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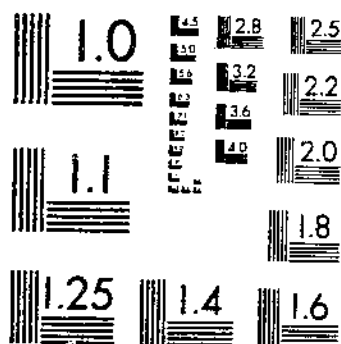
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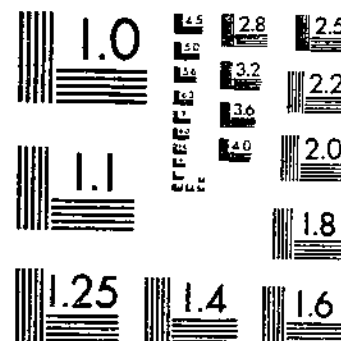
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NEW SPECIES OF NORTH AMERICAN BEES OF THE GENUS DUFOUREA
BOHART, G. E. 1 OF 1

START



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

NEW SPECIES OF NORTH
AMERICAN BEES OF THE
GENUS DUFOUREA
(HYMENOPTERA,
HALICTIDAE)
WITH DESCRIPTIONS
OF TWO PREVIOUSLY
UNDESCRIBED FEMALES

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ABSTRACT

Bohart, George E. New Species of North American Bees of the Genus *Dufourea* (Hymenoptera, Halictidae) with Descriptions of Two Previously Undescribed Females. U.S. Department of Agriculture, Technical Bulletin No. 1618, 21 p., 1980.

Thirteen new species of halictid bees in the genus *Dufourea* are described. Also described are females of two species known previously only from males. All are from the Western United States and northern Mexico.

KEYWORDS: *Dufourea bifida*, *D. cantarovici*, *D. cupreoviridis*, *D. cyanella* halictid bees

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New Species of North American Bees of the Genus *Dufourea* (Hymenoptera, Halictidae) with Descriptions of Two Previously Undescribed Females

By George E. Bohart¹

In the following descriptions, the length of the face is measured from the upper edge of the vertex to the lower margin of the clypeus; the length of sternum VII includes the basal lobes. Structures paired because of bilateral symmetry are described in the singular except where relationships between the members of the pair are involved. For simplicity, the propodeum is

regarded as part of the thorax; consequently, the first abdominal segment is morphologically the second, and so on. Measurements, except for body and wing length, are proportional and are based on noncalibrated eyepiece micrometer readings. Types of the new species will be deposited at the California Academy of Sciences in San Francisco.

DUFOUREA bifida n. sp.

Holotype male: Length about 6.6 mm, of anterior wing 4.6 mm; integument black without blue, green, or bronzy reflections; pubescence white throughout, not concealing integument except on clypeus.

Head.—Face with length to breadth 83-95; inner eye margins distinctly convergent below; distance from clypeus to antennal scrobe slightly greater than scrobal diameter or interscrobal distance; length of eye to galea to maxillary palpus to labial palpus to lacinia 56-57-48-39-34; maxillary palpomere II slightly shorter than labial palpomere I, slightly longer than maxillary palpomere I, about equal to III, IV, V together; antenna reaching posterior margin of thorax; flagellomeres

mostly twice as long as broad, each with rounded expansion just beyond middle, glabrous except for short pubescence dorsally on I, nearly invisible pubescence ventrally on succeeding segments; facial pits generally coarse, dense (averaging much less than one pit width apart) except about one pit width apart along inner eye margin, on small areas near ocelli.

Thorax.—Scutum, scutellum with mixture of long, short, upright pubescence, that of mesepisternum, sides of propodeum long, sparse; scutal, scutellar, metanotal pits coarse, dense, much less than one pit width apart; mesepisternum with pits averaging from one to slightly less than one pit width apart; metepisternal pits fine, close; propodeum coarsely, closely rugose, becoming irregularly striate laterally; lateral face of propodeum polished below with fine pits slightly more than one pit width apart, remainder roughened, pitted, with scattered small protrusions; posterior propodeal face polished, with scattered pits, somewhat larger, irregular

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protrusions; wings lightly yellowish smoky with medium-brown venation; legs slender, unmodified, with tarsomeres II, III longer than broad.

