Systematic Studies on the Family Apidae (Hymenoptera) in Ankara Province
Part I: Bombinae

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Abstract: Species from the family Apidae (Hymenoptera) in Ankara province were considered. Nine species were determined from the subfamily Bombinae. Synonymies, the plants on which the specimens were caught, the Turkish and global distributions are given along with their distribution maps. Detailed drawings of the ventral view and photographs of the dorsal view of the male genitalia are also given except for the species Megabombus armeniacus (Rad.), M. pascuorum (Scopoli), and M. humilis (Illyger), which had insufficient male specimens.

Key Words: Apidae, Bombinae, Systematic, Distribution, Ankara.

Ankara İli Apidae (Hymenoptera) Familyası Üzerinde Sistematik Çalışmalar Bölüm I: Bombinae


Anahtar Sözcümler: Apidae, Bombinae, Sistematik, Yayılış, Ankara.

Introduction

The family Apidae, which is commonly known as the most important and useful insect group, has always been very close and interesting to humans since cultural evolution began (1). Various etymological and anthropological marks of this family can be found in human history (2). Because of this old relationship, there have been many studies on their systematics, taxonomy, biology, host plants, colony raising and their use in the pollination of cultivated crops (3-7). The family Apidae is divided into five subfamilies: Apinae (honey bees), Meliponinae (stingless bees), Euglossinae (solitary orchid bees), Bombinae (bumble bees) and Psithyrinae (cuckoo bumble bees) (8). Some authors have classified Apidae into tribes as Euglossini, Meliponini, Apini and Bombini (9), while others recognize them as genera (10). In the holartic region the family is represented by Apinae, Bombinae and Psithyrinae (11). In the subfamily Apinae there is only one genus Apis L. (12). From Bombinae and Psithyrinae, 300 species have been recorded world wide (8). The external morphology and an illustration of a part of the genitalia have been given on the subgeneric level by Richards (13). Biological and systematic studies have been carried out in England by Prys-Jones and Corbet (10), in Poland by Pawlikowski (3), in Taiwan by Starr (8), in Japan by Ito (9) and in the Balkans by Pettion (14). Introductory morphometric studies by Medler (15) and enzyme variation by Pekkarinen (16) in Holland have been carried out . In Turkey 55 species have been recorded by different authors (4, 7, 17-21). These species are variable in body color and it is quite difficult to distinguish between them (22). In Turkey apart from faunistic studies done by Reinit (17-19) and Rasmont (4), Özgek (7, 20, 21) has illustrated the male genitalia of some species mostly found in the East Anatolian Region.

In this paper, the morphology, color variation of the bodies and the male genitalia are examined. The significance of the characters, especially the squama, sagitta, stipes, cardo, spatha and lacinia, are discussed.
with the figures and photographs along with their host plants and distribution maps.

Materials and Methods

The materials were collected from Akyurt, Altındağ, Ayas, Bala, Beynam, Beypazarı, Çankaya, Çubuk, Elmadağ, Evren, Gölbəği, Gündü, Haymana, Kalecik, Kazan, Kızılcəhamam, Nallıhan, Polatlı, Şereflikoçhisar and Yenimahalle between 1994 and 1996. For the study of male genitalia the technique and terminology follow those proposed by Prys-Jones and Corbet (10), Özbek (20) and Rasmont (4). The figures were drawn with a camera lucida and a Nikon stereoscopic microscope from the ventral view and photographs were taken with a Prior stereoscopic microscope from the dorsal view. The altitudes, the plants on which the specimens were caught and distribution maps were given with information regarding their global and Turkish distributions. Because of the diagnostic value, the measurements of the malar area, clypeus and head index were given following the method proposed by Özbek (20). The formulas below were used to determine the means after and 10 specimens of each species were examined and measurements were taken.

