

On the bumblebee fauna of Turkey: II. The genus *Pyrobombus* (Hymenoptera, Apidae, Bombinae)

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Abstract: Fifteen species and subspecies of the genus *Pyrobombus* are recorded in Turkey. They are listed together with their horizontal and altitudinal distribution, habitats and flowers visited. *P. serrisquama* is recorded for Turkey for the first time. With 2274 specimens collected, *P. incertus* proved to be the most widespread and abundant species, recorded from about sea level up to more than 3000 m. It was followed by *P. niveatus* with 1467 specimens and *P. soroensis* with 1400 specimens. *P. sulfureus* was found at only two localities with five specimens, and it should be classified as »endangered«.

Kurzfassung: In der Türkei wurden bisher 15 Arten und Unterarten der Gattung *Pyrobombus* nachgewiesen. Sie werden hier zusammen mit ihrer horizontalen und vertikalen Verbreitung, ihren Habitaten und den von ihnen angeflogenen Blütenpflanzen aufgelistet. *P. serrisquama* wurde zum ersten Mal in der Türkei festgestellt. *P. incertus* stellte sich mit 2274 Exemplaren als die am weitesten verbreitete und häufigste Art heraus, die von Meereshöhe bis auf über 3000 m vorkommt. Ihr folgte *P. niveatus* mit 1467 Exemplaren und *P. soroensis* mit 1400 Exemplaren. *P. sulfureus* wurde nur an zwei Stellen in insgesamt fünf Exemplaren gefunden und sie muß als bedroht eingestuft werden.

Key words: Bumblebees, *Pyrobombus*, Bombinae, Hymenoptera, distribution, Turkey.

Introduction

In addition to early works by FRIESE & VON WAGNER (1912), FAHRINGER (1921) and FAHRINGER & FRIESE (1921), the bumblebee fauna of Turkey has been intensively studied in particular by REINIG (1967, 1968, 1971, 1973, 1974). The present author began to study this group in Turkey in the 1970s (ÖZBEK 1979, 1983, 1990a, 1990b) and has collected bumblebees in almost all parts of the country. This paper gives an overview of the genus *Pyrobombus*, which comprises 15 taxa in Turkey. In the first part of the study (ÖZBEK 1997), the genera *Alpigenobombus*, *Bombias* and *Bombus* had been treated.

The species are listed in alphabetical order by subgenera and provinces. The information relating to material, methods and other particulars was given in Part I. However, it should be repeated here that collecting efforts were not distributed equally over all parts of the country. In particular, more intensive and systematic collections were undertaken in Erzurum and adjacent provinces, so that these have more records than the other provinces. The symbols on the distribution maps show the sampling localities but not the number of specimens taken, which varied from 1 to about 50.

Genus *Pyrobombus* Dalla Torre, 1880

Subgenus *Pyrobombus* D. T. (s. st.) (= *Pratobombus* Vogt, 1911)

Pyrobombus brodmannicus (Vogt, 1909)

This species was found in relatively small numbers (105 specimens) only in north-east Anatolia (Fig. 1), in mountain meadows above 2000 m up to ca. 3500 m.

Records: Ağrı Prov.: Eleşkirt (2100 m) at Tahir Mt. – Ardahan Prov.: İlgar Mt. (Posof) 2400–2600 m, Şehitveren (Hanak) 2100 m. – Bayburt Prov.: Kopdağı 2200–2400. – Erzurum Prov.: Palandöken Mts. 2100–2400 m, Çat 2000 m, Dumanlı Mt. 2500 m, Dumlu Mts. 2100–2800 m, Kargapazarı Mts. 2000–2900 m, Karagöbek 2300–2500 m, Rabat (Pasinler) 2100–2500 m, Karlı (Tortum) 2200–2500 m, Kireçli Mt. (Narman) 2000–2500 m, Başaklı (Oltu) 2000–2200 m, Çamlıbel (Oltu) 2100 m, Tutmaç (Oltu) 2200 m, Turnalı (Şenkaya) 1800–2100 m, Şenkaya Yaylaları 2200–2600 m, Süngübayır (Olur) 2200–2500 m. – Gümüşhane Prov.: Zigana Mt. (Torul) 1700–2200 m. – Kars Prov.: Sarıkamış 2200 m. – Rize Prov.: Ballıköy (İkizdere) 2600 m.

Distribution data from literature: Kopdağı, Çakmak Dağı, Tahir pass (REINIG 1971); eastern Anatolia (TKALCU 1973); Dumlubaba, Palandöken, Başaklı, Oltu, Kargapazarı and Palandöken Mts. (Erzurum) (ÖZBEK 1990a).

Pyrobombus haematurus (Kriechbaumer, 1870)

This species was found in low number (total of 65 specimens) in north Anatolia, including Bursa Province (Fig. 2) in forests and woodland above 600 m up to ca. 2600m.

Records: Ardahan Prov.: İlgar Mt. (Posof) 2400–2600 m. – Artvin Prov.: Kafkasor 1100 m, Genye Mt. 2200 m. – Ankara Prov.: Kızılcahamam 1500 m. – Bursa Prov.: Uludağ 1200–1400 m, Kirazlı Yayla 1300 m. – Çankırı Prov.: İlgaz Mt. 1600 m. – Gümüşhane Prov.: Zigana Mt. 1900 m. – Kastamonu Prov.: Kırık 900 m. – İstanbul Prov.: Garden of Forestry Faculty. – Ordu Prov.: Boyadı 1000 m. – Rize Prov.: Ortayayla (Pazar) 1100 m. – Samsun Prov.: Dikbiyik (Çarşamba) 900 m. – Sinop Prov.: Erfelek 1200 m. – Tokat Prov.: Tokat Town 950 m. – Trabzon Prov.: Maçka 600 m, Hamsiköy 1200 m.

Distribution data from literature: Uludağ (near Bursa), İsfendiyar Mts. in Bolu Prov. (REINIG 1967, 1968, 1971).

Pyrobombus skorikowi (Vogt, 1911)

This was the least abundant species among the species of *Pyrobombus* (31 specimens) after *P. sulfureus* (Friese). It is distributed in northern Anatolia (Fig. 3) on mountain meadows, adjacent woodland and forest in general above 1000 m.

This species showed considerable variation. Material was not sufficient to compare and separate one form from another, and so it was very difficult to decide precisely on their status. The specimens collected from the western part of the country can be determined as *Pyrobombus pratorum* Linnaeus. The ones collected from the eastern part, particularly from Erzurum and Ardahan, are determined here as *P. skorikowi*. It could be concluded that the subgenus *Pyrobombus* (s. st.) is represented in Turkey by three species, but if we accept the western population as a separate species (*P. pratorum*) then this number will be four. It should be pointed out that all of the species of subgenus *Pyrobombus* (s. st.) had low populations.

Records: Ardahan Prov.: İlgar Mt. 2400–2600 m. – Artvin Prov.: Karagöl (Borçka) 1900 m, Genye Mt. 1800 m. – Bolu Prov.: Abant 1300 m. – Bursa Prov.: Uludağ. – Çankırı Prov.: İlgaz Mts. 1600 m. –

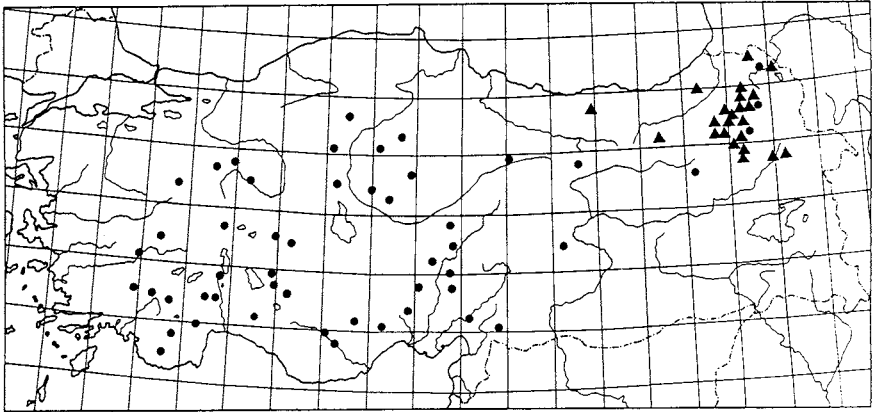


Fig. 1. Distribution of *Pyrobombus brodmannicus* (Vogt) (triangles) and *P. vorticosus* (Gerstaecker) (dots) in Turkey.

