SCOLIIDAE FROM THE WESTERN REGION OF SAUDI ARABIA
(HYMENOPTERA: ACULEATA)

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ABSTRACT

A simplified key to the hairy wasps (Scoliidae) from the western region of Saudi Arabia is given. The key is followed by an annotated list that provides synonyms, and distribution. Eight species from which Micromeriella hyalina hyalina (Klug) and Scolia (Scolia) flaviceps quettaensis (Cameron) are considered as first record to the fauna of Saudi Arabia. A new species, Scolia arabica, is described.

Key words: Hymenoptera, Scoliidae, taxonomy, new species, Saudi Arabia.

INTRODUCTION

Scoliidae, the hairy wasps, are important ectoparasitic group. Their hosts are scarabaeid larvae (Coleoptera) which are pests of forests and agriculture (Krombein, 1978; Gupta and Jonathan, 2003), and rarely curculionids (Brothers and Finnamore,1993). Members of this family are world-wide in distribution but predominantly tropical, and are of about 560 species in two subfamilies: Proscoliinae, and Scoliinae (Brothers and Finnamore,1993; Gupta and Jonathan, 2003).

Members of this family are distinguished from other aculeate Hymenoptera by the presence of a flat plate formed by meso- and metasternum overlapping the bases of mid and hind coxae; the wings have dense fine longitudinal wrinkles near the apex (Krombein, 1978; Brothers and Finnamore, 1993). Black is the predominant colour, sometimes marked with bright yellow, white, red or orange markings or bands. Their wings may give off some bluish to purple iridescence. They range in length from 5-50 mm. The body vestiture is either black, white, or reddish to orange in colour.


No definite studies has been done concerning the Scoliidae of the Arabian Peninsula except for a recent study on Scoliidae of Oman (Osten, in press). Osten recorded five species from which he considered Micromeriella hyalina hyalina (Klug) as a first record to the Arabian Peninsula.

The present work was accomplished to collect and identify the hairy solitary scoliid wasps from the Western Region of Saudi Arabia. Construction of a simplified key and an annotated checklist was aimed.

MATERIALS AND METHODS

Regular survey to the adult hairy solitary scoliid wasps were undertaken during the time period 2002 – 2004, covering various areas in the Western Region of Saudi Arabia (including Jeddah, Hadasham, Taif). Insects were collected by use of Japanese net and Malaise trap. The identified specimens were confirmed by Till Osten (Staatliches Museum für Naturkunde Stuttgart, Germany). Drawings were made using a camera lucida.
Abbreviations: AS= antennal segment; T= tergum; S= sternum.

**PROVISIONAL KEY TO SCOLIIDAE OF WESTERN REGION OF SAUDI ARABIA**

1. Fore wing with two recurrent veins (Fig.1); sexual dimorphism is so marked -------------------------------------- 2
   - Fore wing with one recurrent vein (Fig.2); sexual dimorphism is not so marked ----------------------------- 4

2. Larger species (body length may reach 22mm.); body entirely black in female, black with red bands in male; wings orange with dark apex in female, hyaline, slightly fumigated at apex in male; occiput and scapula with dense erect orange vestiture ----------------------------------------------- *Campsomeriella thoracica*
   - Smaller species (body length 10-16mm.); black with yellowish to creamy bands on abdomen, or golden yellow in some females; wings hyaline with golden yellow veins------------------------------------------ 3

3. Female abdomen golden yellow; occiput with yellowish to orange long hairs; clypeus relatively small, mostly yellow, with black marking in the middle, without longitudinal ridges on apical half (Fig.3); hind tibial spurs apically spatulate (Fig.4)---------------------------------------------------------- *Micromeriella aureola aureola*
   - Female abdomen black with yellowish to creamy bands on posterior margin of T1; occiput with whitish long hairs; clypeus relatively large, ferruginous, with longitudinal ridges at apical half (Fig.5); hind tibial spurs acute apically (Fig.6)--------------------------------------------------- *Micromeriella hyalina hyalina*

