of the fusion of the last segments, sometimes forming an apical club, is probably a homoplasic condition occuring in several other mylabrine genera. *Actenodia* and *Paractenodia* have fused segments (8–11 or 7–11) into a distinct club; *Semenovilia* has completely fused segments 10–11, forming an apical subcylindrical segment; several species of *Hycleus* show a complete or incomplete fusion of the last 2–4 segments, forming a more or less clubbed apex. On the other hand, only two and one species of *Mylabris* and *Croscherichia* have segments 10–11 fused.

Three species of *Mimesthes* have partially red pronotum, an uncommon condition in Mylabrini, which usually have black pronotum. The black colour of *M. nigricollis* perhaps could be considered a primitive condition. Antennae are partially red in two species, another uncommon condition in other mylabrine species (except in several *Hycleus* and in a few species of other genera), particularly in the genus *Actenodia*, here considered as a taxon probably related to *Mimesthes*.

The species of *Mimesthes* are very similar in general shape and colouring, and were described in detail by Marseul (1872, *M. maculicollis*) and Kaszab (1952, *M. holgaticus*; 1981, *M. nigricollis*). Here are presented only brief descriptions and figures, in comparison with *M. maculicollis*.

Key to the species of *Mimesthes*

1 Antennae partially red, if completely dark rufous, hairiness of the fore part of the body dark; pronotum completely black or black and partially red 3
– Antennae black or only segments III–V dark reddish; body hairinesss grey-yellow; pronotum black medially and on margins, with two anterior red spots on sides 2
2 Antennae in both sexes not extending to the pronotum base, and last four antennal segments apparently fused (Fig. 16), forming an enlarged terminal segment, more evident in female; antennal segments V–VI shorter, VI as long as wide; body setation long and dense, downy on frons in lateral view; ratio of mandible length to head length in lateral view (from the fore margin of eye to the vertex) = 0.7; gonoforceps and aedeagus as in Figs 13–15. Little Karoo and southern Great Karoo ..... *karooensis* sp. n.
– Antennae in both sexes slender and elongate, extending in the male to the pronotum base; last three antennal segments approached and compressed but clearly distinguishable (Fig. 10); antennal segments V–VI longer than wide; body setation sparse also on frons; ratio of mandible length to head length in lateral view (from the fore margin of eye to the vertex) = 0.9; gonoforceps and aedeagus as in Figs 6–8. From the extreme SW Namib along the Namaqualand south to Clanwilliam; Bushmanland; northern Great Karoo .... *maculicollis* (Marseul)

3 Pronotum completely black, slightly wider than long, with more scattered punctures; antennal segments III–XI yellow-orange; apical margin of elytra yellow; tarsi brown; setae light and more recumbent on the head and pronotum; gonoforceps and aedeagus as in Figs 24–26. SW Namib ... . *nigricollis* Kaszab

– Pronotum black on posterior and anterior margins, red in the middle, usually without a longitudinal middle black stripe; pronotum two times wider than long, with denser punctures; setae dark on head and pronotum, erect; antennal segments III–IV black, V–XI yellow-red, rarely dark rufous; sutural black margin of elytra extends to apical margin; gonoforceps and aedeagus as in Figs 19–21. Coastal Namaqualand (from Orange River to 33°S) ..... *holgaticus* Kaszab

Mimesthes maculicollis (Marseul, 1872)

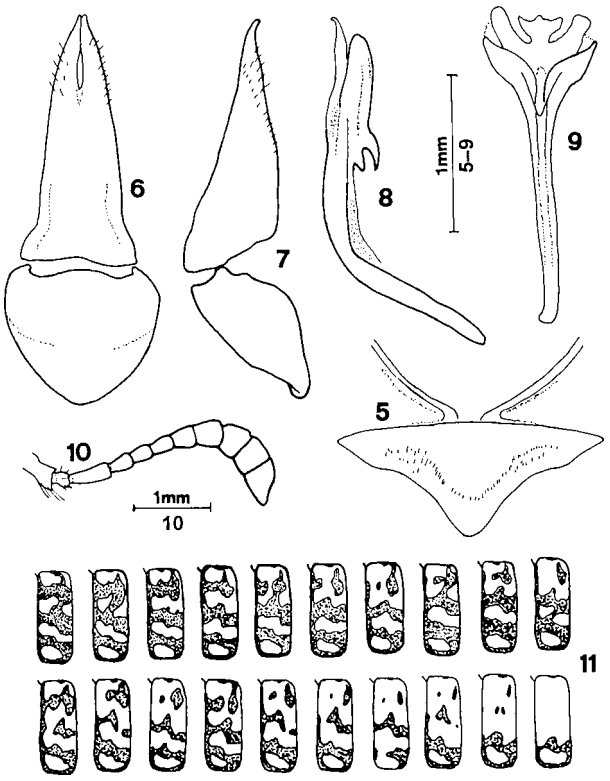
Mylabris (*Mimesthes*) *maculicollis* Marseul, 1872: 567, Table II Fig. 76; Kuzin, 1954: 367.