Head index=100x(Width of the head/Length of the head)
Clypeus index=100x(Width of the labrum/Length of the clypeus)
Malar area=100x(The apical length of the malar area/Length of the malar area)

Abbreviations Used in the Figures

crd  cardo
lcns  lacinia
sgt  sagitta
spth  spatha
sqm  squama
stp  stipes

Results

Genus Bombus Latreille, 1802
Syn. Leucobombus von Dalla Torre, 1880,
Terrestribombus Vogt, 1911

Bombus terrestris L, 1758
Syn. Bombus culimanus (Kirby), 1802, Bombus audax (Harris), 1870, Bombus silangewi Morawitz, 1892, Bombus holsticus Krüger, 1954

Male

Length of the body 13-17 mm; length of the head shorter than width, index 107±4.7, supra-orbital line dorsally tangential to ocelli; first flagellar segment a little longer than the second, nearly equal to the third one; clypeus, vertex and basal half of the propleuron with black hairs; clypeus index 112±8.7; collar with dark yellow, interalar band and scutellum with black hairs; first and second terga with yellow hairs besides some black ones basally scattered on the first tergum, basal half of the third tergum with black hairs while apical part with white ones, fourth, fifth and sixth terga with white or dark yellow hairs; basal part of the third metatarsus broad and margins with short fringes; apical of the eighth sternum straight.

Genitalia broad, nearly circular; apical of lacinia with a broad hook (Figure 1); from dorsal view sagitta flattened like a plate, distal end curved exteriorly, laterally turned through lacinia, inner margin slightly chitinized (Figure 2), from ventral view inner margin strongly chitinized and apex curved like a spoon; spatha not very broad, maximum four times longer than width of sagitta; stipes clearly convex, from dorsal view with sparse dark brown hairs at inner margin; squama pointed at apex, slightly chitinized; cardo broad, undulate at apex, margins more pigmented than inside (Figure 3).

Figure 1. Bombus terrestris apex of the lacinia (ventral view)
Female

Body of the queen 18-22 mm, worker 11-15 mm; length of the head about equal to the width, index 102 ±8.3; with thin spotted area between lateral ocelli and compound eyes; distance between median ocellus and the lateral one short, nearly half of the diameter of median ocellus, ocelli normal size in worker; length of malar area shorter than width, index 103±9.4; width of the clypeus broader than the length, index 112±5.7; mandibula with distinct sulcus obliquus; collar hairs dark yellow, interalar band and scutellum with black hairs; first tergal hairs black, second one with dark yellow or brownly-yellow hairs; third tergum with black, fourth and fifth with yellow hairs, sixth tergum with black hairs medially and white ones laterally.

Material Examined: 17-VI-1995 Beynam Atatürk Forest (Bağla) 10 ♀♀, 1 ♂ (ca. 800m); 24-VI-1995 Kızılcahamam 34 ♀♀ (ca. 900m); 22-VII-1995 Kızılcahamam 1 ♀ (900m); 15-VIII-1996 Beytepe (Yenimahalle) 1 ♀, 1 ♂, 1 ♀ (900 m); 8-IX-1995 Beytepe (Yenimahalle) 38 ♂♂, 3 ♀♀ (900m); 18-IX-1995 Beytepe (Yenimahalle) 9 ♀♀, 23 ♂♂, 17 ♀♀ (900m); 23-VII-1996 Yenimahalle 12 ♀♀, 2 ♂♂, 35 ♀♀ (800m). (Figure 4).

Plants Recorded: Gaillardia sp., Echium italicum L., Echinops sp.
Turkish Distribution From Literature Cited:
Kastamonu, Iğaz Mountains, İsfendiyar Mountains, Baba Mountain (26); Bursa, Ordu, Fatsa, Ünye, Rize, Sivriköy (18); Erzurum, Olur (20); Artvin, Rize, Trabzon, Gümüşhane, Giresun, Ordu, Tokat, Amasya, Çorum, Samsun, Sinop, Kastamonu, Çankiri, Kırklareli, Kırşehir, Ankara, Elazığ, Kütahya, Bursa, Bolu, Bilecik, Yalova, İstanbul, Tekirdağ, Balıkesir, Çanakkale, Manisa, İzmir, Aydın, Muğla, Antalya, Burdur, Isparta, Afyon, Konya, Karaman, Niğde, Nevşehir, İçel, Adana, Osmaniye, Hatay, Gaziantep, Kahramanmaraş (23).

Global Distribution From Literature Cited: Scotland, England (6); Italy, Iberian Peninsula, Turkey, Greece, North Africa, Caucasus (4); Tasmania (24); Poland (3); Denmark, Czechoslovakia, Romania (16).

*Bombus lucorum* L., 1761


**Male**

Length of the body 13-15 mm; length of the head shorter than the width, index 108±6.3, supra-orbital line dorsally reaches the ocelli; first flagellar segment nearly equal to the third, longer than the second one; clypeus, vertex and the basal half of the propleuron with yellow hairs; clypeus short, index 113±9.2; collar with light yellow hairs reaching the ventral part, interalar band and scutellum with black hairs; first and the second terga with yellow hairs but with some black ones at the basal part of the first tergum, basal half of the third tergum with black hairs while the apical part with white ones, fourth, fifth, sixth and the seventh terga with white hairs; apical of eighth sternum with two sharp processes apically.

