

Formicidae (Insecta: Hymenoptera) of Saudi Arabia (Part 2)

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Abstract: The known species of ants from the entire Arabian Peninsula are listed. The present total of 265 includes three genera new to the Arabian fauna, *Leptanilla*, *Yavnella* and *Solenopsis*, 30 records of species new to the Arabian fauna and, additionally, 56 species new to science: *Cryptopone arabica*, *Messor hismai*, *M. muraywahus*, *M. muscatus*, *M. sanganus*, *Leptothorax saudiae*, *Cardiocondyla gallagheri*, *C. yemeni*, *Tetramorium latinode*, *T. yemene*, *Monomorium acutinode*, *M. aeyade*, *M. asiriense*, *M. bausbare*, *M. brunneolucidulum*, *M. buettikeri*, *M. dammame*, *M. dirie*, *M. fayfaense*, *M. fezzanense*, *M. gallagheri*, *M. hanaqe*, *M. harithe*, *M. hemame*, *M. jizane*, *M. knappi*, *M. mahyoubi*, *M. majarishe*, *M. marmule*, *M. matame*, *M. mintiribe*, *M. montanum*, *M. najrane*, *M. qarabe*, *M. rima*, *M. riyaadhe*, *M. subdenticorne*, *M. suleyile*, *M. tumaire*, *M. wahibiense*, *M. yemene*, *Solenopsis omana*, *S. sumara*, *S. zingibara*, *Anoplolepis longitarsis*, *Lepisiota dammama*, *L. dhofara*, *L. harteni*, *L. riyaadha*, *Cataglyphis acutinodis*, *C. flavobrunneus*, *C. harteni*, *C. holgerseni*, *C. opacior*, *C. shuaibensis*, *Camponotus gallagheri*. *Monomorium karawajewi* is synonymised with *M. mayri*. *Cataglyphis auratus*, *C. vaucheri*, *Crematogaster melanogaster*, *Messor crawlei*, *Pheidole katonae* and *Technomyrmex bruneipes* are given a new status.

عائلة النمل (صنف الحشرات : رتبة غشائيات الأجنحة) من المملكة العربية السعودية
القسم الثاني

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خلاصة : يتضمن البحث تسجيل لكافة الأنواع المعروفة من النمل في شبه الجزيرة العربية. إن العدد الأجمالي لها هو ٢٦٥ وتتضمن ثلاثة أجناس جديدة بالنسبة للمجموعة الحيوانية العربية وهي : *Leptanilla* ، *Yavnella* ، *Solenopsis*. كذلك يحتوي البحث على تسجيل لـ ٣٠ نوعاً و ٥٦ نوعاً جديداً للعلم. *Monomorium karawajewi* تم اعتباره مرادف لـ *M. mayri*.

INTRODUCTION

Many collections made in Saudi Arabia by Prof. W. Büttiker during his zoological surveys in 1975-1989 have been made available through Dr. M. Brancucci of the Natural History Museum, Basel. Much material has also been sent from Oman, mainly collected by Mr. M.D. Gallagher of the Oman Natural History Museum, Muscat, and supplemented by collections made by R. Braund, W. Büttiker, J.E. Clarke, J. Darlington, R. Mathias and R.P. Whitcombe. Additional material includes an interesting collection made by W. Büttiker in Kuwait (1988-1989), specimens

from separate ecological studies in the United Arab Emirates by Prof. H. Heatwole of the Zoology Department, North Carolina State University, U.S.A. and Dr. Barbara Tigar of the National Avian Research Centre, Abu Dhabi, and finally important collections from Yemen made by A. van Harten of the Yemeni-German Plant Protection Project assisted by M. Knapp, M. Mahyoub and others. These have been examined, and species known to occur in the Arabian Peninsula now total 265 of which 56 are described as new. Descriptions, name changes and new records are presented but those in COLLINGWOOD (1985) are not repeated.

MATERIALS AND METHODS

Measurements and indices

All measurements are expressed in millimetres and these and all indices are as follows:

CI	Cephalic index; $HW \times 100$ divided by HL
EL	Eye length; the maximum diameter of the eye
HL	Head length; the length from the mid point of the front clypeal border to the mid point of the occipital border
HW	Head width; the maximum width of the head in dorsal view excluding the eyes
PL	Petiole length
PW	Petiole width
PPW	Postpetiole width
SI	Scape index; $SL \times 100$ divided by HW
SL	Scape length; the straight line length of the antennal scape not including the condylar bulb
TL	Total length; the total outstretched length of the individual

The various body parts are as delineated in COLLINGWOOD (1985: Fig. 1).

All type material is housed in the Natural History Museum, Basel (NHMB) and duplicates placed in appropriate institutes and museums of the contributing countries.

Collecting Areas

Collections in Saudi Arabia cover the same areas as described in COLLINGWOOD (1985). The two main areas in Oman are Dhofar in the west with a lush wooded coastal plain, cultivated areas and inland desert (RATCLIFFE-SMITH 1980) and the north-eastern part radiating from Muscat including coastal sands, the mountains of Jabal Shams rising to over 2000 m, areas of agricultural cultivation including date palms and finally sandy deserts and adjacent scrub lands. Collections in the United Arab Emirates by Prof. H. Heatwole were in the deserts of Djebel Haffete and in similar terrain around Ras Ghanada by Dr. B. Tigar, using baits and pitfall traps respectively. In Yemen most collections by A. van Harten and colleagues were made on high land around Sana'a but also in semi-cultivated valleys and coastal plains using a variety of methods including light and Malaise traps. Additional material was collected by Dr. H. Wranik of Rostock University in the vicinity of Aden in 1985 and 1988 and included much the same fauna as described by both EMERY (1893) and FOREL (1892) from Taiz and Aden 100 years ago.

List of all recorded Arabian species

Genera and species	Saudi Arabia	Kuwait	U.A.E.	Oman	Yemen	Range outside Arabia
Subfamily Dorylinae						
<i>Dorylus affinis</i> Shuckard, 1840					+	North Africa, Middle East
<i>D. fulvus</i> (Westwood, 1839)	+			+	+	North Africa, Middle East
Subfamily Leptanillinae						
<i>Leptanilla islamica</i> Baroni Urbani, 1977					+	
<i>Leptanilla</i> sp.					+	
<i>Yavnella</i> sp.					+	
Subfamily Ponerinae						
<i>Anochetus sedilloti</i> Emery, 1884	+					North Africa, India
<i>A. traegaordhi</i> Mayr, 1904	+					Africa
<i>Belonopelta loebli</i> Baroni Urbani, 1975	+					Middle East
<i>Cryptopone arabica</i> n. sp.					+	
<i>C. ochracea</i> (Mayr, 1855)	+					Mediterranean
<i>Hypoponera abeillei</i> (André, 1883)	+					South Europe, North Africa
<i>H. eduardi</i> (Forel, 1894)	+					Mediterranean
<i>H. punctatissima</i> (Roger, 1859)	+			+	+	Cosmopolitan
<i>H. ragusai</i> (Emery, 1894)	+					Middle East, North Africa
<i>Leptogenys maxillosa</i> (Smith, 1858)	+			+		Tropicopolitan
<i>Pachycondyla ambigua</i> André, 1890	+					Africa
<i>P. sennaarensis</i> (Mayr, 1862)	+	+	+	+	+	Africa
<i>Platythyrea modesta</i> Emery, 1899	+			+	+	Africa
Subfamily Cerapachyinae						
<i>Cerapachys longitarsus</i> (Mayr, 1878)	+					North Africa, India
<i>C. wittmeri</i> Collingwood, 1985	+					
<i>Cerapachys</i> sp.					+	
Subfamily Pseudomyrmecinae						
<i>Tetraponera bifoveolata</i> (Mayr, 1895)	+				+	Middle East
<i>T. erythraea</i> (Emery, 1895)					+	Africa
Subfamily Myrmicinae						
<i>Aphaenogaster muschtaidica</i> Emery, 1908	+					South Russia
<i>Cardiocondyla emeryi</i> Forel, 1881	+				+	Tropicopolitan
<i>C. gallagheri</i> n. sp.				+	+	
<i>C. nuda</i> (Mayr, 1866)					+	North Africa, Orient
<i>C. shuckardi</i> Forel, 1891	+	+			+	Africa
<i>C. wrightonii</i> Forel, 1890	+				+	Pantropical
<i>C. yemeni</i> n. sp.					+	
<i>Crematogaster acaciae</i> Forel, 1892				+		NE Africa
<i>C. aegyptiaca</i> Mayr, 1862	+			+	+	North Africa
<i>C. affabilis</i> Forel, 1907	+			+	+	NE Africa
<i>C. antaris</i> Forel, 1894	+		+	+	+	North Africa
<i>C. auberti</i> Emery, 1869	+					South Europe
<i>C. chiarinii</i> Emery, 1881	+				+	NE Africa
<i>C. delagoensis</i> Forel, 1894					+	NE Africa
<i>C. flaviventris</i> Santschi, 1910					+	Africa
<i>C. laestrygon</i> Emery, 1869	+				+	North Africa
<i>C. luctans</i> Forel, 1907	+					Africa
<i>C. melanogaster</i> Emery, 1895 n. stat.				+		South Africa
<i>C. mimosae</i> Santschi, 1914	+			+	+	East Africa
<i>C. mosis</i> Emery, 1869			+		+	Middle East
<i>C. oasisium</i> Santschi, 1911				+		North Africa
<i>C. senegalensis</i> Roger, 1863	+			+		Africa
<i>Crematogaster</i> sp. A				+		

Genera and species	Saudi Arabia	Kuwait	U.A.E.	Oman	Yemen	Range outside Arabia
<i>Crematogaster</i> sp. B					+	
<i>Crematogaster</i> sp. C					+	
<i>Crematogaster</i> sp. D					+	
<i>Leptothorax angulatus</i> Mayr, 1862	+				+	Middle East, Africa
<i>L. humerosus</i> Emery, 1846					+	NE Africa
<i>L. saudiae</i> n. sp.	+					
<i>Leptothorax</i> sp. A				+		
<i>Leptothorax</i> sp. B	+					
<i>Leptothorax</i> sp. C	+					
<i>Melissotarsus emeryi</i> Forel, 1907	+				+	Africa
<i>Messor aralocaspicus</i> (Ruzsky, 1902)	+	+			+	Central Asia, SE Europe
<i>M. arenarius</i> (Fabricius, 1787)	+	+				Middle East, North Africa
<i>M. buettikeri</i> Collingwood, 1985	+	+				
<i>M. ceresis</i> Santschi, 1934	+					Middle East
<i>M. crawleyi</i> Santschi, 1928 n. stat.	+					Middle East
<i>M. decipiens</i> Santschi, 1917	+					Africa
<i>M. ebeninus</i> Santschi, 1927	+	+	+	+	+	Middle East, SE Europe
<i>M. foreli</i> Santschi, 1923	+		+	+		North Africa
<i>M. galla</i> (Mayr, 1904)	+			+	+	Africa
<i>M. hismai</i> n. sp.	+					
<i>M. intermedius</i> Santschi, 1927				+		Middle East
<i>M. medioruber</i> Santschi, 1910	+	+				North Africa
<i>M. meridionalis</i> (André, 1883)	+	+	+			Middle East, Central Asia
<i>M. minor</i> (André, 1883)	+					South Europe
<i>M. muraywahus</i> n. sp.	+					
<i>M. muscatus</i> n. sp.				+		
<i>M. orientalis</i> Emery, 1898					+	Middle East, Central Asia
<i>M. picturatus</i> Santschi, 1927	+	+				North Africa
<i>M. rufotestaceus</i> (Foerster, 1850)	+		+	+		Middle East
<i>M. sanganus</i> n. sp.					+	
<i>M. semirufus</i> (André, 1883)					+	Middle East
<i>M. striaticeps</i> (André, 1883)	+	+				North Africa
<i>M. subgracilinodis</i> Arnoldi, 1969					+	Central Asia
<i>M. syriacus</i> Tohmé, 1969	+					Middle East
<i>M. wasmanni</i> Krausse, 1910				+		South Europe, Middle East
<i>Messor</i> sp.	+					
<i>Monomorium abeillei</i> André, 1881	+	+		+	+	Middle East
<i>M. acutinode</i> n. sp.				+		
<i>M. aeyade</i> n. sp.				+		
<i>M. areniphilum</i> Santschi, 1911	+	+		+	+	Africa
<i>M. asiriense</i> n. sp.	+				+	
<i>M. barbatulum</i> Mayr, 1877				+		Central Asia
<i>M. baushare</i> n. sp.	+				+	
<i>M. bicolor</i> Emery, 1877	+		+			Africa
<i>M. brunneolucidulum</i> n. sp.	+					
<i>M. buettikeri</i> n. sp.		+				
<i>M. buxtoni</i> Crawley, 1920		+				Middle East
<i>M. carbo</i> Forel, 1910	+			+		North Africa
<i>M. carbonarium</i> (Smith, 1858)				+		NE Atlantic
<i>M. chobauti</i> Emery, 1896	+		+			Middle East
<i>M. clavicorne</i> André, 1883	+					Middle East
<i>M. dammame</i> n. sp.	+					
<i>M. dentigerum</i> (Roger, 1862)				+		Middle East
<i>M. desertorum</i> n. sp.	+					
<i>M. destructor</i> (Jerdon, 1851)	+	+		+	+	Pantropical

Genera and species	Saudi Arabia	Kuwait	U.A.E.	Oman	Yemen	Range outside Arabia
<i>M. dirie</i> n. sp.				+		
<i>M. fayfaense</i> n. sp.	+				+	
<i>M. fezzanense</i> n. sp.	+		+	+		Middle East
<i>M. gallagheri</i> n. sp.				+		
<i>M. hanaqe</i> n. sp.				+	+	
<i>M. harithe</i> n. sp.				+		
<i>M. hemame</i> n. sp.		+				
<i>M. jizane</i> n. sp.	+				+	
<i>M. knappi</i> n. sp.					+	
<i>M. luteum</i> Emery, 1881				+	+	
<i>M. mahyoubi</i> n. sp.					+	
<i>M. majarische</i> n. sp.	+					
<i>M. marmule</i> n. sp.				+		
<i>M. matame</i> n. sp.	+					
<i>M. mayri</i> Forel, 1902	+			+	+	Cosmopolitan
<i>M. mintiribe</i> n. sp.				+	+	
<i>M. montanum</i> n. sp.	+				+	
<i>M. najrane</i> n. sp.	+					
<i>M. niloticum</i> Emery, 1881	+			+	+	Middle East
<i>M. nitidiventre</i> Emery, 1893	+	+			+	South Europe
<i>M. pharaonis</i> (Linnaeus, 1758)	+					Cosmopolitan
<i>M. phoenicium</i> Santschi, 1927	+			+		South Europe, Middle East
<i>M. qarabe</i> n. sp.	+					
<i>M. rimae</i> n. sp.					+	
<i>M. riyaadhe</i> n. sp.	+					
<i>M. robustior</i> Forel, 1892				+		Africa
<i>M. salomonis</i> (Linnaeus, 1758)	+	+				North Africa
<i>M. subdenticorne</i> n. sp.					+	
<i>M. subopacum</i> (Smith, 1858)	+			+	+	South Europe, Africa
<i>M. suleyile</i> n. sp.	+					
<i>M. tunaire</i> n. sp.	+		+			
<i>M. venustum</i> (Smith, 1858)	+	+		+		Middle East
<i>M. wahibiense</i> n. sp.			+	+	+	
<i>M. yemene</i> n. sp.					+	
<i>Oxyopomyrmex sabulonis</i> Santschi, 1915	+					North Africa
<i>Pheidole jordanica</i> Saulcy, 1874	+					Middle East
<i>P. katonae</i> Forel, 1907 n. stat.	+					Africa
<i>P. lamellinoda</i> Forel, 1802						Socotra, India
<i>P. nigacephala</i> (Fabricius, 1793)	+	+	+	+	+	Cosmopolitan
<i>P. minuscula</i> Bernard, 1953	+					NW Africa
<i>P. rugaticeps</i> Emery, 1877				+	+	NE Africa
<i>P. sculpturata</i> Mayr, 1866				+	+	Africa
<i>P. sinaitica</i> Mayr, 1862	+				+	Middle East, North Africa
<i>P. teneriffana</i> Forel, 1893	+	+		+	+	Cosmopolitan
<i>Pheidole</i> sp.					+	
<i>Solenopsis omana</i> n. sp.				+		
<i>S. sumara</i> n. sp.					+	
<i>S. zingibara</i> n. sp.					+	
<i>Tetramorium biskrense</i> Forel, 1904	+					North Africa
<i>T. caldarium</i> (Roger, 1857)	+					Cosmopolitan
<i>T. calidum</i> Forel, 1907				+		
<i>T. delagoense</i> Forel, 1894					+	Middle East, Africa
<i>T. depressiceps</i> Menozzi, 1933	+					Middle East
<i>T. doriae</i> Emery, 1881				+	+	NE Africa
<i>T. jizani</i> Collingwood, 1985	+				+	

Genera and species	Saudi Arabia	Kuwait	U.A.E.	Oman	Yemen	Range outside Arabia
<i>T. juba</i> Collingwood, 1985	+					
<i>T. khyarum</i> Bolton, 1980	+				+	Africa
<i>T. lanuginosum</i> Mayr, 1870	+					Cosmopolitan
<i>T. latinode</i> n. sp.					+	
<i>T. sericeiventre</i> Emery, 1877	+	+		+	+	Africa
<i>T. simillimum</i> (Smith, 1851)	+				+	Cosmopolitan
<i>T. syriacum</i> Emery, 1909	+					Middle East
<i>T. turcomanicum</i> Santschi, 1921	+					Central Asia
<i>T. yemene</i> n. sp.					+	
<i>T. zabrae</i> Santschi, 1923					+	
Subfamily Dolichoderinae						
<i>Tapinoma melanocephalum</i> (Fabricius, 1793)	+	+		+	+	Cosmopolitan
<i>T. simrothi</i> Krausse, 1911	+	+		+	+	North Africa, Middle East
<i>Tapinoma</i> sp.					+	
<i>Technomyrmex albipes</i> (Smith, 1862)	+					Cosmopolitan
<i>T. bruneipes</i> Forel, 1895 n. stat.					+	India
<i>T. setosus</i> Collingwood, 1985	+			+	+	
<i>Technomyrmex</i> sp. A	+					
<i>Technomyrmex</i> sp. B	+				+	
Subfamily Formicinae						
<i>Anoplolepis longitarsis</i> n. sp.	+				+	
<i>A. tumidula</i> Emery, 1915	+					NW Africa
<i>Camponotus acvapimensis</i> Mayr, 1862				+		Socotra, Africa
<i>C. adenensis</i> Emery, 1893	+				+	
<i>C. aegyptiacus</i> Emery, 1915	+	+		+	+	NE Africa
<i>C. alii</i> Forel, 1890	+					North Africa
<i>C. arabicus</i> Collingwood, 1985	+				+	
<i>C. atlantis</i> Forel, 1890	+				+	North Africa
<i>C. baldacci</i> Emery, 1894	+					SE Europe
<i>C. carbo</i> Emery, 1877				+		Africa
<i>C. empedocles</i> Emery, 1920	+				+	Africa
<i>C. fayfaensis</i> Collingwood, 1985	+				+	
<i>C. fellah</i> Dalla Torre, 1893	+	+	+	+	+	North Africa
<i>C. flavomarginatus</i> Mayr, 1862	+			+	+	East Africa
<i>C. foraminosus</i> Forel, 1879				+	+	Africa
<i>C. gallagheri</i> n. sp.				+		
<i>C. hova</i> Forel, 1891				+	+	Socotra
<i>C. ilgii</i> Forel, 1894	+				+	NE Africa
<i>C. jizani</i> Collingwood, 1985	+			+	+	
<i>C. kersteni</i> Gerstaecker, 1871	+				+	East Africa
<i>C. maculatus</i> (Fabricius, 1781)				+	+	Africa
<i>C. oasisium</i> Forel, 1890			+	+		Africa
<i>C. sericeus</i> (Fabricius, 1798)	+	+		+	+	India, Africa
<i>C. somalinus</i> André, 1887				+	+	NE Africa
<i>C. thales</i> Forel, 1910	+					North Africa
<i>C. thoracicus</i> (Fabricius, 1804)	+	+	+			North Africa
<i>C. xerxes</i> Forel, 1904	+		+	+		Central Asia, Middle East
<i>Cataglyphis abyssinicus</i> (Forel, 1904)	+			+	+	North Africa
<i>C. acutinodis</i> n. sp.					+	
<i>C. adenensis</i> (Forel, 1904)			+	+	+	
<i>C. albicans</i> (Roger, 1859)	+					North Africa
<i>C. arenarius</i> Finzi, 1940				+		North Africa
<i>C. asiriensis</i> Collingwood, 1985	+					
<i>C. auratus</i> Menozzi, 1932 n. stat.				+		North Africa
<i>C. cinnamomeus</i> Karawaiew, 1910	+		+			Central Asia, North Africa

Genera and species	Saudi Arabia	Kuwait	U.A.E.	Oman	Yemen	Range outside Arabia
<i>C. diebli</i> (Forel, 1902)	+	+		+		North Africa
<i>C. emmae</i> (Forel, 1909)	+					North Africa
<i>C. flavobrunneus</i> n. sp.			+	+	+	
<i>C. harteni</i> n. sp.					+	
<i>C. holgerseni</i> n. sp.	+	+				
<i>C. isis</i> Forel, 1913	+					Middle East
<i>C. laevior</i> Santschi, 1929	+					North Africa
<i>C. lividus</i> (André, 1881)	+	+	+	+	+	Middle East
<i>C. minimus</i> Collingwood, 1985	+		+			
<i>C. niger</i> (André, 1881)	+	+		+	+	Middle East
<i>C. opacior</i> n. sp.					+	
<i>C. ruber</i> (Forel, 1903)				+		North Africa
<i>C. sabulosus</i> Kugler, 1981	+		+	+	+	Middle East
<i>C. savignyi</i> (Dufour, 1862)				+	+	North Africa
<i>C. senitonsus</i> Santschi, 1929	+					Middle East
<i>C. shuaibensis</i> n. sp.					+	
<i>C. urens</i> Collingwood, 1985	+		+	+	+	
<i>C. vaucheri</i> (Emery, 1906) n. stat.				+		North Africa
<i>C. viaticus</i> (Fabricius, 1787)			+	+		North Africa
<i>Cataglyphis</i> sp.	+	+	+	+	+	
<i>Lepisiota arabica</i> (Collingwood, 1985)	+					
<i>L. arenaria</i> (Arnold, 1920)				+		South Africa
<i>L. bipartita</i> (F. Smith, 1861)	+					Middle East
<i>L. canescens</i> (Emery, 1897)	+			+	+	NE Africa
<i>L. carbouaria</i> (Emery, 1892)	+			+	+	NE Africa
<i>L. dammama</i> n. sp.	+					
<i>L. depilis</i> (Emery, 1897)				+		NE Africa
<i>L. dhofara</i> n. sp.				+		
<i>L. dolabellae</i> (Forel, 1911)	+					Middle East
<i>L. erythraea</i> (Forel, 1910)	+				+	NE Africa
<i>L. frauenfeldi</i> (Mayr, 1855)	+					South Europe
<i>L. gracilicornis</i> (Forel, 1892)	+			+	+	
<i>L. harteni</i> n. sp.					+	
<i>L. incisa</i> (Forel, 1913)	+				+	Africa
<i>L. karawajewi</i> (Agosti & Collingwood, 1987)		+				SE Europe
<i>L. nigra</i> (Dalla Torre, 1893)			+	+		SE Europe
<i>L. nigrescens</i> (Karawaiew, 1912)			+		+	North Africa
<i>L. obtusa</i> (Emery, 1901)	+			+	+	NE Africa
<i>L. opaciventris</i> (Finzi, 1936)	+			+	+	Middle East
<i>L. riyadha</i> n. sp.	+					
<i>L. sericea</i> (Forel, 1892)				+		India
<i>L. simplex</i> (Forel, 1892)	+					Africa, India
<i>L. spinisquama</i> (Kuznetsov-Ugamsky, 1929)				+		Socotra, Central Asia
<i>L. validiuscula</i> (Emery, 1897)					+	Africa
<i>Lepisiota</i> sp.				+		
<i>Paratrechina flavipes</i> (Smith, 1874)				+		Asia
<i>P. jaegerskioeldi</i> (Mayr, 1904)	+			+	+	Cosmopolitan
<i>P. longicornis</i> (Latreille, 1802)	+			+	+	Cosmopolitan
<i>Plagiolepis abyssinica</i> Forel, 1894	+					NE Africa
<i>P. exigua</i> Forel, 1894					+	Africa
<i>P. maura</i> Santschi, 1920	+					North Africa
<i>P. pygmaea</i> (Latreille, 1798)	+					South Europe
<i>P. schmitzii</i> Forel, 1895	+					North Africa
<i>Polyrhachis lacteipennis</i> F. Smith, 1838	+			+	+	India, Middle East
<i>P. viscosa</i> F. Smith, 1858				+	+	Africa

SYSTEMATIC ACCOUNT

Key to subfamilies of the family Formicidae (worker caste)

- | | | |
|---|---|-------------------------|
| 1 | Eyes absent | 2 |
| – | Eyes present | 3 |
| 2 | Minute ants; TL generally less than 2.0 and HW less than 0.25. Antennae with 12 segments | Leptanillinae |
| – | Larger ants of variable size, TL from 3.0 to 9.0. Antennae with 10 or 11 segments | Dorylinae |
| 3 | Peduncle with a single node or scale | 4 |
| – | Peduncle with two distinct segments, the petiole and postpetiole | 7 |
| 4 | Gaster with a projecting sting. First and second gastral tergite with a distinct constriction between them | 5 |
| – | Gaster without a projecting sting. First and second gastral tergite not separated by a distinct constriction | 6 |
| 5 | Pygidium (last visible gastral tergite) rounded without short projecting teeth or spines. Antennal insertions concealed by frontal laminae in dorsal view | Ponerinae |
| – | Pygidium flattened, armed with very short spines or peg-like teeth. Antennal insertions not concealed by frontal laminae | Cerapachyinae |
| 6 | Apex of gaster with a circular orifice; petiole a distinct node or scale | Formicinae |
| – | Apex of gaster terminating in a transverse slit; petiole flat and reduced, overhung by the first gaster segment in Arabian species | Dolichoderinae |
| 7 | Clypeus projects back between the frontal ridges. Ocelli absent in worker caste | Myrmicinae |
| – | Clypeus does not project back between the frontal ridges but bends vertically downward in front of the head. Ocelli present and clearly visible in all castes | Pseudomyrmecinae |

Subfamily **Dorylinae**Genus *Dorylus* Fabricius, 1793

Key to species

- | | | |
|---|--|-------------------------------|
| 1 | Funiculus segments distinctly transverse. Male petiole clearly wider than long | <i>Dorylus affinis</i> |
| – | Funiculus segments 3-6 quadrate. Male petiole almost as long as wide | <i>Dorylus fulvus</i> |

Dorylus affinis Shuckard, 1840*Dorylus affinis* Shuckard, 1840. — Ann. Nat. Hist. 5: 316.

Material: Yemen: ♂♂, ♀♀ from: Al-Mahwit, 29.IV.1991; Wadi Rima near Madinat, 12.III.1993; all A. van Harten.

Dorylus fulvus (Westwood, 1839)*Typhlopone fulvus* Westwood, 1839. — Introd. Classif. Insects 2: 219.

Dorylus fulvus. — Emery 1895; Zool. Jb. Abt. Syst. 8: 707.

Material: Yemen: ♂♂, Sana'a, IX.1991, A. van Harten; ♀♀, Madinat al-Shariq, 7.III.1993, C.A. Collingwood.

These dorylines are subterranean species not often appearing above ground. The large males fly towards light in late afternoon and early evening and are seen more often than the workers.

Subfamily Leptanillinae

Genus *Leptanilla* Emery, 1870

Leptanilla islamica Baroni Urbani, 1977

Leptanilla islamica Baroni Urbani, 1977. — Entomologica Basiliensis 2: 474.

Leptanilla sp. (Fig. 1)

Material: Yemen: ♂♂ from: Sana'a, XII.1991; Al-Kowd, II.1993; all A. van Harten.

Leptanilla species are very small narrow-bodied ants. Unassociated males fly to light. These are characterised by their small, flat, narrow heads. This is probably a new species but seems to be quite close to *L. israelis* Kugler, 1987. According to the illustration of *L. islamica*, the petiole is longer and the head broader than that of the species figured here.

Genus *Yavnella* Kugler, 1987

Yavnella sp. (Fig. 2)

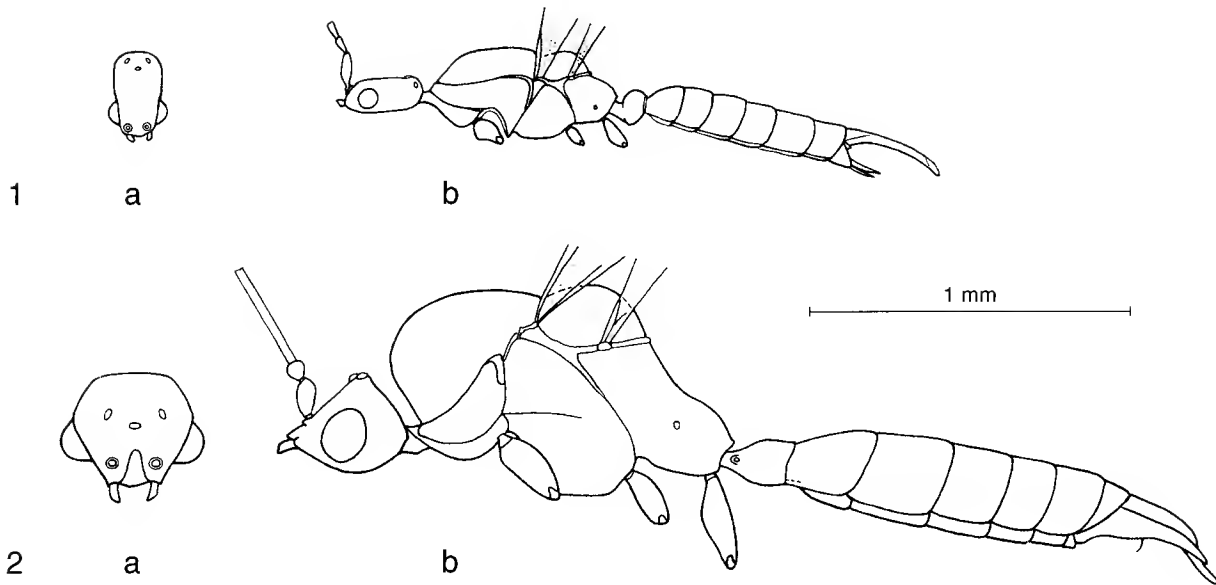
Material: Yemen: ♂♂, Sana'a, VII.1991, A. van Harten.

This genus was first recognised and established by KUGLER (1987) who described the two known species from India and Palestine respectively. The Yemen examples, taken in a light trap, have the general body shape as described by KUGLER (1987) with an expanded prothorax and cut away propodeum, wide short head, bulbous eyes, reduced wing veins and very long funiculus segments 3-12, short scapes and long legs. They appear to be different in detail from the nearest congener *Y. argami* Kugler, 1987. Queens and workers are unknown in this genus but males are quite distinct from other Leptanillinae.

Subfamily Ponerinae

Key to Arabian genera

- | | | | |
|---|---|--------------------|---|
| 1 | Mandibles inserted in the middle of the front margin of the head; occiput is widely emarginate | <i>Anochetus</i> | |
| – | Mandibles inserted at the sides of the front margin of the head; occiput is rounded or flat, not emarginate | | 2 |
| 2 | Mandibles falcate; tarsal claws pectinate | <i>Leptogenys</i> | |
| – | Mandibles denticulate; tarsal claws simple | | 3 |
| 3 | Middle tibiae each with two spurs | | 4 |
| – | Middle tibiae each with a single spur | | 6 |
| 4 | Middle tibia with two pectinate spurs | <i>Platythyrea</i> | |



Figs 1-2: 1, *Leptanilla* sp., ♂: a, head in dorsal view; b, profile; 2, *Yavnella* sp., ♂: a, head in dorsal view; b, profile.

- Tibiae each with one pectinate and one simple spur 5
- 5 Eyes minute or absent *Cryptopone*
- Eyes distinct and moderately large *Pachycondyla*
- 6 Middle tibial spur simple; mandibles long with five large teeth; clypeus produced anteriorly into a cone *Belonopelta*
- Middle tibial spur pectinate; mandibles broadly triangular; anterior margin of clypeus not produced into a sharp cone *Hypoponera*

Genus *Anochetus* Mayr, 1861

Key to species

- 1 Eye about 0.16 times HL. Mesonotum smooth unstriated; petiole in profile tapering to dorsal crest *Anochetus traegaordhi*
- Eye about 0.22 times HL. Mesonotum laterally striate; petiole in profile with evenly convex dorsal crest *Anochetus sedilloti*

Anochetus sedilloti Emery, 1884

Anochetus sedilloti Emery, 1884. — Ann. Mus. civ. Stor. nat. Giacomo Doria 21: 377.

Anochetus traegaordhi Mayr, 1904

Anochetus traegaordhi Mayr, 1904. — in Jägerskjöld: Res. Swed. Zool. Exp. Egypt White Nile 1901, 9 (Formicidae): 2.

Genus *Pachycondyla* Smith, 1858

Key to species

- 1 Robust ants with a deep mesopropodeal furrow and relatively large eyes; mandibles with a dorsolateral pit *Pachycondyla sennaarensis*
 – Smaller ants with flat mesopropodeal furrow and small eyes; mandibles without a dorsolateral pit *Pachycondyla ambigua*

Pachycondyla ambigua André, 1890

Pachycondyla ambigua André, 1890. — Ann. Soc. ent. Belg. 45: 47.

Pachycondyla sennaarensis (Mayr, 1862)

Ponera sennaarensis Mayr, 1862. — Verh. zool.-bot. Ges. Wien 12: 72.

Pachycondyla sennaarensis. — André, 1890; Revue Ent. 9: 316.

Material: Oman: ♂♂, ♀♀, ♀♀ from many collections including Qarn Huwayda, Batcham, Ain Umran, Jabal Qarn, Wadi Rawbat, Wadi Khabb, Sal al-Alan, Al-Sadi, Khawr Sawli, Wadi Ma'ayadin, Madinat Qaboos, Hayl al-Awamir, Dagmar, Wadi Dharbat, 1982-1986; all M.D. Gallagher; ♀♀, Wadi Nahiz, Jabal Samhan, IX.1983, J. Darlington; ♀♀, Salahan, X.1984, J.E. Clarke. — United Arab Emirates: 1 ♀, Ras al-Kainah, 29.III.1991, C. Gross. — Yemen: ♀♀ from: Mahwit, Sana'a, Taiz, Hamamdamt, Wadi Surdud, Seyen Wadi, 1991-1992; all A. van Harten.

This species thrives around human settlements. It is a predaceous scavenger and has a powerful sting. WHITCOMBE (1982) gives a good account of this aggressive species with respect to its damage to honey bees at Khabura, Batina in Oman.

Genus *Platythyrea* Roger, 1863*Platythyrea modesta* Emery, 1899

Platythyrea modesta Emery, 1899. — Ann. Soc. ent. Belg. 43: 457.

Material: Oman: 1 ♀, Wahiba IX.1989, Ebejer. — Yemen: 1 ♀, Fona, Aden Chalet, 3.X.1988, H. Wranik; ♂♂, ♀♀ from: Al-Mahwit, 29.IV.1991; Suq Bani Mansur, 27.IV.1991; all A. van Harten.

This extends the known range in Arabia of this diurnal species.

Genus *Cryptopone* Emery, 1893

Key to species

- 1 Mandibles with five denticles *Cryptopone ochracea*
 – Mandibles with twelve denticles *Cryptopone arabica* n. sp.

Cryptopone arabica n. sp.

Holotype: ♀, Yemen, Wadi Bani, 20.III.1993, C.A. Collingwood. — Paratypes: ♀♀, same series as holotype.

Measurements of holotype: TL 3.2; HL 1.12; HW 1.02; SL 0.86; EL 0.11 (eyes with 12 ommatidia).

Description: Head: long, almost straight-sided with the broadest part at the occiput which is incavate; eyes placed anteriorly well below the midline and visible in dorsal view; frontal furrow continued as a fine line to the occipital border; mandibles with a distinct dorsolateral pit, long and

curved, with 12 denticles and a large apical tooth; length from apex to clypeal border 0.42, measured along outer moderately curved edge 0.60. Frontal laminae expanded laterally, concealing antennal insertions. Scapes broadening to apex, just reaching the occipital margin when laid back.

Alitrunk: metanotal suture well developed forming a clear break dorsally between mesonotum and propodeum; promesonotal suture also visible but not breaking dorsal outline of alitrunk. Petiole squamiform with a strongly developed ventral tooth. All tibiae with one large pectinate spur and one smaller simple spur about half the length of the other. Tarsal claws simple. Whole body including head and gaster covered in pale decumbent pubescence not obscuring the underlying dilute body sculpture so that the general appearance is shining. Four to five short suberect hairs are visible on each side of the head in dorsal view with two longer hairs at the lateral clypeal corners.

Affinities: This species differs from the South European *C. ochracea* by the longer multi-dentate mandibles and overall larger body size.

Cryptopone ochracea (Mayr, 1855)

Ponera ochracea Mayr, 1855. — Verh. zool.-bot. Ges. Wien 5: 118.

Cryptopone ochracea. — Emery 1916; Boll. Soc. ent. Ital. 47: 206.