Mimesthes maculicollis: Péringuey, 1909: 220, Figs 133–136; Kaszab, 1952: 51, 53, Figs 4–19; Kaszab, 1955: 407, Figs 5–8; Kaszab, 1959: 75, Fig. 19.

Description. Body black, antennal segments III–V in some specimens dark reddish, pronotum orange on sides and partially on the middle, elytra yellow-orange with variable black colouring including spots and transverse bands; setation yellow-grey, long on head, pronotum and ventral side, shorter on elytra. Body length: 8.7–13.1 mm; elytral width at widest point: 3–5 mm.

Head slightly transversally depressed on frons, punctures approaching but not confluent, particularly on tempora, large and moderately deep. Mandible elongate, about half as long as the length of head: In lateral view, the ratio of mandibles length to head capsule length (from the eye fore margin to vertex) is 0.9. Labrum longitudinally depressed in the middle, less punctured than head. Labial and maxillary palpi completely black, last segment of maxillary palpi elongate, oval, subtruncate at apex. Male antennae extending to the pronotum base (Fig. 10), 11-segmented, last three segments compressed but distinct and not fused; segments I–II long with erect setae, III–XI with very short and dense setae; segment I elongate and slightly inflated apically, segment II short and subspherical, III cylindrical and three times as long as segment II, 1.5 times as long as IV, segments IV–V cylindrical, decreasing in length, VI similarly shaped to IV and V, about as long as IV, segments VII–IX subtrapezoidal, anteriorly enlarged and similar in length, progressively more transverse, segment X subrectangular, slightly shorter than IX, segment XI obtuse apically, basally as wide as segment X at apex. Female antennae shorter and subclavate, segments VIII–XI distinctly wider than in male.

Pronotum rectangular and transverse, about 0.8 as long as wide; laterally parallel and anteriorly obtusely arcuated, with a short longitudinal depression in the middle and slightly depressed basally, punctures more sparse than on head; basal half, medial longitudinal strip, and the anterior and lateral margins black, anterior sides yellow-orange. Prosternum posteriorly short. Mesonotum rounded at apex. Mesosternum (Fig. 5) only with an anterior smooth and glabrous subtriangular area, slightly depressd in the middle. Metasternum obtusely angulate at apex. Legs elongate and slender, completely black



Figs 5–11: *Mimesthes maculicollis* Marseul. 5 – mesosternum; 6 – gonoforceps, ventral view; 7 – gonoforceps, lateral view; 8 – aedeagus, lateral view; 9 – spiculum gastrale; 10 – male antenna; 11 – elytral variability (from Kaszab, 1952, 1955, modified).

Elytra distinctly wider than pronotum, more than three times as long as pronotum, with contiguous punctures, deeper on black colouring. The extent of black colouring is variable; basically three transverse zig-zag bands connected along the suture and extended along the apical margin, isolating a yellow suboval apical spot; anterior black band more or less completely extended on humerus and connected to the black base. The elytral colour pattern is very variable (Fig. 11) and includes more or less wide or incomplete bands, sometimes anteriorly reduced to isolated spots, or reduced to an extreme yellow form with black margins. Kaszab (1952, 1955) described 20 infraspecific forms.

Posterior margin of penultimate visible abdominal sternum largely arcuate; last visible sternum obtusely angulate on posterior margin, with scattered setae on middle surface; rounded in female. Spiculum gastrale (Fig. 9) Y-shaped with lateral arms foliaceous; gonoforceps ventrally (Fig. 6) with phallobase widely suboval and parameres conically narrowed, laterally (Fig. 7) with parameres not depressed and setose, slightly bent apically; aedeagus in lateral view (Fig. 8) with single hook gibbose and acutely curved.

Remarks. In the original description (Marseul, 1872) the antennal segment I is erroneously indicated as "court

et renflé" and the pronotum is indicated about as wide as the head.

Type material. In the Marseul's collection (MNHN) two very damaged specimens that could be syntypes of this species are preserved.

