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A Revision of the Subgenus *Osychnyukandrena* of the Genus *Andrena* (Hymenoptera: Andrenidae)

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Abstract. The subgenus *Andrena* (*Osychnyukandrena*) is revised and a key to species of the subgenus is provided. One species, *Andrena* (*Lepidandrena*) *gamskrucki* Warncke, 1965 is transfered to this subgenus. *Andrena laticalcar* from Iran and *A. cochleariculcar* from Central Asia are reported as new records.

Key words: taxonomy, Hymenoptera, Andrenidae, *Osychnyukandrena, Andrena gamskrucki*, Central Asis, Iran, new record.

Introduction

Osychnyukandrena is a Central Asian subgenus of the genus *Andrena* erected by Michener, 2000 in recognition of the late Anna Z. Osytshnjuk as a replacement for *Calcarina* Osytschnjuk, 1993 for two species. Its type species is *Andrena cochleariculcar* Lebedev, 1933.

In this study, *Andrena gamskrucki* is added to this subgenus with a key to the species for females of this subgenus. This species does not show typical characters of species belonging to the subgenus *Lepidandrena*, its previous subgenus. These characters are including the short squamous hairs on the scutum and scutellum, the weakly convex clypeus, the long facial fovea, inner side of the hind femur with a strong carina and the dense short spines. We redescribe *Andrena cochleariculcar* Lebedev, 1933, *Andrena laticalcar* Osytshnjuk, 1985 and *Andrena gamskrucki* Warncke, 1965.

Diagnostic characteristics of *Andrena* (*Osychnyukandrena*)

Medium size bees; pronotum with dorsolateral suture, without humeral angle and ridge, densely tessellate; mesoscutom and scutellum densely punctured and shagreened; propodeal enclosure medium, densely tessellate with small rugulae; mesepisternum densely tessellate, tibial spurs spoon-shaped, toothed at margins, extremely curved near the tip to hook-shaped (typical character at subgenus level); metasomal terga with dense deep punctures, T1 prominent in curving area at the middle, pygidial plate medium, V-shaped with smooth surface.

Materials and Methods

The specimens studied were used as loans from the following institutes and collections: Biologiezentrum des Oberösterreichischen Landesmuseums (OLL), Linz, Austria; Klaus Warncke's collection in OLL (OLL-W); Entomological Laboratory, Kyushu University (ELKU) and Hayk Mirzayans Insect Museum (HMIM) in Plant pest research Institute, Tehran, Iran.

Morphological terms used in this paper mainly follow Michener (2007) and Tadauchi (1995). Abbreviations used are as follows: **PP** = punctures, **Ø** = puncture diameter; **IS**= ratio between diameter of a pucture and its distance to a nearby puncture; $\mathbf{T_n}$, $\mathbf{S_n}$ = metasomal tergum and sternum; $\mathbf{FL_n}$ = flagellomere; **L**, **W** = maximum length and width; **BL** = body length (from antennal base

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to tip of pygidial plate); **WL** = length of forewing including tegula; **HL** = head length, from top of vertex to lower margin of clypeus excluding process of labrum; **HW** = head W; **FVL**, **FVW** = maximum length and width of facial fovea; **FL1**, **FL2** = length of first and second flagellomeres of male (measured on ventral surfaces of flagellomeres when antenna stretched forward); **CPL** = clypeal L; **MXP** = maxillary palpus; **GW** = width of genal area seen laterally; **OOD** = ocellocular distance; **POD** = postocellar distance; **OCD** = ocelloccipital distance; **MsW** = mesosomal width (between outer rims of tegulae); **MtW** = metasomal width (maximum width of terga from dorsal view). All measurements were done using an ocular scale (reticule) coupled to a stereomicroscope.

To describe the size of propodeal enclosure the ratio of this area to its dorsolateral area was considered as follows: it is assumed small/medium/large if the area is less than/equal/more than 1/3 of the whole propodeal area. For preparation of male genitalia, hidden male sterna and the repositioning of some appendages, like antenna and other body parts for better observation of their characters, relaxing method was used (Plant & Dubitzky, 2008). In this method, using hot steam water and high pressure in a tightly shut glass container, specimens could be relaxed more quickly than in a conventional relaxing chamber.

