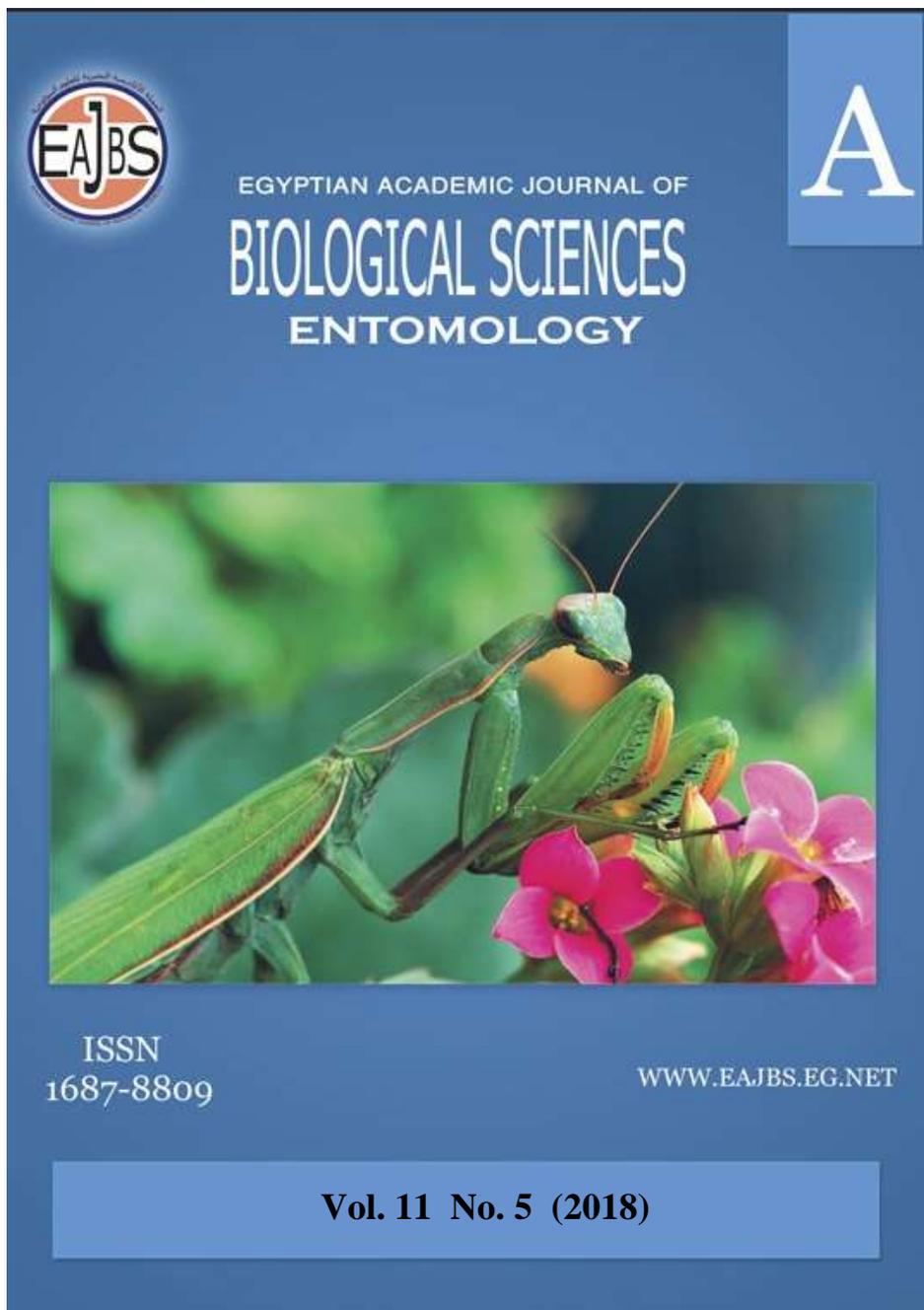


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Taxonomical Studies of Subtribe *Astenina* Hatch (Paederinae, Staphylinidae: Coleoptera) in Egypt

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ABSTRACT

Six species, two subgenera belonging to genus *Astenus* Dejean are taxonomically revised. The first subgenus contains one species (*A. (Astenopleuritus) melanurus*, the other five species transferred from subgenus *Astenognathus* Reitter to subgenus *Astenus* Dejean according to the recent catalogue. Key to subgenera and species are provided. Descriptive notes with some illustrations, distribution and synonymy of all species are given.