Genus *Hypoponera* Santschi, 1938

Key to species

- | | | |
|---|---|---------------------------------|
| 1 | Frontal furrow continued as a thin line to the occipital border | |
| | | <i>Hypoponera punctatissima</i> |
| – | Frontal furrow clearly not reaching the occipital border | 2 |
| 2 | Antennal scape reaches the occipital border when laid back; body colour dark | |
| | | <i>Hypoponera eduardi</i> |
| – | Antennal scape does not reach the occipital border. Body colour light yellowish brown | 3 |
| 3 | Dorsal surface of alitrunk with metanotal suture only faintly indicated | |
| | | <i>Hypoponera abeillei</i> |
| – | Dorsal surface of alitrunk interrupted by shallow but distinct metanotal suture | |
| | | <i>Hypoponera ragusai</i> |

Hypoponera abeillei (André, 1881)

Ponera abeillei André, 1881. — Bull. Soc. ent. Fr. 48: 61.

Hypoponera abeillei. — Taylor 1967; Pac. Ins. Monogr. 13: 12.

Hypoponera eduardi (Forel, 1894)

Ponera eduardi Forel, 1894. — Bull. Soc. Vaud. Sci. nat. 30: 15.

Hypoponera eduardi. — Taylor 1967; Pac. Ins. Monogr. 13: 12.

Hypoponera punctatissima (Roger, 1859)

Ponera punctatissima Roger, 1859. — Berl. ent. Z. 3: 246.

Hypoponera punctatissima. — Taylor 1967; Pacific Insects Monograph: 12.

Material: Oman: ♀♀, Thumrait, VI.1984, J.W. Barnes. — Yemen: ♀♀ from: Sana'a, VII.1991; Zabid, 26.VIII.1991; all A. van Harten.

Winged queens of this very widely distributed tramp species were taken in light traps.

Hypoponera ragusai (Emery, 1894)*Ponera ragusai* Emery, 1894. — Naturalista Sicil. Gior. Sci. nat. 14: 28.*Hypoponera ragusai*. — Baroni Urbani 1971; Mem. Soc. ent. Ital. 50: 18.

Subfamily Cerapachyinae

Genus *Cerapachys* Smith, 1857

Key to species

- 1 Apical funiculus segment swollen to form a single-segmented large club; eyes distinct but very small *Cerapachys wittmeri*
- Apical three segments together forming a club; eyes very large *Cerapachys longitarsus*

Cerapachys longitarsus (Mayr, 1878)*Lioponera longitarsus* Mayr, 1878. — Verh. zool.-bot. Ges. Wien 28:669.*Cerapachys longitarsus*. — Brown 1975; Search Agric. 5. Entomol. (Ithaca) 15: 23.*Cerapachys wittmeri* Collingwood, 1985*Cerapachys wittmeri* Collingwood, 1985. — Fauna of Saudi Arabia 7: 237.*Cerapachys* sp.

Material: Yemen: 2 ♂♂, Sana'a, VII.1991, taken at light, A. van Harten.

The two males are not at present identifiable to species.

Subfamily Pseudomyrmecinae

Genus *Tetraponera* Smith, 1852

Key to species

- 1 Alitrunk in lateral view almost flat, numerous erect hairs *Tetraponera bifoveolata*
- Alitrunk in lateral view undulate; few erect hairs on body *Tetraponera erythraea*

Tetraponera bifoveolata Mayr, 1895*Sima bifoveolata* Mayr, 1895. — Ann. naturh. Hofmus. Wien 10: 146.*Tetraponera bifoveolata*. — Wheeler 1922; Bull. Am. Mus. nat. Hist. 45: 796.

Material: Saudi Arabia: ♂♂, ♀♀ from: Wadi Tumair, 20.II.1976; Dammam, 2.IX.1976; Amjara, 19.II.1980; Wadi Sanakhab, 25.IX.1980; Khoda, 30.IX.1982; all W. Büttiker. — Yemen: 1 ♀, Al-Mahwit, 11.III.1992, A. van Harten; ♀♀, Bilad Bani, 23.III.1993, C.A. Collingwood.

This species, although taken over a wide area of Arabia, has not yet been recorded from Oman. The old record of *T. erythraea* (Emery, 1895) from Aden is still the only one for this species from the peninsula.

Subfamily Myrmicinae

Key to genera

- 1 Apical two segments of antennae forming a club. Antennae with six or ten segments 2
 – Apical three segments of antennae forming a club or antennae with four or five segments forming a somewhat indistinct club. Antennae with 11 or 12 segments . . . 3
 2 Alitrunk box-like without dorsal sutures. Antennae with six segments
Melissotarsus
 – Alitrunk with a distinct mesopropodeal furrow. Antennae with ten segments
Solenopsis
 3 Postpetiole attached mediodorsally to first gastral segment; gaster cordiform from above
Crematogaster
 – Postpetiole attached medioventrally to first gastral segment; gaster pyriform from above 4
 4 Antennae with four or five antennal segments slightly enlarged to form a somewhat indistinct club. 5
 – Antennae with three enlarged apical segments forming a distinct club 6
 5 Eyes large, pointed anteroventrally; antennae with 11 segments
Oxyopomyrmex sabulonis
 – Eyes more or less rounded, not pointed anteroventrally; antennae with 12 segments . 7
 6 Mandibles broadly rounded. Most species polymorphic with head width increasing allometrically with increased body size
Messor
 – Mandibles triangular; monomorphic; head always longer than broad
Aphaenogaster muschtaidica
 7 Propodeum without spines or teeth; clypeus longitudinally bicarinate
Monomorium
 – Propodeum bituberculate, dentate or bispinose; clypeus with median portion flat or rounded, not bicarinate 8
 8 Clypeus raised into a ridge in front of the antennal insertions
Tetramorium
 – Clypeus not raised to a ridge in front of antennal insertions 9
 9 Dimorphic species; major workers have greatly enlarged heads with broad mandibles of three teeth. Minor workers have narrow heads with large multidentate mandibles
Pheidole
 – Monomorphic species; all workers in a colony of more or less even size and shape with mandibles of five teeth 10
 10 Postpetiole enlarged, cordiform from above, in most species wider than long; alitrunk without dorsal hairs
Cardiocondyla
 – Postpetiole not conspicuously enlarged, not or scarcely wider than long; erect hairs always present on dorsum of alitrunk
Leptothorax

Genus *Messor* Forel, 1890

The number of distinguishable *Messor* species in Arabia has increased from 15 to 25. This genus includes a large number of insufficiently characterised infraspecific names and in some cases wrong

attribution. Most species are polymorphic and all descriptions apply to the larger workers. Characters that are considered to be of most value include relative eye size, dorsal pilosity, especially that of the first gastral tergite, and the presence or absence of long J-shaped hairs on the ventral head surface referred to here as a psammophore, for convenience, although strictly this term should apply only to those species where these hairs are crowded. The shapes of the petiole and postpetiole are also important. Sculpture is rather variable even within the same nest series.

Messor species are seed gatherers and a useful account of foraging activity of one of the species in Yemen is given by SHEHALA (1981).

Key to species (large workers)

- | | | |
|----|--|---------------------------------|
| 1 | Underside of head with moderately curved and straight hairs | 2 |
| – | Underside of head with at least some long J-shaped hairs | 3 |
| 2 | Strongly sculptured, robust, brown or brownish-black ants; propodeum angulate to broadly dentate | <i>Messor orientalis</i> |
| – | Smooth, shining, slender bicoloured ants with reddish-yellow head and alitrunk contrasting with dark gaster; propodeum with distinct small teeth | <i>Messor rufotestaceus</i> |
| 3 | First funiculus segment not longer than second; all tibial spurs pectinate | <i>Messor arenarius</i> |
| – | First funiculus segment larger and distinctly longer than second; mid and hind tibial spurs simple | 4 |
| 4 | First gaster tergite conspicuously hairy with long pale hairs | 5 |
| – | First gaster tergite with short hairs, few or none | 9 |
| 5 | Head red or dark red contrasting with dark alitrunk and gaster; maximum HW over 3.0 | <i>Messor decipiens</i> |
| – | Head dark as gaster; maximum HW 2.5 or less | 6 |
| 6 | Eyes large, 0.25 times HW. Propodeal outline smoothly rounded | <i>Messor buettikeri</i> |
| – | Eyes smaller, 0.21 times HW or less. Propodeal outline more or less angulate or dentate | 7 |
| 7 | Propodeum with projecting blunt teeth | <i>Messor muraywahus</i> n. sp. |
| – | Propodeum simply angulate, not dentate | 8 |
| 8 | Dorsum of head finely striated; alitrunk dark | <i>Messor aralocaspius</i> |
| – | Head smooth unsculptured; alitrunk often slightly reddish | <i>Messor subgracilinodis</i> |
| 9 | Unicolorous dark brown to black ants | 10 |
| – | Bicoloured ants with head and/or alitrunk reddish contrasting with dark gaster | 15 |
| 10 | Propodeum armed with spines or teeth | 11 |
| – | Propodeum angulate or rounded | 13 |
| 11 | Head completely striated; alitrunk sculptured | <i>Messor striaticeps</i> |
| – | Head and alitrunk smooth with superficial sculpture | 12 |
| 12 | Eyes large, 0.3 times HW. Propodeum with short broad-based teeth | <i>Messor foreli</i> |
| – | Eyes smaller, less than 0.20 times HW. Propodeum with distinct spines | <i>Messor hismai</i> n. sp. |
| 13 | Eyes large, 0.3 times HW. Scapes long surpassing occiput, SI over 100. Propodeum smoothly rounded | <i>Messor muscatus</i> n. sp. |

- Eyes smaller, 0.25 times HW or less. Scapes shorter, SI 80 or less. Propodeum angulate 14
- 14 Postpetiole long and low without an anteroventral projection. Occiput with 7-8 projecting hairs at each side of the midline *Messor crawleyi*
- Postpetiole a rounded node with an anteroventral projection. Occiput with 3-5 projecting hairs at each side of the midline *Messor ebeninus*
- 15 Head of larger workers red or reddish, distinctly lighter than the gaster 16
- Head dark, unicolorous with the gaster; alitrunk paler, reddish at least in part 21
- 16 Maximum HW 2.0 or less 17
- Maximum HW 2.5 or more 19
- 17 Head wholly or in part smooth and shining; propodeal outline rounded *Messor minor*
- Head completely sculptured; propodeum angled 18
- 18 Head coarsely striate, subrectangular; head, alitrunk and nodes entirely reddish *Messor ceresis*
- Head finely striated with occiput smoothly rounding into the broadly rounded sides; alitrunk and nodes in part brownish *Messor picturatus*
- 19 Dark species with head only slightly reddish; postpetiole in dorsal view slightly longer than wide, without a distinct anteroventral projection *Messor sanganus* n. sp.
- Head and alitrunk red; postpetiole not longer than wide with a distinct anteroventral projection 20
- 20 First gaster tergite smooth and shining without any dorsal hairs *Messor galla*
- First gaster tergite with superficial sculpture and always with a few to several suberect hairs *Messor semirufus*
- 21 Propodeal outline smoothly rounded; ventral J-shaped hairs profuse forming a distinct psammophore; eyes large, 0.25 times HW *Messor syriacus*
- Propodeal profile more or less angulate; ventral J-shaped hairs fewer, not forming a distinct psammophore; eyes smaller, 0.15-0.22 times HW 22
- 22 Gaster with many suberect hairs; occiput with 5-8 projecting hairs at each side of the midline *Messor medioruber*
- Gaster with occasional suberect hairs or none; occiput with 3 or 4 hairs at most projecting at each side of the midline 23
- 23 Eyes large, always more than 0.20 times HW *Messor meridionalis*
- Eyes smaller, 0.14-0.19 times HW 24
- 24 Pronotum somewhat flattened with lateral bosses clearly visible in oblique view; alitrunk at least in part reddish and well contrasted with dark gaster; head somewhat shining *Messor wasmanni*
- Pronotum simply rounded; alitrunk only slightly paler than gaster; head dull with fine sculpture *Messor intermedius*

Messor aralocaspius (Ruzsky, 1902)

Aphaenogaster barbara var. *aralocaspia* Ruzsky, 1902. — Izvest. Turk. Otd. Imp. Russk. Geog. Obsch. 3: 20.

Messor aralocaspius. — Pisarski 1967; Ann. zool. Warsz. 24 (6): 384.

Material: Saudi Arabia: ♀♀, Jeddah-Taif, 1200 m, 1.V.1979, Exp. N. Hedjaz (W. Büttiker); ♀♀, Wadi Khumra, 10.II.1978, W. Büttiker. — Kuwait: 1 ♀, Al-Rileg al-Shamali, 26.III.1988, W. Büttiker. — Yemen: 1 ♀, ♀♀, Sana'a, 7.XII.1990, A. van Harten; ♀♀, Djebel an-Nir Shuaib, 3000 m, 6.III.1993, C.A. Collingwood.

Measurements: HW 1.9-2.4; EL/HW 0.19-0.23.

The head is strongly striate and the whole of the alitrunk dorsum is transversely striate. All dorsal surfaces are covered with long pale hairs. The psammophore is moderately developed, never thick. The propodeum is angulate in profile but never dentate or spined. This is generally a highland species in Arabia and constructs relatively large crater nests.

Messor arenarius (Fabricius, 1787)

Formica arenaria Fabricius, 1787. — Mant. Insect. 1: 30.

Messor arenarius. — Forel 1894; Bull. Soc. Vaud. Sci. nat. 30: 45.

Material: Saudi Arabia: ♀♀ from: Wadi Durmah, 30.XII.1975; Dammam, 14.V.1976; Riyadh, 29.III.1976; all W. Büttiker. — Kuwait: ♀♀, Al-Jawf, 2.XI.1986, W. Büttiker.

Measurements: HW 3.4-4.5; EL/HW 0.165.

This is by far the largest *Messor* species in the Middle East. The subcephalic hairs are numerous but do not form a distinct psammophore. All body surfaces are covered with erect hairs. The propodeum is armed with short strong spines. The general body colour is brownish black but the alitrunk is occasionally somewhat reddish and such examples appear little different from *M. regalis* (Emery, 1892) of sub-Saharan Africa, sharing the same features: short first funiculus segment, pectinate tibial spurs, thick body pilosity, spined propodeum and rugose body sculpture extending to the first gastral tergite.

Messor buettikeri Collingwood, 1985

Messor buettikeri Collingwood, 1985. — Fauna of Saudi Arabia 7: 249.

Material: Kuwait: 6 ♀♀, Aqabat al-Khuraytah, 15.IV.1984, W. Büttiker.

Measurements: HW 1.64; EL/HW 0.24-0.26.

The sample of workers of this smooth-sculptured, black, large-eyed species have the features as described in COLLINGWOOD (1985). A further character is the postpetiole which has the ventral surface flat without an anterior projection.

Messor ceresis Santschi, 1934

Messor ceresis Santschi, 1934. — Bull. Ann. Soc. ent. Belg. 74: 274.

Material: Saudi Arabia: ♀♀ from: Diriyah, 28.III.1975; Wadi Tumair, 13.II.1976; Wadi Hanifa, 18.II.1976; all W. Büttiker.

Measurements: HW 1.3-1.5; EL/HW 0.20-0.223.

This is a small apparently monomorphic red species resembling some forms of *M. minor* (André, 1882), differing in the coarser sculpture of the head and alitrunk, slightly larger eyes, stronger development of the psammophore, distinctly angulate propodeum and less variable size. There are 0-2 projecting hairs at each side on the occiput, two pairs each on the pronotum, petiole and postpetiole with a few hairs at the distal margin of the first gastral tergite. Head, alitrunk and nodes are entirely reddish. The species was described from Lebanon and is evidently rather local.

Messor crawleyi Santschi, 1928; n. stat.

Messor rugosus st. *crawleyi* Santschi, 1928. — Rev. Zool. Bot. Afr. 16: 203.

Material: Saudi Arabia: 1 ♀, Wadi Tumair, 20.II.1976, W. Büttiker.

Measurements: HW 1.52; SL 1.24, EL 0.38; EL/HW 0.249.

This is a large-eyed, small brown sculptured species. The propodeum is sharply angulate with the flat dorsal surface meeting the down slope at a near right angle. The petiole is somewhat thick with a rounded dorsal crest. The postpetiole is low without a ventral projection. The head has the frons striate with the striae extending across to the eyes. The pronotum and the propodeum are

strongly transversely striate; the mesonotum has strong longitudinal striae curving in towards the well-marked promesonotal suture. Both nodes have close reticulopunctate sculpture while the gaster is smooth and glossy. The psammophore is well developed. The occiput has 7-8 hairs at each side of the midline and the alitrunk dorsum has many scattered hairs with two pairs on the propodeum, two pairs on the petiole and three on the postpetiole. At least 12 standing hairs are visible on the first gastral tergite in profile. This species differs from *M. rugosus* (André, 1881) of the Middle East in the distinctly angulate propodeum, sparser pilosity, more striated alitrunk and smoother gaster.

Messor decipiens Santschi, 1917

Messor capensis st. *decipiens* Santschi, 1917. — Bull. Soc. Hist. nat. Afr. 8: 94.

Messor decipiens. — Bolton 1982; Bull. Br. Mus. nat. Hist. 45 (4): 348.

Material: Saudi Arabia: ♀♀, Thanomah, 10.IV.1980, W. Büttiker.

Measurements: HW 2.54-2.76; EL/HW 0.20-0.21.

This species, well characterised by BOLTON (1982), has similar body pilosity to *M. aralocaspius* but is much larger. The previous record, Anamas (COLLINGWOOD 1985), is in the same general area of the Asir highlands as Thanomah.

Messor ebeninus Santschi, 1927

Messor semirufus var. *ebeninus* Santschi, 1927. — Bol. R. Soc. esp. Hist. nat. 27: 229.

Messor ebeninus. — Tohmé 1971; Bull. Soc. ent. Egypte 54: 569.

Material: Saudi Arabia: ♀♀, ♀♀ from: Diriyah, 18.III.1975; Uyaynah, IV.1976; Mizbil, XII.1977; Wadi Awsat, XII.1976; Wadi Khumra, 18.IV.1976; Wadi Hanifa, 28.XI.1977; Jebel Banban, 5.II.1979; Wadi Daykah, IV.1980; Wadi Karrar, I.1979; Harram, 24.XI.1981; all W. Büttiker. — Kuwait: ♀♀, Aqabat al-Khuraytah, 7.IV.1980, W. Büttiker. — United Arab Emirates: ♀♀, Djebel Haffete, X.1989, H. Heatwole; ♀♀, Ras Ghanada, IX.1992, B. Tigar. — Oman: ♀♀, Khasab Musandham, 15.IV.1986, R. Braund. — Yemen: ♀♀ from: Wadi Surdah, 21.IX.1991; Sana'a, 5.I.1992; all A. van Harten; ♀♀, Taiz – Al-Turbah, 14.III.1993, C.A. Collingwood.

Measurements: HW 2.0-2.5; EL/HW 0.19-0.23.

This evenly black species has a rather variable pilosity with 1-5 hairs at each side on the occiput, 1-2 pairs on the propodeum, one pair each on the petiole and postpetiole and there are a few occasional hairs on the first gastral tergite.

Messor foreli Santschi, 1923 (Fig. 3)

Messor aegyptiacus var. *foreli* Santschi, 1923. — Rev. Suisse Zool. 30: 322.

Messor foreli. — Bernard 1981; Syst. Assoc. Spec. 19: 143.

Material: Saudi Arabia: ♀♀ from: Dammam, 18.VIII.1976; Hofuf Road, E of Riyadh, 21.III.1975; all W. Büttiker. — United Arab Emirates: ♀♀, Ras Ghanada, IX.1992, B. Tigar. — Oman: ♀♀, Wadi Andam, II.1986, W. Büttiker; ♀♀, misidentified as *M. planiceps* Stitz, 1917 in COLLINGWOOD (1988), Ras al-Jibsh, 6.III.1987, M.D. Gallagher.

Measurements: HW 1.35-1.39; SI 94; EL/HW 0.30.

This is a small species characterised by its large eyes, dentate propodeum and hairless propodeum, nodes and first gastral tergite. The colour is evenly reddish brown to brownish black and the sculpture is dilute with the whole body shining. The postpetiole is rather low and slightly truncate. It is a true desert species common in the northern Sahara.

Messor galla (Mayr, 1904)

Stenamma (*Messor*) *barbarum* var. *galla* Mayr, 1904. — in Jägerskjöld: Res. Swed. Zool. Exp. Egypt White Nile 1 (6): 5.

Messor galla. — Santschi 1928; Rev. Zool. Bot. Afr. 16: 201.

Material: Oman: ♀♀, Jabal Qarms Musandham, IX.1982, R. Braund; ♀♀ from: Khadrafi Dhofar, 27.IX.1983; Marmul Dhofar, 25.IX.1984; Ayum Pools, 27.IX.1983; Wadi Sayq, 24.IX.1983; all J. Darlington. — Yemen: ♀♀, Madinat al-Shariq, 7.III.1993, C.A. Collingwood.

Measurements: HW 2.84; EL/HW 0.17-0.19.

This subtropical species is evidently common in the cultivated valleys of the Dhofar. It appears to be uncommon in Yemen and in Saudi Arabia was not found further north than the sheltered valleys at Fayfa near the Yemen border.

Messor hismai n. sp. (Fig. 4)

Holotype: ♀, Saudi Arabia, Wadi Hisma, 28°02'N 36°07'E, 1120 m, W. Büttiker. — Paratypes: 5 ♀♀, same series as holotype.

Measurements of holotype: TL 5.32; HL 1.20; HW 1.28; SL 1.20; EL/HW 0.19.

Description: This is a small, dark, apparently monomorphic species with distinct propodeal spines. The whole of the alitrunk dorsum has reticulopunctate sculpture but the nodes and gaster are smooth and glossy black. There are no dorsal hairs on the propodeum or nodes. There are some short hairs on the genae and the gaster with a few longer hairs on the posterior tergite border.

Affinities: This species is similar to *M. foreli* but has distinct propodeal spines and a generally darker colour.

Messor intermedius Santschi, 1927

Messor semirufus var. *intermedius* Santschi, 1927. — Bol. R. Soc. esp. Hist. nat. 27: 229.

Messor intermedius. — Arnoldi 1977; Zool. Z. H. 36: 437.

Material: Saudi Arabia: ♀♀, Wadi al-Ammariyah, 3.II.1977, W. Büttiker.

Measurements: HW 2.78; EL/HW 0.16-0.17.

This is a brown species with the alitrunk sometimes dark red but never as dark as the gaster. It resembles *M. semirufus* in the relatively small eye size but is distinguished by the coarse sculpture and much darker colour. It has a rather local distribution in the Middle East.

Messor medioruber Santschi, 1910

Messor medioruber Santschi, 1910. — Bull. Soc. Hist. nat. Afr. Nord 2: 44.

Material: Kuwait: ♀♀ from: Wafra, III.1988; Sulabiyah, 10.III.1988; all W. Büttiker.

Measurements: HW 2.0; EL/HW 0.245.

This bicoloured species differs from *M. meridionalis* by the numerous dorsal hairs over the alitrunk and gaster and the shape of the postpetiole which has a flat ventral surface without a protruding process when viewed in full profile.

Messor meridionalis (André, 1883) (Fig. 5)

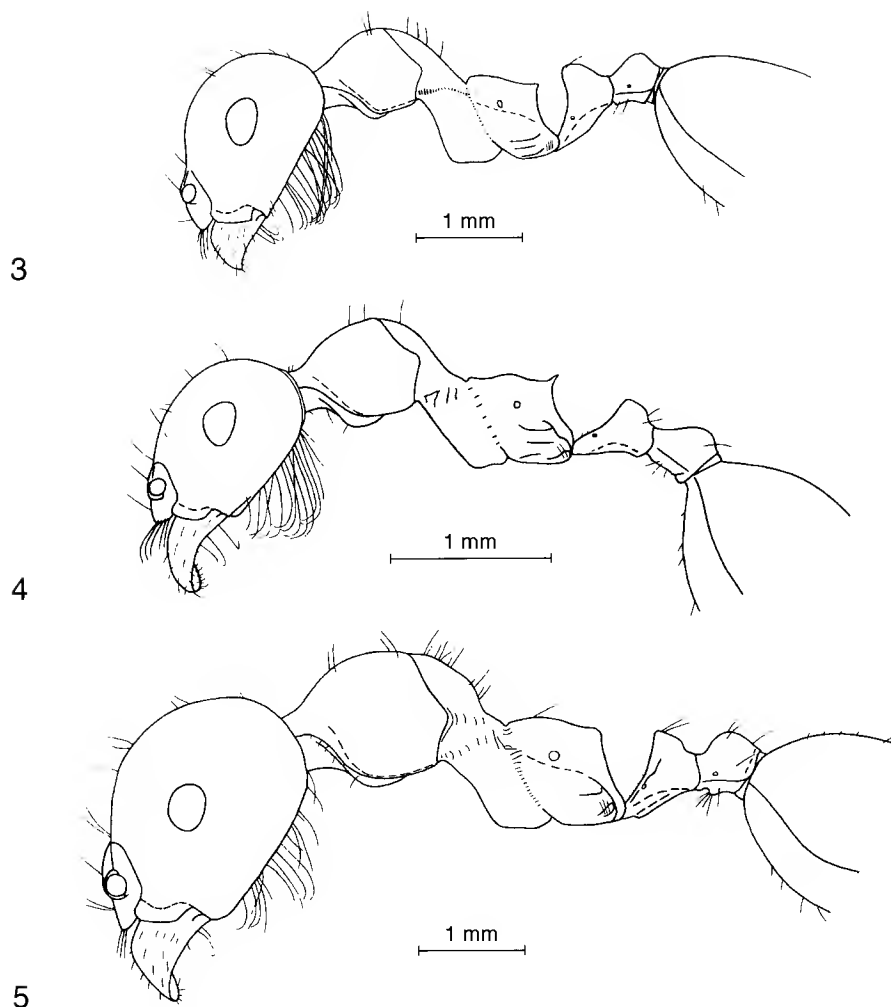
Aphaenogaster barbara var. *meridionalis* André, 1883. — Spec. Hym. Europe 2: 353.

Messor meridionalis. — Bondroit 1918; Ann. Soc. ent. Fr. 67: 155.

Material: Saudi Arabia: ♀♀, ♀♀ from: Diriyah, 28.III.1975; Riyadh Wireless Station, 9.II.1976; Dammam, 28.VIII.1976; Wadi Hanifa, 12.XII.1975; Wadi Durmah, 22.XII.1985; all W. Büttiker. — Kuwait: ♀♀ from: Failaka Island, 31.III.1988; Salubiyah, 16.II.1988; all W. Büttiker. — Oman: ♀♀, Jiddat al-Sahara 23.IV.1989, M.D. Gallagher.

Measurements: HW 2.3-2.6; EL/HW 0.204-0.223.

This bicoloured species known from Afghanistan (PISARSKI 1967) and most of the countries of the Middle East including Iraq and Iran is immediately distinguishable from *M. semirufus*, *M. wasmanni* and other superficially similar species by its relatively large eyes. In museum collections several different species are placed under the name *M. meridionalis* so that there is uncertainty as to which species this name should apply. The nearest similar species in the Santschi collection in NHMB is *M. grandinida* Santschi, 1910.



Figs 3-5: Head and alitrunk in profile: 3, *Messor foreli*, ♀; 4, *M. hismai* n. sp., ♀; 5, *M. meridionalis*, ♀.

Messor minor (André, 1883)

Aphaenogaster barbara var. *minor* André, 1883. — Spec. Hym. Europe 2: 253.

Messor minor. — Kutter 1927; Folia Myrm. Term. 1: 99.

Material: Saudi Arabia: ♀♀, Wadi Shuqub, 7.IV.1983, C.A. Collingwood.

Measurements: HW 1.8-2.4; EL/HW 0.18-0.22.

This red-headed species occurs in South Italy and Tunisia and seems to be indistinguishable from *M. maurus* Barquin, 1981 from Tenerife and Lanzarote. It is known in Arabia only from a restricted area of the Asir highlands.

Messor muraywahus n. sp. (Fig. 6)

Holotype: ♀, Saudi Arabia, Al-Muraywah, 28°45'N 44°00'E, 28.X.1986, W. Büttiker. — Paratypes: 2 ♀♀, same series as holotype.

Measurements of holotype: TL 6.5; HL 2.1; HW 2.2; SL 1.91; EL/HW 0.232.

Description: This species is similar to *M. aralocaspius* but the body hairs are shorter and differently distributed. The occiput has four and five projecting hairs at each side of the midline. Short hairs project on the genae below the eyes. The pronotum has several long dorsal hairs, the petiole one pair and the postpetiole two pairs. Several short hairs are present over the first gastral

dorsum. This species has relatively larger eyes than *M. aralocaspius*, a steeper more sharply angled petiole and the propodeum is armed with slightly projecting blunt teeth. The subcephalic hairs are sparse, not forming a distinct psammophore. The head is moderately shining with a few scattered punctures, the alitrunk dorsum is transversely striate and the gaster has fine superficial sculpture.

Messor muscatus n. sp. (Fig. 7)

Holotype: ♀, Oman, Ras al-Hamra, Muscat, 19.VI.1985, C. Holzschuh. — Paratypes: Oman: 1 ♀, same series as holotype. — Saudi Arabia: 1 ♀, Wadi Shijah, 4.V.1976, W. Büttiker. — Yemen: 2 ♀♀, Madinat al-Shariq, 7.III.1993, C.A. Collingwood.

Measurements of holotype: TL 5.2; HW 1.11; EL/HW 0.31; SI 103.

Description: This small brown species has large eyes and a long scape which surpasses the occiput when laid back. The propodeum is rounded as in *M. syriacus*. The psammophore is distinct but less developed compared with *M. syriacus* and the whole body is evenly brownish, not bicoloured as in *M. syriacus*. The postpetiole is long and low as in *M. crawleyi* and *M. hismai* but this species is distinctly different from both of these in the shape of the propodeum. There are long body hairs over the promesonotum and a few shorter hairs on the first gastral tergite.

Messor picturatus Santschi, 1927

Messor instabilis picturatus Santschi, 1927. — Rev. Suisse Zool. 30.

Messor picturatus. — Collingwood 1985; Fauna of Saudi Arabia 7: 251.

Material: Saudi Arabia: ♀♀ from: Wadi Salbukh, 8.IX.1977; Wadi Hanifa, 3. and 8.II.1976; all W. Büttiker. — Kuwait: ♀♀, Anwha Island, 29.II.1988, W. Büttiker.

Measurements: HW 1.92-2.12; EL/HW 0.21-0.23.

This species has the red head and alitrunk of the *M. minor* species group but differs in the more rounded head, grainy head and stronger alitrunk sculpture. This is particularly evident in the larger examples. Small workers are hard to tell apart except for the larger eyes. The petiole in *M. picturatus* is also thicker compared with similar sized examples of *M. minor* and the anteroventral prominence on the postpetiole is more developed. *M. minor* examples from Corsica and what appears to be the same species from Tenerife have a few erect hairs on the first gastral tergite. These are restricted to two or three on the posterior margin of the first tergite in *M. picturatus*.

Messor rufotestaceus (Foerster, 1850)

Myrmica rufotestacea Foerster, 1850. — Verh. naturh. Ver. preuss. Rheinl. 74: 89.

Messor rufotestaceus. — Emery 1908; Dt. ent. Z. (1908): 437.

Material: Saudi Arabia: ♀♀ from: Riyadh, 20.II.1975; Wadi Harth, 28.IX.1978; Wadi Tabuk, 24.IV.1979; all W. Büttiker. — United Arab Emirates: ♀♀, Ras Ghanada, IX.1992, B. Tigar. — Oman: ♀♀, Kuria Muria, 24.IV.1984, J. Darlington; 1 ♀, Baushar, W of Muscat, X.1985, M.D. Gallagher.

Measurements: HW 1.7; EL/HW 0.21.

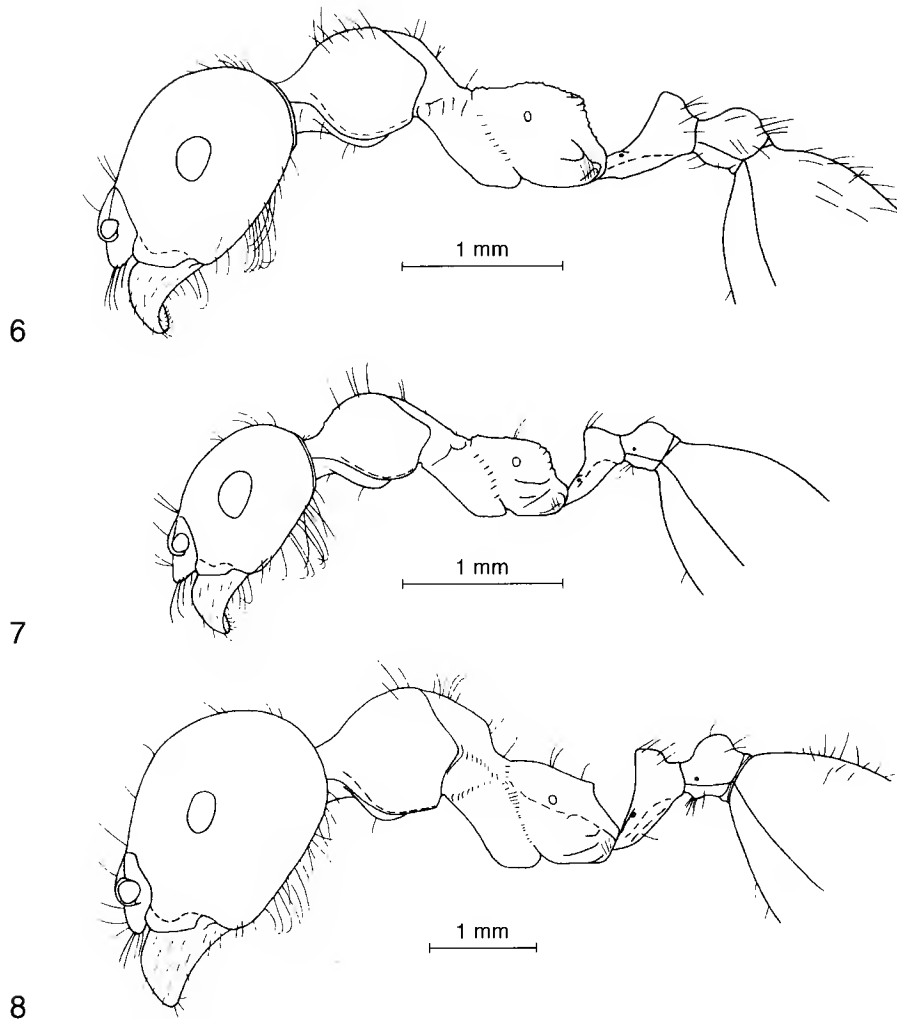
This interesting species stands apart from other Middle Eastern *Messor* species because the antennal segments are exceptionally thin and the nodes are comparatively low. It is a non-trail-forming species living in small communities. It is known from Syria, Palestine and the northern Sahara.

Messor sanganus n. sp.

Holotype: ♀, Yemen, Sangani Pass, 13.III.1993, 2200 m, C.A. Collingwood. — Paratypes: 19 ♀♀, same series as holotype.

Measurements of holotype: TL 7.5; HL 2.28; HW 2.28; EL/HW 0.19.

Description: Head shining, dark red, contrasting with dark alitrunk and gaster. Whole of alitrunk dorsum finely transversely striate. Petiole dorsum sculptured; postpetiole and gaster



Figs 6-8: Head and alitrunk in profile: 6, *Messor muraywabus* n. sp., ♀; 7, *M. muscatus* n. sp., ♀; 8, *M. wasmanni*, ♀.

smooth and shining with some superficial sculpture. The propodeal profile is steeply rounded but not angulate; the petiole is a rounded triangle and the postpetiole is simple, without a distinct anteroventral projection as seen in profile and very slightly longer than broad in dorsal view. The alitrunk has several hairs, the petiole and postpetiole each have two pairs and the first gaster tergite has seven visible in full profile. This species differs from *M. semirufus* in the much darker body colour, slightly larger eyes and the longer lower postpetiole. The ants were taken from a large populous nest in a sun-exposed sheltered part of the high pass.

***Messor striaticeps* (André, 1883)**

Aphaenogaster barbara var. *striaticeps* André, 1883. — Spec. Hym. Europe 2: 356.

Messor striaticeps. — Cagniant 1969; Bull. Soc. Hist. nat. 105: 405.

Material: Saudi Arabia: ♀♀, Tabuk, 13.XI.1988, W. Büttiker. — Kuwait: ♀♀, Al-Jawf, 2.XI.1986, W. Büttiker.

Measurements: HW 2.46; EL/HW 0.205-0.21.

This species is totally black with a strongly striated head and well-developed propodeal spines. The psammophore is weakly developed.

Messor subgracilinodis Arnoldi, 1969

Messor subgracilinodis Arnoldi, 1969. — Zool. Zhurn. 49: 73.

Material: Yemen: ♀♀, Al-Mahwit, above 2000 m, 21.X.1991, A. van Harten.

Measurements: HW 2.48; EL/HW 0.17.

This species has body pilosity much as *M. aralocaspius* but less dense and it also differs by the much smoother head sculpture, smaller eyes and the frequent slightly reddish tinge to the alitrunk.

Messor syriacus Tohmé, 1969

Messor syriacus Tohmé, 1969. — Publ. Univ. Liban Sci. nat. 7: 9.

Material: Saudi Arabia: ♀♀ from: Wadi Durmah, 16.I.1976; Al-Khubra, 22.V.1977; all W. Büttiker.

Measurements: HW 1.7-2.3; EL/HW 0.24-0.28.

This species has large eyes and a well-developed psammophore. The propodeum is rounded in profile, not angulate.

Messor wasmanni Krausse, 1910 (Fig. 8)

Messor barbarus wasmanni Krausse, 1910. — Zool. Anz. 35: 524.

Messor wasmanni. — Casevitz-Weulersse 1990; Bull. Mus. natn. Hist. nat. 12: 154.

Material: Oman: ♀♀, Dharbat Falls, 13.II.1986, M.D. Gallagher.

Measurements: HW 2.5-2.9; EL/HW 0.16-0.19.