Key to the species of the subgenus *Andrena* (*Osychnyukandrena*)

Females

1 Clypeus shagreened, shiny but not steely; facial fovea long, exceeding far beyond a line at lower margins of antennal fossae …… 2

– Clypeus smooth and steely shiny; facial fovea shorter, not exceeding beyond a line at lower margins of antennal fossae; [scutum and scutellum with simple long tawny hairs; outer and inner margins of tibial spurs of midlegs very close to each other] …… *A. gamskrucki*

2 Process of labrum wide, rounded apically; clypeus not strongly convex; facial fovea quadrangle, occupying 1/2 or less of the distance between compound eye and lateral occeli; [tibial spurs of midlegs short, outer and inner margins typically far from each other] …… *A. cochlearicalcar*

– Process of labrum emarginated; clypeus strongly convex; facial fovea occupying more than 3/4 of the distance between compound eye and lateral occeli …… *A. laticalcar*

Andrena (Osychnyukandrena) cochlearicalcar Lebedev, 1933

(Figs. 1B, 2)

Andrena cochlearicalcar Lebedev, 1933, Konowia, 12: 61 [Usbekistan]; Gusenleitner & Schwarz, 2002, Entomofauna, 12 (suppl.): 187.

Female. BL 7.6-7.9 mm, WL 5.5-5.9 mm (n=2).

Color. Flagellum brown beneath; mandibles black with apical half reddened; wing membranes subhyaline, pale brownish, veins and pterostigma brownish; tibial spur yellowish brown; posterior margins of metasomal terga narrowly reddish brown.

Pubescence. Hairs on head slightly dense, whitish; those on clypeus sparse, short 100-200μm, whitish, with lateral fringes, those on vertex long 300-350μm, whitish, those on genal area dense, whitish, short, 150-200μm, facial fovea whitish. Hairs on mesoscutum sparse, short 100-150μm, whitish; those on scutellum sparse, short 100-250μm, whitish, those on mesepisternum slightly dense, long 300-400μm, whitish, propodeal corbicula poor, with short dorsal hairs, with internal yellowish short simple hairs, slightly dense, without anterior fringes; trochanteral floccus imperfect, yellowish, femoral floccus dense, with not very long pinnate hairs, yellowish white; tibial scopa long, dense, pinnate, yellowish white. Hairs on metasomal terga scanty, T_1 with short, sparse suberect,

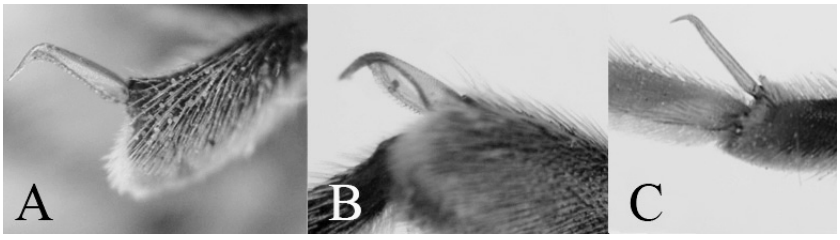

Fig. 1. Tibial spurs of midleg of three species in the subgenus *Osychnyukandrena*, A: *A. laticalcar*, B: *A. cochlearicalcar*, C: *A. gamskrucki*.