Abdomen.—Terga rather uniformly pitted (except impunctate on posterior translucent borders), pits averaging slightly over one pit width apart except slightly sparser, finer on terga IV to VI; apical fascia poorly developed, basal ones with short, dense, fine hairs; venter broadly flattened to concave; nearly impunctate except laterally; sternum VI with low, narrow, median, polished ridge, gradually widened anteriorly, its lateral margins sharply diverging to form straight-sided basal lunule, with anterior margin medially emarginate except for median, thickened, fingerlike projection terminated by emarginate heart-shaped knob, its projection slightly over one-third total median length of segment; VII with pair of triangular apical lobes covered with long pale hair, with basal flaps merging into body of segment, extended distally as pair of smooth-flanking projections, nearly as long as above-described hairy projections; VIII with total length to breadth to length of apical projection 73-48-30; apical projection with breadth of base to terminal knob to narrowest point approximately 3-2-1, with sparse fringe of hairs slightly longer than width of basal projection; genital capsule with gonostylus strongly differentiated, narrowed, pointed, bearing short, sparse hairs; volsella with free distal portion fingerlike, four to five times as long as wide at narrowest point, bearing long, inwardly directed hair fringe.

Allotype female: Length about 6.8 mm, of anterior wing 4.7 mm; integument black, without metallic reflections; pubescence yellowish white throughout, becoming pale golden on anterior clypeal margin.

Head.—Face with length to width 57-66; clypeus strongly rounded apically, with depressed apical margin, otherwise nearly flat; frons, vertex densely pitted (pits much less than one pit width apart) except sparsely pitted near lower inner eye margins; clypeus with surface (except depressed margin) covered by several very large pits averaging about one pit width apart; parafacial pits one pit width apart near

upper, inner corner of eye; antenna with flagellomeres VI-X entirely dark brown.

Thorax.—Scutum, scutellum partially obscured by short, medium length yellowish pubescence, densely (nearly contiguously) pitted; mesepisternum pitted as on scutum; mesepisternum, sides of propodeum coarsely, closely, irregularly striate, with finer transverse striae posteriorly; posterior margin of midtibia with apical half beset with five to six testaceous spines hidden by dense pubescence; midtibia brown with entirely pale, semierect scopa; wings faintly smoky with brown venation.

Abdomen.—Apical fascia complete, conspicuous on terga III to V, nearly complete on II; anal fimbria testaceous; disks of terga I, II uniformly covered with medium-sized pits slightly more than one pit width apart; terga III - V with finer pits averaging two to three pits widths apart, especially on posterior halves; posterior tergal borders pale translucent, appearing testaceous to dark brown over underlying base of succeeding tergum.

Type Series

Holotype male: Magdalena, Sonora, Mexico, October 5, 1968, on a small orange composite (G.E. Bohart). **Allotype female:** Same data as holotype. **Paratypes:** One male, same data as holotype; One male, Southwestern Research Station of American Museum of Natural History, Portal, Ariz., elevation 1500 to 1800 m, October 3, 1958 (H. V. Weems); one male, Atascosa Lookout, Atascosa Mountain, Santa Cruz Co., Ariz., elevation 1600 m, October 9, 1960 (W. L. Nutting).

Discussion

The type series is uniform except for the slightly larger size of the paratype from Santa Cruz Co., Ariz. *D. bifida* is related to the widespread *D. marginata* (Cresson) from which it can be readily distinguished in the male by the expanded apical lobes of sternum VII and the inverted, heart-shaped terminal knob on the apical projection of sternum VIII and in the female by the clearly striate (rather than granulate) propodeal enclosure.

DUFUREA contarovici n. sp.

Holotype male: Length about 7.2 mm, of anterior wing 5.0 mm; integument, without metallic blue, green, or coppery reflections, legs, venter, mouthparts dark brown; pubescence entirely pale yellowish white to white; wings clear hyaline, veins pale testaceous.