INTRODUCTION

Staphylinidae is considered the second largest family of beetles, with over 46200 known species, placed in more than 3200 genera, nearly 400 species are added each year (Newton *et al.*, 2005). In Egypt about 255 species of family Staphylinidae have been recorded (Alfieri, 1976). Most of the rove beetles are predators of other insects and live on or in the soil, in ground litter, moss, or in decomposing organic matter.

The genus *Astenus* was described by Dejean (1833) and is attributed to the subtribe *Astenina* (Hatch, 1957) of the tribe Paederini Fleming. According to recent catalogue by Schülke & Smetana (2015), the subtribe *Astenina* divided into 3 genera, *Astenus* Dejean, *Nazeris* Fauvel (= *Himastenus* Biswas & Sen Gupta) and *Sclerochiton* Kraatz. The genus *Astenus* contains more than 180 species in the Palearctic Region. It divided into four subgenera: *Astenopleuritus* Coiffait (11 species), *Astenus* Dejean (111 species), *Eurysunus* Reitter (65 species) and *Mecognathus* Wollaston (3 species). The taxonomic status was discussed by Stephens (1832), Dejean (1833), Erichson (1839 - 1840), Casey (1905 & 1910), Reitter (1909), Bernhauer & Schubert in their catalogue (1912), Koch (1934 & 1936), Blackwelder (1939 & 1952), Hatch (1957), Horion (1965), Alfieri (1976), Coiffait (1979, 1981, 1982 and 1984), Moore and Legner (1979), Herman (1981 & 2003), Assing (2003 & 2006), Lopl and Smetana (2004), Newton *et al.* (2005), Schülke & Smetana (2015) and Anlas (2017).

The present work was planned for further and detailed taxonomic status for the available species of subtribe *Astenina* which are obtained from two different sources, those collected from the field during study and those from different insect collections in Egypt.

MATERIALS AND METHODS

The present taxonomic study was based on an examination of the preserved specimens in the Egyptian Reference Insect Collections. These collections are: the collection of the Faculty of Agriculture, Al-Azhar University [ALFC], the collection of the Entomological Society of Egypt [EESC] and the collection of the Plant Protection Research Institute, Ministry of Agriculture [MAC]. The fresh materials were collected by using light and pitfall traps and by hand during the last two years.

RESULTS AND DISCUSSION

Subfamily: Paederinae Fleming, 1821

This subfamily can be recognized by the following characters: the last segment of the maxillary palpus is narrow and shorter than the penultimate (Fig. 4); the elytral epipleura are not delimited by a carina; the prothoracic epimeron is not delimited from the hypomeron by a carina; the coxae are large and excreted; the tibiae are without spines on the outer edge except rarely with a very few small spines; abdominal paratergites are present. The subfamily Paederinae is divided into two tribes, Paederini (11 subtribes) and Pinophilini (2 subtribes), both of which are widely distributed worldwide.

Tribe: Paederini Fleming, 1821

According to Schülke & Smetana (2015), the tribe Paederini consists of eleven subtribes as follows: Acanthoglossina, Astenina, Cryptobiina, Dolicaonina, Echiasterina, Lathrobiina, Medonina, Paederina, Scopaeina, Stilicina and Stilicopsina.

Subtribe: Astenina Hatch, 1957

Three genera and four subgenera belonging to subtribe Astenina are recorded by Schülke & Smetana (2015). These genera are: *Astenus* Dejean (with four subgenera), *Nazeris* Fauvel (= *Himastenus* Biswas & Sen Gupta) and *Sclerochiton* Kraatz.