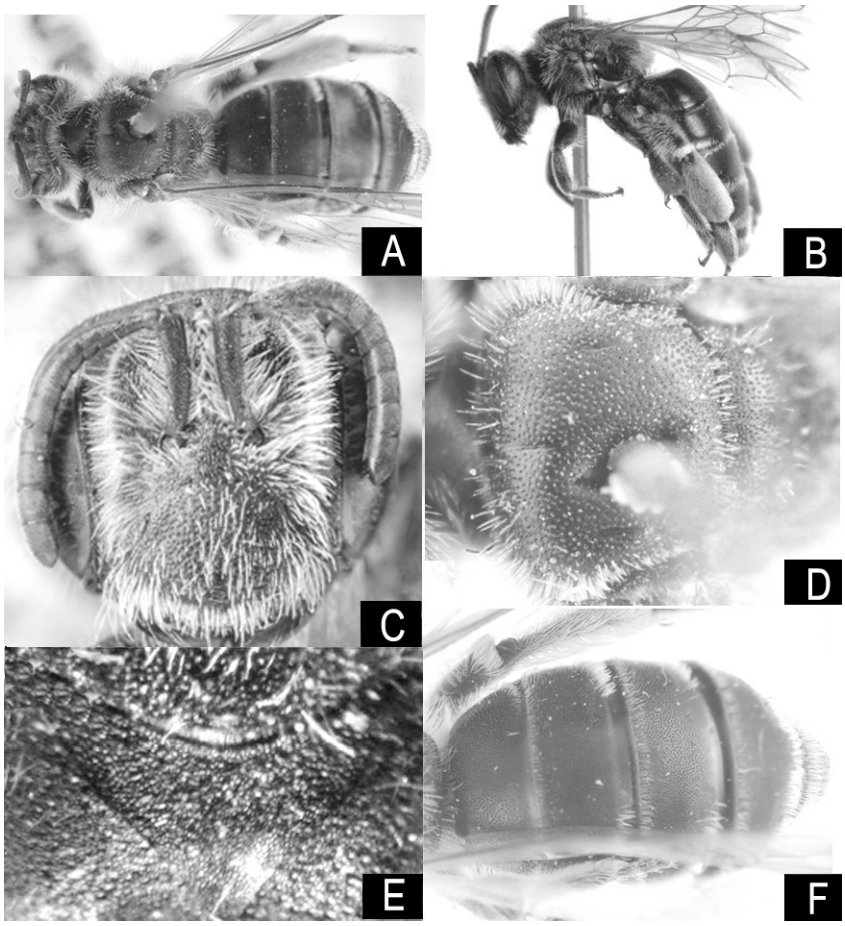

Fig. 2. *Andrena (Osychnyukandrena) cochlearicalcar* Lebedev, 1933, female. A: general habitus in dorsal view; B: the same in lateral view; C: head in frontal view; D: mesoscutum; E: propodeum; F: metasoma.

whitish hairs, T_{2-3} with dull whitish, with broadly interrupted hair bands, T_4 with complete whitish hair band; caudal fimbria golden; S_{2-5} with nearly long, sparse, yellowish subapical fimbriae.

Structure. Head: HL/HW = 0.90. HW: MsW: MtW= 1: 1: 1.2. Vertex nearly concave in frontal view, shagreened and shiny, with fine, obscure, small PPØ25μm, IS = 1. OOD: POD: OCD: = 3: 3: 1. FL1= FL2+FL3, FL2≤FL3 which are broader than long. Eyes with inner margins subparalleled. Facial fovea long and narrow, nearly quadrangle, extending beyond a line at lower margins of antennal fossae, FVL = 1.1 mm, FVW = 0.2 mm. Supraclypeal area flat, shiny, densely punctate, with small rugulae. Face above antennal fossae with fine longitudinal rugulae, interrugal area smooth and shiny. Facial quadrangle broader than long or quadrate. Clypeus convex, densely shagreened, dull, with dense, small PPØ25-30μm, IS ≤ 1, without longitudinal median impunctate space, CPL = 0.8 mm. Process of labrum semicircular. Lower paraocular area smooth and shiny, with dense, slanting minute PPØ25μm, IS = 1. Malar space linear. Genal area slightly broader than eye, GW: EW = 0.6:0.55, surface tessellate and shiny with irregular small, PPØ10-25μm, IS = 1. Mesosoma: pronotum without distinct dorsolateral suture and humeral angle, tessellate and shiny with dense, distinct, PPØ25μm, IS = 0.5. Mesoscutum shagreened, punctate, shiny with fine, dense, distinct PPØ30μm, IS = 1. Scutellum smooth and shiny, punctate, shiny with dense PPØ30μm, IS = 0.5-1. Propodeal enclosure medium to large, triangular, well indicated, rugulose basally, shagreened apically; dorsal face of propodeum similar to enclosure area with shallow small PPØ20μm. Mesepisternum finely tessellate, with sparse PPØ20μm. Vein 1st *m-cu* meeting second submarginal cell at middle of cell. Mid tibial spur short, spoon-shaped and hooked at apical. Hind tibial spur widened at base, curved and narrower towards apically, with distinct teeth. Metasoma: metasomal terga T1 very weakly

tessellate, T_{2-4} smooth, shiny, T_{1-4} with dense small PPØ25-30μm, IS = 0.5-1; posterior depressions of terga weakly indicated; pygidial plate V-shaped with raised internal triangular area. S_{2-5} tessellate with dense small PP.