The first specimen, a male, is labelled: "*maculicollis* Dej. Cap. B." (handwritten, round, sky-blue); "*Mylabris Galamensis* Pér. Seneg." (handwritten, white). This specimen lacks the left antennal segments III–XI, and the rigth antennal segments III–XI are detached and glued on the label; also the left middle leg and the right posterior leg and all tarsi are broken. The second specimen, a female, is labelled: "*maculicollis* Dejean" (handwritten, probably by Dejean, small, white); "*maculicollis*..." (illegible handwriting, perhaps "Cap B."; handwritten, small, sky-blue); "Paratype" (printed, red, not contemporary); "*Mimesthes maculicollis* Mars." (handwritten, rectangular, white); "Muséum Paris coll. De Marseul 2842-90" (printed, rectangular, small, white, not contemporary). This specimen has both antennae broken after segment II. I added the label "*Mimesthes maculicollis* Marseul, M. Bologna det. 1996" (handwritten-printed, rectangular, white).

Type specimens of several variations described by Kaszab (1952, 1955) also were examined (FSCA, HNHM, PPRI, TMSA).

Type locality. "Cap de Bonne-Espérance" (Marseul, 1872). The type specimens are labelled "Cap B." (probably = Cape of Good Hope), but no species of *Mimesthes* occur in the Cape Peninsula. According to the range of the species, the original label probably generically indicates the western Cape Province (South Africa).

Other material examined. Namibia, Lüderitz distr.: Kaukausib Riverbed, 26°53′S, 15°25′E, Diamond area 1 (CB, SMWN); Rosh Pinah, 27°53′S, 16°50′E (TMSA); 10 km NW Rosh Pinah, 27°54′S, 16°42′E (SMWN); Rosh Pinah, 27°56′S, 16°47′E (SMWN); Namuskluft (SMWN); Obib dunes, 28°02′S, 16°37′E (SMWN); Obib dunes, 28°10′S, 16°48′E (SMWN, TMSA); Sendelingedrift, 28°07′S, 16°50′E, Diamond Area 1 (SMWN); Skilpadberg, 28°26′S, 16°39′E, Diamond Area 1 (SMWN); Hohenfels, 28°30′S, 16°37′E, Diamond Area 1 (SMWN). (Karasburg distr.) 3 km S of Gamchab River, 28°19′S, 17°24′E (SMWN); Ortmansboum Farm 120 near Warmad (SMWN); Eendorn Farm 106 [SE of Warmbad] (SMWN).

South Africa, Northern Cape: Bloedorif Orange River (TMSA); 7 km SW of Claims Peak (Richtersveld), 28°26′S, 17°10′E (TMSA); Brandkaross (Richtersveld) (Kaszab, 1955, TMSA); Brandkaross Farm, 28°29′S, 16°41′E (CB, TMSA); Doringpoort (Richtersveld), 28°34′S, 16°56′E (TMSA); 5 km SE of Stinkfontein (Richtersveld), 28°51′S, 17°18′E (TMSA); Jakkalsputs, 28°38′S, 16°54′E (TMSA); 2 km E Holgat mouth, 28°58′S, 16°43′E (TMSA); 16 km E of Holgat, 28°56′S, 16°58′E (TMSA); Holgat (Kaszab, 1952; 1955; FSCA, TMSA); Eksteefontein Valley, 28°47′S, 17°12′E (TMSA); Lekkersing (TMSA); N of Port Nolloth, 29°14′S, 16°52′E (JP); Port Nolloth, 29°14′S, 16°52′E (CB, MNHN); 22 km E Port Nolloth (JP); 2.2 km SW jct R382 (Port Nolloth) and Wolfberg (JP); Oograbies (Kaszab, 1952; TMSA); Farguarson, 29°15′S, 17°15′E (TMSA); 6.5 km S of Die Kruis (Welkrom Farm 523) (JP); 30–60 km W of Steinkopf, ca. 29°17′S, 17°17′E (TMSA); Aninaus Pass W of Steinkopf (CB); idem, 29°17′S, 17°37′E (TMSA); 3 km S of Steinkopf (CB); Aggeneys (Kaszab, 1952; FSCA, TMSA); Putsonderwater (TMSA); near Areb Mnt 22 mil. ENE Springbok (Kaszab, 1956); 10 km E of Springbok (TMSA); 16 km N Grootmis on the road to Port Nolloth (CB); 3–20 km E Kleinsee on R365 (CB); Buffelsrivier Valley, 29°35′S, 17°17′E (TMSA); Springbok (Kaszab, 1956; TMSA); 1–5 km W Springbok on R356 (CB); rd N7–Hondeklipbaai, S of Springbok, 29°47′S, 17°48′E (CB); Spectacle Pass 10–16 km W of Springbok (CB, TMSA); Spectacle Pass 23 km W of Springbok (PPRI); Spectakelberg, 29°41′S, 17°40′E (TMSA); Eselfontein, 29°42′S, 17°43′E (JP); 4.3 km W Komaggas, 29°47′S, 17°26′E (JP); Mesklip, 29°49′S, 17°52′E (TMSA); Messelpad Pass on the road Springbok-Hondeklipbaai (CB); Dassiefontein and Sneeukop, 30°09′S, 17°59′E (SMWN); 10–15 km N of Kamieskroon, ca. 30°07′S, 17°54′E (TMSA); Kamieskroon, 30°11′S, 18°03′E (TMSA); 5–6 km S of Leliefontein near Naras (JP); 15 km N of Garies, junction to Kys (CB); 10 km NNW Garies on N7 (CB); Dembergsdraai, 30°47′S, 17°43′E (TMSA); Roudabel farm, 30°47′S, 17°50′E (TMSA); Kotzesrus, 30°57′S, 17°50′E (TMSA); Niuewoudtville (TMSA); Grootoring, 31°21′S, 19°46′E (TMSA); Groot Toren/Hantamberge, 31°21′S, 19°46′E (CB, JP); 10 km E Calvinia, 31°28′S, 19°58′E (CB); Botterkloof Pass, 31°52′S, 19°15′E (JP); road N12, 10 km N Bristown (CB). Western Cape: 20 km E of Soutpan, 31°12′S, 18°06′E (TMSA); Flaminksvlakte, 31°41′S, 18°31′E (TMSA); 1 km S Nuwerus on R363 (CB); Vanrhynsdorp (TMSA); 20 km W of Vredendal, 31°40′S, 18°31′E (TMSA); 21 km ENE Strandfontein on R27 (CB); 12 km W of Clanwilliam, 32°08′S, 18°40′E (TMSA); Clanwilliam (CB).