This species differs from *M. semirufus* and related species by the shape of the pronotum which is mildly flattened dorsally and expanded laterally into a protuberant boss at each side. This is a constant and characteristic feature and most easily seen in slanted profile. It is a very common grain-harvesting ant found on all of the Greek islands, on the southern Balkan mainland, in South Italy and the Mediterranean islands of Corsica, Sardinia and Sicily but not in Malta or the Balearics. It has also been taken locally in Tunisia but its occurrence so far south as Oman is a surprise. However, TOHMÉ (1968) and TOHMÉ & TOHMÉ (1981) recorded it as *M. concolor* Emery, 1908 from Lebanon and Syria respectively. Specimens labelled *M. concolor* cotype in both the Oxford Hope Museum and the NHMB are confirmed as *M. wasmanni*, *M. concolor* being a junior synonym.

Messor sp.

Material: Saudi Arabia: 1 ♀, Harithi, 19.IV.1985, W. Büttiker.

A single worker resembling *M. muraywahus* n. sp. in general shape, differs in the near absence of long subcephalic hairs. Since this may be due to abrasion and in the absence of further specimens, no formal description is given.

Genus *Pheidole* Westwood, 1839

Key to species (large workers)

- | | | | |
|---|--|-----------------------------|---|
| 1 | HW less than 1.0; head clearly longer than wide | <i>Pheidole minuscula</i> | |
| – | HW more than 1.35; head sides curved, head not or scarcely longer than broad | | 2 |
| 2 | Petiole with a ventral projection, in profile a translucent lobe | <i>Pheidole lamellinoda</i> | |
| – | Petiole without a ventral projection. | | 3 |
| 3 | Postpetiole wider than long, distinctly dentate at widest point | | 4 |
| – | Postpetiole scarcely or not wider than long, rounded or at most slightly angled at sides | | 7 |

- 4 Promesonotal outline evenly curved without a distinct dorsal prominence; funiculus segments 2, 3 and 4 quadrate *Pheidole megacephala*
- Promesonotal outline broken by distinct dorsal ridge or prominence; funiculus segments 2, 3 and 4 longer than wide 5
- 5 Head completely striate to occiput; postpetiole about twice as wide as long *Pheidole teneriffana*
- Head with median occipital area smooth; postpetiole about three times as wide as long 6
- 6 Legs and antennae clothed with erect pubescence; head sculpture strong *Pheidole sculpturata*
- Appendage pubescence subdecumbent; head sculpture weak *Pheidole katonae*
- 7 HW more than 2.0; sides of head striate to occiput; first gaster tergite partially or totally striate *Pheidole rugaticeps*
- HW 1.6 or less; occipital lobes without striae; first gaster tergite smooth 8
- 8 Postpetiole slightly longer than broad about 0.2 times HW; funiculus segment 2 scarcely longer than wide *Pheidole jordanica*
- Postpetiole about as wide as long, 0.23 times HW; funiculus segment 2 slightly longer than wide *Pheidole sinaitica*

Pheidole jordanica Saulcy, 1874*Pheidole jordanica* Saulcy, 1874. — Bull. Soc. Hist. nat. Moselle 13: 17.

Measurements: SI 0.675; HW/PPW 0.227.

This is a fairly common species in the Middle East and occurs also in north-eastern Africa.

Pheidole katonae Forel, 1907; n. stat.*Pheidole sculpturata katonae* Forel, 1907. — Ann. hist.-nat. Mus. natn. Hung. 5: 21.*Pheidole sculpturata*. — Collingwood 1985; Fauna of Saudi Arabia 7: 255, pro parte [misidentification].Material: Saudi Arabia: ♀♀, Fayfa, 27.III.1983, C.A. Collingwood (recorded as *P. sculpturata*). — Oman: ♀♀, Tanuf, 11.XI.1977, R.P. Whitcombe; ♀♀ from: Thumrait, 20.I.1984; Samhan, 25.IV.1984; Jabal Akhdar, 13.X.1984; Dibab, IX.1985; Ras Madrakah, 1.X.1986; all M.D. Gallagher.

Measurements: SI 0.5; HW/PPW 0.313.

The head shape of the large workers is similar to that of *P. sculpturata* but the reduced head sculpture and less abundant oblique appendage pubescence justify specific distinction.*Pheidole megacephala* (Fabricius, 1793)*Formica megacephala* Fabricius, 1793. — Ent. Syst. 2: 361.*Pheidole megacephala*. — Roger 1863; Verz. Formicid.: 30.

Material: Saudi Arabia: ♀♀ from: Bani Rizam, 9.IX.1987; Harithi, 19.IX.1987; all W. Büttiker. — Kuwait: ♀♀, Sulabiyah, 16.II.1988, W. Büttiker. — Oman: ♀♀ from: Wadi Halet, 25.IX.1984; Jabal Samhan, 20.IX.1984; all M.D. Gallagher. — Yemen: ♀♀, Qa a Boun, 18.X.1991, M. Knapp; ♂♂, ♀♀, ♀♀ from: Al-Mahwit, 21.IX.1991; Sana'a, VIII.1991; Wadi Hami, 17.VIII.1991; Hammam Ali, 6.VIII.1991; all A. van Harten; ♀♀, Materlik Laboratory, V.1986, H. Wrantik.

Measurements: SI 0.47; HW/PPW 0.34.

This is a common tramp species. Its origin is not known.

Pheidole rugaticeps Emery, 1877*Pheidole rugaticeps* Emery, 1877. — Ann. Mus. civ. Stor. nat. Genova 9: 375.

Material: Oman: ♀♀ from: Am Umran, 15.IX.1982; Dharbat Falls, 13.II.1984; Bani Habil, 22.X.1984; all M.D. Gallagher; ♀♀ from: Sudha, 15.X.1984; Atsah, 21.IX.1984; all J. Darlington. — Yemen: ♀♀, Al-Mahwit, 7.III.1993, C.A. Collingwood.

Measurements: SI 0.543; HW/PPW 0.274.

EMERY (1881) described a variety, *P. rugaticeps* var. *arabs*, with smoother head sculpture from Yemen. All the examples from Yemen have somewhat smoother head sculpture than named examples in NHMB from north-eastern Africa but there is no other difference between the two forms.

Pheidole sculpturata Mayr, 1866

Pheidole sculpturata Mayr, 1866. — Verh. zool.-bot. Ges. Wien 16: 897.

Material: Oman: ♀♀, Wahiba, 19.III.1985, M.D. Gallagher. — Yemen: ♀♀ from: Taiz, 26.X.1991; Wadi Surdud, 18.XII.1991; all A. van Harten; 1 ♀, Khazain Yadak, IX.1979, B. Lanza; ♀♀ from: Mafhaq, 9.III.1993; Taiz – Al-Turbah, 14.III.1993; all C.A. Collingwood.

Measurements: SI 0.407; HW/PPW 0.335.

These have the large workers more heavily sculptured than those recorded from Saudi Arabia (COLLINGWOOD 1985). In addition the small workers are also larger and have conspicuous erect pubescence on the antennae and legs. The Saudi Arabian examples are now referred to *P. katonae* above.

Pheidole sinaitica Mayr, 1862

Pheidole sinaitica Mayr, 1862. — Verh. zool.-bot. Ges. Wien 12: 745.

Material: Saudi Arabia: ♀♀ from: Turabah, 26.IX.1980; Rahifa, 7.IX.1984; Harithi, 17.X.1984; Wadi Dhyhan, 8.III.1986; all W. Büttiker. — Oman: ♀♀, Jabal Samhan, 1.IX.1989, M.D. Gallagher.

Measurements: SI 0.616; HW/PPW 0.233.

Pheidole teneriffana Forel, 1893

Pheidole teneriffana Forel, 1893. — Ann. Soc. ent. Belg. 37: 465.

Material: Yemen: ♀♀, Al-Kowd, II.1993, A. van Harten.

Winged queens of this widely distributed species were taken at light.

Pheidole sp.

Material: Yemen: 1 ♀, Wadi Wazanan, 14.III.1993, C.A. Collingwood.

A single small worker was taken among leaf litter. It is totally black except for the funiculus which is pale brown. The mesonotal outline is interrupted by a dorsal prominence. The head and alitrunk have strongly punctulate sculpture over the whole dorsum including the nodes. The gaster is smooth and shining. The funiculus segments 2, 3 and 4 are quadrate. Long hairs are scattered over the head, body and appendages. The strong sculpture and dark body colour are unlike those of any other Arabian species collected so far.

Genus *Melissotarsus* Emery, 1877

Melissotarsus emeryi Forel, 1907

Melissotarsus emeryi Forel, 1907. — Revue Ent. 26: 133.

Material: Yemen: ♀♀, Madinat al-Shariq in Wadi Rima, 12.III.1992, A. van Harten; ♀♀ from: Taiz – Mafhaq, 15.II.1993; Bilad Bani, 23.III.1993; all C.A. Collingwood.

This species was found in several low-lying branches of Tamarisk and other trees at Bilad Bani. The ants form tunnels immediately under the bark and do not appear on the surface.

Genus *Leptothorax* Mayr, 1855

Key to species

- | | | |
|---|--|-----------------------------------|
| 1 | Pronotum dentate or angled anterolaterally in dorsal view | 2 |
| – | Pronotum smoothly rounded anterolaterally in dorsal view. | 4 |
| 2 | Pronotum strongly dentate; propodeal spines long, robust and down-curved; head and alitrunk dorsum strongly striate to sulcate | <i>Leptothorax humerosus</i> |
| – | Pronotum mildly dentate; propodeal spines short and blunt; body sculpture not strongly developed | 3 |
| 3 | Petiole dorsum flattened, body hairs short, clavate; antennal clubs dark | <i>Leptothorax angulatus</i> |
| – | Petiole dorsum sharply pointed; body hairs bluntly pointed; colour including appendages uniformly brown | <i>Leptothorax saudiae</i> n. sp. |
| 4 | Head and gaster darker than alitrunk; body sculpture strong; antennal scapes short, SI 83-94; propodeal spines acute | 5 |
| – | Unicolorous brown, body sculpture smooth; antennal scapes long, SI 100; propodeal spines broadly dentate | <i>Leptothorax</i> sp. A |
| 5 | Petiole in profile a blunt triangle | <i>Leptothorax</i> sp. B |
| – | Petiole in profile low with a long anterior peduncle | <i>Leptothorax</i> sp. C |

Leptothorax angulatus Mayr, 1862

Leptothorax angulatus Mayr, 1862. — Verh. zool.-bot. Ges. Wien 12: 739.

Material: Saudi Arabia: ♀♀, Wadi Hunayn, 18.IV.1979, Exp. N. Hedjaz (W. Büttiker). — Yemen: ♀♀, Wadi Bani, 23.III.1993, C.A. Collingwood.

This fairly common species has not yet been recorded from Oman. The species was found in Yemen in partially rotten branches.

Leptothorax humerosus Emery, 1846

Leptothorax humerosus Emery, 1846. — Boll. Soc. ent. Ital. 28: 62.

Material: Yemen: 1 ♀, Zingibar, 24.III.1993, C.A. Collingwood.

This species was named on one specimen from an unknown locality in East Africa. There are thus only two examples of this unique, strongly sculptured, dentate species known so far. The Yemen specimen was taken wandering over the ground under shrubs but no other example was found.

Leptothorax saudiae n. sp. (Fig. 9)

Holotype: ♀, Saudi Arabia, Al-Muraywah, 28°46'N 45°00'E, 28.X.1985, W. Büttiker.

Measurements of holotype: TL 2.8; HL 0.81; HW 0.60; SL 0.62; EL 0.17; spine 0.14.

Description: Head subrectangular with rounded occipital corners but straight occipital margin and only very slight curvature of the sides in dorsal view. The pronotum is slightly angled at each corner. The alitrunk has no mesopropodeal furrow and general dorsal outline is rather flat with the propodeum gently curving to its basal face; the propodeal spines are short, blunt and semi-erect. The petiole is thick but raised dorsally to a sharply pointed triangle. The whole dorsum including the gaster has scattered strong hairs which are thick but bluntly pointed rather than clavate. The head dorsum and clypeus are strongly striate. The promesonotum is longitudinally striate, the striae merging into the strongly punctate propodeum. The petiole is brilliant without

sculpture and the postpetiole and gaster dorsum are both shining but with weak superficial sculpture. The body colour is uniformly brown with much paler antennae and legs.

Affinities: This species resembles *L. grisoni* Forel, 1916 in colour and size corresponding with the general body shape of the widely distributed *L. angulatus* but has the following distinctive differences: The body hairs are longer and more pointed, the petiole is sharply angled dorsally as in *L. denticulatus* Mayr, 1901 and the combination of colour, shape and sculpture does not fit any of these three species.

Leptothorax sp. A

Material: Oman: 1 ♀, Jiddat al-Harasis, 16.XII.1984, M.D. Gallagher.

Measurements: TL 3.4; HL 0.73; HW 0.58; SL 0.58; SI 100; spine 0.20.

The pronotal outline is rounded. The mesopropodeal furrow is distinct and breaks the alitrunk outline. The petiole profile is a blunt triangle with the anterior face mildly concave and the dorsal face slightly convex. There are thick blunt hairs over the whole dorsum. The body colour is dark reddish brown and the hairless legs and antennae are yellowish. The head and alitrunk are smooth without distinct sculpture except at the sides. This species resembles *L. cenatus* Bolton, 1982, but has a more angled petiole and the body sculpture is more diffuse.

Leptothorax sp. B

Material: Saudi Arabia: 1 ♀, Hofuf, 20.V.1978, W. Büttiker.

Measurements: TL 3.0; HL 0.77; HW 0.62; SL 0.52; EL 0.17; spine 0.14.

This species is similar to the above but has a shorter antennal scape, sharper propodeal spines and stronger body sculpture. The body colour is dull yellowish with darker head and gaster.

Leptothorax sp. C

Material: Saudi Arabia: 1 ♀, Wadi Durmah, 8.XII.1975, W. Büttiker.

Measurements: TL 3.6; HL 0.89; HW 0.72; SL 0.68; EL 0.17; spine 0.19.

This has similar colour to the above but has closer punctulate sculpture on the head, alitrunk and nodes. The petiole is lower with a long anterior peduncle and the postpetiole is also low. The spines are relatively long and acute.

Genus *Cardiocondyla* Emery, 1869

Key to species

- | | | |
|---|--|----------------------------------|
| 1 | Propodeal spines very short and blunt. | 2 |
| – | Propodeal spines distinct and acute. | 3 |
| 2 | Petiole as broad or broader than long; unicolorous, blackish brown | |
| | | <i>Cardiocondyla shuckardi</i> |
| – | Petiole longer than broad; alitrunk paler than gaster | <i>Cardiocondyla nuda</i> |
| 3 | Petiole in profile with a flattened dorsum | <i>Cardiocondyla emeryi</i> |
| – | Petiole in profile with a rounded dorsum | 4 |
| 4 | Mesonotum descending abruptly to the mesopropodeal groove; gaster darker than pale head and alitrunk; petiole slightly broader than long | |
| | | <i>Cardiocondyla wroughtonii</i> |

- Mesonotum curving evenly to the mesopropodeal groove; gaster unicolorous with head and alitrunk; petiole longer than wide in dorsal view 5
- 5 Postpetiole nearly twice as wide as petiole; colour evenly dark brown
Cardiocondyla gallagheri n. sp.
- Postpetiole narrow, scarcely wider than long and clearly less than twice as wide as petiole; colour of body, legs and antennae evenly pale yellowish brown
Cardiocondyla yemeni n. sp.

Cardiocondyla emeryi Forel, 1881

Cardiocondyla emeryi Forel, 1881. — Mitt. Münch. ent. Ver. 5: 5.

Material: Oman: 1 ♀, Al-Khuwayr, 1.I.1981, W. Büttiker; ♀♀, Mintirib, 17.XI.1984, M.D. Gallagher. — Yemen: ♀♀, Al-Mahwit, 7.VI.1991, A. van Harten.

Cardiocondyla gallagheri n. sp. (Fig. 10)

Holotype: ♀, Oman, Wahiba Sands, 18.XII.1989, M.D. Gallagher. — Paratypes: 4 ♀♀, same series as holotype.

Measurements of holotype: TL 3.23; HL 0.60; HW 0.46; SL 0.47; EL 0.155; PW 0.152; PPW 0.29.

Description: The antennal scapes just fail to meet the occipital margin. The eyes are prominent. The mesopropodeal furrow is shallow, the mesonotum meeting the propodeum at an oblique angle. The propodeum is mildly convex, not flat. The propodeal spines are moderately long (0.09 mm). The petiole is a thick rounded dome longer than wide in dorsal view. The postpetiole is clearly wider than long and almost twice as wide as the petiole. The head is coarsely sculptured with large shallow punctures and a median band of longitudinal striae. The alitrunk and petiole have similar but more superficial sculpture on the dorsum while the postpetiole and gaster are smooth with a faint reticulate sculpture. The colour is evenly brown with legs and antennae only slightly paler.

Affinities: This species differs from *C. emeryi* by the sharper more upright spines, the more shallow mesopropodeal furrow, the more domed petiole, the wider postpetiole and stronger alitrunk sculpture.

Cardiocondyla nuda (Mayr, 1866)

Leptothorax nudus Mayr, 1866. — Verh. zool.-bot. Ges. Wien 16: 508.

Cardiocondyla nuda. — Forel, 1881. — Mitt. Münch. ent. Ver. 5: 6.

Material: Yemen: ♀♀ from: Al-Mahwit, 29.IV.1991; Sana'a, V.1991; Marib, 4.VI.1991; all A. van Harten.

This cosmopolitan species differs from *C. shuckardi* by the coarser sculpture and flatter alitrunk dorsum.

Cardiocondyla shuckardi Forel, 1891

Cardiocondyla shuckardi Forel, 1891. — in Grandidier: Hist. nat. phys. polit. Madag. 20 (2): 161.

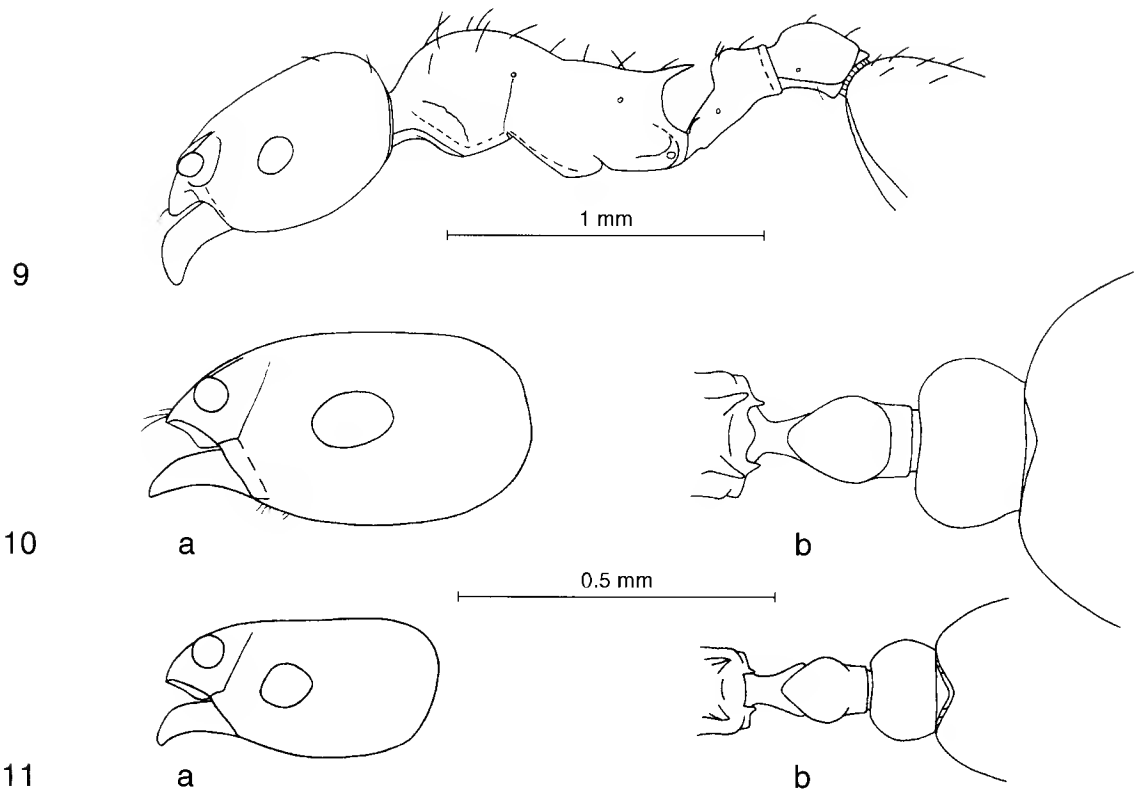
Material: Kuwait: ♀♀, Burgan, 5.IV.1988, W. Büttiker. — Yemen: ♀♀ from: Sana'a, III.1991, IX.1991; Hammam Ali, 5.VIII.1991; Taiz, 20.X.1991; Wadi Surdud, 29.XII.1991; all A. van Harten.

Cardiocondyla wroughtonii (Forel, 1890)

Emeryia wroughtonii Forel, 1890. — Ann. Soc. ent. Belg. 34: 101.

Cardiocondyla wroughtonii. — Forel 1892; Verh. zool.-bot. Ges. Wien 42: 313.

Material: Yemen: ♀♀ from: Al-Mahwit, 29.IV.1991; Sana'a, V.1991; Aden, 18.XII.1991; Wadi Surdud, 29.XII.1991; all A. van Harten.



Figs 9-11: 9, *Leptorborax saudiae* n. sp., ♀, head and alitrunk in profile; 10, *Cardiocondyla gallagheri* n. sp., ♀: a, head in profile; b, petiole and postpetiole in dorsal view; 11, *C. yemeni* n. sp., ♀: a, head in profile; b, petiole and postpetiole in dorsal view.

Cardiocondyla yemeni n. sp. (Fig. 11)

Holotype: ♀, Yemen, Sana'a, 5.III.1993, C.A. Collingwood. — Paratypes: Yemen: 2 ♀♀, same series as holotype; 4 ♀♀, Wadi Surdud, 21.III.1991, A. van Harten.

Measurements of holotype: TL 2.3; HL 0.48; HW 0.38; SL 0.30; EL 0.12; PW 0.11; PPW 0.17.

Description: This species is characterised by its small size, broad dentate spines, reticulopunctate sculpture over the whole dorsum including the gaster and overall pale yellowish-brown colour. In profile the petiole is broadly rounded and relatively low. This is much the smallest of the Arabian species. It is interesting that there were often two or three species of *Cardiocondyla* in the same locality. In particular *C. shuckardi*, *C. wroughtonii* and *C. yemeni* n. sp. were all collected at the same site at Wadi Surdud, and at Sana'a two of these species were seen wandering over the ground in close proximity.

Genus *Crematogaster* Lund, 1831

Key to species

- | | | |
|---|---|------------------------------|
| 1 | Postpetiole entire, not bilobed | 2 |
| – | Postpetiole divided dorsally by a median longitudinal furrow into two lobes | 3 |
| 2 | Body colour yellow; propodeal spines long | <i>Crematogaster luctans</i> |
| – | Body colour black; propodeal spines short, dentate | <i>Crematogaster</i> sp. A |

3	Gaster in whole or part yellowish or testaceous, lighter than head and alitrunk	4
–	Gaster uniformly dark, not lighter than head or alitrunk	5
4	Propodeal spines long and acute	<i>Crematogaster flaviventris</i>
–	Propodeal armature reduced to minute denticles only visible in complete side view	<i>Crematogaster delagoensis</i>
5	Bicoloured ants with head and/or alitrunk reddish, lighter than gaster	6
–	Head, alitrunk and gaster uniformly dark brown or black	13
6	Propodeal spines exceptionally long, at least 0.3 times HW	<i>Crematogaster melanogaster</i>
–	Propodeal spines shorter, 0.2 times HW or much less	7
7	Petiole distinctly wider than long	8
–	Petiole only slightly or not wider than long	9
8	Propodeal spines acute, at least 0.2 mm long; all funiculus segments clearly longer than wide	<i>Crematogaster senegalensis</i>
–	Propodeal spines broadly dentate or tuberculate, short; intermediate funiculus segments quadrate	<i>Crematogaster aegyptiaca</i>
9	Head wider than long	10
–	Head only slightly or not wider than long	<i>Crematogaster oasisium</i>
10	Alitrunk paler than head; spines long and acute	<i>Crematogaster chiarinii</i>
–	Both head and alitrunk reddish, paler than gaster; spines dentiform or reduced to two tubercles	11
11	Head and alitrunk strongly sculptured; spines broadly dentate	<i>Crematogaster mimosae</i>
–	Head and alitrunk weakly sculptured; spines reduced to two tubercles	12
12	Second funiculus segment shorter than third; occiput dull	<i>Crematogaster acaciae</i>
–	Second funiculus segment as long as third; occiput shining	<i>Crematogaster antarcticus</i>
13	Propodeal spines long and thin	14
–	Propodeal spines short or broadly dentate	15
14	TL 3.5 or more; postpetiole weakly bilobed; general appearance dull, not shining	<i>Crematogaster affabilis</i>
–	Smaller species, TL less than 3.0; postpetiole sharply bilobed, body sculpture superficial, general appearance shining	<i>Crematogaster</i> sp. C
15	Body sculpture superficial, colour brown, generally brilliant	<i>Crematogaster</i> sp. B
–	Body sculpture stronger; colour black to greyish black; general appearance dull	16
16	Mesonotal keel well developed; propodeal spines broadly dentate	<i>Crematogaster laestrygon</i>
–	Body sculpture weaker, mesonotal keel very slight; propodeal spines short but acute	17
17	Darker, more robust ants with a distinct mesonotal keel	<i>Crematogaster mosis</i>
–	Lighter coloured ants with mesonotal keel indistinct or absent	<i>Crematogaster auberti</i>

Crematogaster acaciae* Forel, 1892Crematogaster acaciae* Forel, 1892. — Zool. Anz. 15: 141.

Material: Oman: 1 ♀, Khadrafi, 4.IV.1981, M.D. Gallagher.

Crematogaster aegyptiaca* Mayr, 1862Crematogaster aegyptiaca* Mayr, 1862. — Verh. zool.-bot. Ges. Wien 12: 765.

Material: Saudi Arabia: ♀♀, ♀♀ from: Al-Tawil, 21.XI.1984; Duba, 8.X.1986; all W. Büttiker. — Oman: ♀♀, Marmul, Yalooni, 18.XI.1984, J. Darlington; 1 ♀, Qarn al-Alam, 31.V.1984, M.D. Gallagher. — Yemen: 1 ♀, Wadi Bani, 23.III.1993, C.A. Collingwood.

Measurements: HW 1.22-1.26; CI 108-118; PL/PW 0.58-0.63.

Crematogaster affabilis Forel, 1907

Crematogaster chiarinii var. *affabilis* Forel, 1907. — Revue Ent. 26: 142.

Material: Saudi Arabia: ♀♀, ♀♀ from: El Shoiba, 25.XII.1984; Wadi Damad, 24.IX.1986; Wadi Wajj, 9.X.1973; all W. Büttiker. — Oman: ♀♀ from: Wadi Armalet, 17.II.1984; Al-Khawr, 17.IX.1984; all M.D. Gallagher; ♀♀, Tar Ab salt marsh, 21.X.1985, J. Darlington. — Yemen: ♀♀ from: Suq Bani Mansur, 27.IV.1991; Taiz, 20.X.1991; Wadi Surdud, 29.XI.1991; Sana'a, 5.IX.1991; all A. van Harten; ♀♀, Makalla Seyun, 24.III.1992, M. Mahyoub.

This arboreal, long-spined, black species is common in southern Arabia wherever there are trees.

Crematogaster antaris Forel, 1894

Crematogaster auberti antaris Forel, 1894. — Bull. Soc. Vaud. Sci. nat. 30: 26.

Material: Kuwait: ♀♀, Jabal Dhablan, 3.V.1988, W. Büttiker. — United Arab Emirates: ♀♀, Ras Ghanada, XI.1992, B. Tigar. — Oman: ♀♀, ♀♀ from: Qarn Huwayda, 7.I.1982; Jiddat al-Harasis, 16.XII.1984; Wadi Sayq, 21.XII.1982; Wadi Bartha, 19.XI.1985; Barr al-Hickman, 4.XII.1987; all M.D. Gallagher. — Yemen: ♀♀, Mocha Gocha, 23.III.1992, A. van Harten.

Measurements: HW 1.08-1.45; CI 104-114; PL/PW 0.68-0.715.

Crematogaster aegyptiaca is sometimes as red as the deserticolous *C. antaris* but is usually darker, more rugose and pubescent; the petiole is wider with the anterolateral corners produced and wing-like in full dorsal view. Queens of *C. antaris* are larger, have the head and alitrunk red and have characteristic lateral striae on the occiput.

Crematogaster auberti Emery, 1869

Crematogaster auberti Emery, 1869. — Annali Acad. Aspir. nat. Napoli 2: 23.

Crematogaster oasisum. — Santschi 1937; Mem. Soc. Vaud. Sci. nat. 5: 303.

Material: Saudi Arabia: ♀♀, Taif, 2100 m, 20.IV.1976, W. Büttiker.

Crematogaster chiarinii Emery, 1881

Crematogaster chiarinii Emery, 1881. — Ann. Mus. civ. Stor. nat. Genova 16: 271.

Crematogaster affabilis. — Collingwood 1985; Fauna of Saudi Arabia 7: 260.

Material: Saudi Arabia: 1 ♀, ♀♀, Wadi Hanifa, 28.IX.1978, W. Büttiker.

Crematogaster delagoensis Forel, 1894

Crematogaster inermis st. *delagoensis* Forel, 1894. — Mitt. Schweiz. ent. Ges. 57: 126.

Crematogaster delagoensis. — Emery 1921; Gen. Ins. 174: 146.

Material: Oman: ♀♀ from: Ain Umran, 10.IX.1984; Qusabiet, 29.IV.1984; all M.D. Gallagher. — Yemen: ♀♀, Taiz, 20.X.1991, A. van Harten.

Measurements: HW 0.63; SI 104.

This species is like *C. flaviventris* in general appearance but has smoother sculpture, is much smaller and the propodeal armature is reduced to minute denticles. It is similar to *C. inermis* Mayr, 1862 of Egypt and Palestine apart from the paler gaster and angulate propodeum.

Crematogaster flaviventris Santschi, 1910

Crematogaster flaviventris Santschi, 1910. — Ann. Soc. ent. Fr. 78: 370.

Material: Yemen: ♀♀ from: Hammam Ali, 5.VIII.1991; Sadah, 13.VIII.1991; Zabid, 26.VIII.1991; Rissabah, 8.X.1991; all A. van Harten.

Measurements: HW 1.21; SI 85.

This is a member of the *C. castanea* Smith, 1858 complex distinguished by the yellowish gaster contrasting with the brown head and alitrunk. The propodeal spines are sharp and well developed with a downward curvature.

***Crematogaster laestrygon* Emery, 1869**

Crematogaster laestrygon Emery, 1869. — Boll. Soc. ent. Ital. 1: 135.

Material: Yemen: ♀♀ from: Sana'a, III.1991; Kewkaban, 24.IX.1991; Rissabah, 8.X.1991; Djebel an-Nabi Shuaib, 29.IX.1991; all A. van Harten.

This highland species varies in colour from totally dark to various shades of grey sometimes with a reddish tinge but can always be recognised by the strongly developed mesonotal keel and the very short dentate propodeal spines. This species was the only ant found right at the top of Arabia's highest mountain, Djebel an-Nabi Shuaib, at 3750 m.

***Crematogaster melanogaster* Emery, 1895; n. stat.**

Crematogaster arborea melanogaster Emery, 1895. — Ann. Soc. ent. Fr. 64: 29.

Material: Oman: ♀♀, Jabal Qara, 21.X.1984, J. Darlington; ♀♀ from: Rakyat Plateau, 21.IX.1984; Wadi Bani Kharus, 13.X.1984; all M.D. Gallagher.

This species was keyed but not named or described in COLLINGWOOD (1985). It is characterised by the exceptionally long straight propodeal spines which are more than one third the head width and the colour contrast between the yellowish-red head and alitrunk and the dark gaster. It was described and recorded from various localities in South Africa.

***Crematogaster mimosae* Santschi, 1914**

Crematogaster mimosae Santschi, 1914. — Voy. Alluad & Jeannel Afr. d'or. Hym: 87.

Material: Saudi Arabia: ♀♀ from: Wadi Harth, 28.IX.1978; Jebel an-Nir, 2.X.1984; Wadi Hanaq, 15.X.1985; all W. Büttiker. — Oman: ♀♀, Qarn Nature Reserve, 4.II.1987, M.D. Gallagher. — Yemen: ♀♀, Al-Mahwit, 21.IX.1991, A. van Harten; 1 ♀, Shaher beach, 20.II.1992, M. Mahyoub.

***Crematogaster mosis* Emery, 1869**

Crematogaster mosis Emery, 1869. — Boll. Soc. ent. Ital. 1: 35.

Material: United Arab Emirates: ♀♀, Baynunah, X.1993, B. Tigar. — Yemen: ♀♀, Al-Mahwit, III.1993, C.A. Collingwood.

***Crematogaster oasisium* Santschi, 1911**

Crematogaster auberti st. *oasisium* Santschi, 1911. — Bull. Hist. nat. Afr. nd. 3: 84.

Material: Saudi Arabia: ♀♀ from: Wadi Harth, 21.IX.1978; Jabal Dhablan, 3.X.1985; all W. Büttiker. — Oman: ♀♀ from: Marmul, 4.I.1979; Baushar, 29.IV.1982; all M.D. Gallagher.

***Crematogaster senegalensis* Roger, 1863**

Crematogaster senegalensis Roger, 1863. — Berl. ent. Z. 7: 206.

Material: Saudi Arabia: ♀♀ from: Jeddah, 27.XII.1978; Al-Hibri, III.1985; all W. Büttiker. — Oman: ♀♀ from: Wadi Dibab, 4.IV.1985; Jabal Shams, 26.X.1986; all M.D. Gallagher. — Yemen: ♀♀, Wadi Surdud, 29.XI.1991, A. van Harten.

There are a number of additional species that could not be named from existing literature or museum collections and these are briefly described below.

Creinatogaster sp. A

Material: Yemen: 1 ♀, Mabar, pitfall trap, V.1992, M. Mahyoub.

This is a small black ant very like *C. striatula* Emery, 1892 of tropical Africa in size and general appearance. The dorsum of the rounded postpetiole, however, is coarsely striate and not smooth as in *C. striatula*.

Creinatogaster sp. B

Material: United Arab Emirates: 1 ♀, Baynunah, X.1993, B. Tigar. — Oman: 1 ♀, Ras Dhabdhub, 31°32'N 58°49'E, M.D. Gallagher.

Measurements: TL 3.40; HL 0.87; HW 0.89; EL 0.25; spine 0.08.

This is a glossy brown species with weak superficial sculpture especially on the head which is brilliant. The pronotal corners are distinctly angled. The propodeal spines are short but strong. The eyes are relatively large and prominent set behind the midline of the head which is broader than long. There are short curved hairs on the genae below the eyes. This species differs from *C. acaciae* by the strong spines and from *C. chiarinii* by smooth sculpture and brilliant appearance.

Creinatogaster sp. C

Material: Yemen: ♀♀, Zingibar, 23.III.1993, C.A. Collingwood.

Measurements: TL 3.25-3.40; HL 0.82-0.86; HW 0.85-0.86; SL 0.66; EL 0.21.

This is a small black species with long propodeal spines as in *C. affabilis*. The funiculus segments are slightly longer than broad. The promesonotum is flat, not keeled. The mesonotum meets the propodeum at an acute angle. The petiole is slightly longer than broad. The postpetiole is deeply bilobed and has the posterodorsal face projected backward over the first gaster tergite. This species differs from *C. affabilis* in its smaller size, more deeply bilobed postpetiole and slightly stronger body sculpture. It was seen ascending shrubby trees by the wayside near Zingibar.

Creinatogaster sp. D

Material: Yemen: 5 ♀♀ from: Wadi al-Burakani, II.1992, M. Mahyoub; Valley below Sumara Pass, 13.III.1993; all C.A. Collingwood.

This is another long-spined, dark species. The funiculus segments are all longer than wide; the petiole is distinctly wider than long, unlike the last species, and it also differs from that species as well as *C. affabilis* by the much more sculptured punctulate head and alitrunk. The dorsum of the postpetiole and the gaster have long decumbent pubescence.

Genus *Tetramorium* Mayr, 1855

There are three additional species in this genus and one name change as well as a few new records of some interest.

Key to species

- 1 Alitrunk uninterrupted by dorsal sutures; body hairs long and profuse
Tetramorium lanuginosum
 – Alitrunk with a mesopropodeal suture, impressed in most species; pilosity variable
 but not profuse 2

2	Petiole and postpetiole clearly wider than long	<i>Tetramorium latinode</i> n. sp.	
–	At least petiole not distinctly wider than long		3
3	Tibiae with stout suberect hairs.		4
–	Tibiae without suberect hairs on extensor surface		9
4	Petiole and postpetiole with distinct dorsal sculpture		5
–	Petiole and postpetiole smooth and shining		6
5	Nodes coarsely sulcate; colour dark brown or greyish brown	<i>Tetramorium turcomanicum</i>	
–	Nodes irregularly sculptured; colour pale yellowish or reddish brown	<i>Tetramorium syriacum</i>	
6	Head and alitrunk strongly sculptured		7
–	Head and alitrunk sculpture superficial, smooth in part		8
7	Colour black; propodeal spines very short, upturned; striae on occiput divergent	<i>Tetramorium biskrense</i>	
–	Colour pale reddish yellow; head striae longitudinal to the occipital border	<i>Tetramorium calidum</i>	
8	Dorsum of head with distinct median depressed area; propodeal spines short but acute; alitrunk moderately sculptured	<i>Tetramorium depressiceps</i>	
–	Dorsum of head without a median depression; propodeal armature bluntly tuberculate not dentate; alitrunk smooth and shining	<i>Tetramorium juba</i>	
9	Larger species, HW 0.70 or more; petiole in dorsal view longer than broad		10
–	Smaller species, HW 0.56 or less; petiole broader than long		12
10	Propodeal spines minute, sometimes absent	<i>Tetramorium doriae</i>	
–	Propodeal spines strongly developed		11
11	Propodeal dorsum with one or two pairs of suberect hairs	<i>Tetramorium khyarum</i>	
–	Propodeal dorsum without hairs	<i>Tetramorium sericeiventre</i>	
12	Longitudinal rugae on head weakly developed	<i>Tetramorium caldarium</i>	
–	Longitudinal rugae on head strongly developed		13
13	Genae without projecting hairs	<i>Tetramorium simillimum</i>	
–	Genae with one or more projecting hairs at each side		14
14	Genae with one or two projecting hairs above and below eyes at each side	<i>Tetramorium jizani</i>	
–	Genae with one or two projecting hairs above the eyes at each side	<i>Tetramorium delagoense</i>	
–	Genae between occiput and eye with one projecting hair below the eye at each side	<i>Tetramorium yemene</i> n. sp.	