4. Body with yellow markings; wings hyaline mostly orange in colour with small brown subcostal area in male -- ------------------------------------------ 5
   - Body entirely black in some species, or with some red markings in others; wings dark brown to black giving off some bluish or purple iridescence in males ----------------------------- 6

5. Fissura frontalis absent; a carina with black apex is seen between antennal bases; S3 with lateral yellow markings that is covered with yellowish to orange fine hairs ------------------------ *Scolia flaviceps quettaensis*
   - Fissura frontalis present; carina between antennal bases absent; all abdominal sternites shiny black with ferruginous posterior margin ---------------------------------------------- *Scolia erythrocephala*

6. Abdomen entirely black ------------------------------------------------------------- 7
   - T2 and T3 with paired red transverse markings laterally ---------------------------------*Scolia dispar*

7. Antenna entirely black or dark brown; inner emargination of eyes with small reddish spot; S2 densely and finely punctured; body vestiture whitish ----------------------------------------------------------- *Scolia miniata*
   - Antenna with last 4 joints orange in male, while all except AS1 and AS2 orange in female; inner emargination of eyes without such reddish spot; S2 with coarse and dispersed punctures; body vestiture black ------------------------------------------ *Scolia arabica sp. nov.*

**ANNOTATED CHECKLIST TO SCOLIID SPECIES OF SAUDI ARABIA**

*Campsomeriella (Campsomeriella) thoracica* (Fabricius)

Female: Length:16-22mm.Entirely black. Vestiture orange on occiput, pronotum, anterior margin of mesoscutum, inner eye emargination, in mesopleura intermixed with black, black on dorsolateral area of propodeum. Posterior fringes of abdominal tergites black. Wings orange at basal half, black apically. Clypeus
golden yellow, narrow at base, broad and slightly sinuated at free margin, longitudinally ridged subapically (Fig.7). Fissura frontalis absent. Mandibles stout, lined at basal half exteriorly with peculiar ferruginous setae (Fig.8). Hind ocelli margined posteriorly by a distinct linear groove.

Scapula greatly obscured with the dense erect vestiture. Mesoscutum, scutellum, and metanotum with scattered shallow punctures, becoming fine and more contiguous on anterior half of metanotum. Mesopleura finely punctured, metapleura bare, impunctate. Legs densely covered with black spines; hind tibial spurs transparent, acipically acute.

T2 and T3 impunctate, with erect black vestiture posteriorly with a row of subapical punctures beneath. Pygideal plate rounded (Fig. 9), with coarse black setulae. S2-3 with black fringes posteriorly.

Male: Length 12-17mm. Black with orange in the following parts: pronotum medially, clypeus (except for a bell-shaped middle area) (Fig.10), broad bands on posterior margin of abdominal tergites, pygideal plate, base of mandibles. Vestiture pale, erect on head, thorax, T1, T2, much fewer on T3, legs, obscuring punctures below. Posterior fringes on T2-6 orange. Tibiae and tarsi with dense transparent setae

Antennae longer than in female, AS13 transversely truncate at apex (Fig.11). Clypeus surrounded externally with pale yellowish hairs, bare. Legs with some creamy yellow markings. Wings hyaline slightly fumigated at apex. Tegulae golden, with dense black setulae at base. Abdominal sternites with some erect fine pale vestiture. Posterior margin of S5, all S6 and S7 with brownish fine hairs. Lateral margins of all sternites punctured. Pygideal plate (Fig.12) quadrate, with angulated corners, with few scattered transparent spines, impunctate, with transparent posterior margin.

Material: 3♂♂, Hadasham, 10-17.4.2004; 1♂, Hadasham, 29.11.2003; 1♂, Hadasham, 11.3.2004; 1♂, Hadasham, 1.4.2002; large number of females and males were collected at Taif, 5-6.2004.