Genus: *Astenus*, Dejean, 1833

Genus: *Astenus* Dejean, 1833: 36. Type species *Staphylinus angustatus* Paykull, 1789

Astenognathus Reitter, 1909:150 type species *Sunius bimaculatus* Erichson, 1840 (Schülke & Smetana, 2015)

Neognathus Sharp, 1874a: 69 type species *Neognathus angulatus* Sharp

Thoobia Gistel, 1856: 389 type species *Staphylinus angustatus* Paykull

This genus differs from the other genera by the following characters: small species; somewhat densely and finely sculptured. **Head** quadrate, disc densely punctured, narrower behind to form a neck which is less than half as wide as the head; eyes moderate, hardly protruding, located near the middle of the side margin of the head; antennae eleven segmented, filiform, first two or three segments sparsely pubescent, succeeding segments more densely so; mandibles long, slender, falcate (Fig. 3); labrum with small central emargination bounded on each side by a small tooth (Fig. 2); ocelli absent; maxillary palpus four-segmented, first segment small, second segment longer than wide, curved, widest at apex, third segment a little longer and wider than second, widest at near apical third, fourth segment minute (Fig. 4); labial palpus three-segmented, first two segments longer than wide, third segment much shorter and narrower than second (Fig. 5). **Thorax:** pronotum oval, lateral carina absent, disc densely punctate; prosternum long, tumid front, expanded

beneath and behind the coxae; mesosternal process acute, extending about one-third of the distance between the coxae; mesosternum not longitudinally carinate; middle coxae contiguous; elytra quadrate, elytral epipleura not delimited by a carina; anterior coxal cavities closed behind by a process of the prosternum; tibiae without spines on the outer edge; tarsi five segmented, anterior tarsus not dilated (Fig. 6); posterior tarsus with the first segment about as long as the next four together, second segment about half as long as first, third segment less than half as long as second; fourth segment with the lobes as long as third segment; fifth segment longer than third segment. **Abdomen:** moderately densely punctuate; abdominal terga usually not impressed at base; anterior segments with paratergites; first visible sternum with a small keel between coxae.

The genus *Astenus* Dejean is represented in Egypt by only two subgenera: *Astenopleuritus* (one species) and *Astenus* (5 species).

Key to Egyptian subgenera and species of genus *Astenus* Dejean

1-	Base of abdomen narrow, the 1 st abdominal tergite (without the lateral edges) twice as wide as long, without basal impression; pleura of the genital segment in both sexes, each extended in a long appendix, these appendages very apparent at the top of the abdomen..... subgen. <i>Astenopleuritus</i> Coiffait Body length 3.5 to 3.7 mm.; red light brown to yellowish red; posterior margins of the first 3 abdominal tergites without erect setae, near lateral furrow; each of anterior and posterior angles of pronotum with a long seta, both at least as long as the 3 rd antennal segment; eyes small, approximately the same length of the temples; elytra yellowish red, without discal spot; aedeagus as in figures 13 & 14..... <i>A. (Astenopleuritus) melanurus (Kuster)</i>	
-	Base of abdomen wider, usually 3 times as wide as long; the 1 st abdominal tergite (without the lateral edges) with basal transverse impression; lateral margin of pronotum with several erect setae; pleura of genital segment normal, not exceeding or barely above the top of the last segment..... subgen <i>Astenus</i> Dejean	2
2-	Body length 4.5 to 5.2 mm; entirely black except apical borders of elytra yellowish brown, sometimes shoulders with light spots; the temples as long as eyes; each of anterior and posterior angles of pronotum with black and erect seta, both at least as long as the 3 rd antennal segment; elytra distinctly longer than wide,, as wide as head at eye level; antennae rather long, the third segment much longer than the second, slightly longer than wide; aedeagus as in figures 7 & 8..... <i>A. (Astenus) procerus (Gravenhorst)</i>	
-	Smaller species less than 4 mm; yellowish red to red light brown..	3
3-	The first 4 abdominal tergites without lateral setae or with very short setae, much shorter than the first segment of middle tarsus; apex of abdomen with only a few short and thin bristles; elytra without discal spot, entirely yellow; eyes large, longer than the temples; Narrow species, abdomen more parallel, hardly enlarged at the fourth segment, or much narrower than the elytra; aedeagus as in figures 15 & 16; Length 3.5 to 4 mm. <i>A. (Astenus) aegyptiacus Coiffait</i>	
-	Each of the first 4 abdominal tergites bearing on each side a long black seta, at least as long as the first segment of middle tarsus, this seta inserted on the posterior margin, near the lateral furrow; apex of abdomen with similar numerous setae; elytra usually with a dark discal spot, sometimes blurred or absent.	4