Erzurum Prov.: Şenkaya 2100 m, Süngübayır (Olur) 2200 m, İnci (Oltu) 2000 m, Orcuk Yaylası (Oltu) 2000 m, Uzundere Yaylası (Uzundere) 2200 m, Todan (Narman) 2300 m, Karlı (Tortum) 2400 m, Güngörmez 2400 m. – Giresun Prov.: Tamdere 1300 m. – Gümüşhane Prov.: Zigana Mt. (Torul) 1600–1800 m. – Kastamonu Prov.: Çetmi 1500 m. – Ordu Prov.: Gökkyöy 1200 m, Dereköy 1300 m. – Rize Prov.: Ballıköy (İkizdere) 2600 m. – Samsun Prov.: Malgözü (Alaçam) 1000 m. – Sinop Prov.: Erfelek 1600 m, Ayancık 900 m. – Trabzon Prov.: Erikbeli (Tonya).

Distribution data from literature: Uludağ, Sultandağ, Semen Mt., Ilgaz Mts., İsfendiyer Mts., Rize Mts. and Trabzon Mts. (REINIG 1967, 1968, 1971) as *Bombus pratorum* L.

Subgenus *Cullumanobombus* Vogt, 1911

Pyrobombus apollineus (Skorikov, 1910)

A widespread species in eastern Anatolia, but specimens were also collected from some localities in Central Anatolia, including Kayseri, Sivas and Yozgat provinces (Fig. 4). It has a higher abundance in Erzurum province than in the other provinces. A total of 285 specimens was collected. It occurs in mountain meadows, pastures, and uncultivated area left between cultivated land. It prefers open areas and generally high altitudes. It is a pollinator of *Onobrychis viciaefolia*, *Medicago sativa*, *Trifolium pratense*, *T. repens* and some other leguminous plants. It also visits *Helianthus annuus* and *Brassica napus* which are important for oil seeds.

Records: Ağrı Prov.: Tahir Mt. 2100–2400 m, Eleşkirt 2000 m, Hamur 2100 m, Tutak 2000 m, Patnos 1900. – Ardahan Prov.: Türkgözü (Posof) 1200 m, Ilgar Mt. (Posof) 2300–2700 m, Hanak 2000 m, Çıldır 2000 m, Göle 2100 m. – Artvin Prov.: Sebzeçiler 500 m. – Bayburt Prov.: Demirözü 1700 m, Kop Mt. 2000–2800 m. – Bitlis Prov.: Central 1600 m, Tatvan 1500 m, Adılcevaz 1500 m. – Erzincan Prov.: Tercan 1700 m, Cevizli 1400 m, Çağlayan 1350 m, Refahiye 1600 m, Kızıldağ 2000–2600 m. – Erzurum Prov.: Erzurum and Pasinler plateaus 1800–1900 m, Anzav valley (Oltu) 900–1800 m, Atlıkonak (İlica) 1900–2100 m, Başaklı (Oltu) 1700–2200 m, Dikyar (Uzundere) 1400 m, İspir pass 2200 m, Kaledibi (Tortum) 1500 m, Köprüköy 1600 m, Süngübayır (Olur) 1700–2100 m. – Turnalı (Şenkaya) 1900–2200 m, Kargapazarı and Palandöken Mts. 2000–2800 m. – Gümüşhane Prov.: Kale

1600 m, Kelkit 1500 m. – Iğdır Prov.: Karaçomaklı, 2400–2800 m. – Kars Prov.: Susuz 1900 m, Laloglu (Selim) 2000 m, Kümbetli (Selim) 1900 m, Digor 1900 m, Sarıkamış 2000–2400 m, Karakurt (Sarıkamış) 1700 m, Kağızman, 1200m. – Kayseri Prov.: Erciyes Mt. 2000–2100 m. – Muş Prov.: Muş plateau 1300–1400 m. – Sivas Prov.: Suşehri 1200 m, Hafik 1700 m, Zagra 1600 m. – Tunceli Prov.: Munzur (Ovacık) 2100 m, Hozat 1800 m, Pülümür 1900–2400 m. – Van Prov.: Tendürek Mts. (Çaldıran) 2200 m, Erciş 1800 m, Gevaş 1700 m. – Yozgat Prov.: Akdağ Madeni 1800 m.

Distribution data from literature: Gümüşhane, Kop Mt. (Bayburt), Çakmak Mt. (Erzurum), Tahir Mt., Eleşkirt, Hamur (Ağrı), Van (REINIG 1971), Erciyes Mt. (Kayseri) (REINIG 1973); Erzurum (ÖZBEK 1983); Kargapazarı and Palandöken Mts. (Erzurum), Tercan (Erzincan) (ÖZBEK 1990a).

Pyrobombus serrisquama (Morawitz, 1888)

The distribution is confined to north-east Anatolia in some localities of Ardahan, Kars and Erzurum provinces (Fig. 5). It has a low abundance, and a total of 45 specimens was collected. It occurs in high land and open areas, usually in mountain meadows and mountain pastures.

Records: Ardahan Prov.: Ilgar Mt. (Posof) 2300–2600 m, Posof 1400 m, Hanak 2000 m, Şehitveren (Hanak) 2100 m, Göle 2000 m. – Artvin Prov.: Genye Mt 1800 m. – Erzurum Prov.: Sungübayır (Olur) 2000 m, Turnalı (Şenkaya) 1900–2200 m, Çamlıbel Yaylası (Oltu) 2100 m, Karlı (Tortum) 2200–2600 m, Kireçli Mt. (Narman) 2200–2400 m, Umudum Yaylası 2200 m, Karaçuha (Horasan) 1650 m, Rabat (Pasinler) 2200–2400 m, Atatürk University Campus 1850 m. – Kars Prov.: Sarıkamış 2100–2400 m, Susuz 1900 m.

Distribution data from literature: This is a new record for the Turkish fauna.

Subgenus *Kallobombus* Dalla Tore, 1880 (*Soroeensibombus* Vogt, 1911)

Pyrobombus soroensis (Fabricius, 1793)

This species is abundant almost throughout the country (Fig. 6). 1400 specimens were collected. It shows geographical variation. The widespread subspecies is *P. soroensis proteus* Gerstaecker, which occurs in the western and central part of the country, extending in the east to the Erzincan, Bayburt and Gümüşhane provinces. *P. soroensis radoszkowskyi* (Dalla Tore) occurs in eastern Anatolia, particularly in Erzurum, Agri, Kars and Ardahan provinces. Additionally, *P. soroensis citrinus* (Radoszkowsky) is present in some localities.

It occurs in wooded places, orchards, meadows adjacent to woodland areas. *P. soroensis* is a good pollinator of fruit trees. Orchards located along the valleys between mountains, particularly in eastern Anatolia, are favourable for this species because of their abundant flora and nesting sites. The abundance of this species was thus very high in most of these localities.