Tetramorium biskrense Forel, 1904

Tetramorium caespitum var. *biskrensis* Forel, 1904. — Rev. Suisse Zool. 12: 13.

Tetramorium biskrense. — Menozzi 1933; Mem. Soc. ent. Ital. 12: 75.

Material: Saudi Arabia: ♀♀, Abha, 10.IV.1972. — Oman: 1 ♀, ♀♀, Wadi Sayq, 22.III.1986, W. Büttiker. — Kuwait: 1 ♂, 1 ♀, 1 ♀, Al-Rileg al-Shamali, 26.III.1988, W. Büttiker.

The queen of this species, HW 1.2, SL 0.7, has an angled pronotum fully visible in dorsal view and wide nodes with a narrow sharp crest seen in side view. The propodeum is dentate. The head is striate with the striae curving obliquely at the occiput. The mesonotum is confusedly sculptured with the centre dorsum brilliant and strong sculpture at the sides. The gaster is brilliant with a few widely spaced punctures. The male is pale with weak sculpture.

Tetramorium caldarium (Roger, 1857)

Tetrogmus caldarius Roger, 1857. — Berl. ent. Z. 1: 12.

Tetramorium caldarium. — Roger, 1862; Berl. ent. Z. 6: 297.

Material: Oman: 1 ♀, Al-Uqdah, 1.IV.1984, W. Büttiker. — Yemen: ♀♀ from: Bajd Zabid, 15.III.1993; Wadi Bani, 20.III.1993; all C.A. Collingwood.

Tetramorium calidum Forel, 1907

Tetramorium caespitum var. *calida* Forel, 1907. — Ann. hist.-nat. Mus. natn. Hung. 5: 15.

Tetramorium calidum. — Collingwood 1985; Fauna of Saudi Arabia 7: 263.

Material: Oman: ♀♀ from: Jiddat Sahara, 28.XI.1986; Khasab Musandham, 18.XI.1986; all R. Braund. — Yemen: 1 ♀, Al-Mahwit, 20.IV.1991, A. van Harten.

Tetramorium delagoense Forel, 1894

Tetramorium simillimum st. *delagoensis* Forel, 1894. — Mitt. Schweiz. ent. Ges. 9: 80.

Tetramorium delagoense. — Bolton 1979; Bull. Br. Mus. nat. Hist. Ent. 38: 156.

Material: Yemen: ♀♀ from: Hajjah, 12.III.1991; Sadah, 13.VIII.1991; all A. van Harten.

This species is much like *T. simillimum* with very similar size, form and sculpture. It differs in having one or two projecting hairs on the genae at each side between the occiput and eye level. It is recorded from a wide area in Saharan and sub-Saharan Africa (BOLTON 1980) and also recently in Palestine.

Tetramorium depressiceps Menozzi, 1933

Tetramorium semilaeve depressiceps Menozzi, 1933. — Mem. Soc. ent. Ital. 12: 71.

Tetramorium depressiceps. — Collingwood 1985; Fauna of Saudi Arabia 7: 264.

Material: Saudi Arabia: ♀♀ from: Wadi Tumair, 7.II.1976; Wadi Azizah, 18.IX.1983; Harithi, 5.X.1984; all W. Büttiker. — Oman: ♀♀, Wadi Harth, 13.II.1986, J.E. Clarke.

Tetramorium doriae Emery, 1881

Tetramorium doriae Emery, 1881. — Ann. Mus. civ. Stor. nat. Giacomo Doria 16: 530.

Material: Saudi Arabia: 3 ♀♀, Wadi Hanaq, 31.I.1985, W. Büttiker.

Both *T. calidum* and *T. doriae* were described from Arabia but both species are little known and seem to be quite uncommon compared with some other members of the genus.

Tetramorium jizani Collingwood, 1985

Tetramorium jizani Collingwood, 1985. — Fauna of Saudi Arabia 7: 263.

Material: Yemen: ♀♀, Sana'a, 4.XII.1991, A. van Harten.

This species, described from Saudi Arabia not far from the Yemen border, seems to replace the widely distributed *T. simillimum* in that area.

Tetramorium juba Collingwood, 1985

Tetramorium juba, Collingwood, 1985. — Fauna of Saudi Arabia 7: 264.

Material: Saudi Arabia: ♀♀, ♀♀ from: Qarah Village, 16.IV.1976; Wadi Mizbil, 25.II.1977; all W. Büttiker. — Kuwait: 1 ♀, Jal al-Zour, 6.II.1988, W. Büttiker.

Tetramorium khyarum Bolton, 1980

Tetramorium khyarum Bolton, 1980. — Bull. Br. Mus. nat. Hist. 40 (3): 327.

Material: Yemen: ♀♀, Al-Mahwit, 20.IV.1991, A. van Harten.

Tetramorium lanuginosum Mayr, 1870

Tetramorium lanuginosum Mayr, 1870. — Verh. zool.-bot. Ges. Wien 20: 972.

Triglyphothrix lanuginosa. — Collingwood 1985; Fauna of Saudi Arabia 7: 258. [Generic synonymy by BOLTON 1985: 247].

Tetramorium latinode n. sp. (Fig. 12)

Holotype: 1 ♀, Yemen, Mabar, pitfall trap, 11.V.1992, M. Mahyoub & A. Drews.

Measurements of holotype: TL 2.34; HL 0.80; HW 0.64; SL 0.56; PW 0.30; PPW 0.37.

Description: This species is similar to *T. squaminode* Santschi, 1910, with both petiole and postpetiole being much wider than long in dorsal view but the petiole crest is thicker and has rounded sides compared with that species. The propodeal spines are long and strong. The mandibles are finely striate. The head and clypeus are strongly striate; the alitrunk has coarse irregular reticulate sculpture with three striae between the spines. All body surfaces have long clubbed hairs and the scapes and legs have crowded, shorter, suberect hairs.

Tetramorium sericeiventre Emery, 1877

Tetramorium sericeiventre Emery, 1877. — Ann. Mus. civ. Stor. nat. Giacomo Doria 9: 370.

Material: Saudi Arabia: ♀♀ from: Taif, 20.V.1976; Wadi Khumra, 14.X.1976; Wadi Shoib Luha, 3.IX.1976; all W. Büttiker. — Oman: 1 ♂, ♀♀, ♀♀ from: Jabal Qara, 16.IX.1982; Hawayah, 18.VII.1984; Yalooni, 3.X.1984; Khawr Sawli, 13.I.1985; Jabal Samhan, 20.IV.1986; Umm Qashrab, 2.VIII.1986; all M.D. Gallagher. — Yemen: ♀♀ from: Sana'a, V.1991; Al-Butanah, 12.VIII.1991; all A. van Harten; ♂♂, ♀♀, ♀♀ from: Wadi Bani, 20.III.1993; Zingibar, 20.III.1993; all C.A. Collingwood.

This is the most conspicuous species of the genus in southern Arabia. Males were found in numbers at a garage site near Zingibar on 20.III.1993.

Tetramorium syriacum Emery, 1909

Tetramorium caespitum var. *syriaca* Emery, 1909. — Dt. ent. Z. (1909): 699.

Tetramorium syriacum. — Collingwood 1985; Fauna of Saudi Arabia 7: 265.

Material: Saudi Arabia: ♀♀, ♀♀ from: Wadi Tumair, 27.II.1976; Wadi Khumra, 18.III.1976; Wadi Marba, 7.IV.1976; Wadi Shuqub, 26.IV.1984; all W. Büttiker.

Tetramorium turcomanicum Santschi, 1921

Tetramorium caespitum st. *turcomanicum* Santschi, 1921. — Bol. R. Soc. esp. Hist. nat. 21: 111.

Tetramorium turcomanicum. — Tarbinsky 1976; Murav'i Kirgizii: 109.

Material: Saudi Arabia: ♀♀ from: Uyaynah, I.IV.1976; Wadi Khumra, 8.II.1976; Kashm al-Buwaybiyat, V.1978; all W. Büttiker; ♀♀ (recorded as *T. ferox*), Riyadh, 23.III.1983, C.A. Collingwood. — Oman: ♀♀, Jabal Khartam, 22.IV.1986, W. Büttiker. — Yemen: ♀♀ from: Marib, 4.VI.1991; Sana'a, VIII.1991; all A. van Harten.

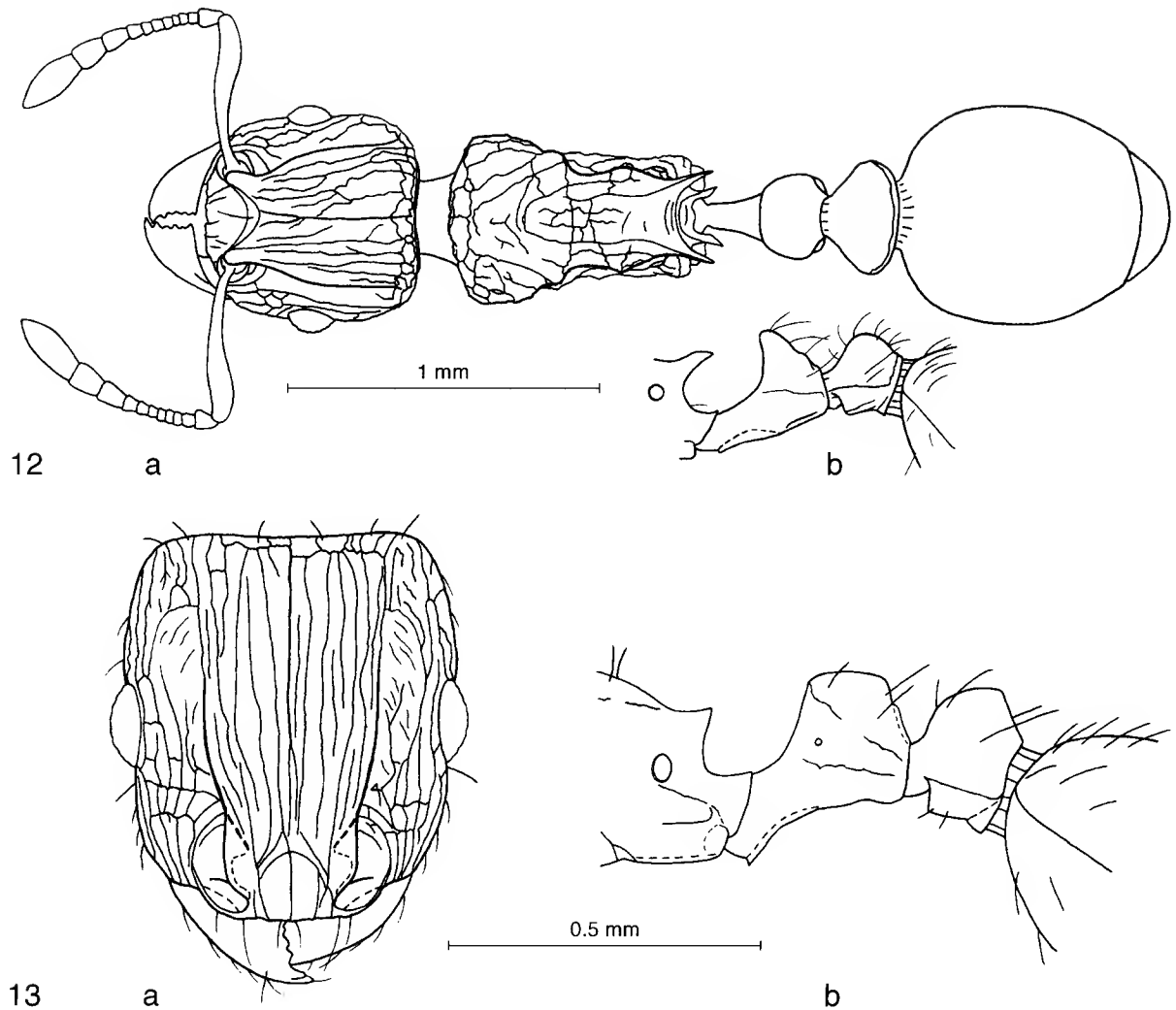
This species was wrongly referred to *T. ferox* Ruzsky, 1903 in COLLINGWOOD (1985). The colour varies from mid to dark brown; the nodes are sculptured but the propodeal spines are shorter than in *T. ferox* or the rather similar *T. chefteki* Forel, 1911 in Greece and Turkey.

Tetramorium yemene n. sp. (Fig. 13)

Holotype: ♀, Yemen, Sid el Feyhn, 10.VI.1992, A. van Harten. — Paratypes: ♂♂, 1 ♀, 1 ♀, same series as holotype.

Measurements of holotype: TL 2.6; HL 0.67; HW 0.58; SL 0.43; EL/HW 0.232; CI 86.5.

Description: This species, like *T. jizani*, resembles *T. simillimum* having distinct frontal carinae extending back almost to the occiput. The head and alitrunk have strong longitudinal striae with intermediate reticulate sculpture which is more weakly developed on the propodeum.



Figs 12-13: 12, *Tetramorium latinode* n. sp., ♀: a, dorsal view; b, nodes in profile; 13, *T. yemene* n. sp., ♀: a, head in dorsal view; b, propodeum and nodes in profile.

The nodes have punctulate sculpture only. The head and alitrunk dorsum have short blunt hairs and there is one long oblique hair at each side of the head below the eye. The petiole has two pairs and the postpetiole three pairs of hairs. The head and alitrunk are brown and the gaster is dark, the legs and antennae yellowish.

The queen, TL 3.60, has similar colour, sculpture and pilosity to the worker but the gaster hairs are more numerous. The propodeal spines are well developed.

The male, TL 2.80, has a large expanded mesonotum, shining without sculpture except at the sides; the scutellum and propodeum are longitudinally striate. The head has moderately dense punctulate sculpture which becomes transverse on the occiput behind the eyes. There is one oblique hair at each side of the head below the eyes as in the female castes.

Affinities: This species differs from *T. jizani* by the much fewer head hairs and more widely spaced head sculpture and from *T. simillimum* by the single hair below the eyes and the reduced petiole sculpture.

Tetramorium zabrae Santschi, 1923

Tetramorium zabrae Santschi, 1923. — Bol. R. Soc. esp. Hist. nat. 23: 135.

Material: Yemen: 1 ♀, Sinhan, 30.VIII.1991, A. van Harten.

Measurements: HL 1.38; HW 1.28; SI 67; PPW 0.63.

Colour entirely black. Pronotal shoulders visible from above but rounded, not angulate. Head and mesonotum longitudinally striate, gaster brilliant. Propodeum bituberculate, not dentate. Postpetiole wider than long with rounded sides.

Genus *Monomorium* Mayr, 1855

Over 50 species of this genus have now been recognised from the Arabian Peninsula. It should be said that without the revision of sub-Saharan species by BOLTON (1987), it would have been scarcely possible to sort out the Arabian species in any sensible fashion. Two very important characters that were overlooked in COLLINGWOOD (1985) but brought out in the comprehensive review by BOLTON (1987) are the presence, disposition or absence of hairs on the alitrunk dorsum and relative eye size. Examination of these features has shown several species that were not recognised in the previous paper and has also necessitated some name changes. The Arabian *Monomorium* fauna is clearly a very rich fauna which merits continuing investigation especially as some of the more interesting species are only represented by one or two specimens. An interesting feature is the large eye size in a large number of Arabian species, possibly an adaptation to nocturnal foraging through the necessary avoidance of extreme daytime temperatures during the summer months.

Key to species

- | | | |
|---|--|---|
| 1 | Terminal funiculus segment longer than the two preceding segments together | 2 |
| – | Terminal funiculus segment shorter than the two preceding segments together | 9 |
| 2 | Antennae with 11 segments | 3 |
| – | Antennae with 12 segments | 5 |
| 3 | Alitrunk entirely without dorsal hairs | <i>Monomorium aeyade</i> n. sp. |
| – | Alitrunk with suberect dorsal hairs | 4 |
| 4 | Terminal funiculus segment broadly swollen | <i>Monomorium clavicorne</i> |
| – | Terminal funiculus segment enlarged but not conspicuously swollen | <i>Monomorium baushare</i> n. sp. |
| 5 | Body colour uniformly dark | 6 |
| – | Body colour yellow or bicoloured | 7 |
| 6 | Mandibles smooth with scattered hair pits; colour bright chocolate brown; antennal scape exceptionally long, SI 115 | <i>Monomorium brunneolucidulum</i> n. sp. |
| – | Mandibles striated; colour evenly blackish brown; antennal scapes shorter, SI less than 80 | <i>Monomorium carbonarium</i> |
| 7 | Colour uniformly yellow. | 8 |
| – | Bicoloured, alitrunk yellow contrasting with glossy black gaster | <i>Monomorium rimae</i> n. sp. |
| 8 | Head with long hairs surrounding occiput and genae in dorsal view; propodeal dorsum rounds gently into the basal face; petiole a broadly rounded triangle in profile | <i>Monomorium qarabe</i> n. sp. |

–	Head without a fringe of long hairs; propodeal dorsum rounds steeply into the basal face; petiole a high rounded cone	<i>Monomorium montanum</i> n. sp.	
9	Antennal scapes short, clearly not reaching occiput, SI less than 80		10
–	Antennal scapes reaching or surpassing occiput, SI 91-115		15
10	Propodeal spiracle slit-like. Terminal funiculus segments thin, not forming a distinct club	<i>Monomorium dentigerum</i>	
–	Propodeal spiracle circular. Terminal funiculus segments form a distinct three-segmented club		11
11	Underside of head with crowded J-shaped hairs forming a distinct psammophore; workers in the same colony of more or less even size		12
–	Underside of head with few scattered heads not forming a distinct psammophore; polymorphic, with workers of different sizes in the same colony		13
12	Body colour yellowish brown; eye size moderate, 0.22-0.25 times HW		
		<i>Monomorium chobauti</i>	
–	Colour black; eyes exceptionally large, 0.34 times HW	<i>Monomorium barbatulum</i>	
13	Colour greyish to black		14
–	Head and alitrunk yellowish	<i>Monomorium destructor</i>	
14	Occiput as well as propodeum with fine transverse striae	<i>Monomorium mayri</i>	
–	Occiput with confused sculpture, not striate	<i>Monomorium robustior</i>	
15	Dorsum of alitrunk without projecting hairs		16
–	Dorsum of alitrunk with projecting hairs		32
16	Head and alitrunk clear red, contrasting with dark gaster		17
–	Head darker than alitrunk or whole body unicolorous brown to black		20
17	Eyes large, 0.3 times HW or more	<i>Monomorium venustum</i>	
–	Eyes small, 0.25 times HW or less		18
18	Propodeal dorsum with distinct longitudinal furrow		19
–	Propodeal dorsum with slight shallow incavation at most	<i>Monomorium bicolor</i>	
19	Propodeal dorsum raised and angled posteriorly to form two blunt slightly projecting bosses; head broad, CI over 85	<i>Monomorium subdenticorne</i> n. sp.	
–	Propodeum low with rounded posterior face; head narrow, CI less than 75		
		<i>Monomorium nitidiventre</i>	
20	Propodeum with a distinct longitudinal furrow		21
–	Propodeal outline smooth without a longitudinal furrow		22
21	Body generally shining; dorsum rather flat; size smaller, HW 0.48-0.51		
		<i>Monomorium harithe</i> n. sp.	
–	Body more sculptured, dull; more robust; size larger. HW 0.60-0.65		
		<i>Monomorium phoenicium</i>	
22	Eyes smaller, 0.25 times HW or less		23
–	Eyes larger, 0.30 times HW or more		26
23	Body colour entirely black	<i>Monomorium carbo</i>	
–	Body colour otherwise		24
24	Body colour dull greyish yellow	<i>Monomorium majarishe</i> n. sp.	
–	Body colour reddish brown to brown		25
25	Head and gaster moderately shining; mesopropodeal furrow distinct, making a right angle in profile	<i>Monomorium salomonis</i>	
–	Head more sculptured; dorsum of alitrunk flatter with mesonotum meeting propodeum at an oblique angle	<i>Monomorium subopacum</i>	

26	TL less than 2.5; densely sculptured including gaster; uniformly black <i>Monomorium najrane</i> n. sp.	
–	Larger ants, TL more than 3.8; gaster moderately shining; alitrunk often lighter than gaster	27
27	Petiole nodes wider than long, about 0.3 times HW; head and alitrunk moderately shining <i>Monomorium marmule</i> n. sp.	
–	Petiole nodes narrower, about 0.25 times HW; head and alitrunk with distinct reticulopunctate sculpture.	28
28	Dorsum of head, nodes and gaster darker than alitrunk <i>Monomorium fezzanense</i> n. sp.	
–	Head and nodes concolorous pale brown with alitrunk.	29
29	Petiole a high triangle in side view, narrow in dorsal view <i>Monomorium acutinode</i> n. sp.	
–	Petiole broadly rounded, slightly wider than long in side view	30
30	Gaster tergite 1 with a double row of erect hairs; gaster darker than alitrunk <i>Monomorium hemame</i> n. sp.	
–	Gaster tergite 1 without erect hairs anterior to the apical row; gaster not distinctly darker than alitrunk	31
31	Ventral head always with a few projecting hairs <i>Monomorium areniphilum</i>	
–	Ventral head entirely without hairs posterior to the maxillae <i>Monomorium dirie</i> n. sp.	
32	Larger species, TL at least 3.8; HW more than 0.75	33
–	Smaller species, TL 2.2-3.2; HW 0.64 or less	36
33	Whole body yellowish; alitrunk rather flat with a shallow oblique mesopropodeal furrow <i>Monomorium luteum</i>	
–	Gaster dark contrasting with red alitrunk; mesonotum and propodeum meeting at a steep angle	34
34	Head, alitrunk nodes and appendages red	35
–	Head and antennal clubs clearly darker than red alitrunk <i>Monomorium matame</i> n. sp.	
35	Head smooth with superficial sculpture <i>Monomorium niloticum</i>	
–	Head completely finely striate <i>Monomorium riyadhe</i> n. sp.	
36	Alitrunk red, contrasting with dark gaster	37
–	Alitrunk pale brown to black, concolorous with gaster	41
37	Whole of dorsum clothed with fine pale hairs; antennae clothed with crowded erect pubescence <i>Monomorium yemene</i> n. sp.	
–	Dorsum of alitrunk with few hairs; scape pubescence short, subdecumbent	38
38	Alitrunk with several pairs of hairs scattered over whole dorsum	39
–	Alitrunk hairs restricted to one pair on the pronotum	40
39	Eyes very small, 0.2 times HW; scapes long, SI 110-112; gaster shining black <i>Monomorium knappi</i> n. sp.	
–	Eyes larger, 0.23-0.25 times HW; scapes shorter, SI 89-102; gaster dull black <i>Monomorium fayfaense</i> n. sp.	
40	Head and alitrunk dull red, gaster brown; laid back scapes reach the occipital border <i>Monomorium hanage</i> n. sp.	
–	Head and alitrunk bright orange red, gaster black; laid back scapes fail to reach the occipital border <i>Monomorium jizane</i> n. sp.	

41	Whole body including gaster densely sculptured and dull	42
–	Gaster at least more or less shining with superficial sculpture	44
42	Colour evenly yellow; hairs on alitrunk scattered	<i>Monomorium pharaonis</i>
–	Colour brown or black; alitrunk hairs mainly or entirely to pronotum	43
43	Body colour brown; larger species, TL 3.1-3.3; HW 0.70	<i>Monomorium suleyile</i> n. sp.
–	Body colour uniformly black, smaller species, TL 2.7-2.9; HW 0.56	<i>Monomorium mahyoubi</i> n. sp.
44	Whole body glossy, nodes and gaster brilliant	<i>Monomorium dammame</i> n. sp.
–	At least alitrunk with close punctulate sculpture	45
45	Pronotum without dorsal hairs; scapes long, reaching occipital margin	<i>Monomorium buettikeri</i> n. sp.
–	Pronotum always with one or two pairs of hairs; laid back scapes do not reach the occipital margin in most species; a rather flat dorsal outline, HW below 0.65, TL less than 3.7 and a more or less uniform body colour ranging from pale brown to black	46
46	Colour black; propodeum with a distinct V-shape which extends to the mesopropodeal border	<i>Monomorium abeillei</i>
–	Colour light to median brown; propodeum with longitudinal furrow flatter, less clearly defined	47
47	TL over 3.0; clypeus with a distinct anteromedian notch	48
–	Size smaller, TL 2.4-2.7; clypeal border mildly concave to straight with a very small median notch or none	49
48	Postpetiole transverse, wider than petiole in dorsal view; pronotum with a single pair of hairs; eyes larger, 0.3 times HW; postpetiole weakly sculptured	<i>Monomorium asiriense</i> n. sp.
–	Postpetiole transverse but not wider than the petiole, pronotum with two pairs of hairs; eyes smaller, 0.25 times HW; postpetiole strongly sculptured	<i>Monomorium buxtoni</i>
49	Head underside with numerous hairs, the longest exceeding the maximum eye length	<i>Monomorium tumaire</i> n. sp.
–	Head underside with fewer hairs, none as long as maximum eye length	50
50	Petiole in profile a high rounded cone	<i>Monomorium mintiribe</i> n. sp.
–	Petiole in profile a rounded blunt triangle	51
51	Petiole nodes punctate; clypeus sculptured	<i>Monomorium gallagheri</i> n. sp.
–	Petiole nodes shining with superficial sculpture; clypeus shining	<i>Monomorium wahibiense</i> n. sp.

***Monomorium abeillei* André, 1881**

Monomorium abeillei André, 1881. — In Emery: Ann. Mus. civ. Stor. nat. Genova 16: 31 (footnote).

Material: Saudi Arabia: ♀♀ from: Qarah, 16.IV.1976; Wadi Marba, 2050 m, 17.IV.1976; Dammam, 13.IX.1976; Wadi Hanifa, 20.I.1977; all W. Büttiker. — Kuwait: ♀♀ from: Wadi Umm al-Rumam, 10.III.1988; Al-Rileg al-Shamali, 26.III.1988; all W. Büttiker. — Oman: ♀♀, Bakka Musandham, 24.X.1984, collector unknown; ♀♀, Ras Dhabdhub, 20.I.1986, W. Büttiker; ♀♀, Khasab Musandham, 19.IV.1985, R. Braund. — Yemen: ♀♀ from: Al-Mahwit, 29.IV.1991; Sana'a, IX.1991; Marib, 9.IX.1991; Djebel an-Nabi Shuaib, 3000 m; all A. van Harten.

Measurements: TL 2.40-2.75; CI 78-91; SI 90-104; EL/HW 0.24-0.29.

Anterior margin of clypeus slightly concave. Eyes moderately large, about one quarter HW with 9-10 ommatidia in the longest row. Head almost straight-sided, occiput weakly emarginate in

dorsal view with rounded corners. In profile the alitrunk has the promesonotal dorsum meeting the flat propodeum at an oblique angle. The propodeum has a characteristic well-defined, longitudinal V-shaped furrow bordered by a distinct raised edge at each side. The petiole in profile is a high rounded triangle, in dorsal view mildly transverse but not wider than the postpetiole. The pronotum has one pair of hairs, the petiole one pair and the postpetiole two pairs. There are a few scattered hairs on the first gastral tergite. The head, pronotum and nodes have superficial reticulate sculpture; the mesopropodeum and the sides of the head are coarsely punctate. The gaster is brilliant with very superficial sculpture. The body colour is evenly brownish black to black with reddish articulations, pale funiculi, tarsi and mandibles. This is a wide-ranging Middle Eastern species found throughout Arabia from coastal lowland to high mountains.

Monomorium acutinode n. sp. (Fig. 14)

Holotype: ♀, Oman, Qarn al-Alam, 31.V.1989, M.D. Gallagher. — Paratypes: 1 ♀, 1 ♀, same series as holotype.

Measurements of holotype: HL 0.91; HW 0.76; SL 0.82; EL 0.25; CI 83.8; SI 107.

Description: The head of this species is more rectangular than in the other members of this group. The petiole is a high cone in profile 0.28-0.29 mm and narrow in dorsal view, 0.21 mm. The head and alitrunk are less sculptured than in *M. areniphilum* but the main difference is the high, relatively narrow petiole. The queen has a high, sharply angled petiole which, unlike in the other species, is almost smooth with very faint sculpture and the dorsum is emarginate. The *M. areniphilum* queen also has a high node but it is much more sculptured with a smoothly rounded crest.

Monomorium aeyade n. sp.

Holotype: ♀, Oman, Wadi Aeyad, 20.III.1990, M.D. Gallagher. — Paratype: 1 ♀, same series as holotype.

Measurements of holotype: TL 1.5; HL 0.38; HW 0.31; CI 81.5; SI 96.8; HW/EL 0.24.

Description: These two tiny ants were taken from under a stone in sandy terrain. They resemble *M. guillarmodi* Arnold, 1946 from Lesotho by their small size and total absence of dorsal alitrunk hairs unlike all other known *Monomorium* species with 11-segmented antennae. The Arabian species differs from *M. guillarmodi* by the smaller eyes, the rounded anterior margin of the clypeus and the more rounded promesonotal dorsum. *M. guillarmodi* has 1-2 pairs of hairs on the occipital margin which are absent in *M. aeyade*. These two, somewhat unique, species are otherwise very similar both being glossy brown with very little sculpture.

Monomorium areniphilum Santschi, 1911 (Fig. 15)

Monomorium salomonis var. *areniphila* Santschi, 1911. — Bull. Soc. Hist. nat. Afr. Nord 3: 84.

Monomorium areniphilum. — Collingwood 1985; Fauna of Saudi Arabia 7: 269.

Material: Saudi Arabia: ♀♀ from: Wadi Hanifa, 30.I.1976; Wadi Shijah, 9.III.1977; Wadi Mutaywiyah, III.1977; Dammam, 18.V.1976; Bani Musayqirah, 16.X.1981; Al-Muraywah, 28.X.1986; all W. Büttiker. — Kuwait: ♀♀, ♀♀ from: Al-Rileg al-Shamali, 18.II.1988; Jabal Khartam, III.1988; Sulabiyah, 6.VII.1988; all W. Büttiker.

Measurements: TL 3.1-4.3; HL 0.86-1.04; HW 0.67-0.88; SL 0.68-0.88; CI 78-88; SI 98-104; EL/HW 0.30-0.35; from BOLTON (1987).

Anterior clypeal margin evenly concave; sides of head slightly and evenly rounded. Promesonotum evenly convex anteriorly becoming flat, then abruptly sloping to the deeply impressed mesopropodeal groove. Petiole node narrow in dorsal view but always slightly wider than long. Head with one or two pairs of hairs dorsally and always several ventrally behind and in addition to those below the mandible insertions. Occiput without projecting hairs. Dorsum of alitrunk bare except for some variable raised pubescence; petiole with one pair, postpetiole with 2-3 pairs of long

hairs. First gaster tergite without standing hairs anterior to the apical row. Dorsum of head with close reticulate sculpture with some fine striae centrally. Alitrunk reticulopunctulate with stronger punctate sculpture on the propodeum. Gaster moderately shining with superficial reticular patterning. Colour variable reddish brown to medium brown. This description is made from specimens collected in Tunisia, Morocco, Lebanon, Palestine as well as Arabia. All of these have short raised pubescence on the lower genae and alitrunk dorsum contrasting with an example from Niger which has no such pubescence. and a slightly broader petiole profile.

Monomorium asiriense n. sp. (Fig. 16)

Monomorium abeillei. — Collingwood 1985; Fauna of Saudi Arabia 7: 269, pro parte [misidentification].

Holotype: ♀, Saudi Arabia, Bishah, 20°01'N 42°34'E, 7.IV.1983, C.A. Collingwood. — Paratypes: Saudi Arabia: 1 ♂, 1 ♀, ♀♀ from: Wadi Shuqub, 7.IV.1983; Bishah, 7.IV.1983; Al-Tawlah, 7.IV.1983; An-Naamah, 8.IV.1983; all C.A. Collingwood.

Measurements of holotype: TL 3.2; HL 0.73; HW 0.51; SL 0.51; range: CI 69-71; SI 100-102; EL/HW 0.285-0.323.

Description: The alitrunk is rather flat but with a sharp mesopropodeal break. The petiole node is a moderately high rounded cone. The clypeus has a distinct median incision. There is one pair of hairs on the pronotum, one on the petiole and one on the postpetiole; the first gastral tergite is bare. There are a few ventral hairs on the head. The head dorsum and alitrunk are densely punctulate but the nodes and gaster are shining with superficial sculpture.

The queen (measurements: HL 0.95-0.98; HW 0.79-0.81; SL 0.75-0.77; EL 0.27) has dense striatopunctulate sculpture on the head and alitrunk but the gaster is shining.

The male is pale and more delicately formed than that of *M. abeillei*, and has colourless legs and antennae.

Affinities: This species was attributed to *M. abeillei* in COLLINGWOOD (1985) but it is both paler in colour and more heavily sculptured.

Monomorium baushare n. sp.

Holotype: ♀, Oman, Sad Baushar, 23°33'N 58°24'E, 2.I.1992, M.D. Gallagher. — Paratypes: Oman: ♀♀, same series as holotype. — Yemen: ♀♀ from: Rissabah, 8.X.1991; Wadi Surdud, 29.XI.1991; all A. van Harten. — Yemen: ♀♀, Hoddaida, Bajil, 15.III.1993, C.A. Collingwood.

Measurements of holotype: TL 1.40; HL 0.42; HW 0.30; SL 0.27; SI 90; EL 0.075 (eye with five ommatidia).

Description: This small ant has antennae with 11 segments and accords with the description of *M. exiguum* by BOLTON (1987) but the antennal scape is slightly longer (*M. exiguum* SI 74-84) and the body size larger. The body sculpture is smooth with a few punctures on the sides of the propodeum and some scratch marks on the head sides. The colour is pale brownish yellow.

Monomorium bicolor Emery, 1877

Monomorium bicolor Emery, 1877. — Ann. Mus. civ. Stor. nat. Giacomo Doria 9: 368.

Material: United Arab Emirates: ♀♀, Umm al-Zamul, 10.X.1993, B. Tigar. — Oman: 1 ♀, Jiddat al-Harasis, 14.II.1988, M.D. Gallagher.

Measurements: HW 0.61-0.63; CI 74-80; SI 108-111; EL/HW 0.262.

This contrasted red and black species was misidentified in COLLINGWOOD (1985). Instead five new species have now been recognised having the same densely sculptured red head and alitrunk contrasted with the dark gaster. *M. bicolor* itself is a widely distributed African species but its Arabian distribution appears to be rather localised.

Monomorium brunneolucidulum n. sp.

Holotype: ♀, Oman, Qarhat Mu'ammar, 2.II.1986, M.D. Gallagher. — Paratypes: 5 ♀♀, same series as holotype.

Measurements of holotype: TL 2.30; HL 0.70; HW 0.53; SL 0.61; CI 75.7; SI 115; EL/HW 0.28.

Description: In this species the mandibles are smooth with scattered hair pits unlike the species discussed so far. It appears to have some affinities with *M. oscaris* Forel, 1894 as well as the larger-eyed species of the *M. altinode* Santschi, 1910 complex. The clypeal ridges project over the mildly concave anterior border. The antennal scapes are long and reach over the occipital margin. The promesonotum is convex and rounds steeply to the mesopropodeal furrow and the propodeum is also strongly convex. The petiole is slightly wider than long in dorsal view, a rounded triangle in side view. There is one pair of occipital hairs, none on the pronotum, one pair of long hairs on the mesonotum plus a few short raised pubescent hairs. The petiole has one pair, the postpetiole three pairs and the first gastral tergite has ten pairs. The head is almost unsculptured with a slight reticulum and a few striae on the frons. The head, pronotum and gaster are brilliant with the mesopropodeum and nodes slightly more sculptured. The head and alitrunk are bright chocolate brown and the gaster dark brown.

Monomorium buettikeri n. sp.

Holotype: ♀, Kuwait, Anwha Island, 29°22'N 48°25'E, III.1988. W. Büttiker. — Paratypes: ♀♀, same series as holotype.

Measurements of holotype: TL 3.20; HL 0.81; HW 0.65; SL 0.70; range: CI 79-81; SI 107-111; EL/HW 0.30-0.33.

Description: The anterior clypeal margin is mildly concave. The eyes are relatively large with 11-12 ommatidia in the longest row. The scape just reaches the occipital border when laid back. The propodeal furrow is flat with slightly raised side margins, in profile with a distinctly rounded declivous face. The pronotum has no standing hairs but there are a few raised pubescent hairs on the mesonotum and the propodeum. The petiole has one pair of long hairs, the postpetiole two pairs and there are several long hairs on the gaster. The head and alitrunk have reticulopunctate sculpture throughout but the general appearance is shining and the gaster is brilliant. The colour is black with the appendages brown paling towards their extremities. *M. buettikeri* resembles *M. abeillei* in general appearance but is larger has a more sculptured head, a more rounded propodeal profile, larger eyes, longer antennae and absence of pronotal hairs.

Monomorium buxtoni Crawley, 1920

Monomorium buxtoni Crawley, 1920. — Ent. Rec. 32: 165.

Measurements: TL 3.2-3.4; HL 0.753; HW 0.59-0.61; SL 0.62-0.64; CI 78-83; SI 101-103; EL/HW 0.24-0.25.

