

Journal of Melittology

Bee Biology, Ecology, Evolution, & Systematics

No. 118, pp. 1–9

18 September 2024

Andrena nimigracilis, a new species (Hymenoptera: Andrenidae) from México

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Abstract. *Andrena nimigracilis* Zabinski, new species, is described from a single male specimen from the state of Michoacán in México. It can be distinguished from males of all other species of North American *Andrena* by the following combination of characters: metasoma extremely narrow, humeral angle extremely weak, propodeum declivitous, genal area small, compound eye wide compared to its length, pretarsal claws with tooth, vertex $\leq 1.5\times$ lateral ocellar diameter, and wings hyaline. Due to this unique morphology, this species currently cannot be placed into any *Andrena* subgenus, therefore placed as subgenus *incertae sedis*.

INTRODUCTION

Andrena Fabricius, 1775 is one of the largest and most diverse bee genera globally, currently containing 1,619 species, with 476 of these occurring in North America (Ascher & Pickering, 2024). It was estimated that there will be about 2,000 species of *Andrena* in total, leaving many species left to be discovered, especially in Mesoamerica (Dubitzky *et al.*, 2010). The bulk of the modern taxonomic foundation of North American *Andrena* was morphology based and produced by Wallace LaBerge during the 1960's to 1980's (Rasmussen *et al.*, 2013). LaBerge (1985) produced a key to the subgenera (updated by Michener, 2007) and many other revisions of subgenera, with keys to facilitate species level identification (LaBerge, 1967, 1969, 1971, 1973, 1977, 1980, 1986, 1989). Other important revisions include those of LaBerge & Thorp (2005), Thorp & LaBerge (2005), Bouseman & LaBerge (1978), LaBerge & Bouseman (1970), LaBerge & Ribble (1972, 1975), Ribble (1967a, 1967b, 1968, 1974) and Donovan (1977). Much of the recent research, mostly based on molecular data, have shown that many of the subgenera of *Andrena* are paraphyletic, indicating that the taxonomy and systematics of the group is far from being complete (Bossert *et al.*, 2022; Pisanty *et al.*, 2022). The strong taxonomic foundation for *Andrena* in North America has facilitated ecological

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doi: <https://doi.org/10.17161/jom.i117.22244>

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ISSN 2325-4467

research and can be built upon using molecular methods to start refining subgeneric and even species concepts. However, there are still likely many rare species of *Andrena* waiting to be discovered sitting within collections. In the past few years, there has been a small increase in the research of North American *Andrena*, with two new species described and another species being resurrected from synonymy (Neff, 2024; Sheffield, 2020a, 2020b). It is vital to continue naming and providing comparative morphological descriptions for these rare species, which in doing so will provide a stronger basis for identifying more specimens of these species in the future.

MATERIALS AND METHODS

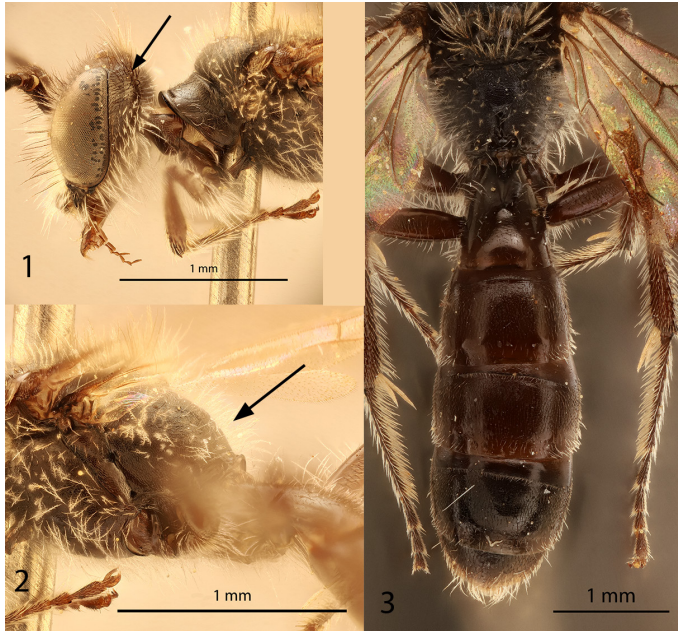
The description follows the format used by LaBerge & Hurd (1965), except for some additional measurements, including intertegular distance, thorax length (dorsally from start of pronotum to posterior of propodeum), thorax width (dorsally between outer margins of tegulae), abdomen length, abdomen greatest width, head length, head width, and antennal length. Measurements were made using an Olympus SZX-B130 dissecting microscope, calibrated with stage micrometer Leica 10310345. Photographs were taken with a Macropod Pro 3D photomacrography system from Macroscopic Solutions® composed of Canon EOS 6D Mark II camera. Photographs were assembled with Zerene Stacker™ software package and edited with Adobe photoshop® CC.