Genitalia broad and somewhat circular as in *B. terrestris*; lacinia with a narrow hook apically (Figure 5); from dorsal view sagitta flattened, distal end exteriorly turned and laterally curved through lacinia as in *B. terrestris*, inner margin slightly chitinised (Figure 6); other parts same as in *B. terrestris* (Figure 7).

**Female**

Body of the queen 17-20, worker 10-14 mm; length of the head shorter than the width, index 108±11.4; with a naked area between lateral ocelli and compound eyes; distance between median ocellus and lateral one equal to the diameter of the median ocellus, worker with smaller ocelli; length of the malar area shorter than the width, index 104±8.1; width of the clypeus broader than the length, index 107±5.4; mandibula with distinct incisura and sulcus obliquus, with no basal carina; collar hairs light-yellow, interalar band and scutellum with black hairs; first tergal hairs black, second tergum with light yellow hairs, third tergum with black, fourth and fifth with white hairs, sixth tergum with black hairs medially and white ones laterally as in *B. terrestris*.
Material Examined: 22-VII-1995 Kızılcahamam 2 ♀♂, 2 ♂♂♂ (1195 m); 29-VII-1996 Kızılcahamam 6 ♀♂, 14 ♂♂♂, 5 ♀♀ (1120 m) (Figure 4).

Plants Recorded: Stachys sp., Astragalus sp.

Turkish Distribution From Literature Cited: Bolu, Araç, Boyalı, Isfendiyar Mountains, Kütahya, İnegöl (26); Uludağ, Sivriköy, Hamsıköy, Zigana, Kıp Mountains, Çakmak Mountains (18); Erzurum, Ordu, Ispir (20); Dumlupınar, Göle, Ardahan, Palandöken (23).

Global Distribution From Literature Cited: England, Scotland (6); Europe, Iberian Peninsula, Greece, Turkey, Transcaucasus (4); Poland (3); Denmark, Norway, Sweden, Finland, Soviet Union (16); Yugoslavia (25).

Genus Pyrobombus von Dalla Torre, 1880


Pyrobombus niveatus Kriechbaumer, 1870

Male

Length of the body 13-17 mm; length of the head equal or a little shorter than the width, index 101±3.3; with large compound eyes and ocelli; supra-orbital line stretches out high above the ocelli; antenna with long flagellum, first segment nearly equal to the third and longer than the second; clypeus with white hairs, vertex and propleuron with black and white ones mixed; clypeus long, index 85±4.6; collar and scutellum with white hairs, interalar band with black ones; first and second tergal hairs white, third tergum with black ones, fourth, fifth and the sixth tergum with reddish-brown hairs.

Genitalia narrow, apically broader; lacinia with a small blunt ending process slightly turned inward; sagitta bird-head shaped with a long beak like distal process turned inward and a smaller one curling exteriorly through lacinia; spatha broad and densely pigmented; stipes from dorsal view convex, blackish-brown and chitinized strongly, with dense dark-brown hairs at inner margin (Figure 8), from ventral view inner margin hairy; squama ear-shaped, circular at apex, with a pointed triangular process stretching out upwardly among the hairs of stipes; cardio narrow, basal margin slightly curved (Figure 9).

Female

Body of the queen 17-22 mm, worker 11-15 mm; head long, index 96±3.7; area between lateral ocelli and the compound eyes narrow and shiny, distance between them maximum two times longer than diameter of median ocellus; length of the malar area shorter than width, index 102±3.6; clypeus clearly convex, spotted dorsally and long, index 97±2.8; mandible with distinct sulcus obliquus, without incisura; collar and scutellum with white hairs, interalar band with black ones; first and second terga with white hairs, third tergum with black ones, fourth, fifth and sixth terga with reddish-brown hairs.