This species was recorded from Kuwait and is known from Iraq and Iran but no recent Arabian specimens have been recognised in the present collections. There are 1-2 pairs of long hairs on the pronotum, two pairs each on the petiole and postpetiole and there are several hairs on the gaster and on the ventral head. The general colour is medium reddish brown. The propodeal furrow is distinct; the petiole is wider than long in dorsal view. The general appearance is more robust than in *M. abeillei*, the eyes are somewhat smaller and the antennal scapes are longer.

Monomorium carbo Forel, 1910

Monomorium salomonis var. *carbo* Forel, 1910. — Zool. Jb. Abt. Syst. 29: 251.

Monomorium carbo. — Bolton 1987; Bull. Br. Mus. nat. Hist. 54 (3): 339.

Material: Oman: 1 ♀, Mugshin Dhofar, 5.IX.1989, M.D. Gallagher.

Measurements: TL 2.5; HL 0.68; HW 0.495; SL 0.55; EL/HW 0.26; CI 72.8; SI 110.

The clypeal border is concave. The alitrunk profile is scarcely impressed by the weak mesopododeal furrow; the petiole is a blunt rounded triangle in profile. The only dorsal hairs include one pair on the petiole and a few scattered hairs on the gaster. There are no subcephalic hairs. The head, alitrunk and nodes have reticulopunctate sculpture and the first gaster tergite is shining with superficial reticulate sculpture. The only available specimen is slightly larger than in the description of Forel's specimens from Ethiopia in BOLTON (1987).

Monomorium chobauti Emery, 1896

Monomorium chobauti Emery, 1896. — Bull. Soc. ent. Fr. (1896): 418.

Material: Saudi Arabia: 1 ♀, Wadi Hanifa, XII.1977, W. Büttiker. — United Arab Emirates: ♀♀, Ras Ghanada, XI.1992, B. Tigar.

Measurements: HW 0.95-1.10; SI 80; EL/HW 0.20.

This reddish-yellow species is characterised by the abundant long ammochoete hairs forming a distinct psammophore. It is comparatively uncommon. It was first described from Algeria but is also known from Tunisia, the Middle East and Turkey.

Monomorium dammame n. sp.

Holotype: ♀, Saudi Arabia, Dammam, 26°24'N 50°11'E, 13.IX.1976, W. Büttiker. — Paratypes: Saudi Arabia: ♀♀, same series as holotype; ♀♀, Al-Khubra, 29.V.1978, W. Büttiker.

Measurements of holotype: TL 2.3; HL 0.80; HW 0.67; SL 0.71; EL/HW 0.34; range: CI 79-87; SI 100-115; EL/HW 0.34-0.365.

Description: The head in dorsal view is oval with rounded sides. The eyes are exceptionally large. The antennal scapes clearly over-reach the occipital margin when laid back and all funiculus segments are longer than broad. The anterior clypeal margin is mildly convex with a small median incision. The dorsal alitrunk outline is rather flat with the mesonotum and propodeum meeting at a very wide angle. The petiole is a high, rounded, equilateral triangle in side view, 0.22 mm high. The pronotum has one pair of hairs, the petiole one pair and the postpetiole two pairs. The head and pronotum are glossy with weak reticulate sculpture, the sides of the mesopropodeum are more coarsely sculptured; the nodes and gaster are brilliant. The overall colour is pale yellowish brown.

Affinities: This species is similar in description to *M. vatranum* Bolton, 1987, but has distinctly larger eyes.

Monomorium dentigerum (Roger, 1862)

Atta dentigera Roger, 1862. — Berl. ent. Z. 6: 259.

Monomorium (Holcomyrmex) dentigerum. — Emery 1921; Gen. Ins. 174: 181.

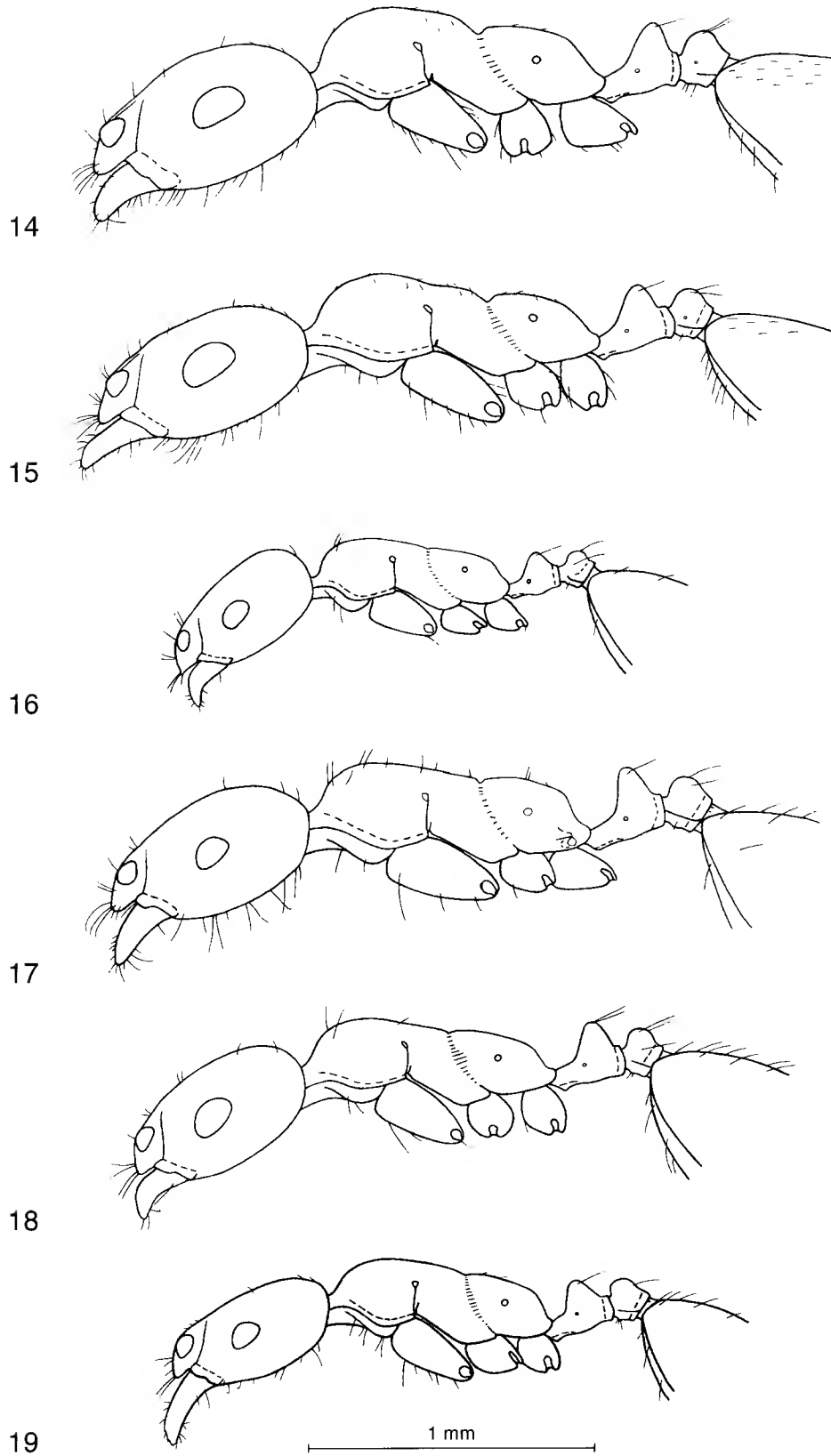
Material: Oman: ♀♀, Jabal Qara, 5.IX.1989, M.D. Gallagher.

This bicoloured species superficially resembles *M. destructor* but is easily distinguished by the narrow, indistinct antennal club and the slit-like propodeal spiracle. It occurs in southern Greece and the Middle East, and the Oman examples extend its range well to the south of previous records.

Monomorium desertorum n. sp.

Holotype: ♀, Saudi Arabia, sandy desert near Najran, 17°30'N 44°03'E, 10.IV.1983, C.A. Collingwood. — Paratypes: Saudi Arabia: 1 ♀, same series as holotype; ♀♀, Hofuf sandy desert, 14.IV.1983, C.A. Collingwood.

Measurements of holotype: TL 1.70; HL 0.50; HW 0.38; SL 0.36; CI 75; SI 96; EL/HW 0.24.



Figs 14-19: Head and alitrunk in profile: 14, *Monomorium acutinode* n. sp., ♀; 15, *M. areniphilum*, ♀; 16, *M. asiriense* n. sp., ♀; 17, *M. fayfaense* n. sp., ♀; 18, *M. hanaqe* n. sp., ♀; 19, *M. jizane* n. sp., ♀.

Description: This is a small yellow species overlooked in the previous paper. Unlike *M. qarahe* n. sp., *M. baushare* n. sp. and *M. aeyade* n. sp., there are 12 antennal segments. The eyes are set slightly forward of the midline; the scapes do not reach the occiput. The body is unsculptured except for scattered pinpoint punctures and metanotal cross-ribs. The clypeal ridges are not outstanding and do not project. In dorsal view the alitrunk appears more waisted than the other small yellow species and the head is slightly narrower. There are scattered hairs over the whole body and oblique hairs are present on the legs and antennae. The four specimens were each taken singly in sand.

***Monomorium destructor* (Jerdon, 1851)**

Atta destructor Jerdon, 1851. — Madras J. Lit. Sci. 17: 105.

Myrmica gracillima F. Smith, 1861. — J. Proc. Linn. Soc. Lond. 6: 31-35. [Synonymy by BOLTON 1987: 324].

Monomorium destructor. — Emery 1893; in: Dalla Torre, Cat. Hym. 7: 60.

Monomorium gracillimum. — Collingwood 1985; Fauna of Saudi Arabia 7: 270 [synonym].

This species abounds throughout Arabia and seems to occur in every type of habitat with many collections from Saudi Arabia, Oman and Yemen. This is one of the most successful pantropical species (WILLIAMS 1994).

***Monomorium dirie* n. sp.**

Holotype: ♀, Oman, Wadi Diri, 16.V.1984, M.D. Gallagher. — **Paratypes:** Oman: ♀♀, same series as holotype; ♀♀ from: Wahiba Sands, 14.XII.1985; Mintirib, 1.III.1986; all M.D. Gallagher.

Measurements of holotype: HL 0.95; HW 0.82; SL 0.85; EL 0.27 (15 ommatidia in the longest row).

Description: This species falls within the general description of *M. areniphilum* but the ventral head is entirely bare of hairs. The alitrunk profile is also flatter with a more shallow mesopropodeal furrow.

***Monomorium fayfaense* n. sp. (Fig. 17)**

Monomorium nitidiventre. — Collingwood 1985; Fauna of Saudi Arabia 7: 272, pro parte [misidentification].

Holotype: ♀, Saudi Arabia, Fayfa, 17°16'N 43°05'E, 27.III.1983, C.A. Collingwood. — **Paratypes:** Saudi Arabia: ♀♀, same series as holotype; ♀♀, Khama mangrove swamp, 1.IV.1983, C.A. Collingwood. — Yemen: ♀♀ from: Rissabah, 18.XI.1991; Wadi Surdud, 29.XII.1991; all A. van Harten.

Measurements of holotype: TL 3.0; HL 0.73; HW 0.58; SL 0.58; range: CI 82-87; SI 89-102; EL/HW 0.234-0.245.

Description: The head is broad with curved sides and emarginate occiput. The clypeus is emarginate. The mesopropodeal furrow is deep and the propodeal dorsum rounds steeply into its declivous face and has a wide longitudinal furrow with raised side margins. The petiole is relatively high and steep, transverse in dorsal view. There are several long hairs on the pronotum and a few short suberect hairs on the mesopropodeum and on the lower genae. The petiole has one pair and the postpetiole two pairs and there are scattered hairs on the first gastral tergite. The head, alitrunk and nodes are bright red and the gaster a strongly contrasted dark colour.

***Monomorium fezzanense* n. sp.**

Holotype: ♀, Saudi Arabia, Jabal Banban, 16.III.1978, W. Büttiker. — **Paratypes:** Saudi Arabia: ♀♀, same series as holotype; ♀♀, N of Tabuk, 4.IV.1979; Exp. N. Hedjaz (W. Büttiker); ♀♀, Al-Tawlah, 7.III.1983, C.A. Collingwood. — Oman: ♀♀, Khabura Batina, 2.VI.1979, R.P. Whitcombe; ♀♀, Thumrait, IV.1984, J.M. Barnes.

Measurements of holotype: HL 0.87; HW 0.71; SL 0.73; EL 0.23.

Description: This species has a narrow petiole, not wider than long in dorsal view. There are no suberect pubescent hairs. The head, alitrunk and nodes are densely punctate and the gaster has close reticulopunctate sculpture so that the whole body is dull. The head, nodes and gaster are dark at least in part, contrasting with the paler alitrunk giving a distinctive bicoloured appearance. SANTSCHI (1936) described this form from Libya but it also occurs in other North African countries and in the Middle East.

Monomorium gallagheri n. sp.

Holotype: ♀, Oman, Qarhat Mu'ammara, 1.II.1986, M.D. Gallagher. — **Paratypes:** Oman: ♀♀, same series as holotype. — Saudi Arabia: ♀♀, Wadi Awsat, 31.XII.1974, W. Büttiker.

Measurements of holotype: TL 2.53; HL 0.88; HW 0.56; SL 0.57; EL 0.145; range: CI 77.8-84.3; SI 99.5-112; EL/HW 0.265-0.312.

Description: The clypeal border is weakly convex with a small median incision. The alitrunk profile is flat with the mesonotum meeting the propodeum at an oblique angle. The propodeal furrow is distinct with well-defined side margins. The petiole node is a rounded triangle in side view. There are no hairs on the underside of the head away from the maxillae. The pronotum has one pair of hairs, the petiole one pair and the postpetiole two; the gaster has several on the first tergite. Head, alitrunk and nodes have evenly punctate sculpture; the gaster is shining with a faint reticulation. The body colour is uniformly medium brown.

Affinities: This species is similar to *M. delagoense* Forel, 1894, but smaller and has larger eyes (*M. delagoense* EL/HW 0.22-0.245).

Monomorium hanaqe n. sp. (Fig. 18)

Holotype: ♀, Saudi Arabia, Wadi Hanaq, 22°49'N 39°22'E, 31.I.1985, W. Büttiker. — **Paratypes:** Saudi Arabia: 1 ♀, ♀♀, same series as holotype; ♀♀, Abu Arish, 2.IV.1983, C.A. Collingwood. — Yemen: ♀♀, Wadi Surdud, 29.XII.1991, A. van Harten.

Measurements of holotype: TL 3.10; HL 0.71; HW 0.53; SL 0.59; EL/HW 0.304; CI 74; SI 113. Paratype queen: TL 6.5; HW 0.84; SL 0.72; EL 0.32.

Description: The head is nearly rectangular with almost straight sides but rounded occipital corners. The mesopropodeal break is distinct but scarcely interrupts the dorsal outline. The petiole is moderately high but narrow in dorsal view, not wider than the postpetiole. There is one pair of hairs on the propodeum, one pair on the petiole, two pairs on the postpetiole and the gaster has some scattered hairs. The head and alitrunk have dense punctulate sculpture but the gaster is somewhat shining with superficial reticulate sculpture. The head and alitrunk are dull red and the gaster is brown not black. This species is distinguished by the duller red colour, the relatively long scapes which reach the occiput and the large eyes. The single associated paratype queen has more dense sculpture, more body hairs and a higher cone-shaped petiole.

Monomorium harithe n. sp.

Holotype: ♀, Saudi Arabia, Harithi, 19.IV.1985, W. Büttiker. — **Paratypes:** Saudi Arabia: ♀♀, same series as holotype; 1 ♀, ♀♀, Riyadh, 21.I.1980, A.H. Talhouk. — Yemen: ♀♀, Taiz - Aden, 20.III.1993, C.A. Collingwood.

Measurements of holotype: TL 2.75; HL 0.65; HW 0.51; SL 0.53; EL/HW 0.29; CI 78.5; SI 103.

Description: The clypeus is mildly convex with a small median incision. The head sides are distinctly rounded the occipital border slightly emarginate. The alitrunk is rather flat with the propodeum falling away from the mesonotum at the shallow mesopropodeal break. The propodeal furrow is distinct with slightly raised margins. There are no alitrunk hairs, one pair on the petiole,

one on the postpetiole and two pairs on the first gastral tergite in front of the apical row. The head and alitrunk have scattered punctures within a superficial reticulum with the nodes and propodeum more strongly sculptured. The colour is evenly dark reddish brown and the general appearance somewhat shining, not dull as in the similar *M. phoenicium*.

Monomorium hemame n. sp.

Holotype: ♀, Kuwait, Umm al-Hemam, 9.III.1988, W. Büttiker. — Paratypes: Kuwait: ♀♀, same series as holotype. — Saudi Arabia: ♀♀, Uyaynah, 1.IV.1976, W. Büttiker.

Measurements of holotype: HL 0.91; HW 0.755; SL 0.77; EL 0.23; CI 83; SI 102; EL/HW 0.31.

Description: This species differs from *M. areniphilum* by having a double row of hairs on the first gastral tergite anterior to the apical row and the gaster is black rather than brown, contrasting with the reddish-brown head and alitrunk. The ventral head hairs are also more abundant. The petiole is narrow in dorsal view, not wider than long.

Monomorium jizane n. sp. (Fig. 19)

Monomorium nitidiventre. — Collingwood 1985; Fauna of Saudi Arabia 7: 272, pro parte [misidentification].

Holotype: ♀, Saudi Arabia, Jizan, Abu Arish, 2.IV.1983, C.A. Collingwood. — Paratypes: Saudi Arabia: ♀♀, same series as holotype; ♀♀, Wadi ad-Dilla, Jizan, 22.IV.1975, W. Büttiker; ♀♀, Najran, 7.IV.1983, C.A. Collingwood. — Oman: ♀♀, Tibat Musandham, 24.IX.1984, M.D. Gallagher. — Yemen: ♀♀ from: Rissabah, 8.X.1991; Taiz, 20.X.1991; all A. van Harten.

Measurements of holotype: TL 2.50; HL 0.64; HW 0.47; SL 0.50; EL/HW 0.27; range: CI 72-76; SI 96-103; EL/HW 0.25-0.29.

Description: The clypeal border is narrowly emarginate or with a small incision in a rather straight outline. The head is long, rectangular with slightly curved sides and a slightly emarginate occiput. The eyes are relatively large with 8-9 ommatidia in the longest row. The antennal scapes just fail to reach the occipital border. The alitrunk has a narrow deep mesopropodeal break; the propodeal furrow is long and distinctly margined as in *M. nitidiventre*. The petiole is a rounded triangle in profile and narrow in dorsal view at least as long as wide. The occiput has a projecting hair near each corner. There is one pair on the pronotum, one pair on the petiole, one or two pairs on the postpetiole and six pairs on the first gastral tergite in front of the apical row. The whole body has dense punctate sculpture with only the sides of the gaster shining. The punctures on the propodeum are arranged in close transverse rows on the descending face. The head, alitrunk and nodes are medium orange red, contrasting with the uniformly black gaster.

Affinities: This species differs from *M. hanaqe* n. sp. by its smaller size, brighter colour, shorter scape, smaller eyes and lower petiole.

Monomorium knappi n. sp. (Fig. 20)

Holotype: ♀, Yemen, Wadi Hadramaut, 24.III.1993, M. Knapp. — Paratypes: ♀♀, same series as holotype.

Measurements of holotype: TL 2.9; HL 0.86; HW 0.63; SL 0.62; EL/HW 0.20; CI 73.8; SI 98.4.

Description: The head, alitrunk and nodes have close reticulate sculpture as in *M. yemene* n. sp. and *M. fayfaense* n. sp., but the gaster is shining with a superficial reticulate sculpture as in *M. nitidiventre*. There are three pairs of hairs on the pronotum, one on the mesonotum, one on the propodeum, one on the petiole, two on the postpetiole and eight pairs on the first gastral tergite. The petiole is high and thin in profile, wider than long in dorsal view. The head is relatively narrow and the eyes small.

Monomorium luteum Emery, 1881

Monomorium luteum Emery, 1881. — Ann. Mus. civ. Stor. nat. Giacomo Doria 16: 532.

Material: Yemen: ♀♀, near Zingibar, 23.III.1993, A. van Harten.

Measurements: TL 4.0-4.2; HL 113-115; HW 0.76-0.78; SL 1.10-1.13; CI 66.1; SI 1.140-1.147; EL/HW 0.323.

This is the largest of the Arabian *Monomorium* species. The head is very long; the antennal scapes are very long; the alitrunk is flat with a shallow oblique mesopropodeal furrow and the petiole is low with a smoothly rounded dorsum. The pronotum has one pair of hairs, the mesonotum one pair, the petiole one pair, the postpetiole two pairs and the first gaster tergite has seven pairs of long hairs. The general aspect is moderately shining with superficial reticulate sculpture becoming coarser on the propodeum. The general body colour is pale brownish yellow.

Monomorium mahyoubi n. sp.

Holotype: ♀, Yemen, Taiz – Al-Turbah, roadside, 14.III.1993, C.A. Collingwood. — Paratypes: Yemen: ♀♀, same series as holotype; ♀♀, Sana'a, 17.III.1993, C.A. Collingwood.

Measurements of holotype: TL 2.8; HL 0.66; HW 0.57; SL 0.62; CI 86; SI 99-100; EL/HW 0.27.

Description: The pronotum has one pair of erect hairs, the mesonotum up to two pairs, the petiole and postpetiole each have two pairs and the first gastral tergite has 8-10 pairs. The head, alitrunk and nodes are coarsely punctate, the gaster less densely but distinctly sculptured so that the whole body is dull without shine. The colour is dark brownish black. The clypeal margin is incised in the middle and the clypeal ridges are relatively sharp.

Affinities: This species resembles *M. suleyile* n. sp. but is smaller, darker and has larger eyes.

Monomorium majarish n. sp.

Holotype: ♀, Saudi Arabia, Wadi Majarish, 21°23'N 40°15'E, 17.II.1983, W. Bürtiker. — Paratypes: ♀♀, same series as holotype.

Measurements of holotype: TL 1.95; HL 0.49; HW 0.38; SL 0.35; EL/HW 0.24; range: CI 78.5-79; SI 90-92.

Description: The clypeus is emarginate. The eyes with six ommatidia in the longest row are set slightly forward of the mid length of the head. The alitrunk in profile shows no dip in the dorsal outline, the mesopropodeal break appearing as a simple line. There are no dorsal hairs on the alitrunk or nodes. The head has no well-defined sculpture and that of the alitrunk dorsum, nodes and lower face of the first gastral tergite is punctate but not dense. The colour is dull greyish yellow.

Affinities: This species appears close to *M. osiridis* Bolton, 1987, but the head sculpture lacks the characteristic median shining strip of *M. osiridis* and the eyes are slightly larger. This was wrongly identified as *M. schultzei* Forel, 1910 in COLLINGWOOD (1985) but that species has not been confirmed for Arabia.

Monomorium marmule n. sp. (Fig. 21)

Holotype: ♀, Oman, Marmul, IX.1989, M.D. Gallagher. — Paratypes: Oman: ♀♀, same series as holotype; ♀♀ from: Yalooni, 3.X.1984; Mintirib, 14.I.1986; all M.D. Gallagher; ♀♀, Yalooni, 18.XI.1984, R. Braund.

Measurements of holotype: HL 0.97; HW 0.80; SL 0.84; EL 0.24; PW 0.26.

Description: This species differs from *M. areniphilum* by the wide transverse nodes both of which are clearly wider than long. The petiole is also rather high in profile, 0.30 mm. Suberect pubescent hairs are present over the alitrunk dorsum and gaster but no long hairs except one pair

on the petiole and two pairs on the postpetiole. The head and alitrunk are reddish brown but both nodes are infuscate dorsally and the antennae darken towards their tips. This species is also less sculptured and more brightly coloured than *M. areniphilum*.

Monomorium matame n. sp. (Fig. 22)

Holotype: ♀, Oman, Wadi Matam, 1.II.1986, M.D. Gallagher. — Paratypes: Oman: ♀♀, same series as holotype. — Saudi Arabia: 1 ♀, Nuayriyah, 20.V.1980, W. Büttiker. — Yemen: ♀♀, Sana'a, II.1991, A. van Harten.

Measurements of holotype: HL 1.10; HW 0.91; SL 1.05; EL 0.31; CI 80-84; SI 111-115.

Description: The pilosity and sculpture are similar to *M. niloticum* but the eyes are larger, EL/HW 0.325-0.34, and the colour different. The head and antennal clubs are brownish, contrasting with the lighter alitrunk whereas in the very large number of *M. niloticum* specimens from Arabia the pale reddish colour of the head, alitrunk, antennae and legs is consistent.

Monomorium mayri Forel, 1902

Monomorium gracillimum var. *mayri* Forel, 1902. — Rev. Suisse Zool. 10: 209.

Monomorium karawajewi. — Collingwood 1985; Fauna of Saudi Arabia 7: 270. n. sp.

Material: Yemen: ♀♀ from: Sana'a, I.1991 and XI.1991; Aden, XII.1991; all A. van Harten.

The Yemen records are new for that country and are additional to the many collections from Saudi Arabia and Oman where this species seems to be almost as common as *M. destructor* from which it only differs in the darker colour. Bright yellowish workers of *M. destructor* can be distinguished easily from the darker samples of *M. mayri* but there are less determinate specimens of greyish colour suggesting that either the two species hybridise or in fact form a continuum of colours from bright yellow, red yellow, greyish to black.

Remarks: BOLTON (1987: 326) treated *M. karawajewi* as a non-available name, although COLLINGWOOD (1985: 270) made *M. karawajewi* sensu Forel, 1913 an available name at species level. However, this does not change the synonymy.

Monomorium mintiribe n. sp. (Fig. 23)

Holotype: ♀, Oman, Mintirib, 17.XI.1984, M.D. Gallagher. — Paratypes: Oman: ♀♀, same series as holotype; 1 ♂, ♀♀, ♀♀, Bilad Bani, 20°03'N 59°17'E, W. Büttiker; ♀♀ from: Mugshin Dhofar, 5.IV.1984; Yalooni, 3.X.1984; Wadi Ibra, 17.I.1988; all M.D. Gallagher. — Saudi Arabia: ♀♀, Al-Kola, 10.IV.1983, C.A. Collingwood.

Measurements of holotype: TL 2.5; HL 0.69; HW 0.55; SL 0.55; range: CI 79; SI 99-103; EL/HW 0.27-0.30.

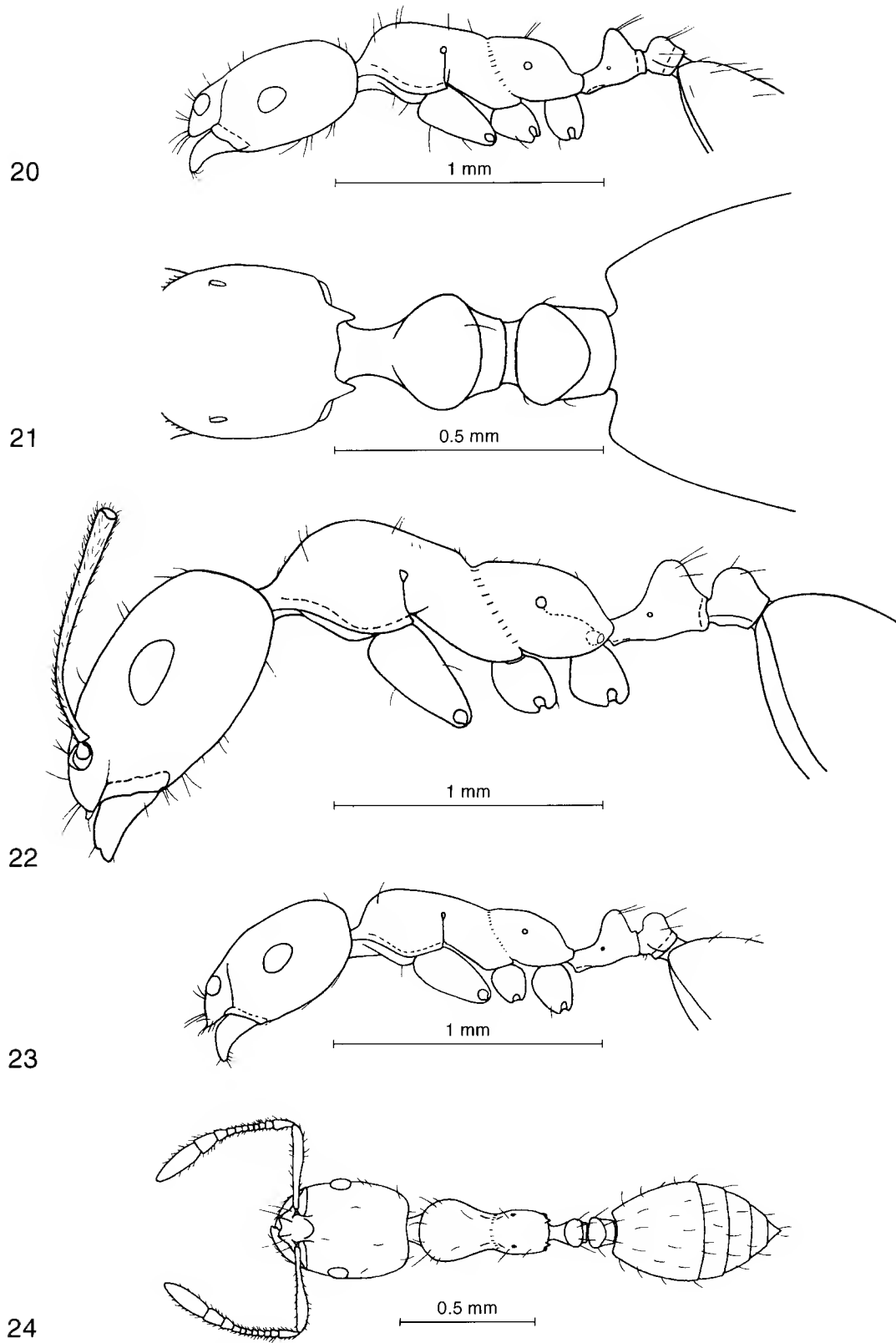
Description: Clypeus with straight anterior border; alitrunk low with a shallow mesopropodeal break and a distinct long propodeal furrow. Petiole a high rounded cone more than 0.21 mm high in full profile. There are one or two pairs of hairs on the pronotum, one pair on the petiole and one on the postpetiole. There are a few hairs on the gaster and on the ventral head and also on the lower genal margins. Raised pubescent hairs are present on the propodeum. The head and alitrunk are shining with uniform shallow punctulate sculpture and the shining gaster has weak reticulate sculpture. The colour is evenly light to medium brown.

Monomorium montanum n. sp. (Fig. 24)

Monomorium zulu. — Collingwood 1985; Fauna of Saudi Arabia 7: 273 [misidentification].

Holotype: ♀, Saudi Arabia, Sawdah Mt., 2500 m, 18°17'N 42°23'E, 9.IV.1983, C.A. Collingwood. — Paratypes: Saudi Arabia: ♀♀, same series as holotype; ♀♀ from: Sanam, 28.VI.1980; Wadi Azizah, 18.IX.1983; all W. Büttiker; ♀♀ from: Bishah, 7.IV.1983; An-Naamah, 8.IV.1983; all C.A. Collingwood.

Measurements of holotype: TL 2.20; HL 0.51; HW 0.40; SL 0.34; EL 0.095; range: TL 1.7-2.3; CI 77.4-79.3; SI 88.6-90.4; EL/HW 0.255.



Figs 20-24: 20, *Monomorium knappi* n. sp., ♀, head and alitrunk in profile; 21, *M. marmule* n. sp., ♀, petiole and postpetiole in dorsal view; 22, *M. matame* n. sp., ♀, head and alitrunk in profile; 23, *M. mintiribe* n. sp., ♀, head and alitrunk in profile; 24, *M. montanum* n. sp., ♀, dorsal view.

Description: The mandibles are unstriated. The clypeus is emarginate with the ridges projecting forward as two small denticles. The basal tooth is slightly offset. The dorsal outline of the alitrunk is flat with the propodeum rounding steeply into the near-vertical descending face. The mesopropodeal furrow is sharp and distinct but too small to break the dorsal outline. The petiole is a high rounded cone. There is one pair of curved hairs on the pronotum, several on the mesopropodeum and gaster and two pairs each on the petiole and postpetiole. Body sculpture is absent except for scattered hair pits, metanotal cross-ribs and faint marks on the sides of the mesopropodeum. The general appearance is shining yellow.

Affinities: This species was wrongly attributed to *M. zulu* Santschi, 1914 in COLLINGWOOD (1985), a species of similar size and colour but belonging to the *M. salomonis* group and not, as with this species, the *M. monomorium* group. *M. montanum* is similar to *M. tynsorum* Bolton, 1987 of Angola but has larger eyes.

***Monomorium najrane* n. sp.**

Monomorium subopacum. — Collingwood 1985; Fauna of Saudi Arabia 7: 272, pro parte [misidentification].

Holotype: ♀, Saudi Arabia, desert near Najran, 17°32'N 44°00'E, 10.IV.1983, C.A. Collingwood. — **Paratypes:** Saudi Arabia: ♀♀, same series as holotype; ♀♀ from: Hofuf desert area, 11.IV.1983; Al-Baix, 11.IV.1983; all C.A. Collingwood.

Measurements of holotype: TL 2.2; HL 0.57; HW 51; SL 0.54; EL/HW 0.34; range: CI 77-88; SI 93-94; EL/HW 0.31-0.36.

Description: The clypeal margin is concave; the scapes reach the occipital border. The mesopropodeal furrow is shallow but distinct. The petiole is broadly rounded in profile. There are no hairs on the alitrunk dorsum, one pair on the petiole and one pair on the postpetiole. The gaster has several dorsal hairs. The sculpture of the whole body is densely reticulopunctate giving a very dull opaque appearance. The body colour is black.

Affinities: This species resembles *M. micropacum* Bolton, 1987, but has much larger eyes.

***Monomorium niloticum* Emery, 1881 (Fig. 25)**

Monomorium niloticum Emery, 1881. — Ann. Mus. civ. Stor. nat. Giacomo Doria 16: 531.

Measurements: HW 0.80-0.88; CI 77-85; SI 100-120; EL/HW 0.285-0.32.

The head is somewhat rectangular in shape but narrowing above the eyes to the widely emarginate occiput. The rather flat mesonotum falls obliquely to the broad and deep mesopropodeal furrow. The propodeal dorsum is at a lower level than the mesonotum with the convex dorsum rounding smoothly into the descending face. The propodeal furrow is well defined with raised side margins. There are 3-4 pairs of hairs on the pronotum, 4-5 on the mesonotum, two on the propodeum, two on the petiole, three on the postpetiole and 6-7 on the first gastral tergite. The head and promesonotum have superficial sculpture with a general shining appearance; the propodeum is punctate with a transverse striate effect. Head, alitrunk and nodes are pale red with the gaster usually darker. This is the most conspicuous and abundant of the larger *Monomorium* species throughout western and central areas of Saudi Arabia, Oman and Yemen. It is not recorded from Kuwait or eastern coastal areas of Arabia and seems not to occur in desert sands away from townships, agricultural and irrigated areas. There is some variation in dorsal pilosity but the alitrunk always has several pairs of hairs.

***Monomorium nitidiventre* Emery, 1893**

Monomorium bicolor nitidiventre Emery, 1893. — Ann. Soc. ent. Fr. 62: 256.

Monomorium nitidiventre. — Collingwood 1985; Fauna of Saudi Arabia 7: 272.

Material: Saudi Arabia: ♀♀ from: Wadi Dhyan, IV.1983; Wadi Qust, 7.IV.1983; Abu Arish, 27.III.1983; all C.A. Collingwood. — Kuwait: ♀♀, Umm al-Rumam, 18.II.1988, W. Büttiker. — Yemen: ♀♀ from: Sana'a, VIII.1991; Rissabah, 8.IX.1991; all A. van Harten.

Measurements: HL 0.75-0.90; HW 0.67-0.91; SL 0.61-0.76; CI 89; SI 90.

The clypeus is widely emarginate. The propodeal furrow is exceptionally well defined with raised side margins. The alitrunk profile is flat with the mesopropodeal furrow distinct but shallow. There are no alitrunk hairs, one pair on the petiole, 1-2 pairs on the postpetiole and occasional hairs on the first gastral tergite. The head and alitrunk have dense reticulopunctate sculpture. The gaster is shining with superficial sculpture, black in whole or in part but well contrasted with the red head, alitrunk and nodes. The Arabian examples are larger than those from Greece but the two populations cannot be distinguished on morphology or colour. This species was misinterpreted and partly misidentified in COLLINGWOOD (1985).

Monomorium phoenicium Santschi, 1927

Monomorium (Xeromyrmex) subopacum var. *phoenicium* Santschi, 1927. — Bull. Ann. Soc. ent. Belg. 67: 242.

Monomorium phoenicium. — Collingwood 1985; Fauna of Saudi Arabia 7: 272.

Material: Saudi Arabia: ♀♀ from: Jeddah, 25.III.1978; Mawqaq, 4.V.1985; all W. Büttiker. — Oman: 1 ♀, Umm Qashrab, 2.VII.1986, M.D. Gallagher.

Measurements: Mean HW 0.642; CI 77.8; SI 118.7; EL/HW 0.275.

The clypeus is emarginate. The antennal scape just reaches the occipital border. The head is comparatively long with gently curved sides and a weakly emarginate occipital border. The alitrunk is high with the promesonotal dorsum curving to the shallow mesopropodeal break. The propodeum has the dorsal face rounding steeply into the declivous face. The propodeal furrow is always distinct with raised margins. There are some subcephalic hairs, one pair on the petiole, one pair on the postpetiole and a few scattered hairs on the gaster. The whole body is densely punctate. The colour varies in different populations from reddish to various shades of brown. This species resembles *M. subopacum* from the Mediterranean area but differs in the impressed propodeal furrow and the denser head sculpture.

Monomorium qarabe n. sp.

Holotype: ♀, Saudi Arabia, Qarah Village, 18°03'N 42°45'E, 16.IV.1976, W. Büttiker. — **Paratype:** 1 ♀, same series as holotype.