Distribution: This species is distributed from Yemen to Iran, northern Africa, southern Spain, Greece and recently from Oman (Osten, in press). In Saudi Arabia, it was previously recorded from Riyadh and Taraba under the name Campsomeris thoracica eriophora Klug (Shalaby, 1961).

Micromeriella aureola aureola (Klug)


Female: Length 13-17mm. Black with mostly golden-yellow abdomen. Wings hyaline with yellow or golden veins. With yellowish to orange vestiture on occiput, inner eye emargination, between antennal bases, some finer ones on metanotum, dorso-median area of propodeum. Head shiny black, middle ocellus is found in a depression. Antennae shiny black, much shorter (AS1-12) than in male, bare, impunctate. Clypeus black at base, densely covered with long whitish vestiture, free margin ferruginous, with very peculiar transverse upwardly elevated band at free margin, slightly protruted in the middle; the ferruginous area of it just above this band appears as if longitudinally ridged (Fig.13). Mandibles ferruginous, stout, with no distinct teeth at inner margin.

Thorax entirely shiny black, with erect whitish to yellowish hairs in the middle that is upwardly directed. Mesoscutum smooth and shiny, covered with such hairs, deeply punctured laterally, bare medially. Tegulae shiny black. Scutellum with such hairs that has large deep sockets, distributed in one row anteriorly, becomes more laterally. Metanotum with lateral group of fine orange hairs that has much finer sockets, leaving small bare area in the middle. Legs black to ferruginous, with all femora densely covered with clusters of long whitish hairs. Front femora densely and finely punctured. Mid and hind tibiae with longitudinal rows of stout transparent spines along their lengths that arising from serrations. Longer hind tibial spur acipically spatulate (Fig.4).

Anterior margin of T1 and antero-median area of T2 black. Anterior margin of T1 with erect fine hairs. Pygideal plate darker, coarsely punctulate. Stermites dark orange, S1 dark brown, bare, impunctate and shiny. Median area of S4-7 with whitish fringes.

Male: Length 11-16 mm. Black and yellow with few ferruginous parts. The following is yellow: middle area of pronotum, very small transverse line on posterior margin of scutellum and metanotum, apices of femora, outer
margins of tibiae, all tarsi, transverse bands on posterior margins of T₁-₆, inner margin of fore and hind femora, clypeus (except in the middle), very small spots on lateral sides of S₃ and S₄ posteriorly, basal half of mandibles, tegula.

The ferruginous is in the following areas: Antennae except AS₁ and AS₂, pygidial plate, S₄, apical half of mandibles.

Antennae much longer than in female with AS₁ and AS₂ contiguously punctured. The yellow part of clypeus contiguously coarsely punctured, narrow at base, with straight basal and free margins, free margin slightly upwardly curved. Scutellum, metanotum and propodeum densely covered with stiff hairs masking background beneath in some specimens. Abdominal tergites with constrictions in between, shiny, bare, deeply punctured. Pygideal plate smooth, impunctate anteriorly, while depressed and punctured, with some long whitish hairs in the middle; posterior margin membranous, upwardly turned. Posterior margin of T₅ and T₆ with orange fringes.

S₃ furrowed posteriorly, impunctate. Anterior margin of S₃ with transverse elevation. S₆ with erect black hairs.


Distribution: South east Iran, Tunisia, Libya, Egypt, Somalia, Eritrea, Sudan, Yemen, Oman. In Saudi Arabia, it was previously recorded from Jeddah (West of Saudi Arabia) (Osten, in press).

**Micromeriella hyalina hyalina** (Klug)

_Scolia hyalina_ Klug, 1832.- Symb. physic. Dec.3 Insect.