Material Examined: 25-V-1995 Beytepe (Yenimahalle) 1 ♀ (900m); 4-VI-1995 Akyurt 2 ♀♂; 17-VI-1995 Beynam Atatürk Forest (Bala) 8 ♀♂, 2 ♀♀ (ca. 1200 m); 24-VI-1995 Kızılcahamam 3 ♀♂, 10 ♀♀ (ca. 1100 m); 22-VII-1995 Kızılcahamam 3 ♀♂, 1 ♂♂, 3 ♀♀ (1370m); 23-VII-1995 Hasanoğlan (Elmadag) 6 ♀♂, 19 ♀♀ (1180m); 23-VII-1995 Karacaahasan (Elmadag) 1 ♀, 7 ♀♀ (1295m); 23-VII-1995 Süleymanlı (Elmadag) 1 ♀ (940 m); 5-VIII-1995 Haymana 2 ♂♂♂ (900 m); 5-VIII-1995 Haymana 1 ♀ (1000 m); 5-VIII-
1995 Haymana 2 ♀ (1100 m); 8-VIII-1995 Beytepe (Yenimahalle) 1 ♀ (900 m); 12-VIII-1995 Karacakusak (Elmadag) 1 ♀, 1 ♂ (1295 m); 12-VIII-1995 Beynam Atatürk Forest (Bala) 1 ♀ (ca. 1200 m); 4-VIII-1996 Beytepe (Yenimahalle) 14 ♀♂ (900 m); 6-VIII-1996 Ümitköy (Yenimahalle) 10 ♀♀, 14 ♀♂, 5 ♀♀ (950m); 12-IX-1996 Eymir (Gölbasağı) 4 ♀♀, 14 ♀♂, 5 ♀♀ (ca. 800m) (Figure 4).


**Turkish Distribution From Literature Cited:** Sultan Mountain (17); Gerede (26); Çakmak Mountain, Murat Plain, Van, Sivrihisar, Hattuşaş, Çorum (18); Erciyes Mountain (Derinay) (19); Cevizli, Konya, Mandarlı Mountains, Ulukışla (27); Erzurum, Pasoğlu, İspir, Hınıs, Horasan, Namaz, Oltu, Olur, Torum (20).

**Global Distribution From Literature Cited:** Turkey, Caucasia, Iran (4).

**Genus Megabombus** von Dalla Torre, 1880

**Syn. Hortobombus** Vogt, 1911

**Megabombus argillusaeus** Scopoli, 1763

**Syn. Bombus sichelli** (Radoszkowski), 1859

**Male**

Length of the body 13-17 mm; head long, index 90±5.2; first flagellar segment nearly equal to the third, longer than second; head with yellow and black hairs; clypeus long, index 93±4.6; collar and scutellum with yellow hairs, interalar band with black ones; first tergum with yellow hairs, second and third terga with black hairs besides some yellow ones apically situated, fourth, fifth and sixth terga with white hairs and seventh one with black.

Genitalia broad; apical of the lacinia elongate upwardly with a process and downwardly with a shorter one, apically high-boot shaped, broader basally; from ventral view inner margin with dense and long hairs; sagitta saw-toothed at inner margin and with a little chitinized ring surrounding at median (Figure 10), from ventral view basal of sagitta sunk deeply into the cardo; spatha normal size, very transparent; stipes convex from both dorsal and ventral view, with sparse dark yellow hairs at inner margin, strongly pigmented, the two symmetrical parts fuse forming a heart-shaped hole under the spatha; squama curving distally and elongate over the stipes with a horn-shaped process extending upwardly through the saw-toothed part of the sagitta: cardo very broad, dorsally convex and light brown (Figure 11).

**Female**

Body of the queen 21-24 mm, worker 13-17 mm; head long, index 80±2.6; with very long malar area, index 75±3.1; length of the clypeus a little longer than the width, index 98±1.6; collar and scutellum with yellow hairs, interalar band with black ones; all abdominal terga with black hairs in queens; in workers first tergum with yellow hairs, second and third terga hairs black, fourth, fifth and the sixth ones with white hairs.

**Material Examined:** 20-V-1995 Soğuksu National Park (Kızılkademam) 1 ♀ (ca. 850 m); 3-VI-1995 Bala 1 ♀ (980 m); 3-VI-1995 Oltan (Ayaz) 1 ♀; 11-VI-1995 Beypazarı 2 ♀♀; 17-VI-1995 Bala 1 ♀, 5 ♀♀ (980 m); 17-VI-1995 Beynam Atatürk Forest (Bala) 2 ♀♀ (1400m); 24-VI-1995 Kızılkademam 2 ♀♀, 25 ♀♀
Plants Recorded: Anchusa leptophylla Roemer & Schultes.