Specimens examined. **[KAZAKHSTAN]** 1 female, Chordara. 200m, W of Tashkent, S. Kazakhstan Prov., 30. iv. 2004 (R. Murao); 1 female, Chordara. 200m, W of Tashkent, S. Kazakhstan Prov., 30. iv. 2004 (O. Tadauchi).

Andrena (*Osychnyukandrena*) *laticalcar* Osytshnjuk, 1985
(Figs. 1A, 3)

Andrena laticalcar Osytshnjuk, 1985. Vest. Zool., (3): 22 [Turkmenistan]; Gusenleitner & Schwarz, 2002, Entomofauna, 12 (suppl.): 418.

Female. BL 9.5 mm; WL 7 mm (n=1).

Color. Flagellum reddish brown beneath; mandible with apical half reddened; wing membranes subhyaline, pale brown, veins and pterostigma yellowish brown; tibial spur yellowish brown; posterior depressions of metasomal terga narrowly transparent, yellowish brown.

Pubescence. Hairs on head and thorax short and nearly dense, dull whitish; those on clypeus 200-300μm, with lateral fringes; those on vertex 400-500μm, dull whitish; those on genal area short 200-300μm, white; facial fovea pale white. Hairs on mesoscutum and scutellum very short 50-100μm, loose, dull whitish, those on mesepisternum long 600-800μm, whitish; propodeal corbicula nearly developed, dull whitish, internal area with simple sparse hairs, dorsal fringes nearly long and dense, with anterior fringes; trochanteral floccus perfect, dense, dull whitish; femoral floccus dense simple hairs with tiny branches, whitish; tibial scopa dense, plumose-like hairs similar to femoral floccus, dull whitish. Hairs on metasomal terga, scanty, brownish; T_1 nearly bare, T_2 with broadly interrupted and T_{3-4} with narrow complete whitish hair bands; caudal fimbria yellowish white; sterna 2-5 with sparse, nearly short dull white subapical fimbriae.

