



New molecular evidence for fragmentation between two distant populations of the threatened stingless bee *Melipona subnitida* Ducke (Hymenoptera, Apidae, Meliponini)

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Abstract

For a snapshot assessment of the genetic diversity present within *Melipona subnitida*, an endemic stingless bee distributed in the semi-arid region of northeastern Brazil, populations separated by over 1,000 km distance were analyzed by ISSR genotyping. This is a prerequisite for the establishment of efficient management and conservation practices. From 21 ISSR primers tested, only nine revealed consistent and polymorphic bands (loci). PCR reactions resulted in 165 loci, of which 92 were polymorphic (57.5%). Both Φ_{ST} (ARLEQUIN) and θ^B (HICKORY) presented high values of similar magnitude (0.34, $p<0.0001$ and 0.33, $p<0.0001$, respectively), showing that these two groups were highly structured. The dendrogram obtained by the cluster analysis and the scatter-plot of the PCoA corroborate with the data presented by the AMOVA and θ^B tests. Clear evidence of subdivision among sampling sites was also observed by the Bayesian grouping model analysis (STRUCTURE) of the ISSR data. It is clear from this study that conservation strategies should take into account the heterogeneity of these two separate populations, and address actions towards their sustainability by integrating our findings with ecological tools.

Keywords

Population differentiation, Hymenoptera, Jandaíra, genetic diversity, ISSR markers

Introduction

Melipona subnitida Ducke (Hymenoptera, Apidae, Meliponini) is an endemic stingless bee distributed in the Caatinga, the semi-arid region of northeastern Brazil (Michener 2007, Camargo and Pedro 2013). The species, called Jandaíra by natives, has great ecological significance as a pollinator of the local native flora and cultivated crops and is of economic importance in honey production, which is valued for its alleged medicinal properties and antibacterial activity (Cruz et al. 2004; Alves et al. 2008; Silva and Paz 2012).

The stingless bees are currently threatened by the increasing destruction of native semi-arid vegetation and by the intensification of agriculture in the Caatinga (Roulston and Goodell 2011; Pereira et al. 2011). In response, small populations of stingless bees may gradually decline, resulting in local extinction. The assessment of the genetic diversity present within *Melipona subnitida* populations is therefore a prerequisite for the establishment of efficient management and conservation practices.

Molecular markers have proven to be decisive in elucidating diversity and differences at the DNA level in microorganisms, plants and animals (Panwar et al. 2010; Sebastien et al. 2012; Rana et al. 2012; Bonatti et al. 2014). Among several markers, Inter Simple Sequence Repeats (ISSR) have been used due to their low cost and high level of polymorphism, and as an alternative to overcome reproducibility problems commonly found in other PCR-based markers (Abbot 2001; Lima-Brito et al. 2011). ISSRs are semiarbitrary markers based on DNA amplification by PCR in the presence of single 15- to 20-bp long primer complementary to a target short sequence repeat (Zietkiewicz et al. 1994). Despite the existence of few genetic studies related to stingless bees, it has recently been shown that ISSR markers can be useful in the analysis of natural bee populations, contributing to the development of management strategies of these important genetic resources (Nascimento et al. 2010; Tavares et al. 2013).

The present study uses ISSR analysis to investigate the degree of genetic differentiation between two *Melipona subnitida* populations separated by over 1,000 km in the Brazilian Caatinga.

Worker bees were randomly collected from natural colonies (one bee from each of 30 colonies) distributed in 2 locations only: (1) 15 nests in *Natal* (*NAT*; coordinates: 5°48'04"S, 35°11'08"W; State of Rio Grande do Norte) and (2) 15 nests in *Ilha das Canárias*, Parnaíba River Delta (*PAR*; coordinates: 2°46'39"S, 41°51'59"W; on the border of the states of Piauí and Maranhão) in Brazil (Figure 1A). All the samples were taken to the laboratory and stored at -20°C until further use. Total genomic DNA was extracted from each adult worker thorax using a phenol/chloroformalcohol isoamyl (25:24:1, v:v:v) extraction of SDS/proteinase-K digested tissue of each individual (Sambrook et al. 1989). High molecular weight DNA was isolated by ethanol precipitation and visualized by agarose gel electrophoresis.

The extracted DNA was then amplified by PCR using twenty-one primers developed by the University of British Columbia (primer set #9). PCRs were carried out in 20 µL-reaction volumes containing approximately 10–50 ng of DNA, 1× PCR buffer

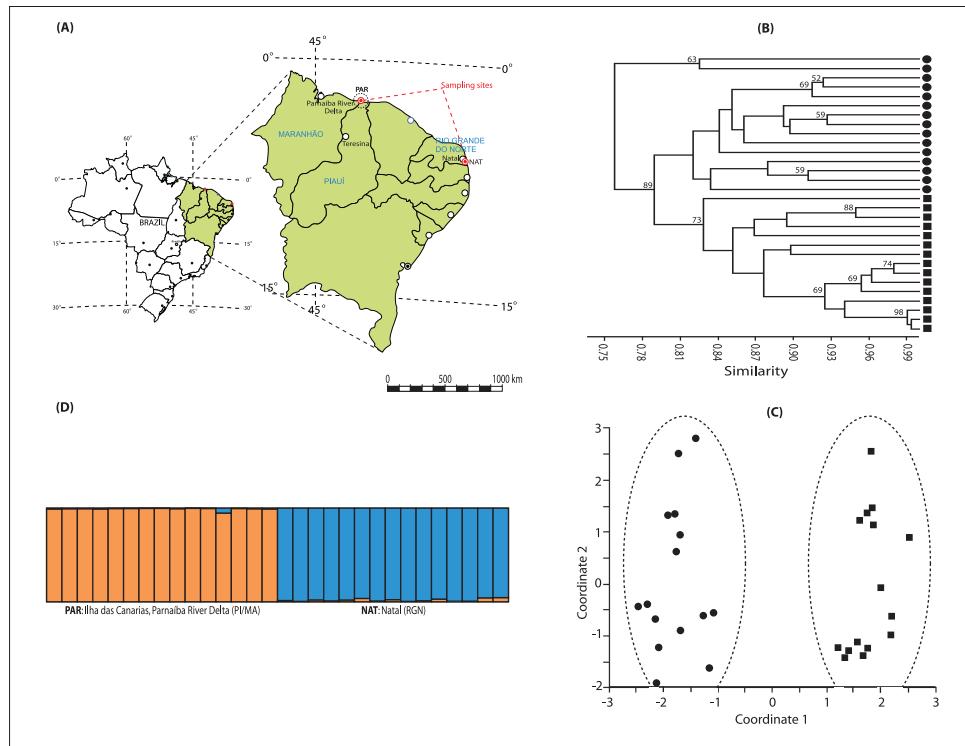


Figure 1. **A** Sampling sites of *Melipona subnitida*: *NAT* (coordinates: 5°48'04"S, 35°11'08"W; State of Rio Grande do Norte) and *PAR* (coordinates: 2°46'39"S, 41°51'59"W; on the border of the States of Piauí and Maranhão) **B** Clustering analysis using UPGMA for *M. subnitida* genotypes included in this study based on DICE similarity coefficient values. Numbers indicate bootstrap values for nodes retained by more than 50% of bootstrap replicates (1000 replications) **C** Scatter-plot of the principal coordinate analysis (PCoA) using ISSR loci. ■ *PAR* genotypes; ● *NAT* genotypes **D** Bar plot from Inferred population structure of using the Bayesian grouping admixture model-based program STRUCTURE ($K = 2$).

(40 mM Tris-HCl; 100 mM KCl), 1.5 μ M of primer, 6.25 mM MgCl₂, 1.5 μ M of each dNTP, 1.25 U of Invitrogen *Taq* DNA polymerase. All amplifications were carried out on a VERITI™ Gradient Thermalcycler (APPLIED BIOSYSTEMS). The following PCR conditions were used: an initial denaturation at 94°C for 1.5 min, followed by 45 cycles of 94°C/40 s, 36°C/1 min. and 72°C/2 min., and a final extension of 72°C/5 min. ISSR markers were screened by silver nitrate detection on denatured 6% polyacrylamide gels, which were scored for absence (0) and presence (1) of bands across genotypes and entered into a binary matrix.

Sample polymorphism was estimated as the percentage of polymorphic bands (PPB) in the total number of bands. The program HICKORY v.1.1, which implements the Bayesian method (Holsinger et al. 2002), was used for estimating θ^B (F_{ST} analogue), heterozygosity (H_s), and the inbreeding coefficient (f), an F_{IS} analogue for dominant markers. Analysis of Molecular Variance (AMOVA) was conducted using

all the amplified loci to check the occurrence of population structure among sampling localities using ARLEQUIN v.3.11 (Excoffier et al. 2006). The use of different algorithms for the calculation of F_{ST} analogues was an additional effort to check for the reliability of the data presented by ISSR markers.

Further, a Bayesian grouping admixture model (burn-in length 100,000 iterations; run length 100,000; $K=1$ to 8 subpopulations tested) was used to infer the number of subpopulations (software STRUCTURE 2.3.3; Pritchard et al. 2000). These results were analyzed using STRUCTURE HARVESTERWeb v.0.6.9 (Evanno et al. 2005).

The similarity among samples within populations was estimated using PAST v1.34 (Hammer et al. 2001) according to Dice's coefficient. Cluster analysis using the unweighted pair-group method arithmetic average (UPGMA) and multidimensional principal coordinate analysis (PCoA) were performed on the data set to reveal the degree of genetic differentiation between sites.

From 21 primers initially screened for their ability to generate ISSR loci, only nine revealed consistent and polymorphic bands (loci) with 30 Jandaíra worker bees. The other 12 ISSR markers were monomorphic or had unreliable amplification and therefore are not included in the genetic diversity analysis. Polymorphic ISSR primers were also considered reproducible after repeated PCRs, under the same reaction conditions and, therefore, selected for genotyping (Table 1). PCR reactions involving these nine primers resulted in 165 loci (bands) or 18.3 bands/primer, of which 92 were polymorphic (10.2 polymorphic bands/primer) ranging in size from 250 to 1636 bp, corresponding to an average polymorphism of 57.5%. Genotyping showed that most of the detected loci were polymorphic. Overall ISSR polymorphism in *Melipona subnitida* was similar to that of *M. quadrifasciata* Lepeletier (67%) (Nascimento et al. 2010). The number of polymorphic bands per primer ranged from 5 (UBC-884 and UBC-888) to 23 (UBC-899).

ISSR genotyping revealed differences in genetic diversity based on the percentage of polymorphic bands (% PPB), which was also estimated separately for each population. Result suggests that the *NAT* population (80.7%) is characterized by a higher genetic diversity than the *PAR* population (64.9%), which in theory might give the *NAT* population an increased ability to adapt to selective pressures.

The θ^B , f and H_s values obtained from four different models of population structure using the Bayesian analysis are shown in Table 2. Of the models applied to the ISSR dataset, the full model, in which θ and f are estimated simultaneously, was preferred primarily because of its smaller deviant information criterion (DIC) value (657.47), with a difference of more than six units required to indicate strong support over all the other models (Holsinger et al. 2002). In the Bayesian approach θ^B (analogue to Wright's F_{ST}), f (analogue to F_{IS}), and H_s (average panmictic heterozygosity across populations) were estimated to be 0.33, 0.31 and 0.29, respectively, indicating a pronounced genetic differentiation between populations, possibly caused by restricted gene flow and random genetic drift (Epperson 1995).

The analysis of molecular variance also provided additional support to the evidence of population differentiation in *Melipona subnitida*. The AMOVA analysis indicated

Table 1. Primer names and sequences used in the ISSR analysis, number of polymorphic bands per primer and range of molecular weight in base pairs (bp) amplified by PCR-ISSR for 30 *Melipona subnitida* worker bees.

Primer code	Primer sequence (5'-3')*	Total number of bands/loci			Number of polymorphic loci			Size range of bands (bp)
		Total	Overall PPL	PAR	Polymorphism (%)	NAT	Polymorphism (%)	
UBC-827	ACA ACA ACA ACA CG	15	6	0.400	3	50.0	6	100.0
UBC-834	AGA GAG AGA GAG AGA GYT	25	8	0.320	7	87.5	2	25.0
UBC-841	GAG AGA GAG AGA GAG AYC	21	16	0.762	11	68.8	13	81.3
UBC-845	CTC TCT CTC TCT CTC TRG	9	9	1.000	8	88.9	8	88.9
UBC-884	HBH AGA GAG AGA GAG AG	18	5	0.278	4	80.0	3	60.0
UBC-886	VDV CTC TCT CTC TCT CT	16	11	0.688	6	54.5	11	100.0
UBC-888	BDB CAC ACA CAC ACA CA	14	5	0.357	3	60.0	4	80.0
UBC-899	CAT GGT GTT GGT CAT TGT TCCA	34	23	0.676	14	60.9	21	91.3
UBC-852	TCT CTC TCT CTC TCT CRA	13	9	0.692	3	33.3	9	100.0
Total		165	92	-	59	-	77	-
Average		-	-	0.575	-	64.9	-	80.7

PPL: Proportion of polymorphic loci; *The following designations were used for degenerate sites: Y (C or T), R (A or G), H (A, T, or C), B (G, T, or C), V (C, G, or A) and D (G, A, or T). PAR: Ilha das Canárias, Parnaíba River Delta; NAT: Natal.

Table 2. Summary of genetic variability, partitioning of diversity and limits for credible interval by Bayesian statistical procedures.

Models	<i>f</i>			θ^B			H_s			DIC
	Mean	2.5 %	97.5 %	Mean	2.5 %	97.5 %	Mean	2.5 %	97.5 %	
Full	0.3096	0.0455	0.67	0.3275	0.2425	0.4188	0.2925	0.2565	0.3254	657.465
$f = 0$	0	-	-	0.2737	0.2099	0.3451	0.3272	0.3122	0.3418	665.837
θ^B	0.3733	0.1702	0.6037	0	-	-	0.3546	0.3319	0.3761	1107.250
f_{free}	0.4997	0.0224	0.9742	0.3578	0.2807	0.4389	0.2771	0.2467	0.3098	700.287

θ^B is analogous to Wright's F_{ST} , f is analogous to F_{IS} , H_s is the average panmictic heterozygosity across populations, and DIC is deviance information criterion.

Table 3. Hierarchical analysis of molecular variance (AMOVA) detected by the ISSR genotyping.

Source of variation	df	Sum of squares	Variance components	Percentage of total variance (%)	P-value*
Among populations	1	96.333	5.697	34.35	< 0.0001
Among individuals within populations	28	304.800	10.886	65.65	0.014
TOTAL	29	401.133	16.583		
Fixation index			F_{ST} index = 0.3435		

*p-values calculated from a random permutation test (10,000 permutations).

that most of the genetic variation found in *M. subnitida* samples could be attributed to differences among individuals within populations (approximately 66% of the variance), but also a large part of the variation (34.35%) was due to differences among localities. The inbreeding coefficient ($f = 0.31$) provided by HICKORY agrees with the results obtained by the AMOVA, as moderate endogamy might be expected for strongly structured populations.

Both θ^B (HICKORY) and Φ_{ST} (ARLEQUIN) presented high values, but of similar magnitude and significance (0.33, $p < 0.0001$ and 0.34, $p < 0.0001$, respectively), showing that these two populations are highly structured (Tables 2–3). These two different approaches showed a general agreement among the results.

A high degree of population differentiation has also been observed for *Melipona quadrifasciata* populations based on ISSR patterns (Nascimento et al. 2010) and *M. rufiventris* Lepeletier (Tavares et al. 2007) based on allozyme, microsatellite and random amplified polymorphic DNA (RAPD) molecular markers. Both studies were conducted within the State of Minas Gerais (Brazil). However, no correlation was found between the first internal transcribed spacer (ITS1) sequence divergence of *M. subnitida* populations and geographical distances in northeastern Brazil, which might be explained by the extremely high mutation rates of the ITS region in *M. subnitida* (Cruz et al. 2006).

Genetic differentiation within *Melipona subnitida* populations was probably because of low gene flow, caused by limited dispersal ability (Engels and Imperatriz-Fonseca 1998; Tavares et al. 2007), the large distance separating the NAT and PAR

populations, and extensive disturbances of population dynamics due to anthropogenic habitat degradation and fragmentation (Quezada-Euán et al. 2007). More recently, mtDNA data has also pointed to genetic differentiation between these *M. subnitida* populations from Rio Grande do Norte (Mossoró city) and Piauí (Parnaíba city, on the border of Maranhão state) (Bonatti et al. 2014).

Furthermore, the dendrogram obtained by the cluster analysis (Figure 1B) and the scatter-plot of the PCoA (Figure 1C) revealed a clear separation of the species in two main clusters confirming a significant molecular genetic difference between the two populations. This topology corroborates the data presented by the Bayesian θ^B and AMOVA. A clear evidence of subdivision among sampling sites was also observed by the Bayesian grouping model analysis of the ISSR data (Figure 1D).

This study provides additional evidence that ISSR markers can be useful tools in defining population genetic substructuring in *Melipona* species. More importantly, the distinctiveness of populations in these two regions suggests that the *NAT* and *PAR* populations of *M. subnitida* have separate evolutionary histories. It is clear from this study that conservation strategies should take into account the heterogeneity of these two separate populations, and that actions should be addressed towards their sustainability by integrating our findings with ecological tools. Failing to do so would risk decimating the entire bee population by uncontrolled human activities in the region.

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First record from Costa Rica of the genus *Caenophanes* Foerster and description of a new species (Hymenoptera, Braconidae, Doryctinae)

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Abstract

The genus *Caenophanes* Foerster is distinguished from the genus *Heterospilus* Haliday and one new species is described from Costa Rica which is the first species of *Caenophanes* described from the Western Hemisphere.

Keywords

Parasitoid wasps, Braconidae, Doryctinae, *Caenophanes*, Costa Rica, taxonomy

Introduction

The small genus *Caenophanes* Foerster has, for a long time, been considered a synonym of *Heterospilus* Haliday but was recently resurrected as a valid genus by Belokobylskij (1993) who placed it in the tribe Doryctini. It is similar to genera in the tribe Heterospilini because of the absence or weakness of fore wing vein 2RS, but is distinguished by having the first subdiscal cell of the fore wing closed at its apex. Belokobylskij (2006) presented a key to the World genera of Doryctinae which have an absent or weak fore wing vein 2RS.

Species of *Caenophanes* have been recorded from the Australasian, Oriental and Palaearctic Regions. During a recent study of the Heterospilini from Costa Rica (Marsh et al. 2013) one new species of *Caenophanes* was discovered. Specimens are also known from Mexico (Belokobylskij et al. 2011) and Wyoming (Scott Shaw, per. comm.) thus expanding the distribution of the genus to the entire Western Hemisphere. The purpose of this paper is to document the distribution of the genus *Caenophanes* for Central America and to present a description of the new species from Costa Rica.

Materials and methods

Specimens were found among the large collection of Heterospilini borrowed from the University of Wyoming. All specimens were examined using a Wild M5 binocular stereomicroscope and fluorescent illumination. Specimens for the scanning electron micrographs were gold/palladium coated using a Denton Desk II TSC turbo-pumped sputter coater and the micrographs were made on a Philips XL30 Environmental Scanning Electron Microscope. Minor levels of adjustments to the images were performed in Adobe Photoshop versions CS3 and CS4, and the plate was prepared in the same program.

Terminology for morphological characters largely follows that of Sharkey and Wharton (1997) and Marsh (2002). Terminology for surface sculpturing follows that of Harris (1979), Marsh (2002) and Marsh et al. 2013.

Label data for holotypes and paratypes is listed exactly as indicated on the labels including misspellings, punctuation, abbreviations and absent spaces. Lines on each label are separated by a bracketed semi-colon [;].

All type material is deposited in the Insect Museum at the University of Wyoming, Laramie, WY (ESUW) and the Department of Entomology, University of Illinois (UILL).

Taxonomy

Genus *Caenophanes* Foerster

<http://species-id.net/wiki/Caenophanes>

Synodus Ratzeburg 1848:31. Preoccupied by *Synodus* Gronovius 1763 Latreille 1828.
Caenophanes Foerster 1862:236. New name for *Synodus* Ratzeburg.

Caenophanes Foerster: Shenefelt and Marsh 1976:1299 (as synonym of *Heterospilus*); Belokobylskij and Tobias 1986:39 (as subgenus of *Dendrosotinus*); Belokobylskij 1993:91 (stat. n.); Belokobylskij et al. 2004:27; Belokobylskij and Maeto 2009: 66–86 (key to species).

Eurybolus Thomson 1892:1855. Preoccupied by *Eurybolus* Ratzeburg 1844; synonymized by Viereck 1914.

Heterospilus (*Ratzsynodus*) Papp 1984:177. Synonymized by Tobias 1986.

Dendrosotinus (*Astigmatandrus*) Belokobylskij 1983:183. Synonymized by Belokobylskij and Tobias 1986.

Type species. *Bracon (Synodus) incompletus* Ratzeburg.

Diagnosis. Small to moderate size, 1.5–3.5 mm; occipital carina not meeting hypostomal carina; fore tibia with single row of small spines; hind coxa with distinct antero-ventral basal tooth; basal sternal plate (acrosternite) of metasomal segment 1 short, less than $\frac{1}{4}$ length of tergum; fore wing second submarginal cell elongated, vein 2RS absent, vein r-m present, first subdiscal cell closed at apex, vein 3CU on same line as vein 1CU; hind wing vein SC+R present, male without stigma in hind wing.

Distribution. Australasian, Oriental, Palaearctic and Neotropical (**new record**).

Biology. Species from Australia have been reared from *Xylopsocus* sp. (Bostrichidae) and *Phoracantha* sp. (Cerambycidae) (Belokobylskij et al. 2004). No biological information is available for the species described below.

Comments. *Caenophanes* is similar to *Heterospilus* by having the fore wing vein 2RS absent, but is distinct by having the fore wing first subdiscal cell closed at the apex. A key to species was presented by Belokobylskij and Maeto (2009).

One new species from Costa Rica is described below which is the first record for the genus in the Western Hemisphere.

***Caenophanes costaricaensis* Marsh, sp. n.**

<http://zoobank.org/356727AB-5FDD-4BAD-9DD8-7D41DA84C9EE>

http://species-id.net/wiki/Caenophanes_costaricaensis

Figs 1–5

Female. Body size: 1.5–3.0 mm. **Color:** head honey yellow or light brown, ocellar triangle usually brown; scape honey yellow or yellow, flagellum brown; mesosoma brown with propleuron, mesopleuron, venter and mesoscutal lobes usually lighter brown or honey yellow; metasomal tergum 1 brown or dark brown, remainder of terga lighter brown or yellow; body rarely entirely honey yellow; legs yellow, femora and tibiae usually brown on apical half; wing veins brown, stigma brown with basal $\frac{1}{3}$ – $\frac{1}{2}$ yellow. **Head** (Fig. 3): vertex coriaceous; frons coriaceous, often striate just behind antennae; face coriaceous-punctate with raised smooth area; temple in dorsal view somewhat broad, not sloping behind eye, width equal to $\frac{1}{2}$ eye width; malar space greater than $\frac{1}{4}$ eye height; ocell-ocular distance 2.5 times diameter of lateral ocellus; 20–28 flagellomeres, first flagellomere slightly longer than second. **Mesosoma** (Fig. 1): mesonotum usually slightly declivous anteriorly, occasionally not declivous and nearly on same line as pronotum; mesoscutal lobes coriaceous, usually covered by dense short hair; notauli scrobiculate, meeting posteriorly in triangular rugose area; scutellum coriaceous; prescutellar furrow with 3–5 cross carinae; mesopleuron weakly coriaceous; precoxal sulcus scrobiculate, shorter than mesopleuron; venter weakly coriaceous; epicnemial carina distinct and raised, expanded as a short flange behind fore coxae; propodeum with apical-lateral corners produced into distinct tubercle, basal median areas distinctly margined and coriaceous, basal median carina present, areola usually distinctly margined, areolar area rugose or carinate, lateral areas entirely rugose. **Wings:** fore wing

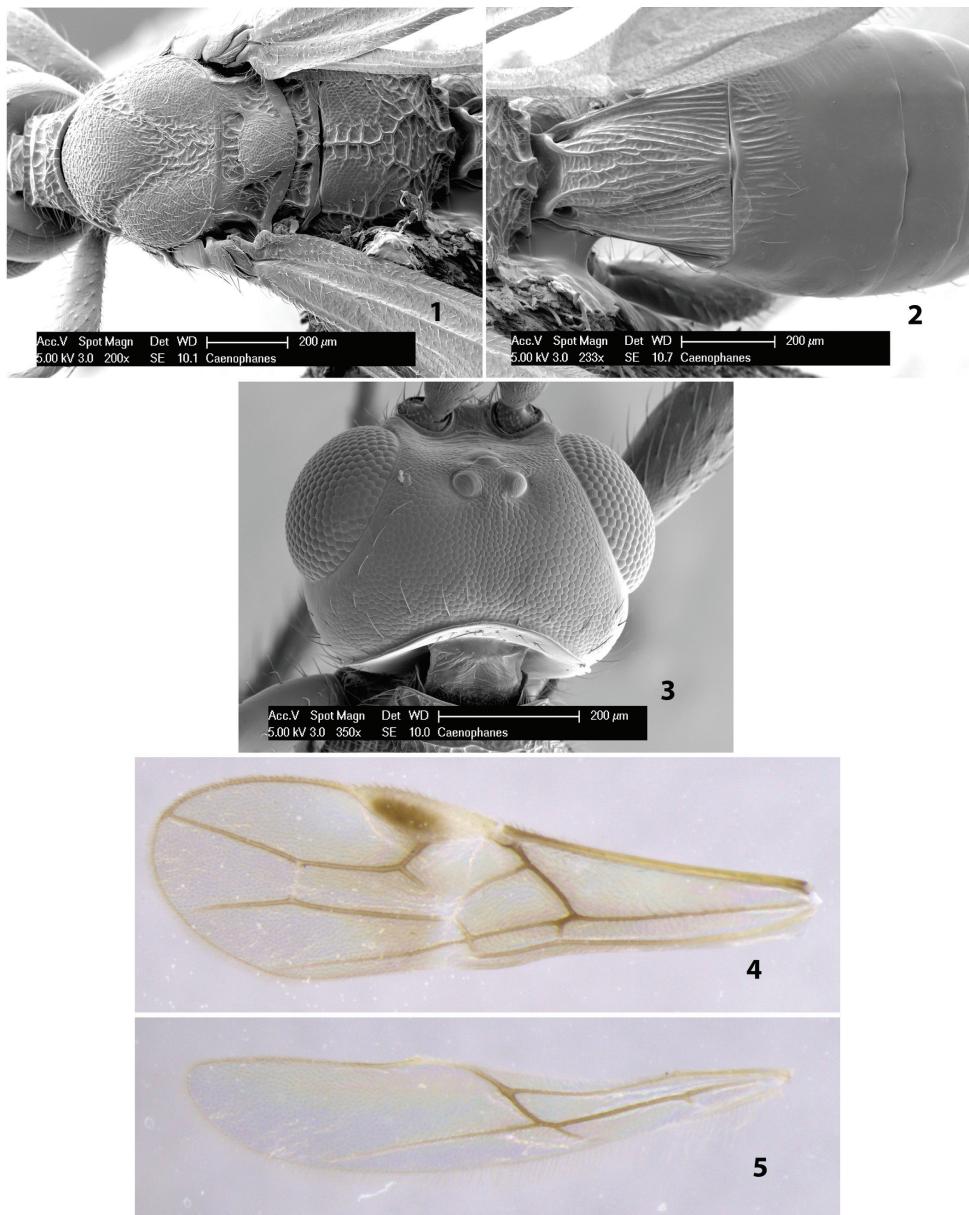


Figure 1–5. *Caenophanes costaricensis* Marsh, n. sp.: **1** mesoscutum **2** metasomal terga **3** vertex, dorsal view **4** fore wing **5** hind wing.

(Fig. 4) vein r about $\frac{1}{3}$ length of vein $3RSa$, vein $1cu-a$ distinctly beyond vein $1M$, first subdiscal cell closed at apex by vein $2cu-a$ which is usually interstitial with vein $m-cu$, vein $3CU$ on same line as vein $1CU$, vein $2CU$ absent; hind wing (Fig. 5) vein $SC+R$ present, vein $M+CU$ shorter than vein $1M$. Legs: hind coxa with distinct antero-ventral

basal tooth; fore tibia with distinct single row of short stout spines along anterior edge. *Metasoma* (Fig. 2): first tergum longitudinally costate, often rugose medially, length slightly greater than apical width; second tergum usually with short costae at extreme base, often nearly entirely smooth; anterior transverse groove weak and curved or sinuate, occasionally absent entirely; posterior transverse groove absent; third and following terga smooth; ovipositor about half as long as metasoma.

Male. Essentially as in female; propodeum usually dark brown, metasomal terga 1 and 4–7 dark brown, terga 2–3 yellow.

Holotype female. Top label (white, printed) - Costa Rica: Guanacaste [;] Est. Biol. Maritz, 600m [;] xi.1996, C. Zuniga, Malaise [;] L.N. 326900–373000 #47554; second label (red, printed) - HOLOTYPE [;] *Caenophanes* [;] *costaricensis* Marsh. Deposited in ESUW.

Paratypes. 4 ♀♀, top label - Costa Rica: Guanacaste [;] Santa Rosa Natl. Park [;] 300m, ex. Malaise trap [;] Site: SE-6-C [;] Dates: 16.xi–9.xii.1985, 18.i–8.ii.1986 and 6–27.ix.1986 [;] I.D. Gauld & D. Janzen; second label - [SE] Bosque San Emilio [;] 50yr old deciduous forest [;] [C] more or less fully [;] shaded as possible (ESUW). 2 ♀♀, top label - Costa Rica: Guanacaste [;] Santa Rosa Natl. Park [;] 300m, ex. Malaise trap [;] Site: BH-9-O [;] Dates: 20.xi.86–10.i.1987 and 28.xii.85–18.i.1986 [;] I.D. Gauld & D. Janzen; second label - [BH] Bosque Humedo [;] mature evergreen dry forest [;] [O] in clearing, fully [;] isolated part of day (ESUW). 1 ♀, top label - Costa Rica: Guanacaste [;] Santa Rosa Natl. Park [;] 300m, ex. Malaise trap [;] Site: blank [;] Dates: 20.xii.86–10.i.1987 [;] I.D. Gauld & D. Janzen; second label - [BH] Bosque Humedo [;] mature evergreen dry forest [;] [C] more or less fully [;] shaded as possible (ESUW). 1 ♂, top label - Costa Rica: Guanacaste [;] Santa Rosa Natl. Park [;] 300m, ex. Malaise trap [;] Site: H-1-O [;] Dates: 29.xi–20.xii.1986 [;] I.D. Gauld & D. Janzen; second label - [H] open regenerating [;] woodland <10 years old [;] [O] in clearing, fully [;] isolated part of day (ESUW). 1 ♀, COSTA RICA Guanacaste [;] ACG, Santa Rosa Station [;] 10.837°N 85.620°W 300m [;] i-xii.2008, malaise trap [;] D.H.Janzen&W. Hallwachs [;] DNA#AW123 (UIL). 1 ♀, top label - Costa Rica: BH-10-C [;] Guanacaste Province [;] Santa Rosa Natl. Pk. [;] 300m. (dry season) [;] 10–31 January 1987; second label - Bosque Humedo, mature [;] dry forest with high [;] proportion evergreen [;] species, fully shaded [;] Townes style Malaise [;] Ian Gauld coll. (ESUW). 1 ♀, top label - Costa Rica: Guanacaste [;] Santa Rosa National Pk. [;] 300m, Malaise, Ian Gauld [;] 10–31.i.1987; second label - Bosque San Emilio [;] 50yr old deciduous [;] forest [;] full shade; third label - SE-6-C [;] 10-31.i.87 (ESUW). 1 ♀, Costa Rica: Limon [;] 30 km N Cariari, 100m [;] Sector Cocori, Malaise [;] iii.1995, E. Rojas #4524 [;] L.N. 286000-567500 (ESUW). 1 ♀, Costa Rica: San Jose [;] San Antonio de Escazu [;] 1300m, iii-iv.1998 [;] W.Eberhard & P.Hanson (ESUW). 1 ♂, Costa Rica, Carthago Pr. [;] Dulce Nombre, Vivero [;] Linda Vista, 1300 m [;] 1994:x–xi, P. Hanson (ESUW).

Etymology. Named for the country of Costa Rica where the specimens were all collected.

Comments. This species does not easily run to any species in the key presented by Belokobylskij and Maeto (2009). It is similar to *nukunu* (Marsh and Austin) (Austin et al. 1994) because of the expanded epicnemial carina but differs in color and by having the ovipositor shorter than the metasoma.

Acknowledgements

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Description of a new chrysidid genus from New Caledonia (Hymenoptera, Chrysidae, Amiseginae)

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Abstract

Generic placement of the amisegine species *Atoposega decorata* Kimsey, 1995, is reexamined and is moved to the new genus, *Noumeasega*. In addition, three new species, *N. bicolorata*, *N. kaoriensis* and *N. neocaldonica*, also from New Caledonia are described and placed in *Noumeasega*. Traits that distinguish *Noumeasega* from *Atoposega* Krombein, 1957 and *Mahinda* Krombein, 1983, are described, and a key to the species is provided along with distribution map and images. In addition, unlike *Atoposega*, males are associated with females in *Noumeasega*.

Keywords

Atoposega, *Mahinda*

Introduction

The genus *Atoposega* Krombein, 1957, is recorded from south Asia and New Caledonia. However, the New Caledonian species, *Atoposega decorata* Kimsey, 1995 is an extreme geographic outlier and lacks many of the characteristics diagnostic for the other species of *Atoposega*. Further collecting has revealed that all of the New Caledonian Amiseginae are congeneric and are distinct from *Atoposega*. In addition, both males and females are present making sex associations possible, unlike the situation in *Atoposega*.

Among the New Caledonian species, *decorata* differs from *Atoposega* species in a number of critical modifications of the mesopleuron, propodeum and hindcoxa. Because of these differences it is clear that the New Caledonian species are not congeneric with *Atoposega*. The only other genus that has females with elongate, spine-like propodeal angles is *Mahinda* Krombein, 1983, but *decorata* also differs in these characteristics from species of *Mahinda*. As a result a new genus, *Noumeasega*, is proposed for the New Caledonian species.

The biology of *Noumeasega* species is unknown.

Materials and methods

Specimens were borrowed from the following institutions and/or these are the type repositories: BME – Bohart Museum of Entomology, University of California, Davis, USA; BPBM – Bernice P. Bishop Museum, Honolulu, Hawaii, USA; INHS – Illinois Natural History Survey, Urbana, USA; MCZ – Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA; and QM – Queensland Museum, South Brisbane, Queensland, Australia.

Terminology follows that of Kimsey and Bohart (1991).

Key to distinguish the genera *Atoposega*, *Mahinda* and *Noumeasega*

- 1 Metasoma with 5 visible segments; males..... 2
- Metasoma with 4 visible segments, ovipositor tube usually visible; females.... 3
- 2 Omaulus absent or consisting of simple carina along edge of punctuation separating lateral from ventral mesopleural margins (Fig. 4); mesopleuron with parallel-sided posteromedial groove, without carinate edge (Fig. 7).....
..... *Noumeasega Kimsey, gen. n.*
- Omaulus well-developed, ridge-like, with ladder-like lateral septa (as in Fig. 2); mesopleuron with posteromedial U-shaped carina-margined fossa (as in Fig. 5) *Mahinda Krombein**
- 3 Omaulus absent or consisting of simple carina along edge of punctuation separating lateral from ventral mesopleural margins (Fig. 3); mesopleuron with parallel-sided posteromedial groove, without carinate edge (Fig. 6); forewing stigma short, broad, without indication of R1 vein, 3× as long as broad beyond juncture of Rs vein *Noumeasega Kimsey, gen. n.*
- Omaulus well-developed, ridge-like, with ladder-like lateral septa (Fig. 2); mesopleuron with posteromedial U-shaped carina-margined fossa (Fig. 5); forewing stigma apically narrowed into slender, vein-like R1, 5× or more as long as broad or strongly brachypterous..... 4
- 4 Fully winged; hindcoxa with two dorsal longitudinal carinae (Fig. 2); propodeum without angles at top of posterior declivity..... *Atoposega Krombein*

- Brachypterous; hindcoxa with one dorsal longitudinal carinae (as in Fig. 3); propodeum with sharp submedial angles or teeth at top of posterior declivity

Mahinda Krombein

* Characteristics of the mesopleuron, propodeum and hindcoxa suggest that male *Mahinda* as described by Krombein are not congeneric with the females and may actually be male *Atoposega*.

Systematics

Noumeasega Kimsey, gen. n.

<http://zoobank.org/DCBD952D-87FC-47F8-A371-8BAD3033AF96>

<http://species-id.net/wiki/Noumeasega>

Diagnosis. Females of *Noumeasega* species most closely resemble those of *Atoposega* and less so *Mahinda* based on the acute or spine-like propodeal angles and forewing with an arcuate Rs vein (Figs 2, 3). Male *Noumeasega* resemble male *Mahinda*, but differ in having the posterior propodeal declivity with an ovoid enclosure, which is absent in *Mahinda*. Both sexes differ from those of *Atoposega* in having the hindcoxa with a single longitudinal carina (two in *Atoposega*), the mesopleuron lacking an omaulus or the omaulus represented by a simple carina or line along the edge of punctuation separating the lateral from the ventral mesopleural surfaces (Figs 4, 5) versus a well-developed and ladder-like omaulus in *Atoposega* (Fig. 2); mesopleuron with parallel-sided posteromedial groove (Figs 6, 7), which is dorsally carinate and U-shaped in *Atoposega* (Fig. 5). *Noumeasega* can be distinguished from other amisegine genera by these characters and by the dentate tarsal claws, malar space with a vertical sulcus, female propodeum with acute or spine-like lateral angle, frons without transverse carina, vertex without longitudinal welt, pronotum with medial longitudinal pit and short sulcus and pit adjacent to lateral posterior lobe, mesopleuron without scrobal sulcus, metanotal dorsal enclosure usually V-shaped, and propodeum with two dorsomedial decumbent teeth, and propodeal declivity smooth and impunctate, with longitudinal medial carina.

Description. Body length. 3–7 mm.

Head. Occipital carina present only dorsally; eyes with tiny sparse setulae; eye not encircled by carina; scapal basin flattened, narrow and cross-ridged; malar space with vertical groove; female flagellum short, fusiform and flattened on one surface, intermediate flagellomeres broader than long; male flagellomeres cylindrical, more than 3× as long as broad.

Mesosoma. Pronotum with posteromedial groove and deep pit before lateral lobe; scutum with notauli present, sometimes obscured by sculpturing, without parapsides; mesopleuron evenly punctate; omaulus faint, indicated by simple carina or forming edge separating lateral from ventral surfaces; scrobal sulcus absent; metanotum elongate, subequal in length to scutellum, with triangular medial enclosure (except in *neo-*

caledonica); propodeum dorsal surface bending abruptly to posterior declivity, lateral angles long and spike-like; hindcoxa with single dorsobasal carina; tarsal claw with large medial tooth; female fully winged; forewing medial vein arising at or more often before cu-a, Rs extended at abrupt angle by dark streak in females; wings densely setose and often banded.

Metasoma. Terga highly polished with tiny widely scattered punctures (females) or denser, evenly dispersed punctures (males); sternum I produced into large basal keel.

Type species. *Noumeasega kaoriensis* Kimsey, sp. n.

Etymology. *Noumea* – the capital city of New Caledonia; *sega* – the name ending of most amisegine genera.

Distribution. *Noumeasega* species are only known from New Caledonia (Fig. 1).

Remarks. Sex associations are not easy to make in the subfamily Amiseginae. Females are often wingless and ant-like, with fully winged males. Even in winged forms males and females are generally structurally quite different, with different wing venation, punctuation, antennal dimensions, thoracic and leg modifications, and coloration. In the New Caledonian *Noumeasega* sex associations are possible for two reasons. First, there is only one generic entity on the island. Thus the males and females are congeneric. Second it is possible to associate males and females in some of the species based on peculiarities of coloration, size and/or geography.

Key to the species of *Noumeasega*

- 1 Four external metasomal terga; antennal segments II-IX less than twice as long as broad; mandible apically simple, with acute apex; females..... 2
- Five external metasomal terga; antennal segments II-IX more than twice as long as broad; mandible apically bidentate; males 5
- 2 Forewing with light and dark bands; propodeal angle elongate, spine-like .. 3
- Forewing evenly brown tinted or untinted; propodeal angle forming short acute angle or tooth 4
- 3 Head, mesosoma and metasoma bright metallic blue, metasomal tergum II with large white sublateral spot; flagellum concolorous, pale orange to yellow; femora medially blue (Fig. 13) ***decorata* (Kimsey)**
- Head, mesosoma and metasoma black, often with coppery or metallic green highlights; metasomal tergum II without white spot; flagellum bicolored with medial articles dark brown, apical and basal segments whitish; femora medially red (Fig. 14) ***bicolorata* Kimsey, sp. n.**
- 4 Flagellomere I 3× as long as broad; malar space more than 3.5 midocellus diameters long; hindocellus separated from eye margin by 0.3-0.5 hindocellar diameter (Fig. 32) ***kaoriensis* Kimsey, sp. n.**
- Flagellomere I less than 3× as long as broad; malar space less than 3 midocellus diameters long; hindocellus nearly touching eye margin, by less than 0.3 hindocellar diameter (Fig. 30) ***neocalledonica* Kimsey, sp. n.**

- 5 Antenna as long or longer than body; flagellomere I more than 4× as long as broad; flagellomere II more than 3× as long as broad 6
- Antenna shorter than body; flagellomere I less than 3.5× as long as broad; flagellomere II less than 2.5× as long as broad 7
- 6 Head and thoracic dorsum black with metallic blue highlights (Fig. 12); malar space less than 2.5 midocellus diameters; flagellomere IX less than 5.5× as long as broad (Fig. 20) *kaoriensis* Kimsey, sp. n.
- Head and mesosoma metallic blue (Fig. 10); malar space more than 2.5 midocellus diameters long; flagellomere IX 6–7× as long as broad (Fig. 19) *decorata* Kimsey
- 7 Clypeus and flagellum dark brown to black; body length 2.5–3.0 mm; least interocular distance more than 0.5× facial length in front view (Fig. 17)
- *bicolorata* Kimsey, sp. n.
- Clypeus and flagellum red; body length 4–5 mm; least interocular distance less than 0.5× facial length in front view (Fig. 21) *neocalledonica* Kimsey, sp. n.

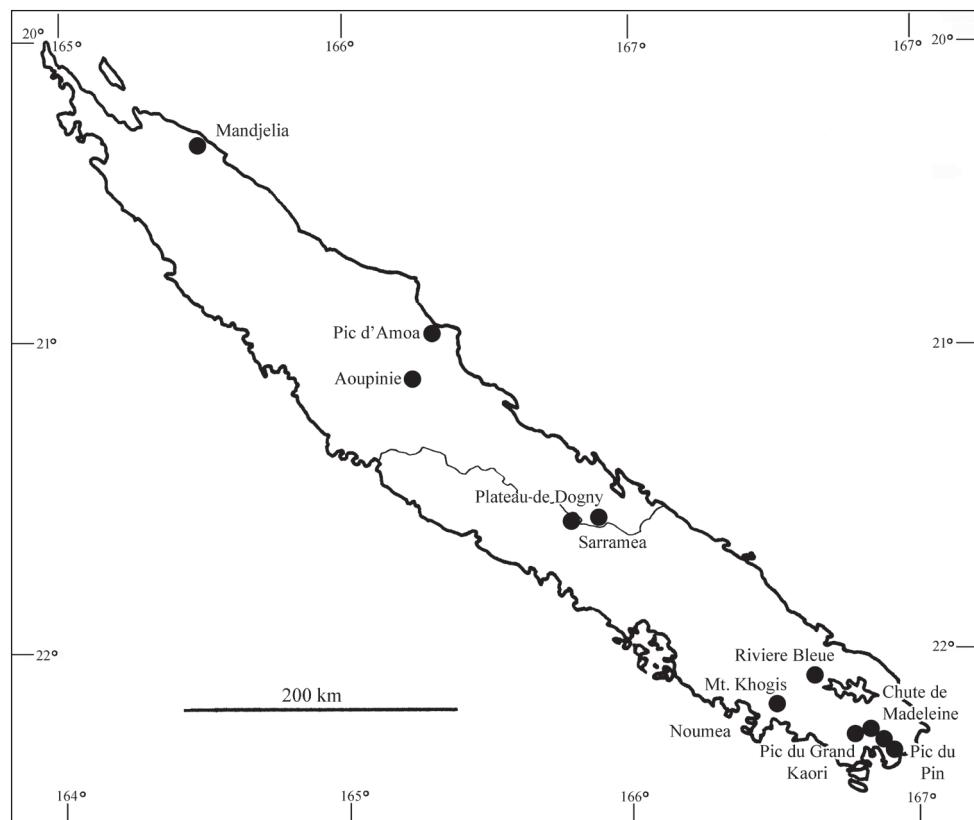


Figure 1. Distribution map of *Noumeasega* species.

***Noumeasega bicolorata* Kimsey, sp. n.**

<http://zoobank.org/2F108127-5738-47D2-8C68-6ED6B9A05832>

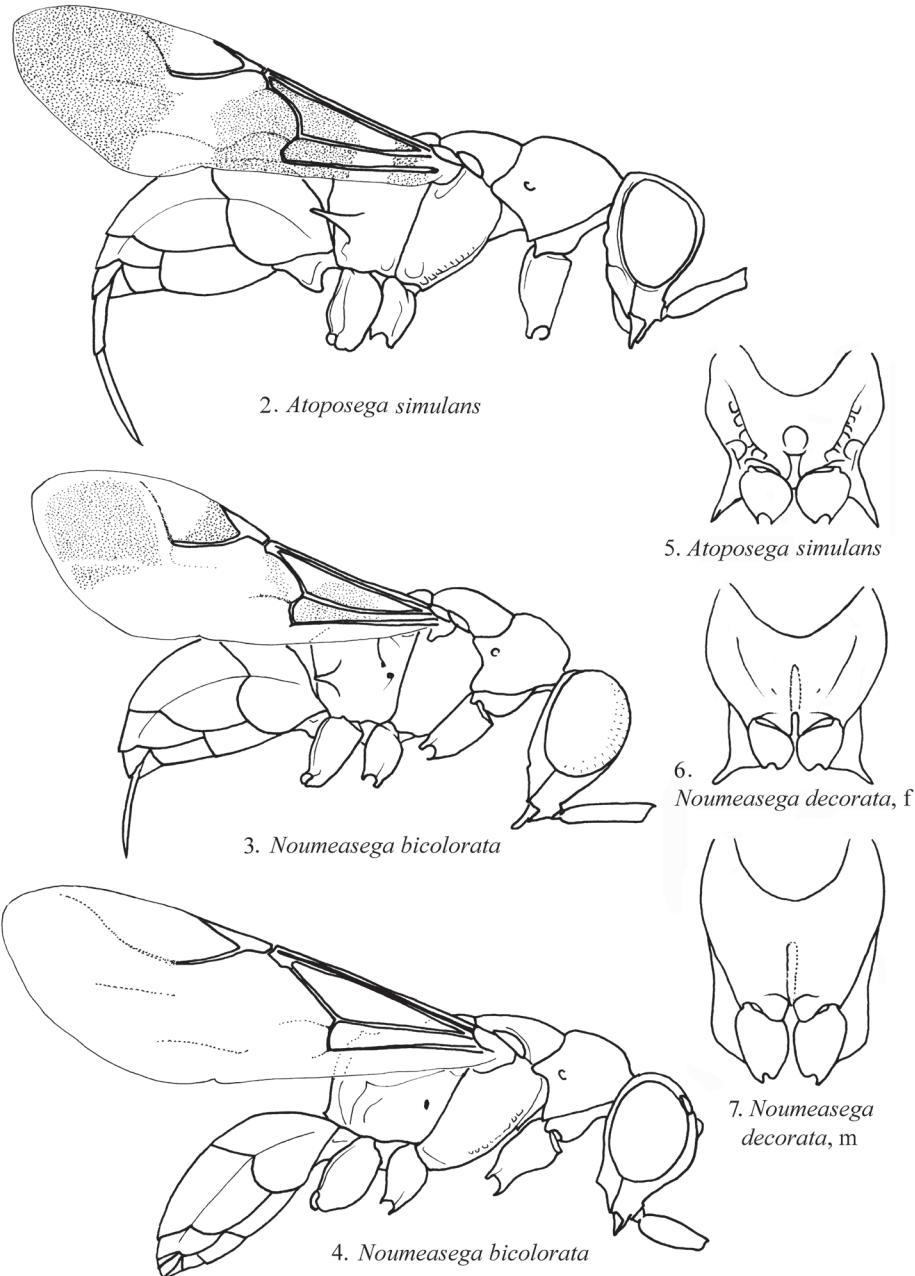
http://species-id.net/wiki/Noumeasega_bicolorata

Figures 3, 4, 9, 14, 17, 22, 25, 26

Type material. Holotype male: Pic du Pin, 22°14'S 166°50'E, 280m, 23/xii/2004–12/i/2005, Malaise trap, Burwell & Wright, #12047 (QM). Paratypes: 1 male: same data as holotype; 2 males: 25/xi–23/xii/2004, Malaise trap, Burwell & Wright, #1864; 2 males: 22°15'S, 166°49'E, 280m, 23/xii/2003–12/i/2005, Malaise trap, Burwell & Wright, #12038; 2 males: 25/xi–23/xii/2004, Malaise trap, Burwell & Wright, #11858; 1 male: 25–26/xi/2004, Malaise trap, Burwell & Wright, #11779; 2 females; Pic du Grand Kaori, 22°17'S 166°54'E, 250m, 22–23/xi/2004, Burwell & Wright, YPT, #11760; 1 female: Pic du Grand Kaori, 22°15'S, 166°49'E, 280m, 25/xi/2004–12/i/2005, Grimbacher & Monteith, RF, #1859; 2 females: Riv. Bleue Panoramic track, 160m, 22°15'S, 166°49'E, 25/xi/2004–12/i/2005, Burwell & Skevington, FIT, #9960; 1 male: Foret Nord, 22°19'S, 166°55'E, 480m, 22/xii/2004–9/i/2005, Malaise trap, Burwell & Wright, #12074; 1 male: 1–22/xii/2004, Malaise trap, Burwell & Wright, #11882 (BME, QM).

Diagnosis. Females share the banded wings and long spine-like propodeal angles with *decorata*. They can be separated by having a black body, with coppery or green highlights, not bright blue as in *decorata* and the flagellum is bicolored, not yellow as in *decorata*. Males have yellow legs and flagellomere I less than 4× as long as broad, which are shared with *necaledonica*. Males also have a dark spot on the forewing below the stigma, a feature shared with *decorata*. They can be distinguished from *necaledonica* by the dark brown to black flagellum and clypeus (red in *necaledonica*).

Female description. Body (Fig. 14): length 2.5–3.0 mm. Head: face (Fig. 22); scapal basin zone of cross-ridging occupying one-third of distance between ocular margins, three-fourths basin height; frons with punctures large, contiguous; vertex (Fig. 26): lateral postocular extension not extending behind eye, midocellus 2 midocellar diameters from ocular margin; hindocellus 0.4 hindocellar diameter from ocular margin; malar space 2.4–2.5 midocellar diameters long; subantennal distance 0.7 midocellar diameter long; scape 4× as long as broad; flagellomere I 2.6–2.8× as long as broad; flagellomere II 0.6× as long as broad; flagellomere IX 1.3–1.5× as long as broad. Mesosoma: pronotum strongly convex in lateral view, with medial sulcus; pronotal and scutal punctures, large, contiguous, not obscuring notauli; scutellum with large, deep, contiguous and slightly striatiform punctures; mesopleural punctures large, contiguous; metanotum with medial ridge or welt; metapleuron and propodeal side polished, impunctate; propodeal posterior enclosure with medial ridge, with a few irregular cross-ridges. Metasoma: Shiny, impunctate. Color: Head and mesosoma black, propleura and upper mesopleuron brown; scape brown; pedicel and flagellomeres I–III and IX–XI pale yellow to pale brown; flagellomeres IV–VIII dark brown; clypeus reddish; coxae whitish to pale brown; femora orange with whitish apices; tibiae and tarsi orange; tegula whitish; wing dark



Figures 2–7. 2–4 Lateral view of body **5–7** Ventral view of mesopleuron and midcoxae.

brown, with untinted band across wing at apex of Rs vein, medial vein and wing base, apical margin untinted, with dark stain adjacent to stigma; metasoma reddish brown; pubescence pale.