Records: Adana Prov.: Pozantı 1600 m. – Amasya Prov.: Boğazköy (Suluova) 1300 m. – Ankara Prov.: Kızılcahamam 1500 m, Bulak 1600 m. – Ardahan Prov.: Ilgar Mt. (Posof) 2400–2600 m, Yurtbekler 1400 m, Türkgözü (Posof) 1600 m, Şehitveren (Hanak) 2100 m, Gölebert 2200 m, Karınca (Göle) 2200 m. – Artvin Prov.: İshan 900 m, Kılıçkaya 1400 m, Sarıgöl 1100 m, Altıparmak 1800–2000 m, Demirkent (Yusufoğlu) 500 m, Akarsu (Ardanuç) 900 m, Karagöl (Şavşat) 1600–1800 m. – Bayburt Prov.: Kop Mt. 2000–2400 m. – Bolu Prov.: Gerede 900 m, Abant Gölü 1300 m. – Bursa Prov.: İnegöl 1400 m, Uludağ 1700–2000 m. – Çankırı Prov.: Ilgaz Mt 2100 m. – Erzincan Prov.: Cevizli 1300 m, Çağlayan 1350 m, Sakaltutan 2100 m, Salur 1700 m, Kızıldağ (Refahiye) 2300 m. – Erzurum Prov.: Kargapazarı Mt. 2200 m, Sungübayır (Olur) 1800–2200 m, Turnalı 1800–2100, Ormanlı 1700–2000 m, Gaziler (Şenkaya), Uzunoluk 1900 m, Ayvalı 1000 m, Anzavderesi 900–1400 m, Başaklı 1700–2200

m, Sütkans 1900 m, Çamlıbel 1600–2000 m, Tutmaç (Oltu) 2000 m, Kireçli Mt. (Narman) 2000–2600 m, Kaledibi 1500 m, Bağbaşı 1200 m, Pehlivanlı 1100 m, Serdarlı 1400 m, Aşağı Meydanlar 1700 m, Arılı 1400 m, Aksu 1500 m, Karlı (Tortum) 2000 m, Gölbaşı 1200 m, Şelale 1100 m, Çamlıyamaç 1700–2200 m, Dikyar (Uzundere) 1300–1700 m, Rabat (Pasinler) 2300–2400 m, Palandöken Mt. 2000–2200 m, Demirbilek 1800 m, Deveci Mt. 2100 m, Kan 1200 m (İspir). – Giresun Prov.: Eğribel 2000 m; Gümüşhane Prov.: Kale 1300 m, Zigana Mt. (Torul) 1800–2200 m; İçel Prov.: Çamlıyayla 1200–1300 m, Sertavul Mts. 1100 m. – Kars Prov.: Çıldır 1900 m, Sarıkamış 2000–2400 m, Susuz 1900 m, Kağızman 1600–1800 m. – Kastamonu Prov.: Gökçeğaç 1200 m, Taşköprü 1200 m, Gelmeç 1100 m. – Konya Prov.: Sultan Mts. (Akşehir) 1800 m. – Ordu Prov.: Mesudiye 1700 m. – Sivas Prov.: Çamlıbel 1900 m (Yıldızeli). – Osmaniye Prov.: Zorkum Yaylası 1600 m, Amanos Mts. 1400 m. – Rize Prov.: Arılı (İkizdere) 2000–2200 m. – Samsun Prov.: Ayvacık 300 m, Malgözü (Yakakent) 1000 m. – Sinop Prov.: Erfelek 1100 m, Ayancık 300 m. – Tokat Prov.: Reşadiye 1600 m, Karabayır (Şerefiye) 1700 m. – Trabzon Prov.: Hamsiköy 1300 m, Maçka 900 m, Tonya 800 m. – Yozgat Prov.: Akdağmadeni 1700 m.

Distribution data from literature: Uludağ and Sultan Mt. (REINIG 1967); Bolu, Kastamonu and Karabük (REINIG 1968); Rize Mts (REINIG 1971); Ardahan (REINIG 1973); Kırpınar Mt. (Konya) (REINIG 1974); Oltu, Tortum (Erzurum), Ardahan (ÖZBEK 1983), Adana (ASLAN & SEKEROĞLU 1996) as *P. soroensis lecitatus* (Kruseman).

Subgenus *Melanobombus* Dalla Torre, 1880 (*Lapidariobombus* Vogt, 1911)

Pyrobombus alagesianus Skorikov, 1922

This species occurred only in the high plateaus of north eastern Anatolia (Fig. 7). 343 specimens were collected on mountain meadows and mountain pastures. It prefers higher altitudes (1800–3000 m), colder climate and more open areas.

Records: Ardahan Prov.: Ilgar Mt. (Posof) 2200–2600 m, Şehitveren (Hanak) 2000 m. – Erzurum Prov.: Süngübayır (Olur) 1900–2200 m, Kireçli Mt. (Narman) 1800–2500 m, Kargapazarı Mts. 1900–2400, Dumlu Mts. 2000–2800 m, Palandöken Mt. 2000–2900 m, Karlı (Tortum) 2000–2600 m.

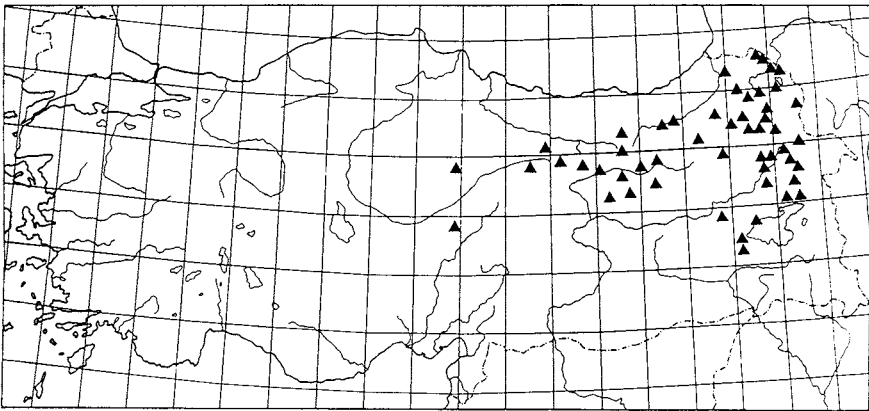
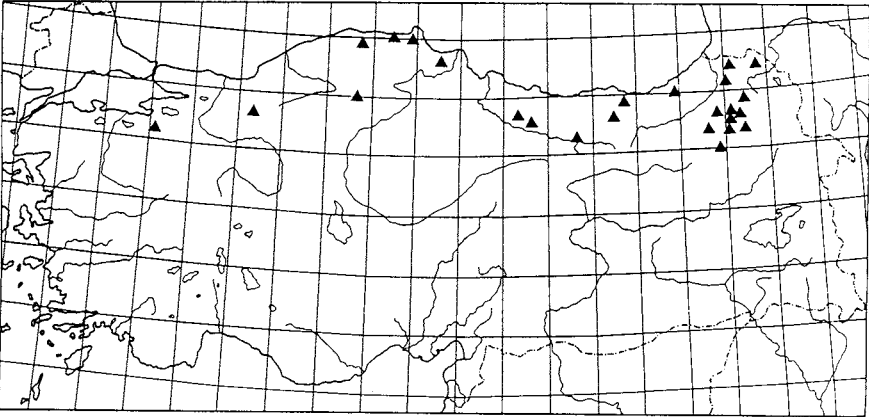
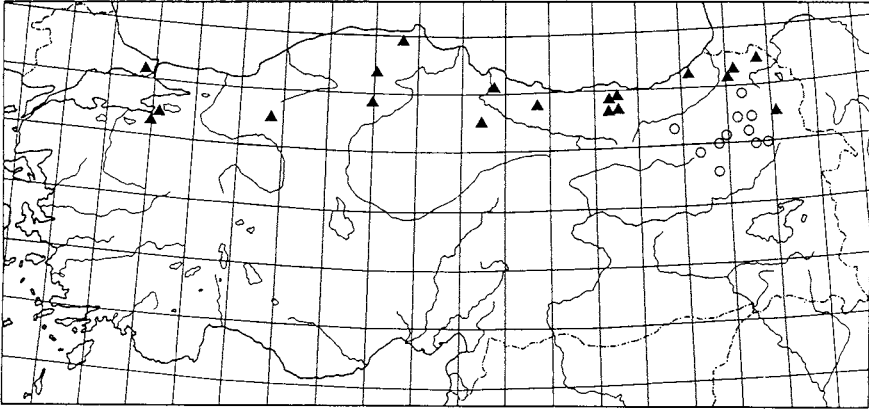
Distribution data from literature: Yanlızçam Mt. (Ardahan) (REINIG 1973); Palandöken Mt., Dumlu Mt. and Kargapazarı Mts. (Erzurum) (ÖZBEK 1983, 1990a).

Pyrobombus erzurumensis Özbek, 1990

The type locality of this species is Erzurum. Its abundance was not high, and 123 specimens were collected. The specimens at hand exhibit some variation in the color of the hairs, particularly on the face, but it is difficult to recognise separate subspecies because specimens collected even at the same localities had the similar variations. It was collected on mountain meadows and pastures above about 2000 m up to 3000, sometimes even higher. It prefers open areas. With this study new localities were found for this species. However its distribution is apparently confined to Agri, Ardahan, Bayburt and Erzurum provinces (Fig. 2).