Measurements of holotype: TL 2.0; HL 0.51; HW 0.40; SL 0.37; CI 79; SI 92.5; EL 0.10.

Description: The head is rectangular with the clypeus emarginate. The clypeal ridges project as short blunt denticles. The mesopropodeal break is shallow; the petiole is a broadly rounded triangle. There are long hairs round the occiput and head sides. The pronotum has one pair of hairs, the mesonotum two, the propodeum one and the petiole and postpetiole each have two pairs. The whole body is smooth bright yellow with only indistinct surface sculpture. It differs from *M. montanum* n. sp. in the ring of head hairs, the lower propodeum and lower broader petiole. The specimens were taken on high ground at 2000 m.

Monomorium rimae n. sp.

Holotype: ♀, Yemen, Wadi Rima near Madinat al-Shariq, 12.III.1992, A. van Harten. — **Paratypes:** ♀♀, same series as holotype.

Measurements of holotype: TL 1.80; HL 0.44; HW 0.37; SL 0.25; CI 84.1; SI 70.2.

Description: This small species resembles *M. nuptialis* Forel, 1913 but has a much shorter scape and is distinctively bicoloured with a glossy black gaster and brown head contrasting with

the yellow alitrunk and nodes. The funiculus segments 2-9 are transverse. The clypeus is broadly emarginate with raised ridges. Scattered dorsal hairs are present on the head and alitrunk and the whole body is unsculptured except for a few punctures at the sides of the propodeum and at the shallow mesopropodeal break.

Monomorium riyadhe n. sp. (Fig. 26)

Holotype: ♀, Saudi Arabia, Riyadh Agricultural Station, 26.III.1983, C.A. Collingwood.

Measurements of holotype: TL 3.8; HL 0.97; HW 0.73; SL 0.84; EL 0.26; CI 74; SI 114; EL/HW 0.355.

Description: The general appearance is as *M. niloticum* but with fewer alitrunk hairs. One pair on the pronotum, one on the mesonotum, one on the propodeum, one on the petiole and one on the postpetiole. The main difference is in the sculpture. The whole head is striate including the sides where the striae are continuous from the mandibles to the occiput. Longitudinal striae also reappear on the propodeum but the promesonotum and the first gastral tergite have reticulo-punctate sculpture. The back of the head, descending face of the propodeum and the dorsum of the nodes are punctate. The head is comparatively long, almost rectangular and the eyes are large with 16 ommatidia in the longest row.

Monomorium robustior Forel, 1892

Monomorium gracillimum r. *robustior* Forel, 1892. — Mitt. Schweiz. ent. Ges. 8: 352.

Monomorium robustior. — Bolton 1987; Bull. Br. Mus. nat. Hist. Ent. 54: 328.

Material: Saudi Arabia: ♀♀, Wadi al-Ammariyah, XII.1977, W. Büttiker. — Oman: ♀♀, Al-Khuwayr, IX.1989, M.D. Gallagher. — Yemen: ♀♀, Wadi Surdud, 29.XII.1991, A. van Harten.

This species is similar in colour to *M. mayri* but lacks the occipital transverse striae characteristic for both *M. destructor* and *M. mayri*, has larger eyes and is less polymorphic than those species.

Monomorium salomonis (Linnaeus, 1758)

Formica salomonis Linnaeus, 1758. — Syst. Nat. ed. 10, 1: 580.

Monomorium salomonis. — Roger 1862; Berl. ent. Z. 6: 294.

This common North African species seems to be rather local outside the Mediterranean area. There are no new records for Arabia but there are a number of related species with larger eyes within the *M. areniphilum/venustum* group, that have eyes at least 0.3 times HW with 11 or more ommatidia in the longest row, a deep mesopropodeal break, an evenly concave anterior clypeal border and a total absence of dorsal alitrunk hairs. All head indices fall within the same parameters as given by BOLTON (1987) for *M. areniphilum* so these cannot be used to distinguish the two species.

Monomorium subdenticorne n. sp. (Fig. 27)

Holotype: ♀, Yemen, Al-Mahwit, 21.IX.1991, A. van Harten. — Paratypes: Yemen: ♀♀, same series as holotype; ♀♀ from: Taiz – Mafhaq, 15.III.1993; Wadi Bani, 20.III.1993; all C.A. Collingwood; ♀♀, Mabar, IV.1993, M. Knapp.

Measurements of holotype: TL 3.6; HL 0.82; HW 0.71; SL 0.75; EL/HW 0.216; CI 88; SI 106.

Description: The clypeus is broadly emarginate, the head emarginate with distinct occipital corners and broadly curved sides. The mesopropodeal break is short but deep. The propodeal dorsum is long and flat but raised posteriorly and angled so as to form two blunt, slightly projected dentiform bosses. The propodeal furrow is both broad and deep. There are no dorsal alitrunk hairs,

Material: Saudi Arabia: ♀♀ from: Wadi Dhyam, IV.1983; Wadi Qust, 7.IV.1983; Abu Arish, 27.III.1983; all C.A. Collingwood. — Kuwait: ♀♀, Umm al-Rumam, 18.II.1988, W. Büttiker. — Yemen: ♀♀ from: Sana'a, VIII.1991; Rissabah, 8.IX.1991; all A. van Harten.

Measurements: HL 0.75-0.90; HW 0.67-0.91; SL 0.61-0.76; CI 89; SI 90.

The clypeus is widely emarginate. The propodeal furrow is exceptionally well defined with raised side margins. The alitrunk profile is flat with the mesopropodeal furrow distinct but shallow. There are no alitrunk hairs, one pair on the petiole, 1-2 pairs on the postpetiole and occasional hairs on the first gastral tergite. The head and alitrunk have dense reticulopunctate sculpture. The gaster is shining with superficial sculpture, black in whole or in part but well contrasted with the red head, alitrunk and nodes. The Arabian examples are larger than those from Greece but the two populations cannot be distinguished on morphology or colour. This species was misinterpreted and partly misidentified in COLLINGWOOD (1985).

Monomorium phoenicium Santschi, 1927

Monomorium (Xeromyrmex) subopacum var. *phoenicium* Santschi, 1927. — Bull. Ann. Soc. ent. Belg. 67: 242.

Monomorium phoenicium. — Collingwood 1985; Fauna of Saudi Arabia 7: 272.

Material: Saudi Arabia: ♀♀ from: Jeddah, 25.III.1978; Mawqaq, 4.V.1985; all W. Büttiker. — Oman: 1 ♀, Umm Qashrab, 2.VII.1986, M.D. Gallagher.

Measurements: Mean HW 0.642; CI 77.8; SI 118.7; EL/HW 0.275.

The clypeus is emarginate. The antennal scape just reaches the occipital border. The head is comparatively long with gently curved sides and a weakly emarginate occipital border. The alitrunk is high with the promesonotal dorsum curving to the shallow mesopropodeal break. The propodeum has the dorsal face rounding steeply into the declivous face. The propodeal furrow is always distinct with raised margins. There are some subcephalic hairs, one pair on the petiole, one pair on the postpetiole and a few scattered hairs on the gaster. The whole body is densely punctate. The colour varies in different populations from reddish to various shades of brown. This species resembles *M. subopacum* from the Mediterranean area but differs in the impressed propodeal furrow and the denser head sculpture.

Monomorium qarabe n. sp.

Holotype: ♀, Saudi Arabia, Qarah Village, 18°03'N 42°45'E, 16.IV.1976, W. Büttiker. — **Paratype:** 1 ♀, same series as holotype.

Measurements of holotype: TL 2.0; HL 0.51; HW 0.40; SL 0.37; CI 79; SI 92.5; EL 0.10.

Description: The head is rectangular with the clypeus emarginate. The clypeal ridges project as short blunt denticles. The mesopropodeal break is shallow; the petiole is a broadly rounded triangle. There are long hairs round the occiput and head sides. The pronotum has one pair of hairs, the mesonotum two, the propodeum one and the petiole and postpetiole each have two pairs. The whole body is smooth bright yellow with only indistinct surface sculpture. It differs from *M. montanum* n. sp. in the ring of head hairs, the lower propodeum and lower broader petiole. The specimens were taken on high ground at 2000 m.

Monomorium rimae n. sp.

Holotype: ♀, Yemen, Wadi Rima near Madinat al-Shariq, 12.III.1992, A. van Harten. — **Paratypes:** ♀♀, same series as holotype.

Measurements of holotype: TL 1.80; HL 0.44; HW 0.37; SL 0.25; CI 84.1; SI 70.2.

Description: This small species resembles *M. nuptialis* Forel, 1913 but has a much shorter scape and is distinctively bicoloured with a glossy black gaster and brown head contrasting with

one pair on the petiole, one on the postpetiole and two pairs on the first gastral tergite anterior to the apical row. There are also short suberect pubescent hairs on the mesopropodeum and gaster. The head, alitrunk and nodes have dense reticulopunctate sculpture; the gaster is shining with superficial reticulate sculpture. The head, alitrunk and nodes are pale brownish red contrasting with the dark gaster.

Affinities: In general appearance this species resembles *M. nitidiventre* apart from the dentiform propodeum and duller colour and is lighter in colour and has a broader head than *M. subdentatum* Forel, 1913 from Zaire.

***Monomorium subopacum* (Smith, 1858)**

Myrmica subopacum F. Smith, 1858. — Cat. Hym. Brit. Mus. 6: 127.

Monomorium subopacum. — Mayr 1862; Verh. zool.-bot. Ges. Wien 12: 753.

Material: Oman: 1 ♀, Tibat Musandham, 24.X.1984, M.D. Gallagher. — Yemen: ♀♀, Sid el Feyhn, 10.VI.1992, M. Knapp.

Measurements: HW 0.60; CI 78; SI 105; EL/HW 0.28.

The Najran record in COLLINGWOOD (1985) should refer to *M. najrane* n. sp. as described above and this species is not known from Saudi Arabia.

***Monomorium suleyile* n. sp. (Fig. 28)**

Holotype: ♀, Saudi Arabia, Suleyil desert, 11.IV.1983, 25°40'N 45°50'E, C.A. Collingwood. — **Paratypes:** Saudi Arabia: 1 ♂, ♀♀, ♀♀ from: same series as holotype; Hofuf, 13.IV.1983; Al-Qatif, 14.IV.1983; Riyadh, 17.IV.1983; all C.A. Collingwood. — Oman: ♀♀ from: Barr al-Hickman, 12.II.1987; Jabal Maram, 27.II.1990; all M.D. Gallagher.

Measurements of holotype: TL 3.2; HL 0.84; HW 0.70; SL 0.73; EL/HW 0.25; range: CI 83-87; SI 99-110.

Description: This species is similar to *M. junodi* Forel and would key to that species in BOLTON (1987). However, worker specimens differ in the longer antennal scapes and slightly larger eyes (*M. junodi* SI 85-100; EL/HW 0.22-0.25). The mesopropodeal furrow is deeply impressed. The head and alitrunk have close punctate sculpture which is arranged linearly on the propodeum, giving a transverse striate effect. The gaster is also densely punctate and dull. The petiole is a rather high but thick triangular cone in profile with the posterior face nearly flat and the anterior face more broadly curved. The worker pilosity is somewhat variable; some examples have more than one pair of pronotal hairs and occasional shorter hairs may be present on the mesonotum and the propodeum. The alitrunk is more massive than in the other species of this group with the declivous face of the propodeum correspondingly steeper. Body colour is brown with the gaster dorsum slightly darker.

The queen (HL 1.10; HW 1.52) has the head, most of the alitrunk and gaster densely sculptured and dull. Much of the dorsal mesonotum is longitudinally striate and less densely sculptured. The head is very broad with large eyes and ocelli.

The male is black, comparatively robust and has close punctate sculpture. This species was wrongly referred to *M. afrum* André, 1884 in COLLINGWOOD (1985), a species with a very different head shape and no dorsal alitrunk hairs but of rather similar size and colour.

***Monomorium tumaire* n. sp. (Fig. 29)**

Holotype: ♀, Saudi Arabia, Wadi Tumair, 25°43'N 45°51'E, 20.II.1976, W. Büttiker. — **Paratypes:** Saudi Arabia: ♀♀, same series as holotype. — United Arab Emirates: ♀♀, Ras Ghanada, IX.1992, B. Tigar. — Oman: ♀♀, Eastern Sands, Mintirib, II.1986, W. Büttiker.

Measurements of holotype: TL 2.56; HL 0.61; HW 0.56; SL 0.56; EL/HW 0.287; range: CI 79-85; SI 100-106.

Description: Clypeus weakly emarginate; head with sides mildly curved and rounded occipital corners. Dorsal outline of alitrunk with a shallow mesopropodeal break, the mesonotum rising from the propodeum at a very gentle slope becoming flat to its junction with the pronotum. The petiole is a thick rounded triangle. The propodeal furrow is distinct and mildly margined. There are two pairs of occipital hairs, abraded in some specimens, 12-16 hairs on the ventral surface of the head, some longer than the maximum eye length. The pronotum has one pair of hairs, the petiole one pair and the postpetiole two hairs. The gaster has 12-16 suberect hairs on the first tergite. The head and alitrunk have shallow reticulopunctate sculpture becoming thinner on the nodes and gaster which are shining.

Affinities: This species is very similar to *M. wahibiense* n. sp. but is differentiated by the projecting occipital hairs and the long ventral head hairs.

***Monomorium venustum* (Smith, 1858) (Fig. 30)**

Myrmica venusta Smith, 1858. — Cat. Hym. Brit. Mus. 6: 127.

Monomorium venustum. — Roger 1863; Berl. ent. Z. 7: 32.

Material: Saudi Arabia: 1 ♀, ♀♀, Wadi Arsida, 10.IX.1982, W. Büttiker. — Kuwait: 1 ♀, ♀♀, Jal al-Zour, 6.III.1988, W. Büttiker. — Oman: ♀♀ from: Montasar, 14.IX.1982; Jabal Qara, 26.IX.1982; Rumais, 2.X.1983; all M.D. Gallagher.

Measurements: HL 0.85-1.10; HW 0.70-0.88; SL 0.75-0.95; EL/HW 0.28-0.33; CI 79-86; SI 106-118.

This evenly red species has somewhat variable sculpture with a reticulostriate head, reticulate alitrunk and nodes and more superficially reticulate gaster. The general appearance is smoother and more brightly coloured than *M. areniphilum*. The petiole is rounded in dorsal view and never wider than long. The intermediate funiculus segments are all slightly longer than wide. There are no subcephalic hairs or suberect dorsal pubescence. The petiole and postpetiole each have one pair of dorsal hairs and the first gastral tergite is bare. It is abundant in the countries of the Middle East but gives way to the many similar species to be found in Arabia.

***Monomorium wahibiense* n. sp. (Fig. 31)**

Holotype: ♀, Oman, Wahiba Sands, 6.VIII.1986, M.D. Gallagher. — **Paratypes:** Oman: ♀♀, same series as holotype. — United Arab Emirates: ♀♀, Djebel Haffere, 3-4.X.1984, H. Heatwole; ♀♀, Ras Ghanada, IX.1992, B. Tigar.

Measurements of holotype: TL 2.65; HL 0.66; HW 0.51; EL/HW 0.307; range: CI 78-86; SI 102-9.

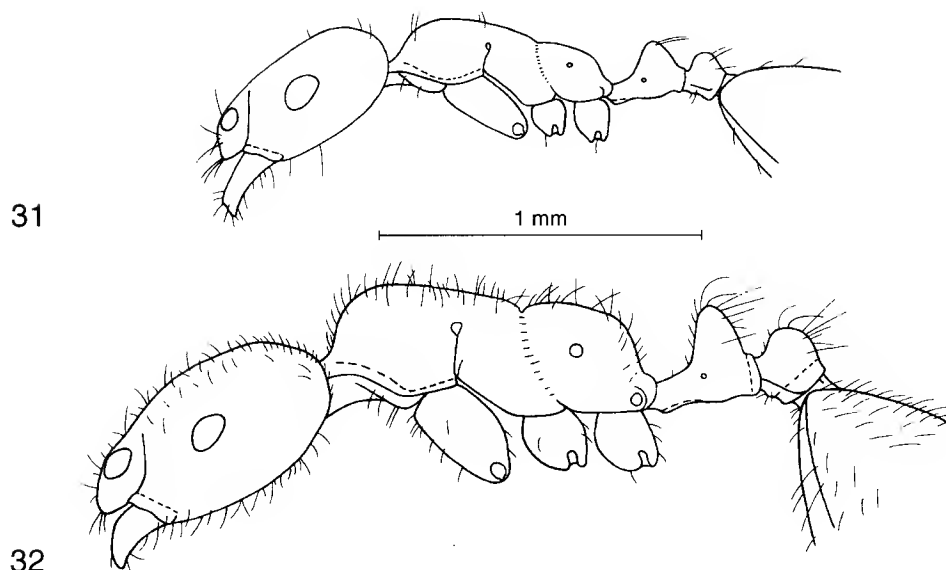
Description: The clypeal front border is straight. The head has curved sides broadening anteriorly from eye level. The alitrunk is low and flat with a shallow mesopropodeal break and the propodeal furrow is shallow without raised side margins. The alitrunk has one pair of hairs, the petiole one pair and the postpetiole two pairs. The gaster and ventral head have several hairs. The head has reticulopunctate sculpture, the alitrunk is weakly sculptured except at the sides of the mesopropodeum. The gaster is brilliant and the general aspect shining.

Affinities: *M. wahibiense* is very similar to *M. mintiribe* n. sp. but can be immediately distinguished by the less steep-sided lower petiole node. HEATWOLE (1990) found *Monomorium* ants to be the commonest component of the desert ant fauna in the United Arab Emirates sand dunes. *M. wahibiense* was the most numerous and is clearly a true desert-adapted species.

***Monomorium yemene* n. sp. (Fig. 32)**

Holotype: ♀, Yemen, Taiz, 20.X.1991, A. van Harten. — **Paratypes:** Yemen: ♀♀, same series as holotype; ♀♀, Zingibar-Shugra, 21.III.1993, C.A. Collingwood.

Measurements of holotype: TL 3.4; HL 0.87; HW 0.72; SL 0.77; CI 62.7; SI 106.9.



Figs 31-32: Head and alitrunk in profile: 31, *Monomorium wahibiense* n. sp., ♀; 32, *M. yemene* n. sp., ♀.

Description: The head is broadly rounded with the occiput emarginate. The clypeus is emarginate. The mesopropodeal furrow is deeply impressed and the propodeal dorsum rounds steeply into its declivous face. The petiole is relatively wide in dorsal view, more than a quarter times HW. Sculpture and colour are as in *M. fayfaense* n. sp.. The whole dorsum including head, alitrunk, nodes and gaster is covered with abundant pale hairs. BOLTON (1987) noted this species without naming it as being similar to *M. hirsutum* Forel, 1910 from Ethiopia but pointed out differences in the shape of the alitrunk and the presence of abundant erect pubescent hairs on all appendage surfaces including the antennae. The eyes are small, 0.19-0.20 times HW as in *M. hirsutum*, but the unusual long erect pubescence distinguishes *M. yemene* from all other species within this complex.

Genus *Solenopsis* Westwood, 1840

Key to species

- | | | |
|---|---|------------------------------------|
| 1 | Postpetiole with an anteroventral flange which appears as a tooth-like projection in profile. Body hairs numerous, on the head fringing round the occiput and genae | <i>Solenopsis omana</i> n. sp. |
| – | Postpetiole without a distinct anteroventral projection when seen in profile. Body hairs sparse, not making a continuous fringe round the head | 2 |
| 2 | Dorsal face of propodeum longer than descending face; head rectangular in dorsal view; CI 72 | <i>Solenopsis sumara</i> n. sp. |
| – | Dorsal face of propodeum about as long as or shorter than descending face; head more square, CI 78 | <i>Solenopsis zingibara</i> n. sp. |

Solenopsis omana n. sp. (Fig. 33)

Holotype: ♀, Oman, Ruwi, 15.II.1985, R. Braund. — **Paratypes:** Oman: 5 ♀♀, same series as holotype. — United Arab Emirates: 1 ♀, Suneira, 25°12'N 55°33'E, 15.IV.1991, J. Gosse.

Measurements of holotype: TL 2.0; HL 0.57; HW 0.44; SL 0.36.

Description: Eye with seven ommatidia. The centre clypeal teeth are widely spaced, short and blunt. The teeth at each side appear as very small projections. The mesopropodeal furrow is deep making an acute angle in profile. The postpetiole has an anteroventral flange or ridge that appears as a small projecting tooth in profile. The head is subrectangular in dorsal view, the CI ranging from 78.9 to 80.5. The head in profile appears narrow with a flat ventral surface. The head has scattered large punctures and the rest of the body has little or no sculpture. All surfaces are covered with long hairs which appear as a fringe surrounding the occiput and genae.

Affinities: This species differs from *S. orbula* Emery, 1875 of North Africa, Malta and Italy by the much shorter head and more abundant longer pilosity but shares with that species and another Middle Eastern species the projecting ventral flange which appears as distinct tooth on the postpetiole.

Solenopsis sumara n. sp.

Holotype: ♀, Yemen, Sumara Pass, 2500 m, 7.III.1993, C.A. Collingwood. — Paratypes: ♀♀, same series as holotype.

Measurements: TL 1.5-1.75; HL 0.55-0.68; HW 0.46-0.51; SL 0.36-0.43.

Description: Head subrectangular with incavate occiput, SI 78. Central clypeal teeth prominent, incurved and narrowly set, lateral teeth hardly visible in dorsal view. Head sculpture with wide-spaced punctures only and general aspect brilliant. Eyes very small with 2-3 ommatidia. The mesopropodeal furrow is a deep narrow cleft but the propodeum continues the line of the promesonotum and forms a gradual flat slope which is slightly longer than its descending face. The antennae and legs have long suberect pubescence, the scape hairs being slightly longer than the maximum scape width. The alitrunk and gaster have occasional long hairs and the head hairs are numerous but short. The ants were in small crowded nests under stones.

Solenopsis zingibara n. sp.

Holotype: ♀, Yemen, Wadi near Zingibar, 21.III.1993, C.A. Collingwood. — Paratypes: 7 ♀♀, same series as holotype.

Measurements: TL 1.6-2.8; HL 0.50-0.70; HW 0.40-0.61; SL 0.35-0.40.

Description: Head rather square, only slightly longer than wide with gently curved sides and weakly concave occiput. The eyes are small with only 3-4 ommatidia. Central clypeal teeth prominent, lateral teeth slightly projecting and visible in dorsal view. In the larger workers the head has six strong frontal striae and scattered coarse punctures. The alitrunk and nodes have spaced punctulate sculpture. The anterior edge of the propodeum is slightly raised at the well-marked mesopropodeal furrow. The propodeal dorsum is shorter than its descending face and obliquely rounded. The body and head pilosity is sparse. The colour is yellowish brown and the general aspect shining. Workers were taken singly in a lowland valley.

Subfamily Dolichoderinae

Key to genera

- 1 In dorsal view four gastral tergites visible; anal orifices situated ventrally *Tapinoma*
 – In dorsal view five gastral tergites visible; anal orifices situated apically *Technomyrmex*

Genus *Tapinoma* Foerster, 1850

Key to species

- 1 Size very small, TL less than 2.0; front of head with dark areas, rest of body pale
Tapinoma melanocephalum
- Larger species, TL more than 2.5; head and rest of body uniformly coloured 2
- 2 Central clypeal notch shallow, clearly wider than deep
Tapinoma sp.
- Central clypeal notch well defined, clearly deeper than wide
Tapinoma simrothi

Tapinoma melanocephalum (Fabricius, 1793)

Formica melanocephala Fabricius, 1793. — Ent. Syst. 2: 353.

Tapinoma melanocephalum. — Mayr 1862; Verh. zool.-bot. Ges. Wien 12: 651.

Material: Yemen: ♀♀, Aden Chalet, 12.XI.1988, H. Wranik.

Tapinoma simrothi Krausse, 1911

Tapinoma simrothi Krausse, 1911. — Boll. Soc. ent. Ital. 41: 18.

Material: Kuwait: ♀♀, Failaka Island, 31.III.1988, W. Büttiker; ♀♀, Wadi Umm al-Rumam, 21.II.1989, M.D. Gallagher. — Yemen: ♀♀, Al-Mahwit, 9.III.1993, C.A. Collingwood.

This common Mediterranean and Middle Eastern species occurred in the garden of a hostel at Al-Mahwit and had invaded the kitchen.

Tapinoma sp.

Material: Yemen: ♀♀, Suq Bani Mansur, 27.IV.1991, A. van Harten.

Measurements: TL 3.20; HL 0.91; HW 0.87; SL 0.91; SI 104.5.

This species has the low profile, colour, general appearance and size of *T. simrothi* but the central clypeal notch is shallow.

Genus *Technomyrmex* Mayr, 1872

Key to species

- 1 Body colour yellowish brown or bicoloured 2
- Body colour evenly greyish or black 4
- 2 Bicoloured ants; TL 2.7-2.9; dorsum with scattered suberect hairs
Technomyrmex setosus
- Pale yellowish-brown ants; TL 2.50 or less; dorsum of alitrunk bare 3
- 3 Front tibiae and femora enlarged; smaller species, TL 1.75; antennal scapes do not reach the occipital margin
Technomyrmex sp. A
- Front tibiae not enlarged; TL 2.2-2.5; antennal scapes long, over-reaching the occipital margin, SI 125
Technomyrmex sp. B
- 4 Legs and antennae entirely pale grey, body colour dark grey
Technomyrmex bruneipes
- Legs, antennae and body dark brownish black except for tarsi and funiculi which are pale
Technomyrmex albipes

Technomyrmex bruneipes Forel, 1895 n. stat.*Technomyrmex albipes* var. *bruneipes* Forel, 1895. — J. Bombay Nat. Hist. Soc. 9: 466.

Material: Yemen: ♀♀ from: Sana'a, II.1991; Al-Mahwit, 7.VI.1991; Hammam Ali, 5.VIII.1991; Al-Hajjarah, 14.III.1992; all A. van Harten.

Measurements: TL 2.5-2.8; HL 0.56-0.59; SL 0.52-0.53; EL 0.19.

The legs and antennae are entirely pale grey contrasting with the dark brown body. The head and alitrunk are coarsely reticulopunctate, the gaster moderately shining. This appears to be quite a common species in Yemen. *T. bruneipes* was described and recorded from India and possibly occurs in Africa and could well be a successful tramp species like the similar *T. albipes* Smith, 1861.

Technomyrmex setosus Collingwood, 1985*Technomyrmex setosus* Collingwood, 1985. — Fauna of Saudi Arabia 7: 243.

Material: Saudi Arabia: ♀♀ from: Jebel Beles, 1.IX.1984; Al-Farah, 9.VIII.1983; Harithi, 11.IV.1984; all W. Büttiker. — Yemen: ♀♀, Al-Hajjarah, 14.III.1992, A. van Harten.

Technomyrmex sp. B (in COLLINGWOOD 1985)

Material: Oman: ♀♀ from: Bani Sur, 7.III.1984; Eastern Sands, III.1986; all W. Büttiker. — Yemen: ♀♀, near Mafhaq, 14.III.1992, A. van Harten.

Measurements: TL 2.2-2.4; HL 0.54-0.65; HW 0.52-0.56; SL 0.62-0.70; EL 0.18-0.19; SI 119-125.

This species as described in COLLINGWOOD (1985) has exceptionally long antennae and large eyes.

Subfamily Formicinae

Key to genera

- | | | |
|---|---|---------------------|
| 1 | Antennae with 12 segments | 2 |
| – | Antennae with 11 segments | 5 |
| 2 | Antennal insertions distant from clypeal margin | 3 |
| – | Antennal insertions close to or contiguous with clypeal margin | 4 |
| 3 | Petiole with spines or teeth; pronotum bidentate | <i>Polyrhachis</i> |
| – | Petiole entire or emarginate, never dentate; pronotum without projecting teeth | <i>Camponotus</i> |
| 4 | Ocelli present and distinct; head with long curved hairs on anteroventral surface; dorsum of propodeum with erect hairs | <i>Cataglyphis</i> |
| – | Ocelli vestigial or absent; ventral head with short hairs only; dorsum of propodeum without erect hairs | <i>Paratrechina</i> |
| 5 | Propodeum bituberculate or bidentate; petiole emarginate and usually bidentate | <i>Lepisiota</i> |
| – | Propodeum unarmed; petiole never emarginate | 6 |
| 6 | In dorsal view metanotum separated from mesonotum by impressed suture | <i>Plagiolepis</i> |
| – | Metanotum not distinguished by sutures; mesopropodeal furrow rounded and shallow | <i>Anoplolepis</i> |

Genus *Plagiolepis* Mayr, 1861

Key to species

- | | | |
|---|---|-------------------------------|
| 1 | Size very small, TL less than 1.3; yellow to yellowish-brown ants | 2 |
| – | Size larger, TL 1.5-2.2; body colour pale brown to dark brown | 3 |
| 2 | Yellowish-brown ants | <i>Plagiolepis abyssinica</i> |
| – | Bright yellow ants | <i>Plagiolepis exigua</i> |
| 3 | Second and third funiculus segments subequal, broader than long, each much shorter than the fourth | <i>Plagiolepis pygmaea</i> |
| – | Third funiculus segment longer than second. | 4 |
| 4 | Third and fourth funiculus segments subequal, longer than broad; pubescence on appendages prominent | <i>Plagiolepis schmitzii</i> |
| – | Third funiculus segment quadrate, slightly shorter than fourth; pubescence sparse | <i>Plagiolepis maura</i> |

Plagiolepis exigua Forel, 1894

Plagiolepis exigua Forel, 1894. — J. Bombay Nat. Hist. Soc. 8: 415.

Material: Yemen: ♀♀ from: Taiz, 20.X.1991; Aden, 18.XII.1991; all A. van Harten; ♀♀ from: near Al-Mahwit, 10.III.1993; Taiz – Al-Turbah, 14.III.1993; all C.A. Collingwood.

This very small yellow ant was taken by sweeping and from the ground. The very slightly larger darker ant recorded as *P. abyssinica* in COLLINGWOOD (1985) was taken in rotten wood. *P. exigua* is almost a cosmopolitan species frequently being found in hot houses in Europe.

Plagiolepis maura Santschi, 1920

Plagiolepis maura Santschi, 1920. — Bull. Soc. Vaud. Sci. nat. 53: 169.

Material: Oman: ♀♀, Ain Hamran, Dhofar, 15.XII.1984, M.D. Gallagher. — Yemen: ♀♀ from: Sana'a, IX.1991; Al-Mahwit, 16.III.1992; Al-Tawilan – Al-Mahwit, 16.III.1992; all A. van Harten; ♀♀, Al-Kowd, II.1993, M. Knapp.

Genus *Anoplolepis* Santschi, 1914

Key to species

- | | | |
|---|---|---------------------------------------|
| 1 | Minute brown ants, TL 1.4 | <i>Anoplolepis tumidula</i> |
| – | Larger darker ants, TL 2.3-2.5 with exceptionally long pale tarsi | <i>Anoplolepis longitarsis</i> n. sp. |

Anoplolepis longitarsis n. sp.

Holotype: ♀, Suq al-Ahad, 26.III.1983, C.A. Collingwood. — Paratypes: Yemen: ♀♀ from: Bajil-Zabid, 15.III.1993; Bajil-Khamis Bani Sad, 16.III.1993; A. van Harten, C.A. Collingwood.

Measurements of holotype: TL 2.35; HL 0.65; HW 0.55; SL 0.60; EL 0.23; hind femur 0.85; hind tibia 0.86; hind tarsus 1.00.

Description: Antennae with 11 segments, the first funiculus segment nearly equal to the second plus third. All funiculus segments elongate. The laid back scape over-reaches the occipital margin by about the length of the first funiculus segment. The hind tarsi are long, the segments together being longer than either the tibia or the femur. The propodeal spiracle is large and

prominent. The petiole is an upright scale. The alitrunk dorsal profile is flat with the outline interrupted by the shallow mesopropodeal furrow. The maxillary palps are longer than the head. The body colour is uniformly brown with the legs becoming paler towards the tibiae and tarsi, the latter being yellowish. The body, legs and antennae are clothed with short adpressed pubescence. Several workers were taken by sweeping low herbage in Yemen but always singly and not in groups. Workers were often seen on the foliage of Leguminosae. Nests were not found.

Affinities: This genus includes several African species but the large eyes and exceptionally long tarsi seem to be unique to this small, narrow-bodied species.

Anoplolepis tumidula (Emery, 1915)

Plagiolepis (*Anoplolepis*) *tumidula* Emery, 1915. — Boll. Lab. Zool. gen. agr. R. Scuola sup. Agric., Portici 10: 19.

Anoplolepis (*Tapinolepis*) *tumidula*. — Emery 1925; Gen. Ins. 183: 18.

Genus *Lepisiota* Santschi, 1926

This genus has been known as *Acantholepis* Mayr, 1861 for about 130 years but this name is a junior homonym of *Acantholepis* Kraye, 1846. *Lepisiota* Santschi, 1926 is the first available replacement name (BOLTON 1994). The new combination was then designated by Bolton one year later in the new catalogue of the ants of the world (BOLTON 1995: 226-229).

Key to species

- | | | |
|---|--|---------------------------------|
| 1 | Antennal scape long, over-reaching the occipital margin by half its length or more; SI 150-205 | 2 |
| – | Antennal scape shorter, over-reaching the occipital margin by a third of its length or less; SI 105-138 | 16 |
| 2 | Dorsum of alitrunk and gaster without any standing hairs; antennal scapes exceptionally long; SI 200-205 | <i>Lepisiota riyadha</i> n. sp. |
| – | Dorsum of alitrunk with at least one or two pairs of long hairs on the pronotum; gaster always with some projecting hairs; SI 200 or less. | 3 |
| 3 | Bicoloured ants; alitrunk paler than gaster, mainly or entirely reddish. | 4 |
| – | Whole body dark except a small area of the mesonotum more or less reddish in a few species | 9 |
| 4 | Alitrunk with whole dorsum clothed with blunt black hairs | <i>Lepisiota arabica</i> |
| – | Alitrunk with one, two or three pairs of fine hairs on the pronotum | 5 |
| 5 | Body sculpture coarse, general appearance opaque | 6 |
| – | All parts of the body shining with superficial reticulate sculpture at most | 7 |
| 6 | Petiole wide, at least 0.33 times HW; head densely sculptured and dull | <i>Lepisiota sericea</i> |
| – | Petiole narrower, less than 0.30 times HW; vertex of head moderately shining | <i>Lepisiota bipartita</i> |
| 7 | Head and alitrunk clear red; propodeum armed with long curved spines | <i>Lepisiota arenaria</i> |
| – | Head darker than alitrunk; propodeum simply dentate or armed with short straight spines | 8 |

8	Legs and antennae clear yellow; propodeal and petiole spines sharp	<i>Lepisiota dammama</i> n. sp.	
–	Legs and antennae dark; propodeum bluntly dentate	<i>Lepisiota dolabellae</i>	
9	Alitrunk sculptured without lustre		10
–	Alitrunk with or without sculpture but always at least moderately shining, in some species brilliant		11
10	Head and alitrunk densely sculptured and completely opaque; propodeal spines long and curved	<i>Lepisiota dhofara</i> n. sp.	
–	Head and alitrunk sculptured but details of sculpture easily seen at low magnification and head with some shine; propodeal armature short and blunt	<i>Lepisiota karawajewi</i>	
11	Whole body entirely black, brilliant or with slight reticulate sculpture at most		12
–	Alitrunk often or usually with small area of mesonotum reddish; head and alitrunk distinctly sculptured, shining but not brilliant		15
12	Propodeal and petiole armature both well developed with long curved spines; antennal scapes long, SI 165-200		13
–	Propodeal spines short and straight, petiole dorsum narrow and rounded with reduced armature; antennal scapes shorter, SI 150-155	<i>Lepisiota nigra</i>	
13	Propodeum and first gastral tergite with some fine surface sculpture; SI 195-200	<i>Lepisiota opaciventris</i>	
–	Whole body brilliant; SI 165-195		14
14	Propodeal spines excessively developed, more than 0.12 mm long and distinctly curved; SI 165-170	<i>Lepisiota spinisquama</i>	
–	Propodeal spines shorter, less than 0.10 mm long, moderately curved; SI 175-195	<i>Lepisiota gracilicornis</i>	
15	Petiole distinctly dentate	<i>Lepisiota frauenfeldi</i>	
–	Petiole dorsum feebly incavate or narrowly rounded without teeth	<i>Lepisiota nigrescens</i>	
16	Head and gaster smooth and shining with faint sculpture at most		17
–	Head and gaster distinctly sculptured		19
17	Whole body dorsum covered with blunt black hairs	<i>Lepisiota validiuscula</i>	
–	Alitrunk with pale thin hairs		18
18	Alitrunk hairs restricted to pronotum	<i>Lepisiota simplex</i>	
–	Whole alitrunk dorsum covered with long pale hairs	<i>Lepisiota canescens</i>	
19	Whole alitrunk dorsum covered with long pale hairs	<i>Lepisiota obtusa</i>	
–	Hairs on alitrunk dorsum restricted to pronotum or none		20
20	Petiole angles produced into long spines		21
–	Petiole dorsum flat, emarginate or dentate at most		22
21	Petiole spines longer than their intervening width	<i>Lepisiota incisa</i>	
–	Petiole spines shorter than their intervening width	<i>Lepisiota carbonaria</i>	
22	Petiole dentate; coarse dorsal sculpture not obscuring cuticular shine	<i>Lepisiota depilis</i>	
–	Petiole with shallow emargination or with dorsum flat or simply rounded; whole body dull without shine		23
23	Alitrunk red, contrasting with dense black gaster; propodeum dentate; pronotum with one or two pairs of hairs	<i>Lepisiota barteni</i> n. sp.	

- Whole body dark; propodeum with blunt projections only, not dentate; alitrunk entirely without dorsal hairs
Lepisiota erythraea

Lepisiota arenaria (Arnold, 1920)

Acantholepis arenaria Arnold, 1920. — Ann. S. Afr. Mus. 14: 560.