General or not identified records and notes. Cape of Good Hope (probably generically referring to the Cape Provinces) (Marseul, 1872; MNHN); Namaqualand (Péringuey, 1909; MNHN); Namaqualand Hester Malan (TMSA); Cape Province Knersvlakte (TMSA).

Péringuey's (1909) records from Carnarvon and Prieska, in the Northern Cape Province, were not examined. The first record is supported by the Bristown record (CB); the record from Prieska is supported by the northern Karoo record from Putsonderwater (TMSA). In the Bloemfontein Museum, a few specimens from the Kenhardt environs [Swardtuinkp (= Zwartkop ?) and Paul se Purts (?)], probably referable to *maculicollis*, were only briefly examined (October 1993) before the identification of the new species *M. karooensis*.

Distribution. Latitudinally from about southern Namibia (just slightly S of Lüderitz) to southern Namaqualand: between about 26°50′S and 32°20′S. Longitudinally from the Atlantic coast to a line connecting Rosh Pinah to Springbok, Clanwilliam and Calvinia, with eastern extensions to the Namibian region of Karas, Bushmanland (Aggeneys) and northern and central Karoo (Putsonderwater and perhaps Prieska; Carnarvon and Bristown) (Fig. 2; the records from Calvinia and Bristown, obtained while the paper was in press, are not mapped).

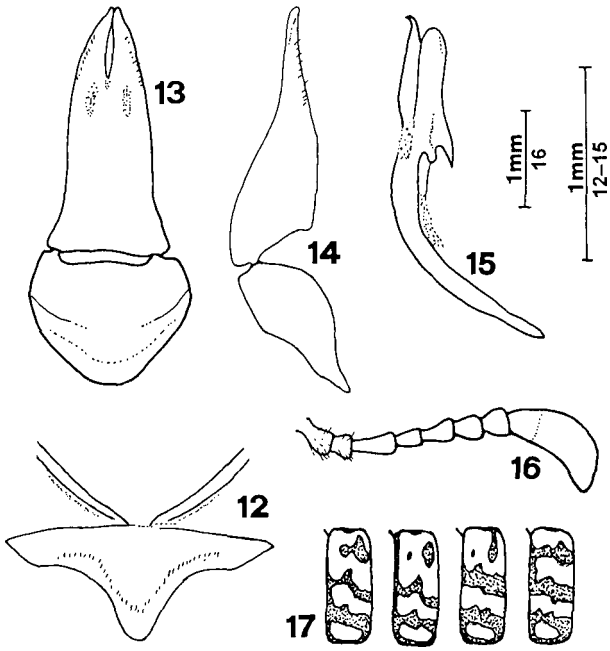
***Mimesthes karooensis* sp. n.**

Diagnosis. A *Mimesthes* with black antennae and black and orange pronotum, close to *M. maculicollis* Marseul, distinguished by the complete fusion of the last four antennal segments, the shorter mandibles, and the downy frontal setation.

Description. Similar to *M. maculicollis* Marseul, except for the following characters.

Setae gold-yellow, very dense on head, pronotum and ventrally; downy on frons, in lateral view. Body length: 9–13.3 mm; elytral width at widest point: 3.3–5.2 mm.

