

African Journal of Biotechnology Vol. 10(21), pp. 4501-4507, 23 May, 2011
Available online at <http://www.academicjournals.org/AJB>
DOI: 10.5897/AJB10.2136
ISSN 1684-5315 © 2011 Academic Journals

Full Length Research Paper

Description of a new species of *Megastigmus* Dalman (Hymenoptera: Chalcidoidea: Torymidae) from Saudi Arabia

Hamed A. Ghramh and Ali A. Shati*

Department of Biology, College of Science, King Khalid University, Abha, Saudi Arabia.

Accepted 25 March, 2011

A new species, *Megastigmus asir*, sp. nov. (Hymenoptera: Torymidae) which emerged from seeds of *Juniperus procera* (Cupressaceae) collected from Jabel Al sodah, Asir region, Saudi Arabia is described and illustrated. The genus, *Megastigmus* Dalman, is recorded for the first time from Saudi Arabia.

Key words: *Megastigmus*, Torymidae, new records, new species, *Juniperus procera*, Saudi Arabia.

INTRODUCTION

Seed infesting chalcids of the genus, *Megastigmus* Dalman (Chalcidoidea: Torymidae), are considered as a serious pest of conifer species (Keen, 1958; Lessmann, 1974a, b; Hedlin et al., 1980; Roques, 1983; Jarry et al., 1996). The genus *Megastigmus* contains 139 species worldwide of which 59 are obligate seed feeders (Grissell, 1999). Most of them develop in seeds of the plant families, Pinaceae and Rosaceae, but their hosts also include conifers of the families Cupressaceae and Taxodiaceae (Yates, 1986) and broad-leaved trees of the families Anacardiaceae, Aquifoliaceae, Fabaceae and Hamamelidaceae (Milliron, 1949; Grissell, 1989; Popescu, 2006; Narendran, 1994; Zerova and Seryogina, 1994; Noyes, 1998). Grissell (1999) recognized four basic feeding types within this genus: Those that feed strictly within tree seeds; facultative parasitoids that require a gall-former but feed on plant tissue within the gall as well; obligate egg-larval or larval parasitoids of gall-forming Hymenoptera; and gall-formers (Grissell, 1999). However, Boucek (1988) suggested that the entomophagous species are peculiar in having a metallic coloration.

In the present paper, the genus *Megastigmus* was

recorded for the first time from Saudi Arabia with description of a new species namely *Megastigmus asir* sp.nov. The new species infests seeds of coniferous tree *Juniperus procera* in Al sodah mountain ranges in Asir region. The types of specimens are deposited in the collection of Zoology Department, Aligarh Muslim University, Aligarh-02. UP, India (ZDAMU) (Registration no. HC. 547).

MATERIALS AND METHODS

The specimens were reared from seeds of *J. procera* Hochst. ex Endl. (Cupressaceae) and were collected from Jabel Al sodah in Asir region, Saudi Arabia during the year 2008 to 2009. The material were examined and imaged under a Nikon SMZ1200 stereomicroscope. Terms for body sculpture were consistent with those used by Boucek (1988), while terms for morphology follow Grissell (1995) and Gibson (1997). Collection abbreviation of ZDAMU: Zoology Department, Aligarh Muslim University, Aligarh-02. UP, India.

Description

Megastigmus asir GHRAMH and SHATI sp. nov.

Female: The length is 2.85 mm, while the ovipositor is 1.40 mm (holotype 2.8 mm, ovipositor 1.37 mm) (Figure 1).

*Corresponding author. E-mail: shati100@yahoo.com. Tel: +96672417830.



Figure 1. Female dorsal view.

Colour: The body is yellowish, with brownish black patches on the ventral side of the gaster. The tegula has the same colour with thorax, gaster has brownish patches laterally and ovipositor sheaths are brownish black, scape and pedicel yellowish. The eye is brownish red, the median ocellus transparent and the lateral ocellus is brownish. The wings hyaline have veins and are pubescence brown (Figure 7), the stigma is blackish brown and the uncus is transparent. Similarly, the legs have the same colour as the body.