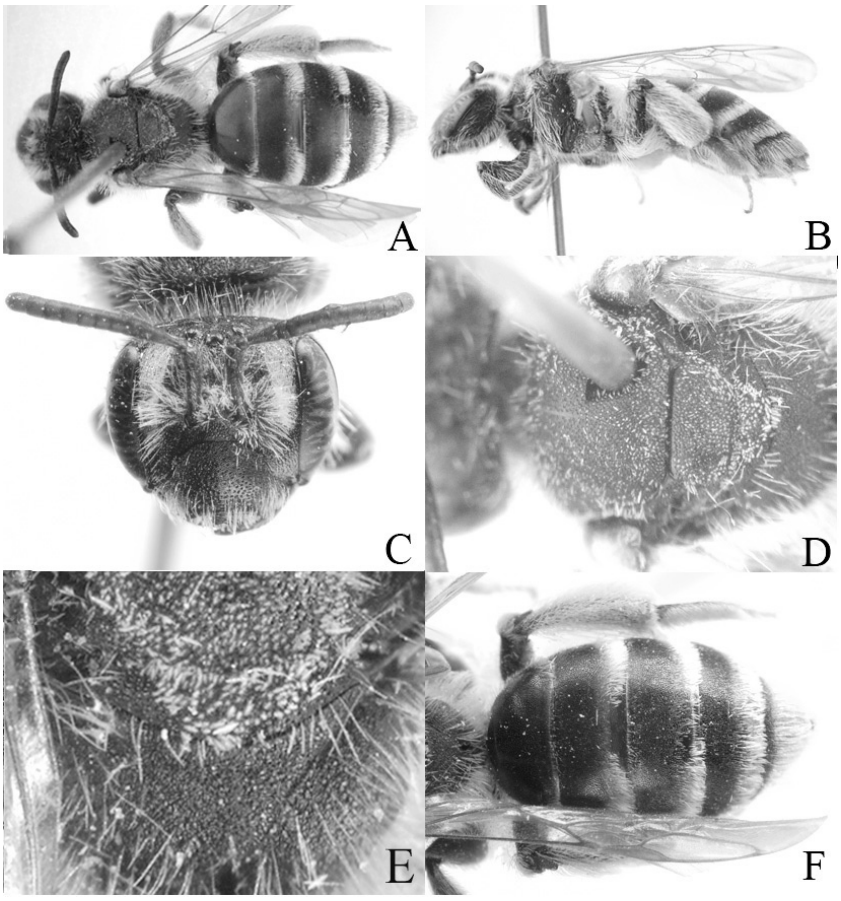

Fig. 3. *Andrena* (*Osychnyukandrena*) *laticalcar* Osytshnjuk, 1985, female. A: general habitus in dorsal view; B: the same in lateral view; C: head in frontal view; D: mesoscutum; E: propodeum; F: metasoma.

Structure. Head: HL/HW = 0.70. HW: MsW: MtW= 1: 1: 1.1. Vertex flat to concave behind occeli, densely tessellate, shiny, nearly without PP. OOD: POD: OCD: =6: 4: 1. FL1≥ FL2+FL3, FL2 = FL3 which are broader than long. Eyes with inner margins paralleled. Facial fovea occupying more than 3/4 space between eye and lateral ocellus, exceeding a line at lower margins of antennal fossae, FVL = 1.4 mm, FVW = 0.3-0.2 mm. Face above antennal fossae with fine longitudinal ruguale, interrugal PP smooth and shiny. Facial quadrangle quadrate (1:1). Clypeus strongly convex, densely shagreened, with PPØ25*μm*, IS =1, without longitudinal median impunctate space, CPL= 0.8 mm. Process of labrum, nearly trapezoidal with emarginated tip. Lower paraocular area densely tessellate, somehow coarse and shiny with small PP 10-20*μm*. Malar space linear. Genal area nearly as wide as eye area, surface tessellate and shiny with shallow minute PP near eye. Mesosoma: pronotum with dorsolateral suture, without humeral angle, with weak lateral ridge, surface strongly shagreened and nearly dull, without PP. Mesoscutum and scutellum densely tessellate, dull, with very dense PPØ25-30*μm*, IS <0.5. Propodeal enclosure medium, coarse by densely punctuate-tessellate; dorsal face of propodeum with similar structure, with very weak wrinkles. Mesepisternum densely shagreened with microscopic sparse PP. Tip of tibial spurs hook shaped (Fig. 1A). Metasoma: metasomal terga smooth and shiny with very dense PPØ15-20*μm*, IS<0.5. T_1 nearly with larger and sparser PPØ20*μm*, IS=1; posterior depressions of terga not well indicated; pygidial plate small, V-shaped without raised internal area. Sterna 2-5 tessellate and shiny with nearly dense very minute PP.

Remarks. This species is very similar to *A. cochlearicalcar* but is separated by denser PP of the metasomal terga and the broader facial fovea.

Specimen examined. **[IRAN]** 1 female, Daregaz [Khorasan Prov.], 28. v.1973 (Ayat).

Andrena (*Osychnyukandrena*) *gamskrucki* Warncke, 1965

(Figs. 1C, 4, 5)

Andrena gamskrucki Warncke, 1965, Beitr. Ent., 15: 61. [Greece]; Gusenleitner & Schwarz, 2002, Entomofauna, 12 (suppl.): 307.

Female. BL 10.5 mm; WL 8.5 mm (n=1).

Color. Flagellum brown uniformly; mandible black; wing membranes subhyaline, pale brown, veins and pterostigma pale brown; tibial spur yellowish brown; tarsi and hind tibia yellowish brown; rest of body black.