Head less depressed on frons; punctures finer. Mandibles less than half as long as the entire head: in lateral view the ratio of mandible length to head capsule length



Figs 12–17: *Mimesthes karooensis* sp. n. 12 – mesosternum; 13 – gonoforceps, ventral view; 14 – gonoforceps, lateral view; 15 – aedeagus, lateral view; 16 – male antenna; 17 – elytral variability.

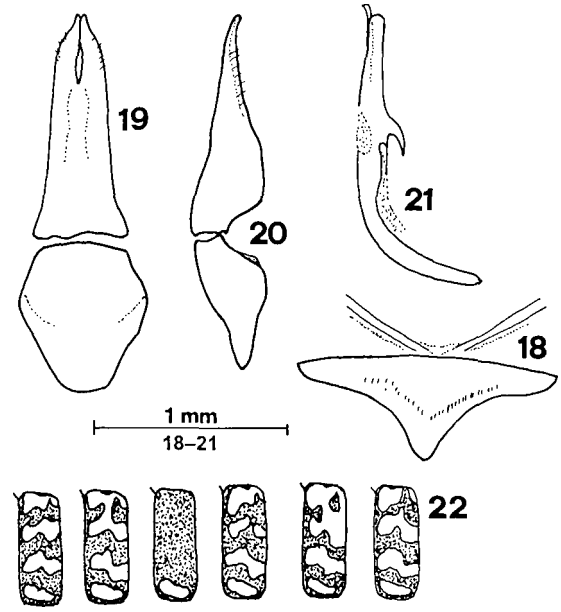
(from eye fore margin to vertex) is 0.7. Antennae in both sexes not extended to the pronotum base; apparently only 8-segmented because of the complete fusion of segments VIII–XI, forming a club, slender in the male (Fig. 16), and subclavate in female; segment VI as long as V; in some specimens a track of the suture between segments VIII and IX is slightly visible.

Pronotum in some specimens less parallel and slightly convergent in the basal half; usually with middle longitudinal black strip. Mesosternum as in Fig. 12. Elytral colouring less variable (Fig. 17) but usually with anterior black band fragmented, with an isolated spot near the suture.

Gonoforceps in ventral view (Fig. 13) more depressed in the anterior half and less conically narrowed; in lateral view (Fig. 14) slightly depressed only at apex; aedeagus (Fig. 15) with hook less gibbose.

Type locality. South Africa, Western Cape: Willowmore.

Type material. 10 specimens from South Africa, Western Cape, labelled: "Capland, Willowmore, Dr. Brauns leg." (det. *Mimesthes maculicollis* Marseul by Z. Kaszab): 1 holotype ♂, 20.xi.1903 (TMSA); 2 paratypes, ♂ and ♀, without date (TMSA); 1 paratype ♂, 10.viii.1916 (TMSA); 1 paratype ♀, x.1913 (TMSA); 1 paratype ♂, 15.ix.1916 (TMSA); 1 paratype ♀, 25.ix.1916 (TMSA); 1 paratype ♀, 20.ix.1920 (CB); 1 paratype ♀, 1.x.1920 (TMSA); 1 paratype ♀, 10.ix.1921 (TMSA). 5 other specimens with similar labels, but collected by "O. Kobrow": 1 paratype ♂, xi.1902 (CB); 2 paratypes, ♂ and ♀, x.1903 (TMSA, sub *maculicollis* ab. *quadripunctatus* and ab. *humeralis*, det Z. Kaszab); 1 paratype ♀, xi.1903 (TMSA, sub *maculicollis* ab. *quadripunctatus* det. Z. Kaszab); 1 paratype ♀, xi.1904 (TMSA, sub *maculicollis* ab. *disjunctus* det. Z. Kaszab).



Figs 18–22: *Mimesthes holgaticus* Kaszab. 18 – mesosternum; 19 – gonoforceps, ventral view; 20 – gonoforceps, lateral view; 21 – aedeagus, lateral view; 22 – elytral variability (from Kaszab, 1952, 1955, modified).

The holotype lacks posterior left tibia and tarsus. Six paratypes have both antennae broken after segment II; two other paratypes have the left antenna broken after segment II.

Other material examined. South Africa. Northern Cape: 1♀, Victoria West 31°24'S–23°07'E, 17.viii.1983, Penrith leg. (TMSA). Western Cape: 1♀, 5 km SW of Ladismith, 350 m, 17.ix.1994, M. Bologna leg. (CB); 1♂ and 1♀, Stellenbosch, xi.1925 (TMSA). Other specimens from the same series of the types were only briefly examined in the HNHM collections and consequently are not considered as paratypes.