Head.—Face with length to breadth 90-100; distance from clypeus to antennal scrobe slightly greater than scrobal diameter but shorter than interscrobial distance; area from lateral ocellus to compound eye almost imperceptibly concave; frons with median carina extending along median ridge from interscrobial line halfway to median ocellus, with flanking impunctate basin; frons otherwise variably pitted, very densely so anterior to lateral ocellus, pits about one pit width apart between, behind ocelli; length of eye to galea to maxillary palpus to labial palpus to lacinia 55-63-61-39-35; maxillary palpomere II subequal to labial palpomere I, about one-fourth longer than maxillary palpomere I, distinctly longer than maxillary palpomere II, III, IV combined, about as long as labial palpomere II, III, IV combined; antenna reaching posterior margin of scutellum; scape at least $2\frac{1}{2}$ times as long as broad; flagellomere I less than half as long as II; flagellomeres III to X ranging from about 2 to about $1\frac{1}{2}$ times as long as broad, each slightly expanded at apical third, bare except for usual nearly microscopic pubescence.

Thorax.—Scutum, scutellum, sides of mesepisternum pitted rather uniformly with moderate-sized pits averaging about one pit width apart; venter of mesepisternum polished, sparsely pitted, not roughened posteriorly; propodeal enclosure at least one and a half times as long as metanotum, with about eight well-spaced, nearly straight striae ending posteriorly on impunctate shelf; side of propodeum with pits about one pit width apart except sparser anteriorly, toward venter; legs slender, unmodified, hind basitarsus about five

times as long as broad; all other tarsomeres distinctly longer than broad.

Abdomen.—Terga rather uniformly pitted with moderate-sized pits averaging between one and two pit widths apart; apical hair fascia thin, inconspicuous; sternum I strongly emarginate medially; sternum IV with strong, sublateral, inwardly directed hooklet; sternum V evenly emarginate apically; sternum III-V each with broad, depressed, transparent apical margin; sternum VI with well-developed semicircular lunules becoming obsolescent medially but directed apically toward thickened, laterally carinate, nearly parallel sided, apically rounded projection about three times as long as broad, free for about half its length, sternum otherwise narrowly emarginate apically; VII with apical lobes polished, weakly hair-fringed laterally, at least twice as long as broad, tapered gradually to narrowly rounded apical lobes; VIII with total length to a breadth to length of median apical projection 57-37-26; projection broadest at base with broadest point less than twice as broad as narrowest zone one-third distance from slightly broadened apical knob; genital capsule with unusually long slender gonostylus (at least five times as long as middle diameter); volsella fingerlike, its free end enlarging gradually toward apex, its inner margin bearing very long setae.

Type Series

Holotype male: Omega, Catron Co., N. Mex., August 18, 1951 (E. L. Kessel).

Discussion

This species is not clearly related to any other. The carinate ridge of the anteromedian portion of the frons and the depressed transparent apical margins of sterna III-V are characteristic.

DUFUREA cupreoviridis n. sp.

Holotype female: Length about 7 mm, of anterior wing 5 mm; integument with greenish and coppery reflections, except nonmetallic

dark brown to black on labrum, legs, base of mandible, brown on abdominal venter, reddish brown on mandibular apex. Pubescence entirely

yellowish white (except anal fimbria ochraceous).

Head.—Face with length to breadth 7-13, length of supraclypeal area (from antennal scrobe to clypeus) to subocellar area (from anterior margin of antennal scrobe to median ocellus) to postocellar area (from anterior margin of median ocellus to vertex) 21-47-23; upper to lower interocular distance 74-72; frons densely covered with (but not obscured by) very short pubescence and sparse longer hairs; clypeus flat, slightly depressed medioapically; apical margin barely deflexed, impunctate, apical two-thirds otherwise with only 10 to 12 very large pits, basal one-third with smaller, coarser pits less than one pit width apart; lower two-thirds of parafacial area mostly sparsely pitted (one to three pit widths apart); frons with fine to medium pits varying from about one pit width apart midway between ocellus and antenna to much closer elsewhere (except nearly impunctate in small areas near ocelli); lateral and ventral aspects of cheek with pits averaging three to four pit widths apart (essentially impunctate in extensive area posterior to mandible); length of eye to galea to maxillary palpus to labial palpus to lacinia 55-62-48-37-30; labial palpomere V nearly equal to II, III, IV combined or to maxillary palpomeres III, IV, V, VI combined, about one-fourth longer than maxillary palpomere I, one-fifth longer than labial palpomere II.