Head: The head in dorsal view is about 1.55 times as long as wide as the pronotal collar with moderately long brown and sparse bristles on the vertex, the occipital and the upper face up to the level of the antenna; whereas the lower face is clothed with pale hairs of medium length. The temple is somewhat straight, but slightly longer than the half length of the eye. The vertex has oblique rugae on either side of the median ocellus, while the rest of the area has a finely cross striate-reticulate; and the occipital carina is distinct by POL 2.81x OOL. The head in the front view (1.10 times) is as broad as it is high. The face below the antenna is moderately distinct with longitudinal rugae, while the other area is finely striated, although the malar space (0.43 times) is as long as the eye. The antenna (Figure 9) is inserted almost in the centre of the face, while the scape exceeds the level of the vertex, and the

pedicellus plus flagellum is 3.4 times as long as the scape. The pedicel is almost as long as the F1, the anellus is elongated, the terminal funicular segments are a little shorter, while the others are of equal length, with a single row of long sensillae. However, the clava (2.1 times) is as long as the preceding segment (Figure 4).

Thorax: The thorax is found with strong cross striations and brown bristles entirely on the dorsal surface (Figure 5). The pronotal collar is as broad as it is long and a little shorter than the mid lobe of the mesoscutum. Mesoscutum is almost as broad as it is long, while the notauli is complete. Scutellum, with rather coarse and fine striations is 0.82 times as long as the mesoscutum is medial. The frenal area is shiny with fine longitudinal rugae on the entire area. Medially, the propodeum is 0.66 times as long as the scutellum, while the median area and sides are almost smooth, and the callus is shiny with dense white hairs. However, the base of each hair has a reddish brown spot. The spiracles oval is separated by 1.5 times on their own diameter from the hind margin of the metanotum. The forewing is 2.70x as long as it is broad, while the basal vein which is distinct, runs obliquely to SMV, and is almost half as long as the MV. The MV's half is as long as the costal cell, while the basal cell is partly closed. The cubital hair line is incomplete, the disc has 4 to 7 scattered hairs towards the tip, the costal cell is hairy in the distal three-fourth area, the speculum is very narrow and almost absent



Figure 2. Female lateral view (on card).



Figure 3. Male lateral view.

and closed below, the stigma is conspicuous and its uncus is distinct, and the stigma is 1.5 times as long as it is broad (minus uncus). Moreover, the hind coxae are dorsally striated and hairy, and their relative lengths are 40, 45, 75 and 60 for hind coxae, femur, tibia and tarsus, respectively.

Gaster: The sessile, that is smooth, is 1.60 times as long as the hind tibia, 0.85x as long as the thorax and 0.75x as long as the ovipositor sheath laterally. The ovipositor sheath (Figure 2) is 0.5 times as long as the body, 1.33 times as long as the gaster and 2.13 times as long as the hind tibia. However, the posterior margin of T1 to T3 is incised in the middle.

Male: The length of the male is 2.3 to 2.7 mm and is relatively much darker in color than the female (Figure 3). It differs from the female in that it has a propodeum with the median area amid a few longitudinal ridges, of which one is very distinct in the form of a median carina, and the remaining area is finely reticulate. The gaster, with basal tergite, is produced in the form of a stalk, while the ocelli are larger and more pigmented. The antenna (Figure 8) is rather slender, while the scape elongates at about 3.8 times as long as it is broad. The pedicellus length plus flagellum is 3.7 times as long as the scape, while the pedicel is rather robust and almost long as the F1. The anellus is almost as long as it is wide, whereas the terminal funicular segments are a little shorter, while the others



Figure 4. Female dorsal view.

are of equal length with a double row of long sensillae. The clava is 2.1 times as long as the preceding segment, and the forewing (Figure 6) is 2.10 times as long as it is broad. Nonetheless, the stigma which is relatively much darker and distinct its uncus, is 1.35 times as long as it is broad (minus uncus).

Distribution: Asir region, Saudi Arabia.

Host: Seeds of *Junipers procera* (Cupressaceae).