Male description. Body (Fig. 9): length 2.5–3.0 mm. Head: face (Fig. 17) with scapal basin densely cross-ridged medially, occupying one-third of distance between eyes and basin height; frons with large, contiguous punctures; vertex (Fig. 25) with broad lateral postocular extension, 1 midocellus diameter wide or wider, midocellus 2 midocellar diameters from eye margin, hindocellus 0.7–0.8 hindocellar diameter from eye margin; clypeal apex broadly rounded; malar space 2.3 midocellar diameters long; subantennal distance 0.8 midocellar diameter long; scape 2.3× as long as broad; flagellomere I 3.2× as long as broad; flagellomere II 2.2× as long as broad; flagellomere IX 2.8× as long as broad; antenna as long as head + mesosoma. Mesosoma: pronotum with medial sulcus, strongly convex in lateral view; pronotal and scutal punctuation contiguous, large, not obscuring notauli; scutellar punctures 0.5 puncture diameters apart; mesopleural punctures large, contiguous; metanotum without medial longitudinal ridge or welt; metapleuron and propodeal side polished, impunctate; propodeal posterior enclosure irregularly cross-ridged, with medial longitudinal ridge. Metasoma: terga evenly punctate, punctures 1–2 puncture diameters apart. Color: head, including clypeus, and mesosoma black with metallic blue highlights dorsally; metasoma black, anterior face of tergum I brown; scape yellowish brown basally, rest of antenna dark brown; wings evenly light brown tinted; legs yellow, becoming dark brown on tarsi; pubescence pale.

Remarks. This is the second most colorful species, after *N. decorata*. Both sexes are brightly colored, with metallic blue highlights on the mesosoma. This species appears to be confined to the southeastern end of the island.

Etymology. The name refers to the bright blue and whitish coloration, *f.*

Noumeasega decorata (Kimsey), comb. n.

http://species-id.net/wiki/Noumeasega_decorata

Figures 6, 7, 10, 13, 19, 24, 27, 38

Atoposega decorata Kimsey 1995:590. Holotype female; New Caledonia: Ciu, near Mt. Canala (MCZ).

Material studied. New Caledonia: 1 female: Sud Prov., 9.1 km nw, Saraméa; (MCZ); 1 female: Sud Prov., Mt. Khogis, 17 km nne Nouméa, 22°10'34"S, 166°30'17"E, 28/i/1996, MT, 425m, Irwin, Webb & Schlinger (INHS); 2 females: Sud Prov., 9.1 km nw, Saraméa; 22°35'07"S, 165°47'24"E, 14–15/i/1996, MT, 425m, Irwin, Webb & Schlinger (BME); 1 male: Mandjelia summit, 750m, 20°24"S 164°32"E, 29/x/2003–31/i/2004, G. Monteith, FIT, #11486 (QM); 1 male: Chute Madeleine, 230m, macquis, 22°14"S, 166°52"E, 18/ix–12/xi/2000, Malaise trap, Skevington & Burwell, #9970 (QM); 1 male: Aoupinie, 850m, 21°11"S, 165°18"E, 23/xi/2001–1/i/2002, Burwell & Monteith, Malaise trap, #8926 (QM); 1 male: Plateau de Dogny, 20/xi/1958, C.R. Joyce (BPBM).

Diagnosis. This is the most brightly colored species of *Noumeasega*. The bright blues and purples, with the white metasomal spot in the female will readily distinguish



Figures 8–11. Lateral view of male *Noumeasega*.

decorata from other *Noumeasega* species. Males can be distinguished by the yellow legs and antennae, metallic blue head and thorax and antenna as long or longer than the body. *Noumeasega decorata* shares the strongly convex pronotum and extensive metallic coloration with *bicolorata*. Other shared characters include the banded wings, spine-like propodeal angle in the females. Males share the unusually long antenna, brown spot adjacent to forewing stigma, and correspondingly long flagellomeres with *kaoriensis*.

Female description. Body (Fig. 13): length 5–6 mm. Head: face (Fig. 24); scapal basin coarsely cross-ridged medially, zone of cross-ridging occupying one-third of distance between eyes, one half of height of scapal basin; frons with punctures contiguous; malar space 2.8 midocellar diameters long; head $0.9 \times$ as long as wide; vertex in

dorsal view (Fig. 28), with narrow lateral postocular extension, less than 0.2 midocellar diameter wide, midocellus 1.5–1.6 midocellar diameters from ocular margin; hindocellus separated from ocular margin by 0.5 hindocellar diameter; clypeus evenly curved apically; malar space 2.8 midocellar diameters long; subantennal distance 0.4 midocellar diameter long; scape length 4.3–4.5× breadth; flagellomere I length 3.0–3.3× breadth; flagellomere II 0.7–0.8× as long as broad; flagellomere IX 1.9–2.0× as long as broad; antenna as long as body. Mesosoma: pronotal and scutal punctures coarse, contiguous, longitudinally ridged, striatiform punctures becoming most pronounced on scutum; scutum with notauli obscured anteriorly by coarse ridging; mesopleuron with contiguous, horizontally striatiform punctures; scutellum with large, contiguous but not striatiform punctures; metapleuron and side of propodeum polished and impunctate; metanotum 1.4× as long as scutellum, medial enclosure with large contiguous punctures, without medial ridge; propodeal dorsal surface coarsely areolate, posterior surface without medial enclosure, medially polished and impunctate, laterally rugose; metapleuron and propodeal side smooth, impunctate. Metasoma: terga and sterna polished and impunctate. Color: head, including clypeus, and mesosoma dark metallic blue, except scutum, metanotum and propodeal sides purple; metasoma black, with blue tints, tergum II with whitish lateral spot; scape and pedicel dark blue; flagellomere I whitish, remainder of flagellum red; coxae blue; femora blue with base and apex whitish; fore and midtibiae whitish, with dark brown apex; hindtibia dark blue; tarsi brown to black; forewing largely dark brown, with untinted band across wing as base of stigma and apex of Rs and wing tip untinted.

Male description. Body (Fig. 10): length 4.5–5.0 mm. Head: face (Fig. 19); scapal basin finely cross-ridged medially, zone of cross-ridging occupying one third of distance between eyes, one half of height of scapal basin; frons with punctures contiguous; malar space 2.9 midocellar diameters long; scape length 2.3× as long as broad; vertex with complete lateral postocular extension; flagellomere I 5× as long as broad; flagellomere II 3.4× as long as broad; flagellomere IX 6.8–7.0 as long as broad; antenna as long as entire body; vertex in dorsal view (Fig. 27), with narrow lateral postocular extension, separated by 0.2–0.3 midocellar diameter, midocellus 2.2–2.3 midocellar diameters from eye margin; hindocellus 0.7–0.8 hindocellar diameters from eye margin; ocular setulae minute; clypeal margin broadly truncate apically; malar space 2.9–3.0 midocellar diameters long; subantennal distance one midocellar diameter long; scape 2.3× as long as broad; flagellomere I 5× as long as broad; flagellomere II 2.4× as long as broad; flagellomere IX 6.8–7.0× as long as broad. Mesosoma: pronotum strongly convex in lateral view; pronotal and scutal punctuation coarse, contiguous; notauli obscured by punctuation; scutellum with coarse, contiguous punctuation; metanotum without longitudinal ridge or welt; mesopleuron with dense, large, contiguous punctures; metapleuron and propodeal side polished, impunctate, posterior enclosure polished and impunctate, with weak medial longitudinal ridge. Metasoma: punctuation even, punctures 1–2 puncture diameters apart. Color: head, including clypeus, and mesosoma dark metallic blue becoming purplish on propodeal side; antenna dark brown to black, except scape yellowish basally, api-

12. *decorata*13. *bicolorata*14. *kaoriensis*15. *neocalledonica***Figures 12–15.** Lateral view of female *Noumeasega*.

cally with metallic blue highlights; metasoma black with metallic blue highlights, tergum I anterior brown; legs yellow, becoming darker brown on tarsi; hindfemur and tibial brown with metallic blue tints; forewing untinted except for brown spot between stigma and R₁ and R_s.

Remarks. Unlike the other species of *Noumeasega*, *decorata* males and females have the mesosoma metallic blue, not black with metallic blue highlights. Additionally, females have the metasoma metallic blue and the males have metallic blue highlights on the metasoma. This is also the largest bodied *Noumeasega* species in both sexes. This is the most widespread species on the island, found in nearly all sites collected.

***Noumeasega kaoriensis* Kimsey, sp. n.**

<http://zoobank.org/65C90FEF-65F6-4B4F-9509-9F38DA71296F>

http://species-id.net/wiki/Noumeasega_kaoriensis

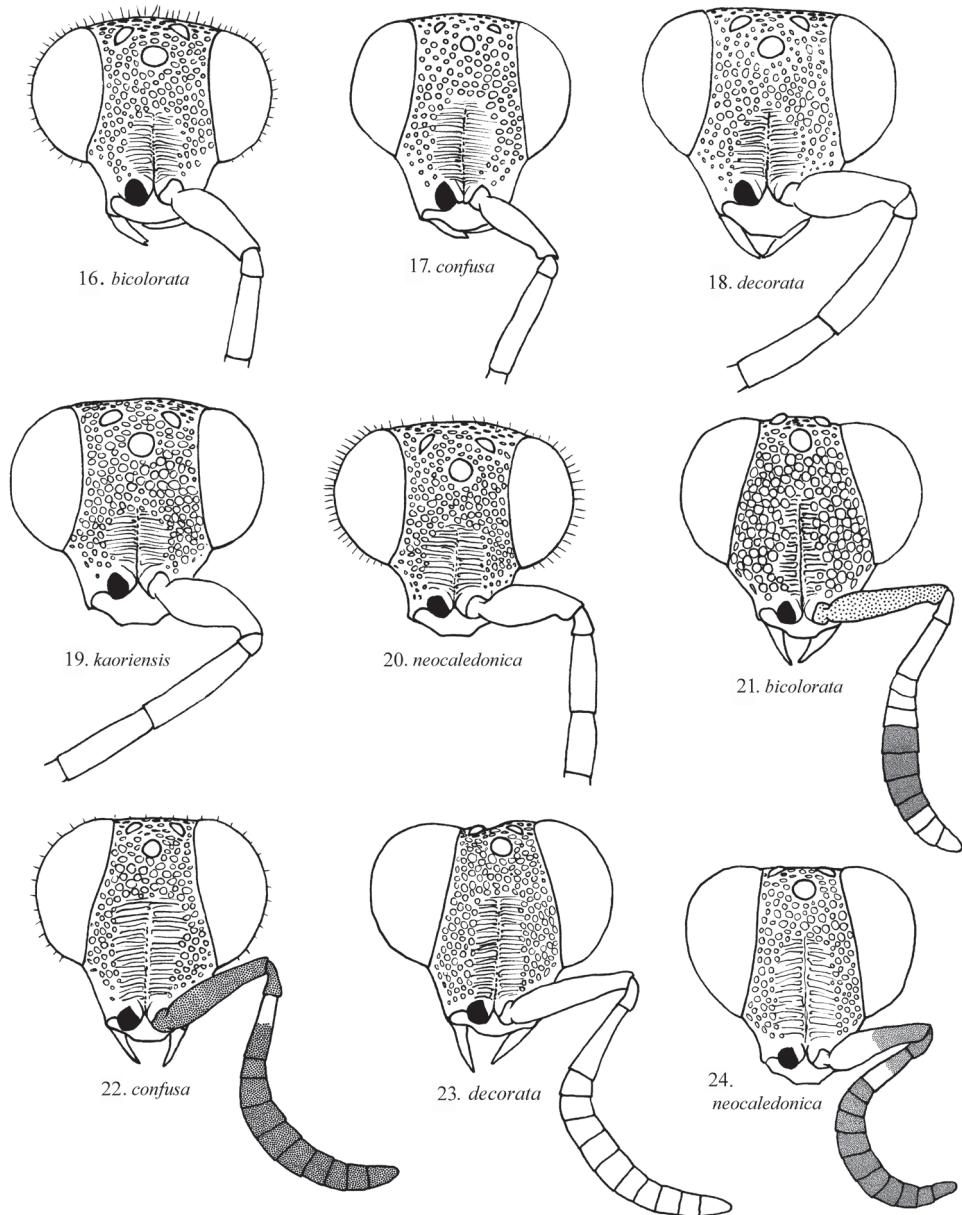
Figures 12, 20, 31, 32

Type material. Holotype male; Pic du Grand Kaori, 22°17'S, 166°54'E, 250m, 21/xi/2001–29/i/2002, G. Monteith, malaise trap, #8920 (QM). Paratypes: 6 males: same data as holotype; 1 male: 22/xi–22/xii/2004, Burwell & Wright, malaise trap, #11846; 1 male: 22/xii/2004–12/i/2005, Burwell & Wright, malaise trap, #12020; 1 female: G. Monteith, malaise trap, #12020; 2 males: 21/xii/2004–12/i/2005, Burwell & Wright, malaise trap, #12030; 1 female: 21/xi/2001–29/i/2002, G. Monteith, malaise trap, #8920; 1 female: 22/xi/2004–12/i/2005, G. Monteith, FIT, #11847; 1 male: Chute Madeleine, 230m, 22°14'E, 166°52'S, 18/ix–12/xi/2000, Skevington & Burwell, #9970; 1 male, 1 female: Forêt Nord, 22°19'S, 166°55'E, 480m, 1–22/xii/2004, Malaise trap, Burwell & Wright, #11882; 2 females: 480m, 22/xii/2004–9/i/2005, Malaise trap, Burwell & Wright, #12074 (BME, QM).

Diagnosis. Male *kaoriensis* share the relatively bright coloration, long flagellomere I and banded wings of *decorata*. However, *N. kaoriensis* can be distinguished from *decorata* by the smaller body size, 3–4 mm long versus 5–6 mm, the black dorsum with metallic blue highlights, clypeus red versus blue, and flagellomere IX less than 5.5× as long as broad. In *kaoriensis* females the forewing is not banded and the propodeal angle is short and acute or tooth-like, not spine-like. Closest to *neocalledonica*, female *kaoriensis* can be distinguished from females of that species by flagellomere I 3× as long as broad, longer malar space and brown legs (yellow in *neocalledonica*).

Female description. Body (Fig. 15): length 3 mm. Head: face (Fig. 23); scapal basin cross-ridging half distance between ocular margins, 0.7× basin height; vertex in dorsal view (Fig. 32), with complete lateral postocular extension, 0.4 midocellar diameter wide, midocellus 1.4 midocellar diameters from ocular margin; hindocellus 0.5 hindocellar diameter from ocular margin; ocular setulae minute; clypeal apex truncate, truncation 1.5 midocellar diameters wide; malar space 3.7–3.8 midocellar diameters long; subantennal distance 2 midocellar diameters long; scape 3.3× as long as broad; flagellomere I 2.6× as long as broad; flagellomere II twice as long as broad; flagellomere IX 4× as long as broad. Mesosoma: pronotum with medial sulcus; pronotal and scutal punctation, coarse contiguous, not obscuring notauli; scutellum with large, contiguous punctures; mesopleural punctures contiguous to 0.5 puncture diameters apart; metanotum without medial ridge or welt; metapleuron and propodeal side smooth impunctate; propodeal posterior enclosure smooth, impunctate, with medial, longitudinal ridge. Metasoma: highly polished and impunctate. Color: head, including clypeus and mesosoma black, with coppery highlights, particularly dorsally and on face; scape, pedicel dark brown, except flagellomere I basally whitish; legs brown, including coxae; wings brown-tinted; metasoma dark brown.

Male description. Body (Fig. 12): length 3.0–4.0 mm. Head: face (Fig. 20); scapal basin zone of cross-ridging half facial height, half as wide as interocular distance; least



Figures 16–24. *Noumeasega*. Front view of face. **16–20** Males, with flagellomeres II–IX or III–IX removed **21–24** Females.

interocular distance $0.8 \times$ facial length, $0.7 \times$ greatest interocular distance; malar space 1.7 midocellar diameters long; subantennal distance 1 midocellar diameter long; vertex in dorsal view (Fig. 31), with broad, lateral postocular extension, $1.4\text{--}1.5$ midocellar diameters wide, midocellus 1.4 midocellar diameters from eye margin, hindocellus 0.6

hindocellar diameter from ocular margin; scape 2.5× as long as broad; flagellomere I 4.5× as long as broad; flagellomere II 4× as long as broad; flagellomere IX 4.8× as long as broad; antenna as long as head + mesosoma. Mesosoma: pronotal and scutal punctuation dense, contiguous, not obscuring notauli; scutellum with dense, nearly contiguous punctures; mesopleuron with punctures 0.5–1.0 puncture diameters apart; metanotum without medial ridge or welt; metapleuron and propodeal side polished and impunctate; propodeum posterior enclosure smooth, impunctate, with medial longitudinal ridge. Metasoma: terga with deep even punctuation, 1–2 puncture diameters apart. Color: head and mesosoma black, with greenish blue highlights dorsally, clypeus red; scape, pedicel chestnut brown; flagellum black; wings evenly light brown tinted; legs including coxae yellow; metasoma black, with faint bluish tints dorsally, anterior face of tergum I chestnut brown to yellowish brown; pubescence pale; ocular setulae present but minute.

Remarks. This is the smallest of the *Noumeasega* species. The sexes are associated based on the darker legs in both, blue to purplish mesosomal highlights, distribution and collecting times.

Etymology. The name refers to the collection site, Pic du Grand Kaori of the holotype.

***Noumeasega neocaledonica* Kimsey, sp. n.**

<http://zoobank.org/9B7833E8-5F47-44EC-AEF2-286AD825AE87>

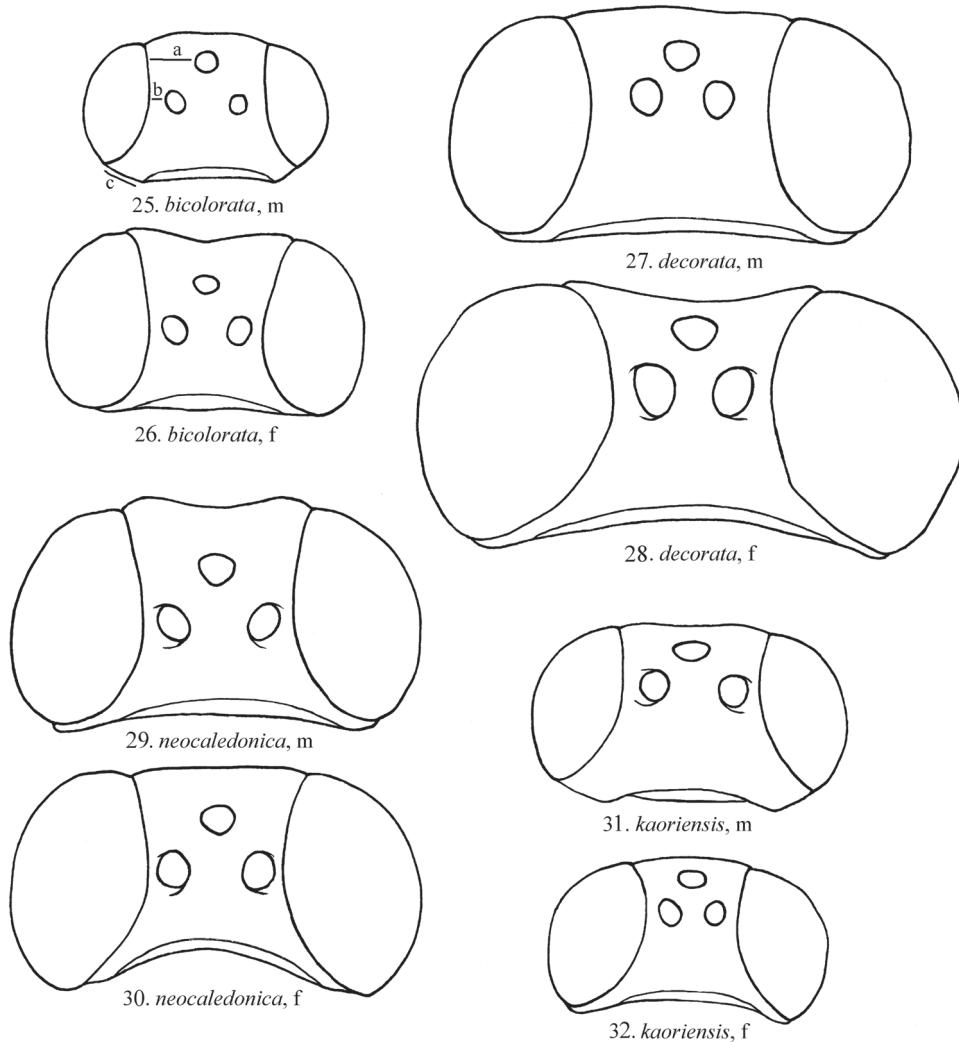
http://species-id.net/wiki/Noumeasega_neocaledonica

Figures 11, 16, 21, 25, 29, 30

Type material. Holotype male: Pic du Grand Kaori, 22°17'S. 166°54'E, 250m, 21/xi/2001–29/i/2002, G. Monteith, Malaise trap, #8920 (QM). Paratypes: 4 females: 2 males: same data as holotype; 1 female: 22/xii/2004–12/i/2005, Burwell & Monteith, Malaise trap, #12020; 1 male: 22/xi/2004–12/xii/2004, Wright & Burwell, Malaise trap, #11852; 1 female: Pic d'Amoa, north slope, 20°58'S. 165°17'E, 480m, 15–16/xii/2004, G. Monteith, YPT, #11972; 1 female: Foret Nord, 22°19'S. 166°55'E, 22/xii/2004–9/i/2005, 480m, Burwell & Wright, Malaise trap, #12074 (QM, BME).

Diagnosis. *Noumeasega neocaledonica* females share a number of features with female *kaoriensis* including the unbanded wings and short tooth-like propodeal angles. They can be distinguished from female *kaoriensis* by the shorter flagellomere I and shorter malar space. Males more closely resemble those of *bicolorata*, with the relatively short antenna and flagellomere I less than 3.5× as long as broad. They can be distinguished from *bicolorata* males by the red clypeus and flagellum, larger body size and forewing without dark stain adjacent to stigma.

Female description. Body (Fig. 16): length 4–5 mm. Head: face (Fig. 25) flattened; scapal basin with medial zone of coarse transverse ridges, occupying one-third of distance between eye margins, two-thirds height of basin; frons with large, contiguous punctures; vertex in dorsal view (Fig. 30), without complete, lateral postocu-



Figures 25–32. *Noumeasega*, dorsal view of head **a** = midocellar eye distance **b** = hindocellar eye distance **c** = postocular distance **m** = males **f** = females.

lar extension, midocellus 1.4 midocellar diameters from eye margin, hindocellus 0.2 hindocellar diameter from eye margin; clypeus narrowly truncate apically, truncation about 1 midocellar diameter wide; malar space 2 midocellar diameters long; subantennal distance 0.7 midocellar diameter long; scape 3.4× as long as wide; flagellomere I 2.4× as long as broad; flagellomere II 0.8× as long as broad; flagellomere IX twice as long as broad; least interocular distance 0.3× facial length; least interocular distance 0.6–0.7× greatest interocular distance. Mesosoma: pronotal and scutal punctures dense, contiguous, somewhat striatiform; notauli not obscured by punctures; scutellar punctures dense, contiguous; mesopleuron with large, nearly contiguous punctures;

metanotum with medial longitudinal ridge or welt; metapleuron and propodeal side polished and impunctate; propodeal enclosure largely impunctate and polished, with medial longitudinal carina or welt. Metasoma: terga impunctate and polished. Color: head and mesosoma black, with coppery highlights dorsally and on face, becoming greener laterally and on metanotum; clypeus dark reddish brown; metasoma black, with faint bluish tints dorsally; tergum I anterior face brown; scape and flagellomere I yellow basally, dark brown apically; pedicel and flagellum dark brown to black; wings evenly brown tinted; legs yellow including coxae; pubescence pale.

Male description. Body (Fig. 11): length 4–5 mm. Head: face (Fig. 21); face with medial zone of dense transverse cross-ridging, occupying half of area between eye margins, half height of basin; vertex in dorsal view (Fig. 29), with narrow lateral postocular extension, 0.2–0.3 midocellar diameter wide, midocellus 1.7 midocellar diameters from eye margin, hindocellus separated from ocular margin by 0.4 hindocellar diameter or less; least interocular distance $0.4 \times$ facial length; least interocular distance $0.8 \times$ greatest interocular distance; clypeal apex broadly, shallowly curved apically; malar space 2.2 midocellar diameters long; subantennal distance 0.8 midocellar diameter long; scape $2.4 \times$ as long as broad; flagellomere I $2.6 \times$ as long as broad; flagellomere II twice as long as broad; flagellomere IX $2.2 \times$ as long as broad; antenna as long as head + mesosoma. Mesosoma: pronotal and scutal punctuation coarse, contiguous, obscuring notauli; metanotum with longitudinal, medial ridge or welt; metapleuron and propodeal side polished and impunctate; propodeal enclosure mostly polished, impunctate, with narrow longitudinal sulcus or line. Metasoma: terga and sterna with small punctures 1–2 puncture diameters apart. Color: head, meso- and metasoma black; clypeus red; metasomal tergum I anterior face brown; scape, pedicel and flagellum orange to light brown; legs and coxae pale brown to yellow; wing membrane untinted; pubescence pale.

Remarks. The sexes are associated based on the weak metallic coloration and the lack of a postocular extension in the female and very narrow one in males, an uncommon feature in the genus.

Etymology. The species name refers to the country of origin.

Acknowledgements

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The prevalence of the parasitic nematode *Sphaerularia* sp. in the overwintering gynes of *Parapolybia* spp. (Hymenoptera, Polistinae)

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Abstract

I report for the first time the parasitization of overwintering gynes of *Parapolybia* species by the entomogenous nematode *Sphaerularia* sp. (Tylenchidae). The nematode was found in 42% of the overwintering wasp clusters examined but occurred in only 6% of individual wasps. The prevalence of parasitic nematodes among group hibernating hymenoptera is briefly discussed and compared with that in solitary hibernating hymenopterans.

Keywords

Parapolybia, group hibernation, gyne, parasitic nematode, Polistinae

Introduction

The parasitic nematodes of social hymenopterans include Mermithidae, *Pheromermis pachysoma* (von Linstow), for *Vespula* spp. (Poinar et al. 1975; Edwards 1980) and Tylenchidae, *Sphaerularia bombyi* Dufour, 1837, for *Bombus* spp. (Poinar and van der Laan 1972; Poinar and Hess 1972; McCorquodale et al. 1998; Schmid-Hempel 1998) and *S. vespae* Kanzaki et al., 2007, for *Vespa simillima* Smith (Sayama et al. 2007). The genus *Sphaerularia* is characterized by the mature female having a large everted uterine sac as its reproductive organ. This is well developed in the host's metasoma (Poinar and

Hess 1972; Poinar and van der Laan 1972). Female nematodes have a negative effect on their host's fitness, such as the sterilization of queens in *Vespa simillima* (Sayama et al. 2007) and *Bombus* spp. (Poinar and van der Laan 1972; Pouvreau 1974) and the reduction of colony productivity in *Bombus hypnorum* (Linnaeus) (Röseler 2002). Following emergence, parasitized overwintered gynes (i.e., potential queens) of hornets and bees usually live a solitary life without founding a colony (Schmid-Hempel 1998; Sayama et al. 2007).

During their overwintering diapause, gynes of bees and hornets are prone to nematode infection by the adult infective form (= inseminated females). By the following spring, the uterine sacs of parasitic nematode females are developed. Instead of founding a colony, parasitized overwintered gynes look for potential hibernation sites and parasitic juveniles are released from the host's metasoma into hibernacula by late summer (Poinar and van der Laan 1972; Schmid-Hempel 1998; Sayama et al. 2007, 2013).

In temperate regions, social hymenopterans have two principal modes of hibernation (but *Apis* spp. do not hibernate): independently or in groups. In *Bombus*, *Vespa*, and some *Polistes* species a single gyne, or few gynes, tunnel under tree bark, soil, or rotten wood before winter and diapause until the following spring (Schmid-Hempel 1998; Matsuura 1980). This mode is known as solitary hibernation. *Sphaerularia* nematodes have previously been reported only in solitary hibernating species. Eight species of *Polistes* and two species of *Parapolybia* occur in Japan. Three species of *Polistes* (*Po. japonicas* de Saussure, *Po. jokahamae* Radoszkowski and *Po. rothneyi* Cameron) and two *Parapolybia* species [*P. indica* (de Saussure) and *P. varia* (Fabricius)] are known as group hibernating species. In group hibernating species usually more than a dozen gynes and sometimes hundreds, overwinter together. *Polistes* group hibernating species sometimes use abandoned nests of vespid wasps (Gibo 1980; Matsuura 1980; Kojima 1993), while *Parapolybia* species usually use the hollow of a broadleaf tree as a hibernaculum (Matsuura 1980; Sugiura et al. 1983).

This is the first report of the infection of gynes of the group hibernating polistine wasp *Parapolybia indica* by parasitic nematodes. In this study, I describe the prevalence and condition of wasps infected by parasitic nematodes in their overwintering clusters and briefly compare them with solitary hibernating hymenopterans.

Materials and methods

Sample collection of overwintering individuals

Parapolybia wasps were collected in Japan from October 2009 to April 2010 in the forest park of Mito city, Mito (36°25'N; 140°22'E, alt. 130 m, site A), Ibaraki Botanical Garden, Naka (36°29'N; 140°26'E, alt. 60 m, site B), Hitachi Ohmiya (36°39'N; 140°16'E, alt. 160 m, site C), the Seminar House of Ibaraki University, Daigo (36°49'N; 140°23'E, alt. 190 m, site D), Ibaraki Prefecture; in October 2012 in Rissho University, Kumagaya (36°06'N; 139°22'E, alt. 50 m, site E), and Nourin park,

Fukaya (36°06'N; 139°17'E, alt. 90 m, site F), Saitama Prefecture. Wasps were collected in the following four phases: phase I) the pre-hibernating phase, which occurs shortly after mating and colony break up, in which females temporarily gather at a nest (possibly at their natal nest) or on plant leaves from late August to mid-October (sites D, E, and F); phase II) the early hibernating phase, in which females alternate between hibernacula from late October to mid-November (sites A and D); phase III) the late hibernating phase, in which females remain in the hibernaculum from mid-January to early February (sites A, B, and C); and phase IV) the precolony founding phase, which occurs shortly after emergence of gynes from hibernation in April (sites A and B).

Most overwintering wasps were found in or near hollows of broadleaf trees such as *Quercus serrata* Murray, *Q. acutissima* Carruthers, or *Prunus jamasakura* Siebold, except for cluster no. A-1, which was occurred under wooden stairs in the park. Wasps resting around the entrances of the holes were collected with forceps during the phase II to IV at sites A and B. For wasps deep inside a tree hollow, the tree was cut off or the entrance of the hollow was bored out, and wasps were extracted with long forceps and/or a wire during phase II at site D and during phase III at sites A and B. The collected wasps were transported in a cool box with ice and stored in that box until dissection later the same day.

Dissection of wasps

The metasomas were removed from live wasps, or wasps killed by 60% ethanol, and dissection was performed on a glass Petri dish under a binocular microscope. The metasomas were examined for the presence of nematodes. Parasitic nematodes were categorized into the following three stages: juveniles (small individuals with of indeterminate sex); uteria (mature adult females with developed uterine sacs); and infective forms (adult females without such sacs) (Fig. 1). Voucher specimens of nematodes and wasps were deposited in the Natural History Collection of Ibaraki University.

In addition, wasps were examined for the presence of fat bodies, sperm in the spermatheca, and the degree of wing wear. Wasps with fat bodies, sperm in the spermatheca, and a lack of wing wear were classified as gynes, whereas individuals lacking fat bodies or sperm in the spermatheca, and with worn wings were classified as workers.

Results

Overwintering *Parapolybia*

For *Parapolybia indica*, three pre-hibernating clusters (gathered at the natal nest) in groups of 14, 16 and 99 (129 total individuals) were collected. And an additional 551 wasps were collected in phases II-IV from 23 additional hibernacula in the phase II-IV (Table 1). Solitary hibernating wasps were found at sites A, B, C, and D ($n = 5$). The



Figure 1. Photomicrograph of a parasitic nematode found in *Parapolybia*. It is considered a free-living or infective form of nematode because it lacks a well-developed everted uterus sac.

Table 1. The number of collected overwintering clusters and wasps. The number of clusters/wasps infected with *Sphaerularia* sp. is shown in parentheses. The breakdowns of the number of infected wasp individuals in each overwintering phase are shown in four columns on the right side.

Species	Site	Location	No. of clusters	No. of wasps	Overwintering phase			
					Phase I	Phase II	Phase III	Phase IV
<i>P. indica</i>	A	36°25'N, 140°22'E, alt. 130 m	17 (8)	408 (28)	-	231 (14)	138 (11)	40 (3)
	B	36°29'N, 140°26'E, alt. 60 m	2 (1)	63 (7)	-	-	55 (5)	8 (2)
	C	36°39'N, 140°16'E, alt. 160 m	1 (0)	1 (0)	-	-	1 (0)	-
	D	36°49'N, 140°23'E, alt. 190 m	4 (2)	93 (7)	14 (0)	79 (7)	-	-
	E	36°06'N, 139°22'E, alt. 50 m	1 (0)	99 (0)	99 (0)	-	-	-
	F	36°06'N, 139°17'E, alt. 90 m	1 (0)	16 (0)	16 (0)	-	-	-
	total		26 (11)	680 (42)	129 (0)	310 (21)	193 (16)	48 (5)
Percentage			42.3%	6.2%	0.0%	6.8%	8.2%	10.4%
<i>P. varia</i>	D	36°49'N, 140°23'E, alt. 190 m	1 (0)	102 (0)				

number of individuals found in a hibernating cluster varied from 2 to 192 ($n = 18$; mean \pm SD = 30.44 ± 44.98 , median = 11).

After dissection, thirteen individuals of *Parapolybia indica* were classified as workers (site A, $n = 4$; site D, $n = 1$; site E, $n = 7$; site F, $n = 1$). They were collected in phases I-II and had no parasitic nematodes in their metasomas. Seven wasps collected before the phase III had no fat bodies or sperm in the spermatheca, and their wings were slightly damaged (site A, $n = 5$; site D, $n = 2$). For such samples, the wings may have been damaged during collection, and/or they were recently emerged workers. The other *P. indica* ($n = 660$) and *P. varia* ($n = 102$) had fat bodies, sperm in the spermatheca, and a lack of wing wear and were classified as gynes.

Nematode-infected wasps and prevalence of parasitic nematodes

The total number of individuals infected by parasitic nematodes was 42. Such individuals were collected from their hibernacula during phases other than the phase I (Table 1). No phase I wasps were found to be nematode infected. All infected individuals were *Parapolybia indica* and were clearly classified as gynes. The prevalence (%) of parasitic nematodes in each overwintering cluster varied from 3.5 to 50.0 (median = 10.5). No statistical relationship was found between the cluster size and prevalence (correlation efficient $r = -0.14$, R ver.2.15.2, R Core Team 2012). The prevalence (%) of infected clusters) increased through the season: for each phase, 0.0 in phase I, 6.8 in phase II, 8.2 in phase III, and 10.4 in phase IV. The overall percentage of nematode infected wasps was 6.2% (Table 1).

A single overwintering cluster of *Parapolybia varia* was found at site D. It was without nematode infection. This cluster was found in the same tunnel as a cluster of *P. indica*. However, each cluster was monospecific and no species mixing was observed in the tunnel. Thus, in this study, only individuals of *P. indica* were infected by nematodes.

Parasitic nematodes

Parasitic nematodes were found only in the hemocoel. The stages of nematodes found in the wasp metasomas varied based on the phases of the wasps at collection. Infected wasps collected from phase II had a large number of juveniles and one or two uteria in their abdomen. Uteria and infective forms (Fig. 1) were found in the metasomas of wasps from phase III clusters. Infected wasps from phase IV contained only uteria.

Discussion

For *Vespa simillima*, more than 60% of overwintered gynes were parasitized by *Sphaerularia vespae* (Sayama et al. 2007, 2013). Parasitized overwintered gynes do not found new colonies in the spring and early summer and probably are readily trapped by

baited traps (Sayama et al. 2007). Therefore, the overall percentage of parasitized females might have overestimated. For bees, the prevalence of *Sphaerularia bombi* varies among bumblebee species and the nesting season (McCorquodale et al. 1998). This study is the first report on the prevalence of parasitic nematodes in overwintering gynes of group a hibernating social hymenoptera. The percentage of parasitized females by *Sphaerularia* sp. in *Parapolybia indica* (6.2%) was lower than other known parasitic *Sphaerularia* species. The prevalence reported here is the percentage of parasitized gynes during overwintering season. Thus, it cannot be simply compared with that of parasitic nematodes in independently hibernating hosts reported previously. The possibility of parasitized wasps founding a new colony in the spring is still unknown.

Infection of hosts (bees and hornets) by parasitic nematodes of the genus *Sphaerularia* occur during the overwintering season in hibernacula such as soil and rotten wood (Poinar and van der Laan 1972; Kanzaki et al. 2007). All wasp individuals parasitized by nematodes are gynes. Infection by nematodes occurs during the period between adult emergence and emergence from hibernation. Thus, the first invasion of *Parapolybia* wasps by parasitic nematodes may also occur in the hibernaculum, as previously reported for solitary hibernating hosts. Juvenile nematodes hatch in the wasp's metasoma and are likely ejected from the host in the hibernaculum before the late hibernating phase (phase IV) of the host. In that case, this character is unique compared with other *Sphaerularia*. Elucidation of the detailed life cycle of parasitic nematodes and its impact on reproductive fitness of *Parapolybia* require further study.

Acknowledgement

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Description and natural history of the first micropterous *Meteorus* species: *M. orocrambivorus* sp. n. (Hymenoptera, Braconidae, Euphorinae), endemic to New Zealand

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Abstract

Wing reduction is well known in the cyclostome lineage of Braconidae, but very unusual in non-cyclostome groups. A new species from New Zealand, *Meteorus orocrambivorus*, the first micropterous species of the non-cyclostome and cosmopolitan genus *Meteorus*, is described. Phylogenetic analysis places it close to *M. versicolor*, a macropterous parasitoid of macrolepidoptera. Details about its host relationships, plant associations and habitat suggest that the necessity of succeeding in cryptic environments may explain the wing modification. A possible case of Batesian mimicry with ants could explain the extreme sexual dimorphism.

Keywords

Wing reduction, sexual dimorphism, alpine habitat, parasitoid, *Orocrambus*

Introduction

Wing reduction is relatively common within the New Zealand braconid fauna. Iqbal et al. (2003) pointed out that 75% of doryctine species displaying wing reductions occur in the Australasian Region, and this proportion is steadily increasing (Austin and Jennings 2009, Belokobylskij and Kula 2012, Belokobylskij and Austin 2013). Several hypotheses, some of them overlapping, have been proposed to explain the origins of wing reduction in groups where it is considered an exception to the general rule, i.e. taxa mainly composed of winged species, such as the Braconidae. Such taxa rely on flight for dispersal to accomplish mating, foraging and colonization of new habitats. Roff (1990) reviewed the prevalent knowledge about the evolution of wing reduction, and sorted the possible causes into four groups: 1) potential tradeoffs between flight capacity and fecundity, whereby the development of wings, wing muscles, and the energetic budget to keep them are negatively correlated with the egg load; 2) relatively stable and cold environments may boost the selection of flightless forms because migration is not required. Stable environments are characterized by a small variability in resource supply in time and space (Roff 1990). Under such conditions, females do not need to travel long distances, and the flight apparatus is reduced in favor of increasing reproduction; 3) increases in latitude and altitude are positively correlated with stable environments (for example, alpine habitats), and as a consequence, they lead to wing reduction; 4) a tight association with concealed, protected, and narrow niches drives the loss of wings because such structures can become a handicap to moving into small and cryptic habitats.

Wing reduction is displayed in varying degrees, from the total loss of structures associated with wings, including the tegula, to wings being structurally well-developed but too short to perform flight. To describe this variability, Iqbal et al. (2003) used the following terminology for parasitoid wasps: 1) macropterous, for specimens having the fore wings fully developed and reaching, or almost so, the abdominal apex; 2) brachypterous, for specimens with the fore wing tips reaching beyond the posterior propodeum but not the second metasomal tergite; 3) micropterous, for specimens whose fore wing tips do not reach the posterior propodeum; and 4) apterous, for specimens with a total absence of wings or, at most, manifesting as small scales no longer than the tegula.

The family Braconidae (Hymenoptera) is mainly comprised of winged species. However, wing reduction is a well-known phenomenon among the cyclostome lineage of Braconidae, since 90 species in 44 genera (1.2%) have been reported showing it (Belokobylskij and Kula 2012). In contrast, only 19 non-cyclostome species in six genera (0.2%) are known with this character (Belokobylskij and Kula 2012). The non-cyclostome euphorine clade (Euphorinae+Meteorinae+Neoneurinae) (Belshaw and Quicke 2002) is represented by three species in the genus *Cosmophorus* Ratzeburg (Belokobylskij and Kula 2012). In *Cosmophorus* only the male is apterous, and this extreme sexual dimorphism is particularly remarkable in *C. laricio* Shaw, a parasitoid of the bark beetle *Pityogenes bistridentatus* (Eichhoff) (Shaw 2009).

Meteorus Haliday (Euphorinae: Meteorini) is a cosmopolitan genus of koinobiont parasitoids of Coleoptera and Lepidoptera larvae. Its most remarkable characteristic is the distinctive pendant (meteor-like) cocoon constructed by the last larval instar (Shaw 1997). Around 326 species have been described worldwide (Yu et al. 2012). Huddleston (1986) studied the New Zealand fauna and reported seven species. Berry and Walker (2004) added *M. pulchricornis* (Wesmael) to the list, an exotic species first detected in 1996. All the New Zealand *Meteorus* species currently known are macroppterous. This paper describes the first micropterous *Meteorus* species and provides information about its biology and habitat.

Methods

The sampling location was Glynn Wye station at Lewis Pass ($42^{\circ}22.78'S$, $172^{\circ}24'E$), North Canterbury Region, New Zealand (Fig. 14). The Lewis Pass traverses the Southern Alps, which run north-south along much of the South Island of New Zealand. It is the most northern and lowest (907m) of the three main alpine passes which allow access between the west and east coasts.

All the *Meteorus* specimens were reared as solitary parasitoids of caterpillars of *Orocrambus ramosellus* Doubleday, *O. simplex* Butler (Lepidoptera: Crambidae) and *Merophyas leucaniana* (Walker) (Tortricidae). The caterpillars were collected by Claudio de Sassi from four locations ($42^{\circ}36.73'S$, $172^{\circ}27.78'E$; $42^{\circ}36.88'S$, $172^{\circ}27.62'E$; $42^{\circ}36.72'S$, $172^{\circ}26.58'E$; $42^{\circ}38.83'S$, $172^{\circ}22.17'E$) at three elevations (650 m, 800 m, 1000 m) from November 2008 to January 2009. The sample sites comprise alpine and subalpine habitats dominated by a mixture of tussock grasses (*Poa* and *Festuca*), representing the native flora component, and exotic pastures accounting for the non-native component (Barratt et al. 2005).

The caterpillars were hand-picked from the host plants *Poa cita* Edgar (silver tussock) and *Festuca novae-zelandiae* (Hack.) (Cockayne, fescue tussock), and subsequently reared to fate in the laboratory (i.e death of caterpillar or emergence of either adult moth or parasitoid). The collected parasitoids were preserved in vials with 95% ethanol, and sent to the University of Wyoming Insect Museum (UWIM).

Eleven specimens were pin-mounted for taxonomic description, 21 remained in alcohol from which 2 legs were sent to Julia Stigenberg at Stockholm University for DNA analyses as a part of her project about the phylogeny of Euphorinae. Morphological terminology follows Sharkey and Wharton (1997) and Zitani et al. (1998). Explanatory illustrations are provided in Aguirre et al. (2011). Sculpture terminology is based on Harris (1979). Specimens were measured using a Leica M80 stereomicroscope with micrometer on a 10 \times ocular. Digital images were captured with a Leica M205 C stereomicroscope with digital Leica DFC295 camera kit and processed with Leica Application Suite Version 3.8.0 auto-montage software. Scanning Electron Microscopy (SEM) images were produced at the University of Wyoming, Robert A. Jenkins Microscopy Facility. Descriptions were made with the DELTA software (Dallwitz

1974, 1980). Holotypes and paratypes are deposited at the Museum of New Zealand Te Papa Tongarewa (MONZ). Voucher material is deposited at the University of Wyoming Insect Museum (UWIM).

Results

Meteorus orocrambivorus Aguirre & Shaw, sp. n.

<http://zoobank.org/F111A855-0E56-49EC-84E5-A5818175173C>
http://species-id.net/wiki/Meteorus_orocrambivorus

Diagnosis. Occipital carina complete; ocelli small (ocelli-ocular distance 2.0–2.3× ocellar diameter in females, 1.7× in males); mandible stout and twisted; notaui smooth and not distinct in females, but deeply impressed, narrow, distinct and rugose in males; female micropterous, male macropterous; propodeum smooth in females, but rugulose-lacunose in males; tarsal claw without lobe; dorsope and laterope absent; ventral borders of first tergite almost touching distally; ovipositor 1.9–2.3× longer than first tergite).

Description of holotype female. *Body color.* Dark brown-ferruginous

Body length. 3.5 mm.

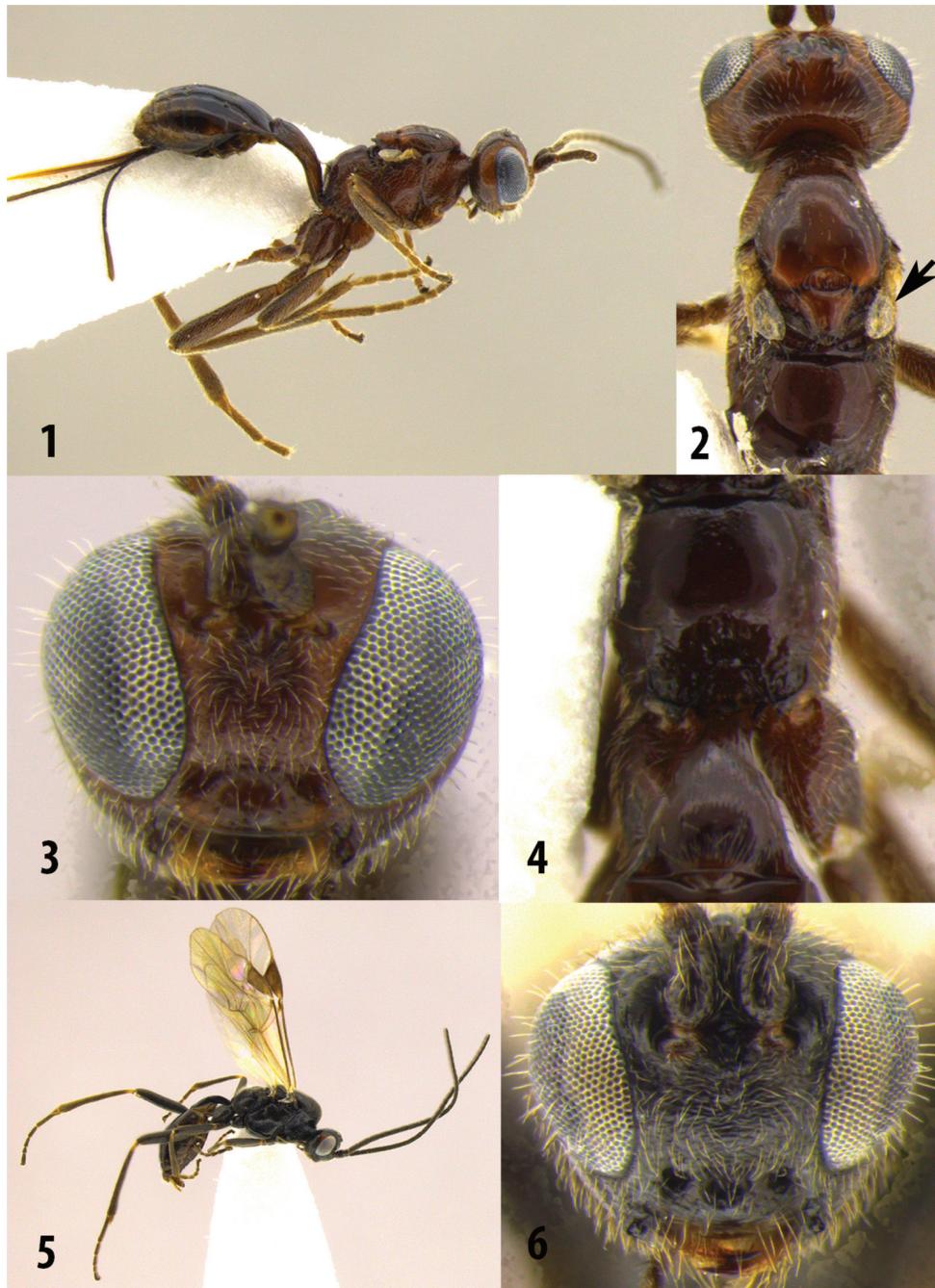
Head. (Fig. 3). Antenna with 16 flagellomeres; flagellar length/width ratios as follows: F1 = 2.6, F2 = 2.2, F3 = 1.9, F 14 = 1, F 15 = 0.9, F 16 = 2.0; head 1.1× wider than high; occipital carina complete; ocelli ocular distance 2.0× ocellar diameter; head height 1.4× eye height; temple length 0.7× eyes length in dorsal view; vertex in dorsal view not descending vertically behind the lateral ocelli; frons smooth and polished; maximum face width 1.4× minimum face width; face finely rugulose; minimum face width 0.7× clypeus width; clypeus punctate; malar space length 0.4× mandible width basally; mandible stout and twisted.

Mesosoma. (Figs 2, 4, 7 and 9). Pronotum in lateral view dorsally rugose; propleuron smooth and polished; notaui smooth and not distinct; mesonotal lobes not defined; mesoscutum smooth and polished; scutellar furrow with one carina; mesopleuron smooth but rugulose close to tegula; sternaulus long, wide and rugose; metapleuron mostly smooth, rugose close to the coxa; suture between propodeum and metapleuron foveate; propodeum smooth; absence of longitudinal and transversal carinae on propodeum; median depression on propodeum weakly present.