Records: Ağrı Prov.: Tahir Mt. 2300 m. – Ardahan Prov.: Ilgar Mt. (Posof) 2200–2600 m. – Bayburt Prov.: Kop Mt. 2000–2800 m. – Erzurum Prov.: Süngübayır (Olur) 2000–2200 m, Başaklı (Oltu) 2000 m, Uzundere Yaylası 2100 m (Uzundere), Kireçli Mt. (Narman) 2000–2500 m, Karlı (Tortum) 2000–2400 m, Rabat (Pasinler) 1900–2200 m, Ahırçık (Ilıca) 2200 m, Zazalar (Çat) 2100 m, Kargapazarı, Dumlu and Palandöken Mts.

Distribution data from literature: Erzurum (type locality) (ÖZBEK 1990b).



Figs. 2-4: Distribution of *Pyrobombus haematurus* (Kriech.) (triangles), *P. erzurumensis* (Özbek) (circles) (Fig. 2, above), *P. skorikowi* (Vogt) (Fig. 3, middle), and *P. apollineus* (Skorikov) (Fig. 4, below) in Turkey.

***Pyrobombus incertus* Morawitz, 1881**

P. incertus was the most widespread and abundant bumblebee species of the genus *Pyrobombus* occurring in Turkey (Fig. 8). 2274 specimens were collected. It is found in meadows, pastures, Leguminosae fields, uncultivated areas between cultivated land and orchards. It is a species of open land and occurs from the altitudes of about 100 m up to ca. 3500 m. It is a very good pollinator of *Helianthus annuus*, *Brassica napus*, *Onobrychis viciaefolia*, *Medicago sativa*, *Trifolium pratense*, *T. repens* and many other cross-pollinated plants including fruit trees and many species of wild plants.

Records: Adana Prov.: Saimbeyli 1050 m, Pozantı 1200 m. – Adıyaman Prov.: Gölbashi 1000 m. – Afyon Prov.: Sandıklı 1100 m, Bayat 1200 m. – Ağrı Prov.: Tahir Mt. 2000–2200 m, Eleşkirt 2000–2400 m, Hamur 1900–2100 m, Tutak 1800–1900 m, Patnos 1700 m. – Aksaray Prov.: Hanobaşı 1100 m, Topakkaya 1200 m, Sultanhan 1000 m. – Ankara Prov.: Atatürk Orman Çiftliği 800 m, Çubuk 1000 m, Elmadağ 1250 m, Polatlı 1100 m. – Antalya Prov.: Beşınar (Korkuteli) 1300 m, Elmalı 900 m, Cevizli (Akseki) 1200 m, Saklıkent 1700 m. – Ardahan Prov.: Ilgar Mt. (Posof) 2000–2600 m, Yurtbekler 1400 m, Türkgözü (Posof) 1600 m, Şehitveren (Hanak) 2100 m, Ardahan Yaylası 2000–2200 m, Gölebert 2200 m, Karınca 1900–2000 m (Göle), vicinity of Çıldır lake ca. 1900 m (Çıldır). – Artvin Prov.: Kınalıçam 800 m, İshan 700 m, Kılıçkaya 1400 m, Sarıgöl 1100–1300 m, Karagöl 1600–1800 m (Şavşat), Borçka 700 m. – Bayburt Prov.: Kopdağı Mt. 2000–2400 m, Aydıntepe 1700 m, Çakıröz 1400 m. – Demirözü 1400 m. – Bingöl Prov.: Karlıova 1800–2200 m. – Bitlis Prov.: Along Tatvan and Bitlis road 1400–1500 m, Adilcevaz 1500 m, Ahlat 1500 m. – Burdur Prov.: Ağlasun 900–1000 m, Çeltikçi 1200 m. – Çankırı Prov.: Along the road Çankırı–Ankara ca. 800 m. – Çorum Prov.: Alaca 1200 m. – Denizli Prov.: Kazıkbeli 1300 m, Tavas 1100 m, Kızılisar 1050 m. – Elazığ Prov.: Harput 1100 m, Hazar 1250 m, Hankendi 1200 m. – Erzincan Prov.: Tercan Plain ca. 1500 m, Üzümlü 1300 m, Cevizli 1400 m, Çağlayan 1250 m, Ilıç 1200 m, Kemah 1100 m, Sandık 800 m (Kemaliye), Çatalarmut 1500 m, Yurtbaşı 1700 m, Sakaltutan 1800 m, Kızıldağ 2300 m (Refahiye). – Erzurum Prov.: Aksar 1100 m, Şenkaya Yaylası 2000–2400 m, Turnalı 1700–2100 m, Gaziler 1500–2000 m (Şenkaya), Süngübayır 1800–2200 m, Eğlek 1600 m, Çataksu 1100–1300 m (Olur), Subatık 1300 m, Sarısaz 1300 m, Kaleboğazı 1400 m, Orcuk 1500 m, Anzav Valley 900–1600 m, Başaklı 1700–2200 m, Çamlıbel 1600–2000 m, Tutmaç 2000 m (Oltu), Kışlaköy 1350 m, Beyler 1700 m, Şehitler 1800 m, Demirdağ 1900 m, Kireçli Mt. (Narman) 1900–2600 m, Pasinler Plain 1700–1800 m, Rabat 2000–2600 m (Pasinler), Köprüköy 1600 m, Hınıs 1700–1800 m, Karaçoban 2000 m, Karayazı 2000–2400 m, Dikyar 1400 m, Şelale 1200 m, Çamlıyamaç 1500–1900 m (Uzundere), Serdarlı 1500 m, Bağbaşı 1200 m, Yukarı Meydanlar 1800–2400 m, Arılı 1400 m, Aşağı Meydanlar 1700 m, Aksu 1600 m, Kaledibi 1600 m, Karagöbek 1900–2400 m, Kargapazarı Mts. 2000–2800 m, Dumlu Mt. 2000–2800 m, Palandöken Mt. 2000–2900 m, Umudum Yaylası 200–2700 m, Laleli 2000–2200 m, Çat 2000–2200 m, Atlıkonak 1800–2400 m, Serçeme Valley 2000–2200 m, Ovacık 2000–2400 m (Ilıca), Ballıtaş 2000 m, Küçükgeçit (Aşkale) 1700 m, Pazaryolu 1600–1800 m, Kan 1100 m, Çamlıkaya 900 m. – Eskişehir Prov.: Sivrihisar 1100 m. – Gümüşhane Prov.: Kale 1600–1700 m, Zigana Mt. 1700–2200 m. – Iğdır Prov.: Iğdır plain ca. 900 m, Karaçomaklı 2800 m. – İsparta Prov.: Along the road side between İsparta and Eğirdir ca. 1100 m, Gelendost 1200 m. – İçel Prov.: Sertavul pass 1600 m, Çamlıyayla 1200 m, Kirobaşı 1500 m. – Kahramanmaraş Prov.: Pazarçık 900 m. – Karaman Prov.: Karadağ 1700–1900 m (Madenşehir), Yeşildere 1200 m. – Kars Prov.: Susuz 1850 m, Kümbetli (Selim) 2000 m, Sarıkamış: 2000–2200 m, Karakurt 1600 m, Digor 1600 m, Kötek 1400 m, Kağızman 1400–1800 m, Aras valley from Gaziler (Tuzluca) up to Çobandede Bridge. – Kayseri Prov.: Develi 1600 m, İncesu 1100 m, Yahyalı 1200 m. – Kırşehir Prov.: Kargasekmez Mt. 1600 m. – Konya Prov.: Sultandağ 1100–1600 m (Akşehir), Ilgın 1300 m, Sille 1100 m, Beyşehir 1200 m, Karacadağ 1900 m. – Malatya Prov.: Yeşilyurt 1000 m, Eskimalatya 1100 m, Sürgü 1300 m. – Muş Prov.: Muş Plain 1300–1500 m, Varto 1400 m. – Nevşehir Prov.: Ürgüp 1100 m, Acıgöl 1200 m. – Niğde Prov.: Ulukışla 1600 m, Kavlaktepe 2000 m, Bademdere 2000–2200 m, Buldurma geçidi (Çamardı) 2700 m. – Rize Prov.: Arılı 1800–2200 m (Kızdere). – Samsun Prov.: Akdağ 1500 m (Ladik), Kavak 400 m. – Sivas Prov.: Beğendik 1900 m, Karacaören (İmranlı) 2100 m, Zara 1500 m, Hafik 1400 m, Yıldızeli 1200 m, Belcik 1400 m, Suşehri 1100 m. – Tokat Prov.: Çamlıbel 1700 m, Kazova 700 m, Reşadiye 1100 m. – Trabzon Prov.: Maçka 700 m, Tonya 500 m. – Tunceli Prov.: Pülümür Mt. 1800–2200 m, Munzur Valley 1600 m, Ovacık

1800 m, Hozat 1700 m, Pertek 1100 m, Çemişgezek 1600 m. – Van Prov.: Çaldıran Plain 1900–2200 m, Gevaş 1700 m, Erçiş 1600 m. – Yozgat Prov.: Akdağmadeni 1700 m.