Material examined

Holotype

Female (on card), 15.vii.2008, Jabel Al sodah, Asir region, Saudi Arabia, coll. Hamed, (ZDAMU) (R.no. 547).

Paratypes

Paratypes comprised 10 females and 5 males (on card) and 18 females and 10 males (in alcohol) with the same data as the



Figure 5. Female head and thorax dorsal view

holotype.

Other materials

A total of 18 females and 7 males (in alcohol), 27.vii.2009, Jabel Al sodah, Asir region, Saudi Arabia, coll. Hamed, is presently in the personal collection of the first author and will be deposited in BMNH, London.

Etymology

The species name is derived from its type locality.

RESULTS AND DISCUSSION

Megastigmus asir, *sp.nov.*, GHRAMH and SHATI, is the first record of this genus in the Kingdom of Saudi Arabia. It was reared from seeds of *J. procera* (Cupressaceae). However, in the Palearctic region, seeds of *Juniperus* spp. are host to eight species of *Megastigmus* (Turgeon et al., 1997). Recently, Roques and Skrzypczynska (2003) recognized 21 species of seed-infesting chalcids of the genus *Megastigmus* in Europe, North Africa and Asia. *Megastigmus asir* *sp. nov.*, runs very close to *Megastigmus atlanticus* (Roques and Skrzypczynska, 2003). However, it differs in that it has longitudinal carinae throughout the frenal area (the longitudinal carinae are found only on the lateral parts of the frenal area in *M. atlanticus*). The forewing stigma elongates more than 1.8 times as long as the width (forewing stigma is 1.5 times as long as the width in *M. atlanticus*), while the ovipositor sheath is 0.5 times as long as the

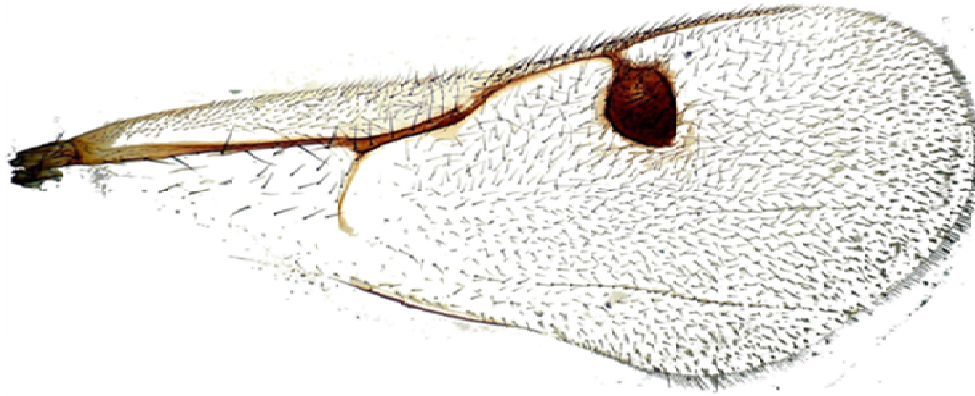


Figure 6. Male wing.