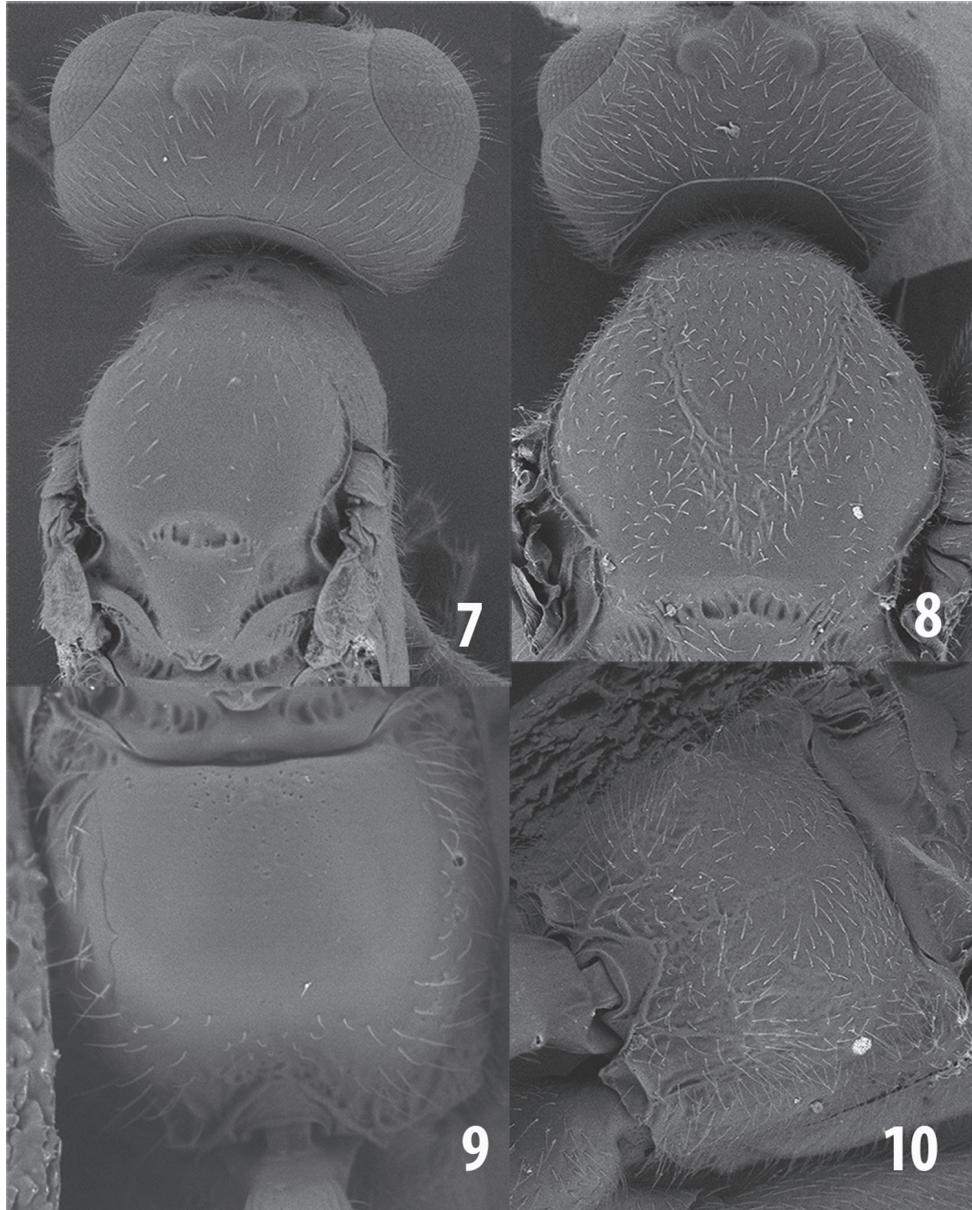
Wings. Very reduced, at most reaching the scutellum apex (Fig. 2).

Legs. Hind coxa slightly strigose dorsally; the remaining surface irregular and pucticulate; hind femur 4.8× longer than it is wide; tarsal claw without lobe.

Metasoma. (Figs 1 and 4). Dorsope and laterope absent; ventral borders of first tergite almost touching distally; first tergite smooth and polished except the apical border with short and convergent costae; ovipositor 2.0× longer than first tergite; ovipositor both not thickened basally and straight.



Figures 1–6. *M. orocrambivorus* sp. n. **1** Female lateral habitus **2** Female head and mesonotum dorsal view. The arrow indicates the reduced wing **3** Female head frontal view **4** Female propodeum and first metasomal tergite dorsal view **5** Male lateral habitus **6** Male frontal view.



Figures 7–10. Contrasting differences between males and females. **7** female head and mesonotum dorsal view **8** male head and mesonotum dorsal view **9** female propodeum dorsal view **10** male propodeum dorsal view.

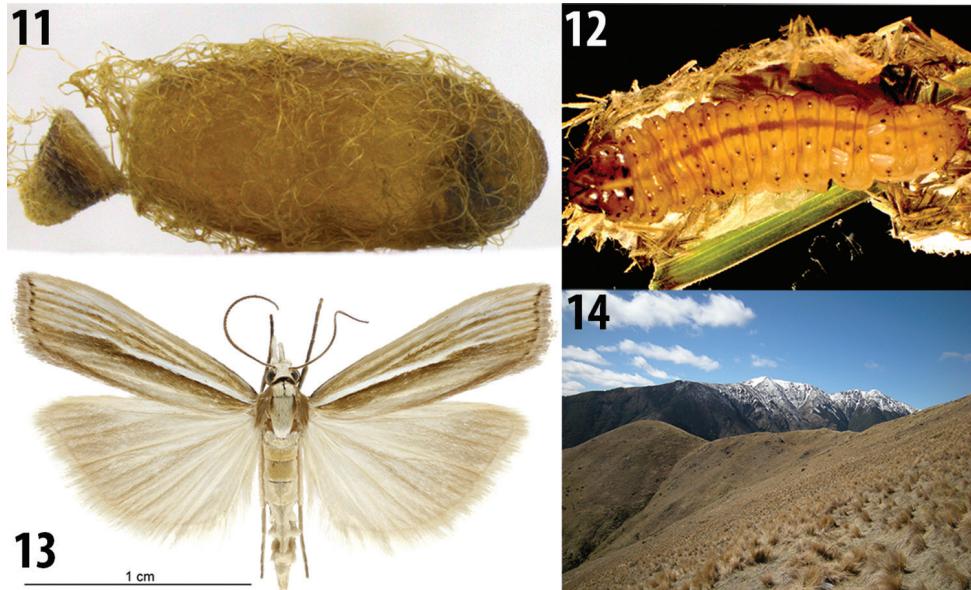
Female variation based on paratypes. Body length 3.0–3.1 mm; head with long and scattered setae; head 1.2× wider than high; ocelli ocular distance 2.3× ocellar diameter; head height 1.3× eye height; temples length 0.6× eyes length in dorsal view; maximum face width 1.3× minimum face width; face strigulate; minimum face width

0.8× clypeus width; malar space length 0.3–0.6× mandible width basally; pronotum in lateral view dorsally lacunose-foveate, faintly costate ventrally; sternaulus carinate-foveate; propodeum smooth except a small, punctate patch dorsally; hind coxa either strigate-punctate, striate, or with very small and disperse punctures; hind femur 4.6–5.2× longer than it is wide; ventral borders of first tergite touching for a short distance; first tergite with costae convergent, faintly demarcated; T2 and T3 slightly coriaceous; ovipositor 1.9–2.3× longer than first tergite; ovipositor neither thickened basally nor curved.

Male variation based on paratypes. (Figs 5, 6, 8 and 10). Body black except the head with a small testaceous patch on the temple behind the eye; wings hyaline; body length 3.7 mm; antenna with 27 flagellomeres; ocelli ocular distance 1.7× ocellar diameter; head height 1.6× eye height; temples length 0.8–0.9× eyes length in dorsal view; vertex in dorsal view not descending vertically behind the lateral ocelli; maximum face width 1.2× minimum face width; minimum face width equal to clypeus width; malar space length 0.7–0.9× mandible width basally; propleuron puncticulate and shiny; notauli deeply impressed, narrow, distinctive and rugose, with pronounced longitudinal carina; mesoscutal lobes well defined; central lobe of mesoscutum punctate; scutellar furrow with seven carinae; mesopleuron smooth and polished; sternaulus rugose; propodeum rugulose-lacunose; longitudinal and transversal carinae on propodeum absent; median depression on propodeum absent; hind coxa with very small and dispersed punctures; wing length 3.6–3.7 mm; second submarginal cell of fore wing not strongly narrowed anteriorly; vein r 0.5× length of 3R_a (fore wing); vein 3RS_a 0.8× length of r-m (fore wing); vein m-cu of fore wing postfurcal; vein 1M 0.8–1× length of cu-a (HW); vein 1M 0.8× length of 1r-m (hind wing); dorsope and laterope absent; apparent dorsopes as deep grooves in the common dorsopes location; first tergite with faintly demarcated and parallel costae, which become more obvious on the apical border.

Comments. The micropterous condition of *M. orocrambivorus* females is unique among all known *Meteorus*. However if the males are compared with the rest of the New Zealand fauna, *M. orocrambivorus* seems closest to *M. cobbus* Huddleston (Huddleston 1986; p. 256, numeral 6 in the key). Males of both species share the following character states: body mostly black except a small, lighter patch (yellow or testaceous) on the temple behind the eyes; small ocelli (ocelli ocular distance \geq 1.5× ocellar diameter); eyes almost parallel (maximum face width \leq 1.2× minimum face width); mandibles stout and twisted; propodeum rugulose; dorsopes and lateropes absent, and ventral borders of first tergite touching for a short distance. *M. orocrambivorus* can be separated from *M. cobbus* by having antennae with 27 flagellomeres (30–33 in *M. cobbus*), notauli narrow, carinate and distinct (broad and reticulated in *M. cobbus*), and first tergite costate (strigose in *M. cobbus*).

Holotype. Female (point-mounted). NEW ZEALAND, South Island, Lewis Pass, Hope River Valley, Glynn Wye Station, 42°36.73'S, 172°27.78'E, 650 m; host plant *Poa cita* Edgar (silver tussock), host caterpillar *Orocrambus ramosellus* Doubleday (Crambidae); collected as solitary parasitoid during the period November 2008 to January 2009; Claudio de Sassi, collector.



Figures 11–14. 11 *M. orocrambivorus* sp. n. cocoon 12 *O. ramosellus* caterpillar 13 *O. ramosellus* adult 14 Lewis Pass, the type-locality.

Paratypes. Two females and seven males same data as the holotype; one female same data as holotype except collected at 42°36.88'S, 172°27.62'E, 800 m; two females and two males same data as holotype except collected at 42°36.72'S, 172°26.58'E; three females and two males same data as holotype except the host caterpillar collected feeding on *Festuca novae-zelandiae* (Hack.) Cockayne at 1000 m; one female same data as holotype except the host caterpillar collected feeding on *F. novae-zelandiae* at 42°36.88'S, 172°26.58'E; one female same data as holotype except the host caterpillar collected feeding on *F. novae-zelandiae* at 42°36.88'S, 172°26.58'E, 650 m; six females and four males same data as holotype except the host caterpillar collected feeding on *F. novae-zelandiae* at 42°36.88'S, 172°26.58'E, 1000 m; one female and one male same data as holotype except the host caterpillar collected feeding on *F. novae-zelandiae* at 42°38.83'S, 172°22.17'E, 650 m.

Distribution. NEW ZEALAND, South Island, Lewis Pass, Hope River Valley, Glynn Wye Station.

Cocoon. (Fig. 11). Length 4.4 mm; width 1.6 mm; honey-brown translucent except apex cap golden, posteriorly bordered by a dark ring; oval-shaped, densely wrapped by silk, irregular cap border, anterior end (cap) nipple-like. The cocoon was found unattached inside a structure built by the caterpillar using grass leaves and silk (Fig. 12). No trace of a suspending thread was detected.

Biology. (Figs 12 and 13). The information gathered from the type series and additional rearings indicates that *M. orocrambivorus* is a solitary parasitoid of larval *O. ramosellus*, *O. simplex* and *M. leucaniana*. Parasitized *Orocrambus* have been collected feeding on *F. novae-zelandiae*, *P. cita*, *Holcus lanatum* L., *Anthoxanthum odoratum* L.,

Agrotis capillaris L., *Festuca rubra* L. and *Rytidosperma setifolium* (Hook. f.) Connor & Edgar. *M. leucaniana* was collected on *F. novae-zelandiae*.

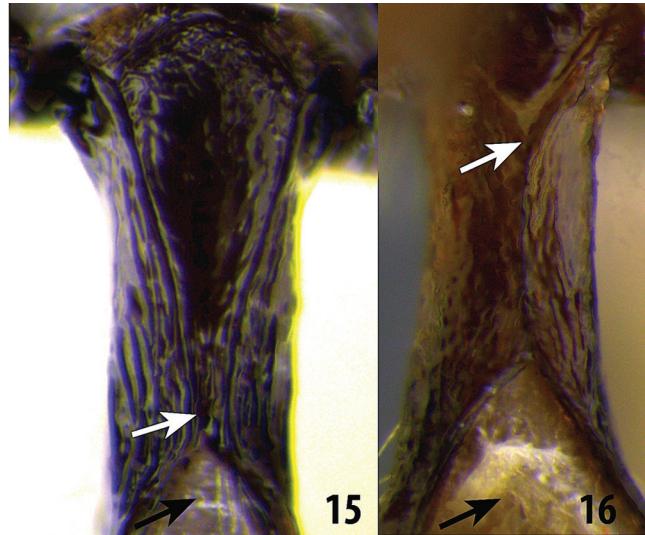
Etymology. The species name *orocrambivorus* is a reference to its feeding habit. The stem of the specific epithet refers to the genus name of the host caterpillar, *Orocrambus*, and the suffix comes from the Latin *-vorare* meaning “devour.”

Discussion

The results of a molecular-based phylogenetic analysis carried out by Julia Stigenberg (unpublished data) placed *M. orocrambivorus* close to *Meteorus versicolor* Wesmael. *Meteorus versicolor* belongs to clade IIB proposed by Stigenberg and Ronquist (2011); their phylogenetic analysis partly agrees with Maeto’s work (1990), which was based on morphology. Clade IIB corresponds with Maeto’s *pulchricornis* (excluding the *colon* subgroup) and *rubens* groups (Stigenberg and Ronquist 2011). Their members are characterized by having a narrow face, strongly twisted mandibles, absence of a tubercle on the frons, and short ovipositor (length less than 2× the length of the first tergite; Stigenberg and Ronquist 2011). *Meteorus orocrambivorus* and *M. versicolor* share a complete occipital carina, slender and twisted mandibles, and no dorsope. However, *M. orocrambivorus* has the tarsal claw without a lobe (tarsal claw with a distinct basal lobe in *M. versicolor*) and ventral borders of first tergite almost touching distally (ventral borders of first tergite completely joined along its basal half in *M. versicolor*, Figs 15–16). *Meteorus versicolor* is a widely distributed species known from the Eastern and Western Palaearctic Region and introduced to North America for biological control of *Euproctis chrysorrhoea* L. (Lymantriidae) (Muesebeck 1923); its host range comprises about 80 lepidopteran species in fifteen families, mostly macrolepidoptera (Yu et al. 2012, Stigenberg and Shaw 2013). Despite the phylogenetic position of *M. orocrambivorus* in the aforementioned analysis, it is difficult to track the origin of the wingless condition in *Meteorus* since *M. orocrambivorus* was the only Australasian species included.

Wing reduction as an adaptation to live in concealed, small and close-fitting niches is a compelling hypothesis to explain wing reduction in several species of Doryctinae (Seltmann and Sharkey 2007, Belokobylskij and Kula 2012, Belokobylskij and Austin 2013). The frequent sampling of wasps with remarkable wing-reduction under the leaf-litter of forested habitats suggests that the necessity of chasing hosts in cryptic habitats has shaped the reduction (Iqbal et al. 2003, Seltmann and Sharkey 2007, Belokobylskij and Kula 2012, Belokobylskij and Austin 2013). The Costa Rican species *Oroceguera andersoni* Seltmann & Sharkey (Braconidae: Doryctinae) is a good example of a wingless parasitoid associated with forest leaf-litter (Seltmann and Sharkey 2007). Since *Orocrambus* caterpillars spin their cocoons at the base of tussock grasses and *M. leucaniana* constructs tunnels in the detritus layer surrounding tussocks, *M. orocrambivorus* female wasps are pressed to succeed in tight spaces.

But a possible adaptation to live in cryptic environments does not fully explain the remarkable sexual dimorphism. The common pattern of sexual dimorphism in *Meteorus*



Figures 15–16. **15** *M. orocrambivorus*, ventral borders of first tergite almost touching distally **16** *M. versicolor*, ventral borders of first tergite completely joined along its basal half. White arrows on both pictures indicate the apical section of the structure. Black arrows indicate the most apical point where the ventral borders converge.

species is: body size and relative eyes size smaller in males than females, relative ocelli size larger in males than females, antennae longer in males than females, in some cases darker body color in males than females, and the obvious absence of ovipositor in males. The morphological deviation in *M. orocrambivorus* females is so extreme that the initial assignation of females to the genus *Meteorus* was dependent on the examination of males. A fleeting glimpse of a *M. orocrambivorus* female in the field could lead to confusion because of its ant-like appearance. The close morphological and behavioral resemblance to ants is called myrmecomorphy, and it is outlined by a set of departures from the common bau-plan in those arthropods having it (McIver and Stonedahl 1993): abdominal constriction, well developed mandibles, elbowed or clubbed antennae, color change, loss or reduction of wings, head enlargement and microstructural modifications (changes in surface sculpture and pubescence). Compared with males, *M. orocrambivorus* females display notable differences in color body (Figs 1–6), wing reduction (Fig 2), reduction in number of flagellomeres, relative head size (Fig 7–8) and texture of body surface (Figs 2, 4 and 7–10). Smooth surfaces on the mesoscutum and propodeum are extremely rare in *Meteorus*, and such surfaces displayed by *M. orocrambivorus* may be unique in the genus. Patterns of myrmecomorphy reflected by modifications on body shape and surface texture may be explained by the Wasmannian mimicry, a special case of Batesian mimicry: when ants antennate each other, one feature they are looking for to recognize conspecifics is the texture of the body surface (Rettenmeyer 1970). This behavior matches with changes in sculpture present in *M. orocrambivorus* females, but additional field observations are necessary to

corroborate an ant-mimicry model: 1) possible model ants sharing the same habitat with *M. orocrambivorus*, 2) model ants showing a denser distribution than *M. orocrambivorus*, and 3) model ants displaying an aggressive behavior or unpalatable to predators (Mappes and Alatalo 1997).

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Faunistic, geographical and biological contributions to the bee genus *Andrena* (Hymenoptera, Andrenidae, Andreninae) from Turkey

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Abstract

A survey of the bee genus *Andrena* Fabricius, 1775 was conducted between 2004 and 2011 in Turkey. A total of 2271 bee specimens, including 1721 females and 550 males, were identified at the subgenus and species level. As a result of morphological studies, 165 species belonging to 45 subgenera were identified. Subgenus of *Truncandrena* had the highest number of species observed in this survey. Two species were determined as a first record in Turkey. Geographical distribution of the species are given in Turkey. Common and rare species are assigned. Flight periods of the species are determined.

Keywords

Insecta, Hymenoptera, Andrenidae, wild bees, diversity, distribution, Anatolia, Turkey

Introduction

Sandbees, *Andrena* Fabricius, 1775, is the largest genus of bees in terms of numbers of species according to present day classification (Michener 2007). To date, *Andrena* contains about 1500 valid species. However, the actual number of species

of *Andrena* may be higher, and estimated at about 2000 species (Dubitzky et al. 2010). *Andrena* is found throughout the holarctic region, and probably absent in the lowland tropics of Africa; it is also absent from the Antilles, and not known from Australia and south of Panama (Michener 2007). All species burrow their nests into the ground, often preferring sunny exposed areas with sparse or bare vegetation and sandy soils. Sandbees are typically solitary, that is, each female constructs its own nest. Many species of *Andrena* are polylectic and use pollen from more than a single plant family for the provision of their brood (Dubitzky 2005). Faunistic studies on the genus *Andrena* of Turkey are limited. Nevertheless there have been nearly 300 species reported from Turkey (Warncke 1966, 1969, 1974, 1975; Özbek 1976; Gusenleitner 1998; Patiny 1998; Gusenleitner and Schwarz 2000; Gusenleitner and Schwarz 2002; Grünwaldt et al. 2005; Dubitzky 2006; Scheuchl and Hazir 2008; Scheuchl and Gusenleitner 2009; Hazir et al. 2012; Scheuchl and Hazir 2012). This number is increasing over time.

Materials and methods

An extensive biogeographical survey was conducted during 2004–2010 (February–September) in seven different regions of Turkey (Central Anatolia, Mediterranean, Aegean, Black Sea, Eastern Anatolia, Southerneast Anatolia, Marmara). Bees were collected from wild flowers with sweepnets and aspirators. Bees were transferred to plastic boxes and killed with ethyl acetate vapors. The altitude and longitude and latitude coordinates were recorded for each site with a global positioning system (GPS) (Magellan) device. Adult bees were transported to the laboratory in plastic boxes and kept at 5°C until pinned. Identification of the species and subspecies were made according to Özbek (1975), Schönitzer et al. (1995), Michener (2000), Osytshnjuk et al. (2005), Warncke (1966, 1968, 1969, 1974, 1975) and Erwin Scheuchl's unpublished book "Key to Palaearctic *Andrena* species" and by comparing the specimens with the bee collections of the Zoologische Staatssammlung München, Germany and Oberösterreichisches Landesmuseum/Biologiezentrum in Linz, Austria. The collected specimens were deposited in the Wild Bee Museum of Turkey (TUYAM) established at Adnan Menderes University, Faculty of Arts and Science, Aydin-Turkey and Erwin Scheuchl's personnel collection in Germany. Distribution maps of most of species, also concerning Turkey, are to be found in Gusenleitner and Schwarz (2002).

Results

This study was a faunistic survey to determine the distribution of biological diversity of the bee genus *Andrena* in Turkey. 2271 bee specimens were collected from 7 regions

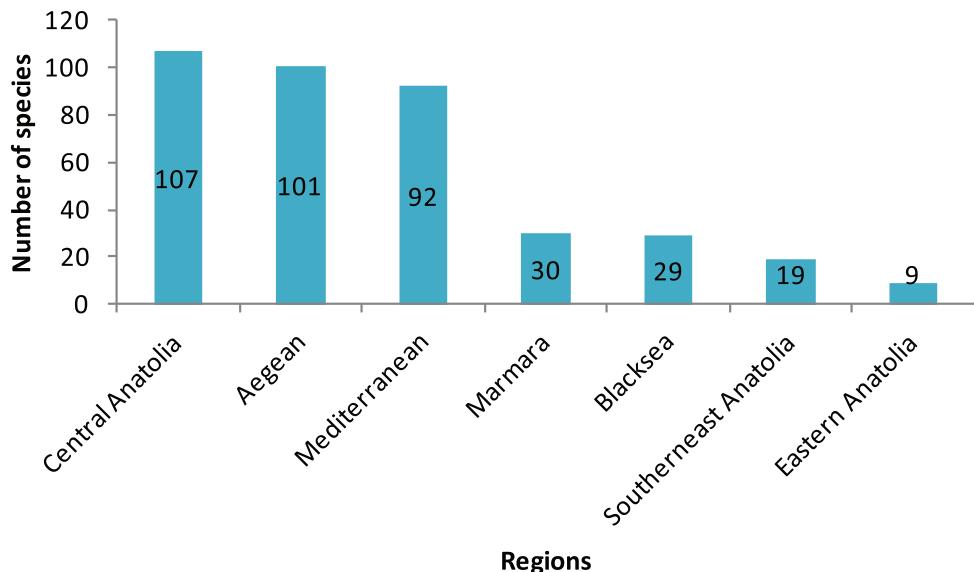


Figure 1. The number of the species according to geographical regions.

of Turkey. As a result of morphological diagnosis, 45 subgenera, 165 species were identified. When geographic regions listed in order to the number of species, Central Anatolia had the highest number (107) and followed with Aegean (101), Mediterranean (92), Marmara (30), Black Sea (29), Southerneast Anatolia (19) and Eastern Anatolia (9) respectively (Figure 1). Identified subgenera (with number of observed species) are *Aciandrena* Warncke (3), *Aenandrena* Warncke (3), *Avandrena* Warncke (1), *Brachyandrena* Pittioni (2), *Campylogaster* Dours (3), *Carandrena* Warncke (3), *Charitandrena* Hedicke (1), *Chlorandrena* Pérez (9), *Chrysandrena* Hedicke (4), *Cordandrena* Warncke (3), *Cryptandrena* Pittioni (3), *Cubiandrena* Warncke (2), *Didonia* Gribodo (2), *Euandrena* Hedicke (3), *Graecandrena* Warncke (1), *Holandrena* Pérez (3), *Hoplandrena* Pérez (2), *Hyperandrena* Pittioni (1), *Larandrena* LaBerge (3), *Leimelissa* Osychnyuk (1), *Lepidandrena* Hedicke (5), *Leucandrena* Hedicke (2), *Melanapis* Cameron (1), *Melandrena* Pérez (14), *Melittoides* Friese (1), *Micrandrena* Ashmead (7), *Nobandrena* Warncke (5), *Notandrena* Pérez (7), *Opandrena* Robertson (1), *Orandrena* Warncke (4), *Oreomelissa* Hirashima (1), *Pallandrena* Warncke (1), *Parandrenella* Popov (3), *Plastandrena* Hedicke (3), *Poecilandrena* Hedicke (8), *Poliandrena* Warncke (5), *Proxiandrena* Schmid-Egger (1), *Ptilandrena* Robertson (1), *Scitandrena* Warncke (1), *Simadrena* Pérez (7), *Thysandrena* Lanham (2), *Trachandrena* Robertson (1), *Truncandrena* Warncke (18), *Ulandrena* Warncke (10) and *Zonadrena* Hedicke (3). *Truncandrena* had the highest number of species observed in this survey. Considering the data obtained from previous studies, geographical distribution of the species in Turkey was given in Table 1.

Table 1. The list of identified species and their geographical distribution in Turkey.

Subgenera	Species	Female ♀♀	Male ♂♂	Geographical distribution
Aciandrena	<i>Andrena aciculata</i> Morawitz, 1868	3	6	A, B, C, E, MA
	<i>A. lamiana</i> Warncke, 1965	11	9	A, B, C, E, MA, ME, S
	<i>A. tenuis</i> Morawitz, 1877	6	7	C
Aenadrena	<i>A. aeneiventris</i> Morawitz, 1872	10	-	A, C, E, MA, ME, S
	<i>A. bisulcata</i> Morawitz, 1877	10	-	A, B, MA, ME, S
	<i>A. hystrix</i> Schmiedeknecht, 1883	12	1	A, C, ME
Avandrena	<i>A. canohirta</i> (Friese, 1922)	8	-	A, C, ME
Brachyandrena	<i>A. colletiformis</i> Morawitz, 1874	7	7	A, C, E, MA, ME
	<i>A. pinguis</i> Ariana et al., 2009	5	1	B, C, ME, S
Campylogaster	<i>A. erberi</i> Morawitz, 1871	-	1	C, ME
	<i>A. incisa</i> Eversmann, 1852	8	4	A, B, C, E
	<i>A. lateralis</i> Morawitz, 1876	3	-	A, C, E
Carandrena	<i>A. falcinella</i> Warncke, 1969	15	-	E, ME, S
	<i>A. purpureomicans</i> Alfkén, 1935	13	19	A, C, E, ME
	<i>A. schlettereri</i> Friese, 1896	5	2	A, B, C, MA, ME, S
Charitandrena	<i>A. hattorfiana</i> (Fabricius, 1775)	7	5	A, MA, ME
	<i>A. astica</i> Warncke, 1967	1	-	MA, ME
	<i>A. cinerea</i> Brullé, 1832	17	1	A, C, MA, ME
	<i>A. cinereophila</i> Warncke, 1965	42	1	A, MA, ME, S
	<i>A. clypella</i> Strand, 1921	11	1	A, C, MA
	<i>A. exquisita</i> Warncke, 1975	19	-	A, MA, ME
Chlorandrena	<i>A. humabilis</i> Warncke, 1965	6	1	A, MA, ME, S
	<i>A. humiliis</i> Imhoff, 1832	22	31	A, B, C, MA, ME, S
	<i>A. orientana</i> Warncke, 1965	12	2	A, MA, ME, S
	<i>A. panurgimorpha</i> Mavromoustakis, 1957	29	12	A, B, C, E, MA, ME, S
	<i>A. fulvago</i> (Christ, 1791)	2	-	B, C, MA
Chrysandrena	<i>A. glandaria</i> Warncke, 1975	2	1	A, ME, S
	<i>A. hesperia</i> Smith, 1853	21	-	A, C, E, MA, ME, S
	<i>A. merula</i> Warncke, 1969	21	-	A, B, C, MA, ME, S
	<i>A. cordialis</i> Morawitz, 1878	35	5	A, B, C, E, MA, ME
Cordandrena	<i>A. cypria</i> Pittioni, 1950	33	3	A, C, E, ME
	<i>A. torda</i> Warncke, 1965	1	-	A, C, S
	<i>A. brunnanensis</i> Friese, 1899	7	8	A, C, E, MA, ME, S
Cryptandrena	<i>A. monacha</i> Warncke, 1965	-	2	A, MA, ME
	<i>A. ventricosa</i> Dours, 1873	5	1	A, C, E, MA, ME
Cubiandrena	<i>A. cubiceps</i> Friese, 1914	-	3	A, C, E, MA, ME, S
	<i>A. cubicepsella</i> Warncke, 1975	-	1	A, C
Didonia	<i>A. mucida</i> Kriechbaumer, 1873	1	-	A, E, MA, ME, S
	<i>A. nasuta</i> Giraud, 1863	8	-	A, C, E
Euandrena	<i>A. bicolor</i> Fabricius, 1775	9	-	A, B, C, E, MA, ME
	<i>A. glabriventris</i> Alfkén, 1935	13	3	C, E
	<i>A. symphyti</i> Schmiedeknecht, 1883	1	2	A, B, C, E, MA, ME
Gracelandrena	<i>A. impunctata</i> Pérez, 1895	-	2	A, B, C, MA, ME
Holandrena	<i>A. labialis</i> (Kirby, 1802)	28	13	A, B, C, E, MA, ME
	<i>A. variabilis</i> Smith, 1853	9	2	A, C, E, MA, ME
	<i>A. wilhelmi</i> Schuberth, 1995	13	4	C, E, MA, ME, S

Subgenera	Species	Female ♀♀	Male ♂♂	Geographical distribution
<i>Hoplandrena</i>	<i>A. rosae</i> Panzer, 1801	2	1	C, E
	<i>A. trimmerana</i> (Kirby, 1802)	1	1	A, B, E, MA, ME
<i>Hyperandrena</i>	<i>A. bicolorata</i> (Rossi, 1790)	7	1	A, MA
<i>Larandrena</i>	<i>A. larisana</i> Warncke, 1965	1	1	A, MA
	<i>A. medioxima</i> Warncke, 1975	3	-	A, C, ME, S
	<i>A. sericata</i> Imhoff, 1866	23	23	A, ME, S
<i>Leimelissa</i>	<i>A. ispida</i> Warncke, 1965	8	3	A, C, E, MA, ME
<i>Lepidandrena</i>	<i>A. curvungula</i> Thomson, 1870	2	-	A, B, C, E, MA
	<i>A. elisaria</i> Giesenleitner, 1998	1	1	E, ME, S
	<i>A. florivaga</i> Eversmann 1852	3	-	B, C, E, MA, ME
	<i>A. gamskrucki</i> ssp. <i>eburnea</i> Warncke, 1975	9	5	A, C, MA, ME
<i>Leucandrena</i>	<i>A. paucisquama</i> Noskiewicz, 1924	4	1	A, C, MA
	<i>A. mistrensis</i> Grünwaldt, 2005	7	-	A
	<i>A. parviceps</i> Kriechbaumer, 1873	4	-	A, E, MA
<i>Melanapis</i>	<i>A. fuscosa</i> Erichson, 1835	8	1	A, C, E, MA, ME, S
	<i>A. albopunctata</i> (Rossi, 1792)	12	2	C, E, MA, ME
	<i>A. assimilis</i> Radoszkowski, 1876	2	-	A, B, C, E, MA, S
	<i>A. atroregularis</i> Hedicke, 1923	5	-	A, B, C, ME, S
	<i>A. cussariensis</i> Morawitz, 1886	1	-	C, E
	<i>A. danuvia</i> Stöckhert, 1950	7	-	A, B, C, E, MA, ME
	<i>A. dubiosa</i> Kohl, 1905	2	-	C, E, ME
	<i>A. fuscocalcarata</i> Morawitz, 1878	5	4	A, B, C, E, ME
	<i>A. limata</i> Smith, 1853	28	4	A, B, C, E, MA, ME
	<i>A. morio</i> Brullé, 1832	32	7	A, C, E, MA, ME
	<i>A. nigroaenea</i> ssp. <i>candidae</i> Strand, 1915	19	7	A, B, C, E, ME
	<i>A. nitida</i> (Müller, 1776)	1	-	B, C, E, MA
<i>Melandrena</i>	<i>A. nitidemula</i> Scheuchl & Hazir, 2012	15	1	C, ME, S
	<i>A. pyropygia</i> Kriechbaumer, 1873	6	-	A, B, E, MA, ME
	<i>A. thoracica</i> Fabricius, 1775	6	-	A, B, C, E, MA, ME
	<i>A. curiosa</i> (Morawitz, 1877)	2	5	A, C, E, ME
	<i>A. alfkennelloides</i> Warncke, 1965	4	-	A, C, E, ME
	<i>A. enslinella</i> Stöckhert, 1924	5	3	C, MA, ME
	<i>A. magunta</i> Warncke, 1965	7	-	A, B, C, E, MA, ME
<i>Micrandrena</i>	<i>A. oenae</i> Warncke, 1975	2	-	C, E
	<i>A. stoeckhertella</i> Pittioni, 1948	2	-	C, ME
	<i>A. tringa</i> Warncke, 1973	3	-	C, E, ME
	<i>A. virgata</i> Warncke, 1975	7	-	A, C, E, ME
	<i>A. anatolica</i> Alfken, 1935	10	1	A, C, E, MA, ME
<i>Nobandrena</i>	<i>A. athenensis</i> Warncke, 1965	8	3	A, C, E, ME
	<i>A. flavobila</i> Warncke, 1965	3	-	A, C
	<i>A. nobilis</i> Morawitz, 1874	32	6	A, B, C, E, ME
	<i>A. probata</i> Warncke, 1973	2	3	C, E, MA
<i>Notandrena</i>	<i>A. erythrocnemis</i> Morawitz, 1870	2	-	A, B, MA, ME
	<i>A. fulvicornis</i> (Schenck, 1853)	22	-	B, C, E, ME
	<i>A. langadensis</i> ssp. <i>clanga</i> Warncke, 1965	7	-	A, C, ME
	<i>A. recurvirostra</i> Warncke, 1975	4	5	A, C, E, S
	<i>A. selcuki</i> Scheuchl & Hazir, 2008	-	2	C
	<i>A. stellaris</i> Warncke, 1965	2	-	C
	<i>A. ungeri</i> Mavromoustakis, 1952	13	2	A, B, C, ME

Subgenera	Species	Female ♀♀	Male ♂♂	Geographical distribution
<i>Opandrena</i>	<i>A. schencki</i> Morawitz, 1866	24	4	A, B, C, E, MA, ME
	<i>A. acrana</i> Warncke, 1967	6	1	C, E
<i>Orandrena</i>	<i>A. garrula</i> Warncke, 1966	12	-	C, E, MA, ME
	<i>A. oralis</i> Morawitz, 1876	1	-	B, C
	<i>A. platalea</i> Warncke, 1975	2	-	C, E, ME
	<i>A. coitana</i> ssp. <i>xema</i> Warncke, 1975	1	1	B, E
<i>Pallandrena</i>	<i>A. korbella</i> Grünwaldt, 2005	3	3	E, ME
	<i>A. crispa</i> Warncke, 1975	13	1	A, C, E, MA
<i>Parandrenella</i>	<i>A. dentiventris</i> Morawitz, 1874	3	2	C, E, ME
	<i>A. figurata</i> Morawitz, 1866	11	6	C, E, MA, ME
<i>Plastandrena</i>	<i>A. bimaculata</i> (Kirby, 1802)	8	4	A, B, C, E, MA, ME
	<i>A. pilipes</i> Fabricius, 1781	29	10	A, C, ME
	<i>A. tibialis</i> (Kirby, 1802)	3	-	A, B, C, E
<i>Poecilandrena</i>	<i>A. crassana</i> Warncke, 1965	9	-	A, MA, ME
	<i>A. efeana</i> Scheuchl & Hazir, 2012	7	1	A
	<i>A. hybrida</i> Warncke, 1975	9	2	A, C, E
	<i>A. iliaca</i> Warncke, 1969	-	1	S
	<i>A. labiata</i> Fabricius, 1781	5	3	B, C, ME
	<i>A. laticeps</i> Morawitz, 1877	11	6	A, C, E, MA, ME
	<i>A. seminuda</i> Friese, 1896	2	-	B, C, MA
	<i>A. semirubra</i> Morawitz, 1875	13	2	A, B, C, E, MA, ME
<i>Poliandrena</i>	<i>A. kriechbaumeri</i> Schmiedeknecht, 1883	19	10	A, B, C, MA, ME
	<i>A. limbata</i> Eversmann, 1852	7	-	A, C, E, MA, ME
	<i>A. polita</i> Smith, 1847	15	23	A, B, C, E, ME
	<i>A. tolgiana</i> Friese, 1921	2	-	A, MA, ME
	<i>A. westensis</i> Warncke, 1965	2	2	A, C, MA, ME
<i>Proxiandrena</i>	<i>A. alutacea</i> Stöckhert, 1942	15	-	A, B, C, E, ME
<i>Ptilandrena</i>	<i>A. vetula</i> Lepeletier, 1841	33	-	B, C, E, ME, S
<i>Scitandrena</i>	<i>A. scita</i> Eversmann, 1852	23	14	A, B, C, E, MA, ME
	<i>A. combinata</i> (Christ, 1791)	5	-	MA, ME
<i>Simandrena</i>	<i>A. dorsata</i> (Kirby, 1802)	38	11	A, B, C, E, MA, ME
	<i>A. lepida</i> Schenck, 1859	36	1	A, B, C, E, MA, ME
	<i>A. melba</i> Warncke, 1966	2	-	A, E, ME
	<i>A. nucleola</i> Warncke, 1973	5	-	B, C, E
	<i>A. propinqua</i> Schenck, 1853	1	-	A
	<i>A. transitoria</i> Morawitz, 1871	18	12	A, B, C, E, ME, S
	<i>A. albiscopa</i> Warncke, 1967	3	-	A, B, C, E, ME, S
<i>Thysandrena</i>	<i>A. ranunculorum</i> Morawitz, 1877	8	2	A, B, C, E, ME
	<i>A. haemorrhoa</i> (Fabricius, 1781)	1	-	A, B, E, MA, ME
<i>Truncandrena</i>	<i>A. asiatica</i> Friese, 1921	18	6	A, E, MA, ME
	<i>A. bassana</i> ssp. <i>etesiacata</i> Warncke, 1975	1	-	B, C
	<i>A. canaeae</i> Strand, 1915	7	-	A, MA, ME, S
	<i>A. combusta</i> Morawitz, 1876	7	1	C, E, ME
	<i>A. delphiensis</i> Warncke, 1965	1	-	A
	<i>A. medeninensis</i> ssp. <i>usura</i> Warncke, 1967	7	1	A, B, C, E, MA, ME

Subgenera	Species	Female ♀♀	Male ♂♂	Geographical distribution
Truncandrena	<i>A. noacki</i> Alfken, 1935	2	2	A, C, E
	<i>A. optata</i> Warncke, 1975	22	7	A, C, MA, ME
	<i>A. paramythensis</i> Mavromoustakis, 1957	1	-	ME
	<i>A. roseotincta</i> Warncke, 1975	9	1	C, ME, S
	<i>A. rotundilabris</i> Morawitz, 1877	2	4	C, E, MA, ME
	<i>A. rufomaculata</i> Friese, 1921	1	-	ME
	<i>A. schmiedeknechti</i> Magretti, 1883	11	7	A, C, E, MA, ME
	<i>A. seitzi</i> Alfken, 1935	1	-	C, ME, S
	<i>A. truncatilabris</i> Morawitz, 1877	77	22	A, B, C, E, MA, ME, S
	<i>A. tscheki</i> Morawitz, 1872	1	-	A, C
	<i>A. ulula</i> Warncke, 1969	24	3	A, C, MA, S
	<i>A. urfanella</i> Scheuchl & Hazir, 2012	27	4	C, ME, S
Ulandrena	<i>A. cantiaca</i> Warncke, 1975	17	14	A, C, E, ME, S
	<i>A. combaella</i> Warncke, 1966	2	1	C, E
	<i>A. crecca</i> Warncke, 1965	9	9	A, B, C, E, MA, ME
	<i>A. elegans</i> Giraud, 1863	8	3	B, C, E, ME
	<i>A. fulvitarsis</i> Brullè, 1832	29	8	A, B, C, E, MA, ME, S
	<i>A. heinrichi</i> Grünwaldt, 2005	1	3	A
	<i>A. neocyprica</i> Mavromoustakis, 1956	7	-	A, MA, ME, S
	<i>A. osychniukae</i> Osytshnjuk, 1977	9	28	A, C, E, MA, ME, S
	<i>A. paradoxa</i> Friese, 1921	2	-	C, ME
	<i>A. schulzi</i> Strand, 1921	-	1	MA
Zonadrena	<i>A. flavipes</i> Panzer, 1798	154	45	A, B, C, E, MA, ME
	<i>A. gazella</i> Friese, 1922	6	1	B, C, E, ME, S
	<i>A. gravida</i> Imhoff, 1832	1	3	A, C, MA
Total	165	1721	550	

A: Aegean Region, **B:** Blacksea Region, **C:** Central Anatolia Region, **E:** Eastern Anatolia Region, **MA:** Marmara Region, **ME:** Mediterranean Region, **S:** Southeastern Anatolia Region.

Taxonomy

Subgenus *Aciandrena* Warncke, 1968

Andrena aciculata Morawitz, 1868

http://species-id.net/wiki/Andrena_aciculata

Distribution in Turkey. All parts of the country except south (Warncke 1974); Erzurum (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 11.V.2005, 1 ♂, 18.V.2005, 1 ♂, leg. E. Scheuchl, Kaza, 40°11'18"N, 32°40'37"E, 14.V.2005, 2 ♂♂, leg. E. Scheuchl; Aydın: Kuşadası, Davutlar, Ağaçlı köyü, 37°44'01"N, 27°18'49"E, 185 m, 27.V.2005, 2 ♀♀, leg. E. Scheuchl; Konya: Eskil-Karapınar arası, 38°08'18"N, 33°30'49"E, 900 m, 19.V.2005, 1 ♂, Kulu, 38°54'98"N, 32°59'56"E, 1145 m, 19.V.2005, 1 ♀, 1 ♂, leg. E. Scheuchl.

***Andrena lamiana* Warncke, 1965**

http://species-id.net/wiki/Andrena_lamiana

Distribution in Turkey. All parts of the country (Warncke 1974); Erzincan, Erzurum, Muş, Tunceli (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 11.V.2005, 2 ♀♀, 1 ♂, 17.V.2005, 1 ♂, 3.VI.2005, 1 ♀, 7.VI.2005, 1 ♂, leg. E. Scheuchl, Kazan, 40°11'18"N, 32°40'37"E, 14.V.2005, 2 ♀♀, 1 ♂, leg. E. Scheuchl; Konya: Eskil-Karapınar arası, 38°08'18"N, 33°30'49"E, 900 m, 19.V.2005, 4 ♀♀, leg. E. Scheuchl, Tuz Gölü çevresi, 38°44'83"N, 33°03'56"E, 940 m, 19.V.2005, 1 ♂, leg. E. Scheuchl, Karapınar yolu, 37°57'06"N, 33°37'19"E, 19.V.2005, 1070 m, 1 ♂, leg. E. Scheuchl; Mersin: Sertavul-Mut arası, 36°47'87"N, 33°20'13"E, 1150 m, 21.V.2005, 2 ♀♀, 1 ♂, 36°50'75"N, 33°18'51"E, 1400 m, 21.V.2005, 2 ♂♂, leg. E. Scheuchl.

***Andrena tenuis* Morawitz, 1877**

http://species-id.net/wiki/Andrena_tenuis

Distribution in Turkey. Karaman (Madenşehir), Kayseri (Yeşilhisar), Nevşehir (Ürgüp), Niğde (Ulukışla) (Warncke 1974).

Material examined. Kırşehir: Mucur, 39°04'01"N, 34°23'10"E, 1015 m, 4.VI.2005, 1 ♀, leg. E. Scheuchl; Konya: Eskil-Karapınar arası, 38°08'18"N, 33°30'49"E, 900 m, 19.V.2005, 2 ♂♂, leg. E. Scheuchl, Tuz Gölü çevresi, 38°44'83"N, 33°03'56"E, 940 m, 19.V.2005, 2 ♀♀, leg. E. Scheuchl, Kulu, 38°54'98"N, 32°59'56"E, 1145 m, 19.V.2005, 3 ♀♀, 5 ♂♂, leg. E. Scheuchl.

Subgenus *Aenandrena* Warncke, 1968***Andrena aeneiventris* Morawitz, 1872**

http://species-id.net/wiki/Andrena_aeneiventris

Distribution in Turkey. Aydın (Nazilli) (Warncke 1966); Çanakkale (Eceabat), Bursa (Kurlu), İzmir (Torbalı) (Warncke 1969); All parts of the country (Warncke 1974); Erzurum (Oltu) (Özbek 1976); Aydın (Nazilli), Hakkari, Hatay (Antakya), Kars, Konya, Sivas (Gürün), Şanlıurfa, (Gusenleitner 1984).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 6.VI.2005, 1 ♀, leg. B. Gülcü, C. Çobanoğlu, Çamlıdere çevresi, 40°32'42"N, 32°34'19"E, 1190 m, 17.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Burdur: Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Erzincan: Kemaliye,

Buğdaypınarı köyü, 12.VII.2005, 1 ♀, leg. C. Çobanoğlu; Erzurum: İspir, 40°27'56"N, 40°58'27"E, 1176 m, 13.VIII.2005, 1 ♀, leg. B. Gülcü, S. Hazır; Kırklareli: Sarpdere çıkışı mağara yolu, 41°51'92"N, 27°34'93"E, 390 m, 1.VI.2009, 2 ♀♀, leg. B. Gülcü, C. Demirtaş; Konya: Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♀, leg. B. Gülcü, Ahırlı-Bozkır arası, 37°11'48"N, 32°12'89"E, 1200 m, 21.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Kütahya: Tavşanlı-Harmancık arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır.

Andrena bisulcata Morawitz, 1877

http://species-id.net/wiki/Andrena_bisulcata

Distribution in Turkey. Adana (Ceyhan), Adapazarı, Balıkesir (Ayvalık), Çanakkale, Diyarbakır, Edirne, Hatay (İskenderun), Mersin (Tarsus), Samsun (Vezirköprü), Şanlıurfa, Tekirdağ (Warncke 1974); Hatay (Antakya), Siirt (Gusenleitner 1984).

Material examined. Burdur: Tefenni yolu, 37°16'10"N, 29°52'44"E, 1150 m, 8.VI.2006, 1 ♀, leg. C. Çobanoğlu; Çanakkale: Altınoluk, Küçükkyuyu, Çetmi yolu, 39°34'99"N, 26°36'29"E, 231 m, 30.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Gaziantep: Gaziantep-Kahramanmaraş arası, 37°13'40"N, 37°15'81"E, 914 m, 18.V.2006, 2 ♀♀, leg. C. Çobanoğlu, S. Hazır; Karaman: Tepebaşı-Ermenek arası, 36°41'41"N, 32°45'99"E, 821 m, 22.V.2007, 4 ♀♀, leg. B. Gülcü, S. Hazır; Manisa: Spil dağı, 38°34'99"N, 27°24'55"E, 821 m, 3.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır; Mersin: Erdemli, 36°40'25"N, 34°24'44"E, 23.IV.2004, 1 ♀, leg. S. Hazır.

Andrena hystrix Schmiedeknecht, 1883

http://species-id.net/wiki/Andrena_hystrix

Synonym: *Andrena hystrix* ssp. *rufilata* Warncke, 1975

Distribution in Turkey. Ankara, Erzurum (Warncke 1974); Erzurum (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 15.V.2005, 1 ♀, 1 ♂, leg. E. Scheuchl; Aydın: Kuşadası, Ağaçlı-Davutlar arası, 37°44'00"N, 27°19'17"E, 187 m, 10.IV.2006, 1 ♀, leg. B. Gülcü, C. Çobanoğlu; Burdur: Tefenni, 37°20'40"N, 29°48'24"E, 1132 m, 8.VI.2006, 4 ♀♀, leg. C. Çobanoğlu, E. Scheuchl, Yeşilova, 37°29'01"N, 29°46'37"E, 1239 m, 8.VI.2006, 2 ♀♀, leg. C. Çobanoğlu, E. Scheuchl; Manisa: Spil dağı, 38°34'99"N, 27°24'55"E, 821 m, 3.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır; Konya: Akören, 37°31'22"N, 32°38'71"E, 1030 m, 23.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Kütahya: Emet-Tavşanlı arası, 39°20'16"N, 29°18'22"E, 1047 m, 5.VI.2007, 1 ♀ leg. C. Hazır, S. Hazır, Tavşanlı-Harmancık arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır.

Subgenus *Avandrena* Warncke, 1968

Andrena canohirta (Friese, 1922)

http://species-id.net/wiki/Andrena_canohirta

Distribution in Turkey. Denizli (Acı göl), Konya (Warncke 1974).

Material examined. Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 159 m, 7.III.2010, 2 ♀♀, 13.III.2010, 3 ♀♀, 14.III.2010, 1 ♀, 18.III.2010, 1 ♀, leg. E. Scheuchl; Antalya: Elmalı, 36°46'36"N, 29°59'32"E, 1175 m, 26.IV.2011, 1 ♀, leg. E. Scheuchl.

Subgenus *Brachyandrena* Pittioni, 1948

Andrena colletiformis Morawitz, 1874

http://species-id.net/wiki/Andrena_colletiformis

Distribution in Turkey. Adana, Ankara, Hatay (Amanos dağları), Toros dağları (Warncke 1966); İstanbul (Selimpaşa), Çanakkale, Denizli (Pamukkale), Adapazarı, İzmir (Torbalı), Tekirdağ, Edirne (İpsala), Bilecik (Osmaneli), Bursa (Gemlik, Kurlu) (Warncke 1969); All parts of the country (Warncke 1974); Erzurum (Oltu, Tortum, Horasan, İspir) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 29.V.2005, 1 ♀, 1 ♂, leg. E. Scheuchl; Antalya: Gölova-Korkuteli arası, 36°48'31"N, 30°00'50 E, 1143 m, 7.VI.2006, 1 ♂, leg. C. Çobanoğlu, E. Scheuchl, Korkuteli-Tefenni arası, 37°09'30"N, 30°01'53 E, 1445 m, 8.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Burdur: Gölhisar-Altınyayla arası, 37°05'34"N, 29°31'51"E, 977 m, 6.VI.2006, 1 ♀, 1 ♂, leg. C. Çobanoğlu, E. Scheuchl, Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 06.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Çanakkale: Altınoluk, Küçükkyuzu, Çetme yolu, 39°34'99"N, 26°36'29"E, 231 m, 30.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Karaman: Tepebaşı-Ermenek arası, 36°41'41"N, 32°45'99"E, 821 m, 22.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Manisa: Demirci-Simav arası, 39°04'48"N, 28°43'36"E, 1260 m, 4.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır.

Andrena pinguis Ariana et al., 2009

http://species-id.net/wiki/Andrena_pinguis

Synonym: *Andrena punctatissima* sensu Warncke, nec Morawitz 1866

Distribution in Turkey. Amasya, Ankara, Antalya, Burdur, Konya, Siirt (Ariana et al. 2009).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 16.VI.2006, 1 ♀, 1 ♂, leg. E. Scheuchl; Antalya: Gölova-

Korkuteli arası, 36°48'31"N, 30°00'50"E, 1143 m, 7.VI.2006, 1 ♀, leg. E. Scheuchl,
Korkuteli-Tefenni arası, 37°09'30"N, 30°01'53"E, 1445 m, 8.VI.2006, 2 ♀♀, leg. E.
Scheuchl; Burdur: Tefenni çevresi, 37°10'54"N, 29°59'13"E, 1487 m, 8.VI.2006, 1
♀, leg. E. Scheuchl.

Subgenus *Campylogaster* Dours, 1873

***Andrena erberi* Morawitz, 1871**

http://species-id.net/wiki/Andrena_erberi

Distribution in Turkey. Adana (Ceyhan), Ankara, Nevşehir (Ürgüp) (Warncke 1966);
All regions of the country (Warncke 1974).

Material examined. Konya: Seydişehir-Beyşehir arası, 37°32'18"N, 31°48'36"E,
1166 m, 23.V.2007, 1 ♂, leg. B. Gülcü, S. Hazır.