Distribution data from literature: Sultandağ (REINIG 1967); Çankırı and Samsun (REINIG 1968); Harsit Valley, Tatvan (Bitlis) (REINIG 1971); Erciyes Mt. (Kayseri), Ürgüp (Nevşehir) (REINIG 1973); İçel, Karaman, Konya, Denizli (REINIG 1974); Erzurum, Erzincan, Kars (ÖZBEK 1979, 1983, 1990a), İçel (ASLAN & ŞEKEROĞLU 1996).

Pyrobombus lapidarius lapidarius Linnaeus, 1758

This subspecies occurs in the northern part of the country, from Uludağ in the west to Erzincan and Gümüşhane provinces in the east (Fig. 9). It has a low abundance, and 168 specimens were collected. It occurs in woodland, mountain meadows adjacent to wooded areas and occasionally orchards.

Records: Ankara Prov.: Kızılcahamam 1600 m, Çamlıdere 1600–1700 m. – Bolu Prov.: Vicinity of Abant lake 1500–1800 m, Gerece 1300 m. – Bursa Prov.: Uludağ, Karabelen 1300 m, Kuşaklıkaya 2000 m, Soğukpınar 1400 m. – Çankırı Prov.: Kesecik (İlgaz) 1200 m. – Erzincan Prov.: Cevizli 1400 m, Sakaltutan 2000 m, Salur 1900 m, Kızıldağ (Refahiye) 1800–2100 m. – Giresun Prov.: Eğribel 1900 m. – Gümüşhane Prov.: Zigana Mt. 2000 m, Köşe 1500 m, Kelkit 1800. – Kastamonu Prov.: Çetni 1200 m, Ilgaz Mt 1700 m. – Ordu Prov.: Kölköy 800 m. – Samsun Prov.: Ayvacık 1400 m (Çarşamba), Vicinity of University campus 400 m, Malgözü 100 m (Yakakent). – Sinop Prov.: Erfelek 700 m, Ayancık 600 m. – Tokat Prov.: Çamlıbel 1800 m, Dökmetepe 1000 m.

Distribution data from literature: Uludağ, Semen Mt., Ilgaz pass, Isfendiyar Mts., Gerece (Bolu) (REINIG 1968, 1971).

Pyrobombus lapidarius caucasicus (Radoszkowski, 1859)

This subspecies occurs in north east Anatolia (Fig. 9). It is quite abundant locally. 362 specimens were collected. It occurs in forest, woodland, adjacent to forested areas above 1500 m and in orchards. *P. l. lapidarius* occurs in northern Turkey from Uludağ to Kızıldağ (Erzincan) and Zigana Mt. (Gümüşhane) whereas *P. l. caucasicus* occurs in the north-east of the country. It is possible to draw a definite borderline between Zigana and Kızıldağ separating both subspecies. Both of them use almost the same habitats, but *P. l. caucasicus* prefers higher altitudes and colder climates.

Records: Ardahan Prov.: Posof 1700 m, Hanak 2000 m, Gölebert 1900 m, Karınca 2000–2200 m (Göle). – Artvin Prov.: Genye Mt. 1800–2100 m, Karagöl 1700–2000 m (Şavşat), Borçka 1200 m, Altıparmak 1900–2200 m, Kılıçkaya 1800–2000 m (Yusufeli). – Erzurum Prov.: Ormanlı 2000–2400 m, Turnalı (Şenkaya) 1800–2100 m, Süngübayır (Olur) 2000 m, Uzunoluk 1700–2200 m, Sütkanı 1900–2100 m, İnci 1900–2200 m, Çamlıbel 1800–2200 m, Tutmaç (Oltu) 1900–2300 m, Uzundere Yaylası 2000–2200 m, Dikyar 1700–2200 m, Çamlıyamaç (Uzundere) 1900–2200 m, Serdarlı 1700–2000 m, Aşağımeydanlar 1700–2000 m, Karlı (Tortum) 2200–2600 m, Kireçli Mt. (Narman) 1900–2400 m, Rabat (Pasinler) 2000–2300 m. – Gümüşhane Prov.: Zigana Mt. (Torul) 1800–2300 m. – Kars Prov.: Sarıkamış 2100–2400 m. – Rize Prov.: Ballıköy (İkizdere) 2000–2400m.

Distribution data from literature: Gölebert, Yalnızçam (Ardahan) (REINIG 1973); Oltu (Erzurum) (ÖZBEK 1983).

Pyrobombus sichelii (Radoszkowski, 1859)

The distribution area of this species is also confined to the northeast of Anatolia (Fig. 7). It had a very low abundance, and 49 specimens were collected. It was found in mountain meadows and mountain pastures.