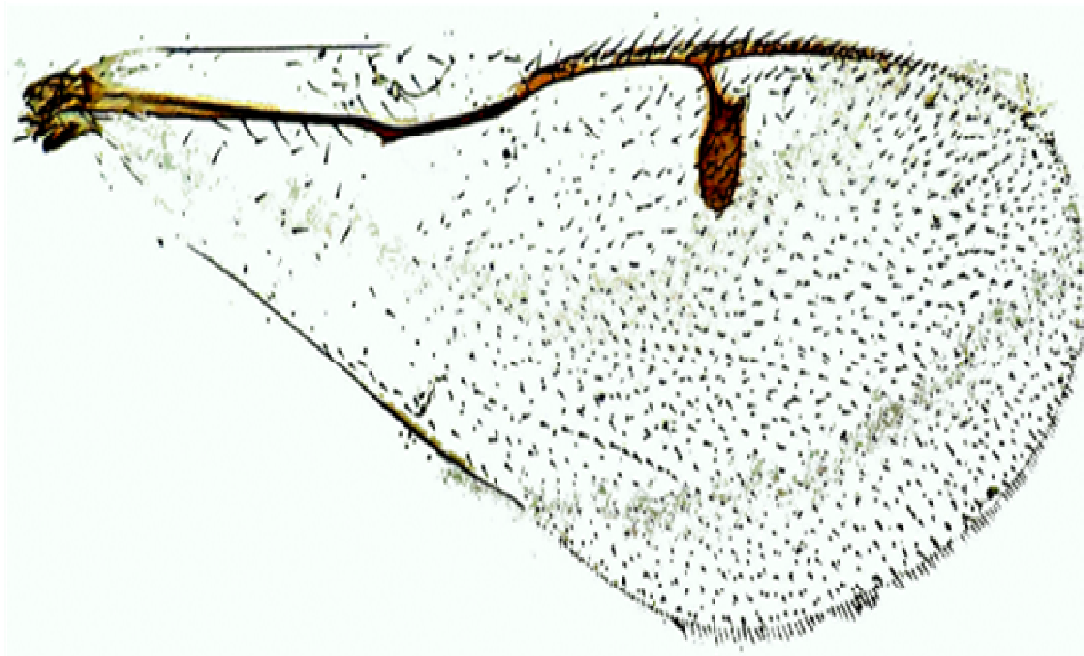


Figure 7. Female wing.



Figure 8. Male antenna.

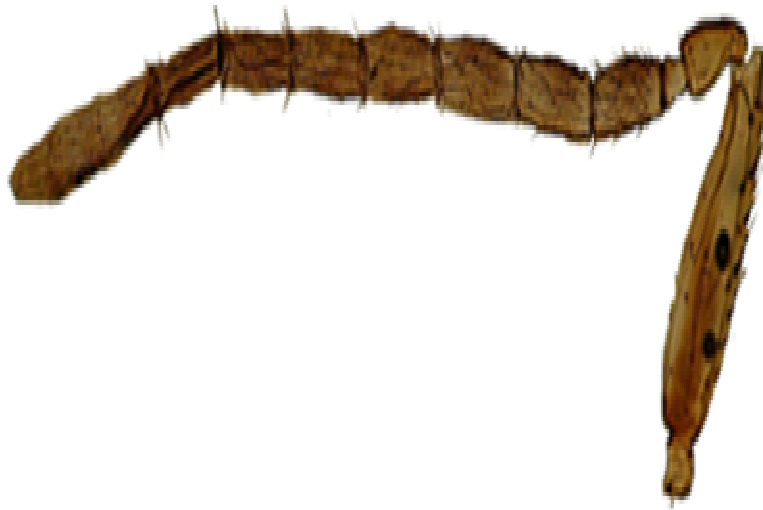


Figure 9. Female antenna.

body and 1.33 times as long as the gaster (ovipositor sheath is 0.7 times as long as the body and 2.1 times as long as the gaster in *M. atlanticus*). The first funicular segment is as long as the pedicel (that is, 1.3 times as long as the pedicel in *M. atlanticus*).

The new species also shows some resemblance in morphology and coloration with *Megastigmus somaliensis* (Hussey, 1955), which was also reared from the same host from East Africa, but it differs in that it has a propodeum, whose median area and sides are almost smooth, and its callus is shiny with dense white hairs (propodeum irregularly and transversely rugose with fine, weak converging carinae). However, the pronotum has a cross striation (pronotal striations are less defined laterally in *M. somaliensis*) and the hind coxae are dorsally striated and hairy (hind coxae are dorsally smooth and hairy in *M. somaliensis*).