Pubescence. Hairs on head and thorax dense; those on clypeus 300-400*μm*, sparse with lateral fringes; those on vertex 400-500*μm*, yellowish; those on genal area short 300-400*μm*, dark brown; facial fovea dark brown. Hairs on mesoscutum and scutellum medium 500-600*μm*, loose, tawny, those on mesepisternum long 900-1100*μm*; propodeal corbicula nearly developed, tawny, internal area with simple sparse hairs, dorsal fringes of propodeal corbicula nearly long and dense, with anterior fringes; trochanteral floccus perfect, pinnate, dull yellowish; femoral floccus dense pinnate, dull yellowish; tibial scopa dense, plumose, yellowish brown. Hairs on metasomal terga, scanty, brownish; T_{1-3} with broadly interrupted and T_4 with very narrow complete yellowish hair bands; caudal fimbria yellowish brown; sterna 2-5 with medium dull yellowish brown subapical fimbriae.

Structure. Head: HL/HW = 0.80. HW: MsW: MtW= 1:1: 1.15. Vertex flat to concave behind occeli, narrow (width less than lateral ocular diameter), densely tessellate, with very shallow PP. OOD: POD: OCD = 4: 3: 1. FL1= FL2+FL3, FL2 ≤ FL3 which are broader than long. Eyes with inner margins subparalleled. Facial fovea occupying 1/2 space between eye and lateral ocellus, reaching a line at lower margin of antennal fossae, FVL = 1.2 mm, FVW = 0.2-0.3 mm. Face above antennal fossae with fine longitudinal ruguale, interrugal area smooth and shiny. Facial quadrangle quadrate (1:1). Supraclypeal area well indicated, completely flat, roughened by rugulae and small PP. Clypeus flat, smooth and steely shiny, with sparse minute PP 20*μm*, without distinct longitudinal median impunctate space, CPL= 1 mm. Process of labrum, trapezoidal with emarginated tip. Lower paraocular area smooth and shiny with dense small PP 10-20*μm*. Malar space linear. Genal area nearly as wide as eye area, surface tessellate and shiny with minute PP near eye. Mesosoma: pronotum with dorsolateral suture, without humeral angel and ridge, surface densely tessellate and shiny, with sparse PP. Mesoscutum and scutellum densely tessellate, dull, with dense PPØ25*μm*, IS =1-0.5. Propodeal enclosure medium, coarse by densely punctuate-tessellate; dorsal face of propodeum with similar structure, but with stronger rugulae. Mesepisternum densely tessellate with small PPØ15-20*μm*. Tip of tibial spurs hook-shaped (Fig. 1), length of tibial spur of midleg long. Metasoma: metasomal terga smooth and shiny with very dense PPØ20-25*μm*, IS=0.5-1. Posterior depressions of terga nearly well indicated; pygidial plate small, V-shaped without raised internal area. Sterna 2-5 tessellate and dull with very dense minute PP.