Thorax.—Scutal pubescence as on frons but short pubescence slightly longer, more dense; scutal pits rather fine but dense and uniform, mostly a little less than one pit width apart; lateral aspect of mesepisternum with pits

averaging about two pit widths apart; propodeal enclosure densely covered with slightly irregular carinae often dividing posteriorly, the sublateral carinae nearly as dense as median ones; lateral aspect of propodeum with fine pits about one pit width apart, covered with fine, transverse striae (or wrinkles) visible only with strong lighting; wings with distinct smoky yellowish tinge, veins ranging from light to dark brown; tibial scopa white, appressed, the hairs well-feathered throughout; midtibial spur nearly clear, slightly darker on apical two-thirds with about 12 roughly triangular teeth, their bases joined.

Abdomen.—Tergal pits fine, on I, II, III ranging from about one pit width apart basally to two and three pit widths apart subapically; posterior tergal borders testaceous to light brown; fimbria ochraceous; posterior hair bands of terga I, II lateral only, those of tergum III both lateral, sublateral, that of tergum IV complete; basal hair bands poorly developed.

Type Series

Holotype female: Sain Alto, Zacatecas, Mexico, elevation 2100 m, October, 4, 1966 (G. E. Bohart, and A. S. Bohart). **Paratype:** One female, same data as holotype.

Discussion

This species resembles *D. oryx* (Viereck), from the females of which it can be distinguished by its white (instead of brown) tibial scopa. It can also be distinguished by its flatter clypeus with densely punctate basal one-third.

DUFOUREA cyanella n. sp.

Holotype male: Length about 7 mm, of anterior wing 4.6 mm; integument of head and thorax intensely dark blue-green, that of abdomen polished, black with indistinct dark-blue tints, that of legs and antenna dark brown to black; pubescence yellowish white, except black on parafacial area, vertex, lateral aspect of scape, brownish on abdominal terga II to VI.

Head.—Face with length to breadth 87-95; inner eye margins slightly convergent below;

distance from clypeus to antennal scrobe at least $1\frac{1}{2}$ times scrobal diameter, nearly twice interscrobal distance; area lateral to lateral ocellus slightly concave; length of eye to galea to maxillary palpus to labial palpus to lacinia 54-70-61-47-39; maxillary palpomere II equal in length to combined III, IV, V; labial palpomere I greater in length than combined II, III; antenna reaching beyond posterior margin of thorax; flagellomeres IV-X moderately expanded at

middles, expansions rounded (not angulate); outer, ventral sides of each flagellomere (except I) with two rows of hairs, inner row of numerous short, straight to apically curled hairs, outer row of two to five long dark hairs with apical halves bent strongly toward flagellar apex; most flagellomeres about twice as long as broad; facial pits generally dense, moderately coarse, except impunctate (but finely roughened) between subantennal sutures, sparse ventrally, on labrum.

Thorax.—Pubescence mostly long, sparse, longer hairs of dorsum and mesepisternum about half as long as eye, very sparse, not at all obscuring integument; pits of mesoscutum, scutellum moderately fine but close, averaging less than one pit width apart except anterolaterally on scutum; mesepisternum very sparsely pitted but minutely roughened (except anteriorly, ventrally); propodeal enclosure with 10 to 12 carinae on each side of midline, the inner five or six close, indistinct, lateral ones well defined, separated by shining integument, posterior margin broadly shining laterally, sublaterally; vertical face shining, sparsely pitted, impunctate on median depression, sides nearly impunctate but minutely roughened; wings lightly, nearly uniformly smoky, veins dark brown; anterior femur slightly swollen, weakly carinate ventrally, with proportions 10-25; anterior tarsomeres II, III not produced, slightly longer than broad; midfemur somewhat swollen (13-25); midtibia with proportions 9-26, with posterolateral toothlike process longer than broad; posterior femur with proportions 13-33 posterior tibia 10-43, posterior tarsomere I 5-26; posterior tarsomeres II, III weakly produced posteriorly, slightly longer than broad; all trochanters without distinctive features.