Female: Length 8-10mm. Shiny black, posterior margins of T₁-₃ with pale yellow bands. Body vestiture white. Frons obviously convex in the middle, punctuated at lower half which is greatly obscured by the long fine hairs originated from base of clypeus and upwardly directed reaching lower half of frons. Antennae (Fig.14) short, with relatively long AS₁. Antennal AS₁ and AS₂ shiny black, remaining joints ferruginous at outer margin, last two or three joints are black. Clypeus relatively large (Fig.5), shiny black, convex at basal half, masked by the dense whitish hairs that is directed transversely from the lateral sides to meet in the middle. Apical half of clypeus reddish, longitudinally ridged, upwardly elevated at free margin. Mandibles stout, ferruginous with dark blunted end, lined with long reddish hairs; with two very slight inner teeth (Fig.15). Occiput with upwardly directed white vestiture.

Anterior margin of pronotum with erect fine whitish hairs. Scapula densely punctured. Mesonotum with whitish intermixed with black hairs becomes much dense laterally. Tegula reddish, black at base. Wings hyaline with golden yellow veins. Legs black with ferruginous end of femora, tibiae and all tarsi. Tibiae and tarsi with dense whitish to transparent hairs and spines. Hind tibial spurs transparent, apically acute.

T₁ with erect fine vestiture in the middle anteriorly, remaining tergites with whitish fringes at posterior margins. Pygidial plate (Fig.16) relatively small, oval-shaped, densely covered with broad golden setulae. Cereri ferruginous. S₂ with such erect fine hairs anteriorly, S₃ with whitish fringes. All sternites shiny black to brown, with few punctures.


Distribution: Senegal, Sudan, Eritrea, Egypt, north Sinai Peninsula until southern Palestine, Libya to Marocco (Betrem, 1927). Recently collected from Oman as a first record to Arabian Peninsula (Osten, in press). Considered as first record to Saudi Arabia.

**Scolia (Discolia) dispar** (Klug)

_Scolia dispers_ Klug, 1832.- Symb. physic. Dec.3 Insect: T.26 F.1 (♀)and 2 (♂).

Female: Length 13-16mm. Black with the following orange parts: head (except clypeus), scapula, lateral spots on T₃ and T₅ which is relatively smaller on T₃, inner side of antennae, outer margin of AS₁₂. Wings dark-brown, with some purplish irredescence.
Occiput with orange vestiture. Ocellar furrow brown. Fissura frontalis extending from below mid ocellus until between antennal bases. AS₁₂ truncate at apex. Frons with some fine golden hairs. Clypeus dark brown, convex in the middle, subsinuated and depressed at free margin, rounded at base; with few fine golden hairs laterally. Mandibles ferruginous, stout without distinct inner teeth, lined with a group of fine comb-like orange peculiar setae at basal half. Scapula with erect orange vestiture, densely punctured. Mesonotum and scutellum contiguously punctured, with fine black hairs. Mesonotum with U-shaped parapsidal furrow, inside which a ferruginous area could be seen. Propodeum with contiguous fine punctures dorso-medially, covered with erect black hairs dorso-laterally.

Legs entirely black, with mid and hind femora shiny ferruginous apicoventrally. Mid and hind tibial spurs furnished with rows of short black spines along their lengths.

Anterior and lateral sides of T₁, as well as lateral margins of remaining tergites with erect black fine hairs. Posterior margin of T₂-₄ with black fringes. All tergites contiguously punctured. Pygideal plate densely setulose, with orange posterior margin. Plates between coxae densely covered with fine whitish hairs. A deep furrow could be seen between S₁ and S₂. Posterior margin of S₂-₅ with fine black fringe.

**Materials:** 1♀, southern Jeddah, 28.1.2002.

**Distribution:** Palestine, Turkey, Cyprus, Syria, Iran, Egypt, Sudan, Algeria, Arabian Peninsula with no specific locality (Osten, 2002). Previously recorded from Saudi Arabia with no specific locality (Betrem, 1935)

**Scolia erythrocephala Fabricius**


*Scolia erythrocephala* Klug, 1805.- Beitr. Z. Naturk. I p.23, n.5, ♀

Male: Length 10-20 mm. Black with yellow bands on T₃ and T₄. The following parts are ferruginous: Thorax, T₁, legs, pygideal plate, clypeus.