***Andrena incisa* Eversmann, 1852**

http://species-id.net/wiki/Andrena_incisa

Distribution in Turkey. Ankara (Warncke 1966); Ankara, Amasya, Erzurum, Karaburun (Madenşehir), Konya (Akşehir), Kütahya (Gediz), Nevşehir, Samsun (Vezirköprü), Sivas (Gürün) (Warncke 1974); Erzurum (Oltu) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü,
39°51'49"N, 32°45'06"E, 7.VI.2005, 1 ♀, leg. E. Scheuchl, Çamlıdere, 40°32'22"N,
32°30'15"E, 1345 m, 17.VI.2006, 1 ♀, 1 ♂, leg. E. Scheuchl, Kızılıcahamam-Gerede
arası, 40°32'17"N, 32°36'33"E, 1001 m, 17.VI.2006, 1 ♀, leg. E. Scheuchl; Çankırı:
Saçaklıbeli dağ geçidi, 40°41'53"N, 33°00'46"E, 1473 m, 18.VI.2006, 5 ♀♀, 3 ♂♂,
leg. B. Gülcü, E. Scheuchl.

***Andrena lateralis* Morawitz, 1876**

http://species-id.net/wiki/Andrena_lateralis

Distribution in Turkey. Ankara, Konya (Akşehir, Beyşehir) (Warncke 1966); An-

kara, Denizli, Erzurum (Horasan, İspır, Kandilli, Tatos dağları, Uzundere), Kara-
man (Madenşehir), Kırıkkale, Konya (Akşehir, Beyşehir), Kütahya (Gediz), Tunceli
(Warncke 1974); Erzurum (Horasan, İspır, Kandilli, Tortum, Uzundere), Tunceli
(Özbek 1976).

Material examined. Ankara: Kızılıcahamam-Güvem arası, 40°34'05"N,
32°39'23"E, 1070 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Konya:
Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 2 ♀♀,
leg. B. Gülcü.

Subgenus *Carandrena* Warncke, 1968***Andrena falcinella* Warncke, 1969**

http://species-id.net/wiki/Andrena_falcinella

Distribution in Turkey. Adana, Diyarbakır, Muş, Şanlıurfa (Birecik) (Warncke 1974); Erzurum (Oltu), Muş (Özbek 1976).

Material examined. Adana: Pozantı otobanı çevresi, 25.IV.2004, 1 ♀, leg. C. Çobanoğlu, Misis-Ceyhan arası, 23.IV.2005, 2 ♀♀, leg. S. Hazır; Diyarbakır: Karacadağ dağı çevresi, 14.V.2005, 5 ♀♀, leg. B. Gülcü, A.B. Yasan, Şanlıurfa-Karacadağ arası, 14.V.2005, 4 ♀♀, leg. B. Gülcü, A.B. Yasan; Şanlıurfa: Siverek, 14.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan, Siverek-Viranşehir arası, 14.V.2005, 2 ♀♀, leg. B. Gülcü, A.B. Yasan.

***Andrena purpureomicans* Alfken, 1935**

http://species-id.net/wiki/Andrena_purpureomicans

Distribution in Turkey. Adana, Ankara, Hatay, Konya (Warncke 1966); Adana, Ankara (Gölbaşı, Polatlı, Şereflikoçhisar), Erzurum (İspir), Hatay (Antakya), Kayseri (Yeşilhisar), Konya (Sarayönü) Muş, Niğde (Ulukışla) (Warncke 1974); Erzurum (İspir), Muş (Özbek 1976).

Material examined. Aksaray: 38°37'29"N, 33°45'21"E, 921 m, 3.V.2007, 4 ♀♀, 10 ♂♂, leg. C. Hazır, B. Gülcü; Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 11.V.2005, 1 ♂, leg. E. Scheuchl, Kazan, 40°11'18"N, 32°40'37"E, 14.V.2005, 1 ♀, 8 ♂♂, leg. E. Scheuchl; Burdur: Karamanlı-Yeşilova arası, 37°29'01"N, 29°46'37"E, 1239 m, 8.VI.2006, 1 ♀, leg. E. Scheuchl, Tefenni, 37°20'40"N, 29°48'24"E, 1132 m, 8.VI.2006, 1 ♀, leg. E. Scheuchl; Konya: Akören çevresi, 37°31'22"N, 32°38'71"E, 1030 m, 23.V.2007, 2 ♀♀, leg. E. Scheuchl; Kütahya: Tavşanlı-Harmancık arası, 39°39'52"N, 29°15'80"E, 832 m, 5.VI.2007, 1 ♀, leg. E. Scheuchl; Manisa: Demirci-Simav arası, 39°04'48"N, 28°43'36"E, 1260 m, 4.VI.2007, 3 ♀♀, leg. C. Hazır, S.Hazır.

***Andrena schlettereri* Friese, 1896**

http://species-id.net/wiki/Andrena_schlettereri

Distribution in Turkey. Adapazarı, Çanakkale, İstanbul (Üsküdar), Tekirdağ (Warncke 1966); Adapazarı, Ankara (Şereflikoçhisar), Bursa (Mustafakemalpaşa), Çanakkale, Diyarbakır (Ergani), Edirne, İstanbul (Üsküdar), Konya, Kütahya, Samsun, Tekirdağ (Warncke 1974).

Material examined. Antalya: Manavgat, Başlar köyü-Ormana arası, 37°07'80"N, 31°30'92"E, 1063 m, 21.V.2007, 1 ♀, leg. E. Scheuchl; Aydın: Bahçearası, 16.IV.2005,

1 ♀, leg. S. Hazır, Söke, Güllübahçe, 37°40'40"N, 27°20'55"E, 20 m, 10.IV.2006,
 1 ♀, leg. B. Gülcü, C. Çobanoğlu, Söke, Tuzburgazı, 37°37'13"N, 27°12'20"E, 4 m,
 10.IV.2006, 1 ♀, leg. B. Gülcü, C. Çobanoğlu, Bafa Gölü, Phrygana, 37°30'31"N,
 27°21'35"E, 20 m, 7.III.2010, 2 ♂♂, leg. E. Scheuchl; Sivas: Yıldızeli, 39°50'09"N,
 36°24'79"E 1509 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan.

Subgenus *Charitandrena* Hedicke, 1933

***Andrena hattorfiana* (Fabricius, 1775)**

http://species-id.net/wiki/Andrena_hattorfiana

Distribution in Turkey. Toroslar (Warncke 1966); Aydın, Mersin (Gülek) (Warncke 1974).

Material examined. Aydın: Akçaköy-Çayır arası, 37°58'49"N, 28°00'42 E, 711 m, 28.V.2006, 1 ♀, 1 ♂, leg. B. Gülcü, S. Hazır, Paşayaylaşı, 37°54'10"N, 27°54'00"E, 696 m, 3.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl, Hamzabali-Çavdarköy arası, 37°47'45"N, 28°07'41"E, 176 m, 22.IV.2007, 2 ♀♀, 1 ♂, leg. B. Gülcü, S. Hazır, Çine, İbrahim kavağı, 17.V.2007, 1 ♀, leg. B. Gülcü; Burdur: Çavdır-Söğüt arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 1 ♂, leg. E. Scheuchl; İzmir: Ödemiş-Bozdağ arası, 38°19'54"N, 28°03'50"E, 1132 m, 28.V.2006, 2 ♂♂, leg. E. Scheuchl; Kırklareli: Sarpdere, Dupnitsa mağarası yolu, 41°50'71"N, 27°33'57"E, 410 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Muğla: Tuzabat, Milas-Yatağan arası, 37°18'46"N, 27°59'88"E, 675 m, 27.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır.

Subgenus *Chlorandrena* Pérez, 1890

***Andrena astica* Warncke, 1967**

http://species-id.net/wiki/Andrena_astica

Distribution in Turkey. Adana (Misis), Balıkesir (Ayvalık) (Warncke 1974).

Material examined. Kahramanmaraş: Kahramanmaraş-Göksun arası, 37°39'69"N, 36°41'75"E, 546 m, 5.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır.

***Andrena cinerea* Brullé, 1832**

http://species-id.net/wiki/Andrena_cinerea

Distribution in Turkey. Bursa (İznik, Uludağ), İstanbul (Belgrad ormanı, Büyükdere, Üsküdar), Manisa, Muğla (Marmaris) (Warncke 1966, 1974).

Material examined. Adana: Pozantı otoban çevresi, 25.IV.2004, 1 ♀, leg. C. Çobanoğlu; Aydın: Kuşadası, Dilek yarımadası milli parkı, İçmeler koyu, 15.IV.2005, 1 ♂, leg. S. Hazır, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N,

27°51'14"E, 176 m, 1.VI.2006, 1 ♀, leg. B. Gülcü, S. Aydın, Kapıkırı, Bafa gölü, 37°29'46"N, 27°32'21"E, 11 m, 22.IV.2007, 11 ♀♀, leg. C. Çobanoğlu, B. Gülcü; Çanakkale: Bayramlı, Himidiye yaylası yolu, 40°08'74"N, 26°17'60"E, 197 m, 31.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Kırklareli: Çukurpınar, 41°51'41"N, 27°29'72"E, 409 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş, Sarpdere çıkışı, mağara yolu, 41°51'92"N, 27°34'93"E 390 m, 1.VI.2009, 1 ♀ leg. B. Gülcü, C. Demirtaş; Sivas: Koyulhisar-Mesudiye arası, 40°18'43"N, 37°50'34"E, 588 m, 12.VIII.2005, 1 ♀, leg. B. Gülcü, S. Hazır.

Andrena cinereophila Warncke, 1965

http://species-id.net/wiki/Andrena_cinereophila

Distribution in Turkey. Adapazarı, Balıkesir (Ayvalık), Mardin (Warncke 1966); All regions of the country (Warncke 1974).

Material examined. Aydın: Bafa gölü çevresi, 37°28'58"N, 27°24'12"E, 9 m, 11.IV.2006, 7 ♀♀, leg. C. Çobanoğlu, B. Gülcü, Karacasu, 37°35'51"N, 28°37'00"E, 795 m, 24.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Diyarbakır: Karacadağ, 14.V.2005, 2 ♀♀, leg. B. Gülcü, A.B. Yasan; Gaziantep: Gaziantep-Kahramanmaraş arası, 37°16'76"N, 37°12'36"E, 918 m, 18.V.2006, 1 ♀, leg. C. Çobanoğlu, S. Hazır; Kahramanmaraş: Kahramanmaraş-Göksun arası, 37°39'69"N, 36°41'75"E, 546 m, 5.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Kırklareli: Çukurpınar, 41°51'41"N, 27°29'72"E, 409 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş, Sarpdere-Balaban arası, 41°51'79"N, 27°37'58"E, 365 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Mersin: Gülnar, 36°20'84"N, 33°37'58"E, 1010 m, 24.V.2005, 14 ♀♀, leg. S. Hazır, Silifke-Gülnar arası, 36°22'42"N, 33°46'46"E, 740 m, 24.V.2005, 6 ♀♀, leg. S. Hazır; Şanlıurfa: Siverek-Diyarbakır arası, 14.V.2005, 8 ♀♀, 1 ♂, leg. B. Gülcü, A.B. Yasan.

Andrena clypella Strand, 1921

http://species-id.net/wiki/Andrena_clypella

Synonym: *Andrena clypella* ssp. *hasitata* Warncke, 1973

Distribution in Turkey. West Turkey (Warncke 1974).

Material examined. Aydın: Kuşadası, Güzelçamlı, Aydeniz, 37°41'93"N, 27°14'97"E, 5 m, 28.V.2005, 1 ♀, leg. E. Scheuchl; Çanakkale: Çanakkaleye 10 km kala Fiat petrol ofisi karşısında, 31.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Gelibolu yarımadası, Çanakkale şehitlik abidesi yolu, 40°07'49"N, 26°17'75"E, 56 m, 31.V.2009, 3 ♀♀, leg. B. Gülcü, C. Demirtaş; Çorum: 17-06-2005, 40°34'47"N, 34°38'73"E, 646 m, 17.VI.2005, 1 ♀, 1 ♂, leg. A.B. Yasan; Kırklareli: Sarpdere çıkışı mağara yolu, 41°51'92"N, 27°34'93"E, 390 m, 1.VI.2009, 2 ♀♀, leg. B. Gülcü, C. Demirtaş; Muğla: Köyceğiz, 36°59'53"N, 28°38'83"E 15 m, 26.V.2005, 1 ♀, leg. S. Hazır, Gökova, Akyaka-

ka, 37°03'09"N, 28°18'67"E, 0 m, 26.V.2005, 1 ♀, leg. S. Hazır, Bafa, Kapıkırı yolu, 37°27'41"N, 27°32'35"E, 15 m, 27.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır.

***Andrena exquisita* Warncke, 1975**

http://species-id.net/wiki/Andrena_exquisita

Distribution in Turkey. Balıkesir (Bigadiç), İstanbul (Büyükdere) (Warncke 1974); İstanbul (Büyükdere) (Warncke 1975; Blank and Kraus 1994).

Material examined. Aydın: Yılmazköy-Paşayaylası arası, 37°52'49"N, 27°53'57"E, 339 m, 30.IV.2006, 1 ♀, leg. B. Gülcü, S. Hazır; Bursa: Uludağ Milli Parkı giriş-Soğuksu Pınar arası, 40°06'14"N, 29°04'88"E, 1265 m, 3.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Çanakkale: Armağan-Çukurpınar arası, Dereköy civarı, 41°50'86"N, 27°26'73"E, 428 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Kahramanmaraş: Kahramanmaraş-Göksun arası, 37°39'69"N, 36°41'75"E, 546 m, 5.V.2007, 9 ♀♀, leg. B. Gülcü, C. Hazır, 37°45'29"N, 36°41'97"E, 661 m, 6.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Kırklareli: Çukurpınar, 41°51'41"N, 27°29'72"E, 409 m, 1.VI.2009, 4 ♀♀, leg. B. Gülcü, C. Demirtaş; Manisa: Spil dağı milli parkı, 38°36'01"N, 27°26'49"E, 406 m, 23.IV.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır.

***Andrena humabilis* Warncke, 1965**

http://species-id.net/wiki/Andrena_humabilis

Distribution in Turkey. Adana, Balıkesir (Ayvalık, Bigadiç), Bursa (Karacabey, Mustafakemalpaşa), Çanakkale, Diyarbakır, İstanbul (Büyükdere) Mersin (Gülek), (Warncke 1966, 1974).

Material examined. Adana: Pozantı otoban çevresi, 25.IV.2004, 2 ♀♀, leg. C. Çobanoğlu; Antalya: Elmalı, 36°46'36"N, 29°59'32"E, 1175 m, 26.IV.2011, 1 ♀, leg. E. Scheuchl; Aydın: Bafa Gölü, Phrygana, 37°30'31"N, 27°21'35"E, 20 m, 7.III.2010, 1 ♂, leg. E. Scheuchl; Kahramanmaraş: Kahramanmaraş-Göksun arası, 37°39'69"N, 36°41'75"E, 546 m, 5.V.2007, 3 ♀♀, leg. B. Gülcü, C. Hazır.

***Andrena humilis* Imhoff, 1832**

http://species-id.net/wiki/Andrena_humilis

Synonym: *Andrena humilis* ssp. *indigena* Warncke, 1975

Distribution in Turkey. Balıkesir (Havran), İstanbul (Kilyos) (Warncke 1966); Bolu (Abant) (Warncke 1969).

Material examined. Adana: Pozantı otoban çevresi, 25.IV.2004, 1 ♀, leg. C. Çobanoğlu; Saimbeyli, 38°04'25"N, 36°08'88"E, 1468 m, 6.V.2007, 1 ♂, leg. B.

Gülçü, C. Hazır; Ankara: Güvem-Çerkes arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 1 ♀, 4 ♂♂, leg. B. Gülçü, E. Scheuchl; Bursa: Uludağ Soğuk Pınar yolu, 40°03'84"N, 29°07'11"E, 1029 m, 3.VI.2009, 2 ♀♀, 4 ♂♂, leg. B. Gülçü, C. Demirtaş, Uludağ Milli Parkı girişi-Soğuk Pınar arası, 40°06'14"N, 29°04'88"E, 1265 m, 3.VI.2009, 5 ♀♀, 14 ♂♂, leg. B. Gülçü, C. Demirtaş, Soğuk Pınar yolu, Uludağ etegi, 40°04'68"N, 29°06'16"E 1231 m, 3.VI.2009, 6 ♂♂, leg. B. Gülçü, C. Demirtaş; Çanakkale: Gelibolu yarımadası, Çanakkale şehitlik abidesi yolu, 40°07'49"N, 26°17'75"E 56 m, 31.V.2009, 1 ♀, 1 ♂, leg. B. Gülçü, C. Demirtaş; Karaman: Taşkent, 36°54'45"N, 33°30'19"E, 1649 m, 22.V.2007, 1 ♀, leg. B. Gülçü, S. Hazır; Kayseri: Erciyes-Hacılar arası, 38°36'13"N, 35°29'53"E, 1800 m, 20.VI.2006, 1 ♀, leg. B. Gülçü, E. Scheuchl; Kırklareli: Çukurpınar, 41°51'41"N, 27°29'72"E, 409 m, 1.VI.2009, 1 ♀, 1 ♂, leg. B. Gülçü, C. Demirtaş; Manisa: Spil dağı milli parkı, 38°34'21"N, 27°24'00"E, 972 m, 23.IV.2007, 1 ♀, leg. B. Gülçü, S. Hazır; Rize: Ovit dağı geçiti, 40°37'39"N, 40°48'39"E, 2566 m, 2.VII.2006, 1 ♀, leg. B. Gülçü, E. Scheuchl; Şanlıurfa: Siverek-Diyarbakır arası, 14.V.2005, 7 ♀♀, leg. B. Gülçü, A.B. Yasan.

Andrena orientana Warncke, 1965

http://species-id.net/wiki/Andrena_orientana

Synonym: *Andrena taraxaci* ssp. *orientana* Warncke, 1965

Distribution in Turkey. Adana (Misis), Adapazarı, Antalya (Akseki, Manavgat, Side), Çanakkale, Balıkesir (Ayvalık, Bigadiç), Bursa (İznik, Karacabey), Denizli (Acıgöl, Pamukkale), Diyarbakır, Hatay (Antakya), İstanbul (Büyükdere), Manisa, Mersin (Tarsus) (Warncke 1974); Adana, Antalya (Side) (Schwenninger 2007).

Material examined. Antalya: Elmali, 36°46'36"N, 29°59'32"E, 1175 m, 26.IV.2011, 1 ♀, leg. E. Scheuchl; Aydın: Bozdoğan, 1.IV.2005, 2 ♀♀, leg. S. Hazır, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 1.III.2006, 1 ♂, leg. B. Gülçü, S. Aydin, Kuşadası, AĞAÇLI-Davutlar arası, 37°44'00"N, 27°19'17"E, 187 m, 10.IV.2006, 1 ♂, leg. C. Çobanoğlu, B. Gülçü, Bafa gölü çevresi, 37°28'25"N, 27°25'17"E, 11 m, 22.IV.2007, 2 ♀♀, 37°28'58"N, 27°24'12"E 9 m. 5 ♀♀, Karacasu, Yazır-Nargedik arası, 37°40'16"N, 28°38'49"E, 630 m, 24.IV.2007, 1 ♀, leg. B. Gülçü, C. Hazır; Şanlıurfa: Siverek-Diyarbakır arası, 14.V.2005, 1 ♀, leg. B. Gülçü, A.B. Yasan.

Andrena panurgimorpha Mavromoustakis, 1957

http://species-id.net/wiki/Andrena_panurgimorpha

Distribution in Turkey. Balıkesir (Ayvalık), Çanakkale, Konya (Beyşehir) (Warncke 1966); All parts of the country (Warncke 1974); Erzurum (İspir), Muş (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 6.VI.2005, 1 ♀, leg. E. Scheuchl; Kazan, 40°11'18"N, 32°40'37"E, 14.V.2005, 2 ♂♂, leg. E. Scheuchl; Antalya: Korkuteli-Tefenni arası, 37°08'08"N, 30°04'07"E, 1325 m, 8.VI.2006, 2 ♀♀, leg. C. Çobanoğlu, E. Scheuchl; Aydın: Karacasu, Yazır-Nargedik arası, 37°40'16"N, 28°38'49"E, 630 m, 24.IV.2007, 1 ♂, leg. B. Gülcü, S.Hazır, Söke, 37°45'24"N, 27°21'94"E, 95 m, 28.V.2005, 1 ♂, leg. S.Hazır, Bafa gölü, 37°28'58"N, 27°24'12"E, 9 m, 11.IV.2006, 5 ♀♀, leg. C. Çobanoğlu, B. Gülcü; Çorum: Çerkeş köyü yakını, 40°42'01"N, 34°16'04"E, 916 m, 17.VI.2005, 2 ♀♀, leg. A.B. Yasan; Gaziantep: Gaziantep-Kahramanmaraş arası, 37°13'40"N, 37°15'81"E, 914 m, 18.V.2006, 6 ♀♀, 1 ♂, leg. C. Çobanoğlu, S. Hazır; Kahramanmaraş: 37°19'07"N, 37°10'40"E, 8 m, 18.V.2006, 1 ♀, leg. S. Hazır, C. Çobanoğlu, 06-05-2007 K.Maraş-Göksun arası, 37°45'29"N, 36°41'97"E, 661 m, 6.V.2007, 1 ♀, leg. B.Gülcü, C.Hazır; Konya: Seydişehir-Beyşehir arası, 37°32'18"N, 31°48'36"E, 1166 m, 23.V.2007, 1 ♂, leg. B. Gülcü, S.Hazır; Mersin: Gülnar çevresi, 36°20'84"N, 33°37'58"E, 1010 m, 24.V.2005, 2 ♂♂, Erdemli çevresi, 36°37'21"N, 34°19'96"E, 180 m, 22.V.2005, 4 ♀♀, 1 ♂, leg. S. Hazır; Nevşehir: Nevşehir-Aksaray arası, 38°32'49"N, 34°28'27"E, 1269 m, 5.VI.2005, 2 ♀♀, 1 ♂, leg. B. Gülcü, S. Hazır; Niğde: Ulukışla çevresi, 37°32'82"N, 34°31'40"E, 1389 m, 1 ♂, leg. C. Çobanoğlu, S. Hazır; Rize: Camçavuş, 2.VII.2006, 2 ♀♀, Ovit dağı geçidi, 40°37'39"N, 40°48'39"E, 2566 m, 2.VII.2006, 2 ♀♀, leg. B. Gülcü, E. Scheuchl; Şanlıurfa: Karacadağ kasabasından 1 km sonra, 14.V.2005, 1 ♂, Şanlıurfa-Birecik arası, 15.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan.

Subgenus *Chrysandrena* Hedicke, 1933

Andrena fulvago (Christ, 1791)

http://species-id.net/wiki/Andrena_fulvago

Distribution in Turkey. Bolu (Abant) (Warncke 1969); Bolu (Abant gölü, Karagöl), İstanbul (Belgrat ormanı) (Warncke 1974).

Material examined. Ankara: Kızılcahamam-Güvem arası, 40°34'05"N, 32°39'23"E, 1070 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Kırklareli: Çukurpınar, 41°51'41"N, 27°29'72"E, 409 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş.

Andrena glandaria Warncke, 1975

http://species-id.net/wiki/Andrena_glandaria

Distribution in Turkey. Antalya, Şanlıurfa (Warncke 1974).

Material examined. Aydın: Söke, 37°45'24"N, 27°21'94 E, 95 m, 28.V.2005, 1 ♂, leg. S. Hazır; Isparta: Gelendost, 38°04'08"N, 30°58'70"E, 940 m, 25.V.2005, 1 ♀, leg. E. Scheuchl; Muğla: Bafa, 37°27'41"N, 27°32'35"E, 15 m, 27.V.2007, 1 ♀, leg. B. Gülcü.

***Andrena hesperia* Smith, 1853**

http://species-id.net/wiki/Andrena_hesperia

Distribution in Turkey. Adana, Balıkesir (Ayvalık), Konya (Warncke 1966); Adana, Ankara, Antalya (Akseki, Side), Balıkesir (Ayvalık), Bursa, Denizli (Acıgöl, Pamukkale), Diyarbakır, Erzurum (İspir), İstanbul (Büyücekmece, Büyükdere), Konya (Sarayönü), Manisa, Mersin (Tarsus) (Warncke 1974); Erzurum (İspir) (Özbek 1976).

Material examined. Adana: 37°02'23"N, 35°08'14"E, 104 m, 19.V.2006, 1 ♀, leg. C. Çobanoğlu, S. Hazır; Pozanti otoban çevresi, 25.IV.2004, 4 ♀♀, leg. C. Çobanoğlu; Ankara: Çamlıdere-Elmalı arası, 40°25'51"N, 32°28'01"E, 1278 m, 17.VI.2006, 2 ♀♀, leg. B. Gülcü, E. Scheuchl, Kızılıcahamam-Çerkes arası, 40°31'18"N, 32°38'11"E, 1113 m, 18.VI.2006, 2 ♀♀, leg. B. Gülcü, E. Scheuchl; Antalya: Korkuteli-Tefenni arası, 37°08'14"N, 30°03'51"E, 1353 m, 8.VI.2006, 1 ♀, leg. E. Scheuchl; Aydın: Söke, 37°45'24"N, 27°21'94"E, 95 m, 28.V.2005, 1 ♀, leg. S. Hazır, 27-05-2005 Kuşadası, Dilek yarımadası milli parkı, 37°41'52"N, 27°09'12"E, 0 m, 27.V.2005, 1 ♀, leg. S. Hazır, Yılmazköy-Paşayaylaşı arası, 37°51'18"N, 27°53'49"E, 86 m, 30.IV.2006, 1 ♀, leg. B. Gülcü, S. Hazır, Yılmazköy, 37°51'09"N, 27°53'43"E, 73 m, 30.IV.2006, 1 ♀, leg. B. Gülcü, S. Hazır; Çanakkale: Çanakkaleye 10 km kala, 31.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Kahramanmaraş: Kahramanmaraş-Göksun arası, 37°39'69"N, 36°41'75"E, 546 m, 5.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Karaman: Taşkent, 36°54'45"N, 32°30'19"E, 1649 m, 22.V.2007, 2 ♀♀, leg. E. Scheuchl; Manisa: Spil dağı milli parkı, 38°34'21"N, 27°24'00"E, 972 m, 23.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Muğla: Kapıkırı çevresi, 37°27'41"N, 27°32'35"E, 15 m, 27.V.2007, 2 ♀♀, leg. E. Scheuchl.

***Andrena merula* Warncke, 1969**

http://species-id.net/wiki/Andrena_merula

Distribution in Turkey. Amasya, İstanbul (Belgrad ormanı), Mersin (Mut) (Warncke 1969, 1974).

Material examined. Antalya: Korkuteli-Tefenni arası, 37°08'08"N, 30°04'07"E, 1325 m, 8.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Aydın: Yılmazköy-Paşayaylaşı arası, 37°52'49"N, 27°53'57"E, 339 m, 30.IV.2006, 2 ♀♀, leg. B. Gülcü, S. Hazır, Söke, 37°45'24"N, 27°21'94"E, 95 m, 28.V.2005, 1 ♀, leg. S. Hazır, Köşk, Uzundere, 292 m, 28.V.2006, 1 ♀, leg. B. Gülcü, S. Hazır, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 19.IV.2007, 5 ♀♀, leg. B. Gülcü, S. Hazır; Gaziantep: Gaziantep-Kahramanmaraş arası, 37°16'76"N, 37°12'36"E, 918 m, 18.V.2006, 6 ♀♀, leg. C. Çobanoğlu, S. Hazır; Isparta: Gelendost, 38°04'08"N, 30°58'70"E, 940 m, 25.V.2005, 1 ♀, leg. E. Scheuchl; Konya: Bozkır-Seydişehir arası, 37°15'92"N, 32°07'86"E, 1170 m, 25.V.2005, 1 ♀, leg. S. Hazır; Manisa: Spil dağı milli parkı, 38°36'01"N, 27°26'49"E, 406 m, 23.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Mersin: Gülnar, 36°20'84"N, 33°37'58"E, 1010 m, 24.V.2005, 1 ♀, leg. S. Hazır; Muğla: Yatağan, 37°12'54"N, 28°20'10"E, 625 m, 26.V.2005, 1 ♀, leg. S. Hazır.

Subgenus *Cordandrena* Warncke, 1968

***Andrena cordialis* Morawitz, 1878**

http://species-id.net/wiki/Andrena_cordialis

Distribution in Turkey. Adapazarı, Ankara, Konya, Samsun (Warncke 1966); Adapazarı, Ankara (Şereflikoçhisar), Bursa (Mustafakemalpaşa), Erzurum, İğdır, Kırıkkale, Kayseri (Yeşilhisar), Konya (Kulu, Sarayönü), Kütahya, Mersin (Sertavul), Muş, Samsun, Tokat (Niksar) (Warncke 1974); Erzurum (Oltu), İğdır, Muş (Özbek 1976).

Material examined. Aksaray: 38°28'97"N, 33°53'30"E, 973 m, 5.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır; Ankara: Kazan, 15.V.2005, 5 ♀♀, leg. S. Hazır, 1 ♂, leg. E. Scheuchl, 39°04'45"N, 33°24'85"E, 916 m, 5.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır, Kızılcahamam-Gerede arası, 40°32'17"N, 32°36'33"E 1001 m, 17.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl, Peçenek-Çamlıdere arası, 40°27'21"N, 32°25'21"E, 1144 m, 17.VI.2006, 7 ♀♀, leg. C. Çobanoğlu, Gümüş-Çerkes arası, 40°42'43"N, 32°46'05"E, 1294 m, 18.VI.2006, 3 ♀♀, leg. B. Gülcü, E. Scheuchl; Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, leg. B. Gülcü, S. Hazır; Burdur: Çavdır-Gölhisar arası, 37°08'41"N, 29°33'13"E, 956 m, 6.VI.2006, 1 ♀, leg. C. Çobanoğlu, Gölhisar-Altinyayla arası, 37°05'34"N, 29°31'51"E, 977 m, 6.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl, Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Çorum: 40°36'37"N, 35°08'01"E, 1057 m, 17.VI.2005, 1 ♀, leg. A.B. Yasan; Hatay: Altınözü, 36°06'57"N, 36°16'27"E, 204 m, 17.V.2006, 1 ♀, leg. S. Hazır; Kastamonu: Tosya-İskilip arası, 40°56'18"N, 34°15'10"E 1507 m, 19.VI.2006, 4 ♀♀, 40°58'43"N, 34°11'23"E 1171 m, 19.VI.2006, 1 ♀ leg. B. Gülcü, E. Scheuchl; Konya: Akören, 37°31'22"N, 32°38'71"E, 1030 m, 23.V.2007, 3 ♀♀, Seydişehir-Beyşehir arası, 37°32'18"N, 31°48'36"E, 1166 m, 23.V.2007, 1 ♀ leg. B. Gülcü, S. Hazır; Kütahya: Tavşanlı-Harmancık arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 1 ♀, 3 ♂♂, leg. C. Hazır, S. Hazır; Manisa: Demirci-Simav arası, 39°04'48"N, 28°43'36"E, 1260 m, 4.VI.2007, 1 ♂, leg. C. Hazır, S. Hazır; Sivas: Karakaya köyü, 39°49'07"N, 36°17'21"E, 1222 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan.

***Andrena cypria* Pittioni, 1950**

http://species-id.net/wiki/Andrena_cypria

Distribution in Turkey. Konya (Warncke 1966); Ankara (Gölbaşı, Şereflikoçhisar), Erzurum, Kayseri (Yeşilhisar), Konya (Sarayönü), Kırşehir (Kaman), Mersin (Mut), Muş, Nevşehir (Ürgüp), Niğde (Ulukışla), Sivas (Gürün) (Warncke 1974); Erzurum, Muş (Özbek 1976).

Material examined. Aksaray: 38°32'05"N, 33°49'90"E, 966 m, 5.VI.2005, 1 ♀, 3 ♂♂, leg. S. Hazır, 38°38'22"N, 33°44'30"E, 929 m, 5.VI.2005, 2 ♀♀, leg. B. Gülcü, S. Hazır, 38°37'29"N, 33°45'21"E, 921 m, 3.V.2007, 1 ♀, leg. B.

Gülçü, C. Hazır; Ankara: Gölbaşı, 39°31'10"N, 32°52'02"E, 19.V.2005, 1 ♀, leg. S. Hazır; 39°04'45"N, 33°24'85"E, 916 m, 5.VI.2005, 6 ♀♀, leg. S. Hazır, Haymana, 39°20'77"N, 32°45'58"E, 1094 m, 5.VI.2005, 2 ♀♀ leg. S. Hazır, Güvem-Çerkes arası, 40°42'43"N, 32°46'05"E, 1294 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Aydın: Kuşadası, Güzelçamlı-Davutlar arası, 37°43'18"N, 27°15'03"E, 3 m, 10.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü, Bafa gölü çevresi, 37°28'25"N, 27°25'17"E, 11 m, 11.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, leg. B. Gülcü, S. Hazır; Burdur: Yeşilova, 37°29'01"N, 29°46'37"E, 1239 m, 8.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Kırşehir: Kaman çıkışı, 39°22'16"N, 33°47'71"E, 1057 m, 4.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır; Konya: Ahırlı-Bozkır arası, 37°11'48"N, 32°12'89"E, 1200 m, 21.V.2007, 3 ♀♀, leg. B. Gülcü, Bozkır-Yalnızca arası, 37°09'58"N, 32°15'75"E, 1464 m, 21.V.2007, 1 ♀, leg. B. Gülcü, Akören, 37°31'22"N, 32°38'71"E, 1030 m, 23.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Manisa: Spil dağı milli parkı, 38°35'15"N, 27°26'16"E, 612 m, 23.IV.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Sivas: Karakaya köyü, 39°49'07"N, 36°17'21"E, 1222 m, 18.VI.2005, 1 ♀, Yıldızeli, 39°50'09"N, 36°24'79"E, 1509 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan; Yozgat: Ozan köyü, 39°48'82"N, 35°08'42"E, 1166 m, 18.VI.2005, 3 ♀♀, Sorgun, 39°49'82"N, 35°08'42"E, 1166 m, 18.VI.2005, 2 ♀♀, leg. A.B. Yasan.

Andrena torda Warncke, 1965

http://species-id.net/wiki/Andrena_torda

Distribution in Turkey. Konya (Beyşehir) (Warncke 1966); Ankara, Aydın (Bozdoğan), Diyarbakır, Konya (Beyşehir, Sarayıönü) (Warncke 1974).

Material examined. Aydın: Milas-Akbük arası, 37°28'07"N, 27°20'20"E, 113 m, 11.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü.

Subgenus *Cryptandrena* Pittioni, 1948

Andrena brumanensis Friese, 1899

http://species-id.net/wiki/Andrena_brumanensis

Synonym: *Andrena clypeata* Brullé, 1832

Distribution in Turkey. Adana, Ankara, Balıkesir (Ayvalık, Bigadiç), Bursa, Çanakkale, İstanbul (Kilyos), Konya, Mersin (Mut), Muş, Şanlıurfa (Birecik) (Warncke 1974); Erzurum (Oltu), Muş (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 17.V.2005, 2 ♂♂, 29.V.2005, 1 ♀, 7.VI.2005, 1 ♂, leg. E. Scheuchl, Kazan, 14.V.2005, 1 ♂, leg. S. Hazır; Antalya: Manavgat, Başlar

köyü-Ormana arası, 37°07'80"N, 31°30'92"E, 1063 m, 21.V.2007, 1 ♀, leg. E. Scheuchl, Korkuteli, 36°55'05"N, 30°03'33"E, 1295 m, 26.IV.2011, 1 ♂, leg. E. Scheuchl; Diyarbakır: Karacadağ, 14.V.2005, 2 ♀♀, 1 ♂, leg. B. Gülcü, A.B. Yasan; Konya: Akören çevresi, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 2 ♀♀, leg. E. Scheuchl; Mersin: Gülnar-Ermenek arası, Toros dağları, 24.V.2005, 1 ♂, leg. E. Scheuchl; Şanlıurfa: Siverek-Viranşehir arası, 14.V.2005, 1 ♀, Siverek-Diyarbakır arası, 14.V.2005, 1 ♂, leg. B. Gülcü, A.B. Yasan.

Andrena monacha Warncke, 1965

http://species-id.net/wiki/Andrena_monacha

Distribution in Turkey. Adapazarı, Balıkesir (Ayvalık, Bigadiç), Toros dağları (Warncke 1966; Blank and Kraus 1994); Adana (Karataş), Adapazarı, Antalya (Aspendos, Finike, Side), Balıkesir (Ayvalık, Bigadiç), Bursa (Karacabey), Mersin (Gülek), Muğla, Osmaniye (Warncke 1974).

Material examined. Antalya: Elmali, 36°46'36"N, 29°59'32"E, 1175 m, 26.IV.2011, 1 ♂, leg. E. Scheuchl; Aydın: Malgaçmustafa-Ovacık arası, 37°59'11"N, 28°10'21"E, 771 m, 21.IV.2007, 1 ♂, leg. B. Gülcü, S. Hazır.

Andrena ventricosa Dours, 1873

http://species-id.net/wiki/Andrena_ventricosa

Distribution in Turkey. Adana (Karataş), Balıkesir (Ayvalık), Bilecik, Konya (Beyşehir), Manisa (Warncke 1966); All regions of the country (Warncke 1974); Erzurum (Horasan, İspir, Oltu) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 15.V.2005, 1 ♀, 1 ♂, leg. E. Scheuchl; Antalya: Korkuteli-Tefenni arası, 37°09'30"N, 30°01'53"E, 1445 m, 8.VI.2006, 1 ♀, leg. C. Cobanoğlu, E. Scheuchl; Çanakkale: Bayramlı, Himidiye yaylası yolu, 40°08'74"N, 26°17'60"E, 197 m, 31.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Konya: Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♀, leg. B. Gülcü; Mersin: Gülnar-Ermenek arası, Toros dağları, 24.V.2005, 1 ♀, leg. E. Scheuchl.

Subgenus *Cubiandrena* Warncke, 1968

Andrena cubiceps Friese, 1914

http://species-id.net/wiki/Andrena_cubiceps

Distribution in Turkey. Adana, Eskişehir (Warncke 1966); Aydın (Söke), Çanakkale, Nevşehir (Göreme), Tekirdağ (Warncke 1969); Adana, Antalya, Aydın (Söke), Bil-

ecik, Çanakkale, Eskişehir, Hatay (Antakya), İstanbul, Karaman (Madenşehir), Konya, Mersin (Alata, Gülek, Mut, Silifke, Tarsus), Nevşehir (Göreme), Osmaniye, Şanlıurfa, Tekirdağ (Warncke 1974).

Material examined. Aydın: Yılmazköy, 3.VI.2006, 1 ♂, leg. E. Scheuchl; Erzurum: İspir-Bayburt arası, 40°26'29"N, 40°49'26"E, 1258 m, 2.VII.2006, 1 ♂, leg. E. Scheuchl; Mersin: Limonlu, 23.V.2005, 1 ♂, leg. E. Scheuchl.

Andrena cubicepsella Warncke, 1975

http://species-id.net/wiki/Andrena_cubicepsella

Distribution in Turkey. Ankara, Karaman (Madenşehir), Nevşehir (Avanos) (Warncke 1974).

Material examined. Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 11.VI.2006, 1 ♂, leg. E. Scheuchl.

Subgenus *Didonia* Gribodo, 1894

Andrena mucida Kriechbaumer, 1873

http://species-id.net/wiki/Andrena_mucida

Distribution in Turkey. Edirne (Çamlıca) (Warncke 1969); Denizli (Açı göl), Diyarbakır, Edirne, Erzurum (Horasan, Oltu), Hatay (Antakya), Kars (Sarıkamış) (Warncke 1974); Erzurum (Horasan, Oltu), Kars (Sarıkamış) (Özbek 1976).

Material examined. Adana: Saimbeyli, 38°04'25"N, 36°28'88"E, 1468 m, 6.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır.

Andrena nasuta Giraud, 1863

http://species-id.net/wiki/Andrena_nasuta

Distribution in Turkey. Ankara (Warncke 1966); Erzurum (Oltu) (Özbek 1976).

Material examined. Ankara: Çamlıdere çevresi, 40°25'51"N, 32°28'01"E, 1278 m, 17.VI.2006, 1 ♀, leg. E. Scheuchl, Kızılcahamam-Güvem arası, 40°34'05"N, 32°39'23"E, 1070 m, 18.VI.2006, 1 ♀, leg. E. Scheuchl; Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, Hamzabaklı-Çavdarköy arası, 37°47'45"N, 28°07'41"E, 176 m, 22.IV.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Karaman: Göktepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 1 ♀, leg. E. Scheuchl; Kayseri: Erciyes-Develi arası, 38°29'00"N, 35°30'45"E, 2002 m, 20.VI.2006, 2 ♀♀, leg. B. Gülcü, E. Scheuchl; Kütahya: Tavşanlı-Harmancık arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır.

Subgenus *Euandrena* Hedicke, 1933***Andrena bicolor* Fabricius, 1775**

http://species-id.net/wiki/Andrena_bicolor

Distribution in Turkey. Balıkesir (Ayvalık), Kayseri (Erciyes dağı), Tekirdağ (Warncke 1966); Amasya, Ankara, Antalya (Akseki), Ardahan, Balıkesir (Ayvalık), Bursa (Uludağ), Diyarbakır, Erzurum (Oltu), Kayseri (Erciyes dağı), Konya, Nevşehir (Ürgüp), Tekirdağ (Warncke 1974); Ardahan, Erzincan, Erzurum (Oltu) (Özbek 1976).

Material examined. Ankara: Güvem-Çerkes arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Aydın: Bozdoğan, 1.IV.2005, 2 ♀♀, leg. S. Hazır, AYTEPE, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.II.2006, 1 ♀, 1.III.2006, 1 ♀, leg. B. Gülcü, S. Aydin, Gölhısar-Mesutlu arası, 37°47'57"N, 27°55'42"E, 48 m, 23.II.2006, 1 ♀, leg. S. Hazır, B. Gülcü; Bursa: Uludağ, Soğuk Pınar yolу, 40°03'84"N, 29°07'11"E, 1029 m, 3.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Kırklareli: Sarpdere-Balaban arası, 41°51'79"N, 27°37'58"E, 365 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Sivas: Koyulhisar-Mesudiye arası, 40°21'49"N, 37°48'44"E, 1713 m, 12.VIII.2005, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena glabriventris* Alfken, 1935**

http://species-id.net/wiki/Andrena_glabriventris

Distribution in Turkey. Ankara (Warncke 1966); Ankara (Gölbaşı, Hasanoğlan, Şereflikoçhisar), Erzurum, Nevşehir (Ürgüp), Niğde (Ulukışla), Konya (Warncke 1974); Erzurum (Özbek 1976).

Material examined. Aksaray: Sivrihisar dağ geçidi, 38°14'36"N, 34°25'35"E, 1706 m, 20.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Ankara: Karakeçili, 39°35'00"N, 33°24'67"E, 762 m, 4.VI.2005, 4 ♀♀, leg. S. Hazır, Emirdağ, 40°09'14"N, 32°38'12"E, 854 m, 17.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Kırşehir: Karakaya köyü, 39°26'34"N, 33°28'24"E, 971 m, 4.VI.2005, 2 ♀♀, leg. S. Hazır, B. Gülcü, Kaman, 6.VI.2005, 3 ♀♀, leg. S. Hazır; Konya: Seydişehir-Bozkır arası, 37°21'57"N, 32°05'01"E, 1098 m, 21.V.2007, 1 ♂, leg. E. Scheuchl, Akören çevresi, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♂, leg. E. Scheuchl; Kütahya: Simav-Saphane arası, 39°03'06"N, 29°06'02"E, 966 m, 4.VI.2007, 1 ♂, leg. E. Scheuchl; Sivas: Karakaya köyü, 39°49'07"N, 36°17'21"E, 1222 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan; Yozgat: Pazarcık, 39°47'90"N, 36°00'49"E, 1242 m, 18.VI.2005, 1 ♀, leg. A. B. Yasan.

***Andrena symphyti* Schmiedeknecht, 1883**

http://species-id.net/wiki/Andrena_symphyti

Synonym: *Andrena symphyti* ssp. *furcata* Friese, 1921

Distribution in Turkey. Ankara, Erzurum (Oltu, Tanyeri), Gümüşhane (Zigana geçidi), Hatay (Amanos dağları), İstanbul, Karaman (Madenşehir), Konya (Akşehir, Sarayıönü), Nevşehir (Ürgüp), Mersin (Mut, Gülek), Rize (Çinçiva), Topraklı, Hardiman (Warncke 1974); Erzurum (Özbek 1976).

Material examined. Aydın: Malgaçmustafa-Ovacık arası, 37°59'11"N, 28°10'21"E, 771 m, 21.IV.2007, 1 ♀, 2 ♂♂, leg. B. Gülcü, S. Hazır.

Subgenus *Graecandrena* Warncke, 1968***Andrena impunctata* Pérez, 1895**

http://species-id.net/wiki/Andrena_impunctata

Distribution in Turkey. Adapazarı, Ankara (Şereflikoçhisar), Balıkesir (Ayvalık), Bursa (Mustafakemalpaşa), Çanakkale, İstanbul, İzmir, Samsun (Warncke 1974).

Material examined. Ankara, Kazan, 40°11'18"N, 32°40'37"E, 14.V.2005, 1 ♂, leg. E. Scheuchl; Mersin: Çamlıayyla çevresi, Ulaş köyü, 36°59'23"N, 34°47'39"E, 22.V.2005, 1 ♂, leg. E. Scheuchl.

Subgenus *Holandrena* Pérez, 1890***Andrena labialis* (Kirby, 1802)**

http://species-id.net/wiki/Andrena_labialis

Distribution in Turkey. Toprakkale (Fahringer and Friese 1921); Bursa (Uludağ) (Fahringer 1922); Ankara (Şereflikoçhisar), Antalya (Finike), Erzurum (Kandilli, Oltu, Zigana köyü, Tatos dağları, İspir), Gümüşhane, Karaman (Madenşehir), Kars, Konya, Mersin (Sertavul, Gülek), Niğde (Ulukışla), Tunceli (Warncke 1974); Erzurum (Oltu, Tortum, İspir, Horasan, Narman, Hınıs), Muş, İğdır, Tunceli, Bayburt, Elazığ (Özbek 1976).

Material examined. Ankara: Yeşilköy-Kızılcahamam arası, 40°24'15"N, 32°33'38"E, 1327 m, 17.VI.2006, 3 ♀♀, 1 ♂, Şabanözü-Çankırı arası, 40°30'23"N, 33°24'54"E, 1487 m, 18.VI.2006, 1 ♀, Kızılcahamam, 40°24'24"N, 32°34'20"E, 1317 m, 17.VI.2006, 1 ♀, Çamlıdere, 40°32'42"N, 32°34'19"E, 1190 m, 17.VI.2006, 3 ♀♀, leg. B. Gülcü, E. Scheuchl; Aydın: Ovacık, 38°03'02"N, 28°08'09"E, 1089 m, 24.VI.2008, 1 ♀, leg. B. Gülcü, S. Hazır; Burdur: Tefenni, 37°16'10"N, 29°52'44"E, 1150 m, 8.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Çanakkale: Bayramlı,

Himidiye yaylası yolu, 40°08'74"N, 26°17'60"E, 197 m, 31.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Çankırı: Saçakbeli dağ geçidi, 40°41'53"N, 33°00'46"E, 1473 m, 18.VI.2006, 2 ♂♂, leg. B. Gülcü, E. Scheuchl; Denizli: Acıpayam-Çameli arası, 37°11'11"N, 29°25'15"E, 1557 m, 8.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Erzincan: Kemaliye, 39°12'80"N, 38°32'14"E, 1528 m, 8.VII.2005, 1 ♀, leg. C. Çobanoğlu; Erzurum: İspir-Bayburt arası, 40°26'29"N, 40°49'26"E, 1258 m, 2.VII.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Karabük: Bartın-Safranbolu arası, 41°26'54"N, 32°44'52"E, 364 m, 10.VII.2005, 1 ♀, Eflani yolu, Yağlıca Köyü, 41°23'13"N, 32°50'06"E, 953 m, 10.VII.2005, 1 ♀, leg. B. Gülcü; Kastamonu: Çankırı-Ilgaz arası, 40°50'30"N, 33°34'52"E, 1314 m, 18.VI.2006, 2 ♀♀, 6 ♂♂, Eflani-Daday arası, 41°28'20"N, 33°04'50"E, 1006 m, 10.VII.2005, 1 ♀, 19-06-2006 Tosya-İskilip arası, 40°58'43"N, 34°11'23"E, 1171 m, 19.VI.2006, 2 ♂♂, Türbe dağı geçiti, 40°56'14"N, 34°12'33"E, 1625 m, 19.VI.2006, 1 ♂, leg. B. Gülcü; Kayseri: Kayseri-Erciyes arası, 38°36'57"N, 35°30'48"E, 1680 m, 20.VI.2006, 1 ♀, 1 ♂, leg. B. Gülcü, E. Scheuchl; Konya: Seydişehir-Bozkır arası, 37°21'57"N, 32°05'01"E, 1098 m, 21.V.2007, 1 ♀, leg. E. Scheuchl; Kütahya: Simav-Saphane arası, 39°03'06"N, 29°06'02"E, 966 m, 4.VI.2007, 1 ♀, leg. E. Scheuchl, Emet-Tavşanlı arası, 39°27'30"N, 29°19'03"E, 881 m, 5.VI.2007, 3 ♀♀, leg. E. Scheuchl; Mersin: Gülnar, 36°20'40"N, 33°28'77"E, 1140 m, 24.V.2005, 2 ♀♀, leg. S. Hazır; Sivas: Karakaya köyü, 39°49'07"N, 36°17'21"E, 1222 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan.

Andrena variabilis Smith, 1853

http://species-id.net/wiki/Andrena_variabilis

Distribution in Turkey. Amanos dağları, İstanbul (Warncke 1966); İzmir (Ensetepe) (Warncke 1969); All regions of the country (Warncke 1974); Erzurum (İspir), İğdır (Tuzluca) (Özbek 1976).

Material examined. Adana: Karaisalı, 16.VI.2005, 1 ♀, leg. S. Hazır; Ankara: Kurtboğazı barajı çevresi, 40°16'28"N, 32°41'19"E, 1014 m, 17.VI.2006, 2 ♀♀, Yeşilköy-Kızılcahamam arası, 40°24'15"N, 32°33'38"E, 1327 m, 17.VI.2006, 3 ♀♀, 2 ♂♂, leg. B. Gülcü, E. Scheuchl, Akyurt, 40°08'11"N, 33°11'95"E, 1329 m, 16.VI.2005, 1 ♀, leg. A.B. Yasan; Konya: Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♀, leg. B. Gülcü; Sivas: Koyulhisar-Mesudiye arası, 40°18'24"N, 37°51'38"E, 1221 m, 12.VIII.2005, 1 ♀, leg. B. Gülcü, S. Hazır.

Andrena wilhelmi Schuberth, 1995

http://species-id.net/wiki/Andrena_wilhelmi

Distribution in Turkey. Adana (Ceyhan), Ankara (Şereflikoçhisar), Balıkesir (Ayvalık), Bursa (Karacabey), Hatay (Topoğazi), İğdır, İstanbul (Florya), Konya (Beyşehir), Mersin (Mut, Namrum) (Schuberth 1995).

Material examined. Antalya: Başlar köyü-Ormana arası, 37°07'80"N, 31°30'92"E, 1063 m, 21.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Diyarbakır: Karacadağ, 14.V.2005, 2 ♂♂, Şanlıurfa-Karacadağ arası, 14.V.2005, 1 ♂, leg. B. Gülcü, A.B. Yasan; Gaziantep: Nurdağı, 15.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan; Konya: Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 3 ♀♀, leg. B. Gülcü, Seydişehir-Beyşehir arası, 37°32'18"N, 31°48'36"E, 1166 m, 23.V.2007, 1 ♀, 1 ♂, leg. B. Gülcü, S. Hazır; Mersin: Gülnar, 36°20'40"N, 33°28'77"E, 1140 m, 24.V.2005, 7 ♀♀, leg. S. Hazır.

Subgenus *Hoplandrena* Pérez, 1890

Andrena rosae Panzer, 1801

http://species-id.net/wiki/Andrena_rosae

Distribution in Turkey. Erzurum (Tanyeri) (Warncke 1974).

Material examined. Konya: Bozkır-Yalnızca arası, 37°09'58"N, 32°15'75"E, 1464 m, 21.V.2007, 2 ♀♀, 1 ♂, leg. E. Scheuchl.

Andrena trimmerana (Kirby, 1802)

http://species-id.net/wiki/Andrena_trimmerana

Distribution in Turkey. İstanbul, Erzurum (Oltu, Tortum), Mersin (Gülek) (Warncke 1974); Erzurum (Oltu, Tortum) (Özbek 1976).