REFERENCES

- Boucek Z (1988). Australian Chalcidoidea (Hymenoptera). A Biosystematic Revision Genera Fourteen Families, with a Reclassification Species (Wallingford, Oxon: CAB. International) p. 838.
- Gibson GAP (1997). Morphology and terminology, In Gibson GAP, Huber JT, Wolley JB (Ed). Annotated Keys to the Genera of *Nearctic Chalcidoidea* (Hymenoptera). Ottawa: National Res. Council Canada Press, pp. 16-44.
- Grissell EE (1989). *Megastigmus floridanus* (Hymenoptera: Torymidae), newly discovered on Ilex seed (Aquifoliaceae). P. Entomol. Soc. Wash. 91: 604-610.
- Grissell EE (1995). Toryminae (Hymenoptera: Chalcidoidea: Torymidae): A Redefinition, Generic Classification, and Annotated World Catalog of Species (Gainesville, IL:Associated Publishers), p. 470.
- Grissell EE (1999). An annotated catalog of world Megastigminae (Hymenoptera: Chalcidoidea: Torymidae). Contrib. Am. Entomol. Inst. 31(4): 92.
- Hedlin A, Yates H, Cibrain-Tover D, Ebel B, Koerber T, Merkel E (1980). Cone and Seed Insects of North American Conifers. Ottawa: Environ. Can. For. Serv. Washington, DC: U.S. For. Serv. Mexico: Secr. Agric. Recur. Hidraul. p. 122.
- Hussey NW (1955). A new species of *Megastigmus* (Hym. Chalcidoidea) from British Somaliland, B. Entomol. Res. 47: 57-59.
- Jarry M, Candau JN, Roques A, Ycart B (1996). Monitoring the impact of a seed chalcid, *Megastigmus spermotrophus* Wachtl (Hymenoptera: Torymidae) on seed production in a Douglas-fir seed orchard in France: modelling of the orchard invasion by non-resident chalcids. Can. Entomol. 129: 7-19.
- Keen FP (1958). Cone and seed insects of western forest trees. U.S. Dept. Agric. Tech. Bull. 1169: 1-168.
- Lessmann D (1974a). Ein Beitrag für Verbreitung und Lebensweise von *Megastigmus spermotrophus* Wachtl und *M. bipunctatus* Swederus (Hymenoptera: Chalcidoidea). Z. Angew. Entomol. 75: 1-42.
- Lessmann D (1974b). Zum vorkommen von *Megastigmus*-Arten und weiteren Samenschadlingen in der Bundesrepublik Deutschlands. Z. Angew. Entomol. 76: 160-166.
- Milliron HE (1949). Taxonomic and biological investigations in genus *Megastigmus*, with particular references to the taxonomy of Nearctic species (Hymenoptera, Chalcidoidea, Callimomidae). Am. Nat. 41: 257-420.
- Narendran TC (1994). *Torymidae* and *Eurytomidae* of Indian Subcontinent (Hymenoptera: Chalcidoidea), University of Calicut, India, p. 500.
- Noyes JS (1998). Chalcidoidea, Biological and Taxonomical Information. The Natural History Museum, CD-Rom.
- Popescu IE (2006). Torymid and Eurytomid Wasps (Hymenoptera, Chalcidoidea: Torymidae, Eurytomidae) of Piatra Craiului National Park (Brasov, Romania). Research in Piatra Craiului National Park. 2: 172-177.
- Roques A (1983). Les insectes ravageurs des cones et graines de coniferesen France, Z. Angew. Entomol. 98(1): 350-367.

- Roques AM, Skrzypczynska M (2003). Seed-infesting chalcids of the genus *Megastigmus* Dalman, 1820 (Hymenoptera: Torymidae) native and introduced to the west Palearctic region: taxonomy, host specificity and distribution. *Nat. Hist.* 37: 127-238.
- Turgeon JJ, Kagimon K, Debarr GL (1997). A new species of *Megastigmus* Dalman (Hymenoptera: Torymidae) reared from seeds of Atlantic white cedar (Cupressaceae), with notes on infestation rates. *P. Entomol. Soc. Wash.* 99: 608-612.
- Yates HO (1986). Checklist of insects and mites species attacking cones and seeds of world conifers, *J. Entomol. Sci.* 21: 142-68.
- Zerova MD, Seryogina LA (1994). The Seed-eating Chalcidoidea of Palearctics (in Russian). Kiev: Natl. Acad. Sci. Ukraine, p. 237.