Head densely covered with erect fine hairs especially the occiput and above antennal bases. Middle ocellus present in a rounded depression from which fissura frontalis extending until between antennal bases. Antennae are found on slight elevation; all antennal segments dull, covered with micropubescence (except AS₁). Frons densely punctured. Clypeus (Fig.17) dull, bare in the middle, with group of punctures anteriorly, increase laterally; free margin depressed and flattened. Labrum in the form of rounded lobe, covered with stiff hairs. Mandibles relatively short, sickle-shaped, with two slight inner teeth (Fig.18). Pronotum densely covered with erect dark hairs especially on scapula. Mesonotum densely punctured, covered with fine black hairs antero-laterally, and golden finer ones posteriorly. Tegulae golden with dark hairy base. Scutellum contiguously punctured, densely covered with very fine black hairs. Lateral sides of metanotum with group of contiguous fine punctures. Dorso-median area of propodeum very finely punctured, hairy, dorso-lateral area bare, impunctate, very smooth anteriorly. Propodeal spiracles in the form of transverse projected slits.

Wings orange at costal margin, remaining part dark brown. Legs dark brown, slender. Outer margin of mid and hind tibiae with rows of black spines. Longer hind tibial spur apically acute. Abdomen densely punctured, hairy. Posterior margin of T₂-₄ with black fringe. Pygideal plate ferruginous with membranous yellowish outer margin, concave (Fig.19). A transverse furrow could be seen between S₁ and S₂. Abdominal sternites dark brown, ferruginous posteriorly. S₂ contiguously punctured.

**Materials:** 1♂, Hadasham, 21.3.2004.

**Distribution:** Central Europe, Africa. In Saudi Arabia, previously recorded from Madina (Shalaby, 1961).

**Scolia (Scolia) flaviceps quettaensis (Cameron)**


*Scolia (Scolia) erythrocephala schmidti* Betrem, 1927.- Ent. Mitt. xvi (4).

*Scolia (Scolia) erythrocephala schmidti* var. *flavoscapulata* Betrem, 1927.- Ent. Mitt. xvi (4).
Male: Length 12-20 mm. Black to ferruginous with some yellow. The ferruginous is in the following areas: Head (except posterior margin of eyes), thorax, anterior half of T1, posterior half of pygideal plate, very thin band on posterior margin of T3, outer margin of antennae, clypeus, mandibles except its end, femora except proximally, outer margin of tibiae and tarsi, pro- and mesopleuron, posterior margin of abdominal sternites. The yellow is in the following areas: T3, T4, lateral margins of T3, lateral spots on S3.

Head with stiff fine erect pale hairs, densely punctured. Fissura frontalis absent. Clypeus (Fig.20) slightly convex in the middle, with some punctures and hairs at base, flattened at free margin. A longitudinal carina with elevated black spot could be seen between antennal bases. AS13 obliquely truncate at apex (Fig.21). Pronotum with dense erect fine black vestiture. Wings mostly dark brown, with orange small area on costal margin that is not extending to apex comprising costal, radial and SMC1. Apical area of hind wing median cell is also orange. T1 and T2 densely covered with fine black hairs, T3-5 with dense yellowish hairs, that present only at lateral sides of T5, remaining tergites with longer black hairs. Pygideal plate (Fig.22) bare, coarsely sculptured. Posterior margins of tergites with black fringes. Abdominal sternites shiny with fewer hairs and black fringes posteriorly as those covering tergites, that increase in density at S6, and all S7. The yellow markings of S3 with some reddish to orange fine hairs.


Distribution: Iran, Afghanistan, Iraq, Oman (Betrem, 1935; Osten, in press) and United Emirates (Osten et al., 2003), first record to Saudi Arabia.