Material examined. Aydın: Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, leg. B. Gülcü, S. Hazır; Kastamonu: Tosya-İskilip arası, 40°56'18"N, 34°15'10"E, 1507 m, 19.VI.2006, 1 ♂, leg. E. Scheuchl.

Subgenus *Hyperandrena* Pittioni, 1948

Andrena bicolorata (Rossi, 1790)

http://species-id.net/wiki/Andrena_bicolorata

Distribution in Turkey. İzmir (Warncke 1966); Bursa (Mustafakemalpaşa), İzmir (Seydiköy) (Warncke 1974).

Material examined. Aydın: Kuşadası, Davutlar, 15.IV.2005, 1 ♀, 1 ♂, leg. S. Hazır, Söke, Akçakonak köyü, 37°41'30"N, 27°21'35"E, 20 m, 10.IV.2006, 3 ♀♀, Söke, Güllübahçe, 37°40'40"N, 27°20'55"E, 20 m, 10.IV.2006, 2 ♀♀, leg. C. Çobanoğlu, B. Gülcü, Umurlu, Serçeköy köyü, 37°49'59"N, 27°55'50"E, 30 m, 13.III.2010, 1 ♀, leg. E. Scheuchl.

Subgenus *Larandrena* LaBerge, 1964***Andrena larisana* Warncke, 1965**

http://species-id.net/wiki/Andrena_larisana

Synonym: *Andrena tunetana* ssp. *larisana* Warncke, 1965

Distribution in Turkey. Adapazarı, Bursa (Mustafakemalpaşa), Balıkesir (Ayvalık, Bigadiç), İstanbul (Üsküdar) (Warncke 1974).

Material examined. Aydın: Çine, Çine Çayı, Söğütçük, 37°28'08"N, 28°09'33"E, 236 m, 12.III.2010, 1 ♀, 1 ♂, leg. E. Scheuchl.

***Andrena medioxima* Warncke, 1975**

http://species-id.net/wiki/Andrena_medioxima

Synonym: *Andrena tunetana* ssp. *medioxima* Warncke, 1975

Distribution in Turkey. Ankara (Şereflikoçhisar), Antalya (Side), Denizli (Acıgöl), Kayseri (Yeşilhisar), Nevşehir (Ürgüp) (Warncke 1974); Nevşehir, Şanlıurfa (Birecik) (Warncke 1975).

Material examined. Ankara: Karakeçili, 39°35'00"N, 33°24'67"E, 762 m, 4.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır; Aydın: Bahçearası, 16.IV.2005, 1 ♀, leg. S. Hazır; Nevşehir: Nevşehir-Aksaray arası, 38°32'49"N, 34°28'27"E, 1269 m, 5.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena sericata* Imhoff, 1866**

http://species-id.net/wiki/Andrena_sericata

Distribution in Turkey. Diyarbakır, Antalya (Elmalı) (Warncke 1974).

Material examined. Aydın: Baltaköy, 37°47'06"N, 27°53'07"E, 38 m, 23.II.2006, 1 ♀, 5 ♂♂, Gölhisar-Mesutlu arası, 37°47'57"N, 27°55'42"E, 48 m, 23.II.2006, 7 ♀♀, 2 ♂♂, Karahayıt köyü, 37°48'06"N, 28°00'55"E, 46 m, 23.II.2006, 6 ♀♀, 6 ♂♂, Tepeköy, 37°47'24"N, 27°53'43"E, 35 m, 23.II.2006, 1 ♀, 3 ♂♂, Yenipazar-Bozdoğan arası, Alarmut köyü, 37°48'49"N, 28°18'48"E, 61 m, 23.II.2006, 7 ♂♂, leg. B. Gülcü, S. Hazır, Umurlu, Serçeköy köyü, 37°49'59"N, 27°55'50"E, 30 m, 13.III.2010, 8 ♀♀, leg. E. Scheuchl.

Subgenus *Leimelissa* Osychnyuk, 1984

Andrena ispida Warncke, 1965

http://species-id.net/wiki/Andrena_ispida

Distribution in Turkey. Konya (Beyşehir) (Warncke 1966); Çanakkale (Eceabat), Erzurum (Oltu, İspir, Uzundere-the old name is Azort), Kırşehir, Konya (Akşehir, Beyşehir), Nevşehir (Ürgüp), Niğde (Çiftehan), Mersin (Mut), Sivas (Gürün) (Warncke 1974); Erzurum (Oltu, İspir, Tortum) (Özbek 1976).

Material examined. Ankara: Yeşilköy-Kızılcahamam arası, 40°24'15"N, 32°33'38"E, 1328 m, 17.VI.2006, 1 ♀, leg. E. Scheuchl; Antalya: Korkuteli-Tefenni arası, 37°08'14"N, 30°03'51"E, 1353 m, 8.VI.2006, 1 ♀, leg. C. Cobanoğlu, E. Scheuchl, Başlar köyü-Ormana arası, 37°07'80"N, 31°30'92"E, 1063 m, 21.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Burdur: Göllhisar-Altinyayla arası, 37°05'34"N, 29°31'51"E, 977 m, 6.VI.2006, 1 ♀, leg. C. Cobanoğlu, E. Scheuchl; Konya: Kulu, 38°54'98"N, 32°59'56"E, 1145 m, 19.V.2005, 1 ♂, leg. E. Scheuchl; Kütahya: Gediz-Hisarcık arası, 39°04'79"N, 29°23'95"E, 967 m, 4.VI.2007, 1 ♂, leg. E. Scheuchl, Emet-Tavşanlı arası, 39°27'30"N, 29°19'03"E, 881 m, 5.VI.2007, 1 ♀, leg. E. Scheuchl; Mersin: Sertavul-Mut arası, 36°47'87"N, 33°20'13"E, 1150 m, 19.V.2005, 2 ♀♀, 1 ♂, leg. E. Scheuchl, Çamlıayyla çevresi, Ulaş köyü, 36°59'23"N, 34°47'39"E, 22.V.2005, 1 ♀, leg. E. Scheuchl.

Subgenus *Lepidandrena* Hedicke, 1933

Andrena curvungula Thomson, 1870

http://species-id.net/wiki/Andrena_curvungula

Distribution in Turkey. Amasya, Ankara, Aydın (Bozdoğan), Erzurum (İspir), Kayseri (Erciyes dağı) (Warncke 1974); Erzurum (İspir) (Özbek 1976).

Material examined. Aydin: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'48"N, 27°51'49"E, 197 m, 24.IV.2011, 1 ♀, leg. E. Scheuchl; Kirklareli: Çukurpınar, 41°52'65"N, 27°30'78"E, 369 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş.

Andrena elisaria Gusenleitner, 1998

http://species-id.net/wiki/Andrena_elisaria

Distribution in Turkey. Hakkari (Süvari Halil Geçidi, Yüksekova), Şırnak (Uludere) (Gusenleitner 1998).

Material examined. Adana: Pınarlı-Saimbeyli arası, 38°07'50"N, 36°10'00"E, 1442 m, 6.V.2007, 1 ♂, leg. B. Gülcü, C. Hazır; Antalya: Korkuteli-Elmalı arası, 36°56'39"N, 30°08'20"E, 1335 m, 7.VI.2006, 1 ♀, leg. E. Scheuchl.

***Andrena florivaga* Eversmann, 1852**

http://species-id.net/wiki/Andrena_florivaga

Distribution in Turkey. İstanbul (Üsküdar) (Warncke 1966); Adana (Pozantı), İstanbul (Üsküdar), Erzurum (İspir), Muş, Samsun (Bafra) (Warncke 1974); Erzurum (Oltu, İspir), Muş (Özbek 1976).

Material examined. Ankara: Kazan, 14.V.2005, 1 ♀, leg. E. Scheuchl, Güven-Çerkeş arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Kastamonu: Tosya-İskilip arası, 40°58'43"N, 34°11'23"E, 1171 m, 19.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl.

***Andrena gamskrucki* ssp. *eburnea* Warncke, 1975**

Distribution in Turkey. Balıkesir (Ayvalık, Bigadiç, Sındırığı), Burdur, Denizli (Açıgöl), Nevşehir (Warncke 1974).

Material examined. Antalya: Korkuteli, 36°55'05"N, 30°03'33"E, 1295 m, 26.IV.2011, 1 ♀, leg. E. Scheuchl; Aydın: Boğaziçi yolu, 16.IV.2005, 2 ♀♀, Orhanlı-Bahçearası arası, 16.IV.2005, 3 ♀♀, leg. S. Hazır, Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.II.2006, 1 ♀, leg. B. Gülcü, S. Aydın, Karahayıt köyü, 37°48'06"N, 28°00'55"E, 46 m, 23.II.2006, 4 ♂♂, leg. B. Gülcü, S. Hazır, Madran dağı, 37°39'12"N, 28°11'51"E, 1546 m, 17.V.2007, 1 ♂, leg. B. Gülcü; Burdur: Çamköy, 37°14'17"N, 29°32'07"E, 925 m, 25.IV.2011, 2 ♀♀, leg. E. Scheuchl.

***Andrena paucisquama* Noskiewicz, 1924**

http://species-id.net/wiki/Andrena_paucisquama

Synonym: *Andrena paucisquama* ssp. *curonica* Warncke, 1975

Distribution in Turkey. Ankara, Balıkesir (Sındırığı), Bursa (Karacabey), Manisa (Akhisar, Kayapınar) (Warncke 1974).

Material examined. Ankara: Kızılcahamam-Çerkeş arası, 40°31'18"N, 32°38'11"E, 1113 m, 18.VI.2006, 1 ♀, leg. E. Scheuchl; Aydın: Paşayaylaşı, 37°55'47"N, 27°53'44"E, 1151 m, 3.VI.2006, 1 ♀, leg. E. Scheuchl, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'48"N, 27°51'49"E, 197 m, 23.IV.2011, 1 ♀, leg. E. Scheuchl; Kütahya: Demirci-Simav arası, 39°06'11"N, 28°43'96"E, 1348 m, 4.VI.2007, 1 ♀, 1 ♂, leg. E. Scheuchl.

Subgenus *Leucandrena* Hedicke, 1933***Andrena mistrensis* Grünwaldt, 2005**

http://species-id.net/wiki/Andrena_mistrensis

Distribution in Turkey. Aydın (Hazır et al. 2012).

Material examined. Aydın: Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 16.IV.2005, 1 ♀, leg. B. Gülcü, S. Aydın, Boğaziçi yolu, 16.IV.2005, 1 ♀, Koçarlı, 16.IV.2005, 1 ♀, Orhaneli-Bahçearası arası, 16.IV.2005, 3 ♀♀, leg. S. Hazır, Karacasu, Yazır-Bingeş arası, 37°38'05"N, 28°39'03"E, 860 m, 24.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena parviceps* Kriechbaumer, 1873**

http://species-id.net/wiki/Andrena_parviceps

Distribution in Turkey. Bursa (Uludağ), Erzincan (Kemaliye), Muş (Warncke 1974); Erzurum (Oltu), Muş (Özbek 1976).

Material examined. Aydın: Kuşadası, 16.IV.2005, 1 ♀, Orhaneli-Bahçearası arası, 16.IV.2005, 3 ♀♀, leg. S. Hazır.

Subgenus *Melanapis* Cameron, 1902***Andrena fuscosa* Erichson, 1835**

http://species-id.net/wiki/Andrena_fuscosa

Distribution in Turkey. Adana (Ceyhan, Karataş), Adapazarı, Amanos dağları, Ankara, Balıkesir (Ayvalık) (Warncke 1966); Aydın (Kuşadası), Bilecik (Warncke 1969); All regions of the country (Warncke 1974); Erzurum (İspir, Horasan) (Özbek 1976).

Material examined. Antalya: Bozova, 37°12'02"N, 30°15'58"E, 935 m, 26.IV.2011, 1 ♂, leg. E. Scheuchl; Aydın: Kuşadası, Davutlar, 15.IV.2005, 1 ♀, leg. B. Gülcü, S. Hazır, Söke, Güllübahçe, 34°40'40"N, 27°20'55"E, 20 m, 10.IV.2006, 1 ♀, Milas-Akbük arası, 37°28'07"N, 27°20'20"E, 113 m, 11.IV.2006, 1 ♀, leg. B. Gülcü, C. Çobanoğlu, Aytepe, Adnan Menderes Üniversitesi kampüsü, 17.IV.2007, 1 ♀, leg. B. Gülcü, Sultanhisar, Güvendik köyü, 37°57'16"N, 28°10'01"E, 558 m, 21.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Erzurum: İspir-Bayburt arası, 40°26'29"N, 40°49'26"E, 1258 m, 2.VII.2006, 1 ♀, leg. E. Scheuchl; Gaziantep: Nizip-Gaziantep arası, 15.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan; Konya: Ahırlı-Bozkır arası, 37°15'06"N, 32°09'00"E, 1201 m, 21.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır.

Subgenus *Melandrena* Pérez, 1890***Andrena albopunctata* (Rossi, 1792)**

http://species-id.net/wiki/Andrena_albopunctata

Synonym: *Andrena albopunctata* ssp. *funebris* Panzer, 1798

Distribution in Turkey. Ankara, Bursa, Kayseri (Erciyes), Konya (Beyşehir), Toros dağları (Warncke 1966); All regions of the country (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 29.V.2005, 1 ♀, 6.VI.2005, 1 ♀, leg. E. Scheuchl; Konuya: Eskil-Aksaray arası, 38°35'52"N, 33°10'44 E, 920 m, 19.V.2005, 1 ♂, Toros Dağları, Görmeli çevresi, 36°31'47"N, 33°59'62"E, 1400 m, 24.V.2005 2 ♀♀, Beyşehir, 37°51'35"N, 31°36'19"E, 1140 m, 25.V.2005, 1 ♀, Bozkır-Seydişehir arası, 37°15'92"N, 32°07'86"E, 1170 m, 25.V.2005, 2 ♀♀, leg. S. Hazır, Ahırlı-Bozkır arası, 37°15'06"N, 32°09'00"E, 1201 m, 21.V.2007, 3 ♀♀, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E 1159 m, 23.V.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Kırşehir: Mucur, 39°04'01"N, 34°23'10"E, 1015 m, 4.VI.2005, 1 ♂, leg. E. Scheuchl.

***Andrena assimilis* Radoszkowski, 1876**

http://species-id.net/wiki/Andrena_assimilis

Distribution in Turkey. Balıkesir (Ayvalık), Kayseri (Erciyes) (Warncke 1966); Balıkesir (Ayvalık), Diyarbakır, Erzurum (Oltu, Tortum), Kayseri (Erciyes dağı), Malatya (Warncke 1974); Erzurum (Oltu, Tortum) (Özbek 1976).

Material examined. Aydın: Karacasu, Yolaltı-Aşağıgörle arası, 37°34'10"N, 28°39'48"E, 806 m, 24.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Kastamonu: Tosya-İskilip arası, 40°56'18 N", 34°15'10"E, 1507 m, 19.VI.2006, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena atroregularis* Hedicke, 1923**

http://species-id.net/wiki/Andrena_atroregularis

Distribution in Turkey. Ankara (Warncke 1966); Amasya, Ankara, Kahramanmaraş, Karaman (Madenşehir), Konya, Şanlıurfa (Warncke 1974).

Material examined. Aydın: Kuşadası, Davutlar, Ağaçlı köyü, 37°43'95"N, 27°19'08"E, 185 m, 28.V.2005, 5 ♀♀, leg. S. Hazır.

***Andrena cussariensis* Morawitz, 1886**

http://species-id.net/wiki/Andrena_cussariensis

Distribution in Turkey. Erzurum, Hakkari (Yüksekova), Kayseri (Erciyes dağı) (Warncke 1974); Erzincan, Erzurum (Özbek 1976).

Material examined. Sivas: Yıldızeli, 39°53'26"N, 36°34'28"E, 1380 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan.

***Andrena danuvia* Stöckhert, 1950**

http://species-id.net/wiki/Andrena_danuvia

Synonym: *Andrena cineraria* ssp. *danuvia* Stöckhert, 1950

Distribution in Turkey. Amanos dağları, Artvin, Erzurum (Oltu, Tortum), İstanbul (Belgrat ormanı), Karaman (Madenşehir), Kastamonu (Ilgaz dağı), Kayseri (Erciyes dağı), Konya (Beyşehir), Manisa (Kayapınar), Mersin (Sertavul), Trabzon (Hamsiköy, Soğanlı geçiti) (Warncke 1974); Erzurum (Başaklı-Oltu) (Özbek 1976).

Material examined. Aydın: Kuşadası, Dilek yarımadası milli parkı, 37°41'56"N, 27°09'55"E, 0 m, 10.IV.2006, 4 ♀♀, leg. B. Gülcü, C. Çobanoğlu; Manisa: Spil dağı, 38°34'21"N, 27°24'00"E, 972 m, 23.IV.2007, 2 ♀♀, 38°35'15"N, 27°26'16"E, 612 m, 23.IV.2007, 1 ♀, leg. B. Gülcü, C. Hazır.

***Andrena dubiosa* Kohl, 1905**

http://species-id.net/wiki/Andrena_dubiosa

Distribution in Turkey. Amanos dağları, Ankara, Kayseri (Erciyes), Toros dağları (Warncke 1966); Amanos dağları, Ankara, Karaman (Madenşehir) (Warncke 1974).

Material examined. Erzincan: Kemaliye, Osnohot, 39°19'07"N, 38°29'20"E, 1333 m, 5.VII.2005, 1 ♀, Kemaliye, Venk çayı çevresi, 39°17'08"N, 38°31'44"E, 1366 m, 13.VII.2005, 1 ♀, leg. C. Çobanoğlu.

***Andrena fuscocalcarata* Morawitz, 1878**

http://species-id.net/wiki/Andrena_fuscocalcarata

Distribution in Turkey. Ankara, Konya (Beyşehir) (Warncke 1966); Ankara, Erzurum (İspir, Uzungere), Kayseri (Yeşilhisar), Konya (Beyşehir, Karapınar), Mersin (Sertavul geçiti), Niğde (Ulukışla), Sivas (Warncke 1974); Erzurum (İspir, Horasan, Tortum) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi Beytepe kampüsü, 3.VI.2005, 1 ♂, leg. C. Çobanoğlu, 15.VI.2005, 1 ♂, 16.VI.2006, 1 ♀, leg. E. Scheuchl; Çankırı:

Güvem-Çerkeş arası, Yumaklı köyü, 40°42'43"N, 32°46'05"E, 1294 m, 18.VI.2006, 1 ♂, leg. E. Scheuchl; Çorum: 40°34'47"N, 34°38'73"E, 646 m, 17.VI.2005, 1 ♀, leg. A.B. Yasan; Konya: Bozkır-Seydişehir arası, 37°15'92"N, 32°07'86"E, 1170 m, 25.V.2005, 2 ♀♀, leg. E. Scheuchl; Kütahya: Emet-Tavşanlı arası, 39°27'30"N, 29°19'03"E, 881 m, 5.VI.2007, 1 ♀, leg. E. Scheuchl; Yozgat: Pazarcık, 39°47'90"N, 36°00'49"E, 1242 m, 18.VI.2006, 1 ♂, leg. A.B. Yasan.

Andrena limata Smith, 1853

http://species-id.net/wiki/Andrena_limata

Synonym: *Andrena nitida* ssp. *batesiae* Cockerell, 1910

Distribution in Turkey. Adana, Adapazarı, Amasya, Ankara, Balıkesir (Ayvalık), Burdur, Kayseri (Erciyes), Nevşehir (Ürgüp) (Warncke 1966); Aydın (Germencik), İzmir (Ensetepe) (Warncke 1969); Erzurum (Tortum, Oltu-Başaklı) (Özbek 1976).

Material examined. Ankara: Kazan, 15.V.2005, 1 ♀, Hacettepe Üniversitesi Beytepe kampüsü, 27.VI.2005, 1 ♂, leg. E. Scheuchl, Kızılıcahamam, kurtboğazı, 40°16'28"N, 32°41'19"E, 1003 m, 7.VII.2005, 1 ♀, leg. B. Gülcü; Antalya: Olympos çevresi, 36°24'42"N, 30°25'48"E, 312 m, 13.IV.2006, 1 ♀, 36°32'52"N, 30°26'57"E, 30 m, 13.IV.2006, 2 ♀♀, Haciobası-Akseki arası, 36°44'01"N, 31°36'10"E, 17 m, 14.IV.2006, 3 ♀♀, leg. B. Gülcü, C. Çobanoğlu; Aydın: Bahçearası çevresi, 16.IV.2005, 1 ♀, leg. B. Gülcü, S. Hazır, Tire çevresi, 10.IV.2006, 2 ♂♂, leg. B. Gülcü, Kuşadası, 29.VI.2006, 2 ♀♀, leg. E. Scheuchl, Karacasu, Yukarıgörle-Karabağlar arası, 37°33'21"N, 28°37'45"E, 554 m, 24.IV.2007, 2 ♀♀, Karacasu, Yazır-Bingöl arası, 37°38'05"N, 28°39'03"E, 860 m, 24.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Bolu: Bolu'ya 8 km kala, 10.VII.2004, 1 ♀, leg. S. Hazır; Denizli: Denizli-Serinhisar arası, 37°42'38"N, 29°12'17"E, 697 m, 12.IV.2006, 1 ♀, leg. B. Gülcü, C. Çobanoğlu; Erzurum: İspir, 40°27'56"N, 40°58'27"E, 1176 m, 13.VIII.2005, 1 ♂, leg. B. Gülcü, S. Hazır, İspir-Bayburt arası, 40°26'29"N, 40°49'26"E, 1258 m, 2.VII.2006, 7 ♀♀, leg. B. Gülcü, E. Scheuchl; Manisa: Salihli, 16.VII.2005, 2 ♀♀, leg. B. Gülcü, S. Hazır; Muğla: Dalyan, Gökbelen, 36°47'31"N, 28°39'88"E, 0 m, 26.V.2005, 1 ♀, leg. S. Hazır; Uşak: Uşak-Afyon yolu, Büyük Oturak kasabası, 16.VII.2005, 2 ♀♀, leg. B. Gülcü, S. Hazır.

Andrena morio Brullé, 1832

http://species-id.net/wiki/Andrena_morio

Distribution in Turkey. Adapazarı, Amanos dağları, Ankara, Aydın (Kuşadası), Balıkesir (Ayvalık), Eskişehir, İzmir, Konya (Beyşehir) (Warncke 1966); All regions of the country (Warncke 1974); Aydın (Kuşadası), Toros dağları (Warncke 1969); Erzurum (Oltu-Başaklı, Tortum) (Özbek 1976).

Material examined. Ankara: Bala, 39°32'42"N, 33°10'22"E, 961 m, 4.VI.2005, 1 ♀, leg. B. Gülcü, S.Hazır; Antalya: Olympos çevresi, 36°32'52"N, 30°26'57"E, 30 m, 13.IV.2006, 2 ♀♀, leg. B. Gülcü, C. Çobanoğlu; Aydın: Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 1.III.2006, 2 ♂♂, 17.III.2006, 1 ♀, 21.III.2006, 1 ♂, 31.III.2006, 1 ♀, leg. B. Gülcü, S. Aydın, Kuşadası, Dilek yarımadası milli parkı, 37°41'56"N, 27°09'55"E, 0 m, 10.IV.2006, 2 ♀♀, Bafa Gölü çevresi, 37°28'25"N, 27°25'17"E, 11 m, 11.IV.2006, 1 ♀, leg. B. Gülcü, C. Çobanoğlu, Karacasu, Yazar-Nargedik arası, 37°40'16"N, 28°38'40"E, 630 m, 24.IV.2006, 1 ♀, Umurlu, 37°51'16"N, 27°58'43"E, 66 m, 30.IV.2006, 1 ♀, Ovacık-Beydağ, Bıçakçı köyü, 38°03'31"N, 28°06'58"E, 799 m, 21.IV.2007, 1 ♂, Sultanhisar-Malgaçmustafa arası, 37°54'56"N, 28°09'58"E, 164 m, 21.IV.2007, 1 ♀, Hamzabali-Çavdar köy arası, 37°47'45"N, 28°07'41"E, 176 m, 22.IV.2007, 1 ♀, Karacasu, Yazar-Bingeş arası, 37°38'05"N, 28°39'03"E, 860 m, 24.IV.2007, 1 ♀, Karacasu, Kemer köyü-Güneyyaka arası, 37°32'19"N, 28°31'15"E, 349 m, 24.IV.2007, 7 ♀♀, leg. B. Gülcü, S.Hazır; Erzurum: İspir-Bayburt arası, 40°26'29"N, 40°49'26"E, 1258 m, 2.VII.2006, 2 ♀♀, leg. B. Gülcü, E. Scheuchl; Kırşehir: Mucur, 39°04'01"N, 34°23'10"E, 1015 m, 4.VI.2005, 1 ♀, 1 ♂, leg. E. Scheuchl; Konya: Tuz Gölü çevresi, 38°44'83 N, 33°03'56 E, 940 m, 19.V.2005, 2 ♂♂, leg. E. Scheuchl, Ahırlı-Bozkır arası, 37°15'06"N, 32°09'00"E, 1201 m, 21.V.2007, 2 ♀♀, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 2 ♀♀, leg. B. Gülcü, S.Hazır; Nevşehir: 38°58'59"N, 34°32'76"E, 1150 m, 4.VI.2005, 1 ♀, leg. E. Scheuchl; Niğde: Gölcük-Çiftlik arası, 38°14'24"N, 34°34'05"E, 1572 m, 20.VI.2006, 3 ♀♀, Sekrin boğazı geçidi, 38°13'42"N, 34°32'35"E, 1657 m, 20.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl.

Andrena nigroaenea ssp. *candiae* Strand, 1915

Distribution in Turkey. All regions of the country (Warncke 1974); Erzurum (Oltu 1976).

Material examined. Ankara: Hacettepe Üniversitesi Beytepe kampüsü, 27.VI.2005, 2 ♀♀, 29.VI.2005, 2 ♀♀ 1 ♂, leg. E. Scheuchl, 24.III.2006, 4 ♂♂, leg. C. Çobanoğlu, 12.III.2008, 1 ♂, leg. E. Aytekin, Emirdağ, 40°09'14"N, 32°38'12"E, 854 m, 17.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl, Güvem-Cerkes arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 1 ♀, Kızılıcahamam-Güvem arası, 40°34'05"N, 32°39'23"E, 1070 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Antalya: Manavgat-Alanya arası, 36°44'57"N, 31°30'31"E, 6 m, 13.IV.2006, 1 ♀, Hacıobası-Akseki arası, 36°44'01"N, 31°36'10"E, 17 m, 14.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü, Seki-Elmalı arası, 36°49'45"N, 29°45'36"E, 1434 m, 6.VI.2006, 2 ♀♀, leg. C. Çobanoğlu, E. Scheuchl; Aydın: Kuşadası, Dilek yarımadası milli parkı, 18.IV.2005, 1 ♀, leg. B. Gülcü, Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 1.III.2006, 1 ♀, leg. B. Gülcü, S. Aydın, Kuşadası, Dilek yarımadası milli parkı, 37°41'56"N, 27°09'55"E, 0 m, 10.IV.2006, 1 ♂, leg. C. Çobanoğlu, B. Gülcü, Akçaköy-Çayır arası, 37°58'49"N, 28°00'42"E, 711 m, 28.V.2006, 2 ♀♀, leg. B. Gülcü, S. Hazır; Kasta-

monu: Kastamonu-Ilgaz arası, Çatören, 41°08'41"N, 33°46'49"E 1163 m, 11.VII.2005, 1 ♀, leg. B. Gülcü, Türbe dağı geçiti, 40°56'14"N, 34°12'33"E, 1625 m, 19.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Kütahya: Emet-Tavşanlı arası, 39°20'16"N, 29°18'22"E, 1047 m, 5.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır; Muğla: Milas-Yatağan arası, Tuzabat, 37°18'46"N, 27°59'88"E, 675 m, 27.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır.

Andrena nitida (Müller, 1776)

http://species-id.net/wiki/Andrena_nitida

Distribution in Turkey. Erzurum (İspir, Kandilli, Ovacık), Gümüşhane (Zigana dağı), Rize (Çayeli, Çinçiva), Trabzon (Soğanlı geçiti), İstanbul (Belgrat ormanı) (Warncke 1974); Erzurum (İspir, Kandilli, Ovacık) (Özbek 1976).

Material examined. Ankara: Çamlıdere-Elmalı arası, 40°25'51"N, 32°28'01"E, 1278 m, 17.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl.

Andrena nitidemula Scheuchl & Hazır, 2012

http://species-id.net/wiki/Andrena_nitudemula

Distribution in Turkey. Ankara (Çamlıdere), Burdur, Hakkari, Konya, Mersin (Limonlu, Mut), Sivas (Scheuchl and Hazır 2012).

Material examined. Ankara: Çamlıdere çevresi, 40°25'51"N, 32°28'01"E, 1278 m, 17.VI.2006, 1 ♀, leg. E. Scheuchl, 40°27'10"N, 32°28'33"E, 1150 m, 17.VI.2006, 1 ♀, leg. E. Scheuchl, Yeşilköy-Kızılıcahamam arası, 40°24'15"N, 32°33'38"E, 1328 m, 17.VI.2006, 1 ♂, leg. E. Scheuchl; Burdur: Gölhisar-Altınyayla arası, 37°02'31"N, 29°32'15"E, 1330 m, 6.VI.2006, 1 ♀, leg. E. Scheuchl; Konya: Görmeli çevresi, Toros dağları, 34°31'47"N, 33°59'63"E, 1400 m, 24.V.2005, 1 ♀, leg. S. Hazır; Mersin: Limonlu, 36°33'52"N, 34°13'02"E, 140 m, 23.V.2005, 7 ♀♀, leg. S. Hazır, 2 ♀♀, leg. E. Scheuchl, Gülnar-Ermenek arası, 36°21'38"N, 33°18'84"E, 1075 m, 24.V.2005, 1 ♀, leg. E. Scheuchl; Sivas: Koyulhisar-Mesudiye arası, 40°23'15"N, 37°46'36"E, 12.VIII.2005, 1542 m, 1 ♀, leg. S. Hazır, B. Gülcü.

Andrena pyropygia Kriechbaumer, 1873

http://species-id.net/wiki/Andrena_pyropygia

Distribution in Turkey. Amanos dağları, Amasya, Bursa, Toros dağları (Warncke 1966); Aydın (Kuşadası) (Warncke 1969).

Material examined. Aydın: Davutlar, Ağaçlı köyü, 37°43'99"N, 27°18'80"E, 185 m, 27.V.2005, 1 ♀, leg. E. Scheuchl, Kuşadası, 27.VI.2006, 1 ♀, leg. E. Scheuchl; Çorum: Bayat, 40°35'61"N, 34°18'54"E, 619 m, 17.VI.2005, 1 ♀, 40°37'10"N, 34°17'80"E, 648 m, 17.VI.2005, 2 ♀♀, leg. A.B. Yasan; Mersin: Gülnar, 36°20'40"N, 33°28'77"E, 1140 m, 24.V.2005, 1 ♀, leg. S. Hazır.

***Andrena thoracica* (Fabricius, 1775)**

http://species-id.net/wiki/Andrena_thoracica

Synonym: *Andrena thoracica* ssp. *kotschyi* Mavromoustakis, 1953

Distribution in Turkey. Amanos dağları, Amasya, Balıkesir (Ayvalık), Eskişehir (Sivrihisar), İstanbul, Manisa, (Warncke 1966); İşık dağları (Warncke 1969); Erzurum (Oltu-Başaklı) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 15.VI.2006, 1 ♀, leg. E. Scheuchl; Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E 176 m, 21.II.2006, 1 ♀, leg. B. Gülcü, S. Hazır, 1.III.2006, 1 ♀, leg. B. Gülcü, S. Aydın; Erzurum: İspir-Bayburt arası, 40°26'29"N, 40°49'26"E, 1258 m, 2.VII.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Muğla: Yatağan, 37°12'54"N, 28°20'10"E, 625 m, 26.V.2005, 1 ♀, leg. E. Scheuchl; Sivas: Koyulhisar-Mesudiye arası, 40°23'15"N, 37°46'36"E, 1542 m, 12.VIII.2005, 1 ♀, leg. B. Gülcü, S. Hazır.

Subgenus *Melittoides* Friese, 1921***Andrena curiosa* (Morawitz, 1877)**

http://species-id.net/wiki/Andrena_curiosa

Distribution in Turkey. Erzurum (Horasan, İspir, Kandilli, Tatos dağları, Tortum), Hatay (Amanos dağları), İzmir, Karaman (Madenşehir), Konya (Warncke 1974); Erzurum (Aşkale, Horasan, İspir, Tortum) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 18.V.2005, 2 ♂♂, 29.V.2005, 1 ♂, 3.VI.2005, 1 ♀, 1 ♂, leg. E. Scheuchl; Konya: Karapınar yolu, 37°57'06"N, 33°37'19"E, 1070 m, 19.V.2005, 1 ♂, leg. E. Scheuchl, Bozkır-Seydişehir arası, 37°15'92"N, 32°07'86"E, 1170 m, 25.V.2005, 1 ♀, leg. E. Scheuchl.

Subgenus *Micrandrena* Ashmead, 1899***Andrena alfkenelloides* Warncke, 1965**

http://species-id.net/wiki/Andrena_alfkenelloides

Synonym: *Andrena alfkenelloides* ssp. *alfkenelloides* Warncke, 1965; *Andrena alfkenelloides* ssp. *cardalia* Warncke, 1975

Distribution in Turkey. Ankara, Antalya (Akseki, Side), Denizli (Çardak), Mersin (Gülek) Nevşehir (Ürgüp), Niğde (Çiftehan), Tunceli (Warncke 1974); Tunceli (Özbek 1976).

Material examined. Aydın: Akçaköy-Ödemiş arası, 37°58'49"N, 28°00'42"E, 711 m, 28.V.2006, 1 ♀, leg. E. Scheuchl; Burdur: Çavdır-Söğüt arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 1 ♀, leg. E. Scheuchl; Mersin: Yastıbağı, 36°38'55"N, 34°01'16"E, 1030 m, 23.V.2005, 1 ♀, leg. E. Scheuchl, Akova, 36°22'98"N, 33°12'23"E, 24.V.2005, 1 ♀, leg. E. Scheuchl.

Andrena enslinella Stöckhert, 1924

http://species-id.net/wiki/Andrena_enslinella

Distribution in Turkey. Ankara, Çorum, İstanbul (Üsküdar), Konya (Akşehir), Mersin (Sertavul), Sivas (Gürün) (Warncke 1974).

Material examined. Ankara: Kazan, 40°11'18"N, 32°40'37"E, 14.V.2005, 1 ♀, 1 ♂, leg. E. Scheuchl, Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 15.V.2005, 1 ♀, 2 ♂♂, 7.VI.2005, 2 ♀♀, leg. E. Scheuchl; Isparta: Gelendost, 38°04'08"N, 30°58'70"E, 940 m, 25.V.2005, 1 ♀, leg. E. Scheuchl.

Andrena magunta Warncke, 1965

http://species-id.net/wiki/Andrena_magunta

Distribution in Turkey. Adana, Amanos dağları, Balıkesir (Ayvalık), Kayseri (Erciyes) (Warncke 1966); Adana, Ağrı (Ararat), Amanos dağları, Ankara, Antalya (Akseki), Balikesir (Ayvalık), Erzurum (Horasan, İspir, Tortum), Gümüşhane, Hatay (Antakya), Kayseri (Erciyes dağı), Konya, Mersin (Namrun, Sertavul), Nevşehir (Ürgüp), Niğde (Ulukışla), Sivas (Gürün) (Warncke 1974); Erzurum (Horasan, İspir, Tortum) (Özbek 1976).

Material examined. Ankara: Çamlıdere çevresi, 40°25'51"N, 32°28'01"E, 1278 m, 17.VI.2006, 1 ♀, leg. E. Scheuchl; Aydın: AYTEPE, Adnan Menderes Üniversitesi Kampüsü, 37°51'07"N, 27°51'24"E, 159 m, 12.III.2010, 1 ♀, leg. E. Scheuchl; Kütahya: Emet-Tavşanlı arası, 39°20'16"N, 29°18'22"E, 1047 m, 5.VI.2007, 1 ♀, Tavşanlı-Harmancık arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır; Manisa: Demirci, 39°04'48"N, 28°43'36"E, 1260 m, 4.VI.2007, 2 ♀♀, leg. E. Scheuchl; Muğla: Milas-Yatağan arası, 37°18'46"N, 27°59'88"E, 675 m, 27.V.2007, 1 ♀, leg. E. Scheuchl.

Andrena oenas Warncke, 1975

http://species-id.net/wiki/Andrena_oenas

Distribution in Turkey. Ankara, Erzurum (Horasan), Konya (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 29.V.2005, 2 ♀♀, leg. E. Scheuchl.

***Andrena stoeckhertella* Pittioni, 1948**

http://species-id.net/wiki/Andrena_stoeckhertella

Distribution in Turkey. Ankara, Konya (Warncke 1974).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 15.V.2005, 1 ♀, leg. E. Scheuchl; Mersin: Esenpınar, 36°35'79"N, 34°02'70"E, 970 m, 23.V.2005, 1 ♀, leg. E. Scheuchl.

***Andrena tringa* Warncke, 1973**

http://species-id.net/wiki/Andrena_tringa

Distribution in Turkey. Ankara (Şereflikoçhisar), Ardahan, Burdur, Erzurum (Oltu), Kayseri (Yeşilhisar), Konya (Sarayönü), Nevşehir (Ürgüp) (Warncke 1974); Ardahan, Erzurum (Oltu, Tortum), Kars (Özbek 1976).

Material examined. Ankara: Kazan, 40°11'18"N, 32°40'37"E, 14.V.2005, 2 ♀♀, leg. E. Scheuchl; Kırşehir: 39°10'72"N, 34°09'08"E, 1010 m, 4.V.2005, 1 ♀, leg. E. Scheuchl.

***Andrena virgata* Warncke, 1975**

http://species-id.net/wiki/Andrena_virgata

Distribution in Turkey. Ağrı (Ararat), Ankara, Erzurum (Horasan) (Warncke 1974); Ağrı (Doğubayazıt), Erzurum (Horasan) (Özbek 1976).

Material examined. Antalya: Manavgat, Başlar köyü-Ormana arası, 37°07'80"N, 31°30'92"E, 1063 m, 21.V.2007, 1 ♀, leg. E. Scheuchl; Aydın: Ovacık-Beydağ arası, 38°03'31"N, 28°06'58"E, 799 m, 21.IV.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Manisa: Spil dağı milli parkı, 38°35'15"N, 27°26'16"E, 612 m, 23.IV.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Mersin: Şahmurlu köyü, 36°38'58"N, 34°01'23"E, 970 m, 23.V.2005, 1 ♀, leg. E. Scheuchl; Gülnar çevresi, Pinus ormanı, 36°20'40"N, 33°28'77"E, 1140 m, 24.V.2005, 1 ♀, leg. E. Scheuchl.

Subgenus *Nobandrena* Warncke, 1968***Andrena anatolica* Alfken, 1935**

http://species-id.net/wiki/Andrena_anatolica

Distribution in Turkey. Ankara, Eskişehir, Konya, Mersin (Mut) (Warncke 1966); Ankara, Erzurum (Horasan), Eskişehir, Karaman (Madenşehir), Konya (Eregli), Mersin (Mut), Sivas (Gürün) (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 29.V.2005, 1 ♂, leg. E. Scheuchl, 3.VI.2005, 1 ♀, leg. C. Çobanoğlu, Kızılıcahamam-Güvem arası, 40°34'05"N, 32°39'23"E, 1070 m,

18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Karaman: Gölcük-Ermenek arası, $36^{\circ}38'95"N$, $32^{\circ}41'13"E$, 1616 m, 22.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Kırklareli: Çukurpınar, $41^{\circ}51'41"N$, $27^{\circ}29'72"E$, 409 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Konya: Akören-Seydişehir arası, $37^{\circ}28'22"N$, $32^{\circ}20'69"E$, 1159 m, 23.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Kütahya: Emet-Tavşanlı arası, $39^{\circ}20'16"N$, $29^{\circ}18'22"E$, 1047 m, 5.VII.2007, 1 ♀, leg. C. Hazır, S. Hazır; Mersin: Sertaval-Mut arası, $36^{\circ}48'36"N$, $33^{\circ}19'48"E$, 1270 m, 21.V.2005, 1 ♀, leg. S. Hazır; Muğla: Marmaris yolu, $37^{\circ}11'33"N$, $28^{\circ}21'82"E$, 620 m, 27.V.2007, 2 ♀♀, leg. B. Gülcü; Nevşehir: $38^{\circ}58'59"N$, $34^{\circ}32'76"E$, 1150 m, 4.VI.2005, 1 ♀, leg. E. Scheuchl.

Andrena athenensis Warncke, 1965

http://species-id.net/wiki/Andrena_athenensis

Distribution in Turkey. Erzurum (Horasan), Konya (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Afyon: Köroğlu dağ geçiti, $38^{\circ}55'20"N$, $30^{\circ}53'40"E$, 1295 m, 21.VI.2006, 2 ♀♀, 1 ♂, leg. E. Scheuchl; Burdur: Gölhisar-Altınyayla arası, $37^{\circ}05'34"N$, $29^{\circ}31'51"E$, 977 m, 6.VI.2006, 1 ♀, Söğüt-Çavdır arası, $37^{\circ}06'36"N$, $29^{\circ}44'00"E$, 1116 m, 6.VI.2006, 1 ♀, 1 ♂, $37^{\circ}08'05"N$, $29^{\circ}41'18"E$, 1015 m, 6.VI.2006, 2 ♀♀, Yeşilova, $37^{\circ}29'01"N$, $29^{\circ}46'37"E$, 1239 m, 8.VI.2006, 1 ♀, leg. C. Çobanoğlu; Kütahya: Demirci-Simav arası, $39^{\circ}08'00"N$, $28^{\circ}47'26"E$, 686 m, 4.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır, Dereköy, $39^{\circ}11'44"N$, $29^{\circ}17'45"E$, 868 m, 4.VI.2007, 1 ♂, leg. E. Scheuchl.

Andrena flavobila Warncke, 1965

http://species-id.net/wiki/Andrena_flavobila

Synonym: *Andrena flavobila* ssp. *albicilla* Warncke, 1975

Distribution in Turkey. Konya (Sarayönü) (Warncke 1966), Ankara (Şereflikoçhisar), Denizli (Açı göl), Nevşehir (Ürgüp), Niğde (Ulukışla) (Warncke 1974).

Material examined. Ankara: Kazan, 14.V.2005, 1 ♀, leg. E. Scheuchl, Hacettepe Üniversitesi, Beytepe kampüsü, $39^{\circ}51'49"N$, $32^{\circ}45'06"E$, 15.V.2005, 1 ♀, leg. E. Scheuchl; Konya: Tuz Gölü çevresi, $38^{\circ}44'83"N$, $33^{\circ}03'56"E$, 940 m, 19.V.2005, 1 ♀, leg. E. Scheuchl.

Andrena nobilis Morawitz, 1874

http://species-id.net/wiki/Andrena_nobilis

Distribution in Turkey. Aksaray, Ankara, Kayseri, Kırıkkale, Konya (Beyşehir), Toros dağları (Warncke 1966); Adana (Pozantı), Aksaray, Amasya, Ankara, İzmir (Selçuk),

Erzurum (Azort, İspir, Horasan, Tanyeri), Karaman (Madenşehir), Kayseri, Kırıkkale, Konya (Beyşehir), Mersin (Gülek, Sertavul), Nevşehir (Ürgüp) (Warncke 1974); Erzurum (Oltu, Tortum, İspir, Horasan) (Özbek 1976).

Material examined. Aksaray: 38°28'97"N, 33°53'31"E, 977 m, 5.VI.2005, 1♀, leg. B. Gülcü, S. Hazır; Ankara: Karakeçili, 39°35'00"N, 33°24'67"E, 762 m, 4.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır, Beypazarı, Kargı köyü, 9.VI.2005, 1 ♀, leg. E. Aytekin; Aydın: Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 19.IV.2007, 1 ♂, Ovacık, 38°01'18"N, 28°10'75"E, 1292 m, 24.VI.2008, 7 ♀♀, Uzunlar-Ovacık arası, 38°00'86"N, 28°10'80"E, 1300 m, 24.VI.2008, 6 ♀♀, leg. B. Gülcü, S. Hazır; Burdur: Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 2 ♀♀, Tefenni, 37°16'10"N, 29°52'44"E, 1150 m, 8.VI.2006, 1 ♀, 37°20'40"N, 29°48'24"E 1132 m, 8.VI.2006, 1 ♀ leg. C. Çobanoğlu, E. Scheuchl; Çorum: Bayat, 40°40'06"N, 34°27'19"E, 715 m, 17.VI.2005, 2 ♀♀, leg. S. Hazır, B. Gülcü; İzmir: Ödemiş-Bozdağ arası, 38°17'45"N, 28°03'56"E, 1018 m, 28.V.2006, 1 ♀, leg. B. Gülcü, S. Hazır; Karaman: Göktepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Konya: Seydişehir-Bozkır arası, 37°23'56"N, 32°01'06"E, 1097 m, 21.V.2007, 1 ♀, Akören, 37°31'22"N, 32°38'71"E, 1030 m, 23.V.2007, 3 ♀♀, leg. B. Gülcü, S. Hazır; Kütahya: Gediz-Hisarcık arası, 39°07'55"N, 29°21'05"E, 1009 m, 4.VI.2007, 1 ♀, leg. E. Scheuchl; Nevşehir: Gülhisar, 38°43'42"N, 34°41'00"E, 1011 m, 4.VI.2005, 5 ♂♂, leg. B. Gülcü, S. Hazır; Yozgat: 39°40'86"N, 35°45'89"E, 1254 m, 18.VI.2005, 2 ♀♀, leg. S. Hazır, B. Gülcü.

Andrena probata Warncke, 1973

http://species-id.net/wiki/Andrena_probata

Distribution in Turkey. Erzurum (Warncke 1974; Özbek 1976).

Material examined. Ankara: Kızılcahamam-Güvem arası, 40°34'05"N, 32°39'23"E, 1070 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Bursa: Uludağ, Soğuk Pınar yolu, 40°03'84"N, 29°07'11"E, 1029 m, 3.VI.2009, 2 ♂♂, leg. B. Gülcü, C. Demirtaş; Karaman: Göktepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 1 ♂, leg. B. Gülcü, S. Hazır; Kayseri: Erciyes-Develi arası, 38°29'00"N, 35°30'45"E, 2002 m, 20.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl.

Subgenus *Notandrena* Pérez, 1890

Andrena erythrocnemis Morawitz, 1870

http://species-id.net/wiki/Andrena_erythrocnemis

Distribution in Turkey. Antalya (Finike), İzmir (Selçuk), Muğla (Marmaris), Samsun (Warncke 1974).

Material examined. Kırklareli: Sarpdere çıkışı mağara yolu, 41°51'92"N, 27°34'93"E, 390 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Samsun: Samsun-Ankara arası, 41°05'24"N, 36°05'04"E, 728 m, 3.VII.2006, 1 ♀, leg. E. Scheuchl.

Andrena fulvicornis (Schenck, 1853)

http://species-id.net/wiki/Andrena_fulvicornis

Synonym: *Andrena nitidiuscula* sensu Warncke 1974 partim, nec Schenck 1853

Distribution in Turkey. Antalya, Erzurum, Hakkari (Schmid-Egger and Doczkal 1995); Erzurum (Schwenninger 2013).

Material examined. Adana: Ceyhan, 23.IV.2005, 2 ♀♀, Misis-Ceyhan arası, 23.IV.2005, 7 ♀♀, leg. S. Hazır; Ankara: Kazan, 15.V.2005, 1 ♀, leg. S. Hazır; Burdur: Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 1 ♀, Tefenni, 37°20'40"N, 29°48'24"E, 1132 m, 8.VI.2006, 2 ♀♀, Yeşilova, 37°29'01"N, 29°46'37"E, 1239 m, 8.VI.2006, 5 ♀♀, leg. C. Çobanoğlu, E. Scheuchl; Isparta: Gelençost, 38°06'82"N, 31°01'45"E, 960 m, 25.V.2005, 1 ♀, leg. S. Hazır; Mersin: Gülnar, 36°20'84"N, 33°37'58"E, 1010 m, 24.V.2005, 1 ♀, leg. S. Hazır; Samsun: Samsun-Ankara arası, 41°05'24"N, 36°05'04"E, 728 m, 3.VII.2006, 2 ♀♀, leg. E. Scheuchl.

Andrena langadensis ssp. *clanga* Warncke, 1965

Distribution in Turkey. Adana (Ceyhan, Kadırli) (Warncke 1966); Adana (Ceyhan, Kadırli, Karataş), İzmir (Selçuk), Mersin (Tarsus) (Warncke 1974).

Material examined. Ankara: Kazan, 40°11'18"N, 32°40'37"E, 14.V.2005, 2 ♀♀, leg. E. Scheuchl; Kırıkkale: 39°55'25"N, 33°59'05"E, 1165 m, 18.VI.2005, 5 ♀♀, leg. A.B. Yasan.

Andrena recurvirostra Warncke, 1975

http://species-id.net/wiki/Andrena_recurvirostra

Distribution in Turkey. Konya (Beyşehir), Muş, Şanlıurfa (Warncke 1974); Konya (Beyşehir) (Warncke 1975); Erzurum (Oltu), Muş (Özbek 1976).

Material examined. Ankara: Kazan, 40°09'14"N, 32°38'12"E, 14.V.2005, 1 ♀, leg. E. Scheuchl; Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 180 m, 4.VI.2006, 1 ♀, leg. E. Scheuchl; Konya: Bozkır-Yalnızca arası, 37°09'58"N, 32°15'75"E, 1464 m, 21.V.2007, 2 ♂♂, leg. B. Gülcü, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♀, Seydişehir-Beyşehir arası, 37°32'18"N, 31°48'36"E, 1166 m, 23.V.2007, 1 ♀, 3 ♂♂, leg. B. Gülcü, S. Hazır.

***Andrena selcuki* Scheuchl & Hazir, 2008**

http://species-id.net/wiki/Andrena_selcuki

Distribution in Turkey. Konya (Kulu) (Scheuchl and Hazir 2008).

Material examined. Konya, Kulu, 38°54'98"N, 32°59'56"E, 1145 m, 19.V.2005, 2 ♂♂, leg. E. Scheuchl.

***Andrena stellaris* Warncke, 1965**

http://species-id.net/wiki/Andrena_stellaris

Distribution in Turkey. Aksaray (Warncke 1966); Aksaray, Nevşehir (Ürgüp), Niğde, Kayseri (Yeşilhisar, Sultanhanı) (Warncke 1974).

Material examined. Kırıkkale: 39°55'25"N, 33°59'05"E, 1165 m, 18.VI.2005, 2 ♀♀, leg. A.B. Yasan.

***Andrena ungeri* Mavromoustakis, 1952**

http://species-id.net/wiki/Andrena_ungeri

Distribution in Turkey. Adana (Ceyhan, Kadirli), Hatay (Warncke 1966).

Material examined. Adana: Pozantı otoban çevresi, 25.IV.2004, 1 ♀, leg. C. Çobanoğlu, Ceyhan, 23.IV.2005, 2 ♀♀, Misis-Ceyhan arası, 23.IV.2005, 1 ♀, 1 ♂, leg. S. Hazır; Aksaray: 38°28'97"N, 33°53'30"E, 975 m, 5.VI.2005, 1 ♂, leg. E. Scheuchl; Amasya: Yeşilöz, 40°33'19"N, 36°08'46"E, 822 m, 17.VI.2005, 1 ♀, leg. B. Gülcü; Aydın: Umurlu, Serçeköy köyü, 37°50'30"N, 27°56'00"E, 32 m, 9.VI.2007, 1 ♀, leg. E. Scheuchl; Burdur: Tefenni, 37°20'40"N, 29°48'24"E, 1132 m, 8.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; 16-05-2006 Hatay: Yayladağı, 35°55'20"N, 36°02'86"E, 437 m, 16.V.2006, 1 ♀, Yayladağı-Leylekli arası, 35°57'79"N, 36°02'88"E, 628 m, 16.V.2006, 2 ♀♀, Altınözü, 36°06'57"N, 36°16'27"E, 204 m, 17.V.2006, 2 ♀♀, leg. C. Çobanoğlu, S. Hazır, Serinyol, 36°22'07"N, 36°11'89"E, 152 m, 4.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır.