The last locality requires confirmation because of its ecological characteristics and geographical position: The new species is apparently related to the Karoo habitats ("Little Karoo" and "Great Karoo") in the more eastern areas of the Cape Province; Stellenbosch is characterised by Mediterranean habitats ("Coastal scrub relics" or "Fynbos"; see Acocks, 1988). Perhaps the label generically indicates the region around Stellenbosch, which includes eastern close areas characterised by Karoo vegetation.

Etymology. The name originates from "Karoo", the typical biome of this species.

Distribution. Endemic to central and southern Karoo (Western and Northern Cape Province) (Fig. 3). The detailed localities are listed above.

Mimesthes holgaticus Kaszab, 1952

Mimesthes holgaticus Kaszab, 1952: 51, Figs 20–24; Kaszab, 1955: 406, Fig. 4; Kaszab, 1981: 179.

Description. Similar to *M. maculicollis* Marseul, except for the following characters (see Kaszab, 1952 for a detailed description).

Head and pronotum with black setae; antennal segments III–XI red, only rarely dark reddish, several specimens with segments III–V basally black. Fore half of pronotum usually red orange, black only on base; only a few specimens with middle longitudinal black strip con-

necting the basal black half to the anterior black margin. Body usually shorter and wider (body length: 7–10.8 mm; elytral width at widest point: 2.7–4.6 mm).

Head and pronotum punctures wider, slightly deeper, more dense, confluent in some specimens; usually the surface is more opaque and a medial longitudinal unpunctured area is present on head.

Pronotum strongly transverse, two or more times as wide as long; sides parallel, fore angles less rounded, acutely direct to the base. Mesosternum as in Fig. 18. Elytral variation reduced (Fig. 22), usually with black bands more extended, some forms extremely dark. Kaszab (1952, 1955) described intrasubspecific forms.

Gonoforceps in ventral view (Fig. 19) more parallel and obliquely narrowed at apex; in lateral view (Fig. 20) with parameres depressed on side, narrower and apically more curved; aedeagal hook (Fig. 21) slightly gibbose.

Type material. Two paratypes labelled "Holgat N.W. C.P., XI.1950, C. Koch" (TMSA) were examined. Also type specimens of several infrasubspecific forms described by Kaszab, were examined in the HNHM and TMSA collections.

Type locality. "Südafrika, Holgat, im norwestlichen Zipfel von Klein-Namaqualand, nicht weit von der Meerküste" (Kaszab, 1952).

Other material examined. South Africa. Northern Cape: Jakkalsputs, 28°38′S, 16°54′E (TMSA); Manganese mine (Richtersveld), 28°40′S, 16°58′E (TMSA); Rietfontein coast, 28°48′S, 16°35′E (CB); Rietfontein gate, 28°48′S, 16°37′E (CB, TMSA); Holgat (Kaszab, 1952; 1955; TMSA); 16 km E Holgat, 28°56′S, 16°58′E (TMSA); 2 km E Holgat mouth, 28°58′S, 16°43′E (CB, TMSA); Oograbies (Kaszab, 1955; TMSA); Port Nolloth, 29°14′S, 16°57′E (MNHN, TMSA); 8–11 km ESE Port Nolloth, 29°19′S, 17°16′E (CB); 25.6 km E Port Nolloth on R382 (JP); Port Nolloth/Kleinsee, about 29°32′S, 17°43′E (TMSA); Tnong-Gys dunes, 29°32′S, 17°14′E (TMSA); Buffelsrivier Valley, 29°36′S, 17°14′E (TMSA); Wicauin (?), 29°52′S, 17°25′E (TMSA); Zwartduine, 30°00′S, 17°15′E (TMSA); Graskom, 30°18′S, 17°23E (TMSA); Dembergsdraai, 30°47′S, 17°43′E (TMSA); Groenriviermond, 30°52′S, 17°35′E (TMSA); Kotzesrus, 30°57′S, 7°50′E (TMSA); Rooidam Farm, 31°04′S, 17°48′E (TMSA). Western Cape: 2 km ENE Hoekbaai, 31°11′S, 17°47′E (CB, TMSA); 38 km N Cape Town, 33°34′S, 18°27′E (TMSA).