4-	Pronotum small , much narrower than the head and elytra; its lateral margins with 4 – 5 black erect setae; elytra yellowish red, without discal spots; aedeagus truncated apically (Fig. 17 & 18); length 3 mm..... <i>A. (Astenus) indicus Kraatz</i>	
-	Elytra with a large dark brown discal spot, sometimes touching the lateral margins; propygidium with a white border membranous...	5
5	length 3.5 to 4 mm, red yellow, head and abdomen darkened; eyes small, as long as the temple; antennal segments 5-10 one and half times as long as wide; anterior and posterior angles with lateral seta, both well developed, at least as long as the third antennal segment; elytra and base of abdomen strongly and densely granulated; aedeagus as in figures 11 & 12..... <i>A. (Astenus) bimaculatus cinguliventris Koch</i>	
-	Length 3.5 mm; eyes large and pulging, longer than the temple; antennal segments 5-10 twice as long as wide; sometimes pronotum with one or two smaller setae between anterior and posterior setae on the lateral margin; elytra with rough punctuation; aedeagus as in Figures 9 & 10..... <i>A. (Astenus) nigromaculatus (Motsch.)</i>	

Subgenus: *Astenopleuritus* Coiffait, 1982: 98, type species *Astenus flavipennis* Cameron, 1931.

1- *A. (Astenopleuritus) melanurus* (Kuster, 1853)

Sunius melanurus Kuster, 1853: 76.

Sunius aemulus Rottenberg, 1870: 33.

Descriptive notes: Body length 3.5 to 3.7 mm, red light brown to yellowish red, with propygidium more or less darkened; legs, antennae and mouthparts yellow. Head without the mouth parts, much longer than wide behind the eyes; eyes large and highly convex, scarcely longer than the temples, surface of head covered with thin and dense umbilicated punctures. Antennae short, 3rd segment slightly longer than the 2nd or 4th segments, the following 5th - 10th approximately one and half times longer than wide. Pronotum oval, slightly longer than wide, as long as head without the mouthparts of its widest point, which is located towards the anterior quarter, or almost as wide as the head behind the eyes, its surface covered with umbilicated punctures, slightly stronger than the head, each of anterior and posterior angles of pronotum with seta, both at least as long as the 3rd segment of the antennae. Elytra longer than wide, significantly longer at the shoulder than pronotum on its median line, at least as wide as head at eyes level, their surface covered with strong, densely and coarsely punctuation.

Abdomen at the base with a punctuation similar to that of elytra, but finer and closer, in transverse wrinkles, becoming even finer and more sparse towards the top, the first three abdominal tergites without erect setae to their posterior border, near the lateral furrow, or with short setae, shorter than the first segment of intermediate tarsi; propygidium border with a whitish membranous to its posterior margin.

Aedeagus short, stout, slightly arched, the ventral plate ending in sharp point and strongly toothed below (Figs. 13 & 14).

Distribution: This species is known from southern Europe, North Africa, Cyprus, Iran, Syria, Turkey in Palearctic Region, and also in Oriental and Afrotropical Region (Schülke & Smetana, 2015).

Materials examined:

Rod El Farg, 12/11/1907 (4); Cairo, 2/5/1909 (2); Luxer, 7/7/1904 (3); Tura,

1/5/1913; 16/10/1910(4); .. /10 (4); Marg, -/9/1907(12); 18/10/1907; Abu Rawash, 1/1/19, 20/9/1909 (2); Mazghona, 20/10/1907; Massara, 4/10/1907; Katta, 15/11/1910 (2); Egypt (4) [EESC]

Talbiah, 29/11/1915; Maadi, 1/3/1912; Kirdasa, 20/1/1921; 5/12/1920 [ALFC]
Benha, 25/6/1912; 25/11/1934; W. Digla, 7/9/1923; 1/8/1924; 23/8/1925;
28/10/1934; Giza, 2/8/1926; Asyut, 12/11/1930; Helwan, 26/6/1933; Barrage,
10/9/1933; King Mariot, 17/3/1935; Ramleh, 12/6/1930 [MAC]

Subgenus *Astenus* Dejean, 1833: 36 type species *Staphylinus angustatus* Paykull, 1789

The subgenus *Astenus* can be recognized from the subgenus *Astenopleutitus* by the Pleura of genital segment are normal, not exceeding or barely above the top of the tergum and sternum. Base of the abdomen is broad. The first abdominal tergite (without the side edges) at least is three times as wide as long, with distinct basal transverse impression. Elytra are parallel sides, almost as wide as the last abdominal segments. Winged species having always three to five lateral setae on pronotum.