Subgenus *Opandrena* Robertson, 1902***Andrena schencki* Morawitz, 1866**

http://species-id.net/wiki/Andrena_schencki

Distribution in Turkey. All regions of the country (Warncke 1974); Erzurum (Oltu, Hınıs, Pasinler, Horasan) (Özbek 1976).

Material examined. Ankara: Çamlıdere, 40°32'42"N, 32°34'19"E, 1190 m, 17.VI.2006, 1 ♀, Kızılcahamam, 40°24'24"N, 32°34'20"E, 1317 m, 17.VI.2006, 1 ♀, Kurtboğazı barajı çevresi, 40°16'28"N, 32°41'19"E, 1014 m, 17.VI.2006, 2 ♀♀,

Şabanözü-Çankırı arası, 40°30'23"N, 33°24'54"E, 1487 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Antalya: Korkuteli-Tefenni arası, 37°09'30"N, 30°01'53"E, 1445 m, 8.VI.2006, 1 ♀, leg. C. Cobanoğlu, E. Scheuchl, Taşağıl, Beydiğin köyü, 37°00'54"N, 31°22'74"E, 250 m, 20.V.2007, 7 ♀♀, leg. B. Gülcü, C. Hazır; Aydın: Madran dağı, 37°39'12"N, 28°11'51"E, 1546 m, 17.V.2007, 1 ♂, leg. B. Gülcü; Balıkesir: Kazdağları, Küçükkuyu-Kırıcı yolu, 39°36'01"N, 26°34'51"E, 477 m, 30.V.2009, 2 ♀♀, leg. B. Gülcü, C. Demirtaş; Çankırı: Saçakbeli dağ geçiti, 40°41'53"N, 33°00'46"E, 1473 m, 18.VI.2006, 2 ♀♀, 1 ♂, leg. E. Scheuchl; Çorum: 40°34'82"N, 34°45'08"E, 1167 m, 17.VI.2005, 1 ♀, leg. A.B. Yasan; Konya: Kulu, 38°54'98"N, 32°59'56"E, 1145 m, 19.V.2005, 1 ♀, leg. E. Scheuchl, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 2 ♀♀, leg. B. Gülcü; Mersin: Gülnar-Ermenek arası, Toros dağları, 24.V.2005, 1 ♀, leg. E. Scheuchl; Kütahya: Simav-Saphane arası, 39°03'06"N, 29°06'02"E, 966 m, 4.VI.2007, 1 ♂, leg. E. Scheuchl; Emet-Tavşanlı arası, 39°27'30"N, 29°19'03"E, 881 m, 5.VI.2007, 2 ♀♀, 1 ♂, leg. E. Scheuchl.

Subgenus *Orandrena* Warncke, 1968

***Andrena acrana* Warncke, 1967**

http://species-id.net/wiki/Andrena_acrana

Distribution in Turkey. Aksaray, Ankara (Gölbaşı, Şereflikoçhisar), Erzurum, Kayseri (Yeşilhisar), Nevşehir (Ürgüp), Niğde (Ulukışla), Konya (Sarayönü) (Warncke 1974); Erzurum (Özbek 1976).

Material examined. Aksaray: 38°28'97"N, 33°53'30"E, 975 m, 5.VI.2005, 1 ♀, leg. E. Scheuchl; Ankara: Kazan, 15.V.2005, 1 ♀, leg. S. Hazır, 1 ♀, leg. E. Scheuchl, Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 11.V.2005, 1 ♂, 29.V.2005, 1 ♀, leg. E. Scheuchl; Konya: Eskil-Karapınar çevresi, 38°08'18"N, 33°30'49"E, 900 m, 19.V.2005, 1 ♀, leg. E. Scheuchl, Kulu-Cihanbeyli arası, 38°41'74"N, 32°55'32"E, 986 m, 19.V.2005, 1 ♀, leg. S. Hazır, Tuz Gölü çevresi, 38°44'83"N, 33°03'56"E, 940 m, 19.V.2005, 1 ♂, leg. E. Scheuchl.

***Andrena garrula* Warncke, 1965**

http://species-id.net/wiki/Andrena_garrula

Distribution in Turkey. Ankara (Şereflikoçhisar), Edirne, Kayseri (Yeşilhisar), Konya (Sarayönü), Nevşehir (Ürgüp), Muş (Warncke 1974); Erzurum (Oltu), Muş (Özbek 1976); Konya (Sarayönü) (Blank and Kraus 1994).

Material examined. Aksaray: 38°37'29"N, 33°45'21"E, 921 m, 3.V.2007, 6 ♀♀, leg. B. Gülcü, C. Hazır; Ankara: Kazan, 15.V.2005, 1 ♀, leg. S. Hazır, 1 ♀, leg. E. Scheuchl, Hacettepe Üniversitesi Beytepe kampüsü, 21.IV.2006, 3 ♀♀, leg. C. Cobanoğlu; Antalya: Bozova, 37°12'02"N, 30°15'58"E, 935 m, 26.IV.2011, 1 ♀, leg. E. Scheuchl.

***Andrena oralis* Morawitz, 1876**

http://species-id.net/wiki/Andrena_oralis

Distribution in Turkey. Amasya, Ankara (Elmadağı) (Warncke 1974).

Material examined. Kayseri: Kayseri-Erciyes arası, 38°36'57"N, 35°30'48"E, 1680 m, 20.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl.

***Andrena platalea* Warncke, 1975**

http://species-id.net/wiki/Andrena_platalea

Distribution in Turkey. Erzurum, Niğde (Ulukişla), Sivas (Gürün) (Warncke 1974); Erzurum (Özbek 1976).

Material examined. Antalya: Korkuteli-Tefenni arası, 37°08'14"N, 30°03'51"E, 1353 m, 8.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Konya: Eskil-Karapınar çevresi, 38°08' 18 N, 33°30' 49 E, 900 m, 19.V.2005, 1 ♀, leg. E. Scheuchl.

Subgenus *Oreomelissa* Hirashima & Tadauchi, 1975***Andrena coitana* ssp. *xema* Warncke, 1975**

Distribution in Turkey. Bayburt, Erzurum (Tatos dağları 1600 m), Gümüşhane (Zigana dağı), Rize (İkizdere, 2100 m) (Warncke 1974); Bayburt, Erzurum (İspir) (Özbek 1976); Rize (İkizdere) (Blank and Kraus 1994).

Material examined. Rize: İspir yolu, Sivrikaya köyü, 40°40'32"N, 40°42'33"E, 1860 m, 2.VII.2006, 1 ♀, 1 ♂, leg. C. Çobanoğlu.

Subgenus *Pallandrena* Warncke, 1968***Andrena korbella* Grünwaldt, 2005**

http://species-id.net/wiki/Andrena_korbella

Distribution in Turkey. Ağrı, Erzincan, Erzurum, Hakkari (Grünwaldt et al. 2005).

Material examined. Adana: Saimbeyli çevresi, 38°04'15"N, 36°08'52"E, 1470 m, 6.V.2007, 3 ♂♂ leg. S. Hazır, B. Gülcü, Pınarlar-Saimbeyli arası, 38°07'31"N, 36°10'00"E, 1440 m, 6.V.2007, 3 ♀♀, leg. S. Hazır, B. Gülcü.

Subgenus *Parandrenella* Popov, 1958***Andrena crispa* Warncke, 1975**

http://species-id.net/wiki/Andrena_crispa

Distribution in Turkey. Erzurum (Horasan) (Warncke 1974; Özbek 1976; Blank and Kraus 1994).

Material examined. Ankara: Çamlıdere, 40°32'42"N, 32°34'19"E, 17.VI.2006, 1190 m, 1 ♀, Çamlıdere-Elmalı arası, 40°27'10"N, 32°28'33"E, 1150 m, 17.VI.2006, 1 ♀, Peçenek-Çamlıdere arası, 40°27'21"N, 32°25'21"E, 1144 m, 17.VI.2006, 7 ♀♀, Kızılcahamam-Gerede arası, 40°32'17"N, 32°36'33"E, 1001 m, 17.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Bursa: Uludağ, Soğuk Pınar-Keleş yolu, 40°01'74"N, 29°07'44"E, 798 m, 3.VI.2009, 1 ♀, 1 ♂, leg. B. Gülcü, C. Demirtaş; Kayseri: Kayseri-Erciyes arası, 38°36'57"N, 35°30'48"E, 1680 m, 20.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Kütahya: Tavşanlı-Harmancık arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır.

***Andrena dentiventris* Morawitz, 1873**

http://species-id.net/wiki/Andrena_dentiventris

Distribution in Turkey. Aksaray, Konya (Warncke 1966); Aksaray, Ankara (Gölbaşı, Polatlı), Erzurum, Kayseri (Sultanhani, Yeşilhisar), Konya (Sarayönü), Nevşehir (Ürgüp), Niğde (Ulukışla) (Warncke 1974); Erzurum, Muş (Özbek 1976).

Material examined. Antalya: Bozova, 37°12'02"N, 30°15'58"E, 935 m, 26.IV.2011, 2 ♂♂, leg. E. Scheuchl; Konya: Kulu-Cihanbeyli arası, 38°41'74"N, 32°55'32"E, 986 m, 19.V.2005, 2 ♀♀, leg. S. Hazır, Akören, 37°31'22"N, 32°38'71"E, 1030 m, 23.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena figurata* Morawitz, 1866**

http://species-id.net/wiki/Andrena_figurata

Distribution in Turkey. Adapazarı, Ankara, Konya (Warncke 1966); Adapazarı, Ankara (Gölbaşı), Erzurum (Horasan), Kayseri (Yeşilhisar), Konya (Sarayönü), Mersin (Sertavul), Nevşehir (Ürgüp), Niğde (Ulukışla), Sivas (Gürün) (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 3.VI.2005, 2 ♀♀, leg. C. Çobanoğlu; 11.V.2005, 1 ♂, 18.V.2005, 2 ♂♂, leg. E. Scheuchl, Kazan, 40°11'18"N, 32°40'37"E, 14.V.2005, 2 ♂♂, leg. E. Scheuchl; Kırşehir: Kaman çıkışı, 39°22'16"N, 33°47'71"E, 1057 m, 4.VI.2005, 1 ♀, Karakaya köyü, 39°26'34"N, 33°38'72"E, 971 m, 4.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır; Konya: Kulu, 38°54'98"N, 32°59'56"E, 1145 m, 19.V.2005,

1 ♂, leg. E. Scheuchl, Kulu-Cihanbeyli arası: 38°41'74"N, 32°55'32"E, 986 m, 19.V.2005, 1 ♀, Beyşehir, 37°51'35"N, 31°36'19"E, 1140 m, 25.V.2005, 1 ♀, leg. S. Hazır; Mersin: Gülnar-Ermenek arası, 36°21'38"N, 33°18'84"E, 1075 m, 24.V.2005, 1 ♀, E. Scheuchl; Niğde: Ulukışla, 37°32'82"N, 34°31'40"E, 1389 m, 19.V.2006, 1 ♀, leg. C. Çobanoğlu, S. Hazır; Sivas: Yıldızeli, 39°53'26"N, 36°34'28"E, 1380 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan; Yozgat: Ozan köyü, 39°48'82"N, 35°08'42"E, 1166 m, 18.VI.2005, 1 ♀, Pazarcık, 39°47'90"N, 36°00'49"E, 1242 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan.

Subgenus *Plastandrena* Hedicke, 1933

***Andrena bimaculata* (Kirby, 1802)**

http://species-id.net/wiki/Andrena_bimaculata

Distribution in Turkey. Adana, Adapazarı, Balıkesir (Ayvalık), Malatya (Warncke 1966); Erzincan, Erzurum, Muş (Özbek 1976).

Material examined. Ankara: Kurtboğazı-Pazar arası, 40°19'36"N, 32°42'12"E, 993 m, 17.VI.2006, 2 ♀♀, Kurtboğazı barajı çevresi, 40°16'28"N, 32°41'19"E, 1014 m, 17.VI.2006, 1 ♂, Emirdağ, 40°09'14"N, 32°38'12"E 854 m, 17.VI.2006, 1 ♀, Kızılıcahamam-Çerkes arası, 40°31'18"N, 32°38'11"E, 1113 m, 18.VI.2006, 1 ♀, 1 ♂, Şabanözü-Çankırı arası, 40°30'23"N, 33°24'54"E, 1487 m, 18.VI.2006, 1 ♂, leg. B. Gülcü, E. Scheuchl; Aydın: Kuşadası, Dilek yarımadası milli parkı, Jandarma karakolu çevresi, 15.IV.2005, 1 ♂, leg. S. Hazır, Ağaçlı-Davutlar arası, 37°44'00"N, 27°19'17"E, 187 m, 10.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü; Kastamonu: Tosya-İskilip arası, 40°56'18"N, 34°15'10"E, 1507 m, 19.VI.2006, 1 ♀, 40°58'43"N, 34°11'23"E, 1171 m, 19.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Kayseri: Erciyes-Develi arası, 38°29'00"N, 35°30'45"E, 2002 m, 20.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl.

***Andrena pilipes* Fabricius, 1781**

http://species-id.net/wiki/Andrena_pilipes

Synonym: *Andrena carbonaria* (Linné, 1767)

Distribution in Turkey. Denizli (Dazkırı) (Warncke 1969).

Material examined. Adana: Pozanti otoban çevresi, 25.IV.2004, 2 ♀♀, leg. C. Çobanoğlu, Göksun-Tufanbeyli arası, 38°14'76"N, 36°18'22"E, 1449 m, 6.V.2007, 1 ♂, leg. B. Gülcü, C. Hazır; Aksaray: Zengen, 10.V.2004, 2 ♀♀, leg. S. Hazır; Ankara: Kazan, 15.V.2005, 1 ♀, leg. E. Scheuchl, 1 ♀, 1 ♂, leg. S. Hazır; Antalya: Taşağıl-Beşkonak arası, 36°56'53"N, 31°13'00"E, 68 m, 14.IV.2006, 2 ♀♀, leg. C. Çobanoğlu, B. Gülcü; Aydın: Kuşadası, Ağaçlı-Davutlar arası, 37°44'00"N, 27°19'17"E, 187 m, 10.IV.2006, 1 ♂, leg. C. Çobanoğlu, Umurlu, 37°51'16"N, 27°58'43"E, 66 m, 30.IV.2006, 2 ♀♀,

leg. B. Gülcü, S. Hazır, AYTEPE, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 19.IV.2007, 1 ♀, 21.VI.2007, 1 ♀, leg. B. Gülcü, S. Hazır, Sultanhisar-Malgaçmustafa arası, 37°54'56"N, 28°09'58"E, 164 m, 21.IV.2007, 1 ♀, leg. B. Gülcü, Malgaçmustafa-Ovacık arası, 37°59'11"N, 28°10'21"E, 771 m, 21.IV.2007, 1 ♀, leg. S. Hazır, Atça, 37°52'40"N, 28°13'52"E, 52 m, 22.IV.2007, 1 ♀, leg. B. Gülcü, Hamzabaklı-Çavdarköy arası, 37°47'45"N, 28°07'41"E, 176 m, 22.IV.2007, 2 ♀♀, leg. C. Çobanoğlu, B. Gülcü, Karacasu, 37°38'05"N, 28°39'03"E, 860 m, 24.IV.2007, 3 ♀♀, 1 ♂, Karacasu, Güneyyaka köyü, 37°31'01"N, 28°30'45"E, 588 m, 24.IV.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; İzmir: Tire, 10.IV.2006, 2 ♂♂, leg. B. Gülcü; Kırşehir: Karakaya köyü, 39°26'34"N, 33°38'72"E, 971 m, 4.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır; Konya: Tuz gölü çevresi, 38°44'83"N, 33°03'56"E, 940 m, 19.V.2005, 1 ♂, leg. S. Hazır, Seydişehir-Bozkır arası, 37°21'57"N, 32°05'01"E, 1098 m, 21.V.2007, 3 ♀♀, Bozkır-Yalnızca arası, 37°09'58"N, 32°15'75"E, 1464 m, 21.V.2007, 1 ♀, leg. B. Gülcü, Akören, 37°31'22"N, 32°38'71"E, 1030 m, 23.V.2007, 1 ♀, 2 ♂♂, leg. B. Gülcü, S. Hazır; Mersin: Sertavul-Mut arası, 36°48'36"N, 33°19'48"E, 1270 m, 21.V.2005, 1 ♂, leg. S. Hazır; Niğde: Gölcük-Çiftlik arası, 38°14'24"N, 34°34'05"E, 1572 m, 20.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl.

Andrena tibialis (Kirby, 1802)

http://species-id.net/wiki/Andrena_tibialis

Synonym: *Andrena tibialis* ssp. *tibialis* (Kirby, 1802); *Andrena tibialis* ssp. *concreta* Warncke, 1975; *Andrena tibialis* ssp. *porzana* Warncke, 1975

Distribution in Turkey. Amasya (Warncke 1966); Amasya, Ardahan (Warncke 1974); Ardahan (Özbek 1976).

Material examined. Ankara: Kazan, 15.V.2005, 1 ♀, leg. S. Hazır; Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 19.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Denizli: 37°50'01"N, 29°02'51"E, 345 m, 12.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü.

Subgenus *Poecilandrena* Hedicke, 1933

Andrena crassana Warncke, 1965

http://species-id.net/wiki/Andrena_crassana

Synonym: *Andrena crassana* ssp. *crassana* Warncke, 1965; *Andrena crassana* ssp. *inka* Warncke, 1969

Distribution in Turkey. Antalya (Finike), Bursa (Karacabey), Muğla (Marmaris) (Warncke 1974).

Material examined. Antalya: Taşağıl, Beydiğin çevresi, 37°00'54"N, 31°22'74"E, 250 m, 20.V.2007, 1 ♀, leg. E. Scheuchl; Manavgat, Başlar köyü-Ormana arası, 37°07'80"N, 31°30'92"E, 1063 m, 21.V.2007, 1 ♀, leg. E. Scheuchl; Hatay: Serinyol, 36°22'07"N, 36°11'89"E, 152 m, 4.V.2007, 2 ♀♀, 36°23'24"N, 36°11'75"E, 261 m, 4.V.2007, 3 ♀♀, leg. B. Gülcü, C. Hazır; Kütahya: Simav-Saphane arası, 39°03'06"N, 29°06'02"E, 966 m, 4.VI.2007, 1 ♀, leg. E. Scheuchl; Muğla: Yatağan, 37°12'54"N, 28°20'10"E, 625 m, 26.V.2005, 1 ♀, leg. S. Hazır.

Andrena efeana Scheuchl & Hazır, 2012

http://species-id.net/wiki/Andrena_efeana

Distribution in Turkey. Aydın (Scheuchl and Hazır 2012).

Material examined. Aydın: Malgaçmustafa-Ovacık arası, 38°01'17' N, 28°09'57' E, 1084 m, 21.IV.2007, 7 ♀♀, 1 ♂, leg. S. Hazır, B. Gülcü.

Andrena hybrida Warncke, 1975

http://species-id.net/wiki/Andrena_hybrida

Distribution in Turkey. Erzurum, Konya, Muş (Warncke 1974); Erzurum, Muş (Özbek 1976); Konya (Blank and Kraus 1994).

Material examined. Aydın: Madran dağı, 37°39'12"N, 28°11'51"E, 1546 m, 17.V.2007, 6 ♀♀, 2 ♂♂, leg. B. Gülcü, S. Hazır; Konya: Eskil-Karapınar arası, 38°08'18"N, 33°30'49"E, 900 m, 19.V.2005, 1 ♀, leg. E. Scheuchl, Kulu-Cihanbeyli arası, 39°40'85"N, 32°55'32"E, 985 m, 19.V.2005, 1 ♀, leg. E. Scheuchl, Karapınar, 38°02'05"N, 33°34'75"E, 945 m, 1 ♀, leg. E. Scheuchl.

Andrena iliaca Warncke, 1969

http://species-id.net/wiki/Andrena_iliaca

Distribution in Turkey. Diyarbakır (Hazır et al. 2012).

Material examined. Diyarbakır: Karacadağ çevresi, 31.V.2005, 1 ♂, leg. B. Gülcü.

Andrena labiata Fabricius, 1781

http://species-id.net/wiki/Andrena_labiata

Synonym: *Andrena labiata* ssp. *labiata* Fabricius, 1781

Distribution in Turkey. Ankara, Osmaniye (Warncke 1974), Erzurum, İğdır (Özbek 1976).

Material examined. Ankara: Güvem-Çerkes arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 3 ♀♀, 1 ♂, leg. B. Gülcü, E. Scheuchl; Karaman: Taşkent 36°53'16"N, 32°31'37"E, 1735 m, 22.V.2007, 1 ♂, leg. B. Gülcü, S. Hazır; Kastamonu: Tosya-İskilip arası, 40°58'43"N, 34°11'23"E, 1171 m, 19.VI.2006, 2 ♀♀, Türbe dağı geçti, 40°56'14"N, 34°12'33"E, 1625 m, 19.VI.2006, 1 ♂, leg. B. Gülcü, E. Scheuchl.

Andrena laticeps Morawitz, 1877

http://species-id.net/wiki/Andrena_laticeps

Distribution in Turkey. Adapazarı, Kayseri, Konya (Warncke 1966); Adapazarı, Erzincan (Refahiye), Kayseri, Konya, Niğde (Ulukışla), Mersin (Sertavul), Sivas (Gürün) (Warncke 1974); Erzincan (Refahiye) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi Beytepe kampüsü, 17.V.2005, 3 ♂♂, leg. C. Çobanoğlu, 27.V.2005, 1 ♂, 29.V.2005, 1 ♀, leg. E. Scheuchl, Güvem-Çerkes arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Karaman: Göktepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 4 ♀♀, 1 ♂, leg. B. Gülcü, S. Hazır, Taşkent çevresi, 36°53'16"N, 32°31'37"E, 1735 m, 22.V.2007, 1 ♂, leg. E. Scheuchl; Kütahya: Emet, 39°20'06"N, 29°18'12"E, 1044 m, 5.VI.2007, 1 ♀, leg. E. Scheuchl; Mersin: Akova, 36°22'98"N, 33°12'23"E, 1215 m, 24.V.2005, 2 ♀♀, leg. E. Scheuchl; Niğde: 37°34'79"N, 34°31'94"E, 1516 m, 19.V.2006, 2 ♀♀, leg. C. Çobanoğlu.

Andrena seminuda Friese, 1896

http://species-id.net/wiki/Andrena_seminuda

Distribution in Turkey. Balıkesir (Bigadiç, Sındırğı), Çorum (İskilip), İstanbul (Üsküdar), Gümüşhane (Zigana köyü), Samsun (Warncke 1974).

Material examined. Ankara: Güvem-Çerkes arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Bursa: Uludağ, Soğuk Pınar yolu, 40°03'84"N, 29°07'11"E, 1029 m, 3.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş.

Andrena semirubra Morawitz, 1875

http://species-id.net/wiki/Andrena_semirubra

Distribution in Turkey. Ankara, Antalya (Akseki), Bursa (Uludağ), Erzincan (Refahiye), Erzurum (Tortum, İspir), Sivas (Gürün) (Warncke 1974); Erzincan (Refahiye), Erzurum (Tortum, İspir) (Özbek 1976).

Material examined. Adana: Göksun-Tufanbeyli arası, 38°14'76"N, 36°18'22"E, 1449 m, 6.V.2007, 1 ♂, leg. B. Gülcü, C. Hazır; Ankara: Hacettepe Üniversitesi

Beytepe kampüsü, 29.V.2005, 1 ♂, leg. E. Scheuchl; Karaman: Göltepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 1 ♀, Taşkent, 36°53'16"N, 32°31'37"E, 1735 m, 22.V.2007, 9 ♀♀, leg. B. Gülcü, S. Hazır; Kastamonu: Türbe dağı geçiti, 40°56'14"N, 34°12'33"E, 1625 m, 19.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Kütahya: Emet, 39°20'06"N, 29°18'12"E, 1044 m, 5.VI.2007, 1 ♀, leg. E. Scheuchl; Niğde: 37°34'79"N, 34°31'94"E, 1516 m, 19.V.2006, 1 ♀, leg. C. Çobanoğlu, S. Hazır.

Subgenus *Poliandrena* Warncke, 1968

***Andrena kriechbaumeri* Schmiedeknecht, 1883**

http://species-id.net/wiki/Andrena_kriechbaumeri

Distribution in Turkey. Amasya, Ankara (Warncke 1974).

Material examined. Ankara: Kızılcahamam-Gerede arası, 40°32'17"N, 32°36'33"E, 1001 m, 17.VI.2006, 1 ♀, leg. C. Çobanoğlu; Antalya: Manavgat, Başlar köyü-Ibradi arası, 37°05'71"N, 31°33'47"E, 1010 m, 21.V.2007, 1 ♂, leg. E. Scheuchl; Balıkesir: Kazdağları, Küçükkyuyu-Kırcı yolu, 39°36'01"N, 26°34'51"E, 477 m, 30.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Kırklareli: Çukurpınar, 41°52'65"N, 27°30'78"E, 369 m, 1.VI.2009, 5 ♀♀, 41°51'41"N, 27°29'72"E 409 m, 1.VI.2009, 4 ♀♀, Sarpdere çıkışı mağara yolu, 41°51'92"N, 27°34'93"E, 390 m, 1.VI.2009, 1 ♀, 1 ♂, Sarpdere, Dupnitsa mağarası yolu, 41°50'71"N, 27°33'57"E, 410 m, 1.VI.2009, 1 ♂, leg. B. Gülcü, C. Demirtaş; Mersin: Gülnar, 36°20'84"N, 33°37'58"E, 1010 m, 24.V.2005, 1 ♂, Silifke-Gülnar arası, 36°22'42"N, 33°46'46"E, 740 m, 24.V.2005, 2 ♀♀, leg. S. Hazır; Muğla: Gökova, Akyaka, 37°03'09"N, 28°18'67"E, 0 m, 26.V.2005, 5 ♀♀, 6 ♂♂, leg. S. Hazır.

***Andrena limbata* Eversmann, 1852**

http://species-id.net/wiki/Andrena_limbata

Distribution in Turkey. Çanakkale, Konya (Beyşehir) (Warncke 1966); Ankara, Çanakkale, Erzurum (Horasan), İstanbul, İzmir, Konya (Beyşehir), Mersin (Mut) (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Ankara: Kızılcahamam-Çerkes arası, 40°31'18"N, 32°38'11"E, 1113 m, 17.VI.2006, 3 ♀♀, leg. B. Gülcü, E. Scheuchl; Aydın: Akçaköy-Ödemiş arası, 37°58'21"N, 28°01'04"E, 627 m, 28.V.2006, 1 ♀, leg. E. Scheuchl; Çankırı: Saçakbeli dağ geçiti, 40°41'53"N, 33°00'46"E, 1473 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Burdur: Dirimli dağ geçiti, 36°57'57"N, 29°34'53"E, 1581 m, 6.VI.2006, 2 ♀♀, leg. C. Çobanoğlu, E. Scheuchl.

***Andrena polita* Smith, 1847**

http://species-id.net/wiki/Andrena_polita

Synonym: *Andrena polita* ssp. *polita* Smith, 1847

Distribution in Turkey. Hatay, Toros dağları (Warncke 1966); Ardahan, Erzincan (Refahiye, Tanyeri), Erzurum (Oltu), Karaman (Madenşehir), Konya, Nevşehir (Ürgüp), Sinop, Sivas (Gürün) (Warncke 1974); Ardahan, Erzincan (Refahiye), Erzurum (Oltu) (Özbek 1976).

Material examined. Ankara: Emirdağ, 40°09'14"N, 32°38'12"E, 854 m, 17.VI.2006, 2 ♀♀, 1 ♂, Kızılıcahamam-Gerede arası, 40°32'17"N, 32°36'33"E, 1001 m, 17.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Antalya: Korkuteli-Tefenni arası, 37°07'42"N, 30°04'28"E, 1234 m, 8.VI.2006, 3 ♀♀, 4 ♂♂, 37°08'08"N, 30°04'07"E, 1325 m, 8.VI.2006, 2 ♀♀, 14 ♂♂, 37°08'14"N, 30°03'51"E, 1353 m, 8.VI.2006, 3 ♀♀, leg. C. Cobanoğlu, E. Scheuchl; Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, 2 ♂♂, 19.IV.2007, 3 ♀♀, leg. B. Gülcü, S. Hazır; Kütahya: Emet-Tavşanlı arası, 39°27'30"N, 29°19'03"E, 881 m, 5.VI.2007, 1 ♂, leg. E. Scheuchl; Yozgat: Ozan köyü, 39°48'82"N, 35°08'42"E, 1166 m, 18.VI.2005, 1 ♂, leg. A.B. Yasan.

***Andrena toelgiana* Friese, 1921**

http://species-id.net/wiki/Andrena_toelgiana

Distribution in Turkey. Amanos dağları, Balıkesir (Ayvalık) (Warncke 1966); Adana (Ceyhan), Amanos dağları, Antalya (Side), Balıkesir (Ayvalık) (Warncke 1974).

Material examined. Adana: Çukurova Üniversitesi, Balcalı kampüsü, 16.VI.2005, 1 ♀, leg. S. Hazır; Aydın: Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'30"N, 27°51'07"E, 182 m, 21.IV.2011, 1 ♀, leg. E. Scheuchl.

***Andrena westensis* Warncke, 1965**

http://species-id.net/wiki/Andrena_westensis

Synonym: *Andrena polita* ssp. *westensis* Warncke, 1965

Distribution in Turkey. Ankara, Antalya (Anamur, Finike), Balıkesir (Bigadiç), Manisa (Kayapınar), Mersin (Gülek) (Warncke 1974).

Material examined. Antalya: İbradı-Akseki arası, 37°03'02"N, 31°43'54"E, 98 m, 21.V.2007, 1 ♂, leg. E. Scheuchl; Aydın: Yılmazköy-Paşayaylası arası, 37°52'49"N, 27°53'57"E, 339 m, 30.IV.2006, 1 ♀, Karacasu, 37°40'16"N, 28°38'49"E 630 m, 24.IV.2007, 1 ♀, 1 ♂, leg. B. Gülcü, S. Hazır.

Subgenus *Proxiandrena* Schmid-Egger, 2005

Andrena alutacea Stöckhert, 1942

http://species-id.net/wiki/Andrena_alutacea

Synonym: *Andrena proxima* sensu Warncke 1974 partim, nec (Kirby 1802)

Distribution in Turkey. Ağrı, Amasya, Erzurum (Horasan), Hakkari, Kars (Karakurt), Konya, Mersin (Mut), Muş, Nevşehir, Sivas (Gürün) (Schmid-Egger 2005).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 29.V.2005, 2 ♀♀, leg. E. Scheuchl, Çamlıdere, 40°32'22"N, 32°30'15"E, 1345 m, 17.VI.2006, 2 ♀♀, leg. E. Scheuchl, Kızılcahamam-Güvem arası, 40°34'05"N, 32°39'23"E, 1070 m, 18.VI.2006, 1 ♀, E. Scheuchl; Aydın: Akçaköy-Ödemiş arası, 37°58'49"N, 28°00'42"E, 711 m, 28.V.2006, 1 ♀, leg. E. Scheuchl; Çankırı: Saçaklıbeli dağ geçidi, 40°41'53"N, 33°00'46"E, 1473 m, 18.VI.2006, 7 ♀♀, leg. E. Scheuchl; Konya: Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♀, leg. E. Scheuchl, Kütahya: Demirci-Simav arası, 39°06'11"N, 28°43'96"E, 1348 m, 4.VI.2007, 1 ♀, leg. E. Scheuchl.

Subgenus *Ptilandrena* Robertson, 1902

Andrena vetula Lepeletier, 1841

http://species-id.net/wiki/Andrena_vetula

Distribution in Turkey. Adana (Karataş), Mersin (Tarsus) (Warncke 1966); Adana (Karataş), Adıyaman (Pınarbaşı), Amasya, Ankara, Erzurum (Narman), Mersin (Gülek, Mut, Namrun, Silifke, Tarsus) (Warncke 1974); Erzurum (Narman, Oltu, Tortum) (Özbek 1976).

Material examined. Adana: Karataş, 22.IV.2005, 3 ♀♀, Misis-Ceyhan arası, 23.IV.2005, 1 ♀, leg. S. Hazır; Ankara: Karakeçili, 39°35'00"N, 33°24'67"E, 760 m, 4.VI.2005, 1 ♀, leg. E. Scheuchl; Çorum: 40°37'10"N, 34°17'80"E, 648 m, 17.VI.2005, 1 ♀, leg. A.B. Yasan; Gaziantep: Nizip-Gaziantep arası, 15.V.2005, 2 ♀♀, leg. B. Gülcü, A.B. Yasan; Hatay: Yayladağı, 35°55'20"N, 36°02'86"E, 437 m, 16.V.2006, 2 ♀♀, Yayladağı, Gözene 36°03'91"N, 36°34'68"E, 211 m, 16.V.2006, 1 ♀, Yayladağı-Leylekli arası, 35°57'79"N, 36°02'88"E, 628 m, 16.V.2006, 5 ♀♀, leg. C. Çobanoğlu, S. Hazır; Belen-Kırıkhan arası, 36°28'85"N, 36°15'88"E, 625 m, 4.V.2007, 10 ♀♀, Serinyol, 36°22'07"N, 36°11'89"E, 152 m, 4.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Mersin: Esenpınar, 36°35'40"N, 34°07'20"E, 810 m, 23.V.2005, 1 ♀, leg. E. Scheuchl, Limonlu, 36°34'54"N, 34°09'29"E, 590 m, 23.V.2005, 2 ♀♀, leg. E. Scheuchl; Osmaniye: Osmaniye-Gaziantep arası, 15.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan; Şanlıurfa: Birecik, Mezra kasabası, 15.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan.

Subgenus *Scitandrena* Warncke, 1968

***Andrena scita* Eversmann, 1852**

http://species-id.net/wiki/Andrena_scita

Distribution in Turkey. Aksaray, Ankara, Çanakkale, Bilecik, Denizli (Pamukkale), Kayseri (Erciyes), Konya (Beyşehir), Toros dağları (Warncke 1966); Erzurum (Oltu, Tortum, İspir, Horasan, Hınıs) (Özbek 1976).

Material examined. Aksaray: Tuz Gölü çevresi, 38°44'56"N, 33°39'85"E, 928 m, 5.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır; Ankara: Hacettepe Üniversitesi Beytepe kampüsü, 3.VI.2005, 1 ♂, leg. E. Scheuchl, Beypazarı, Boztepe köyü, 9.VI.2005, 1 ♀, Beypazarı, Kargı köyü, 9.VI.2005, 1 ♀, leg. E. Aytekin, Kurtboğazı-Pazar arası, 40°19'36"N, 32°42'12"E, 903 m, 17.VI.2006, 3 ♀♀, 1 ♂, leg. B. Gülcü, E. Scheuchl; Antalya: Korkuteli-Elmalı arası, 36°56'39"N, 30°08'20"E, 1335 m, 7.VI.2006, 1 ♂, leg. E. Scheuchl, Korkuteli-Tefenni arası, 37°08'14"N, 30°03'51"E, 1353 m, 8.VI.2006, 1 ♂, leg. E. Scheuchl; Aydın: Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, leg. A.B. Yasan, 19.IV.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır, Ovacık, 38°03'02"N, 28°08'09"E, 1089 m, 24.VI.2008, 2 ♀♀, Uzunlar-Ovacık arası, 37°58'03"N, 28°11'14"E, 912 m, 24.VI.2008, 1 ♀, leg. B. Gülcü, S. Hazır; Balıkesir: Altınoluk, Küçükkyuyu Çetme yolu, 39°34'99"N, 26°36'29"E, 231 m, 30.V.2009, 2 ♂♂, leg. B. Gülcü, C. Demirtaş; Burdur: Gölhisar-Altınyayla arası, 37°05'34"N, 29°31'51"E, 977 m, 6.VI.2006, 1 ♂, Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 2 ♀♀, Tefenni, 37°20'40"N, 29°48'24"E, 1132 m, 8.VI.2006, 1 ♂, leg. C. Çobanoğlu, E. Scheuchl; Çanakkale: Gelibolu yarımadası, Çanakkale şehitlik abidesi yolu, 40°07'49"N, 26°17'75"E, 56 m, 31.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Denizli: 37°56'46"N, 29°06'97"E, 365 m, 28.V.2005, 1 ♀, leg. S. Hazır; Karaman: Başyayla, 36°41'78"N, 32°46'18"E, 1850 m, 24.V.2005, 1 ♀, leg. S. Hazır; Karabük: Yenice, 11.VII.2004, 1 ♀, leg. B. Gülcü, A.B. Yasan; Kırşehir: Mucur, 39°04'01"N, 34°23'10"E, 1015 m, 4.VI.2005, 1 ♂, leg. E. Scheuchl; Kütahya: Dereköy, 39°11'44"N, 29°17'45"E, 868 m, 4.VI.2007, 1 ♂, leg. E. Scheuchl, Emet, 39°20'06"N, 29°18'12"E, 1044 m, 5.VI.2007, 1 ♀, leg. E. Scheuchl; Mersin: Mut-Sertavul arası, 36°47'94"N, 33°20'00"E, 1165 m, 23.V.2007, 3 ♂♂, leg. B. Gülcü; Nevşehir: Gülhisar, 38°43'42"N, 34°41'00"E, 1011 m, 4.VI.2005, 1 ♂, leg. E. Scheuchl;

Subgenus *Simandrena* Pérez, 1890

***Andrena combinata* (Christ, 1791)**

http://species-id.net/wiki/Andrena_combinata

Distribution in Turkey. Toroslar (Warncke 1966).

Material examined. Balıkesir: Kazdağları, Küçükkyuyu-Kırıcı yolu, 39°36'01"N, 26°34'51"E, 477 m, 30.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Bursa: Uludağ, Soğuk Pınar yolu, 40°03'84"N, 29°07'11"E, 1029 m, 3.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Hatay: Serinyol, 36°23'24"N, 36°11'75"E, 261 m, 4.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Mersin: Limonlu, 36°34'54"N, 34°09'29"E, 590 m, 23.V.2005, 1 ♀, leg. E. Scheuchl; Kırklareli: Sarpdere çıkıştı mağara yolu, 41°51'92"N, 27°34'93"E, 390 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş.

Andrena dorsata (Kirby, 1802)

http://species-id.net/wiki/Andrena_dorsata

Distribution in Turkey. Adana, Adapazarı, Eskişehir (Sivrihisar), İstanbul, Konya, Tekirdağ, Toros dağları (Gülek) (Warncke 1966), Afyon (Çay), Ankara (Delice), Hatay (Samandağ) (Warncke 1969); Bingöl, Erzincan, Erzurum (Oltu), Kars (Kağızman), Muş (Özbek 1976).

Material examined. Adana: Göksun-Tufanbeyli arası, 38°14'76"N, 36°18'22"E, 1449 m, 6.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Afyon: Köroğlu dağı geçidi, 38°55'20"N, 30°53'40"E, 1294 m, 23.VI.2006, 1 ♀, leg. B. Gülcü; Amasya: Yeşilöz, 40°33'19"N, 36°08'46"E, 822 m, 17.VI.2005, 1 ♀, 1 ♂, leg. B. Gülcü; Ankara: Kazan, 15.V.2005, 1 ♀, leg. E. Scheuchl, 2 ♀♀, leg. S. Hazır, Beypazarı, 9.VI.2005, 1 ♂, Beypazarı, Kargı köyü, 12.VI.2005, 1 ♀, leg. E. Aytekin, Emirdağ, 40°09'14"N, 32°38'12"E, 854 m, 17.VI.2006, 7 ♀♀, Kurtboğazı barajı çevresi, 40°16'28"N, 32°41'19"E, 1014 m, 17.VI.2006, 8 ♀♀, 1 ♂, Kurtboğazı-Pazar arası, 40°19'36"N, 32°42'12"E, 993 m, 17.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Antalya: Bozova, 37°12'02"N, 30°15'58"E, 935 m, 26.IV.2011, 2 ♀♀, leg. E. Scheuchl; Aydın: Kuşadası, Güzelçamlı-Davutlar arası, 15.IV.2005, 1 ♀, leg. S. Hazır; Baltaköy, 37°47'06"N, 27°53'07"E, 38 m, 23.II.2006, 1 ♂, Yenipazar-Bozdoğan arası, Alamut köyü, 37°48'49"N, 28°18'48"E, 61 m, 23.II.2006, 1 ♂, leg. B. Gülcü, S. Hazır; Burdur: Çavdır-Gölhisar arası, 37°08'41"N, 29°33'13"E, 956 m, 6.VI.2006, 3 ♀♀, leg. C. Çobanoğlu; Çorum: 40°37'10"N, 34°17'80"E, 648 m, 17.VI.2005, 1 ♀, leg. A.B. Yasan; Denizli: 37°40'27"N, 29°13'32"E, 987 m, 5.VI.2006, 2 ♀♀, leg. C. Çobanoğlu, B. Gülcü; Hatay: Kırıkhan-Belen arası, 36°27'23"N, 36°18'70"E, 90 m, 17.V.2006, 1 ♀, leg. B. Gülcü, C. Hazır; Isparta: Gelendost, 38°04'08"N, 30°58'70"E, 940 m, 25.V.2005, 1 ♀, leg. E. Scheuchl; Kahramanmaraş: Kahramanmaraş-Türkoğlu arası, 37°29'08"N, 36°53'67"E, 460 m, 18.V.2006, 1 ♀, leg. C. Çobanoğlu, S. Hazır; Karabük: Bartın-Safranbolu arası, 41°26'54"N, 32°44'52"E, 364 m, 10.VII.2005, 2 ♂♂, leg. B. Gülcü; Kastamonu: Kastamonu-Ilgaz arası, 41°07'04"N, 33°45'14"E, 1274 m, 11.VII.2005, 1 ♀, leg. B. Gülcü; Kırıkkale: 39°55'25"N, 33°59'05"E, 822 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan; Kırşehir: 39°19'43 N, 34°13'17 E, 1150 m, 4.VI.2005, 1 ♂, leg. E. Scheuchl; Konya: Ahırlı-Bozkır arası, 37°11'48"N, 32°12'89"E, 1200 m, 21.V.2007, 1 ♂, leg. E. Scheuchl; Mersin: Mut çevresi, 21.V.2005, 2 ♂♂, leg. E. Scheuchl; Samsun: Samsun-Ankara arası, 41°05'24"N, 36°05'04"E, 728 m, 3.VII.2006, 1 ♀, leg. E. Scheuchl.

***Andrena lepida* Schenck, 1859**

http://species-id.net/wiki/Andrena_lepida

Synonym: *Andrena lepida* ssp. *eleonorae* Warncke, 1967

Distribution in Turkey. Ankara, Balıkesir (Ayvalık), Eskişehir, Konya (Warncke 1966); Erzurum (Özbek 1976).

Material examined. Adana: Pozantı otoban çevresi, 25.IV.2004, 4 ♀♀, leg. C. Çobanoğlu; Ankara: Hacettepe Üniversitesi Beytepe kampüsü, 11.V.2005, 1 ♀, 21.IV.2006, 1 ♀, leg. C. Çobanoğlu, 11.V.2005, 1 ♀, leg. E. Scheuchl, Kazan, 15.V.2005, 1 ♀, leg. S. Hazır, Beypazarı, Boztepe, 9.VI.2005, 1 ♀, leg. E. Aytekin, Kurtboğazı-Pazar arası, 40°19'36"N, 32°42'12"E, 993 m, 17.VI.2006, 1 ♀, Güvem-Çerkes arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 1 ♀ leg. B. Gülcü, E. Scheuchl; Antalya: Taşağıl, Beydiğin köyü, 37°00'55"N, 31°22'74"E, 250 m, 20.V.2007, 4 ♀♀, Başlar köyü, 37°07'95"N, 31°28'36"E, 952 m, 21.V.2007, 1 ♂, leg. C. Çobanoğlu; Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, leg. B. Gülcü, S. Hazır; Burdur: Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 1 ♀, leg. E. Scheuchl; Karamanlı-Yeşilova arası, 37°29'01"N, 29°46'37"E, 1239 m, 8.VI.2006, 3 ♀♀, leg. E. Scheuchl, Çorum: Bayat, 40°40'06"N, 34°27'19"E, 715 m, 17.VI.2005, 1 ♀, leg. A.B. Yasan; Denizli: Serinhisar-Acipayam arası, 37°29'31"N, 29°19'03"E, 879 m, 12.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü; Kahramanmaraş: Kahramanmaraş-Türkoğlu arası, 37°29'08"N, 36°53'67"E, 460 m, 18.V.2006, 3 ♀♀, leg. C. Çobanoğlu, S. Hazır; Karaman: Başyayla, 36°41'78"N, 32°46'18"E, 1850 m, 24.V.2005, 1 ♀, leg. S. Hazır; Kastamonu: Tosya-İskilip arası, 40°58'43"N, 34°11'23"E, 1171 m, 19.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Kırıkkale: 39°55'25"N, 33°59'05"E, 1165 m, 18.VI.2005, 4 ♀♀, leg. A.B. Yasan; Kırşehir: Karakaya köyü, 39°26'34"N, 33°38'24"E, 971 m, 4.VI.2005, 1 ♀, leg. E. Scheuchl; Konya: Eskil-Aksaray arası, 37°42'74"N, 33°05'85"E, 920 m, 19.V.2005, 1 ♀, leg. E. Scheuchl; Mersin: Gülnar, 36°20'40"N, 33°28'77"E, 1140 m, 24.V.2005, 1 ♀, leg. E. Scheuchl; Yozgat: Ozan köyü, 39°48'82"N, 35°08'42"E, 1166 m, 18.VI.2005, 1 ♀, Saray, 39°41'26"N, 35°38'65"E, 1165 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan.

***Andrena melba* Warncke, 1965**

http://species-id.net/wiki/Andrena_melba

Distribution in Turkey. Ağrı (Ararat), Erzurum (Horasan) (Warncke 1974); Ağrı, Erzurum (Horasan), Kars (Karakurt) (Özbek 1976).

Material examined. Antalya: Başlar köyü, 37°07'95"N, 31°28'36"E, 952 m, 21.V.2007, 1 ♀, leg. C. Çobanoğlu; Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena nucleola* Warncke, 1973**

http://species-id.net/wiki/Andrena_nucleola

Distribution in Turkey. Amasya, Erzurum (Oltu, Tortum) (Warncke 1974); Erzurum (Oltu, Tortum) (Özbek 1976).

Material examined. Ankara: Kazan, 14.V.2005, 1 ♀, leg. S. Hazır, 2 ♀♀, leg. E. Scheuchl, Hacettepe Üniversitesi Beytepe kampüsü, 21.IV.2006, 1 ♀, leg. C. Çobanoğlu; Kastamonu: Türbe dağı geçiti, 40°56'14"N, 34°12'33"E, 1625 m, 19.VI.2006, 1 ♀, leg. E. Scheuchl.

***Andrena propinqua* Schenck, 1853**

http://species-id.net/wiki/Andrena_propinqua

Distribution in Turkey. No record

Material examined. Aydın: Çine çayı çevresi, 16.IV.2005, 1 ♀, leg. S. Hazır.

***Andrena transitoria* Morawitz, 1871**

http://species-id.net/wiki/Andrena_transitoria

Distribution in Turkey. Ankara, Elazığ, Eskişehir, Hatay, Konya (Beyşehir), Nevşehir (Ürgüp) (Warncke 1966); Erzurum (Tortum), Kars (Kağızman) (Özbek 1976).

Material examined. Aksaray: Tuz gölü çevresi, 38°49'80"N, 33°35'71"E, 930 m, 5.VI.2005, 1 ♀, leg. B. Gülcü, S. Hazır; Ankara: Hacettepe Üniversitesi Beytepe kampüsü, 3.VI.2005, 1 ♀, 28.IV.2006, 1 ♀, leg. C. Çobanoğlu, Beypazarı, 9.VI.2005, 1 ♀, leg. E. Aytekin; Antalya: Bozova, 37°12'02"N, 30°15'58"E, 935 m, 26.IV.2011, 1 ♂, leg. E. Scheuchl; Bolu: Seben, 10.VII.2004, 1 ♀, leg. S. Hazır; Burdur: Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl; Gaziantep: Gaziantep-Kahramanmaraş arası, 37°14'58"N, 37°15'56"E, 849 m, 5.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Isparta: Gelendost, 38°06'82"N, 31°01'45"E, 960 m, 25.V.2005, 1 ♀, leg. S. Hazır; Kırşehir: 39°19'43"N, 34°13'17"E, 1147 m, 4.VI.2005, 1 ♂, Kaman, 39°22'16"N, 33°47'71"E, 1057 m, 4.VI.2005, 1 ♂, leg. B. Gülcü, S. Hazır; Konya: Bozkır-Seydişehir arası, 37°15'92"N, 32°07'86"E, 1170 m, 25.V.2005, 2 ♀♀, Seydişehir, 37°23'45"N, 32°02'19"E, 1090 m, 25.V.2005, 1 ♀, leg. S. Hazır, Bozkır-Yalnızca arası, 37°09'58"N, 32°15'75"E, 1464 m, 21.V.2007, 2 ♀♀, leg. B. Gülcü, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır, Seydişehir-Beyşehir arası, 37°32'18"N, 31°48'36"E, 1166 m, 23.V.2007, 2 ♀♀, leg. B. Gülcü; Kütahya: Emet-Tavşanlı arası, 39°23'66"N, 29°21'27"E, 1172 m, 5.VI.2007, 2 ♀♀, Tavşanlı-Harmancık arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 1 ♂, leg. C. Hazır, S. Hazır; Nevşehir: Mucur-Nevşehir arası, 38°58'59"N, 34°32'76"E, 1149 m, 4.VI.2005, 7 ♂♂, leg. B. Gülcü, S. Hazır.

Subgenus *Thysandrena* Lanham, 1949

***Andrena albiscopa* Warncke, 1967**

http://species-id.net/wiki/Andrena_albiscopa

Synonym: *Andrena numida* ssp. *albiscopa* Warncke, 1967

Distribution in Turkey. Ağrı (Ararat), Amasya, Ankara (Şereflikoçhisar), Erzurum (Horasan), Eskişehir (Sivrihisar), Hatay (Antakya), Kayseri (Sultanhani, Yeşilhisar), Konya (Kulu, Sarayönü), Kütahya, Mersin (Sertavul), Nevşehir, Samsun (Vezirköprü), Şanlıurfa, Tokat (Niksar) (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Aksaray: 38°28'97"N, 33°53'30"E, 975 m, 5.VI.2005, 1 ♀, leg. E. Scheuchl; Çorum: 40°37'10"N, 34°17'80"E, 648 m, 17.VI.2005, 1 ♀, leg. A.B. Yasan; Konya: Akören, 37°31'22"N, 32°38'71"E, 1030 m, 23.V.2007, 1 ♀, leg. E. Scheuch.

***Andrena ranunculorum* Morawitz, 1877**

http://species-id.net/wiki/Andrena_ranunculorum

Distribution in Turkey. Ankara, Çorum (İskilip), Erzurum (Horasan, İspir, Kandilli, Oltu, Tortum), Eskişehir (Sivrihisar), Kayseri (Yeşilhisar), Konya (Sarayönü), Niğde (Ulukişla), Mersin (Sertavul), Trabzon (Soğanlı geçiti) (Warncke 1974); Erzurum (Horasan, İspir, Kandilli, Oltu, Tortum) (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 11.V.2005, 2 ♂♂, 29.V.2005, 1 ♀, leg. E. Scheuchl, Burdur: Altınyayla, Dirimli dağ geçiti, 36°57'57"N, 29°34'53"E, 1581 m, 6.VI.2006, 1 ♀, leg. E. Scheuchl; Kütahya: Demirci-Simav arası, 39°06'11"N, 28°43'96"E, 1348 m, 4.VI.2007, 2 ♀♀, leg. E. Scheuchl; Manisa: Demirci, 39°04'48"N, 28°43'36"E, 1260 m, 4.VI.2007, 1 ♀, leg. E. Scheuchl; Sivas: Karakaya köyü, 39°49'07"N, 36°17'21"E, 1222 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan; Yozgat: 39°40'86"N, 35°45'89"E, 1254 m, 18.VI.2005, 2 ♀♀, leg. B. Gülcü, S. Hazır.