Abdomen.—Terga, sterna shining, sparsely pitted to nearly impunctate; impunctate posterior tergal borders translucent dark brown; sterna without sublateral swellings or hooklets; sternum V broadly, rather deeply emarginate; sternum VI with median carina dividing anteriorly into triangular basal plateau, posteriorly into pair of sharp projections divided by U-shaped emargination, with carina in profile crowned by dense white hair in places two or three times as long as projections; VII with very long, slender,

parallel-sided pair of apical lobes extended beyond similarly long, slender basal flaps, with hair of margins pale to sooty brown, no longer than width of basal flaps; VIII with length (including basal lobes) to breadth to length of median apical projection to breadth of projection at base 55-32-27-8; apical projection strongly narrowed two-thirds distance toward apex, gradually broadened distally toward small apical knob, margined with pale hairs about as long as greatest breadth of projection; genital capsule with distal portion of gonocoxite strongly differentiated by suture, narrowed from basal portion, its hairs short, not concealing integument; volsella short, its free end less than twice as long as broad, with largely terminal hair tuft; tergum VII with weakly defined pygidial area extended apically as rounded lobe nearly as long as broad.

Allotype female: Length about 7.5 mm, of anterior wing 5 mm; integument dark blue; abdominal dorsum with bluish-brown reflections; abdominal venter dark reddish brown; pubescence pale except mostly dark brown on clypeus, parafacial areas, vertex, mixed pale, dark brown on disk of scutum, scutellum, mixed light to medium brown on terga (except pale on apical fringes of II to IV).

Head.—Face with length to breadth 5-5; upper to lower interocular distance 33-31; length of clypeus to subantennal area to distance from anterior margin of antennal scrobe to anterior margin of median ocellus to length of vertex 9-4.5-22-14.5; clypeus nearly flat, with rounded, deflexed, impunctate anterior margin, elsewhere coarsely pitted, parafacials shining, sparsely pitted opposite middle two-thirds of eye, otherwise strongly, densely pitted; frons, vertex strongly, closely pitted except on small area lateral to ocelli.

Thorax.—Scutum, scutellum strongly, closely pitted (pits much less than one pit apart except sometimes as least one pit width apart centrally); scutum, scutellum with numerous short pale hairs (especially laterally) in addition to sparser long, dark, evenly distributed ones; mesepisternum with pits averaging about one pit width apart except ventrally impunctate and finely shagreened; wings slightly smoky, veins medium brown; tibial scopa pale, sparse; propodeal enclosure strongly, closely striate,

posterior margin nonstriate but strongly roughened; posterior face sparsely pitted but roughened, sides strongly pitted.

Abdomen.—Tergum I nearly impunctate, II-V shining, sparsely pitted; tergum II with lateral pale hair border, that of III lateral and sublateral, that of IV complete; anal fimbria brown.

Type Series

Holotype male: Juan Aldamo, Zacatecas, Mexico, October 4, 1966 (G. E. Bohart and A. S.

Bohart). **Allotype female:** Navios Viejos, Durango, Mexico, August 3, 1951 (P. D. Hurd).

Discussion

D. cyanella bears some resemblance to *D. oryx* (Viereck) and *D. cupreoviridis* n. sp. The male can be distinguished from *D. oryx* by its more intense blue color and very slender apical lobes on sternum VIII (the male of *D. cupreoviridis* is not known). The female can be distinguished from either species by its dark mesoscutal pubescence and darker blue integument.

DUFOUREA mexicana n. sp.

Holotype male: Length about 8 mm, of anterior wing 4.5 mm. Integument black with faint bluish reflections on head, anteriorly, laterally on thorax, dorsally on terga I-IV, with faint bronzy reflections on scutellum, central area of scutum, with tip of mandible reddish brown, with dark-brown tarsomeres, sterna, tergal apices; pubescence whitish except dark on most of frons, anterior portion of vertex, mixed with dark on lower parafacial area, most of abdominal terga IV to VI.