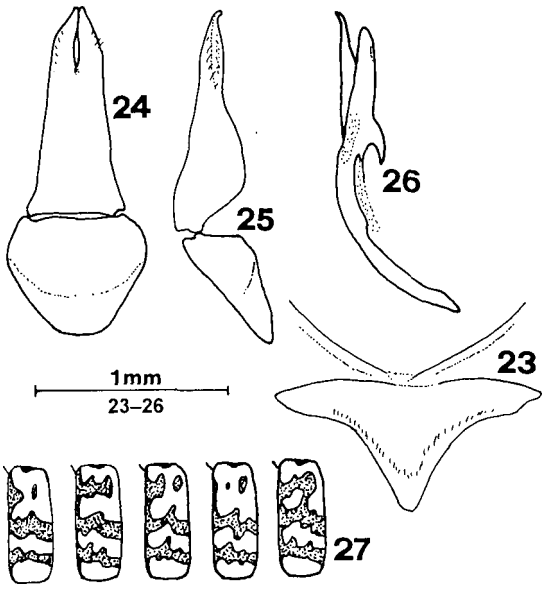
The last locality is isolated from the main range of distribution of *M. holgaticus*, which is North of the Olifants River coast. In the TMSA collection are preserved two specimens from this locality, labelled "August 30 1983 with groundtraps, 63 days, leg. Endrödy-Younga; groundtrap with meat bait; E-Y 2002". Dr S. Endrödy-Younga (in litteris 14 dec. 1995) confirmed this record from his field note-book (E-Y 2002) and wrote me that "the extension of namaqua species along these near-coast sand accumulations is not unusual".

General or not identified records. Cape of Good Hope (MCSN), probably indicating generically the Western Cape Province.

Distribution. Endemic to the coastal Namaqualand (South Africa), from the Orange River just North to Cape Town (Fig. 3).

Mimesthes nigricollis Kaszab, 1981

Mimesthes nigricollis Kaszab, 1981: 179, Figs 41–46.



Figs 23–27: *Mimesthes nigricollis* Kaszab. 23 – mesosternum; 22 – gonoforceps, ventral view; 25 –gonoforceps, lateral view; 26 – aedeagus, lateral view; 27 – elytral variability.

Description. Similar to *M. maculicollis* Marseul, except for the following characters (see Kaszab, 1981 for a detailed description).

Body setation brown. Antennal segments III–XI red-orange, II reddish; pronotum completely black; tarsi brown. Body length: 8.5–11 mm; elytral width at widest point: 2.9–4.6 mm.

Head and pronotal punctures slightly denser, surface shiny; vertex longitudinally slightly depressed.

Pronotum only slightly wider than head at eyes, transverse, about 0.7–0.8 as long as wide, sides parallel, anterior angles largely rounded, obliquely directed to base; on each side one or two smooth and shiny rounded small areas. Mesosternum as in Fig. 23; anterior suture less visible, anterior margin more curved on sides; middle smooth area slightly more depressed; mesepisterna scarcely bordered. Elytral colouring (Fig. 27) usually with black bands narrower and never extended on apical margin; black bands evidently zig-zag shaped. Kaszab (1981) described 4 unnamed forms of elytral colouring. Tarsal pads smaller.

Gonoforceps in ventral view (Fig. 24) parallel and obliquely narrowed at apex, as in *M. holgaticus*, phallobase wider; in lateral view (Fig. 25) parameres evidently depressed on sides; aedeagal hook (Fig. 26) very long and slightly gibbose. Kaszab (1981) erroneously figured the aedeagus without a hook.

Type material. 27 Paratypes (26 TMSA, 1 CB) labelled: "SW Afr., S Namib, Obib dunes, 28.10 S, 16.48 E, 17.9.1973, E–Y 114; singled on dunes; S. Endroedy-Younga leg." were examined.

Type locality. "Südafrika, südlicher Namib, Obib Dünen, 28°10′S, 16°48′E" (Kaszab, 1981). Actually this locality is in Namibia rather than South Africa.

Other material examined. Namibia. Lüderitz distr.: Sargdeckel Klinghardt Mts, 27°24′S, 15°41′E (CB, TMSA); Obib Dunes, 28°10′S, 16°48′E (Kaszab, 1981; CB, TMSA); Obib

Dunes, south to 28°10′S, 16°48′E (Kaszab, 1981); Obib Dunes east to 28°02′S, 16°37′E (Kaszab, 1981).

Distribution. Endemic to the southern portion of the Namib desert (Fig. 3).

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REFERENCES

Acocks J.P.H. 1988: Veld types of South Africa. *Mem. Bot. Surv. S. Afr.* **57**: I–IX, 1–146.

Billberg G.J. 1813: *Monographia Mylabridum*. Holmiae, 80 pp, 7 pls.

Bologna M.A. 1978: Alcuni Meloidi dell'Africa orientale e meridionale e descrizione di una specie nuova (Coleoptera, Meloidae). Zoological Researches in Ethiopia. Part I. *Quad. Accad. Naz. Lincei (Roma)* **243**(1): 137–189.

Bologna M.A. 1990: Faunistica e zoogeografia dei Meloidae (Coleoptera) della Somalia. *Biogeographia (N.S.)* **14**: 293–401.