Subgenus *Trachandrena* Robertson, 1902

***Andrena haemorrhoa* (Fabricius, 1781)**

http://species-id.net/wiki/Andrena_haemorrhoa

Distribution in Turkey. Antalya (Akseki), İstanbul (Belgrad ormanı), Erzurum (Horasan), Kütahya, Samsun (Çarşamba), Tekirdağ (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Aydın: Umurlu, Serçeköy köyü, 37°49'59"N, 27°55'50"E, 30 m, 13.III.2010, 1 ♀, leg. E. Scheuchl.

Subgenus *Truncandrena* Warncke, 1968

***Andrena asiatica* Friese, 1921**

http://species-id.net/wiki/Andrena_asiatica

Distribution in Turkey. Ağrı dağı, Amanos dağları (Warncke 1966); Amanos dağları, Balıkesir (Sındırğı-Karaköy), Erzurum (Horasan), Manisa (Akhisar) (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Aydın: Beyköy-Ödemiş arası, 37°56'51"N, 28°01'30"E, 457 m, 28.V.2006, 1 ♀, leg. B. Gülcü, S. Hazır, Paşayaylaşı, 37°54'10"N, 27°54'00"E, 696 m, 3.VI.2006, 1 ♀, 37°55'47"N, 27°53'44"E, 1151 m, 3.VI.2006, 4 ♀♀, 1 ♂, leg. B. Gülcü, E. Scheuchl, Karacasu, 37°32'19"N, 28°31'15"E, 349 m, 24.IV.2007, 9 ♀♀, 4 ♂♂, leg. B. Gülcü, S. Hazır, Madran dağı, 17.V.2007, 1 ♀, leg. B. Gülcü; İzmir: Ödemiş-Bozdağ arası, 38°17'45"N, 28°03'56"E, 1018 m, 28.V.2006, 1 ♀, leg. B. Gülcü, S. Hazır; Manisa: Spil dağı milli parkı, 38°32'08"N, 27°27'03"E, 972 m, 3.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır; Kütahya: Simav-Saphane arası, 39°03'06"N, 29°06'02"E, 966 m, 4.VI.2007, 1 ♂, leg. E. Scheuchl.

***Andrena bassana* ssp. *etesiaca* Warncke, 1975**

Distribution in Turkey. Amasya, Ankara (Gölbaşı), Kayseri (Sultanhani) (Warncke 1974).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 3.VI.2005, 1 ♀, leg. E. Scheuchl.

***Andrena canaeae* Strand, 1915**

http://species-id.net/wiki/Andrena_canaeae

Distribution in Turkey. Adıyaman (Pınarbaşı), Antalya, İstanbul (Prens adaları) (Warncke 1974).

Material examined. Aydın: Aytepe, Adnan Menderes Üniversitesi kampüsü, 3.III.2010, 1 ♀, 7.III.2010, 1 ♀, 13.III.2010, 1 ♀, 14.III.2010, 2 ♀♀, 15.III.2010, 1 ♀, 21.IV.2011, 1 ♀, leg. E. Scheuchl.

***Andrena combusta* Morawitz, 1876**

http://species-id.net/wiki/Andrena_combusta

Synonym: *Andrena oulskii* ssp. *oulskii* sensu Warncke 1974, nec Radoszkowski 1867.

Distribution in Turkey. Ağrı (Ararat), Kayseri (Yeşilhisar) (Warncke 1974); Erzurum (Oltu), İğdır (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 17.V.2005, 1 ♀, leg. E. Scheuchl, 3.VI.2005, 1 ♀, leg. C. Çobanoğlu, Kazan, 14.V.2005, 1 ♀, leg. E. Scheuchl; Mersin: Silifke-Mut arası, 36°25'09"N, 33°47'52"E, 70 m, 21.V.2005, 4 ♀♀, 1 ♂, leg. S. Hazır.

***Andrena delphiensis* Warncke, 1965**

http://species-id.net/wiki/Andrena_delphiensis

Distribution in Turkey. Denizli (Hazır et al. 2012).

Material examined. Denizli: 37°50'01"N, 29°02'51"E, 345 m, 12.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü.

***Andrena medeninensis* ssp. *usura* Warncke, 1967**

Distribution in Turkey. Antalya (Akseki), Balıkesir (Ayvalık, Bigadiç), Çorum (İskilip), Malatya, Mersin (Gülek) (Warncke 1974); Malatya (Özbek 1976).

Material examined. Aydın: Karacasu, 37°34'10"N, 28°39'48"E, 806 m, 24.IV.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Burdur: Dağarcık, göl kenarı, 37°31'13"N, 30°33'31"E, 840 m, 26.IV.2011, 1 ♀, leg. E. Scheuchl; Denizli: Serinhisar yakını, dağkenarı, 37°36'55"N, 29°16'14"E, 1030 m, 25.IV.2011, 1 ♀, 1 ♂, leg. E. Scheuchl; Niğde: Ulukışla, 37°32'82"N, 34°31'40"E, 1389 m, 19.V.2006, 4 ♀♀, leg. C. Çobanoğlu, S. Hazır.

***Andrena noacki* Alfken, 1935**

http://species-id.net/wiki/Andrena_noacki

Synonym: *Andrena oulskii* ssp. *noacki* Alfken, 1935

Distribution in Turkey. Ankara (Şereflikoçhisar), Erzurum (Warncke 1974); Erzurum (Özbek 1976).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 29.V.2005, 1 ♀, 1 ♂, leg. E. Scheuchl; Denizli: 37°50'01"N, 25°02'51"E, 345 m, 12.IV.2006, 2 ♂♂, leg. C. Çobanoğlu, B. Gülcü; Nevşehir: 38°32'49"N, 34°28'27"E, 1270 m, 5.VI.2005, 1 ♀, leg. E. Scheuchl.

***Andrena optata* Warncke, 1975**

http://species-id.net/wiki/Andrena_optata

Synonym: *Andrena rufomaculata* ssp. *optata* Warncke, 1975

Distribution in Turkey. Antalya (Serik, Side), Aydın (Kuşadası), Balıkesir (Ayvalık), Bursa, Denizli (Acıgöl), İstanbul (Üsküdar), İzmir (Selçuk), Konya, Manisa (Kayapınar) (Warncke 1974).

Material examined. Antalya: Kemer, 36°35'14"N, 30°32'32"E, 30 m, 13.IV.2006, 1 ♀, 1 ♂, Manavgat-Alanya arası, 36°44'57"N, 31°30'31"E, 6 m, 13.IV.2006, 1 ♀, Akseki, 36°43'51"N, 31°34'34"E, 8 m, 14.IV.2006, 2 ♀♀, Akseki, Gençler köyü, 36°47'23"N, 31°42'53"E, 269 m, 14.IV.2006, 1 ♀, Hacıobası-Akseki arası, 36°44'01"N, 31°36'10"E, 17 m, 14.IV.2006, 9 ♀♀, 1 ♂, Taşağıl-Beşkonak arası, 36°56'53"N, 31°13'00"E, 68 m, 14.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü; Aydın: AYTEPE, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 20.IV.2005, 1 ♀, leg. B. Gülcü, 17.III.2006, 2 ♂♂, 31.III.2006, 1 ♂, leg. B. Gülcü, S. Aydın, Söke, 37°40'40"N, 27°20'55"E, 20 m, 10.IV.2006, 1 ♀, 1 ♂, Kuşadası, Dilek yarımadası milli parkı, 37°41'56"N, 27°09'55"E, 0 m, 10.IV.2006, 4 ♀♀, leg. C. Çobanoğlu, B. Gülcü, Karacasu, 37°38'05"N, 28°39'03"E, 860 m, 24.IV.2007, 1 ♂, leg. B. Gülcü, S. Hazır; Manisa: Spil dağı, 38°34'21"N, 27°24'00"E, 972 m, 23.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena paramythensis* Mavromoustakis, 1957**

http://species-id.net/wiki/Andrena_paramythensis

Synonym: *Andrena rufomaculata* ssp. *paramythensis* Mavromoustakis, 1957

Distribution in Turkey. No record.

Material examined. Osmaniye: Osmaniye-Gaziantep arası, 13.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan.

***Andrena roseotincta* Warncke, 1975**

http://species-id.net/wiki/Andrena_roseotincta

Synonym: *Andrena oulskii* ssp. *roseotincta* Warncke, 1975

Distribution in Turkey. Şanlıurfa (Birecik) (Warncke 1974).

Material examined. Aksaray: Zengen, 1.V.2004, 1 ♀, leg. S. Hazır; Antalya: Bozova, 37°12'02"N, 30°15'58"E, 935 m, 26.IV.2011, 2 ♀♀, 1 ♂, leg. E. Scheuchl; Gaziantep: Gaziantep-Şanlıurfa arası, 13.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan; Şanlıurfa: Birecik, 15.V.2005, 3 ♀♀, Mezra kasabası, 15.V.2005, 2 ♀♀, leg. B. Gülcü, A.B. Yasan.

***Andrena rotundilabris* Morawitz, 1877**

http://species-id.net/wiki/Andrena_rotundilabris

Distribution in Turkey. Adana (Warncke 1966); Adana, Erzurum (Horasan), Hakkari (Zapsuyu), İstanbul, Kayseri (Pınarbaşı), Mersin (Gözne, Gülek, Sertavul), Niğde (Çiftehan), Sivas (Gürün) (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Ankara: Kızılıcahamam-Çerkes arası, 40°31'18"N, 32°38'11"E, 1113 m, 18.VI.2006, 1 ♀, leg. E. Scheuchl; Bursa: Uludağ, Soğuk Pınar-Keleş yolu, 40°01'74"N, 29°07'44"E, 798 m, 3.VI.2009, 2 ♂♂, leg. B. Gülcü, C. Demirtaş; Mersin: Şahmurlu köyü, 36°38'58"N, 34°01'23"E, 970 m, 23.V.2005, 1 ♀, 2 ♂♂, leg. E. Scheuchl.

***Andrena rufomaculata* Friese, 1921**

http://species-id.net/wiki/Andrena_rufomaculata

Synonym: *Andrena rufomaculata* ssp. *rufomaculata* Friese, 1921

Distribution in Turkey. Amanos dağları (Warncke 1966, 1974).

Material examined. Hatay: Belen-Kırıkhan arası, 36°28'85"N, 36°15'88"E, 625 m, 4.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır.

***Andrena schmiedeknechti* Magretti, 1883**

http://species-id.net/wiki/Andrena_schmiedeknechti

Distribution in Turkey. Adapazarı, Balıkesir (Ayvalık, Bigadiç) (Warncke 1966); Adapazarı, Balıkesir (Ayvalık, Bigadiç), Bursa (Mustafakemalpaşa), Erzurum (Horasan), İzmir (Selçuk), Karaman (Madenşehir), Kars (Sarıkamış), Kayseri (Yeşilhisar), Konya, Manisa, Nevşehir (Ürgüp), Niğde (Ulukişla) (Warncke 1974); Erzurum (Horasan), Kars (Sarıkamış) (Özbek 1976).

Material examined. Ankara: Gölbaba, 39°31'10"N, 32°52'02"E, 19.V.2005, 1 ♀, leg. S. Hazır, Hacettepe Üniversitesi Beytepe kampüsü, 3.VI.2005, 1 ♀, 21.IV.2006, 1 ♀, 1 ♂, 28.IV.2006, 2 ♀, leg. C. Çobanoğlu; Antalya: Korkuteli civarı, ormanlık alan, 36°59'00"N, 30°09'07"E, 1170 m, 26.IV.2011, 1 ♂, leg. E. Scheuchl; Aydın: Söke, 37°40'40"N, 27°20'55"E, 20 m, 10.IV.2006, 1 ♀, 37°41'47"N, 27°21'58"E, 13 m, 10.IV.2006, 1 ♀, Bafa Gölü çevresi, 37°28'58"N, 27°24'12"E, 9 m, 11.IV.2006, 1 ♀, leg. B. Gülcü, C. Çobanoğlu, Karacasu, 37°38'05"N, 28°39'03"E, 860 m, 24.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Karaman: Göktepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 1 ♀, 3 ♂♂, leg. B. Gülcü, S. Hazır; Konya: Eskil-Aksaray arası, 37°42'74"N, 33°05'85"E, 920 m, 19.V.2005, 1 ♂, leg. E. Scheuchl, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♀, leg. E. Scheuchl; Mersin: Sertavul-Mut arası, 36°48'36"N, 33°19'48"E, 1270 m, 21.V.2005, 1 ♂, leg. S. Hazır.

***Andrena seitzi* Alfken, 1935**

http://species-id.net/wiki/Andrena_seitzi

Synonym: *Andrena citrinella* Warncke, 1967

Distribution in Turkey. Ankara (Warncke 1966); Ankara, Diyarbakır, Konya (Warncke 1974).

Material examined. Adana: Pozanti, 25.IV.2004, 1♀, leg. S. Hazır.

***Andrena truncatilabris* Morawitz, 1877**

http://species-id.net/wiki/Andrena_truncatilabris

Distribution in Turkey. Adana, Adapazarı, Amanos dağları, Ankara, Balıkesir (Ayvalık), Konya, Mersin (Tarsus) (Warncke 1966); All parts of the country (Warncke 1974); Erzurum (Tortum, Oltu, Narman, İspir, Horasan), Kars, Muş (Özbek 1976).

Material examined. Adana: Ceyhan, 23.IV.2005, 3 ♀♀, leg. S. Hazır; Aksaray: Tuz Gölü çevresi, 38°49'80"N, 33°35'71"E, 930 m, 5.VI.2005, 2 ♀♀, 38°28'97"N, 33°53'30"E, 973 m, 5.VI.2005, 1 ♀, 1 ♂, leg. S. Hazır, B. Gülcü; Amasya: Mecidözü, 40°32'44"N, 35°20'85"E, 757 m, 17.VI.2005, 1 ♀, leg. B. Gülcü; Ankara: Hacettepe Üniversitesi Beytepe kampüsü, 3.VI.2005, 17 ♀♀, 3.VI.2006, 1 ♂, 21.IV.2006, 1 ♀, 1 ♂, leg. C. Çobanoğlu, Beypazarı, 9.VI.2005, 3 ♀♀, Beypazarı, Kargı köyü, 12.VI.2005, 1 ♀, leg. E. Aytekin, Kazan, 15.V.2005, 1 ♂, leg. E. Scheuchl, Eryaman 5. Etap, 9.V.2007, 2 ♀♀, leg. S. Hazır; Antalya: Bozova, 37°12'02"N, 30°15'58"E, 935 m, 26.IV.2011, 1 ♂, leg. E. Scheuchl; Aydın: Söke, Güllübahçe, 37°40'40"N, 27°20'55"E, 20 m, 10.IV.2006, 1 ♀, leg. B. Gülcü, C. Çobanoğlu, Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, leg. S. Hazır, B. Gülcü, Karacasu, 37°33'21"N, 28°37'45"E, 554 m, 24.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Balıkesir: Altınoluk, Küçükkyuyu-Çetmi yolu, 39°34'99"N, 26°36'29"E, 231 m, 30.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Burdur: Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 3 ♀♀, leg. C. Çobanoğlu, E. Scheuchl; Çanakkale: Bayramlı, Himidiye yaylası yolu, 40°08'74"N, 26°17'60"E, 197 m, 31.V.2009, 2 ♀♀, leg. B. Gülcü, C. Demirtaş; Çorum: 40°34'47"N, 34°38'73"E, 646 m, 17.VI.2005, 1 ♀, leg. A.B. Yasan, Bayat, 40°40'06"N, 34°27'19"E, 715 m, 17.VI.2005, 1 ♀, leg. S. Hazır, B. Gülcü; Gaziantep: Gaziantep-Şanlıurfa arası, 13.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan; Hatay: Yayladağı, 36°01'35"N, 36°02'36"E, 490 m, 16.V.2006, 2 ♀♀, Kırıkhan-Belen arası, 36°27'23"N, 36°18'70"E, 90 m, 17.V.2006, 1 ♀, leg. S. Hazır, C. Çobanoğlu, Belen-Kırıkhan arası, 36°28'85"N, 36°15'88"E, 625 m, 4.V.2007, 1 ♀, leg. C. Hazır, B. Gülcü; Isparta: Gelendost, 38°04'08"N, 30°58'70"E, 937 m, 25.V.2005, 1 ♀, 1 ♂, 38°06'82"N, 31°01'45"E, 960 m, 25.V.2005, 1 ♂, leg. S. Hazır; Kahramanmaraş: Balkayaşı: 37°19'82"N, 37°09'88"E, 693 m, 18.V.2006, 1 ♀, leg. S. Hazır, C. Çobanoğlu; Karaman: Göktepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Kırşehir: Karakaya

köyü, $39^{\circ}26'34"N$, $33^{\circ}38'24"E$, 971 m, 4.VI.2005, 5 ♀♀, leg. S. Hazır, B. Gülcü; Konya: Kulu, $38^{\circ}54'98"N$, $32^{\circ}59'56"E$, 1140 m, 19.V.2005, 1 ♂, leg. S. Hazır, Seydişehir-Bozkır arası, $37^{\circ}23'56"N$, $32^{\circ}01'06"E$, 1097 m, 21.V.2007, 3 ♀♀, leg. B. Gülcü, S. Hazır; Kütahya: Emet-Tavşanlı arası, $39^{\circ}20'16"N$, $29^{\circ}18'22"E$, 1047 m, 5.VI.2007, 4 ♀♀, leg. C. Hazır, S. Hazır; Muğla: Milas-Yatağan arası, Tuzabat çevresi, $37^{\circ}18'46"N$, $27^{\circ}59'88"E$, 675 m, 27.V.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Mersin: Sarıkaya-Sarıkavak arası, $37^{\circ}05'80"N$, $34^{\circ}42'40"E$, 920 m, 22.V.2005, 5 ♂♂, Gülnar-Ermenek arası, $36^{\circ}21'38"N$, $33^{\circ}18'84"E$, 1070 m, 24.V.2005, 1 ♂, leg. S. Hazır; Nevşehir: $38^{\circ}32'49"N$, $34^{\circ}28'27"E$, 1270 m, 5.VI.2005, 1 ♀, leg. E. Scheuchl; Sivas: Karakaya köyü, $39^{\circ}49'07"N$, $36^{\circ}17'21"E$, 1222 m, 18.VI.2005, 1 ♀, Yıldızeli, $39^{\circ}53'26"N$, $36^{\circ}34'28"E$, 1380 m, 18.VI.2005, 3 ♀♀, 1 ♂, A.B. Yasan; Yozgat: $39^{\circ}40'86"N$, $35^{\circ}45'89"E$, 1254 m, 18.VI.2005, 3 ♀♀, leg. S. Hazır, B. Gülcü; Ozan köyü, $39^{\circ}48'82"N$, $35^{\circ}08'42"E$, 1166 m, 18.VI.2005, 1 ♀, Saray, $39^{\circ}41'26"N$, $35^{\circ}38'65"E$, 1165 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan.

Andrena tscheki Morawitz, 1872

http://species-id.net/wiki/Andrena_tscheki

Synonym: *Andrena tscheki* ssp. *tritica* Warncke, 1965

Distribution in Turkey. Elma Dağı, Karaman (Göktepe), Bulgar Dağ (Bolkar dağı) (Warncke 1974).

Material examined. Aydın: Çine, Çine Çayı, Söğütçük kuzeyi, $37^{\circ}28'08"N$, $28^{\circ}09'33"E$, 236 m, 12.III.2010, 1 ♀, leg. E. Scheuchl.

Andrena ulula Warncke, 1969

http://species-id.net/wiki/Andrena_ulula

Distribution in Turkey. Diyarbakır, Karaman (Madenşehir), Konya (Beyşehir) (Warncke 1974).

Material examined. Ankara: Haymana, $39^{\circ}20'77"N$, $32^{\circ}45'58"E$, 1095 m, 5.VI.2005, 1 ♀, leg. E. Scheuchl; Bursa: Uludağ, Soğuk Pınar-Keleş yolu, $40^{\circ}01'74"N$, $29^{\circ}07'44"E$, 798 m, 3.VI.2009, 1 ♂, leg. B. Gülcü, C. Demirtaş; Konya: Görmeли, $36^{\circ}31'47"N$, $33^{\circ}59'62"E$, 1400 m, 24.V.2005, 2 ♀♀, Bozkır-Seydişehir arası, $37^{\circ}15'92"N$, $32^{\circ}07'86"E$, 1170 m, 25.V.2005, 9 ♀♀, Seydişehir çevresi, $37^{\circ}23'45"N$, $32^{\circ}02'18"E$, 1090 m, 25.V.2005, 1 ♀, leg. S. Hazır, Ahırlı-Bozkır arası, $37^{\circ}11'48"N$, $32^{\circ}12'89"E$, 1200 m, 21.V.2007, 1 ♀, 2 ♂♂, Akören-Seydişehir arası, $37^{\circ}28'22"N$, $32^{\circ}20'69"E$, 1159 m, 23.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Kütahya: Emet-Tavşanlı arası, $39^{\circ}23'66"N$, $29^{\circ}21'27"E$, 1172 m, 5.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır; Manisa: Akhisar-Soma arası, $38^{\circ}58'45"N$, $27^{\circ}47'36"E$, 111 m, 23.IV.2007, 7 ♀♀, leg. B. Gülcü, C. Hazır.

***Andrena urfanella* Scheuchl & Hazır, 2012**

http://species-id.net/wiki/Andrena_ufanella

Distribution in Turkey. Ankara, Aksaray, Diyarbakır, Hatay (Altınözü), Gaziantep, Kahramanmaraş, Konya (Beyşehir), Kilis, Mersin, Mardin (Derik), Şanlıurfa (Ceylanpınar, Harran) (Scheuchl and Hazır 2012).

Material examined. Ankara: Hacettepe Üniversitesi, Beytepe kampüsü, 39°51'49"N, 32°45'06"E, 11.V.2005, 1 ♂, 15.V.2005, 1 ♂, 18.V.2005, 1 ♀, 1 ♂, 3.VI.2005, 1 ♂, leg. E. Scheuchl, Aksaray: 38°38'22"N, 33°44'30"E, 929 m, 5.VI.2005, 1 ♀, leg. S. Hazır, B. Gülcü, 38°38'22"N, 33°44'31"E, 930 m, 5.VI.2005, 1 ♀, leg. E. Scheuchl; Diyarbakır: Şanlıurfa-Karacadağ arası, 37°49'32"N, 39°38'06"E, 14.V.2005, 3 ♀♀, leg. B. Gülcü, A.B. Yasan; Gaziantep: Gaziantep-Şanlıurfa arası, 13.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan; Hatay: Altınözü, 36°06'57"N, 36°16'27"E, 204 m, 17.V.2006, 2 ♀♀, leg. S. Hazır, C.Çobanoğlu; Kahramanmaraş: 37°20'93"N, 37°08'98"E, 601 m, 18.V.2006, 1 ♀, leg. S. Hazır, C.Çobanoğlu; Konya: Beyşehir, 37°51'36"N, 31°36'19"E, 1140 m, 25.V.2005, 3 ♀♀, leg. S. Hazır, 2 ♀♀, leg. E. Scheuchl; Mersin: Gülnar-Ermenek arası, 36°21'38"N, 33°18'84"E, 1075 m, 24.V.2005, 2 ♀♀, leg. S. Hazır; Şanlıurfa: Siverek-Viranşehir arası, 37°44'38"N, 39°18'64"E, 835 m, 14.V.2005, 10 ♀♀, leg. B. Gülcü, A.B. Yasan.

Subgenus *Ulandrena* Warncke, 1968***Andrena cantiaca* Warncke, 1975**

http://species-id.net/wiki/Andrena_cantiaca

Distribution in Turkey. Erzurum (Horasan), Konya, Mersin (Sertavul), Nevşehir, Niğde (Ulukışla), Şanlıurfa (Birecik) (Warncke 1974); Erzurum (Horasan) (Özbek 1976); Niğde (Ulukışla) (Blank and Kraus 1994).

Material examined. Ankara: Hacettepe Üniversitesi Beytepe kampüsü, 5.V.2004, 1 ♀, leg. A. Korkmaz; Aydın: Kuşadası, Dilek yarımadası milli parkı, İçmeler koyu, 15.IV.2005, 1 ♀, Orhaneli-Bahçearası arası, 16.IV.2005, 1 ♀, leg. S. Hazır, 31-03-2006 Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 31.III.2006, 1 ♀, 6 ♂♂, 4.IV.2006, 2 ♀♀, leg. B. Gülcü, S. Aydın, Kuşadası, AĞAÇLI-Davutlar arası, 37°44'00"N, 27°19'17"E, 187 m, 10.IV.2006, 1 ♂, Dilek yarımadası milli parkı, 37°41'56"N, 27°09'55"E, 0 m, 10.IV.2006, 1 ♀, Bafa gölü çevresi, 37°29'46"N, 27°32'21"E, 11 m, 11.IV.2006, 1 ♀, leg. B. Gülcü, C. Çobanoğlu, Aytepe, Adnan Menderes Üniversitesi kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 1 ♀, Atça, 37°52'40"N, 28°13'52"E, 52 m, 22.IV.2007, 7 ♀♀, 2 ♂♂, Karacasu, 37°38'05"N, 28°39'03"E, 860 m, 24.IV.2007, 1 ♂, leg. B. Gülcü, S. Hazır; Karaman: Başyayla-Ermenek arası, 36°40'02"N, 32°37'60"E, 1558 m, 22.V.2007, 2 ♂♂, Göktepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 1 ♂, leg. B. Gülcü, S. Hazır; Konya: Ahırlı-Bozkır arası, 37°11'48"N, 32°12'89"E, 1200 m, 21.V.2007, 1 ♂, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena combaella* Warncke, 1966**

http://species-id.net/wiki/Andrena_combaella

Distribution in Turkey. Erzurum (Horasan), Konya (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Ankara: Peçenek-Çamlıdere arası, 40°27'21"N, 32°25'21"E, 1144 m, 17.VI.2006, 1 ♀, leg. E. Scheuchl; Çankırı: Saçakbeli dağ geçidi, 40°41'53"N, 33°00'46"E, 1473 m, 18.VI.2006, 1 ♀, 1 ♂, leg. B. Gülcü, E. Scheuchl.

***Andrena crecca* Warncke, 1965**

http://species-id.net/wiki/Andrena_crecca

Synonym: *Andrena concinna* ssp. *crecca* Warncke, 1965

Distribution in Turkey. Amasya, Ankara, Bursa (Uludağ), Erzincan (Tanyeri), Erzurum (Horasan), İzmir, Konya (Beyşehir), Niğde (Ulukışla) (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Afyon: Köroğlu dağ geçidi, 38°55'20"N, 30°53'40"E, 1294 m, 23.VI.2006, 1 ♀, leg. S. Hazır, B. Gülcü; Aksaray: Sivrihisar dağ geçidi, 38°14'36"N, 34°25'35"E, 1706 m, 20.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Amasya: Mahmırlar köyü, 17.VI.2005, 1 ♂, leg. B. Gülcü; Ankara: Haymana, 39°22'72"N, 32°49'19"E, 1051 m, 5.VI.2005, 1 ♀, leg. S. Hazır, Hacettepe Üniversitesi Beytepe kampüsü, 16.VI.2006, 1 ♂, leg. E. Scheuchl; Bolu: Seben, 12.VII.2004, 1 ♀, leg. S. Hazır; Burdur: Dirimli dağ geçidi, 36°55'56"N, 29°38'39"E, 1350 m, 6.VI.2006, 1 ♂, leg. E. Scheuchl; Çankırı: Saçakbeli dağ geçidi, 40°41'53"N, 33°00'46"E, 1473 m, 18.VI.2006, 2 ♀♀, 1 ♂, leg. E. Scheuchl, Şabanözü-Çankırı arası, 40°30'23"N, 33°24'54"E, 1487 m, 18.VI.2006, 2 ♂♂, leg. E. Scheuchl; Karaman: Göktepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 2 ♂♂, leg. B. Gülcü, S. Hazır; Kütahya: Tavşanlı-Ermenek arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 2 ♀♀, leg. C. Hazır, S. Hazır, Tavşanlı-Harmancık arası, 5.VI.2007, 1 ♂, leg. B. Gülcü, S. Hazır; Niğde: Gölcük-Çiftlik arası, 38°14'24"N, 34°34'05"E, 1572 m, 20.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl.

***Andrena elegans* Giraud, 1863**

http://species-id.net/wiki/Andrena_elegans

Distribution in Turkey. Ankara (Beynam), Erzincan (Tanyeri), Erzurum (Oltu) (Warncke 1974); Erzurum (Oltu) (Özbek 1976).

Material examined. Amasya: Mahmırlar köyü, 17.VI.2005, 4 ♀♀, 2 ♂♂, leg. B. Gülcü, A.B. Yasan; Ankara: Akyurt, 40°08'11"N, 38°11'95"E, 1329 m, 16.VI.2005, 1 ♀, leg. A.B. Yasan; Antalya: Elmalı, 36°46'08"N, 29°59'05"E, 1181 m, 7.VI.2006, 2 ♀♀, 1 ♂, leg. B. Gülcü, A.B. Yasan, Gökova-Korkuteli arası, 36°48'31"N, 29°00'50"E, 1143 m, 7.VI.2006, 1 ♀, leg. C. Çobanoğlu.

***Andrena fulvitarsis* Brullé, 1832**

http://species-id.net/wiki/Andrena_fulvitarsis

Distribution in Turkey. Adana, Ankara, Çanakkale, İstanbul (Belgrat ormanı, Halkalı), Toros dağları (Warncke 1966); Adana, Ankara, Antalya (Anamur, Side), Çanakkale, Diyarbakır, Edirne, Erzurum (Horasan), İstanbul (Belgrat ormanı, Büyükdere), Karaman (Madenşehir), Kayseri (Yeşilhisar), Mersin (Gilindire, Gülek), Muğla (Marmaris), Niğde (Ulukışla), Şanlıurfa (Birecik) (Warncke 1974); Erzurum (Horasan) (Özbek 1976).

Material examined. Adana: Saimbeyli, 38°04'25"N, 36°09'88"E, 1468 m, 6.V.2007, 1 ♂, leg. B. Gülcü, C. Hazır; Ankara: Güməm-Çerkes arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Antalya: Taşağıl, Beydiğin köyü, 37°00'54"N, 31°22'74"E, 250 m, 20.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Aydın: Çakırbeyli-Koçarlı arası, 2.V.2004, 1 ♀, leg. B. Gülcü, Kuşadası, Dilek yarımadası milli parkı, İçmeler koyu, 15.IV.2005, 1 ♀, leg. B. Gülcü, S. Hazır, Koçarlı, Menderesin Çiftliği, 16.IV.2005, 2 ♀, leg. S. Hazır, Orhaneli-Bahçearası arası, 16.IV.2005, 4 ♀♀, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 20.IV.2005, 1 ♂, leg. B. Gülcü, S. Hazır, 4.IV.2006, 1 ♂, leg. B. Gülcü, S. Aydin, Kuşadası, Ağaçlı-Davutlar arası, 37°44'00"N, 27°19'17"E, 187 m, 10.IV.2006, 1 ♀, Söke, Akçakonak köyü, 37°41'30"N, 27°21'35"E, 20 m, 10.IV.2006, 1 ♀, Bafa gölü, Kapıkırı, 37°29'46"N, 27°32'21"E, 11 m, 11.IV.2006, 1 ♀, leg. C. Çobanoğlu, B. Gülcü, Atça, 37°52'40"N, 28°13'52"E, 52 m, 22.IV.2007, 5 ♀♀, leg. B. Gülcü, S. Hazır, Karacasu, 37°35'51"N, 28°37'00"E, 795 m, 24.IV.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Gaziantep: Gaziantep-Kahramanmaraş arası, 37°14'58"N, 37°15'56"E, 849 m, 5.V.2007, 1 ♂, leg. B. Gülcü, C. Hazır; İzmir: Selçuk civarı, 37°55'29"N, 27°21'44"E, 36 m, 13.III.2010, 1 ♂, leg. E. Scheuchl Karabük: Eflani yolu, Yağlıca köyü, 41°23'13"N, 32°50'06"E, 953 m, 10.VII.2005, 2 ♀♀, leg. B. Gülcü; Karaman: Başyayla-Ermenek arası, 36°40'02"N, 32°37'60"E, 1558 m, 22.V.2007, 1 ♂, leg. B. Gülcü, S. Hazır; Kırşehir: Karakaya köyü, 39°26'34"N, 33°28'24"E, 971 m, 4.VI.2005, 1 ♀, leg. E. Scheuchl; Konya: Ahırlı-Bozkır arası, 37°11'48"N, 32°12'89"E, 1200 m, 21.V.2007, 1 ♂, leg. B. Gülcü, S. Hazır, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 2 ♀♀, leg. B. Gülcü; Kütahya: Emet-Tavşanlı arası, 39°23'66"N, 29°21'27"E, 1172 m, 5.VI.2007, 3 ♀♀, 1 ♂, Tavşanlı-Harmancık arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır; Manisa: Akhisar-Soma arası, 38°58'45"N, 27°47'36"E, 111 m, 23.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena heinrichi* Grünwaldt, 2005**

http://species-id.net/wiki/Andrena_heinrichi

Distribution in Turkey. Aydın (Kuşadası) (Grünwaldt et al. 2005).

Material examined. Aydın: Çakırbeyli-Koçarlı arası, Çine çayı çevresi, 2.V.2004, 1 ♀, leg. B. Gülcü, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 19.IV.2007, 3 ♂♂, leg. B. Gülcü, S. Hazır.

***Andrena neocypriaca* Mavromoustakis, 1956**

http://species-id.net/wiki/Andrena_neocypriaca

Distribution in Turkey. Adapazarı, Hatay (Warncke 1966); Adapazarı, Antalya (Anamur, Side), Hatay (Antakya, Topboğazı), İzmir, Mersin (Mut), Muğla (Fethiye, Marmaris), Şanlıurfa (Birecik) (Warncke 1974).

Material examined. Aydın: Söke, 37°45'24"N, 27°21'94"E, 95 m, 28.V.2005, 1 ♀, leg. S. Hazır, Yılmazköy-Paşayaylası arası, 37°52'49"N, 27°53'57"E, 339 m, 30.IV.2006, 3 ♀♀, leg. B. Gülcü, S. Hazır; Gaziantep: Nurdağı-Gaziantep arası, 14.V.2005, 1 ♀, leg. B. Gülcü, A.B. Yasan; Kahramanmaraş: Kahramanmaraş-Göksun arası, 37°39'69"N, 36°41'75"E, 546 m, 5.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Mersin: Erdemli, 36°37'21"N, 34°19'96"E, 180 m, 22.V.2005, 1 ♀, leg. S. Hazır.

***Andrena osychniukae* Osytshnjuk, 1977**

http://species-id.net/wiki/Andrena_osychniukae

Synonym: *Andrena abbreviata* ssp. *osychniuki* Warncke, 1972 [recte: 1975]

Distribution in Turkey. All regions of the country (Warncke 1974); Erzurum (Horasan, Tortum) (Özbek 1976).

Material examined. Aksaray: 38°38'22"N, 33°44'31"E, 930 m, 5.VI.2005, 4 ♂♂, leg. E. Scheuchl Ankara: Kazan, 40°11'54"N, 32°60'73"E, 848 m, 6.VI.2004, 1 ♀, leg. S. Hazır; Aydın: Atça, 37°52'40"N, 28°13'52"E, 52 m, 22.IV.2007, 1 ♀, leg. B. Gülcü, S. Hazır; Çanakkale: Gelibolu yarımadası, Bayramlı-Çiftlik yolu, 40°08'04"N, 26°16'79"E, 95 m, 31.V.2009, 1 ♀, Bayramlı, Himidiye yaylası yolu, 40°08'74"N, 26°17'60"E, 197 m, 31.V.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Gaziantep: Gaziantep-Kahramanmaraş arası, 37°14'58"N, 37°15'56"E, 849 m, 5.V.2007, 2 ♀♀, leg. B. Gülcü, C. Hazır; Hatay: Serinyol, 36°22'07"N, 36°11'89"E, 152 m, 4.V.2007, 2 ♂♂, leg. B. Gülcü, C. Hazır; Karaman: Göktepe-Ermenek arası, 36°38'95"N, 32°41'13"E, 1616 m, 22.V.2007, 5 ♂♂, leg. B. Gülcü, S. Hazır; Kırklareli: Sarpdere çıkışı mağara yolu, 41°51'92"N, 27°34'93"E, 390 m, 1.VI.2009, 1 ♀, leg. B. Gülcü, C. Demirtaş; Kırşehir: Karakaya köyü, 39°26'34"N, 33°28'24"E, 971 m, 4.VI.2005, 1 ♀, leg. E. Scheuchl; Konya: Eskil-Aksaray arası, 37°42'74"N, 33°05'85"E, 920 m, 19.V.2005, 6 ♂♂, Tuz gölü çevresi, 38°44'83"N, 33°03'56"E, 940 m, 19.V.2005, 2 ♂♂, leg. S. Hazır, Ahırlı-Bozkır arası, 37°11'48"N, 32°12'89"E, 1200 m, 21.V.2007, 5 ♂♂, Bozkır-Yalnızca arası, 37°09'58"N, 32°15'75"E, 1464 m, 21.V.2007, 1 ♀, leg. B. Gülcü, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 1 ♀, 2 ♂♂, leg. B. Gülcü, S. Hazır; Kütahya: Emet-Tavşanlı arası, 39°23'66"N, 29°21'27"E, 1172 m, 5.VI.2007, 1 ♀, leg. C. Hazır, S. Hazır; Mersin: Sertavul-Mut arası, 36°48'36"N, 33°19'48"E, 1270 m, 21.V.2005, 1 ♂, leg. S. Hazır.

***Andrena paradoxa* Friese, 1921**

http://species-id.net/wiki/Andrena_paradoxa

Synonym: *Andrena concinna* ssp. *paradoxa* Friese, 1921

Distribution in Turkey. Mersin (Gülek), Amanos dağları (Warncke 1974).

Material examined. Ankara: Hacettepe Üniversitesi Beytepe kampüsü, 29.V.2005, 1 ♀, leg. E. Scheuchl; Konya: Seydişehir-Beyşehir arası, 37°32'18"N, 31°48'36"E, 1166 m, 23.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır.

***Andrena schulzi* Strand, 1921**

http://species-id.net/wiki/Andrena_schulzi

Distribution in Turkey. Çanakkale (Hazır et al. 2012).

Material examined. Çanakkaleye 10 km kala, 31.V.2009, 1 ♂, leg. B. Gülcü, C. Demirtaş.

Subgenus *Zonandrena* Hedicke, 1933***Andrena flavipes* Panzer, 1798**

http://species-id.net/wiki/Andrena_flavipes

Distribution in Turkey. Balıkesir (Edremit), Bilecik, Bolu (Abant), Burdur, Çanakkale (Truva, Gelibolu), Denizli (Pamukkale), İstanbul (Selimpaşa), İzmir (Ensetepe), Karaman, Samsun (Dikbiyik) (Warncke 1969); All regions of the country (Warncke 1974); Erzurum (Oltu, Tortum, İspir, Horasan, Hinis, Aşkale), İğdır, Tunceli, Elazığ (Özbek 1976).

Material examined. Adana: Bekirli köyü, 37°11'59"N, 35°12'57"E, 131 m, 23.IV.2004, 2 ♀♀, leg. C. Çobanoğlu, Ceyhan, 23.IV.2005, 2 ♀♀, Misis-Ceyhan arası, 23.IV.2005, 1 ♀, Çukurova Üniversitesi, Balcalı kampüsü, 16.VI.2005, 1 ♀, leg. S. Hazır, Göksun-Tufanbeyli arası, 38°14'76"N, 36°18'22"E, 1449 m, 6.V.2007, 1 ♀, leg. B. Gülcü, C. Hazır; Afyon: Köroğlu dağ geçidi, 38°55'20"N, 30°53'40"E, 1295 m, 21.VI.2006, 1 ♀, leg. E. Scheuchl; Aksaray: 38°28'97"N, 33°53'30"E, 973 m, 5.VI.2005, 1 ♂, leg. B. Gülcü, S. Hazır, 38°37'29"N, 33°45'21"E, 921 m, 3.V.2007, 4 ♀♀, leg. B. Gülcü, C. Hazır; Amasya: Mecidöyü: 40°32'44"N, 35°20'85"E, 757 m, 17.VI.2005, 1 ♂, leg. B. Gülcü; Ankara: Kazan, 29.VI.2004, 1 ♀, 1 ♂, leg. S. Hazır, Hacettepe Üniversitesi, Beytepe kampüsü, 11.V.2005, 1 ♂, leg. C. Çobanoğlu, 1 ♀, leg. E. Scheuchl, Gölbaşı, 39°31'10"N, 32°52'02"E, 19.V.2005, 1 ♂, leg. S. Hazır, Hacettepe Üniversitesi, Beytepe kampüsü, 3.VI.2005, 3 ♀♀, 1 ♂, leg. C. Çobanoğlu, Beypazarı, Boztepe, 9.VI.2005, 4 ♀♀, leg. E. Aytekin, Hacettepe Üniversitesi, Beytepe kampüsü, 27.VI.2005, 1 ♀, leg. E. Scheuchl, Beypazarı, Dölek

yolu, Kargı köyü, 4.VIII.2005, 3 ♀♀, 1 ♂, leg. E. Aytekin, Hacettepe Üniversitesi, Beytepe kampüsü, 21.IV.2006, 8 ♀♀, 28.IV.2006 9 ♀♀, 4 ♂♂, leg. C. Çobanoğlu, Çamlıdere, 40°32'22"N, 32°30'15"E, 1345 m, 17.VI.2006, 1 ♀, Kurtboğazı barajı çevresi, 40°16'28"N, 32°41'19"E, 1014 m, 17.VI.2006, 2 ♀♀, leg. B. Gülcü, E. Scheuchl; Antalya: Kemer: 36°35'14"N, 30°32'32"E, 30 m, 13.IV.2006, 9 ♀♀, Manavgat-Alanya arası, 36°44'57"N, 31°30'31"E, 6 m, 13.IV.2006, 3 ♀♀, Haciobası-Akseki arası, 36°44'01"N, 31°36'10"E 17 m, 14.IV.2006 1 ♀, leg. C. Çobanoğlu, B. Gülcü, Kemerköy-Gömbe arası, 36°25'47"N, 29°40'08"E, 1540 m, 7.VI.2006, 1 ♀, leg. C. Çobanoğlu, E. Scheuchl, Taşağıl, Beydiğin köyü, 37°00'54"N, 31°22'74"E, 250 m, 20.V.2007, 4 ♀♀, leg. B. Gülcü, S. Hazır, Başlar köyü, 37°07'95"N, 31°28'36"E, 952 m, 21.V.2007, 3 ♀♀, leg. C. Hazır; Aydın: Kuşadası, Davutlar, 15.IV.2005, 1 ♀, Bahçelerası, 16.IV.2005, 1 ♀, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 20.IV.2005, 1 ♀, leg. B. Gülcü, S. Hazır, Kuşadası, Dilek yarımadası milli parkı, 37°41'52"N, 27°09'12"E, 0 m, 27.V.2005, 1 ♂, leg. S. Hazır, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.II.2006, 1 ♀, 2 ♂♂, leg. B. Gülcü, S. Aydın, Yenipazar-Bozdoğan arası, Alamut köyü, 37°48'49"N, 28°18'48"E, 61 m, 23.II.2006, 1 ♂, leg. B. Gülcü, S. Hazır; Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 1.III.2006, 2 ♂♂, 31.III.2006, 1 ♂, leg. B. Gülcü, S. Aydın, Söke, Akçakonak köyü, 37°41'30"N, 27°21'35"E, 20 m, 10.IV.2006, 1 ♀, Söke, Tuzburgazi, 37°37'13"N, 27°12'20"E, 4 m, 10.IV.2006, 6 ♀♀, Bafa gölü çevresi, 37°28'25"N, 27°25'17"E, 11 m, 11.IV.2006, 1 ♂, leg. C. Çobanoğlu, B. Gülcü, Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'27"N, 27°51'14"E, 176 m, 21.VI.2006, 5 ♀♀, Atça, 37°52'40"N, 28°13'52"E, 52 m, 22.IV.2007, 1 ♀, Hamzabaklı-Çavdarköy arası, 37°47'45"N, 28°07'41"E, 176 m, 22.IV.2007, 1 ♀, Karacasu, Yazır-Binges arası, 37°38'05"N, 28°39'03"E, 860 m, 24.IV.2007, 3 ♀♀, Karacasu, Yazır-Nargedik arası, 37°40'16"N, 28°38'49"E, 630 m, 24.IV.2007, 1 ♀, Karacasu, Yukarıgörle-Karabağlar arası, 37°33'21"N, 28°37'45"E, 554 m, 24.IV.2007, 1 ♀, Ovacık, 38°03'02"N, 28°08'09"E, 1089 m, 24.VI.2008, 1 ♀, leg. B. Gülcü, S. Hazır; Bayburt: 26.VII.2004, 1 ♀, leg. S. Hazır; Bolu: Seben, 10.VII.2004, 1 ♀, leg. S. Hazır; Burdur: Dirimli dağ geçiti, 36°55'56"N, 29°38'39"E, 1350 m, 6.VI.2006, 1 ♀, Söğüt-Çavdır arası, 37°06'36"N, 29°44'00"E, 1116 m, 6.VI.2006, 1 ♀, 2 ♂♂, Tefenni, 37°20'40"N, 29°48'24"E 1132 m, 8.VI.2006, 1 ♂, leg. C. Çobanoğlu, E. Scheuchl; Çanakkale: Gelibolu yarımadası, Bayramlı-Çiftlik yolu, 40°08'04"N, 26°16'79"E, 95 m, 31.V.2009, 1 ♀, Çanakkale şehitlik abidesi yolu, 40°07'49"N, 26°17'75"E, 56 m, 31.V.2009 2 ♂♂, Bayramlı, Himidiye yayLASı yolu, 40°08'74"N, 26°17'60"E, 197 m, 31.V.2009, 2 ♀♀, leg. B. Gülcü, C. Demirtaş; Çankırı: Saçakbeli dağ geçiti, 40°41'53"N, 33°00'46"E, 1473 m, 18.VI.2006, 3 ♂♂, leg. E. Scheuchl; Çorum: 40°34'47"N, 34°38'73"E, 646 m, 17.VI.2005, 1 ♂, Bayat, 40°40'06"N, 34°27'19"E, 715 m, 17.VI.2005, 1 ♀, leg. A.B. Yasan; Denizli: 37°50'01"N, 29°02'51"E, 345 m, 12.IV.2006, 4 ♀♀, Denizli-Serinhisar arası, 37°42'38"N, 29°12'17"E, 697 m, 12.IV.2006, 1 ♀, Serinhisar-Açıpayam arası, 37°29'31"N, 29°19'03"E, 879 m, 12.IV.2006, 2 ♀♀, leg. C. Çobanoğlu, B. Gülcü; Düzce: Düzce-Akçakoca arası, 41°00'05"N, 31°11'15"E, 261 m, 9.VII.2005, 3 ♂♂, leg. B. Gülcü; Hatay: Yayladağı, 35°55'20"N, 36°02'86"E, 437 m, 16.V.2006,

8 ♀♀, Altınözü, 36°06'57"N, 36°16'27"E, 204 m, 17.V.2006, 3 ♀♀, Kırıkhan-Belen arası, 36°27'23"N, 36°18'70"E, 90 m, 17.V.2006, 6 ♀♀, leg. C. Çobanoğlu, S. Hazır; Kahramanmaraş: Kahramanmaraş-Türkoğlu arası, 37°29'08"N, 36°53'67"E, 460 m, 18.V.2006, 2 ♀♀, leg. C. Çobanoğlu, S. Hazır; Karabük: Bartın-Safranbolu arası, 41°26'54"N, 32°44'52"E, 364 m, 10.VII.2005, 2 ♂♂, leg. B. Gülcü; Kastamonu: Kastamonu-Ilgaz arası, 41°07'04"N, 33°45'14"E, 1274 m, 11.VII.2005, 1 ♂, leg. B. Gülcü, Tosya-İskilip arası, 40°56'18"N, 34°15'10"E, 1507 m, 19.VI.2006, 1 ♀, 1 ♂, Türbe dağı geçiti, 40°56'14"N, 34°12'33"E, 1625 m, 19.VI.2006, 2 ♀♀, leg. B. Gülcü, E. Scheuchl; Kayseri: Kayseri-Erciyes arası, 38°36'57"N, 35°30'48"E, 1680 m, 20.VI.2006, 2 ♀♀, leg. E. Scheuchl; Kırıkkale: 39°55'25"N, 33°59'05"E, 1165 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan; Kırşehir: Mucur-Nevşehir arası, 38°58'59"N, 34°32'76"E, 1149 m, 4.VI.2005, 2 ♂♂, leg. B. Gülcü, S. Hazır; Konya: Kulu, 38°54'98"N, 32°59'56"E, 1140 m, 19.V.2005, 3 ♂♂, Seydişehir, 37°23'45"N, 32°02'18"E, 1090 m, 25.V.2005, 1 ♂, leg. S. Hazır, Ahırlı-Bozkır arası, 37°15'06"N, 32°09'00"E, 1201 m, 21.V.2007, 1 ♀, leg. B. Gülcü, S. Hazır, Bozkır-Yalnızca arası, 37°09'58"N, 32°15'75"E, 1464 m, 21.V.2007, 1 ♀, leg. B. Gülcü, Akören, 37°31'22"N, 32°38'71"E, 1030 m, 23.V.2007, 1 ♀, Akören-Seydişehir arası, 37°28'22"N, 32°20'69"E, 1159 m, 23.V.2007, 2 ♀♀, leg. B. Gülcü, S. Hazır; Kütahya: Emet-Tavşanlı arası, 39°23'66"N, 29°21'27"E, 1172 m, 5.VI.2007. 4 ♀♀, 39°27'30"N, 29°19'03"E, 881 m, 5.VI.2007, 1 ♀, Tavşanlı-Harmancık arası, 39°34'91"N, 29°24'85"E, 851 m, 5.VI.2007, 4 ♀♀, leg. C. Hazır, S. Hazır; Manisa: Salihli, 16.VII.2005, 1 ♀, leg. B. Gülcü, S. Hazır, Demirci-Simav arası, 39°04'48"N, 28°43'36"E, 1260 m, 4.VI.2007, 1 ♂, leg. C. Hazır, S. Hazır; Mersin: Mut, 21.V.2005, 1 ♂, Sarıkaya-Sarıkavak arası, 37°05'80"N, 34°42'40"E, 920 m, 22.V.2005 1 ♂, Esenpinar, 36°35'40"N, 34°07'20"E, 810 m, 23.V.2005, 1 ♀, leg. S. Hazır, Mut-Sertavul arası, 36°47'94"N, 33°20'00"E, 1165 m, 23.V.2007, 1 ♀, leg. B. Gülcü; Muğla: Milas-Yatağan arası, 37°18'46"N, 27°59'88"E, 675 m, 27.V.2007, 2 ♀♀, leg. E. Scheuchl; Nevşehir: 38°58'59"N, 34°32'76"E, 1150 m, 4.VI.2005, 1 ♂, leg. E. Scheuchl; Samsun: Tekkeköy, 24.VII.2004, 1 ♀, leg. S. Hazır; Sivas: Koyulhisar-Mesudiye arası, 40°18'24"N, 37°51'38"E, 1221 m, 12.VIII.2005, 1 ♀, leg. B. Gülcü, S. Hazır; Yozgat: Akdağ madeni çevresi, 39°40'86"N, 35°45'89"E, 1254 m, 18.VI.2005, 1 ♀, Ozan köyü, 39°48'82"N, 35°08'42"E, 1166 m, 18.VI.2005, 1 ♀, leg. A.B. Yasan.

Andrena gazella Friese, 1922

http://species-id.net/wiki/Andrena_gazella

Synonym: *Andrena gazella* ssp. *gazella* Friese, 1922

Distribution in Turkey. Diyarbakır, Erzurum, Mersin (Sertavul), Şanlıurfa (Warncke 1974); Erzurum (Özbek 1976).

Material examined. Ankara: Gümüş-Çerkes arası, 40°41'15"N, 32°43'57"E, 1606 m, 18.VI.2006, 1 ♀, leg. B. Gülcü, E. Scheuchl; Çankırı: Saçaklıbeli dağ geçiti, 40°41'53"N, 33°00'46"E, 1473 m, 18.VI.2006, 3 ♀♀, 1 ♂, leg. B. Gülcü, E. Scheuchl.

chl; Burdur: Dirimli dağ geçiti, 36°55'56"N, 29°38'39"E, 1350 m, 6.VI.2006, 1 ♀, leg. C. Cobanoğlu, E. Scheuchl; Karabük: Eflani yolu, Yağlıca köyü, 41°23'13"N, 32°50'06"E, 953 m, 10.VII.2005, 1 ♀, leg. B. Gülcü.