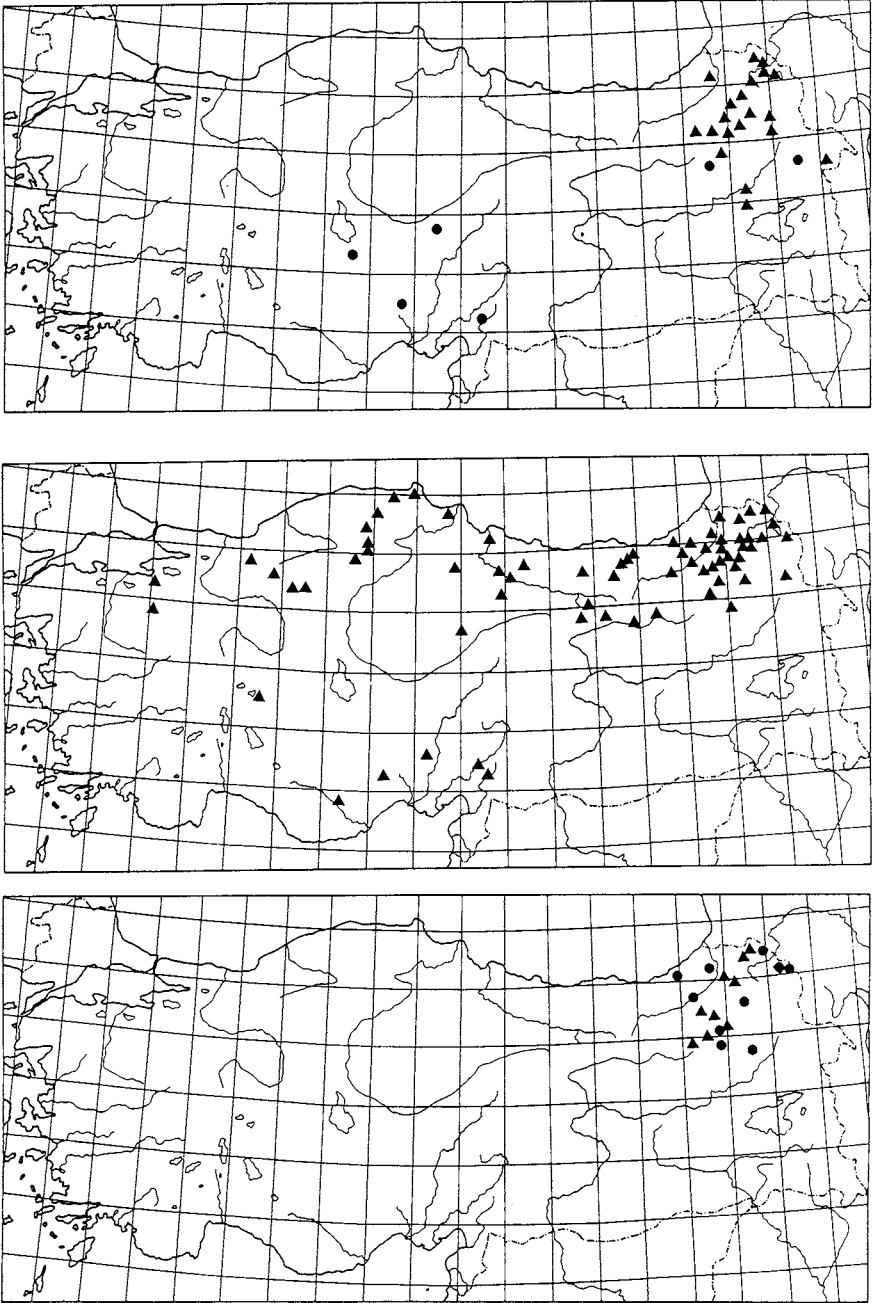


Fig. 5–7. Distribution of *Pyrobombus serrisquama* (Morawitz) (triangles), *P. sulfureus* (Friese) (dots) (Fig. 5, top), *P. soroensis* (Fabricius) (Fig. 6, middle), *P. alagesianus* (Skorikov) (triangles), and *P. sichelii* (Radoszkowski) (dots) (Fig. 7, below) in Turkey.

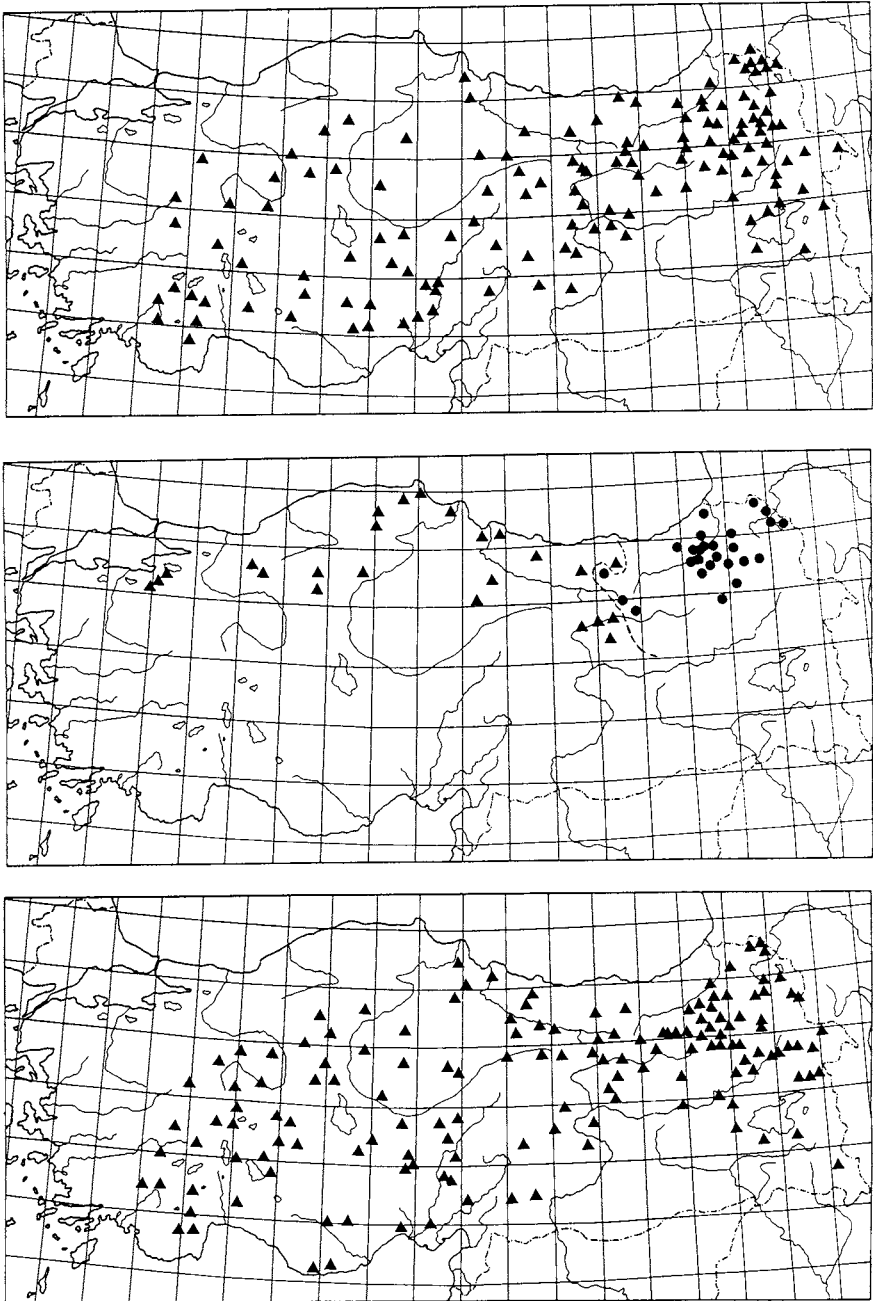


Fig. 8–10. Distribution of *Pyrobombus incertus* (Morawitz) (Fig. 8, top), *P. lapidarius lapidarius* (Linnaeus) (triangles) and *P. lapidarius caucasicus* (Radoszkowski) (dots) in Turkey.

Records: Ardahan Prov.: Ilgar Mt. (Posof) 2000–2800 m, Gölebert 2100 m, Karınca 2000–2200 m (Göle). – Artvin Prov.: Altıparmak Mt. (Yusufeli) 2200–2600 m. – Erzurum Prov.: Kireçli Mt. (Narman) 2000–2600 m, Uzundere Yaylası (Uzundere) 2100 m, Karlı (Tortum) 2200–2600 m, Aygır pass (İspir) 2000–2500 m, Rabat (Pasinler) 2000–2400 m, Palandöken Mt. 2000–2800 m, Dumlu Mt. 2000–2600 m. – Rize Prov.: Arılı (İkizdere) 2000–2200 m.

Distribution data from literature: Rize Mts. (Rize), İspir (Erzurum) (REINIG 1971); Ardahan (REINIG 1973).

Subgenus *Sibiricobombus* Vogt, 1911

Pyrobombus niveatus (Kriechbaumer, 1870)

P. niveatus is a widespread species throughout almost the entire country (Fig. 10). It occurs from sea level up to ca. 3000 m. Its abundance was quite high, and 1467 specimens were collected. It was the second most abundant species after *P. incertus*. It was recorded in meadows, mountain meadows and orchards, often adjacent to villages and farm houses. It is a good pollinator of some cultivated plants, including sainfoin, alfalfa, sunflower and fruit trees. It is of special importance for the pollination of fruit trees. *P. niveatus* nests mostly in the walls and eaves of buildings, in fences of orchards and gardens, and so it was commonly seen in the vicinity of residential areas as well as in mountain meadows and pastures. It is a strong and fast-flying bumblebee.