Bologna M.A. 1991: Coleoptera Meloidae. *Fauna d'Italia XXVIII*. Calderini, Bologna, XIV + 541 pp.

Bologna M.A. & Coco E. 1990: Revisione del Genere Croscherichia Pardo Alcaide, 1950 (Coleoptera: Meloidae). *Mem. Soc. Entomol. Ital.* **69**: 97–180.

Bologna M.A. & Pinto J.P. (in press): Phylogenetic studies of the Meloidae (Coleoptera), with emphasis on the evolution of phoresy. *Syst. Entomol.*

Borchmann F. 1917: Meloidae, Cephaloidae. In Junk W. & Schenkling S. (eds): *Coleopterorum Catalogus. Pars 69*. Junk, Berlin, 208 pp.

Cros A. 1930: Notes biologiques sur les espèces algériennes du gen. Coryna. *Bull. Soc. Sci. Nat. Maroc* **10**: 156–174, 3 pls.

Endrödy-Younga S. 1978: Coleoptera. In Werger M.J.A. (ed.): *Biogeography and Ecology of Southern Africa*. Junk, The Hague, 1439 pp.

Holm E. 1990: Notes on faunas bordering on the Namib Desert. In Seely M.K. (ed.): Namib ecology: 25 years of Namib research. *Transv. Mus. Monogr. 7*, pp. 55–60.

Kaszab Z. 1952: Über neue und wenig bekannte Meloiden aus Südafrika. *Ann. Transv. Mus.* **22**: 47–57.

Kaszab Z. 1955: Neue Südafrikanische Meloiden (Coleoptera) aus dem Transvaal Museum in Pretoria. *Ann. Transv. Mus.* **22**: 401–413.

Kaszab Z. 1956: Coleoptera Meloidae. *S. Afr. Anim. Life* **3**: 273–294.

Kaszab Z. 1959: Phylogenetische Beziehungen des Flügelgeäders der Meloiden (Coleoptera) nebst Beschreibung neuer Gattungen und Arten. *Acta Zool. Acad. Sci. Hung.* **5**: 67–114.

Kaszab Z. 1969: The system of the Meloidae (Coleoptera). *Mem. Soc. Entomol. Ital.* **48**: 241–248.

Kaszab Z. 1981: Faunistische und taxonomische Studien über Meloiden (Coleoptera). *Annls. Hist.-Natur. Mus. Nat. Hung.* **73**: 159–185.

Kuzin V.S. 1954: (To the knowledge of the system of Meloidae.) *Trudy Vses. Entomol. Obshch.* **44**: 336–379 (in Russian).

Marseul S.A. de 1870: Monographie des Mylabrides d'Europe et des contrées limitrophes en Afrique et en Asie. *Abeille (Paris)* **7**: 1–204.

Marseul S.A. de 1872: Monographie des Mylabrides. *Mém. Soc. R. Liège* **1872**: 363–662, 9 pls.

Paoli G. 1932: Osservazioni sulla biologia del Dociostaurus maroccanus Thnb. in Italia nelle fasi gregarie e solitarie e sull'azione di alcuni Insetti parassiti. *Nuovi Ann. Agric.* **12**: 627–639.

Paoli G. 1937: Studi sulle cavallette di Foggia (Dociostaurus maroccanus Thnb.) e sui loro oofagi (Ditteri-Bombiliidi e Coleotteri Meloidi) ed acari ectofagi (Eritreidi e Trombidiidi). *Redia* **23**: 27–202, 3 pls.

Pardo Alcaide A. 1950: Estudios sobre Meloidae II. Los "Mylabrini" de la Peninsula Iberica. *Bol. Patol. Veg. Entomol. Agr.* **17**[1949]: 61–82.

Pardo Alcaide A. 1954: Etudes sur les Meloidae V. Les Mylabrini du Maroc et du Sahara occidental espagnol (Col. Meloidae). *Bull. Soc. Sci. Nat. Phys. Maroc* **34**: 55–88.

Peringuey L. 1909: Descriptive catalogue of the Coleoptera of South Africa. Family Meloidae. *Trans. R. Soc. S. Afr.* **1**: 165–297, pls 22–24.

Ruthenford M.C. & Westfall R.H. 1994: Biomes of southern Africa: An objective categorization. *Mem. Bot. Surv. S. Afr.* **63**: I–VIII, 1–94.

Seely M.K. (ed.) 1990: Namib Ecology: 25 years of Namib research. *Transv. Mus. Monogr. 7*, 230 pp.

Selander R.B. 1991: On the nomenclature and classification of the Meloidae (Coleoptera). *Insecta Mundi* **5**: 65–94.

White E.F. 1983: *The Vegetation of Africa*. Unesco, Paris, 384 pp., 4 maps.

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