2- *A. (Astenus) aegyptiacus* Coiffait, 1971.

A. (Astenognathus) aegyptiacus Coiffait, 1971: 189, type Northwestern Egypt, Siwa Oasis.

Descriptive notes: Body length 3.5 - 4 mm. Slender and with parallel sides, entirely yellow except propygidium reddish and slightly darker; legs reddish brown; antennae and mouthparts yellow. Head without the mouth parts, much longer than wide, hind angles clearly marked, eyes large, much longer than the temples; surface of head covered with umbilicated punctures. Antennae short, the 3rd segment slightly longer than the 2nd or the 4th, somewhat one and half as long as wide; pronotum oval, distinctly longer than wide at its widest point, which is located toward the anterior third, in this point, much narrower than the head, with erased angles, each angles bearing a seta, nearly as long as the 3rd segment of antennae, the sides also with a smaller setae on the lateral margins, a little beyond the middle and a similar one between the anterior seta and neck seta; surface of pronotum with umbilicated punctures, more or less oblong, slightly larger than the head. Elytra rectangular, distinctly longer than wide, longer and wider than pronotum, also wider than head, including eyes, with rough and dense punctures. Abdomen parallel sides, not or hardly expanded at the 4th visible segment, tergites in front of with faint punctures but as sharp as that of elytra, becoming gradually finer and more sparse, abdominal visible tergites 1- 4 with indistinct short setae, inserted on the posterior margins near lateral furrows; propygidium border with a white membranous extending to its posterior edge. Aedeagus short, narrowed into a sharp point apically, ventral plate almost straight, its end with arcuate sharp tooth (Figs. 15 & 16).

Distribution: Egypt (This species described from Egypt).

3- *A. (Astenus) bimaculatus cinguliventris* Koch, 1936: 152.

Descriptive notes: Body length 3.5 to 4 mm. red yellow, elytra usually with a discal spot, the head and abdomen more or less darkened, antennae, legs and mouthparts yellow. Head without the mouthparts, distinctly longer than wide, behind the eyes narrowed rounded, temples just as long as eyes, which are large and convex, head with umbilicated punctures somewhat large and dense. Antenna short, the 3rd antennal segment slightly longer than the 2nd or 4th, from the 5th to the 10th less than two times as long as wide. Pronotum oval, about as long as the head without the mouthparts, much narrower than head, its greatest width toward the anterior third, surface covered with umbilicated punctures, anterior and posterior angles with lateral seta, both well developed, at least as long as the 3rd segment of antennae. Elytra

longer than wide, slightly narrowed apically, much longer at the shoulder than pronotum at its midline, slightly wider than the head at eye level, their surface strongly and densely granulated. Abdomen with punctuation at the base of the same type as that of elytra, arranged in transverse series, finer and closer, becoming even finer and more sparse on posterior tergites; first 4 tergites, each with a large silk erect seta on posterior margins near the lateral furrows; propygidium border with a white membranous. Aedeagus (Figs. 11 & 12) ventral plate turned up into a sharp point dorsally, sharply toothed far enough below the apex.

Distribution: this subspecies described from Egypt by Koch, 1936.

Materials Examined: Giza, 23/10/2016[MAC]

4- A. (*Astenus*) *indicus* (Kraatz, 1859)

Sunis indicus Kraatz, 1859: 148.

Sunius aequalis Blackburn, 1888: 9.

A. (Astenognathus) parviceps Ragusa, 1891: 239.

Descriptive notes: This species can be recognized by the following characters: Form narrow, elongate with parallel sides, yellowish red; head behind eyes broadly rounded at its base; antenna long and slender, 3rd antennal segment one and half times as long as the 2nd segment; pronotum small, slightly wider in front, much narrower than the head and especially the elytra, sides of pronotum bearing 4 – 5 black erect long setae on each side; the first four abdominal tergites, each of them bearing on each side a long black seta, at least as long as the first segment of middle tarsus, this seta inserted on the posterior margin, near the lateral furrow; seventh abdominal segment black; posterior margin of sixth abdominal sternite of male acute, excision, triangular, externally bounded by a narrow groove; posterior margin of sternite 5 of male feebly emarginated at middle; aedeagus truncated at apex as in figures 17 & 18.