Material: Oman: ♀♀ from: Jabal Qarn, 27.IX.1984; Wadi Rawnab, 1.X.1984; all M.D. Gallagher.

Measurements: HW 0.68-0.69; SI 167-176.

This elegant red species was misidentified as *Acantholepis longinoda* Arnold, 1920 from Wahiba Sands in COLLINGWOOD (1985). The two species have similar morphological characteristics but *L. longinoda* is more sculptured.

Lepisiota bipartita (F. Smith, 1861)

Formica bipartita F. Smith, 1861. — J. Proc. Linn. Soc. Lond. 6: 33.

Acantholepis bipartita. — Roger 1863; Verz. Formicid.: 11.

Material: Saudi Arabia: ♀♀, Jeddah, 2.VI.1977, W. Büttiker.

Measurements: HW 0.55-0.65; SI 163-180.

This bicoloured species is common in the Middle Eastern countries.

Lepisiota canescens (Emery, 1897)

Acantholepis capensis canescens Emery, 1897. — Ann. Mus. civ. Stor. nat. Giacomo Doria 38: 601.

Acantholepis canescens. — Bernard & Cagniant 1962; Bull. Soc. ent. Fr. 67: 163.

Material: Oman: ♀♀ from: Jabal Samhan, Muscat, 25.IV.1984; Dhe Ayrib 25.IV.1984; all J. Darlington. — Yemen: ♀♀, Hammam Ali, 5.VIII.1991, A. van Harten.

Measurements: HW 0.60-0.61; SI 108-121.

Lepisiota carbonaria (Emery, 1892)

Acantholepis carbonaria Emery, 1892. — Ann. Mus. civ. Stor. nat. Giacomo Doria 32: 119.

Material: Oman: ♀♀, Wadi Shuwayiyah, 27.XII.1982, M.D. Gallagher. — Yemen: ♀♀ from: Rissabah, 8.X.1991; Taiz, 20.X.1991; beach E of Aden, 18.XII.1991; all A. van Harten; ♀♀, Ma'agala, 22.II.1992, M. Mahyoub; ♀♀, Aden Chalet, 10.X.1988, H. Wranik; ♀♀, Madinat al-Shariq, 7.III.1993, C.A. Collingwood.

Measurements: HW 0.60-0.61, SI 116.

Lepisiota dammama n. sp.

Holotype: ♀, Saudi Arabia, Dammam, 26°24'N 50°11'E, 5.I.1979, W. Büttiker. — Paratypes: Saudi Arabia: ♀♀, same series as holotype; ♀♀ from: Jebel Maniq, 5.I.1979; Wadi Awsat, 31.XII.1976; all W. Büttiker.

Measurements of holotype: HW 0.61; SL 0.95; EL 0.23; SI 153; EL/HW 0.37.

Description: This is a large-eyed, shining bicoloured species with sharp pointed propodeal and petiole spines, pale antennae and legs. The head is brilliant black, the gaster brownish and the alitrunk confusedly coloured with pale red and dark areas.

Affinities: It is distinguished from *L. frauenfeldi* by the sharper spines, more shining appearance and much paler colour.

Lepisiota depilis (Emery, 1897)

Acantholepis capensis depilis Emery, 1897. — Ann. Mus. civ. Stor. nat. Giacomo Doria 38: 602.

Acantholepis depilis. — Collingwood 1985; Fauna of Saudi Arabia 7: 294.

Material: Oman: ♀♀, Marhbat, 19.IX.1984, M.D. Gallagher.

Measurements: HW 0.62; SI 112-113.

Lepisiota dhofara n. sp.

Holotype: ♀, Oman, Jabal Qara, 18.X.1984, J. Darlington.

Measurements of holotype: HW 0.60; SL 1.05; SI 175.

Description: This is a very densely sculptured opaque species entirely without surface shine on the head or alitrunk. The propodeal spines are long and curved but the petiole teeth are shorter than their intervening space. The dull appearance is due to the close microsculpture, not to pubescence which is sparse.

Lepisiota erythraea (Forel, 1910)

Acantholepis carbonaria var. *erythraea* Forel, 1910. — Zool. Jb. Abt. Syst. 29: 265.

Acantholepis erythraea. — Collingwood 1985; Fauna of Saudi Arabia 7: 294.

Material: Yemen: ♀♀, Sana'a, VII.1992, A. van Harten; ♀♀, Taiz – Mafhaq, 15.III.1993, C.A. Collingwood.

Measurements: HW 0.57-0.58, SI 107.

Lepisiota gracilicornis (Forel, 1892)

Acantholepis gracilicornis Forel, 1892. — Ann. Soc. ent. Belg. 36: 42.

Material: Oman: ♀♀ from: Wadi Himna, 14.II.1984; Wadi Sayq, 12.III.1985; Mintirib, XII.1985; Al-Khuwaymah, 19.VII.1986; all M.D. Gallagher; ♀♀, Khasab, Musandham, 15.I.1984, R. Braund. — Yemen: ♀♀ from: Sana'a, V.1991; Hammam Ali, 5.VIII.1991; all A. van Harten; ♀♀ from: Wadi Wazanan, 14.III.1993; Wadi Bani, 20.III.1993; all C.A. Collingwood.

Measurements: HW 0.64-0.65; SI 178-183.

Lepisiota harteni n. sp. (Fig. 34)

Holotype: ♀, Yemen, Hammam Ali, 16.II.1992, A. van Harten. — Paratypes: 9 ♀♀, same series as holotype.

Measurements of holotype: TL 2.80; HL 0.61; HW 0.57; SL 0.70; EL 0.17.

Description: This is a rather small, sculptured species with a reddish alitrunk. The whole body including the gaster has close punctulate sculpture. The propodeal spines are short and broad-based. The petiole is truncate without lateral teeth and a very shallow emargination. The gaster has relatively dense decumbent pubescence. There is no raised pubescence on the legs or antennae. There is one pair of hairs on the pronotum. The head is fringed with short suberect pubescence.

Affinities: This species corresponds with *L. frauenfeldi* var. *truncata* (Santschi, 1927) but according to Santschi (loc. cit.) *L. f.* var. *truncata* is a small version of *L. velox* (Baroni Urbani, 1968), a moderately shining species whereas *L. harteni* is entirely dull with a much more pubescent gaster.

Lepisiota incisa (Forel, 1913)

Acantholepis capensis r. *incisa* Forel, 1913. — Rev. Zool. Afr. 2: 338.

Acantholepis incisa. — Collingwood 1985; Fauna of Saudi Arabia 7: 295.

Material: Yemen: ♀♀ from: Al-Mahwit, 29.IV.1991; Wadi Surdud, 27.XII.1991; all A. van Harten; ♀♀, Aden Chalet, 18.X.1988, H. Wranik; ♀♀, Madinat al-Shariq, 7.III.1993, C.A. Collingwood.

Measurements: HW 0.56-0.57; SI 105-107.

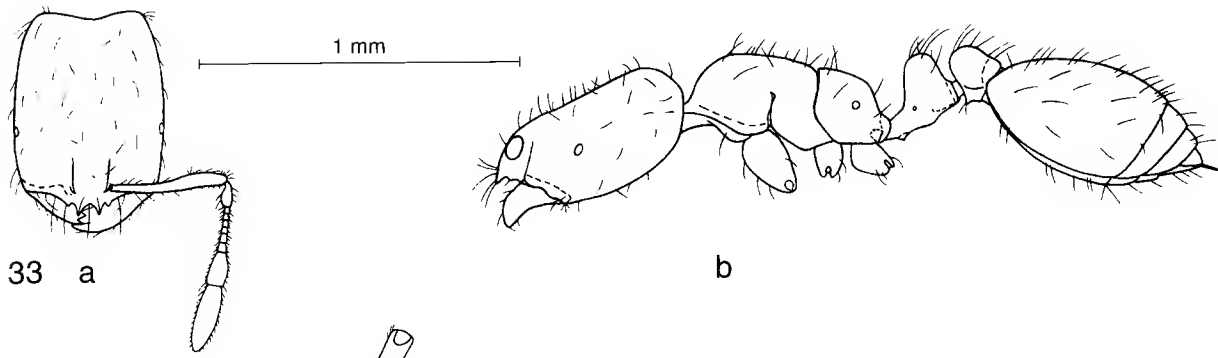
Lepisiota karawajewi (Agosti & Collingwood, 1987)

Acantholepis karawajewi Agosti & Collingwood, 1987. — Mitt. Schweiz. ent. Ges. 60: 57.

Material: Kuwait: ♀♀, Jebel an-Nir, 5.II.1988, W. Büttiker.

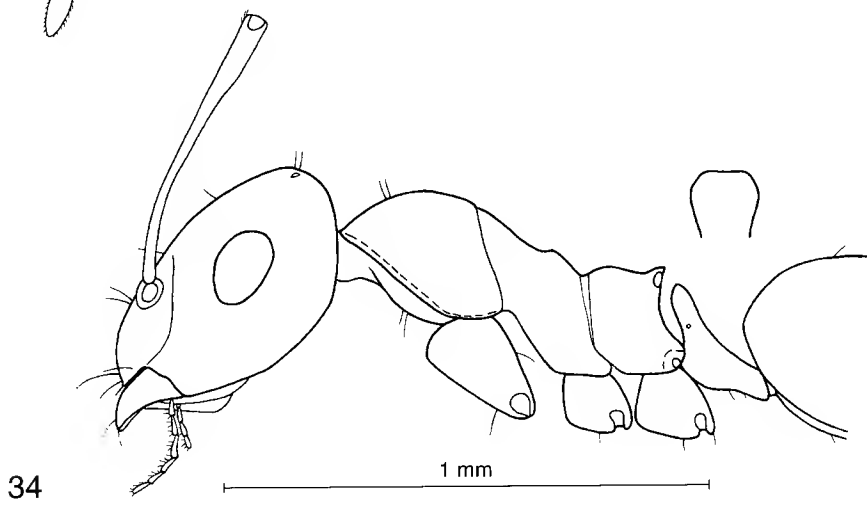
Measurements: HW 0.56-0.65; SI 152-166.

This is a dull-sculptured species, common in the southern Greek Islands.

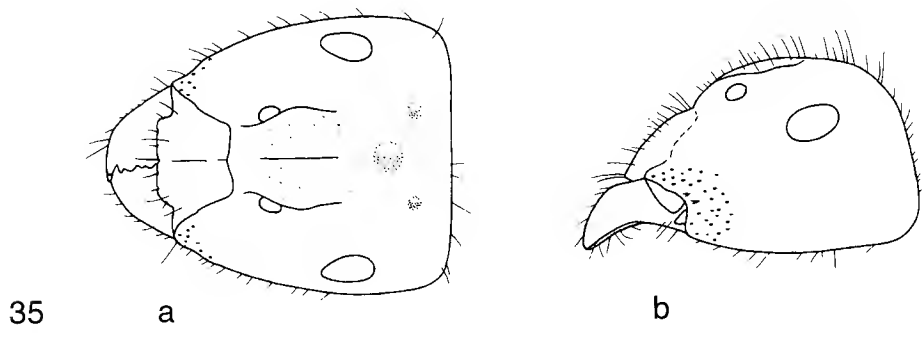


33 a

b

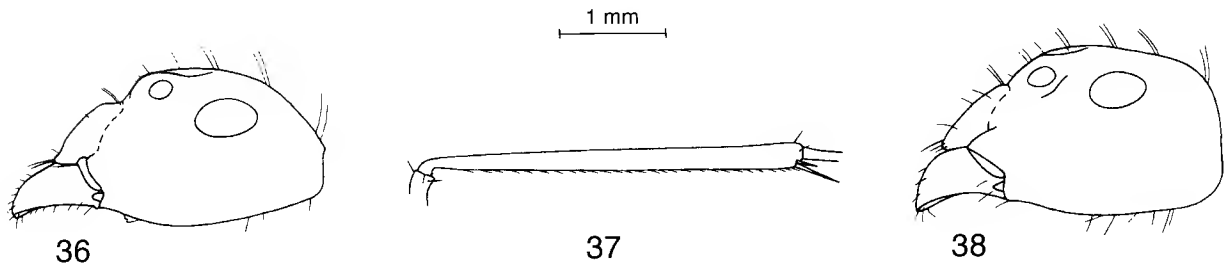


34



35 a

b



36

37

38

Figs 33-38: 33, *Solenopsis omana* n. sp., ♀, a, head and alitrunk in profile; b, head in dorsal view; 34, *Lepisiota harteni* n. sp., ♀, head and alitrunk in profile; 35, *Camponotus carbo*, ♀, a, head in dorsal view; b, head in profile; 36, *C. fellah*, ♀, head in profile; 37, *C. gallagheri* n. sp., ♀, hind femur and tibia; 38, *C. somalinus*, ♀, head in profile.

Lepisiota nigra (Dalla Torre, 1893)

Acantholepis frauenfeldi var. *nigra* Dalla Torre, 1893. — Cat. Hym. 7: 171.

Acantholepis frauenfeldi var. *nigra* Emery, 1893. — Boll. Soc. ent. Ital. 47: 221.

Acantholepis nigra Emery. — Agosti & Collingwood 1987; Mitt. Schweiz. ent. Ges. 60: 57.

Material: Oman: ♀♀, Qurm Creek, 6.XI.1987, M.D. Gallagher.

Measurements: HW 0.63-0.64, SI 150-165.

This is a black shining ant, similar to *L. gracilicornis* in body shine but morphologically closer to *L. frauenfeldi*. It is a local south east European species.

Lepisiota nigrescens (Karawaiew, 1912)

Acantholepis frauenfeldi var. *nigrescens* Karawaiew, 1912. — Russk. ent. Obozr. 12 15.

Acantholepis nigrescens. — Collingwood 1985; Fauna of Saudi Arabia 7: 295.

Material: Saudi Arabia: ♀♀, Wadi Mizbil, 14.IV.1977, W. Büttiker. — United Arab Emirates: ♀♀, Ras Ghanada, IX.1992, B. Tigar. — Yemen: ♀♀, Sumara Pass, 13.III.1993, C.A. Collingwood.

Measurements: HW 0.62; SI 166-167.

Lepisiota obtusa (Emery, 1901)

Acantholepis carbonaria var. *obtusa* Emery, 1901. — Boll. Soc. ent. Ital. 33: 63.

Acantholepis obtusa. — Collingwood 1985; Fauna of Saudi Arabia 7: 296.

Material: Oman: ♀♀ from: Wadi Khawr, 18.I.1983; Wadi Halq, 26.IX.1984; all M.D. Gallagher. — Yemen: ♀♀, Sadah, 13.VIII.1991, A. van Harten; ♀♀ from: Qa al-Boun, X.1991; Shabwah, 21.III.1992; Jeyun, 30.III.1992; all M. Knapp; ♀♀, Al-Mahwit, 10.III.1993, C.A. Collingwood.

Measurements: HW 0.61-0.62; SI 116-118.

Lepisiota opaciventris (Finzi, 1936)

Acantholepis frauenfeldi var. *opaciventris* Finzi, 1936. — Sber. Akad. Wiss. Wien math.-naturw. Kl. 139: 23.

Acantholepis opaciventris. — Collingwood 1985; Fauna of Saudi Arabia 7: 295.

Material: Yemen: ♀♀ from: Al-Mahwit, 7.VI.1991; Wadi Surdud, 29.XII.1991; Hammam Ali, 16.II.1992; Madinat al-Shariq, 12.III.1992; all A. van Harten; ♀♀, Bajil Zabid, 15.III.1993, C.A. Collingwood.

Measurements: HW 0.60-0.70; SI 197-200.

Lepisiota riyadha n. sp.

Holotype: ♀, Saudi Arabia, Riyadh Agricultural Station, 27.III.1983, C.A. Collingwood. — Paratypes: 5 ♀♀, same series as holotype.

Measurements of holotype: HW 0.50; SL 1.01; range: HW 0.47-0.63; SL 1.00-1.25.

Description: The colour and body size is as in *L. frauenfeldi* (Mayr, 1855) but the antennal scapes are much longer, SI 199-205. There are no erect hairs on the alitrunk. The petiole spines are well developed but not so long relatively as in *L. gracilicornis* and *L. opaciventris*, the other long-scaped species.

Lepisiota sericea (Forel, 1892)

Acantholepis frauenfeldi var. *sericea* Forel, 1892. — Ann. Soc. ent. Belg. 36: 41.

Lepisiota sericea. — Pisarski 1967; Ann. Zool. 24: 408.

Material: Oman: 1 ♀, Rumais, Muscat, 24.XI.1983, M.D. Gallagher; 1 ♀, Wattayah, 22.XI.1983, W. Büttiker.

Measurements: HW 0.63; SI 158.

This is a dull sculptured species also characterised by its wide simply-angled petiole about 0.3 times HW. The alitrunk is reddish. It is recorded from the Indian subcontinent.

Lepisiota spinisquama (Kuznetsov-Ugamsky, 1929)

Acantholepis frauenfeldi var. *spinisquama* Kuznetsov-Ugamsky, 1929. — Zool. Anz. 82: 480.

Acantholepis spinisquama. — Pisarski 1967; Ann. zool. Warsz. 24 (6): 410.

Material: Oman: ♀♀ from: Madinat Qaboos, 5.XI.1983; Jabal Akhdar, 24.II.1984; Qarn al-Alam, 14.V.1984; Rima Oil Camp, IX.1984; Khawr Niad, 25.X.1984; all M.D. Gallagher. — Socotra: ♀♀, Hadibo, Muomi, Nogeed, Mouri, 14-17.IV.1993, A. van Harten.

Measurements: HW 0.65-0.71; SI 169-171.

This species has exceptionally long curved spines and is apparently common on the island of Socotra. Elsewhere it is recorded from Turkestan and Afghanistan and is also evidently well established in parts of Oman.

Lepisiota validiuscula (Emery, 1897)

Acantholepis capensis var. *validiuscula* Emery, 1897. — Ann. Mus. civ. Stor. nat. Genova 18: 602.

Material: Yemen: ♀♀ from: Sana'a, many collections I.1991-X.1991; Al-Mahwit, 21.IX.1981; Amran, 11.II.1992; Hammam Ali, 16.II.1992; all A. van Harten.

Measurements: HW 0.59-0.63; SI 125-135.

This seems to be a very abundant species in western Yemen, easily distinguished from *L. canescens* by the stout black dorsal hairs. It is recorded from East and South Africa but has not yet been found in Arabia outside Yemen.

Lepisiota sp.

Material: Oman: 1 ♀, Mintirib, 8.II.1986, W. Büttiker.

This has the pale brownish-yellow colour of *L. fergusonii* (Forel, 1895) from India but the only available specimen is too damaged for a formal description or identification.

Genus *Paratrechina* Motschulsky, 1863

Key to species

- | | | | |
|---|--|------------------------------------|---|
| 1 | Antennal scapes very long, extending as far as the mesonotum; the scapes and tibiae have no suberect hairs | <i>Paratrechina longicornis</i> | |
| – | Antennal scapes and legs shorter, always with some suberect hairs. | | 2 |
| 2 | Gaster covered with thick pubescence | <i>Paratrechina jaegerskioeldi</i> | |
| – | Body pubescence sparse | <i>Paratrechina flavipes</i> | |

Paratrechina flavipes (Smith, 1874)

Tapinoma flavipes Smith, 1874. — Trans. Ent. Soc. London 1874: 404.

Paratrechina flavipes. — Emery 1925; Gen. Ins. 183: 420.

Material: United Arab Emirates: 1 ♂, 1 ♀, ♀♀ from: Juneira, 15.IV.1991; Kalba, 30.III.1991; all C. Gosse. — Oman: 1 ♀, Hawiyah, 18.VII.1986, M.D. Gallagher; 1 ♀, Mintirib, III.1986, W. Büttiker.

This yellowish species, like *P. jaegerskioeldi*, is tending to become distributed widely through the temperate regions of the world. It is native to Japan and Korea but there are now many records in the west and from plant houses.

Paratrechina jaegerskioeldi (Mayr, 1904)

Prenolepis jaegerskioeldi Mayr, 1904. — in Jägerskjöld: Res. Swed. Zool. Exp. Egypt White Nile 1: 8.

Paratrechina jaegerskioeldi. — Emery 1925; Gen. Ins. 183: 218.

Material: Yemen: ♀♀ from: Sana'a, IX.1991; Taiz, 20.I.1991; Aden, 18.XII.1991; all A. van Harten.

This is a more localised tramp species that is abundant in many parts of the Middle East. Several collections of this ant have been sent by M.D. Gallagher from domestic and other premises around Muscat in Oman and there are new records.

Paratrechina longicornis (Latreille, 1802)

Formica longicornis Latreille, 1802. — Fourmis: 112.

Paratrechina longicornis. — Emery 1925; Gen. Ins. 183: 217.

Material: Yemen: ♀♀ from: Aden; Zingibar; all H. Wranik; ♀♀ from: Aden; Mabar; Al-Mahwit; all A. van Harten.

There are many locations in the western areas of Yemen for this common tramp species. It flourishes in the humid semi-shade of banana plantations.

Genus *Camponotus* Mayr, 1861

This is a large genus with 25 species now known from Arabia.

Key to species

- | | | |
|----|---|-----------------------------------|
| 1 | Dorsum of alitrunk interrupted by a deep mesopropodeal furrow | 2 |
| – | Dorsal outline of alitrunk a more or less continuous curve | 4 |
| 2 | Whole body densely sculptured, hairy and opaque; propodeum broadly dentate | |
| | <i>Camponotus sericeus</i> | |
| – | Body weakly sculptured; propodeum obtusely rounded | 3 |
| 3 | Gaster testaceous, paler than brown alitrunk | <i>Camponotus fayfaensis</i> |
| – | Gaster dark, unicolorous with alitrunk | <i>Camponotus ilgii</i> |
| 4 | Gaster dull with close patterned pubescence | 5 |
| – | Gaster more or less shining with sparse pubescence | 6 |
| 5 | Gaster with thick silvery pubescence with a distinct longitudinal pattern at each side of the dorsum; genae uniformly dark | <i>Camponotus flavomarginatus</i> |
| – | Gaster with thinner pubescence with dorsal pattern appearing as a single median band; genae reddish immediately above the mandible insertions | |
| | <i>Camponotus jizani</i> | |
| 6 | Gaster with a distinct pattern of yellow blotches along the sides of the first two tergites | 7 |
| – | Gaster either uniformly dark or with front part of the first tergite pale | 8 |
| 7 | Yellow patches on gaster appear as a row of two or three discrete spots; subcephalic hairs numerous | <i>Camponotus maculatus</i> |
| – | Blotches at sides of gaster merge into each other; subcephalic hairs present but not numerous | <i>Camponotus aegyptiacus</i> |
| 8 | Body colour uniformly dark | 9 |
| – | At least lower part of alitrunk and petiole pale | 15 |
| 9 | Head with front part with large scattered pits; genae with projecting hairs | 10 |
| – | Head with occasional fine punctures, not pits; genae not fringed with projecting hairs | 11 |
| 10 | Whole of head including occiput fringed with short hairs; antennae broadening to apex | <i>Camponotus carbo</i> |
| – | Projecting hairs at sides of head restricted to lower part below eyes; antennae not markedly broadening to apex | <i>Camponotus foraminosus</i> |

11	Subcephalic hairs sparse; legs yellow	<i>Camponotus adenensis</i>	
–	Subcephalic hairs numerous; legs pale brown		12
12	Gaster without pubescence, whole body shining	<i>Camponotus thales</i>	
–	Gaster with sparse pubescence, head and alitrunk sculptured and dull		13
13	Occiput viewed in full face with at least one projecting hair at each corner	<i>Camponotus acvapimensis</i>	
–	Occiput bare or with projecting hairs restricted to median area		14
14	Hind tibiae channelled with a few spiny hairs on flexor surface	<i>Camponotus empedocles</i>	
–	Hind tibiae not channelled and with a few subdecumbent hairs only	<i>Camponotus kersteni</i>	
15	Hind tibiae with a row of six or more spiny hairs on flexor surface		16
–	Hind tibiae with fine and subdecumbent hairs only		22
16	At least some subcephalic hairs present on the posteroventral head		17
–	Underside of head bare without projecting hairs except close to the mandibles		20
17	Large workers with whole alitrunk dorsum and head black		18
–	All workers with alitrunk predominantly pale		19
18	Subcephalic hairs numerous	<i>Camponotus somalinus</i>	
–	Subcephalic hairs restricted to 2-4	<i>Camponotus fellah</i>	
19	Maximum HW 3.3 or less; subcephalic hairs numerous	<i>Camponotus baldacci</i>	
–	Maximum HW up to 4.0; subcephalic hairs only 2-4	<i>Camponotus hova</i>	
20	First gastral tergite with basal two thirds paler than rest; petiole dorsum steeply rounded	<i>Camponotus oasisium</i>	
–	Gaster completely dark or with small yellowish patch at base only; petiole dorsum widely rounded to flat		21
21	Dorsum of alitrunk and gaster entirely dark	<i>Camponotus xerxes</i>	
–	Gaster with yellowish patch at base, most of alitrunk in part yellowish brown	<i>Camponotus thoracicus</i>	
22	Subcephalic hairs abundant; gaster entirely dark and somewhat dull with scattered pubescence	<i>Camponotus arabicus</i>	
–	Subcephalic hairs sparse or absent; gaster shining partly or entirely yellowish		23
23	Underside of head with a few hairs; head shining		24
–	Underside of head completely bare; head sculptured and dull	<i>Camponotus gallagheri</i> n. sp.	
24	First gaster tergite and petiole pale yellow; alitrunk entirely or mainly yellowish	<i>Camponotus atlantis</i>	
–	First gaster tergite dark; alitrunk dorsum in part shining black	<i>Camponotus alii</i>	

Camponotus adenensis Emery, 1893

Camponotus maculatus adenensis Emery, 1893. — Ann. Soc. ent. Fr. 62: 257.

Camponotus adenensis. — Collingwood 1985; Fauna of Saudi Arabia 7: 277.

Material: Yemen: ♀♀, Shamsun camp, 17.III.1988, H. Wranik; ♀♀ from: Amran, 20.X.1991; Wadi Surdud, 9.XII.1991; all A. van Harten; ♀♀, Sana'a, 4.III.1993, C.A. Collingwood.

Camponotus aegyptiacus Emery, 1915

Camponotus maculatus aegyptiacus Emery, 1915. — Bull. Soc. ent. Fr. (1914): 79.

Camponotus aegyptiacus. — Baroni Urbani 1972; Verh. naturf. Ges. Basel 82 (1): 130.

Material: Oman: 1 ♀, Jabal Qara, 4.IX.1989, R.P. Whitcombe; ♀♀, Dhalqi Dhofar, 16.IX.1989, M.D. Gallagher. — Yemen: 1 ♂, ♀♀, Aden, 16.IX.1988, H. Wranik; ♀♀ from: Al-Mahwit, 7.VI.1991; Sanhan, 30.VIII.1991; all A. van Harten; ♀♀, Zabid, 26.XII.1992, M. Mahyoub.

This species is generally common throughout Arabia. Males frequently fly to light in the evening.

Camponotus arabicus Collingwood, 1985

Camponotus arabicus Collingwood, 1985. — Fauna of Saudi Arabia 7: 281.

Material: Oman: ♀♀, Qaboos Dhofar, 4.XI.1983, J. Darlington.

Camponotus atlantis Forel, 1890

Camponotus rubripes st. *atlantis* Forel, 1890. — Ann. Soc. ent. Belg. 34: LXIII.

Camponotus atlantis. — Emery 1925; Gen. Ins. 183: 91.

Material: Oman: ♀♀ from: Shuwayyah, 27.IX.1983; Ras Madrakah, 1.X.1984; all M.D. Gallagher. — Yemen: ♀♀, ♀♀ from: Sana'a, III.1991; Al-Mahwit, 29.IV.1991; Taiz, 20.XI.1991; all A. van Harten; ♀♀, Sumara Pass, 13.III.1993, C.A. Collingwood.

Camponotus carbo Emery, 1877 (Fig. 35)

Camponotus carbo Emery, 1877. — Ann. Mus. civ. Stor. nat. Giacomo Doria 9: 364.

Material: Oman: 1 ♀, Wahiba Sands, 6.III.1986, M.D. Gallagher.

Measurements: HL 3.0; HW 2.3; SL 2.4; EL 0.32.

The clypeus projects slightly in front of the head side margins and has the front border with a broken, bluntly serrated edge. It has a distinct keel which continues posteriorly as an indented line between the frontal ridges. The head is densely sculptured, microreticulate and dull with scattered large punctures towards the genae and across the clypeus and lower frons, also the proximal third of the scape which widens from its narrow base to about 1.5 times its width near the apex. The alitrunk dorsum forms a simple arch in side view but with distinct promesonotal and mesopropodeal sutures. The petiole is a simple scale nearly as high as the propodeum. The dense sculpture of the head continues over the alitrunk; the gaster is more finely reticulostriate and the general appearance is dull without shine. In dorsal view short hairs project round the head from the occiput to the anterior genal margins. There are numerous longer hairs on the pronotum, on the posterior border of the propodeum and on the gastral dorsum.

Camponotus empedocles Emery, 1920

Camponotus thales var. *empedocles* Emery, 1920. — Boll. Soc. ent. Ital. 52: 6.

Camponotus empedocles. — Collingwood 1985; Fauna of Saudi Arabia 7: 279.

Material: Yemen: ♀♀ from: Al-Hajjarah, 14.III.1992; Wadi Surdud, 29.XII.1992; all A. van Harten.

Camponotus fayfaensis Collingwood, 1985

Camponotus fayfaensis Collingwood, 1985. — Fauna of Saudi Arabia 7: 280.

Material: Yemen: ♀♀ from: Taiz – Al-Turbah, 14.III.1993; near Zingibar, 20.III.1993; all C.A. Collingwood.

This species was collected among trees on the coastal belt in Yemen.

Camponotus fellah Dalla Torre, 1893 (Fig. 36)

Camponotus fellah Dalla Torre, 1893. — Cat. Hym. 7: 245.

Material: Saudi Arabia: ♀♀ from: Wadi Khumra, V.1979; Al-Jarf, XI.1976; all W. Büttiker. — Kuwait: 1 ♀, Anwha Island, 29.III.1988, W. Büttiker. — United Arab Emirates: 1 ♀, Djebel Haffete, 4.X.1989, H. Heatwole. — Oman: ♂♂, ♀♀, ♀♀ from: Wadi Hisma, 5.XII.1984; Ras al-Marran, 16.IX.1985; Ras al-Junayz, 2.II.1988; Tayah salt marsh, 10.II.1992; all M.D. Gallagher. — Yemen: ♀♀, Shabruah, 21.III.1991, M. Knapp; ♀♀, Zingibar-Shugra, 21.III.1993, C.A. Collingwood.

***Camponotus flavomarginatus* Mayr, 1862**

Camponotus flavomarginatus Mayr, 1862. — Verh. zool.-bot. Ges. Wien 12: 664.

Material: Oman: ♀♀, Jabal Samhan, 1.IX.1989, M.D. Gallagher. — Yemen: ♀♀, Al-Mahwit, 29.IV.1991, A. van Harten; ♀♀ from: Sumara Pass, 13.III.1993; Sangani Pass, 13.III.1993; Bajil-Khamis Bani Sad, 16.III.1993; all C.A. Collingwood.

***Camponotus foraminosus* Forel, 1879**

Camponotus foraminosus Forel, 1879. — Bull. Soc. Vaud. Sci. nat. 16: 87.

Material: Saudi Arabia: ♀♀ from: Wadi Shuqub, 20.IX.1979; Tabuk, XI.1988; all W. Büttiker. — Oman: 1 ♀, Ain Umran, 16.IX.1979, M.D. Gallagher. — Yemen: 1 ♀, Mabar, at light, VIII.1992, A. van Harten; 1 ♀, Bajil-Khamis Bani Sad, 16.III.1993, C.A. Collingwood.

***Camponotus gallagheri* n. sp. (Fig. 37)**

Holotype: ♀, Oman, Jabal Shams, 1.X.1990, M.D. Gallagher. — **Paratypes:** 4 ♀♀, same series as holotype.

Measurements of holotype: TL 12.8; HL 3.16; HW 2.84; SL 3.21; alitrunk length 5.2; PW 0.76.

Description: The head is distinctly emarginate. There are no subcephalic hairs posterior to the mandibles. The alitrunk dorsum has two pairs of hairs on the pronotum, one pair on the mesonotum, four on the propodeum, one on the petiole and one on the first gastral tergite. The petiole has rounded sides and a flattened dorsal crest. The hind tibiae have decumbent pubescence but no suberect spiny hairs. The head and alitrunk dorsum are dark brown, the rest of the alitrunk petiole and gaster yellowish brown. The paratype minor workers are evenly yellowish brown. The five workers were collected above 2000 m.

Affinities: The affinities of this species appear to be with the *C. thraso* group but the denser sculpture of the head and alitrunk and the relatively large size of the major worker resemble more *C. thoracicus* and allied species.

***Camponotus hova* Forel, 1891**

Camponotus hova Forel, 1891. — Hist. phys. nat. polit. Madag. 20: 35.

Material: Oman: 1 ♀, W of Muscat, 26.IX.1984, M.D. Gallagher. — Yemen: 1 ♀, Jal Witlaidon, II.1985, H. Materlik; ♀♀, Socotra – Nogeed, 16.IV.1993, A. van Harten.

This species is widely recorded from islands off East Africa.

***Camponotus ilgii* Forel, 1894**

Camponotus ilgii Forel, 1894. — Mitt. Schweiz. ent. Ges. 9: 64.

Material: Oman: ♀♀, Jabal Samhan, 28.IX.1984, M.D. Gallagher. — Yemen: ♀♀ from: Wadi Wazanan, 14.III.1993; Bani, 20.III.1993; all C.A. Collingwood.

This species was collected among trees on the coastal belt in Yemen; it was taken singly on trees with *Crematogaster affabilis*.

***Camponotus jizani* Collingwood, 1985**

Camponotus jizani Collingwood, 1985. — Fauna of Saudi Arabia 7: 281.

Material: Oman: ♀♀, Jabal Qarn, 22.IX.1984, M.D. Gallagher. — Saudi Arabia: ♀♀, Barithi, 5.X.1984, W. Büttiker. — Yemen: ♀♀ from: Rissabah, 8.X.1991; Taiz, 29.X.1991; Amran, 11.II.1992; Al-Mahwit, 16.III.1992; all A. van Harten; ♀♀ from: Mabar, 8.III.1993; Taiz – Al-Turbah, 14.III.1993; Sana'a, 9.III.1993; all C.A. Collingwood.

This species is abundant in the lower valleys of south-west Yemen just as it was around Fayfa in Saudi Arabia while the rather similar *C. flavomarginatus* seems to be more restricted to the mountains where, as in the Asir mountains and the Sumara and Sangani passes in Yemen, it occurred on rugged land over 2200 m.

***Camponotus kersteni* Gerstaecker, 1871**

Camponotus kersteni Gerstaecker, 1871. — Arch. Naturgesch. 37: 355.

Material: Yemen: ♀♀ from: Hammam Ali, 10.II.1992; Mocha Gocha, 23.III.1992; all A. van Harten.

***Camponotus maculatus* (Fabricius, 1781)**

Formica maculata Fabricius, 1781. — Spec. Insect. 1: 491.

Camponotus maculatus. — Mayr 1862; Verh. zool.-bot. Ges. Wien 12: 654.

Material: Oman: 1 ♀, Afrad Batina, 26.III.1989, R.P. Whitcombe. — Yemen: ♀♀ from: Qa al-Boun, VIII.1992; Wadi Wazanan, 14.III.1993; all A. van Harten; ♀♀, Taiz – Al-Turbah, 14.III.1993, C.A. Collingwood.

This common African species is evidently restricted to the southern, warmer valleys of Arabia.

***Camponotus oasisium* Forel, 1890**

Camponotus rubriceps r. *oasisium* Forel, 1890. — Ann. Soc. ent. Belg. 34: LXV.

Camponotus oasisium. — Collingwood 1961; Vidensk. Medd. Dansk Naturh. Foren. 123: 75.

Material: Saudi Arabia: 1 ♀, Abu Arish, 26.III.1983, C.A. Collingwood. — United Arab Emirates: ♀♀, Umm al-Zamul, 16.XII.1993, B. Tigar. — Oman: ♀♀ from: Banidat Khraim, 2.X.1983; Jabal Akhdar, 30.V.1987; all M.D. Gallagher; 1 ♀, Jabal Akhdar, 21.II.1986, W. Büttiker.

***Camponotus sericeus* (Fabricius, 1798)**

Formica sericea Fabricius, 1798. — Suppl. Ent. Syst.: 279.

Camponotus sericeus. — Mayr 1862; Verh. zool.-bot. Ges. Wien 12: 675.

There are many records for this conspicuous and common species throughout western and central Arabia including Saudi Arabia, Oman and Yemen. In Yemen it has been taken near Aden by H. Wrantik; Zabid, Hammam Ali, Marib, Sana'a, Wadi Bani, Mafhaq, Al-Mahwit and Madinat al-Shariq by A. van Harten and others. Unlike many of the larger *Camponotus* species which are generally nocturnal, this ant, itself large and conspicuous, forages throughout the day.

***Camponotus somalinus* André, 1887 (Fig. 38)**

Camponotus somalinus André, 1887. — Rev. ent. Caen 6: 20.

Material: Oman: 1 ♂, 1 ♀ from: Sur Creek, XII.1988; Muscat, 5.IX.1989; all M.D. Gallagher. — Yemen: ♀♀, Sana'a, III.1991, A. van Harten; ♀♀, Wadi Udain, 13.III.1993, C.A. Collingwood.

This black species is like *C. fellah* but has more body hairs and there are 8-12 hairs on the ventral head compared with *C. fellah* where there are 2-4. This pilosity difference occurs in all castes. *C. somalinus* was described from East Africa.

***Camponotus thoracicus* (Fabricius, 1804)**

Formica thoracica Fabricius, 1804. — Syst. Piez.: 397.

Camponotus thoracicus. — Roger 1862; Berl. ent. Z. 6: 205.