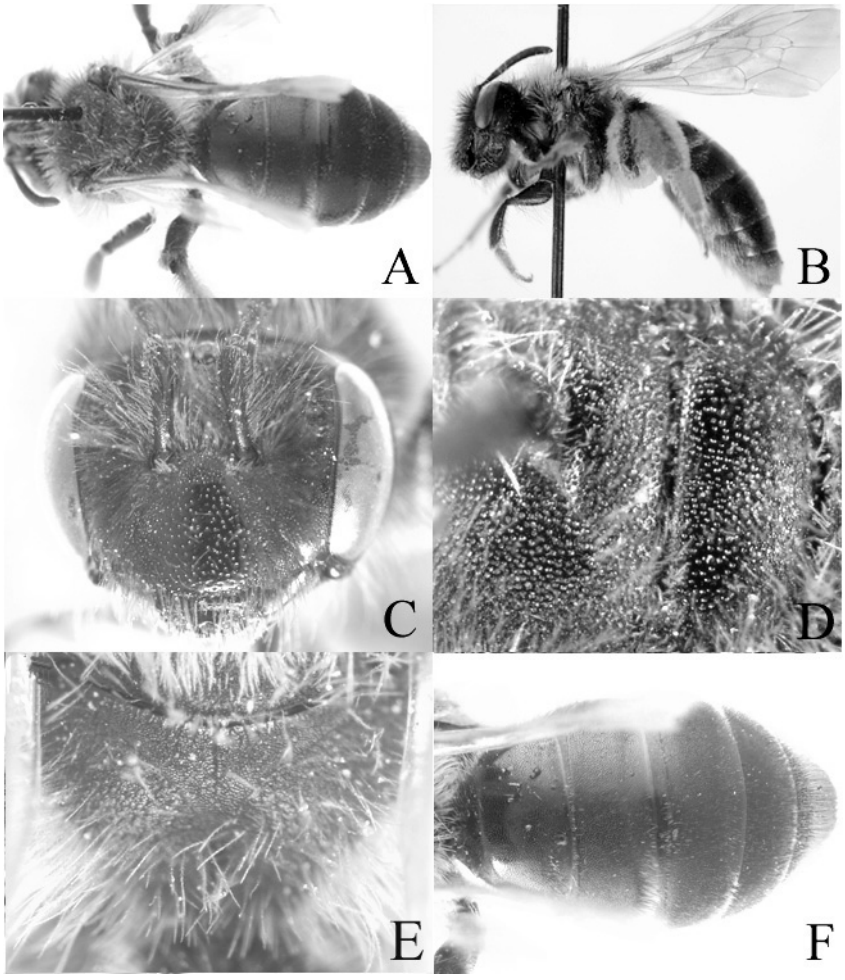

Fig. 4. *Andrena* (*Osychnyukandrena*) *gamskrucki* Warncke, female. A: general habitus in dorsal view; B: the same in lateral view; C: head in frontal view; D: mesoscutum; E: propodeum; F: metasoma.

Male. BL 8 mm; WL 7.5 mm (n=1).

Color. Flagellum brown uniformly; mandible with apical half reddened; wing membranes subhyaline, pale brown, veins and pterostigma, tibial spur, tarsi, hind tibia and posterior depressions of matasomal terga yellowish brown; rest of body black.

Pubescence. Hairs on head and thorax dense; those on clypeus, dark brownish, long 650-750*μm*, with lateral fringes; those on vertex long, 600-700*μm*, yellowish mixed with dark brown hairs; those on genal area long 700-800*μm*, dense dark brown. Hairs on mesoscutum and scutellum long 700-800*μm*, loose, pale yellowish, those on mesepisternum long 900-1100*μm*. Hairs on metasomal terga, dense, brownish, with complete but loose pale yellowish brown hair bands; sterna 2-5 with dense short hairs and laterally with dull yellowish long sparse subapical fimbriae.

Structure. Head: HL/HW = 0.75. HW: MsW: MtW= 1: 1: 1. Vertex flat, narrow (width less than lateral ocular diameter), densely coarse tessellate, with very shallow PP. OOD: POD: OCD: = 3: 2: 1. FL1= FL2+FL3, FL2 < FL3 which are broader than long. Eyes with inner margins subparalleled. Face above antennal fossae with fine longitudinal rugulae, interrugal area weakly tessellate to smooth and shiny. Facial quadrangle nearly quadrate (1:1). Supraclypeal area same as in female, well indicated, completely flat, roughened by rugulae and small PP. Clypeus flat, smooth and steely shiny, with sparse minute PPØ20*μm*, without distinct longitudinal median impunctate space, CPL= 0.8 mm. Process of labrum trapezoidal with emarginated tip. Lower paraocular area smooth and shiny with dense small PP 10-20*μm* near eye with dense microscopic PP. Malar space linear. Genal area nearly as wide as eye area, surface tessellate and shiny with minute

PP near eye. Mesosoma: pronotum with very weak dorsolateral suture, without humeral angle and ridge, surface densely tessellate and shiny, with sparse PP. Mesoscutum and scutellum densely shagreened, shiny, with dense PPØ35*μm*, IS =1-0.5. Propodeal enclosure medium, with densely punctuate-tessellate; dorsal face of propodeum with similar structure, but with stronger rugulae and very shallow PP. Mesepisternum densely tessellate with PPØ35*μm*. Tip of tibial spurs hook-shaped (Fig. 1C), length of tibial spur of midleg long. Metasoma: metasomal terga tessellate and shiny with dense PPØ20-25*μm*, IS=1. Posterior depressions of terga well indicated. Sterna 2-5 tessellate and dull with very dense minute PP. Male terminalia (genitalia and hind sterna) as in Fig. 5.