Distribution: India, Burma, Oriental Region, East and West Africa, Canaries.

Remark: This species is not represented in our collections, also not collected during the study (Alfieri, 1976).

5- A. (*Astenus*) *nigromaculatus* (Motschulsky, 1858); type: Egypt, Alexandria.

Sunius nigromaculatus Motschulsky, 1858: 637.

Sunius simillimus Eppelsheim, 1885:123.

Descriptive notes: Body length 3.5 mm, red yellow to red brown, propygidium and discal spot on the elytra dark brown, legs, antennae and mouthparts yellow. Head without the mouthparts, as long as wide at eye level, slightly narrowed behind them, eyes large and bulging, slightly longer than the temples, the head surface covered with a thin, tight umbilicated punctures. Antennae rather long, the 3rd segment much longer than the 2nd or the 4th, from the 5th to 10th segments about twice as long as wide. Pronotum oval, longer than wide, as long as head without the mouth parts, in its widest point, which is located toward the anterior third, slightly narrower than the head behind the eyes, pronotal surface covered with umbilicated and tight punctures, a little stronger than that of the head, lateral margin of pronotum with two well-developed long setae, at least as long as the 3rd segment of the antennae, and sometimes between them one or two smaller setae. Elytra large, much longer than wide, much longer at the shoulders than pronotum on its median line, at least as wide as head at eye level, its surface covered with rough, strong and dense punctures; punctuation of the abdomen of the same type as that of elytra, but finer and more tightly arranged and transverse wrinkles, becoming finer and more sparse on posterior terga; first 4 terga each with a large silk inserted on the posterior margin near the lateral furrow; propygidium border with a white membranous. Aedeagus

slightly arched, the ventral plate narrowed rather abruptly in a sharp point at its apex (Figs. 9 & 10).

Distribution: Spain, Algeria, Egypt, Morocco, Tunisia, Israel, Syria and Yemen.

Materials Examined: Beni Mazar, 21/5/1915; Alexandria, 1910 (5); Tura, 18/7/1909(4); Pyramids, 12/11/1911; Luxor, 7/7/1909(2); 20/9/1912 (5) [EESC]
Fayoum, 2/9/2017 (3), Giza, 18/9/2017 (2) [MAC]

6- A. (*Astenus*) *procerus* (Gravenhorst, 1806)

Paederus procerus Gravenhorst, 1806: 141 **type: Paris.**

Paederus filiformis Latreille, 1806: 293

Paederus extensus Mannerheim, 1830: 39.

Astenus (Astenognathus) procerus Lacordaire, 1835: 436.

Paederus filum Waltl, 1838: 267.

Sunius seriealus Motschnlsky, 1860: 561.

Sunius humeralis Gredler, 1863:110.

Sunius abbreviatus Baudi di Selve, 1870: 393.

Descriptive notes: Body length from 4.5 to 5.2 mm, black, apical elytral borders yellow-brown, legs, antennae and mouthparts yellow red. Head without the mouthparts, distinctly longer than wide, slightly narrowed behind eyes towards the neck, the hind angles rounded, the temples as long as eyes, head with a thin umbilicated punctuation. Antennae rather long, the 3rd segment much longer than the 2nd, slightly longer than wide. Pronotum oval, much longer than wide at its widest point, which is located towards the anterior quarter, at this point, a little narrower than head, its surface covered with umbilicated and tight punctuations, similar to head; each of anterior and posterior lateral margins of pronotum with well-developed long setae both at least as long as the 3rd antennal segment. Elytra distinctly longer than wide, longer at the shoulder than pronotum on its midline, as wide as head at eye level, their surface covered with a strong, grainy and tight punctuation. Abdominal terga with the same punctuation as that of elytra, the anterior terga thinner and tighter, become finer and sparser on posterior terga. Aedeagus arched, long stretches in a sharp point, the apex with a small longitudinal ridges raised median strip visible in profile (Figs. 7 & 8).