SYSTEMATICS

Andrena nimigracilis Zabinski, new species

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(Figs. 1–6)



Figures 1–3. Main features of the holotype of *Andrena nimigracilis*, new species. **1.** Lateral view of head showing narrow gena, as indicated by the arrow. **2.** Lateral view of declivitous propodeum, as indicated by the arrow. **3.** Dorsal view of thin abdomen.



Figures 4–6. Holotype of *Andrena nimigracilis*, new species. 4. Facial view. 5. Dorsal habitus. 6. Lateral habitus.

DIAGNOSIS: The new species, known only from the male, most closely resembles the male of *Andrena* (*Celetlandrena*) *vinnula* LaBerge & Hurd, 1965. Both species share a declivitous propodeum, forewing with 1st m-cu vein meeting second submarginal cell at about two thirds distance from base of cell, maxillary palpus exceeding galea by at least last three segments, clypeus protruding beyond eyes, pronotum with humeral angle, first flagellar segment slightly longer than segment 2, long antennae extending past tegula, pale yellow/cream colored clypeus, and sternum 6 not reflexed. *Andrena nimigracilis* differs from that species in having an extremely weak humeral angle, a gena narrow (0.53× width of compound eye), an abdomen extremely narrow (narrower than thorax, with T1 longer than broad), compound eyes wide compared to length (width=0.5 × length), propodeum coarse, labial palpus segment 1 flattened, as long as succeeding segments combined, and vertex ≤1.5× lateral ocellar diameter.

DESCRIPTION: Male. Measurements: Orientation dorsal: total length, 6.58 mm; greatest width (of entire specimen is head), 1.85 mm; intertegular distance, 1.12 mm; thorax length, 2.23 mm; thorax width, 1.54 mm; abdomen length, 3.95 mm; abdomen greatest width, 1.28 mm; forewing length, 4.42 mm. Orientation front of face: head width, 1.97 mm; head length, 1.62 mm. orientation lateral-dorsal: antennae length, 2.92 mm

Integument Color: Black except as follows, abdomen and legs brown rufescence; wing membranes hyaline to very lightly infumate; ocelli brown, eyes brown; clypeus pale yellowish to cream; tibial spurs same color as wing membranes.

Structure: Antenna long, extending past tegula posteriorly; scape subequal to flagellar segments 1, 2, plus half of 3; flagellar segment 1 slightly longer than segment 2, subequal in length to all but apical segment, which is slightly longer. Compound eye twice as long as broad in lateral view; inner eye margins converging slightly inferiorly, interocular distance greatest in upper half. Malar space linear, about 5 times as long as broad. Mandibles edentate, without ventrobasal lamella, and two strong lateral carina from base to apex. Galea short, shorter than clypeus; shiny with fine micro reticular shagreening. Maxillary palpus exceeds galeae by about last 3 segments; segments 1, 3, 4, and 6 subequal; segment 2 longest, 5 shortest, and 4 much thinner proximally. Labial palpus segment 1 curved, flattened, and subequal to 2–4 combined; segment 4 subequal to 2 and 3 combined; segments 2 and 3 subequal. Labral process small and obcordate. Clypeus with indentations on margins medially, shortest at apex, and widest at base, protruding beyond eye in lateral view; shiny, with dense reticular shagreening, and sparse scattered punctures from base of setae. Supraclypeal area shiny, raised, and faintly rugose. Eyes distinctly broader than genal area, about twice as broad in lateral view; genal area with light scattered punctures and shiny. Vertex ≤1.5× lateral ocellar diameter; vertex and frons with dense strong shagreening. Facial fovea thin and shallow. Strong carina from apex of supraclypeal area to base of median ocellus; carina starts progressively weakening at upper third distance to apex.

Pronotum with extremely weak humeral angle and dorsoventral ridge; covered by coarse dense reticular shagreening. Mesoscutum with dense shallow punctures, separated by less than 1 puncture width, weakly rugose at none separated punctures. Tegulae shiny with sparse punctures. Mesoscutellum same as mesoscutum but with punctures less dense medially and at apex. Metanotum same as mesoscutum but more rugose with oval shaped punctures. Propodeum coarsely sculpted, coarsest within propodeum triangle; propodeum triangle strongly rugose anteriorly, anterior and medial rugose are long, diagonal and horizontal, and posteriorly fades to shorter rugose; rest of propodeum with dense finely rugose punctures forming ridges throughout.