Scolia (Discolia) miniata Saussure


Male: Length 10-12 mm. Entirely dark brown slender species, with brownish legs, antennae, and wings. Occiput and inner emargination of eyes with some short, whitish erect vestiture. A quadrate, contiguously and finely punctured elevated area could be seen just above and between antennal bases, extending to just above clypeus (Fig.24). A reddish spot could be seen at inner emargination of eyes. Clypeus shiny, bare (except for some fine whitish hairs at base laterally), convex in the middle, with flattened to rounded free margin that is slightly elevated upwardly. Mandibles slender, reddish with small brownish area near to its tip, lined with whitish hairs at outer margin; with 2 slight teeth at inner margin (Fig.23). AS1 and AS2 sculptured, AS13 rounded to slightly truncate at apex (Fig.25). Middle ocellus is found in a rounded depression. Fissura frontalis absent.

Scapula, mesonotum, scutellum densely covered with suberect, fine whitish vestiture. Metanotum with fewer finer ones, lateral margins with coarse contiguous punctures. Dorso-median area of propodeum with scattered erect pale vestiture. Legs slender, covered with such whitish hairs intermixed with black spines along outer margins of tibiae. T1, anterior margin of T2 with fine whitish hairs, lateral sides of tergites with black ones. S2 densely punctured, S3-5 bare, impunctuate and shiny; S6 and S7 densely covered with fine pale hairs. Pygideal plate (Fig.26) conical shaped, with scattered long brownish setae, with spaced shallow, coarse punctures.

Materials: 1♂, southern Jeddah, 5.2002

Distribution: This species was found to be restricted to Arabian Peninsula where it was recently collected in Oman (Osten, in press). In Saudi Arabia, previously recorded with no specific locality (Betrem, 1935).

Scolia arabica sp. nov.

Holotype, male: Length 15-21mm. Body, legs, and wings entirely black. Sinus ocularis, and a fine line at the orbita are red as described by Betrem (1935) for S. miniata senescens Perez, 1907, Distribution: Arabia, Djidah but the rest is different. Most of AS6 and all AS10-13 orange in colour. Wings black with purplish iridescence. Vestiture black. Fissura frontalis absent. Middle ocellus present in a rounded depression. Frons obviously convex in the middle, contiguously and finely punctured. Last antennal segment (AS13) obliquely truncate at apex, deeply concave at inner margin (Fig.27); remaining segments finely and continguously punctured. Clypeus (Fig.28) convex medially, impunctate (except for some scattered punctures at base), with lateral fine vestiture, greatly

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depressed apico-laterally, with rounded to flattened free margin that is contiguously punctured. Labrum greatly concealed beneath clypeus, deeply notched apically. Mandibles relatively short, ferruginous at apex.

Scapula with erect fine vestiture. Mesoscutum with some subcontiguous punctures posteriorly. Scutellum with such vestiture along its surface, coarsely punctured as those of metanotum. Dorso-lateral area of propodeum with dense fine vestiture, finely punctured.

Abdominal tergites with contiguous fine punctures, with black vestiture that increase in density at posterior tergites. Pygideal plate (Fig.29) rounded, deeply concave medially, with some scattered long black setae.

Paratype, female: Length 25mm. robust than male, with short antennae, AS1 and AS2 black, remaining antennal segments orange, continguously and finely punctured; outer margin of AS1 with erect black hairs; AS12 slightly truncate at apex, not curved at inner side. Free margin of clypeus upwardly elevated, sinuated. Mandibles robust, ferruginous at end, outer margin of basal half lined with long very peculiar black setae.

Thorax with fewer vestiture than in male. Pygideal plate densely setulose, normal. S2 convex in the middle, with some scattered deep coarse punctures.

Materials: Holotype: 1♂, Hadasham (21 47N, 39 39E) in my collection; Paratypes: 1♀, Hadasham, 12.2.2003; 3♂♂, Hadasham, 17.1.2004; 10♀♀, 12♂♂ Taif (Mazghadiah), 4-6, 2004

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