Remarks. This species is similar to *A. laticalcar* Osytshnjuk but is separated by the bigger head; the broader and shorter facial fovea; the flat clypeus with smooth and shiny surface; tawny hairs on the thorax and the longer tibial spur of midleg.

Specimens examined. Paratypes: **[GREECE]** 1 female, Larisa, Graecia (= Greece), 10. iv. 1962 (K. Warncke); 1 male, Saloniki, Langadikia, Greece-E, 1. iv. 1977 (K. Warncke).

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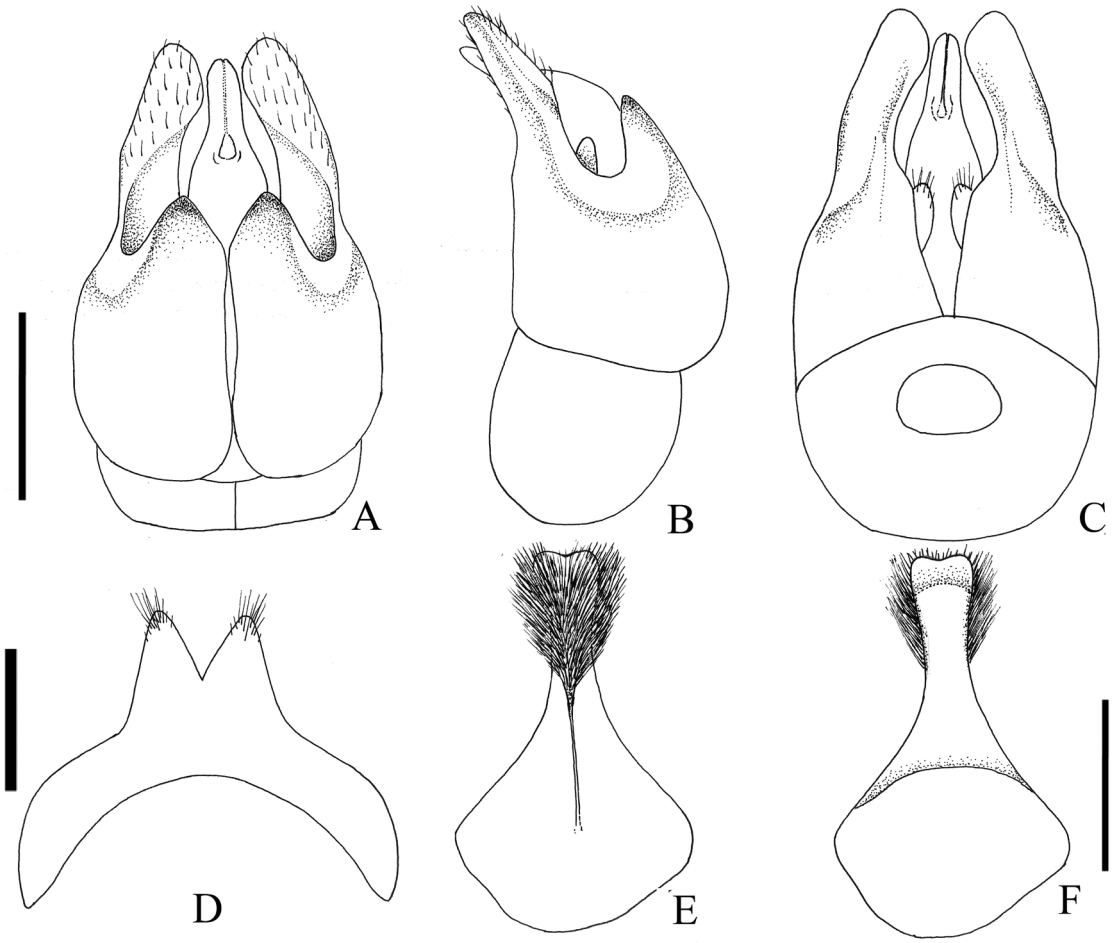

Figs. 5. Male terminalia of *Andrena gamskrucki* Warncke. A-C: dorsal, lateral and ventral view of the genital capsule (scale bar: 375 μm); D: 7th sternum (scale bar: 500 μm); E-F: dorsal and ventral view of 8th sternum (scale bar: 275 μm).

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