Mesepisternum same as propodeum covered in dense connected or nearly always connected finely rugose punctures throughout. Metepisternum like mesepisternum and propodeum but with shallow less dense oval punctures and less rugose. Middle basitarsus thin, same width throughout; slightly thinner than hind basitarsus; hind tibia much wider distally, at least 2–3 times wider; middle tibia wider distally but not as extreme. Hind tibial spurs straight, middle tibia spur nearly straight, and fore tibial spur slightly bent medially with lamella extending from near base to medial bend. Pretarsal claws with tooth on all legs. Wings stigma broadest medially; prestigma about half width of stigma; stigma 3 times or more length of prestigma; 3 submarginal cells; 1st m-cu vein reaches second submarginal cell at about two thirds distance from base of cell or closer to 2nd transcubital vein than to 1st.

Metasomal tergum 1–5 all shiny. Terga 1 with extremely sparse minute punctures, separated by puncture diameter of 3 or more. Terga 2–4 apically with dense long honeycomb surface, medially with fine tessellation, and punctures separated by 2–3 puncture diameters. Terga 5 same as 2–4 but lacking apical honeycomb textured surface. Sternum shiny; sternum 1–4 covered in fine tessellation, strongest apically, and sparse punctures separated by 3 or more punctures diameters; sternum 5 same as 1–4 but tessellation weak, not strongest apically; sternum 6 not reflexed. Genitalia was not examined to avoid damage to other parts of the specimen.

Vestiture: White throughout, hairs on head, thorax, and femur of foreleg long and highly plumose. Rest of body, hairs are generally short and simple, with an occasional long and plumose hair. Terga without apical fasciae and sterna without distinct apical bands of long hair.

HOLOTYPE: Male, México, Michoacán, San Juan Nuevo, 31-X-1987, 1800m, Col. L Godinez, LG-259. SM0295750 KUNHM-ENT. Deposited at the Snow Entomological Museum Collection (SEMC) at University of Kansas in Lawrence, Kansas.

DISTRIBUTION: Only known from type locality.

FEMALE: UNKNOWN.

ETYMOLOGY: The name of this species is derived from the two Latin words *Nimis*, meaning too, too much, or excessively, and *Gracilis*, meaning thin or slender, emphasizing the uniquely narrow abdomen of this species.

Addition of *Andrena nimigracilis* to the key to the subgenera of *Andrena* of North and Central America (Males) (LaBerge, 1985; Michener, 2007: 248–251).

- 18(17). Propodeum with lateral surface separated from lower posterior surface by short lateral carina; antennae short, female-like, usually not extending past tegulae(*Hesperandrena*)
- Propodeum with lateral surface not at all separated from lower posterior surface by a carina; antennae long, extending past tegulae.....68
- 68(18). Genal area narrower than eye in lateral view; abdomen abnormally narrow, 3 times as long as wide.....(*Andrena nimigracilis*)
- Genal area broader than eye in lateral view; abdomen narrow but not abnormal, less than 2.5 times as long as wide.....(*Celetandrena*)

DISCUSSION

Many morphological features are similar between *A. nimigracilis* and *A. vinnula*, except for the genal area that is narrower than the eye in lateral view for *A. nimigracilis* (broader for *A. vinnula*). This feature, combined with the extremely thin abdomen of *A. nimigracilis* and other more subtle differences, has led to the determination not to place it within the subgenus *Celetlandrena* LaBerge & Hurd. Once additional specimens are found, and the female is discovered, it may be possible for the new species to be assigned to *Celetlandrena*. Additionally, it may be important to note the geographic proximity of these species. *Andrena vinnula* was collected in Chapingo, México (LaBerge & Hurd, 1965), which is near México City in the state of México. *Andrena nimigracilis* was collected in the state of Michoacán, the neighboring eastern state.

Nothing is known about the biology of *A. nimigracilis* other than it occurs at high elevation (1800 m) and that it has a late active season with an October collection date. The goal of publishing this description is to facilitate the discovery of more specimens, including the female in entomology collections, or during field work in this area. It is hoped that when more specimens are discovered the genitalia and sterna 7 and 8 descriptions could be added. Continuing efforts for describing rare *Andrena* species based on morphology will continue to serve as a foundation for finding more specimens in the future.

ACKNOWLEDGEMENTS

I am grateful to Victor Gonzalez, Favízia Freitas de Oliveira, and John L. Neff for providing feedback and advice. This work was supported by the National Science Foundation (DBI-2101851 to V.H. Gonzalez & M.S. Engel).

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Journal of Melittology

A Journal of Bee Biology, Ecology, Evolution, & Systematics

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The *Journal of Melittology* was established at the University of Kansas through the efforts of Michael S. Engel, Victor H. Gonzalez, Ismael A. Hinojosa-Díaz, and Charles D. Michener in 2013 and each article is published as its own number, with issues appearing online as soon as they are ready. Papers are composed using Microsoft Word® and Adobe InDesign® in Lawrence, Kansas, USA.

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ISSN 2325-4467