***Andrena gravida* Imhoff, 1832**

http://species-id.net/wiki/Andrena_gravida

Distribution in Turkey. Balıkesir (Bigadiç), İstanbul (Büyükdere, Belgrad ormanı), İzmir (Selçuk), Karaman (Madenşehir), Kayseri (Erciyes dağı), Manisa (Kayapınar) (Warncke 1974).

Material examined. Aydın: Aytepe, Adnan Menderes Üniversitesi Kampüsü, 37°51'48"N, 27°51'49"E, 197 m, 24.IV.2011, 1 ♀, 3 ♂, leg. E. Scheuchl.

Discussion

Sandbees are morphologically similar and genera or subgenera are often difficult to differentiate typologically (Michener 2007). Currently 101 subgenera have been recognized with 51 of them restricted to the Palearctic (Dubitzky et al. 2010). Warncke (1975) recorded 294 species and 53 subgenera from Turkey demonstrating that it has a rich *Andrena* fauna with more than half of the subgenera and about 20% of species in the world. This result can be partially explained by its climatic richness. Turkey has Mediterranean, Iranian-Turanian and Euro-Siberian phytogeographical regions which lie at the intersection of different topographic-climatic features. This produces a wealth of plants and arid land which is suitable for building nests of *Andrena* species and may have been a driver in bee diversity.

The present study was a faunistic survey to determine the distribution of biological diversity of the genus *Andrena* in Turkey. The highest number of *Andrena* species (107 species) was found in Central Anatolia. This region has steppes and a dry continental climate. It occurs in the Iran-Turanian phytogeographic region with rich floral diversity (Avci 2005). This wealth of plant diversity and an abundance of dry land is conducive for nest building and may have encouraged *Andrena* species diversity.

The numbers of *Andrena* species in the Black Sea, Eastern and Southeastern Anatolia regions were lower than those found in Central Anatolia for reasons relegated mostly to access to collecting sites. In the case of the Black Sea region it is because it receives rain at any time of the year which often prevents the collection of sufficient samples at flowers. Warncke collected bee samples in Black Sea region in different years and identified 59 species. Compared with other regions in Turkey, the Black Sea region represents the lowest number of *Andrena* species (Warncke 1966, 1969, 1974, 1975). Contrastingly, security problems in East and Southeast Anatolia regions substantially limited our field studies for political and safety reasons. We hypothesize that the diversity of *Andrena* species will be higher in future field studies in these regions with unfettered

access because Özbek (1976) identified 134 species in the Eastern region and Warncke (1966, 1969, 1974, 1975) also identified 64 species in the South East region.

In this study, 9 species in the genus *Andrena* in the Eastern region were identified. Seven of them had been recorded by Özbek (1975) in the same region. However, *A. dubiosa* and *A. cubiceps* species were recorded as a first time from Erzincan and Erzurum province, respectively.

The distribution of *A. dubiosa* in Central and Southern Anatolia regions and *A. cubiceps* in Aegean, Central, Marmara, Mediterranean and Southern Anatolia regions had been reported by Warncke (1966, 1969, 1974).

According to our data, *A. humilis*, *A. labialis* and *A. truncatilabris* are the most widely spread species in Turkey. These species were found in 6 geographic regions. *A. humilis* was reported in two regions of Turkey before (the Black Sea and Marmara regions) by Warncke (1966, 1969) whereas, *A. labialis* was reported in five regions of Turkey (Fahringer and Friese 1921, Fahringer 1922, Warncke 1974, Özbek 1976). *A. humilis* species was found for the first time in Aegean region with this study. It is known that *A. truncatilabris* prefers steppe areas and we have commonly found them in Central Anatolia. Although we haven't found *A. truncatilabris* in the Eastern region, previous studies reported that this species was present in this region (Özbek 1976). Thus, *A. truncatilabris* has been reported in every region of Turkey. Other common species are *A. lamiana*, *A. flavipes*, *A. panurgimorpha* and *A. fulvitarsis* have seen in all parts of the country (Warncke 1974).

The most number of specimens (154 females and 45 males) belong to *A. flavipes*. This species was collected from 5 different geographical regions (the Mediterranean, Aegean, Central Anatolia, Black Sea, and Marmara regions) and 31 provinces. However, this species was recorded in the Eastern region (Özbek 1976). Warncke (1974) reported that *A. flavipes* was an ubiquitous species. Özdek (1978) reported that populations of this species could be found close to honey bee populations in some regions in apple orchards. The high prevalence of *A. flavipes* may be explained by having a long flight period with two generations per year, polylectic host behavior and high ecological flexibility of the species (Özbek 1975; Osytshnjuk et al. 2005). Although *A. flavipes* species had generally big populations, some of the species were rarely encountered. These were: *A. erberi*, *A. astica*, *A. torda*, *A. cubicepsella*, *A. mucida*, *A. cussariensis*, *A. nitida*, *A. oralis*, *A. iliaca*, *A. propinqua*, *A. haemorrhoa*, *A. bassana* ssp. *etesia*, *A. delphiensis*, *A. paramythensis*, *A. rufo-maculata*, *A. seitzii*, *A. tscheki*, *A. schulzi*. Only one specimen was caught from these species. Having a short flight period and/or specific host plant preference could be the reason of low prevalence.

The presence of *A. elisaria* and *A. platalea* are confirmed in the Mediterranean region for the first time with this study. However, the previous studies recorded *A. elisaria* and *A. platalea* species in the Eastern and Southeastern Anatolia regions (Gusenleitner 1998) and the Central and Eastern Anatolia regions (Warncke 1974, 1975; Özdek 1976), respectively.

Similar to previous studies, we have collected some species from only one region of Turkey. *A. tenuis*, *A. selcuki* and *A. stellaris* were obtained from only Central Anatolia region. On the other hand *A. mistrensis*, *A. efeana*, *A. propinquua*, *A. delphiniensis* and *A. heinrichi* were obtained from only Aegean region. *A. paramythensis* and *A. rufomaculata* were determined in Mediterranean region. *A. schulzi* and *A. iliaca* were obtained from only Marmara and Southeastern Anatolia region, respectively. According to the data, the distribution of these species is possibly restricted to the determined regions.

Dubitzky (2005) indicates that most of the *Andrena* species fly from early spring until early summer and a few species occur in the summer or fall. The data obtained in our study support this observation. *Andrena* species are usually active in the spring according to our results. The flight period of the 112 identified species and 2 subspecies were between April and June.

According to our data, *A. bicolor* and *A. thoracica* have a longer flight period than previously reported. Although *A. bicolor* and *A. thoracica* were collected from April to July and April to August, respectively (Warncke 1966, 1974; Özbek 1976), we obtained them from February to August. Considering the long flight period of *A. thoracica* and *A. bicolor*, it is reasonable to hypothesize that these species are bivoltine in Turkey.

In this study, two *Andrena* species, *A. propinquua* and *A. paramythensis* were identified as a first record in Turkey.

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Males of Neotropical social wasps (Vespidae, Polistinae, Epiponini) recognize colonies with virgin females

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Abstract

Male behavior of Neotropical swarm-founding wasps has rarely been observed. The few published observations about male activities only describe their behavior during the short period they spend inside nests. In consequence, virtually nothing is known about what they do outside the colonies, and even less is known about mating behavior. This paper provides the first report of Epiponini males arriving at a colony with virgin females. The behavior of males and workers after queen removal was observed in one colony of *Chartergellus communis* located at a farm in Pedregulho, São Paulo, Brazil. The day after queen elimination, males were observed outside the nest. When males tried to enter the nest, workers aggressively attacked them. These attacks were similar to the defensive behavior used when foreign conspecifics attempt to enter the nest. The aggressive workers response and the absence of males before queen removal indicated that the males did not belong to the colony. Additionally, no fights were observed between individuals before queen removal. It is likely that foreign males arrived at the colony to mate with virgin females. Observations suggest that epiponine males are able to find nests with virgin females in mature stages of the colony cycle, and that mating can occur during different stages of the colony cycle.

Keywords

Males, social wasps, queenless, colonies

Introduction

Females are the foundation of Hymenoptera societies: queens are responsible for reproduction, and female workers perform all the tasks related to colony maintenance. Males do not play any essential social role in the colony, rather, they represent an energetic cost because they frequently request or rob food from workers (Turillazzi 1985). For this reason, workers frequently attack males and drive them from the colony (West-Eberhard 1969, Kasuya 1983). Males of social Hymenoptera usually spend little time in their natal colonies, eventually departing to search for unrelated females with which to mate (Strassmann 2001).

Males of Epiponini wasps have been observed only during certain periods of the colony cycle: in the male production phase (Noll and Zucchi 2002), during colony foundation (Richards 1978, Castellón 1982, West-Eberhard 1982, Strassmann et al. 1997), and during the swarm emigration in *Apoica* (Howard et al. 2002). These observations suggest epiponine mating may occur in newly established nests. According to West-Eberhard (1982) males could follow the scent trail of the founding swarm looking for virgin females with which to copulate. In fact, males of social Hymenoptera could be attracted by pheromones released by females, or females could be attracted by pheromones released by males in aggregations (Hölldobler and Bartz 1985, Ayasse et al. 2001). Nevertheless, some males of social wasps (like *Parachartergus colobopterus*) and bees search for virgin females around nests (West-Eberhard 1982, Boomsma et al. 2005). Regardless, the behavior of males has been poorly studied in Epiponini, and mating has never been observed for any species, so nothing is virtually known about their reproductive strategies, let alone how and where males search for females. Here we provide the first report of Epiponini males arriving at a colony with virgin females.

Material and methods

One colony of *Chatebergellus communis* was observed for six months (05/2010 to 07/2010, 09/2010 to 11/2010), twice a week, four hours a day; at a farm located in Pedregulho, São Paulo State, Brazil (20°15'S; 047°27'W (DDM), 1041 m AMSL). A section of nest envelope was cut, and put back (as a door) every day, in order to perform the observations. To identify queens, some eggs were eliminated to stimulate oviposition. All queens and a sample of workers ($N=40$) were individually marked with quick-drying paint. During the first month of observations 11 females were observed laying eggs. Nevertheless the number of reproductive females decreased, until one remained as the sole egg layer in a colony of 298 adults. After five months of observations (24/10/10) the queen was eliminated in order to study the behavior of workers in an orphaned colony. Before queen removal the colony never passed through a male production stage, additionally no males were observed outside or inside the colony. After queen elimination males were observed flying outside the colony, their behavior and worker response to male presence were observed for three days after queen removal.

Results

The day after queen elimination males were observed outside the colony. Males constantly tried to get into the nest (by the entrance and by the open door) inducing an aggressive response from workers. When workers perceived the presence of males, they immediately flew off the nest to face them and prevent their entrance. Workers fought aggressively against males during flight: they struck, bit, and grasped the male body. Sometimes fights were so violent that males and workers fell to the ground and continued fighting; one male was dead after an encounter with a worker. Before queen removal no aggressive behaviors were observed between colony members.

Discussion

The workers' response against males was similar to the defense response used when foreign individuals try to get access to colonies. Aggressive behaviors toward arriving males were also observed in a colony of *Polybia liliacea* in Brazil (Jeanne pers. comm) and in a colony of *Vespa crabro* (Bunn 1988), where workers attacked males when they tried to get inside the nest. The degree of aggressiveness shown by *Chartergellus communis* workers towards arriving males suggests these males did not belong to the observed colony.

Social wasps can recognize nestmates (Pfennig et al. 1983, Gamboa et al. 1986). If males do not share chemical cues from the nest (Pfennig et al. 1983), they will be attacked because workers do not recognize them as colony members. If observed males were siblings of the colony, female response probably would be different. For example, even during the colony male-production phase where workers expel males from the colony through aggressive behaviors (darts, chasing and biting), interactions never resulted in the death of males (West-Eberhard 1969, Kasuya 1983, Chavarría and West-Eberhard 2010, Chavarría unpublished data). In these cases, nest mate recognition might influence the lower level of aggression against sibling males compared to that observed against outsiders (Pfennig et al. 1983, Gamboa et al. 1986).

The observations of males arriving at the colony after queen elimination suggest males were attracted to the nest. It is possible that queen elimination stimulated some workers to develop their ovaries (Fletcher and Ross 1985) given that many of the females were observed trying to lay eggs one week after queen removal (unpublished data). Females could release pheromones or secretions from the venom gland (Post and Jeanne 1984) to signal they were receptive to copulate (Ayasse et al. 2001), attracting foreign males as a result. Something similar was observed in ants, where gynes within their natal nest "call" males that fly in search of mates (female-calling syndrome: Hölldobler and Bartz 1985). According to Boomsma et al. (2005) and Bunn (1988) males of social insects that hover around nests containing virgin females, usually copulate near to the nest. Unlike primitive social wasps, queens and potential reproductives of Epiponini wasps remain in the nest. Therefore their mating strategy could be associated

with males patrolling and searching for virgin females. These males may be attracted by pheromones and they probably mate close to or inside the nest.

Our observations on *Chartergellus* suggest that mating strategies could involve the active searching for receptive females by males. Nevertheless, since epiponines show a great deal of variation in nest architecture, morphological caste syndromes, colony size, and distribution (Richards 1978), it can be expected that they also exhibit a variety of male mating strategies across species. For this reason, our observations cannot be generalized to all epiponines, nevertheless they show that males are able to find nests with virgin females in mature stages of the colony cycle. In contrast to previous findings (Ross and Carpenter 1991), our results suggest that mating in Epiponini would not necessarily occur at the time of colony foundation. This would be an important trait for colony survivorship, since in case of queen loss males could find a nest with no inseminated females and copulate, ensuring colony reproductive success. Probably mating occurs whenever a colony requires, and this may occur during colony foundation, or later in the colony cycle as West-Eberhard (1978) observed. Although more observations on male behavior are necessary, the observations reported here show that mating strategies of Epiponini could be complex, and mating can occur during different stages of the colony cycle.

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Lasioglossum (*Acanthalictus*) *dybowskii* (Hymenoptera, Halictidae) newly recorded from South Korea, with a checklist of the genus *Lasioglossum* in Korean Peninsula

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Abstract

Lasioglossum (Acanthalictus) dybowskii is recorded from South Korea for the first time. The species is re-described, and drawings and photographs of taxonomically important characters are added. Bionomical data such as flight and flower records and habitat are reported. A checklist of the genus *Lasioglossum* in the Korean Peninsula is presented.

Keywords

Hymenoptera, Halictidae, *Lasioglossum*, *Acanthalictus*, Korean Peninsula, checklist

Introduction

The halictine bee subgenus *Acanthalictus* Cockerell of the genus *Lasioglossum* Curtis (Halictidae, Halictinae) is a monotypic group and is known only from the Far East Asia (Michener 2007). It is also placed in the *Hemihalictus* series (weak-veined *Lasioglossum*) because of the weak second submarginal vein of the female fore wing. According to recent phylogenetic analyses based on molecular data, this informal group is monophyletic (Danforth et al. 2003; Gibbs et al. 2012). However, the systematics

in *Hemihalictus* series are not clear, due to lack of adequate study on the phylogenetic relationships and definition of each included subgenus.

First author, Murao, had the opportunity to examine specimens of *Acanthalictus* collected in Eastern Asia. In the course of his examination, he found *L. dybowskii* from South Korea, never before recorded from that area. In this paper, we report the new locality data of *L. dybowskii* in the Korean Peninsula, provide a redescription and some bionomical notes for the future reconstruction of systematic and phylogenetic analysis. We also give a checklist of Korean *Lasioglossum* that will be useful in promoting the study of Korean halictine bee fauna.

Material and methods

This study is based on the specimens deposited in the Entomological Laboratory, Faculty of Agriculture, Kyushu University, Fukuoka, Japan (ELKU), the late Dr. Shoichi F. Sakagami's collection deposited in the Museum of Nature and Human Activities, Hyogo, Japan (MNHAH), the Plant Quarantine Technology Center, Suwon, South Korea (QIA), and the first author's private collection (without abbreviation). Terminology used in the description follows Murao and Tadauchi (2007), partly Sakagami and Tadauchi (1995), and Gibbs (2010). Abbreviations used in the text are as follows: BL = body length; WL = wing length; HL = head length; HW = head width; IOD = interocellar distance; OOD = ocellocular distance; OCD = ocellooccipital distance; UOD = upper interorbital distance; MOD = maximum interorbital distance; LOD = lower interorbital distance; IAD = interantennal distance; AOD = antennocular distance; CAL = clypealveolar distance; CPL = clypeal length; EL = eye length; EW = eye width; GW = genal width; SPL = scape length; Fn = nth antennal flagellomere; FnL = length of nth flagellomere; FnW = width of nth flagellomere; MsW = mesosomal width; SCL = mesoscutellar length; MNL = metanotal length; MPL = metapostnotal length; MtW = metasomal width; Tn = nth metasomal tergum; Sn = nth metasomal sternum; IS = interspace between punctures (e.g., IS 0.5d means $\frac{1}{2}$ of the diameter of a puncture); PP = punctures. Body measurements are given in ranges followed by the average and standard deviation.

Taxonomy

The subgenus *Acanthalictus* Cockerell, 1924

Acanthalictus Cockerell, 1924: 184. Type species: *Halictus dybowskii* Radoszkowski, 1876, by original designation.

Evylaeus (*Acanthalictus*): Pesenko 2007a: 16–17.

Diagnosis. This subgenus is characterized in having the following features: 1) lower margin of clypeus reflected forward (Fig. 5); 2) female mandible with two apical teeth (Fig. 6); 3) basal elevation of male labrum high swelled, with longitudinal furrow

(Fig. 8); 4) male S2 gently swelled on apical part (Fig. 15); and 5) male S6 expanded apically as in Fig. 20 (Michener 2007; Pesenko 2007a). In this study, we noticed an additional apparently unique character, namely the female labrum lacking basal elevation (Fig. 7). The comparative morphological study of labrum has not been performed yet in the genus *Lasioglossum*, but this character state may be an autoapomorphy.

***Lasioglossum (Acanthalictus) dybowskii* (Radoszkowski, 1876)**

http://species-id.net/wiki/Lasioglossum_dybowskii

Figs 1–17, 19–25

Halictus dybowskii Radoszkowski, 1876: 110 [Lectotype: Institute of Systematic and Experimental Zoology, Polish Academy of Sciences, Krakow, Poland; ♀, Amur (Khabarovsk Terr., Russia designated by Pesenko 2007b: 107,); Cockerell 1924: 582 [♂]].

Halictus griseipennis Cockerell, 1924: 185 [Holotype: U. S. National Museum of Natural History, Smithsonian Institution, Washington, D.C., USA; ♀, Kongaus (Primorsky Terr., Anisimovka,), Russia]. Synonymy by Ebmer (1978a).

Evylaeus (Acanthalictus) dybowskii: Pesenko 2007b: 91 [in key], 107 [lectotype designated].

Lasioglossum (Evylaeus) dybowskii: Ebmer 1978a: 209, 211; Ebmer 1996: 284–285; Ebmer 2006: 568.

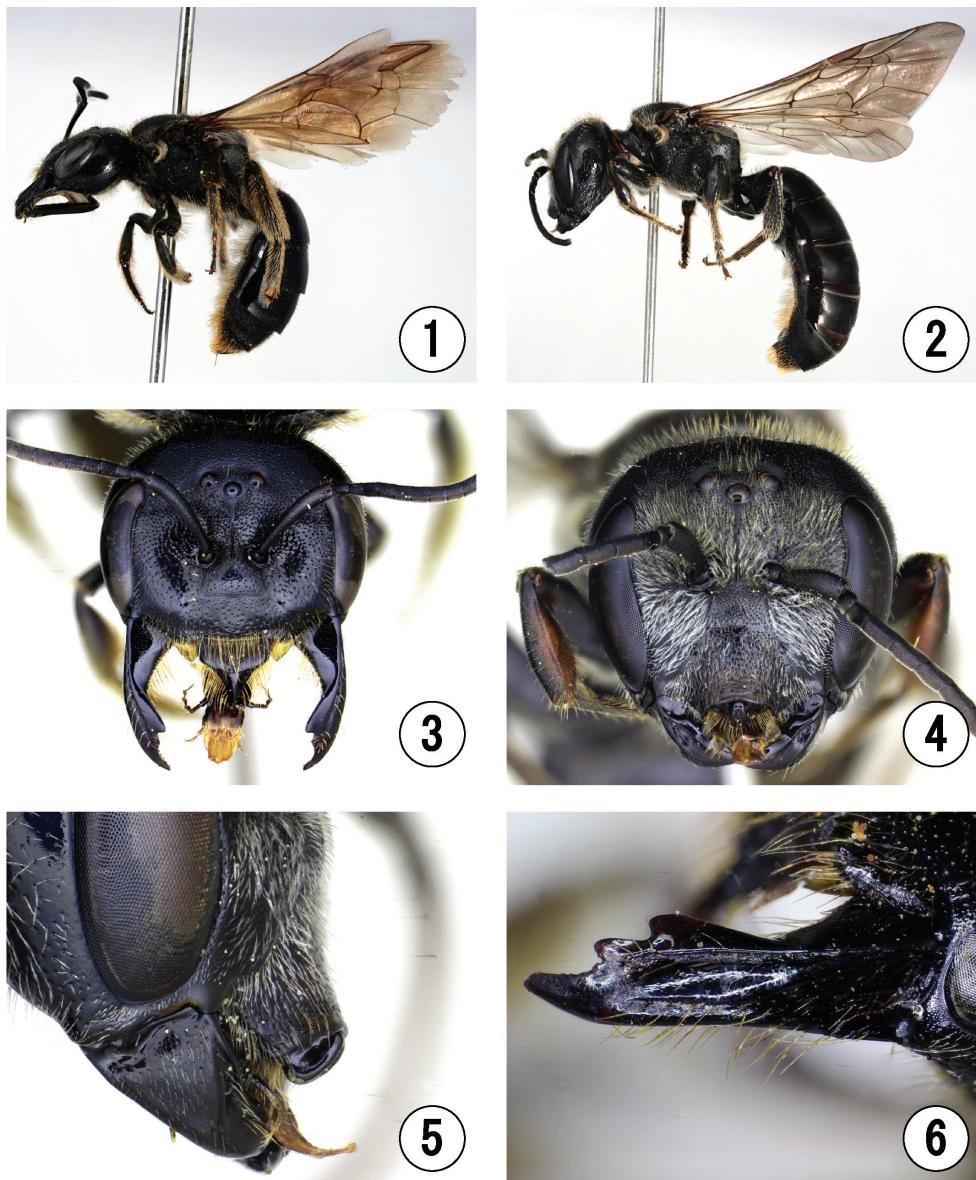
Specimens examined. [NORTH KOREA] **Gangwon-do:** 1 ♀, Mt. Kongōsan (= Mt. Kumgangsan), 8. ix. 1931 (C. Takeya, ELKU, illustrated in Fig. 6). [SOUTH KOREA] **Gangwon-do:** 2 ♀, Mt. Gariwangsan, alt. 1100m, Jeongseon-gun, N $37^{\circ}27'15''$, E $128^{\circ}1'10''$, 10. vi. 2013 (O. Tadauchi leg., ELKU); Mt. Gariwangsan, Jeongseon-gun, 3 ♀, 30. vii. 2013 (HS. Lee, QIA), 2 ♀ 1 ♂, 30. vii. 2013 (R. Murao, 1 ♀ illustrated in Figs 11, 13, 1 ♀ in Figs 1, 3, 9–10, 12–19, 1 ♂ in Figs 2, 4–5, 14–16, 20, 22–25); 1 ♀, Mt. Odaesan, alt. 900m, N $37^{\circ}47'0''$, E $128^{\circ}32'19''$, 9. vi. 2013 (O. Tadauchi, ELKU); 2 ♀, Jingogae, Mt. Odaesan, 27. vii. 2001 (HS. Lee, QIA); BougMyong-ri, DongSan-myon, ChunChon-gun, 1 ♀, 26. iv. 1992 (O. Tadauchi, ELKU), 1 ♀, 22. v. 1992 (O. Tadauchi, ELKU, illustrated in Fig. 7); 5 ♀, Hwangiri, Seo-myeon, Yangyang-gun, N $37^{\circ}56'25.8''$, E $128^{\circ}31'19.7''$, 29. iv. 2007 (HS. Lee, QIA); 2 ♀, Sangwonsa Temple, Mt. Chiaksan, Seongnam-ri, Sinlim-myeon, Wonju, 26. v. 2009 (HS. Lee, QIA). **Gyeonggi-do:** 3 ♀, KwangNung, Pochon-gun, 18. v. 1992 (O. Tadauchi, ELKU). [CHINA] 1 ♂, Mandschurei, Gaolinzsa, 10–14. ix. 1953 (V. Alin, MNHAH, illustrated in Figs 8, 21).

Distribution. Russian Far East, northeastern China, Korean Peninsula (north, south= new record).

Published records for Korean Peninsula. North Korea: Ebmer (1996).

Flight period. Female: April to September. Male: July to September.

Flower records. This species visited the following 9 species in 7 families listed as follows. Apiaceae: *Angelica anomala*. Asteraceae: *Cirsium japonicum*, *Taraxacum* sp. Brassicaceae: *Sisymbrium luteum*. Caprifoliaceae: *Viburnum erosum*. Fabaceae: *Lespedeza* sp. Oleaceae: *Ligustrum japonicum*. Rosaceae: *Crataegus* sp., *Neillia incise*.



Figures 1–6. *Lasioglossum (Acanthalictus) dybowskii* (Radoszkowski). **1–2** lateral habitus **3–4** head in frontal view **5** clypeus in lateral view **6** teeth of mandible. **1, 3, 6** female; **2, 4, 5** male.

Habitat in South Korea. One of the collecting sites (Mt. Gariwangsan) for this species is shown in Fig. 18. This site is mountain covered by both broad-leaved and coniferous forests. This species was collected on the flower of *Angelica anomala* (Fig. 17) at the forest edge.

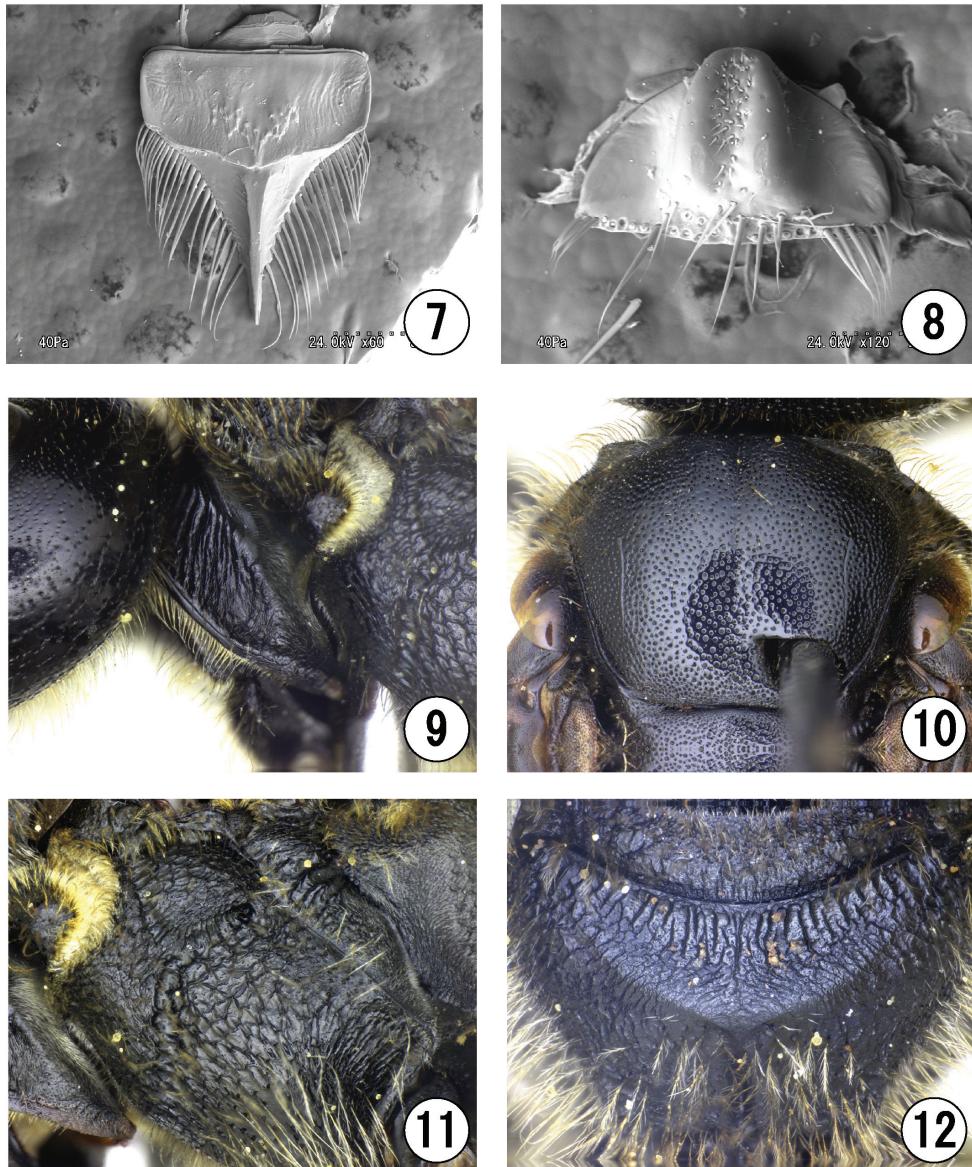
Redescription. Female. Coloration. Body black except for the following parts: flagellum dark brown or brown ventrally; tegula blackish brown, translucent; tibial spur yellow; wings transparent and dim, veins and stigma brown or blackish brown.

Pubescence. Body seta whitish to pale yellowish. Head with sparse erect setae. Mesosoma with sparse elect fine branched setae, and pronotum with thin tomentum marginally; hind trochanter to tibia with dense plumose or fine branched setae, forming scopa. T1 basally with sparse erect setae. T2–T3 basolateral with thin whitish appressed setae, forming basal setal bands. Discs of T2–T4 with sparse, short setae. Discs on S2–S5 with sparse semi-erect setae.

Measurements (n = 5): BL = 13.14–15.86 (14.06±1.09), WL = 11.43–13.00 (12.29±0.74); HL = 3.25–3.50 (3.32±0.12), HW = 3.80–4.40 (4.03±0.24), IOD = 0.48–0.55 (0.52±0.03), OOD = 0.80–1.00 (0.88±0.08), OCD = 1.15–1.40 (1.25±0.01), UOD = 2.55–2.90 (2.66±0.16), MOD = 2.90–3.35 (3.04±0.19), LOD = 2.93–3.38 (3.08±0.18), IAD = 0.40–0.55 (0.47±0.06), AOD = 0.95–1.15 (1.01±0.08), CAL = 0.42–0.48 (0.46±0.03), CPL = 0.61–0.66 (0.64±0.02), EL = 2.00–2.25 (2.09±0.10), EW = 0.75–0.85 (0.79±0.04), GW = 1.20–1.48 (1.28±0.12), SPL = 1.48–1.77 (1.60±0.11), F1L = 0.23 (0.23±0.00), F2L = 0.23 (0.23±0.00), F3L = 0.23 (0.23±0.00), F2W = 0.23–0.26 (0.23±0.01); MsW = 3.55–3.80 (3.71±0.12), SCL = 0.43–0.48 (0.45±0.02), MNL = 0.23–0.28 (0.25±0.02), MPL = 0.25–0.28 (0.26±0.01); MtW = 4.20–4.75 (4.44±0.22).

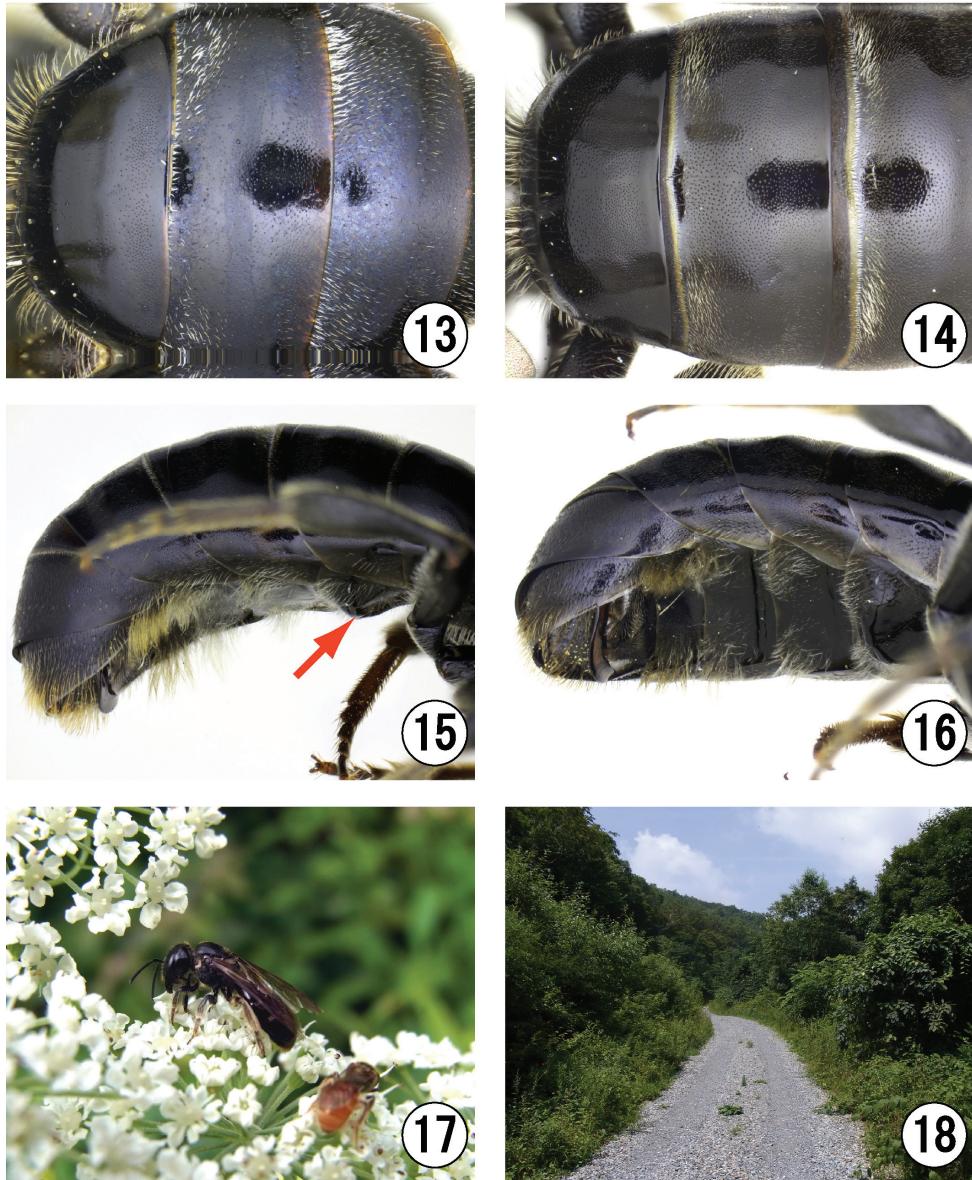
Structure and sculpture. Head wider than long; HW:HL = 1:0.82. Vertex flat in frontal view. MOD:UOD:LOD = 1:0.88:1.01. IOD:OOD:OCD = 1:1.69:2.40. IAD:AOD = 1:2.15. PP between ocellular area and vertex moderately dense, IS smooth (IS = 1–3d). Paraocular area with moderately dense PP, IS smooth; PP on lower paraocular area sparser than on upper ones (IS = 1–1.5d in upper, = 1–3d in lower areas). Frons with dense PP, IS smooth (IS = 0.5–1.5d). Supraclypeus slightly convex, with PP becoming gradually sparse lower part, IS smooth. CPL:CAL = 1:0.72. Clypeus flat and inclined, with sparse PP, IS smooth (IS = 1.5–5d). EW:GW = 1:1.61. Genal area with moderately dense PP, IS smooth (IS = 1–3d). Malar space linear. Occiput not carinate. Postgena slanting, with sparse PP and weak tessellation. Hypostomal carinae nearly parallel. Mandible long, approximately 1.3 × as long as EL. Labrum (Fig. 7): basal area approximately 2 × wider than long; distal process approximately 1.4 × as long as basal area, triangular, and without lateral projection; distal keel narrow, pointed apically. Antenna short, not reaching metasoma. F1–F3L:F2W = 1:1.00:1.00:1.03.

Dorsolateral angle of pronotum obtuse; lateral surface with oblique ridges on anterior half (Fig. 9); lateral ridge absent; lateral lobe rounded. Mesoscutum (Fig. 10) with dense PP, but PP on disc sparser than laterally (IS = 1–2d on disc, = 0.5–1d in the remainder); mesoscutum anteriorly shallowly depressed along middle parapsidal line; parapsidal line a narrow groove. Mesoscutellum similarly sculptured as mesoscutum. Metanotum rugulose. Mesepisternum (Fig. 11) reticulate-rugulæ over entire surface. SCL:MNL:MPL = 1:0.56:0.59. Propodeum: metapostnotum (Fig. 12) with



Figures 7–12. *Lasioglossum (Acanthalictus) dybowskii* (Radoszkowski). **7–8** labrum **9** lateral surface of pronotum **10** mesoscutum **11** mesepisternum **12** metapostnotum. **7, 9–12** female; **8** male.

longitudinal ridges that do not attain posterior margin, posteriorly weakly rugulose, posterior margin not carinate; dorsolateral slope with oblique ridges; lateral and posterior surfaces rugulose; posterior surface with lateral carinae on lower half, without oblique carina. Coxae of usual shape, without tubercle. Fore trochanter narrow, longer than wide. Basitibial plate of hind leg carinate marginally. Inner hind tibial spur serrate (Fig. 19). Fore wing with three submarginal cell.



Figures 13–18. *Lasioglossum (Acanthalictus) dybowskii* (Radoszkowski). **13–14** 1st to 3rd metasomal terga **15** 2nd metasomal sterna in lateral view (arrow indicate) **16** setae on metasomal sterna **17** female on the flower of *Angelica anomala* **18** collecting site at Mt. Gariwansan, South Korea. **13, 17** female; **14–16** male.

T1–T3 as in Fig. 13: disc of T1 medially with sparse fine PP, apically with moderately dense fine PP, and without lineolation over entire surface; discs of T2–T3 basally with sparse fine PP, the remaining parts sculptured similarly to T1. Disc of T4 with

moderately dense PP and very weak tessellation over entire surface. Metasomal sterna not modified.

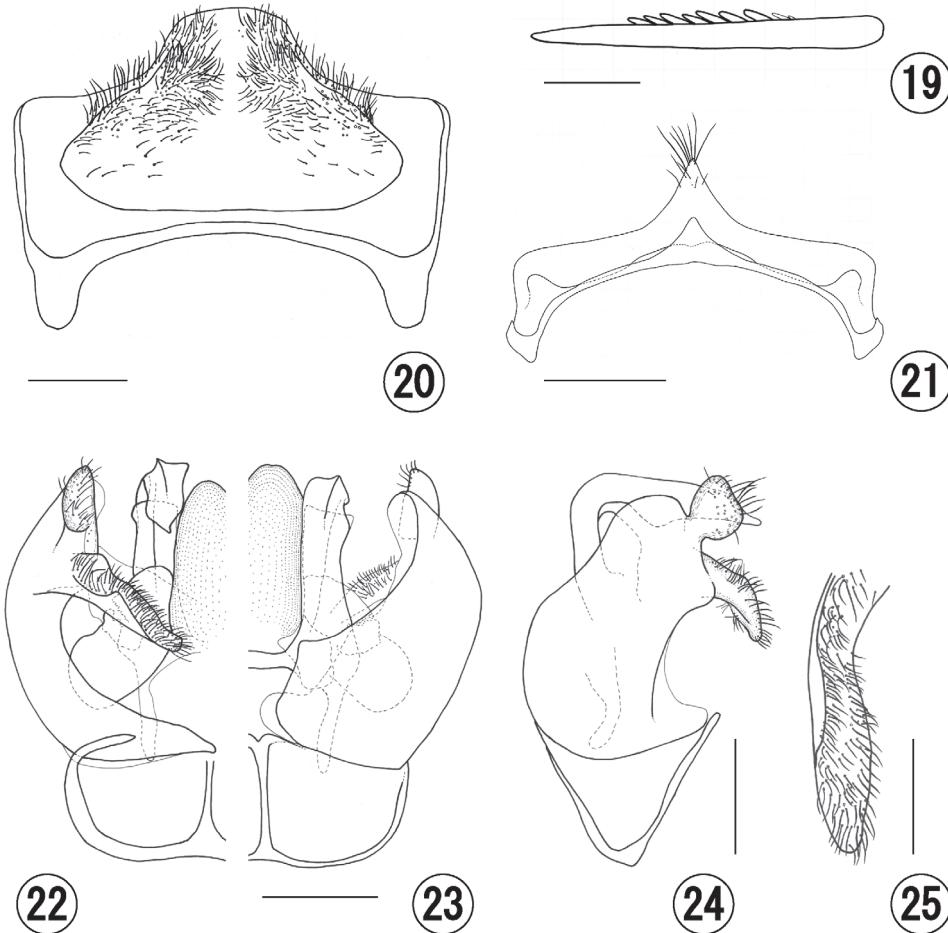
Male. Coloration. Body black except the following parts: clypeus slightly dark yellow on lower half; flagellum dark brown ventrally; pronotum anteriorly yellowish brown; tegula blackish brown, translucent; fore tibia reddish brown on outer surface; tibial spur yellow; wings transparent, veins and stigma pale brown.

Pubescence. Body setae whitish to pale yellowish. Head with sparse erect setae except for lower paraocular area that is covered with thin tomentum. Mesosoma with sparse erect fine branched setae, and pronotum with thin tomentum marginally. T1 basally with sparse erect setae. T2–T3 basolateral with thin whitish appressed setae. S2–S5 as in Fig. 16: S2 apicolaterally with sparse semi-erect fine branched setae; S3–S5 laterally with erect fine branched seta tufts; setae on S5 longer than on other sterna.

Measurements ($n = 1$, unit mm): BL = 17.14, WL = 13.14; HL = 3.70, HW = 3.75, IOD = 0.55, OOD = 0.85, OCD = 1.30, UOD = 2.50, MOD = 2.70, LOD = 2.25, IAD = 0.5, AOD = 0.7. CAL = 0.40, CPL = 0.94, EL = 2.40, EW = 0.85, GW = 1.25, SPL = 0.81, F1L = 0.26, F2L = 0.42, F3L = 0.42, F2W = 0.26; MsW = 3.70, SCL = 0.80, MNL = 0.50, MPL = 0.63; MtW = 3.85.

Structure and sculpture. Head as long as wide; HW:HL = 1:0.99. Vertex flat in frontal view. MOD:UOD:LOD = 1:0.93:0.83. IOD:OOD:OCD = 1:1.55:2.36. IAD:AOD = 1:1.4. PP between ocellocular area and vertex moderately dense, IS smooth (IS = 1–3d). Paraocular area with dense PP, IS smooth; PP on lower paraocular area sparser than on upper one (IS $\leq d$ in upper part, IS $\leq d$ or 0.5–2d in lower part). Frons with reticulate PP. Supraclypeus weakly convex with dense PP, IS smooth (IS = 1–1.5d). CPL:CAL = 1:0.43. Clypeus with dense PP, IS smooth (IS = 0.5–1.5d). EW:GW = 1:1.47. Malar space short, 0.19 \times as long as mandible at base. Genal area sparsely punctuate, IS = 1–8d. Occiput not carinate. Postgena slanting, with sparse PP and weak tessellation. Hypostomal carinae nearly parallel. Mandible edentate (without subapical tooth) and robust. Labrum without distal process. Antenna short, not reaching metasoma. F1–F3L:F2W = 1:1.63:1.63:1.00, F2L:F2W = 1:0.62; flagellum nearly flattened ventrally.

Dorsolateral angle of pronotum obtuse; lateral surface with oblique ridges on anterior half; lateral ridge absent; lateral lobe rounded. Tegula ovoid, with shallow and moderately dense PP (IS = 1–2d) on anterior half. Mesoscutum and mesoscutellum with dense PP over entire surface, IS smooth (IS = 1–1.5d); mesoscutum anteriorly deeply depressed along middle parapsidal line; parapsidal line a narrow groove. Metanotum and mesepisternum reticulate-rugulose over entire surface. SCL:MNL:MPL = 1:0.63:0.78. Propodeum: metapostnotum with irregular sinuate ridges that not attain posterior margin, posteriorly weakly rugulose, posterior margin not carinate; dorsolateral slope and lateral surface reticulate-rugulose; posterior surface with lateral carinae on lower half, without oblique carina, and with many oblique ridges over entire surface. Fore trochanter rounded and narrow, longer than wide. Hind tibia without basitibial plate. Hind basitarsus slender, approximately 6 \times as long as wide. Inner hind tibial spur finely serrate. Fore wing with three submarginal cell.



Figures 19–25. *Lasioglossum (Acanthalictus) dybowskii* (Radoszkowski). **19** inner hind tibial spur **20** 6th metasomal sternum **21** 7–8th metasomal sterna **22** genitalia in ventral view **23** genitalia in dorsal view **24** genitalia in lateral view **25** ventral retrorse lobe of genitalia, **19** female; **20–25** male. Scale bars: **19, 25**= 0.25 mm; **20–24**= 0.5 mm.

T1–T4 (Fig. 14 in T1–T3): disc of T1 medially and apically with fine PP that become gradually denser toward apical part, without lineolation; T2–T4 similarly punctuate as T1 nearly over entire surface, IS smooth. S7–S8 (Fig. 21): S7 with short and triangular median process; median process of S8 triangular, with sparse simple setae.

Genitalia (Figs 22–25): gonobase flat at the bottom, ventral arms not connected with each other at upper ends; gonocoxite smooth, and inner dorsal margin angulate at the approximately basal one-third; gonostylus located at ventral side of gonocoxite, and with sparse short setae; ventral retrorse lobe slender, not reaching gonobase, rounded apically, and with dense short setae.

A checklist of the genus *Lasioglossum* in Korean Peninsula

Forty species of *Lasioglossum* in total have been recorded from the Korean Peninsula by various researchers (Ebmer 1978b, 1995, 1996, 2006; Ebmer et al. 2006; Lee et al. 1999; Murao 2011; Murao and Tadauchi 2007, 2008, 2011; Pesenko 2006, 2007b). *Lasioglossum problematicum* (Blüthgen) known from Far East Asia is also recorded from North Korea by Ebmer (1978b) based on female specimens. After that, Pesenko (2007b) regarded the continental records of *L. problematicum* as *L. virideglaucum* Ebmer and Sakagami. Females of *L. problematicum* and *L. virideglaucum* cannot be distinguished from each other (Ebmer 2006; Murao et al. 2006), and the distribution of these species should be verified based on male specimens or a DNA analysis. In the following list, *Lasioglossum nipponicola* Sakagami and Tadauchi, *L. gorkiense* (Blüthgen), and *L. koreanum* Ebmer are synonymized by Pesenko (2006) as follows: *L. nipponicola* = *L. agelastum* Fan & Ebmer, *L. gorkiense* = *L. scitulum* (Smith), and *L. koreanum* = *L. occidens* (Smith). However, these synonymies need to be revised in a future study.

Lasioglossum series (strong-veined *Lasioglossum*)

1. *Lasioglossum denticolle* (Morawitz, 1891): North Korea (Ebmer 1978b)
2. *Lasioglossum exiliceps* (Vachal, 1903): North Korea (Ebmer 1996)
3. *Lasioglossum formosae* (Strand, 1910): North Korea (Ebmer 1978b). Pesenko (2006) recorded it from "Chanpen, Korean Peninsula".
4. *Lasioglossum gorkiense* (Blüthgen, 1931): North Korea (Ebmer 1978b)
5. *Lasioglossum kansuense* (Blüthgen, 1934): North Korea (Ebmer 1978b)
6. *Lasioglossum koreanum* Ebmer, 1978: North Korea (Ebmer 1978b)
7. *Lasioglossum nipponicola* Sakagami & Tadauchi, 1995: South Korea (Lee et al. 1999; Ebmer 2006)
8. *Lasioglossum primavera* Sakagami & Maeta, 1990: South Korea (Murao and Tadauchi 2011)
9. *Lasioglossum proximatum* (Smith, 1879): North Korea (Ebmer 1996)
10. *Lasioglossum subopacum subopacum* (Smith, 1853): South Korea (Murao 2011)
11. *Lasioglossum sutshanicum* Pesenko, 1986: North Korea (Ebmer 1996)
12. *Lasioglossum upinense* (Morawitz, 1890): North Korea (Ebmer 1996)

Hemibalictus series (weak-veined *Lasioglossum*)

13. *Lasioglossum affine* (Smith, 1853): North and South Korea (Ebmer 1978b; Murao and Tadauchi 2007; Pesenko 2007b)
14. *Lasioglossum albipes* (Fabricius, 1781): North Korea (Ebmer 1978b)
15. *Lasioglossum apristum* (Vachal, 1903): North and South Korea (Ebmer 1978b, 1995; Murao and Tadauchi 2007)
16. *Lasioglossum baleicum* (Cockerell, 1937): North and South Korea (Ebmer 1978b, 2006; Murao and Tadauchi 2007)
17. *Lasioglossum calceatum* (Scopoli, 1763): North Korea (Ebmer 1978b)
18. *Lasioglossum duplex* (Dalla Torre, 1896): South Korea (Murao and Tadauchi 2007)

19. *Lasioglossum dybowskii* (Radoszkowski, 1876): North and South Korea (Ebmer 1996; present study)
20. *Lasioglossum ellipticeps* (Blüthgen, 1923): North Korea (Ebmer 1978b)
21. *Lasioglossum fratellum betulae* Ebmer, 1978: North Korea (Ebmer 1978b)
22. *Lasioglossum hoffmanni* (Strand, 1915): North and South Korea (Ebmer 1978b, 1995, as *L. vulsum*; Murao and Tadauchi 2007)
23. *Lasioglossum kankauchare* (Strand, 1914): North Korea (Ebmer 1978b)
24. *Lasioglossum kiautshouense* (Strand, 1910): North Korea (Ebmer 1978b, 1996)
25. *Lasioglossum nipponense* (Hirashima, 1953): South Korea (Ebmer 2006; Murao and Tadauchi 2007)
26. *Lasioglossum pallilolum* (Strand, 1914): North and South Korea (Ebmer 1996, 2006)
27. *Lasioglossum percrassiceps* (Cockerell, 1931): South Korea (Murao and Tadauchi 2007)
28. *Lasioglossum problematicum* (Blüthgen, 1923) or *Lasioglossum virideglaucum* Ebmer & Sakagami, 1994: North Korea (Ebmer 1978b)
29. *Lasioglossum rufitarse* (Zetterstedt, 1838): North Korea (Ebmer 1978b)
30. *Lasioglossum sakagamii* Ebmer, 1978: North Korea (Ebmer 1978b)
31. *Lasioglossum sibiriacum* (Blüthgen, 1923): North and South Korea (Ebmer 1978b, 1995; Murao and Tadauchi 2007)
32. *Lasioglossum simplicior* (Cockerell, 1931): North Korea (Ebmer 1978b)
33. *Lasioglossum speculinum* (Cockerell, 1925): North Korea (Ebmer 1978b)
34. *Lasioglossum subfratellum* (Blüthgen, 1934): North Korea (Ebmer 1995)
35. *Lasioglossum subfulvicorne subfulvicorne* (Blüthgen, 1934): North Korea (Ebmer 1978b as *L. austriacum* Ebmer; Ebmer 1995)
36. *Lasioglossum taeniolellum* (Vachal, 1903): North Korea (Ebmer 1978b)
37. *Lasioglossum transpositum* (Cockerell, 1925): South Korea (Murao and Tadauchi 2008)
38. *Lasioglossum villosum trichopse* (Strand, 1914): North Korea (Ebmer 1978b)
39. *Lasioglossum viridellum* (Cockerell, 1931): North Korea (Ebmer 1978b)
40. *Lasioglossum vulsum* (Vachal, 1903): North Korea (Ebmer 1995, as *L. trispine*; Ebmer et al. 2006)

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