Material: Saudi Arabia: ♀♀, ♀♀ from: Wadi Tumair, III.1976; Wadi Mutaywiyah, IX.1976; Buwaybiyat, II.1977; Hofuf, X.1978; all W. Büttiker. — Kuwait: ♀♀, Wadi Umm al-Rumais, 20.II.1988, W. Büttiker. — United Arab Emirates: ♀♀, Baynunah, 12.XI.1993, B. Tigar. — Oman: 1 ♀, Yalooni, 18.VI.1988, K. Stanley-Price; 1 ♀, ♀♀, Thibar, 12.III.1992, M.D. Gallagher. — Yemen: ♀♀, Thibar, 12.III.1992, A. van Harten.

***Camponotus xerxes* Forel, 1904**

Camponotus maculatus r. *xerxes* Forel, 1894. — Ann. Soc. ent. Belg. 48: 424.

Material: Saudi Arabia: ♂♂, ♀♀, ♀♀ from: Wadi Durmah, Wadi Mizbil, Dammam, Wadi Muraywah, 1975-1979; all W. Büttiker. — Kuwait: ♀♀, Jal al-Zour, 6.II.1988, W. Büttiker. — United Arab Emirates: ♀♀, Ras Ghanada, IX.1992, B. Tigar. — Oman: ♀♀, Thumrait, VI.1984, J.M. Barnes; ♀♀, Ras Dhabdhub, 14.I.1986, M.D. Gallagher.

This is the commonest of the larger *Camponotus* species in Saudi Arabia. Additional records to the many in COLLINGWOOD (1985) are given above. This species has a wide range from Central

Asia to the Middle East and Arabia but does not seem to occur in the south west of Saudi Arabia or in Yemen where it is probably replaced by the similar *C. fellah*. The delimitation of these two large nocturnal foraging species however is not too clear and both species occur in similar habitats in the United Arab Emirates.

Genus *Polyrhachis* Smith, 1863

Key to species

- 1 Petiole with large lateral spines set horizontally, median spines absent or reduced to small prominences; propodeal spines long and curved *Polyrhachis lacteipennis*
 – Petiole with large lateral spines directed upwards, the intermediate spines short and dentate; propodeal spines very short *Polyrhachis viscosa*

Polyrhachis lacteipennis F. Smith, 1838

Polyrhachis lacteipennis F. Smith, 1838. — J. Proc. Linn. Soc. Lond. Zool. 2: 60.

Polyrhachis simplex Mayr. — Collingwood 1985; Fauna of Saudi Arabia 7: 274 [supposed synonym].

Material: Oman: ♀♀, Wadi Fanjan, 9.IV.1985, C. Holzschuh; ♀♀ from: Al-Khuwayr, 2.XI.1983; Wadi Andaq, 25.IX.1984; Mintirib, 17.XI.1984; Khawr Sawli, 18.I.1985; all M.D. Gallagher. — Yemen: ♀♀, Aden Chalet, 29.X.1988, H. Wranik.

The previous records from Al-Qatif, Saudi Arabia and Khabura, Oman (COLLINGWOOD 1985) should refer to this species, not to *P. simplex* Mayr, 1862 which is probably a synonym.

Polyrhachis viscosa F. Smith, 1858

Polyrhachis viscosa F. Smith, 1858. — Cat. Hym. Brit. Mus. 6: 71.

Material: Yemen: ♀♀, near Al-Mahwit, 10.III.1993, C.A. Collingwood.

A small colony was found nesting under a stone among dwarf palms.

Genus *Cataglyphis* Foerster, 1850

Ants of genus *Cataglyphis* have been reclassified, and a synopsis and key to the species groups are provided by AGOSTI (1990). Agosti & Collingwood are currently revising the North African and Arabian species of the *C. bicolor* group, resulting in some name changes since COLLINGWOOD (1985). Those changes are here indicated, but detailed descriptions of the species and of the proposed synonymy will be given there. Furthermore, it is questioned whether allopatric populations with distinct characters should be treated as one or several species. This concerns mainly the better known species of the *C. bicolor* species group, such as *C. adenensis*, *C. laevior*, *C. isis* and *C. diehli* since all the populations reviewed are allopatric and somewhat variable. These names are retained in the present paper until further experience indicates conclusively that the three synonymised forms are indeed always allopatric.

Key to species

- 1 Petiole a truncated node with a flat dorsal surface sloping forward (*C. albicans* group) 2
 – Petiole a rounded node or an upright thick scale 11

2	Body colour uniformly shining black	3
–	Colour otherwise	6
3	HW of largest workers less than 1.2; scape longer than HW <i>Cataglyphis minimus</i>	
–	HW of largest workers 2.0 or more; scape shorter than HW	4
4	Node steeply sloped and high; height to length 4.8:3 <i>Cataglyphis acutinodis</i> n. sp.	
–	Node with flat slope; height to length 4.5:4	5
5	Head unsculptured, brilliant <i>Cataglyphis vaucheri</i>	
–	Head sculptured <i>Cataglyphis albicans</i>	
6	Head, alitrunk and gaster unicolorous; antennal scape shorter than head length	7
–	Bicoloured with at least head paler than gaster; antennal scape longer than head length	9
7	Whole body a deep brown colour; petiole relatively narrow, higher than long in profile <i>Cataglyphis cinnamomeus</i>	
–	Whole body yellow or light brown; petiole broader, not higher than long	8
8	Whole body golden brown <i>Cataglyphis auratus</i>	
–	Whole body yellow <i>Cataglyphis lividus</i>	
9	Gaster entirely dark; head red	10
–	Gaster with only apical segments dark and first tergite unicolorous yellow with head and alitrunk <i>Cataglyphis arenarius</i>	
10	Head and pronotum dull red, sculptured <i>Cataglyphis semitonsus</i>	
–	Head and entire alitrunk bright red <i>Cataglyphis ruber</i>	
11	Petiole an upright scale	12
–	Petiole a rounded node	14
12	Body entirely yellow; third maxillary palp long with long curved hairs (<i>C. bombycinus</i> group) <i>Cataglyphis sabulosus</i>	
–	Body mainly or entirely dark; third maxillary palp shorter without long curved hairs	13
13	Funiculus segments 2-7 short, quadrate (<i>C. emmae</i> group) <i>Cataglyphis emmae</i>	
–	Funiculus segments all longer than broad (<i>C. anescens</i> group ?) <i>Cataglyphis shuaibensis</i> n. sp.	
14	Maxillary palps short, segment 4 shorter than 5 + 6 (<i>C. altisquamis</i> group)	15
–	Maxillary palps long, segment 4 longer than 5 + 6 (<i>C. bicolor</i> group)	17
15	Alitrunk entirely without dorsal hairs; whole body opaque <i>Cataglyphis opacior</i> n. sp.	
–	Dorsal alitrunk hairs present	16
16	Whole of alitrunk clothed with stout black hairs <i>Cataglyphis asiriensis</i>	
–	Alitrunk hairs restricted to a few on pronotum and on posterior part of propodeum only <i>Cataglyphis harteni</i> n. sp.	
17	Petiole a high rounded node; first funiculus segment 1.3-1.5 times longer than funiculus segment 2	18
–	Petiole lower or more massive; first funiculus segment at least 1.7 times longer than funiculus segment 2	22
18	Body colour evenly dark or black	19
–	Body colour yellowish or bicoloured	20
19	Gaster mildly sculptured and dull; antennal scapes with occasional erect hairs <i>Cataglyphis isis</i>	
–	Gaster brilliant; antennal scapes without erect hairs <i>Cataglyphis diehli</i>	

- 20 Whole body including head and gaster yellowish brown
Cataglyphis flavobrunneus n. sp.
- Gaster dark, contrasting with red head 21
- 21 Head slightly or not longer than wide; petiole dorsum mildly flattened
Cataglyphis adenensis
- Head distinctly longer than wide; petiole dorsum smoothly rounded
Cataglyphis laevior
- 22 Body colour dark without distinct colour contrast 23
- At least head and/or alitrunk red, contrasting with dark gaster 26
- 23 Propodeum high, relatively massive with the dorsal and descending faces meeting at a rounded right angle
Cataglyphis holgerseni n. sp.
- Propodeal dorsum rounds evenly into its descending face 24
- 24 Petiole a large rounded dome 25
- Petiole lower, either longer than high or with anterodorsal face slightly flattened, propodeum high with dorsal and descending faces meeting at a rounded right angle
Cataglyphis urens
- 25 Propodeum high and steeply rounded; head unicolorous with alitrunk
Cataglyphis savignyi
- Propodeum lower with a flatter curvature; head often obscurely reddish
Cataglyphis niger
- 26 Petiole low, longer than high in profile
Cataglyphis abyssinicus
- Petiole higher with a somewhat flattened anterodorsal slope
Cataglyphis sp.

Cataglyphis abyssinicus (Forel, 1904)

Myrmecocystus viaticus st. *abyssinicus* Forel, 1904. — Ezheg. zool. Mus. Imp. Akad. Nauk 8: 282.

Cataglyphis abyssinicus. — Collingwood 1985; Fauna of Saudi Arabia 7: 286.

Material: Oman: ♀♀, Qurm Nature Reserve, 30.I.1987, M.D. Gallagher; 1 ♀, Wahiba, I.1985, P.W. Munton. — Yemen: ♀♀, Sana'a, V.1991, A. van Harten; ♀♀, Sana'a, 4.III.1993, C.A. Collingwood.

This species may be wrongly named since, according to AGOSTI (1994), the type series might include a mixed series of worker and inquiline females, belonging to another species.

Cataglyphis acutinodis n. sp. (Fig. 39)

Holotype: ♀, Yemen, Sana'a, IX.1992, A. van Harten. — Paratypes: Yemen: ♀♀, same series as holotype; ♀♀, Al-Mahwit, 21.IX.1991, A. van Harten. — Oman: ♀♀ from: Samhan, 8.III.1993; Al-Mahwit, 8.III.1993; Sana'a, 10.III.1993; all C.A. Collingwood.

Measurements of holotype: TL 5.6; HL 1.46; HW 1.32; SL 1.24; EL 0.40; SI 85.

Description: This black species differs from *C. albicans* by the higher, steeper petiole; ratio height to length 4.8:3.0 (*C. albicans* 4.5:4.0). The antennae, tibiae and tarsi are yellow; in *C. albicans* from Saudi Arabia these are pale brown.

Affinities: There are similar examples taken by H. Heatwole in the Chinese Gobi near Urumchi.

Cataglyphis adenensis (Forel, 1904)

Myrmecocystus viaticus r. *adenensis* Forel, 1904. — Ezheg. zool. Mus. Imp. Akad. Nauk 8: 382 (footnote).

Cataglyphis adenensis. — Santschi, 1929; Rev. Suisse Zool. 36: 41.

Material: Oman: 1 ♀, Mugshin Dhofar, 20.IX.1979, R.P. Whitcombe. — Yemen: 1 ♀, ♀♀ from: Mafhaq, 9.III.1993; Taiz – Al-Turbah, 14.III.1993; Shugra-Lauder, 21.III.1993; all C.A. Collingwood; ♀♀, Damt, 29.III.1993, A. van Harten.

This species has a short broad head which is bright red. The petiole is high like in *C. flavobrunneus* n. sp., but the dorsum is sloped rather than smoothly rounded.

***Cataglyphis arenarius* Finzi, 1940**

Cataglyphis arenarius Finzi, 1940. — Mem. Soc. ent. Ital. 18: 163.

Material: Oman: ♀♀, Mugshin Dhofar, 20.IX.1979, R.P. Whitcombe.

Measurements: SI 110-116.

These ants have a yellowish body colour except for the gaster which is dark from the posterior edge of the first tergite. The petiole in profile is shorter and has a flatter dorsum than *C. ruber*. This species and *C. auratus*, *C. cinnamomeus*, *C. lividus*, *C. ruber* and *C. semitonsus*, belong to the *C. albicans* species complex.

***Cataglyphis auratus* Menozzi, 1932 n. stat.**

Cataglyphis albicans var. *aurata* Menozzi, 1932. — Boll. Soc. ent. Ital. 64: 95.

Material: Saudi Arabia: ♀♀, Kushm Dibi, 10.V.1981, W. Büttiker.

This species and *C. auratus*, *C. cinnamomeus*, *C. lividus*, *C. ruber* and *C. semitonsus*, belong to the *C. albicans* species complex. *C. auratus* is golden brown in colour. The head and alitrunk have fine reticulate sculpture. Decumbent pubescence is well developed on the occiput and on the dorsum and sides of the propodeum. The gaster is brilliant with no dorsal hairs or pubescence. This species was described from the Sudan.

***Cataglyphis cinnamomeus* (Karawaiew, 1910) (Fig. 40)**

Myrmecocystus albicans cinnamomeus Karawaiew, 1910. — Russk. ent. Obozr. 9: 269.

Cataglyphis cinnamomea. — Pisarski 1967; Ann. Zool. Polska Akad. Nauk 24: 418.

Material: Saudi Arabia: ♀♀, Wadi Tumair, 20.II.1976, W. Büttiker.

Measurements: SI 91.7.

This is a deep brown, rather sculptured species with a more rounded narrower petiole compared with *C. albicans*. It was described from Central Asia but also occurs in Afghanistan and Tunisia.

***Cataglyphis diehli* (Forel, 1902)**

Myrmecocystus viaticus r. *diehli* Forel, 1902. — Ann. Soc. ent. Belg. 46: 462.

Cataglyphis diehli. — Collingwood 1985; Fauna of Saudi Arabia 7: 287.

Material: Kuwait: ♀♀, Sulabiyah, 14.III.1988, W. Büttiker. — Oman: ♀♀, Rima Oil Camp, IX.1984, M.D. Gallagher; 1 ♀, Batina, 5.I.1980, R.P. Whitcombe.

This species and *C. isis*, *C. laevior*, and *C. flavobrunneus* n. sp. are distinguished from others in the *C. bicolor* group by the shorter funiculus segments, the high narrow petiole, the long, slit-shaped propodeal spiracle and the extremely flat propodeum of small workers.

***Cataglyphis emmae* (Forel, 1909)**

Formica (Proformica) emmae Forel, 1909. — Bull. Soc. Vaud. Sci. nat. 45: 381.

Cataglyphis emmae. — Santschi 1929; Rev. Suisse Zool. 36: 30.

Material: Saudi Arabia: 1 ♀, Wadi Tumair, 17.II.1976, W. Büttiker.

***Cataglyphis flavobrunneus* n. sp. (Fig. 41)**

Holotype: ♀, Oman, Mintirib, 18.II.1986, W. Büttiker. — Paratypes: Oman: ♀♀, same series as holotype; ♀♀ from: Qarn al-Alam, 31.V.1984; Dhahdhub, 29.V.1986; Sur Creek, 26.IX.1986; Ras al-Hadd, 21.II.1992; all M.D. Gallagher. — Saudi Arabia: 1 ♀, Jeddah, 19.II.1978, W. Büttiker. — United Arab Emirates: 1 ♀, Djebel Haffere, X.1989, H. Heatwole; ♀♀, Ras Ghanada, IX.1992, B. Tigar. — Yemen: 1 ♀, Aden, 5.XI.1988, H. Wranik.

Measurements of holotype: TL 8.9; HL 2.2; HW 2.15; SL 2.32; EL 0.58.

Description: The first funiculus segment is 1.29 longer than segment 2; the petiole is a high rounded dome as in *C. laevior*, *C. diehli* and *C. isis*. This species has similar features to *C. laevior* but is entirely bright yellowish brown including the antennae and legs without dark markings. The head is smooth and polished with superficial reticulate sculpture. Most specimens were taken as single individuals.

Two worker specimens taken in Oman, Ras al-Hadd by M.D. Gallagher have the same appearance and colour to *C. flavobrunneus* with the same narrow-domed node but the funiculus segments are longer. Their first funiculus segment is 1.45-1.75 longer than funiculus segment 2. Also the head sculpture is more distinct giving a grainy appearance. More material is needed to establish whether these represent another species.

Cataglyphis harteni n. sp. (Fig. 42)

Holotype: ♀, Yemen, Djebel an-Nabi Shuaib, 11.IX.1992, A. van Harten. — Paratypes: Yemen: 4 ♀♀, same series as holotype; 10 ♀♀, same locality, 7.III.1993, C.A. Collingwood.

Measurements of holotype: TL 5.25; HL 1.94; HW 1.52; SL 1.94; PW 0.43; PL 0.33; EL 0.60.

Description: There is one pair of coarse hairs on the pronotum and one pair on the posterior dorsum of the propodeum, two pairs on the petiole and one pair on the first gastral tergite. The first funiculus segment is 1.56 times segment 2. The third and fourth maxillary palp segments are each shorter than the fifth and sixth combined. The petiole is a high thick node with a distinctly convex anterior face and a steep posterior face. The propodeum is rather low with the dorsal face sloping gently into its declivous face. The colour is uniformly dull black with dense reticulate sculpture extending over the head, alitrunk and first gaster tergite. The eyes are somewhat bulbous and project from the side margins of the head in posterior view. The inner faces of the femora and tibiae have thick black bristles.

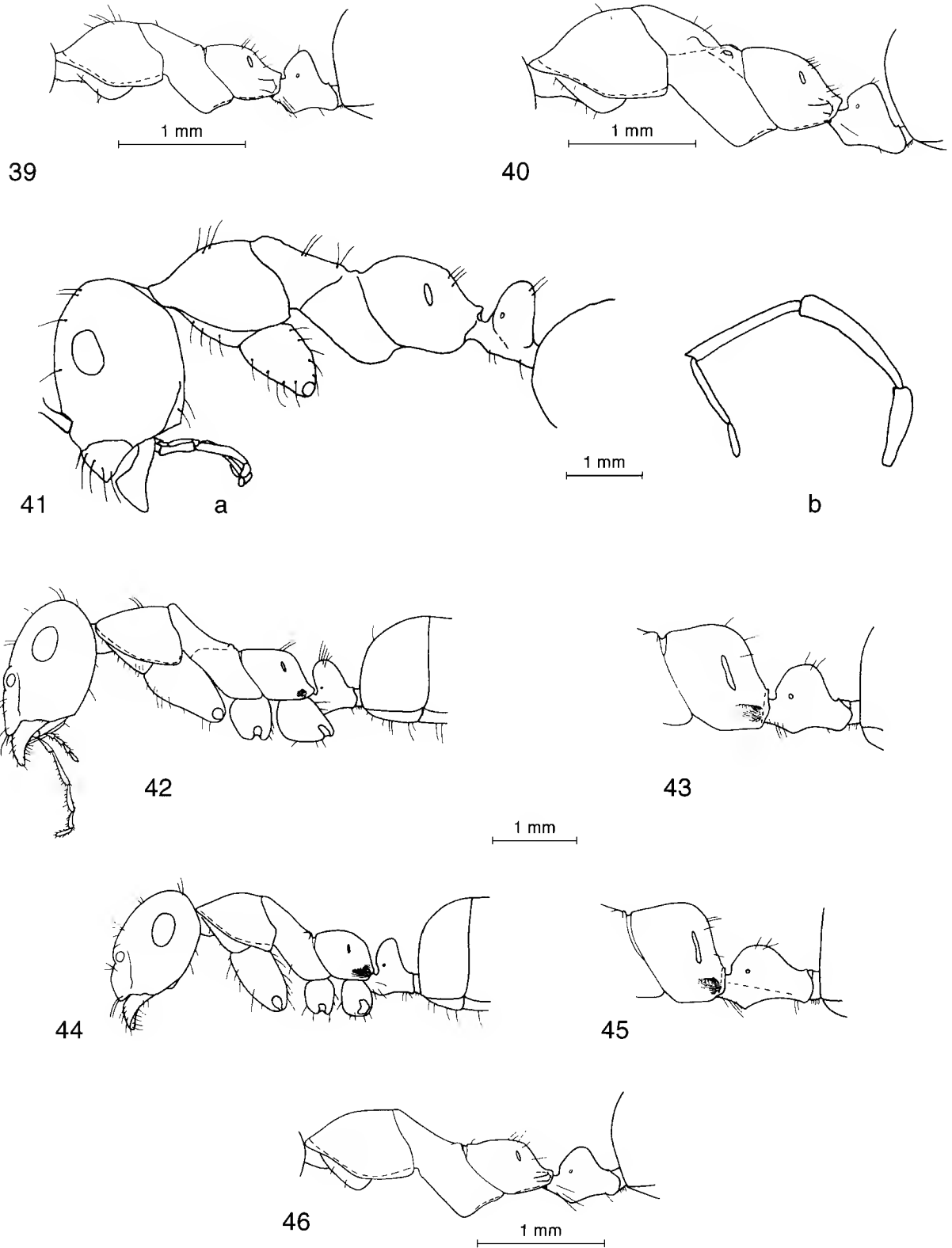
Affinities: This species belongs to the *C. altisquamis* complex and closely resembles *C. asiriensis* Collingwood, 1985 except for the much reduced dorsal pilosity of the alitrunk and gaster. This species occurred high up on the eastern side of the mountain mass of Djebel an-Nabi Shuaib at altitudes over 3500 m.

Cataglyphis holgerseni n. sp.

Holotype: ♀, Sinai, near Eilat, 23.XII.1978, H. Holgersen. — Paratypes: Sinai: ♀♀, same series as holotype. — Saudi Arabia: ♀♀, ♀♀ from: Al-Qatif, 12.IV.1983; Riyadh, 22.III.1983; all C.A. Collingwood. — Oman: 1 ♀, Thumrait, VI.1984, J.M. Barnes.

This species was confused with *C. niger* in the earlier paper and was not recognised as distinct until Holger Holgersen kindly sent us some ants from the Middle East. Among these were examples of the present species from Sinai. These are immediately distinguishable from other black *Cataglyphis* by the high-raised propodeum. In profile the dorsal and descending face of the propodeum form a rounded right angle as in the red species *C. urens*. *Cataglyphis holgerseni* is one of the largest of the Arabian *Cataglyphis* and cannot be confused with any other species by its colour and propodeal shape. The petiole is also relatively massive as in *C. niger* and more so than in its sister species *C. urens*.

Affinities: *Cataglyphis savignyi* also has a high propodeum but this is smoothly rounded. Examples of *C. holgerseni* from the type locality in Sinai are present in the Copenhagen Zoological Museum, and were misidentified as *C. caerulescens* Santschi, 1929. Many examples of the dark



Figs 39-46: Profiles of *Cataglyphis* species: 39, *C. acutinodis* n. sp., ♀, propodeum and node; 40, *C. cinnamomeus*, ♀, propodeum and node; 41, *C. flavobrunneus* n. sp., ♀: a, head and alitrunk; b, antenna; 42, *C. harteni* n. sp., ♀, head and alitrunk; 43, *C. niger*, ♀, propodeum and node; 44, *C. opacior* n. sp., ♀, head and alitrunk; 45, *C. urens*, ♀, propodeum and node; 46, *C. vaucheri*, ♀, propodeum and node.

species in the *C. bicolor* group may show a somewhat purplish tinge and this name has no taxonomic status (AGOSTI 1990).

Cataglyphis isis Forel, 1913

Cataglyphis diebli var. *isis* Forel, 1913. — Rev. Suisse Zool. 21: 434.

Cataglyphis isis. — Pisarski 1967; Ann. zool. Warsz. 24 (6): 421.

Material: Oman: ♀♀, Daraib Dhofar, 24.IV.1984, J. Darlington.

Cataglyphis laevior Santschi, 1929

Cataglyphis bicolor st. *laevior* Santschi, 1929. — Rev. Suisse Zool. 36: 47.

Cataglyphis laevior. — Collingwood 1985; Fauna of Saudi Arabia 7: 288.

Material: Kuwait: ♀♀, Jabal Liyah, 15.II.1988, W. Büttiker. — United Arab Emirates: ♀♀, Baynunah, 8.VI.1993, B. Tigar.

Cataglyphis lividus (André, 1881)

Myrmecocystus albicans var. *livida* André, 1881. — Ann. Soc. ent. Fr. 6 (1): 58.

Cataglyphis lividus. — Arnoldi 1964; Zool. Zh. 43: 1810.

Material: Saudi Arabia: ♀♀ from: Wadi Khumra, 7.I.1976; Diriyah, 10.IX.1977; all W. Büttiker. — Kuwait: ♀♀, Wadi Umm al-Rumais, 20.II.1984, W. Büttiker. — United Arab Emirates: 1 ♀, Djebel Haffete, X.1989, H. Heatwole; ♀♀, Ras Ghanada, IX.1992, B. Tigar. — Oman: ♀♀ from: Wadi Kawrah, 1.X.1984; Qurm Creek, 6.XI.1987; Tawr um Halq, 13.II.1988 Al-Khuwayr, IX.1989; all M.D. Gallagher. — Yemen: ♀♀ from: Zabid, 15.III.1993; Damt-Aden, 20.III.1993; Zingibar, 20.III.1993; all A. van Harten, C.A. Collingwood.

Measurements: SI 111.5.

This yellow species is one of the most widely distributed of the smaller *Cataglyphis* throughout Arabia.

Cataglyphis minimus Collingwood, 1985

Cataglyphis minima Collingwood, 1985. — Fauna of Saudi Arabia 7: 289.

Material: United Arab Emirates: ♀♀, Ras Ghanada, IX.1992, B. Tigar.

Measurements: SI 123-124.

A large number of this very small species in the *C. albicans* group was collected by pitfall trapping at Ras Ghanada. All workers obtained were of approximately even size.

Cataglyphis niger (André, 1881) (Fig. 43)

Myrmecocystus viaticus var. *niger* André, 1881. — Ann. Soc. ent. Fr. (6) 1: 56.

Cataglyphis niger. — Collingwood 1985; Fauna of Saudi Arabia 7: 290.

Material: Kuwait: ♀♀, Wadi Umm al-Rumam 20.II.1988, W. Büttiker. — Oman: Jabal Akhdar, Ibri, Batina, Khabura, Jabal Shams, and other localities; all M.D. Gallagher. — Yemen: ♀♀, Sana'a, V.1991, A. van Harten.

This large black species is widely distributed throughout Arabia and all the countries of the Middle East.

Cataglyphis opacior n. sp. (Fig. 44)

Holotype: ♀, Yemen, Djebel an-Nabi Shuaib, 18.III.1993, C.A. Collingwood. — Paratypes: Yemen: 2 ♀♀, Sumara Pass, 2500 m, 13.III.1993, C.A. Collingwood.

Description: This species is very similar to *C. harteni* n. sp., except for the complete absence of suberect dorsal hairs on the alitrunk and gaster. The whole body is densely sculptured and dull.

***Cataglyphis ruber* (Forel, 1903)**

Myrmecocystus albicans rubra Forel, 1903. — Ann. Soc. ent. Belg. 47: 268.

Cataglyphis albicans ruber. — Emery 1912; Zool. Jb. Suppl. 15 (1): 99.

Cataglyphis ruber. — Collingwood 1985; Fauna of Saudi Arabia 7: 291.

Material: Saudi Arabia: ♀♀ from: Wadi Tumair, 17.II.1976; Riyadh, 29.V.1976; all W. Büttiker. — Oman: ♀♀ from: Barr al-Hickman, 12.II.1987; Madinat Qaboos, 4.XI.1989; all M.D. Gallagher.

Measurements: SI 100.

This vivid red species has the entire gaster dark. This is a first record for Saudi Arabia.

***Cataglyphis sabulosus* Kugler, 1981**

Cataglyphis sabulosa Kugler, 1981. — Israel J. Ent. 15: 84.

Material: Oman: 1 ♀, Al-Khuwayr, 1.1990, K. Mathias; 1 ♀, Qarhat Mu'ammār, 20.II.1986, W. Büttiker. — United Arab Emirates: 1 ♀, Djebel Haffete, X.1989, H. Heatwole; ♀♀, Ras Ghanada, XI.1992, B. Tigar.

This is the only species of the *C. bombycinus* species group known from Arabia up to the present.

***Cataglyphis savignyi* (Dufour, 1862)**

Formica savignyi Dufour, 1862. — Ann. Soc. ent. Fr. (4) 2: 141.

Cataglyphis savignyi. — Roger 1863; Berl. ent. Z. 7: 12.

Material: Oman: ♀♀ from: Montasar, 14.IX.1984; Qarhat Mu'ammār, 20.II.1986; all M.D. Gallagher; ♀♀, Wahiba, 23.III.1986, W. Büttiker. — Yemen: ♀♀, Taiz – Mafhaq, 15.III.1993, C.A. Collingwood.

This species is rather similar to *Cataglyphis* sp. but has the petiole more massive. The propodeum is more raised than in *C. niger*. It is known otherwise from the northern fringe of the Saharan desert from the Atlantic to the northern Sinai.

***Cataglyphis semitonsus* Santschi, 1929**

Cataglyphis albicans var. *semitonsa* Santschi, 1929. — Rev. Suisse Zool. 36: 61.

Cataglyphis semitonsa. — Collingwood 1985; Fauna of Saudi Arabia 7: 291.

Material: Saudi Arabia: ♀♀, Wadi Majarish, 27.IV.1983, W. Büttiker. — Yemen: 1 ♀, Sana'a, IV.1991, A. van Harten; 1 ♀, Samhan, 8.III.1993, C.A. Collingwood.

Measurements: SI 94-95.

This Middle Eastern species has a red head and pronotum with the body progressively darkening posteriorly.

***Cataglyphis shuaibensis* n. sp.**

Holotype: ♀, Yemen, Djebel an-Nabi Shuaib, 18.III.1993, C.A. Collingwood. — **Paratypes:** ♂♂, ♀♀, same series as holotype and nests from the same locality.

Measurements of holotype: TL 6.3; HL 1.60; HW 1.32; SL 1.64; EL 0.42; PW 0.82; PL 0.29.

Description: Colour totally black except for mid-brown tarsi. The gaster is brilliant and the head, alitrunk and petiole are shining with superficial reticulate sculpture. There are no dorsal hairs on the alitrunk, three pairs on the first tergite dorsum and there are long hairs on the inside femora and tibiae. The propodeum is high with the dorsal and descending faces of nearly equal length. The group of nests was found in a protected south-facing terrace just below the summit of Djebel an-Nabi Shuaib at approximately 3300 m.

Affinities: This species comes near to *C. aenescens* (Nylander, 1849) and allied species in south-eastern Europe and Turkestan.

Cataglyphis urens Collingwood, 1985 (Fig. 45)

Cataglyphis urens Collingwood, 1985. — Fauna of Saudi Arabia 7: 290.

Cataglyphis saharae Santschi. — Collingwood 1985; Fauna of Saudi Arabia 7: 291 [misidentification].

Material: Oman: ♀♀ from: Tibat Musandham, 24.X.1982; Mugshin, Dhofar, 5.X.1989; all M.D. Gallagher; ♀♀, Al-Khuwayr, V.1990, R. Mathias. — Yemen: ♀♀ from: Marib, 4.VI.1991; Shabwah, 21.III.1992; all A. van Harten. — United Arab Emirates: ♀♀ from: Madinat al-Zayed, 14.X.1993; Merewah, 5.VI.1993; all B. Tigar.

This bright red species with the high-raised propodeum has so far only been taken in the south and south-west of the Arabian Peninsula below 25°30'N and is not known from outside Arabia. The specimens along the Arabian Gulf coast in the United Arab Emirates have sometimes some variation of propodeal height within one single nest.

Cataglyphis vaucheri (Emery, 1906) n. stat. (Fig. 46)

Myrmecocystus albicans vaucheri Emery, 1906. — Mem. R. Acad. Sci. Ist. Bologna (6) 3: 54.

Material: Oman: ♀♀, Jabal Samhan, 20.I.1984, M.D. Gallagher. — Yemen: ♀♀, Wadi Damt, 29.III.1993, A. van Harten.

Measurements: SI 99-100.

This black species is distinguished from *C. albicans* by the reduced sculpture. The head, which is wider relative to the promesonotum compared with *C. albicans*, is brilliant and the alitrunk has very superficial sculpture. *C. vaucheri* was described from Morocco.

Cataglyphis sp.

Cataglyphis desertorum. — Collingwood 1985; Fauna of Saudi Arabia 7: 286 [misidentification].

This is the commonest *Cataglyphis* species throughout Arabia and there are many collections from the southern Sinai Peninsula to Saudi Arabia, Kuwait, United Arab Emirates, Oman and Yemen. However, no nest series is known, and only single workers were collected. In COLLINGWOOD (1985), this species appeared under the name *C. desertorum* Forel, 1894, but Forel's species, described from southern Tunisia, is probably a synonym of *C. savignyi* (Agosti & Collingwood, in prep.). For this reason, a formal description will be given later.

DISCUSSION

The wealth of species now known to occur in the Arabian Peninsula includes a relatively large number of new species, about 25 % of the total, which are supposedly endemic. This compares with the Iberian Peninsula where a similar proportion of recorded species are unknown outside Spain or Portugal. It is evident from the many collections from Yemen made by A. van Harten and colleagues, using methods of soil extraction as well as Malaise and light traps, that the present inventory of Arabian species is by no means exhaustive. Leptanillinae and the smaller Myrmicinae continue to produce new records.

In this paper the remarkable number of species in the genus *Monomorium*, 20 % of the total species recorded, is in part due to the comprehensive review of the sub-Saharan species by BOLTON (1987) that gives confidence that any not included in that paper, or in the smaller lists of recorded species from the Middle East, must be new. In other genera with a large number of species such as *Crematogaster*, names are not assignable with confidence without such a review and the same applies even to the larger and more conspicuous ants in such genera as *Camponotus* and *Cataglyphis* where new discoveries continue to be made. It was remarked in the earlier paper that no Dacetine ants, which include a wealth of African species, have yet been collected in Arabia. There should be some in the more vegetated parts of the southern coastal belt and in the more sheltered valleys.

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REFERENCES

- AGOSTI, D. 1990. Review and reclassification of *Cataglyphis* (Hymenoptera, Formicidae). *Journal of Natural History* 24: 1457-1525.
- AGOSTI, D. 1994. A new inquiline ant (Hymenoptera: Formicidae) in *Cataglyphis* and its phylogenetic relationship. *Journal of Natural History* 28: 913-919.
- BOLTON, B. 1980. The genus *Tetramorium* in the Ethiopian zoogeographical region. *Bulletin of the British Museum (Natural History)*. *Entomology* 40 (3): 193-384.
- BOLTON, B. 1982. Afrotropical species of the ant genera *Cardiocondyla*, *Leptothorax*, *Melissotarsus*, *Messor* and *Cataulacus* (Formicidae). *Bulletin of the British Museum (Natural History)*. *Entomology* 45 (4): 309-370.
- BOLTON, B. 1985. The ant genus *Triglyphothrix* Forel, a synonym of *Tetramorium* Mayr. *Journal of Natural History* 19: 243-248.
- BOLTON, B. 1987. A review of the *Solenopsis* genus group and revision of Afrotropical *Monomorium* (Hymenoptera, Formicidae). *Bulletin of the British Museum (Natural History)*. *Entomology* 54: 263-452.
- BOLTON, B. 1994. Identification Guide to the Ant Genera of the World. 222 pp. Harvard University Press.
- BOLTON, B. 1995. *A new general catalogue of the ants of the world*. Harvard University Press.
- COLLINGWOOD, C.A. 1985. Hymenoptera: Fam. Formicidae of Saudi Arabia. *Fauna of Saudi Arabia* 7: 230-302.
- COLLINGWOOD, C.A. 1988. The Ants (Hymenoptera, Formicidae) of the Wahiba Sands, Oman. *Journal of Oman Studies, Special Report* 3: 361-362.
- EMERY, C. 1881. Viaggio ad Assab nel Mar Rosso dei signori G. Doria ed O. Beccari 1879. Formiche. *Annali del Museo Civico di Storia Naturale Giacomo Doria* 16: 523-535.
- EMERY, C. 1893. Formicides de l'île d'Aden. *Bulletin de la Société Entomologique de France* 62: 256.
- EMERY, C. 1925. In: Hymenoptera Formicidae subfam. Formicinae Genera Insectorum. 185. Wytzman, P.A.G.: 1-302.
- FOREL, A. 1892. Étude sur *Acantholepis* (Formicidae). *Annales de la Société Entomologique de Belgique* 36: 39-43.
- HEATWOLE, H. 1990. The ant assemblage of a sand dune desert in the United Arab Emirates. *Journal of Arid Environments* 21: 71-79.
- KUGLER, J. 1987. The Leptanillinae (Hymenoptera: Formicidae) of Israel and a description of a new species from India. *Israel Journal of Entomology* 22: 45-57.
- PISARSKI, B. 1967. Fourmis (Hymenoptera: Formicidae) d'Afghanistan récoltées par M. Dr. K. Lindberg. *Annales zoologici, Warszawa* 24 (6): 375-425.
- RATCLIFFE-SMITH, A. 1980. The vegetation of Dhofar. *Journal of Oman Studies, Special Report* 2: 59-86.
- SANTSCHI, F. 1936. Étude sur les fourmis de la genre *Monomorium* Mayr. *Bulletin de la Société des Sciences Naturelles du Maroc* 16: 50.

- SHEHALA, M.N. 1981. Notes on the foraging activities and behaviour of the ants *Messor semirufus* and *Cataglyphis bicolor nigra* in Yemen. *Bulletin de la Société Entomologique d'Égypte* (1975) **61**: 1-14.
- TOHMÉ, G. 1969. *Répartition géographique des fourmis du Liban. (Hymenoptera-Formicoidea)*. 77 pp. Thèse. Université de Toulouse.
- TOHMÉ, G. & TOHMÉ, H. 1981. Les fourmis du genre *Messor* en Syrie. *Ecologia Mediterranea* **7** (1): 139-153.
- WHEELER, W.M. 1922. Ants of the Belgian Congo. *Bulletin of the American Museum of Natural History* **45**: 1-1139.
- WILLIAMS, D.F. (ed.) 1994. Exotic ants: Biology, impact, and control of introduced species. Boulder, Westview Press.
- WHITCOMBE, R.P. 1982. Ants (Formicidae) especially those associated with honeybees (*Apis* spp.) from the Sultanate of Oman. Report VII 2C no. 3. 28 pp. Durham University, Khabura Development Project.

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