Distribution: This species widespread in Europe, North Africa and Cyprus, Iran, Lebanon, Tajikistan, Turkey, Uzbekistan and West Siberia (Schülke & Smetana, 2015)

Materials Examined: Fayoum, 21/10/20116 (3); Beni mazar, 11/ 2/2017 [MAC]

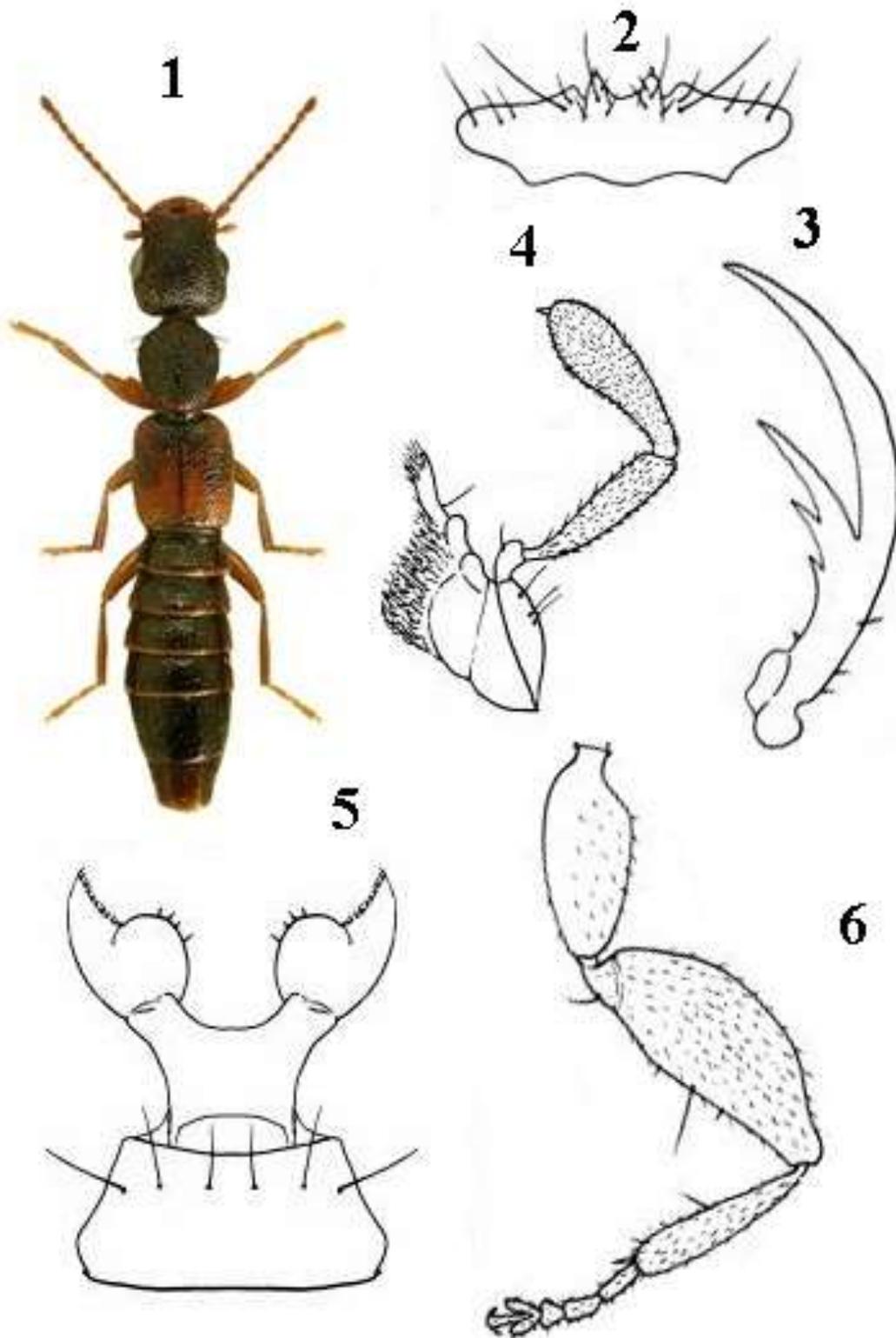
**PLATE [1]**

Fig. 1: *A. (Astenus) bimaculatus* (dorsal view); Fig.2: Labrum; Fig. 3: Mandible;
Fig.4: Maxillary palpus; Fig. 5: Labium; Fig. 6: Fore leg