Turkish Distribution From Literature Cited: Istanbul, Çanakkale, Balıkesir, Manisa, Bursa, Adapazari, Düzce, Aşkaboca, Bolu, Zonguldak, Kastamonu, Konya, Sinop, Tokat, Ordu, Giresun, Trabzon, Rize, Artvin (28); Erzurum (20).

Global Distribution From Literature Cited: England (6); Italy, France, Switzerland, Sardinia, Belgium, Turkey, Greece, Caucasus, Bulgaria, Iran (4).

Megabombus zonatus (Smith), 1854

Male

Length of the body 12-16 mm; head nearly equal to the width, index 99±8.7; first flagellar segment a little shorter than the third, second flagellar segment nearly half the length of the first one; head with yellow hairs; length of the clypeus a little longer than the width, index 96±6.7; collar and scutellum with yellow, interalar band with black hairs; first to fifth terga with yellow hairs, sixth and seventh with black ones.

Genitalia not very broad; lacinia narrow, apex distinctly sharp, with dense brown hairs at inner margin; sagitta without tooth at inner margin, apex with a small process curving exteriorly; spatha not very broad, circular, not very dense; from dorsal view stipes convex, with round ending and more pigmented apex, inner margin with sparse hairs, with a round process through cardo ventrally (Figure 12), from ventral view sharply ending stipes rolling over lacinia forming a sheath; squama with an ear-shaped inner process, innermost margin with dense brown hairs; cardo light brown, convex dorsally (Figure 13).

Figure 12. Megabombus zonatus male genitalia (dorsal view)
Female

Body of the queen 18-21 mm, worker 16-19 mm; length of the head a little longer than the width, index 96±8.3; head with yellow hairs also with some black ones between compound eyes; malar area very long, index 79±8.0; clypeus with sparse and little spots, length a little longer than the width, index 96±9.4; collar and scutellum with yellow hairs, interalar band with black hairs mixed with the other segments; first to fifth terga with yellow hairs, sixth tergum with black ones; ventral of the abdomen and the tibia with yellow hairs.

Material Examined: 22-VII-1995 Kizilcukuraham 1 ♀, 1 ♂ (1370m); 23-VII-1995 Karacahasan (Elmadag) 2 ♀♀ (1295m); 23-VII-1995 Suleymanli (Elmadag) 2 ♀♀ (940m); 5-VIII-1995 Haymana 3 ♀♀ (1000m); 12-VIII-1995 Karacahasan (Elmadag) 2 ♀♀ (1250m); 12-VIII-1995 Taburlar (Elmadag) 1 ♀ (1000m) (Figure 4).


Turkish Distribution From Literature Cited: Ilgaz Mountains, Ispundjry Mountains, Çanik (26); Bursa, Eşikir (18); Ardanah (19); Erzurum, Muş, Tortum, Oltu, Ispir (20).

Global Distribution From Literature Cited: England, Ireland, Scotland (6); Central Europe, France, Turkey, Caucasus (4); Poland (3).

Megabombus armeniacus (Radoszkowski), 1877

Syn. Fervidobombus scythes (Skorikov), 1925

Female

Queen 16-20 mm, worker 10-15 mm; head long, index 88±8.6; area between lateral ocelli and the compound eyes very broad; head with black hairs; malar area very long, index 67±9.2; clypeus distinctly convex, with sparse holes, width shorter than the length, index 87±9.9; collar and scutellum with yellow hairs, interalar band narrow, with black hairs; first to fifth terga with yellow hairs, sixth tergum with black hairs.
Material Examined: 22-VII-1995 Yukarıkese (Kizılağan) 2 ♀♀ (1370m); 23-VII-1995 Elmadag 1 ♀ (1180m); 23-VII-1995 Karacahan (Elmadag) 2 ♀♀; 24 ♀♂ (1295m); 23-VII-1995 Sülêymânlı (Elmadag) 5 ♀♀ (940m); 23-VII-1995 Bala 1 ♀ (1100 m); 12-VIII-1995 Yeşildere (Elmadag) 4 ♀♀ (ca. 1300 m) (Figure 4).


Turkish Distribution From Literature Cited: Rize, Kop, Hamur, Van, Hattuşaş, Afyon (18); Ürgüp, Kayseri (19); Konya (27); Erzurum, Pasinler, Tercan, Palandöken, Oltu, Tortum (20).

Global Distribution From Literature Cited: Balkans, Turkey, Caucasia, Iran, Soviet Union (4); Poland (3).