Records: Adana Prov.: Tufanbeyli, Saimbeyli 1000 m, Yeniköy 900 m, Balcalı 100 m. – Adıyaman Prov.: Gölbaşı 1500 m. – Afyon Prov.: Emirdağ 1200 m, Sandıklı 1100 m. – Ağrı Prov.: Tahir Mt. 2200–2400 m, Eleşkirt 2000 m, Hamur 1800 m, Tutak 1800 m, along the road of Tutak and Patnos 1800 m. – Aksaray Prov.: Hanobaşı 1100 m, Sultanhan 1000 m. – Amasya Prov.: Boğazköy 500 m. – Ankara Prov.: Beytepe 900 m, Atatürk Orman Çiftliği 850–1000 m, Çubuk 1100 m, Elmadağ 1500 m, Kazan 1300 m, Hacibektaşlı 800 m (Şereflikoçhisar), Gölbaşı 900 m. – Antalya Prov.: Alımpınarı 1000 m, Saklıkent 1700 m, Elmalı 1200 m, Cevizli (Akseki) 1700 m. – Ardahan Prov.: Yurtbekler 1400 m, Türkgözü (Posof) 1600 m, Çıldır 1900 m. – Artvin Prov.: Kınalıçam 700 m, İshan 600 m, Kılıçkaya 1000–1300 m (Yusufeli), Ardanoç 900 m. – Bayburt Prov.: Köp Mt. 2000–2200 m, Aydıntepe 1600–1800 m, Demirözü 1700 m, Aksar 1600 m. – Bingöl Prov.: Harkal Mt. 2300–2600 m, Karlıova 1750 m. – Bitlis Prov.: Beekeeping Institute 1500 m, Tatvan 1700 m. – Burdur Prov.: Bucak 1000 m. – Çankırı Prov.: Along the side of Çankırı–Ankara road. – Çorum Prov.: Alaca 1200 m. – Denizli Prov.: Kazıkbeli 1300 m, Tavas 1100 m, Kızılhisar 1050 m. – Elazığ Prov.: Hazar 1250 m. – Erzincan Prov.: Tercan 1500 m, Bayırbağ (Üzümlü) 1300 m, Cevizli 1200 m, Bahçeli 1300 m, Çatalarmut 1300 m, Salur 1500 m, Çatalçam (Refahiye) 1700 m. – Erzurum Prov.: Süngübayır 1700–2200 m, Eğlek 1600 m, Çataksu (Olur) 900–1200 m, Aksar 1100 m, Şenkaya 1700–2000 m, Gaziler 1400–1800 m, Turnalı (Şenkaya) 1800–2200 m, Anzav Valley 900–1400 m, Subatık 1400–1900 m, Sütkans 1900–2100 m, Sarısaz 1300 m, Kaleboğazı 1400 m, Tutmaç 1700–2200 m, Özdere (Oltu) 1900 m, Uzundere Yaylası 1850–2200 m, Şelale 1100 m, Balıklı (Uzundere) 1300 m, Pehlivanlı 1200 m, Bağbaşı 1300 m, Tortumkale 1500 m, Yukarımeydanlar 1800–2000 m, Karlı (Tortum) 2200–2600 m, Güngörmez 2200 m, Kargapazarı Mts. 1900–2600 m, Köşk 1900 m, Dumlu Mts. 2000–2600 m, Umudum Yaylası 2000–2200 m, Palandöken Mt. 2000–2800 m, Pasinler plain 1700–1900 m, Aras Valley (Horasan) ca 1600 m, Hınıs 1600 m, Tekman 1900 m, Karayazı 2000 m, Çat 1800–2200 m, Atlıkönak (Ilıca) 1900–2400 m, Küçük geçit (Aşkale) 1700 m, Serçeme Valley 1800 m, Pazaryolu 1400 m, İspir 1200 m. – Eskişehir Prov.: Sıvrıhisar 1000 m, Kaymaz 850 m, Hamidiye 900 m, Alpagut (Mihalgazi) 1000 m, Çukurhisar 700 m. – Giresun Prov.: Şebinkarahisar 1400 m. – Gümüşhane Prov.: Kale 1500 m, Zigana Mt. (Torul) 1800–2200 m. – Hakkari Prov.: Dez Valley 1500 m. – Iğdır Prov.: Taşburun 900 m. – İsparta Prov.: Eğirdir 1100 m. – İcel Prov.: Şehitlik (Silifke) 400 m, Çamlıyayla (Tarsus), Ovacık 300 m. –

Kahramanmaraş Prov.: Elbistan 1400 m, Pazarcık 1300 m. – Karaman Prov.: Karadağ (Madenşehir) 1700–1900 m, Yeşildere 1200 m. – Kars Prov.: Susuz 1900 m, Digor 1700 m, Kağızman 1300 m, Akkurt 1500, Karakurt (Sarıkamış) 1600 m. – Kayseri Prov.: Develi 1700 m, İncesu 1100 m, Yahyalı 1200 m. – Kırıkkale Prov.: Yahsıhan 1100 m. – Kırşehir Prov.: Kargaçekmez Mt. 1600 m. – Konya Prov.: Sultandağ (Akşehir) 1500–1600 m, Ilgın 1300 m, Sille 1100 m, Beyşehir 1200 m, Karacadağ 1900 m, Kadınhanı 1100 m, Doğanhisar 1400 m. – Kütahya Prov.: Hısarcık 1100 m. – Malatya Prov.: University Campus 1100 m, Yeşilyurt 1000 m, Doğanşehir 1000 m. – Muş Prov.: Muş plain 1300–1400 m, Varto 1800 m. – Nevşehir Prov.: Ürgüp 1100 m. – Niğde Prov.: Ulukışla 1600 m, Kavaltepe 2000 m, Bademdere (Çamardı) 2000–2200 m. – Osmaniye Prov.: Nur Mt. 1200–1400 m. – Samsun Prov.: Akdağ 1500 m, B. Kızıloğlu (Ladik) 950 m, Kavak 400 m. – Sivas Prov.: Imranlı 1800 m, Zara 1500 m, Hafik 1400 m, Yıldızeli 1200 m, Suşehri 1000 m. – Tokat Prov.: Çamlıbel 1700 m, Reşadiye 750 m, Aybastı 800 m. – Tunceli Prov.: Pülümür Mt. 1800–2200 m, Hozat 1700 m, Pertek 1100 m, Çemişgezek 1600 m. – Uşak Prov.: Güre 1000 m. – Van Prov.: Erciş 1700 m, Muradiye 1800 m, Çaldıran plain 1900–2100 m, Gevaş 1700 m. – Yozgat Prov.: Akdağmadeni 1700 m, Yerköy 1200 m, Çatallı 1400 m.

Distribution data from literature: Taurus Mts. (VOGT 1909); Bolkar Mt. (Niğde) (FRIESE & WAGNER 1912, FAHRINGER 1922); Sultandağ (Konya) (REINIG 1967); Çankırı, Bolu (REINIG 1968); Ağrı, Van, Çorum, Eskişehir (REINIG 1971); Erciyes (Kayseri) (REINIG 1973); Antalya, Denizli (REINIG 1974); Erzurum (ÖZBEK 1983, 1990 a), Adana, İçel (ASLAN & SEKEROĞLU 1996).

***Pyrobombus sulfureus* (Friese, 1905)**

This is a rare species, and 3 specimens were collected in only two localities. It should be pointed out that *P. sulfureus* is extremely rare in Turkey and therefore threatened with extinction. Since 1970, thousands of bumblebee specimens have been collected throughout the country, but only a few specimens of *P. sulfureus* have been found and only from Palandöken and Bolkar Mts. The quantity of faunistic data might still be insufficient to allow for definitive judgement, but this taxon should be accepted as “endangered” and should be placed in the “Red List of Threatened Animals”. The distribution map for *P. sulfureus* (Fig. 5) in Turkey derived from examined specimens and literature records.

Records: Erzurum Prov.: Palandöken Mt. 2400 m. – Niğde Prov.: Gümüş, Bolkar Mt. 2200–2600 m.

Distribution data from literature: Taurus Mts., Ulukışla (Niğde) (VOGT 1909, FRIESE & WAGNER 1912); Amanos Mt. (Osmaniye) (FAHRINGER & FRIESE 1921), Hamur (Ağrı) (REINIG 1971); Erciyes (Kayseri) (REINIG 1973).

***Pyrobombus vorticatus* (Gertaecker, 1872)**

Widespread almost throughout the country (Fig. 1), like *P. niveatus*, but in general less abundant. Its abundance is higher in western Anatolia than in the east, where it is very rare. Occurs in meadows, mountain meadows and on road sides.