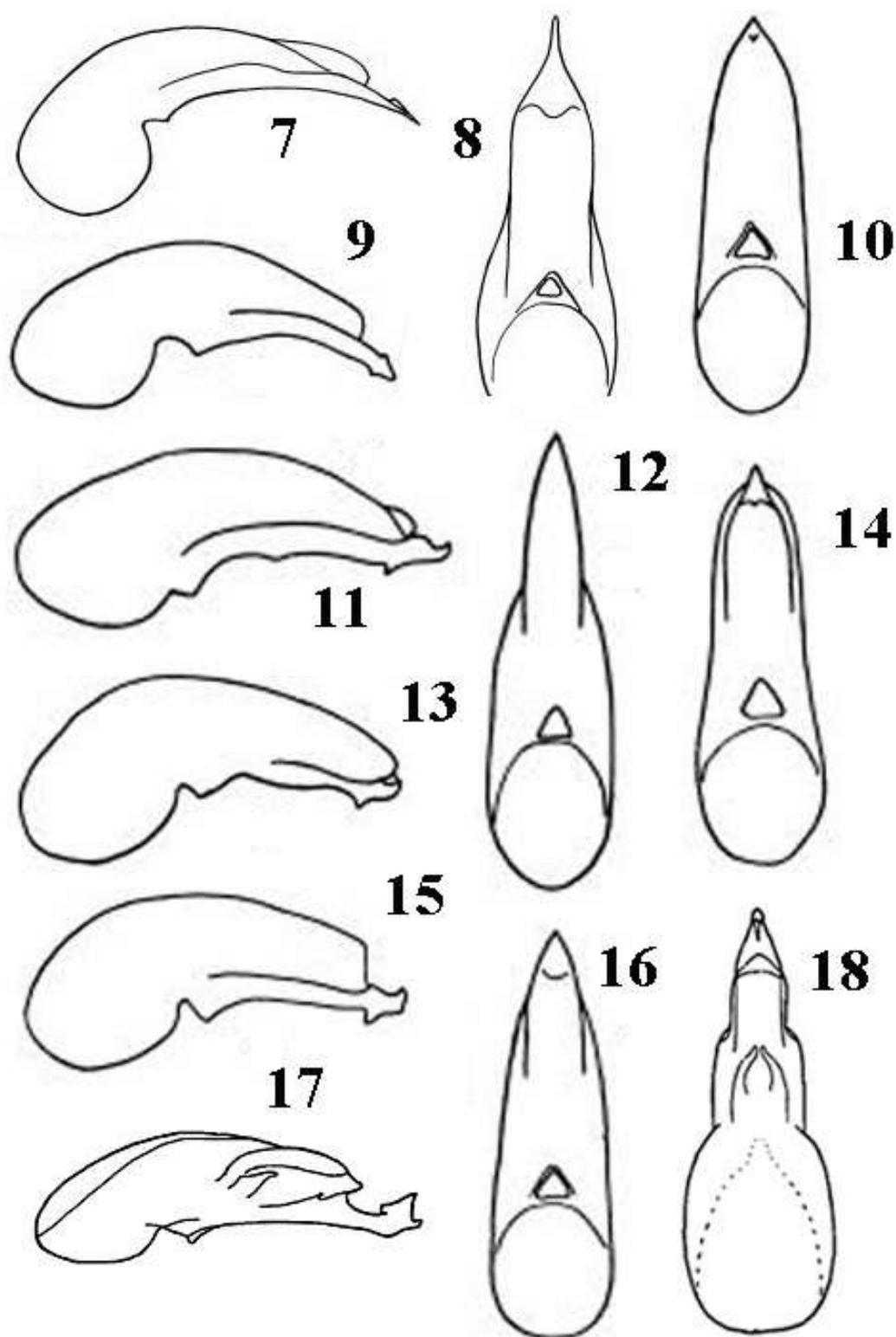


PLATE [2]

Aedeagus of: Figs. 7-8: *A. (Astenus) procerus*; Figs. 9-10: *A. (Astenus) nigromaculatus*; Figs. 11-12: *A. (Astenus) bimaculatus*; Figs. 13-14: *A. (Astenus) melanurus*; Figs. 15-16: *A. (Astenus) aegyptiacus*; Figs. 17-18: *A. (Astenus) indicus*.

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