*Megabombus mesomelas* (Gerstaecker), 1869

Syn. *Bombus elegans* (Seidl.), 1837

**Male**

14-16 mm; head long, index 86±8.8, with white and black hairs; area between compound eyes and the lateral ocellus shiny; first flagellar segment nearly equal to the third, both longer than the second; clypeus long, index 92±9.8; collar and scutellum with white hairs, interalar band with indistinct margins and with black hairs; first, second and the third terga with white hairs, fourth, fifth and the sixth terga with light yellow hairs; seventh tergum laterally with long and light yellow hairs but medially with short black ones.

Genitalia normal, not very broad; apex of the lacinia with a process like a curled leaf interiorly; apex of the sagitta flattened, curved exteriorly as in *M. zonatus* but broader, median part with an inwardly extending process, all sagitta pigmented strongly except the apex (Figure 14); sphäta not very broad, innermost part denser; stipes clearly convex with a round process through cardo basally, with dense brown hairs at inner margin extending through the sagitta; squama ear-shaped from dorsal view, apex thinner than the basal part, with no hairs at inner margin, nearly fused with the lacinia from ventral view; cardo broad and light brown (Figure 15).

Material Examined: 5-VIII-1995 Haymana 1 ♂ (1000m); 12-VIII-1995 Karacahan (Elmadag) 1 ♂ (1295m); 12-VIII-1995 Yeşildere (Elmadag) 1 ♂ (ca. 1300m); 12-VIII-1995 Beynam Atatürk Forest (Bala) 1 ♂ (ca. 1200m) (Figure 4).

![Figure 14. Megabombus mesomelas male genitalia (dorsal view)](image)

![Figure 15. Megabombus mesomelas male genitalia (ventral view)](image)


Turkish Distribution From Literature Cited: Rize, Kop, Eşelkirt, Van, Trabzon (18); Bolkar Mountains (27); Ardahan, Yalnızçam Mountains (19); Erzurum, Pasinler, Tercan, Palandöken (20).

Global Distribution From Literature Cited: Balkans, Turkey, Caucasia, Iran (4); Poland (3).

**Discussion**

The family *Apidae* is distinguished from the other families by the presence of a well developed malar area in males and tibial coricula in females. Because of being sexually dimorphic it is sometimes quite difficult to determine the species. Mayr (22) pointed out that there may sometimes be more than 100 different body color variations in one species. This difficulty may be solved by using male genitalia in the determination. The subfamily *Apinae* includes one genus *Apis* L., which is distinguished by the presence of hairy compound eyes and highly eusocial lifestyle.
The subfamily Bombinae is distinguished from the other subfamilies by the lack of hairs on the compound eyes and primitive eusocial lifestyle. In the genus *Bombus* Latreille, the basic structural taxonomic characters of the male genitalia are as follows: Sagitta flattened like a plate, distal edge curves exteriorly, lacinia with a hooklike process apically and in females the presence of a lateral incisura on the mandible. These data are consistent with those of Alford (6). The structure of the sagitta is shown in more detail in this study from the ventral view. *B. terrestris* and *B. lucorum* are morphologically very similar and also have a similar genital structure, however *B. terrestris* is distinguished by a broader process at the apical of the lacinia and that it exists in lowlands, below 1000 m and in open habitats. These species need to be studied in much more detail especially their vertical differentiation and clines. In *Pyrobombus* von Dalla Torre the basic structural taxonomic characters of the male genitalia are: Rounded sagitta that has an internally or externally curved hook and also presence of large compound eyes, in females ocelli located below the supraorbital line. *P. niveatus* is distinguished by white hairs on the clypeus. These data are consistent with those of Richards (13) and Özbek (20, 23). The genus *Megabombus* von Dalla Torre has the following taxonomic characters: In the male genitalia squama extending through the stipes forming a lamella, antenna long and curved and in females there is a distinct sulcus obliquus on the mandible. *M. argilaceus* is distinguished by the presence of long squama and high-boot shaped lacinia. The genital organ structure of *M. argilaceus* is similar to those of *M. hortorum* and *M. portschinskyi* but from the ventral view it is shown that in *M. argilaceus* the apical of the squama is sharper and the broader sagitta has a basal portion extending in through the stipes. More detailed information on the biology of this subfamily is needed. Therefore, more biological data and especially studies on biochemical taxonomy are needed necessary.

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