Records: Adana Prov.: Yeniköy (Pozantı) 900 m, Gedikli (Kozan) 1100 m. – Afyon Prov.: Sandıklı 1100 m. – Ankara Prov.: Çubuk 1100 m, Elmadağ 1300 m. – Antalya Prov.: Yazırgözesi (Beydağları) 1200 m, Saklıkent 1600–1800 m, Karagöl 1300 m (Elmalı), Cevizli (Akseki) 1600 m. – Ardahan Prov.: Ilgar Mt. (Posof) 2000–2400 m. – Burdur Prov.: Yeşilova 1050 m, Tefenni 1100 m, Çeltikçi pass 1300 m, Ağlasun 900–1100 m. – Çankırı Prov.: Along the road sides of Ilgaz and Çankırı. – Çorum Prov.: Alaca 900 m, Sungurlu 1000 m. – Denizli Prov.: Kazıkbeli 1300 m, Tavas 1100 m. – Erzincan Prov.: Cevizli 1300 m. – Erzurum Prov.: Süngübayır (Olur) 1900–2200 m, Uzunoluk Yaylası (Oltu) 2000–2400 m, Çat 2100 m. – Eskişehir Prov.: Alpagut (Mihalgazi) 1000 m, Sivrihisar 1050 m. – Gaziantep Prov.: Fevzipaşa 800 m. – İsparta Prov.: Between İsparta and Eğirdir 1100–1200 m. – İçel Prov.: Sertavul pass 1300 m, Gülek pass 1100 m, Çamlıyayla (Tarsus) 1200 m. – Karaman Prov.: Karadağ 1700–1900 m (Madenşehir), Yeşildere 1200 m. – Kayseri Prov.: Sarıoğlan 1200 m, Sultanhan 1100 m,

Develi 1800 m. – Kırşehir Prov.: Özbağ 1300 m, Kargasekmez Mt. 1600 m. – Konya Prov.: Sultandağ Mt. 1500–1600 m (Akşehir), Ilgaz 1300 m, Sille 1100 m, Beyşehir 1200 m, Halkapınar (Ereğli) 1300 m. – Malatya Prov.: Doğanşehir 1000 m. – Niğde Prov.: Gümüş, Bolkar Mt. 2200–2600, Ulukışla 1600 m. – Osmaniye Prov.: Bahçe 700 m. – Sivas Prov.: Yıldızeli 1300 m. – Yozgat Prov.: Çataltı 1400 m.

Distribution data from literature: Taurus Mts. (VOGT 1909); Ereğli (Konya), Kuşçular, Belemelik (Adana), Bolkar Mts. (FAHRINGER 1922); Sultandağ (Konya) (REINIG 1967); Sivrihisar (Eskişehir), Çankırı (REINIG 1968); Çorum (REINIG 1971); Erciyes (Kayseri) (REINIG 1973); Denizli, Konya, Karaman (REINIG 1974).

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Tab. 1. Plant species visited by bumblebees in Turkey. Pb: *Pyrobombus brodmannicus*, Ph: *P. haematurus*, Ps: *P. skorokowi*, Pa: *P. apollineus*, Pe: *P. serrisquama*, Po: *P. soroensis*, Pl: *P. alagesianus*, Pz: *P. erzurumensis*; Pi: *P. incertus*, Pll: *P. lapidarius lapidarius*, Plc: *P. lapidarius caucasicus*, Pc: *P. sichelii*, Pn: *P. niveatus*, Pf: *P. sulfureus*; Pv: *P. vorticosus*.

Plant species	Bumblebee species														
	Pb	Ph	Ps	Pa	Pe	Po	Pl	Pz	Pi	Pll	Plc	Pc	Pn	Pf	Pv
Boraginaceae															
<i>Alkanna orientalis</i>				•					•		•	•	•		•
<i>Anchusa arvensis</i>				•					•		•		•		•
<i>A. azurea</i>				•					•		•		•		•
<i>A. leptophylla</i>				•					•						
<i>Cerinth minor</i>	•		•				•		•						
<i>Echium italicum</i>		•		•		•			•	•			•		•
<i>E. vulgare</i>			•	•					•		•	•	•		•
<i>Myosotis lithospermifolia</i>	•					•	•								
<i>M. alpestris</i>		•								•					
<i>M. sylvatica</i>						•									
Campanulaceae															
<i>Campanula glomerata</i>									•						
<i>C. latifolia</i>		•				•			•	•	•				
<i>C. rapunculoides</i>				•			•								
Caryophyllaceae															
<i>Cerastium dichotomum</i>				•		•	•		•	•					
<i>Dianthus multicaulis</i>		•	•						•		•	•			•
<i>Minuartia erythrocephala</i>							•								
<i>M. recurva</i>	•								•						
<i>Silene compacta</i>		•					•		•		•				
Compositae															
<i>Arctium lappa</i>		•		•		•			•	•			•		•
<i>A. platylepis</i>						•									
<i>Anthemis tinctoria</i>	•		•						•		•	•			
<i>Carduus acanthoides</i>				•		•		•	•				•		•
<i>C. crispus</i>				•		•		•	•				•		•
<i>C. defloratus</i>						•		•	•				•		•
<i>C. nutans</i>				•	•	•		•	•				•		•
<i>C. olympicus</i>		•	•					•	•				•		•
<i>Centaurea carduiiformis</i>												•	•		
<i>C. depressa</i>						•		•	•			•	•		•

C. glastifolia
C. jacea
C. iberica
C. pulcherrima
C. scabiosa
C. sessilis
C. solstitialis
C. virgata
Cichorium intybus
Cirsium acaule
C. arvense
C. palustre
C. syriacum
C. vulgare
Echinops viscosus
Erigeron acer
E. caucasicus
Helianthus annuus
Inula oculuchristi
Jurinella moschus
Onopordum illyricum
Serratula tinctoria
Silybum marianum
Taraxacum androssovii
T. officinalis
T. serotinum
Tragopogon aureus
T. latifolium

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Convolvulaceae*Convolvulus arvensis*

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Dipsacaceae*Cephalaria procera**C. sparsipilosa**Dipsacus silvestris**Scabiosa caucasica**Morina persica*

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Ericaceae*Arbutus unedo**Calluna vulgaris**Vaccinium healths**V. myrtillus*

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Euphorbiaceae*Euphorbia virgata*

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Gentianaceae*Gentiana angulosa**G. cruciata**G. gelida**G. pyrenaica**G. verna*

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Geraniaceae*Geranium sylvaticum*

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Hypericaceae*Hypericum linarioides**H. maculatum*

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Labiatae*Ajuga chamaepitys**A. orientalis*

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<i>Cotoneaster nummularia</i>					•			•						•
<i>Dryas octopetala</i>								•					•	
<i>Fragaria vesca</i>	•				•				•					
<i>Geum montanum</i>	•				•	•	•	•		•	•	•		
<i>G. reptans</i>				•				•						•
<i>G. urbanum</i>				•									•	
<i>Malus communis</i>				•		•							•	
<i>Potentilla bifurca</i>								•						•
<i>P. cruticosa</i>								•					•	
<i>P. reptans</i>						•		•			•	•		
<i>Prunus armeniacus</i>				•		•		•					•	
<i>P. avium</i>				•		•		•					•	
<i>P. spinosa</i>				•		•		•					•	
<i>Rosa canina</i>						•				•			•	
<i>Rubus billorus</i>						•		•					•	
<i>R. canescens</i>						•		•					•	
<i>R. idaeus</i>		•				•		•		•				
Salicaceae														
<i>Salix sp.</i>						•		•		•		•		•
Scrophulariaceae														
<i>Digitalis ambigua</i>				•		•		•		•		•		•
<i>D. ferruginea</i>									•			•		•
<i>D. purpurea</i>				•		•		•				•		•
<i>Linaria genistifolia</i>						•		•				•		
<i>Pedicularis comosa</i>										•		•		
<i>P. condensata</i>								•						•
<i>Veronica gentianoides</i>		•				•		•		•		•		•
<i>V. montana</i>	•				•			•			•	•		
<i>V. orientalis</i>	•					•		•		•		•		
Umbelliferae														
<i>Eryngium alpinum</i>				•		•	•	•				•	•	•
<i>E. billardieri</i>					•	•	•	•				•	•	
<i>E. campestre</i>								•	•	•				•
<i>E. giganteum</i>								•						•
Valerianaceae														
<i>Valeriana peucophaea</i>		•				•								•
<i>V. leucophaea</i>								•				•		•
Verbenaceae														
<i>Vitex agnus-castus</i>								•						•

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