Head.—Face with length to breadth 90-98; inner eye margins converging below; distance from clypeus to antennal scrobe distinctly greater than scrobal diameter or interscrobal distance; length of eye to galea to maxillary palpus to labial palpus to lacinia 53-69-65-48-34; antenna reaching about to posterior margin of thorax; scape not swollen, slightly over twice as long as broad; flagellomere II about twice as long as I; flagellomeres III-X strongly crenulate, summits of crenulations angulate; flagellum bare except for usual minute pubescence; clypeus, supraclypeal area nearly obscured by long, prostrate pubescence; ventral margin of mandible with normal pubescence; clypeus very coarsely, closely pitted with narrow impunctate apical border; supraclypeal area with pits mostly less than one pit width apart except on area around tentorial pit; frons coarsely, closely pitted except with some shining interspaces on parafacial area, posterolateral to ocelli, nearly impunctate medioposteriorly to antennal scrobe; labrum with upper two-thirds shining,

longitudinally striate, with lower one-third pitted.

Thorax.—Scutum, scutellum with short and long pubescence but not at all obscured, with pits moderately strong, averaging less than one pit width apart (but with distinct interspaces) except more sparsely pitted medially on scutum; mesepisternum laterally with pits mostly one to two pit widths apart, not roughened (or setigerous); enclosure of propodeum closely (but not coarsely) striate, the striae obsolescent posterolaterally, dorsolateral, posterolateral areas of propodeum rather closely pitted but becoming impunctate along ventrolateral portions, transversely wrinkled posterolaterally; wings almost clear hyaline, with veins from light to dark brown; legs without swollen or produced segments, midtibia without distinct toothlike projections on lateral margin (except for usual apical one); all tarsomeres II, III longer than broad.

Abdomen.—Tergal pits mostly rather coarse, averaging about one pit width apart on densest central areas of terga I, II; sterna I to IV completely covered (but not obscured) with moderately long pubescence; sterna III, IV without sublateral swellings or hooklets; sternum V nearly truncate apically; sternum VI flat, nearly undifferentiated except for subbasal pair of lunular creases and flat, triangular, equilateral projection nearly one-third total median length of sternum, with margins bearing hair fringe equal to length of projection; VII with pair of apical lobes (beyond basal

flaps) parallel-sided, four to five times as long as broad, completely bordered by white hair fringe about one-third as long as broad, bordered on apex by white hair about one-third length of lobes, with basal flaps merging into body of sternum, not covering base of lobes; VIII with length (including basal lobes) to breadth to length of median apical projection 59-45-27; base of projection little longer than broad, apical half slender, parallel sided except for expanded apical truncation; genital capsule with distal portion of gonocoxite sharply narrowed, with few short hairs not concealing integument, with slender fingershaped volsella at least six times as long as narrowest portion, bearing long, inwardly directed marginal hairs; apical tergum with posterolateral margin somewhat sinuate, with central, heavily sclerotized area not sharply differentiated in outline from translucent lateral margin.

Allotype female: Length about 7.5 mm; of anterior wing 4.6 mm; pubescence yellowish white except mostly dark on frons, mixed dark, pale on lower parafacial area, apical terga; integument color as in male except tibiae brown.

Head.—Face with length to breadth 10-11; length of clypeus to subantennal area to subocellar area (anterior margin of median ocellus to anterior margin of antennal scrobe) to postocellar area 2-1-5-2; upper to lower interocular distance 72-69; flagellum ranging from black basally to dark brown apically; clypeus with anterior margin evenly rounded, with pits widely separated apically, close basally, covered with (but not obscured by) prostrate pubescence; pits of parafacial area, frons finer than in male and much closer than one pit width apart, except sparser in broad zone along inner margin of middle portion of eye; pits of subantennal area fine (finer than on frons, much finer than on clypeus), about one pit width apart; lateral face of cheek with pits two to three pit widths apart, those of ventral face somewhat

sparser; mandible with apical two-thirds reddish brown.

Thorax.—Scutum, scutellum partially obscured by rather sparse hair of medium length and denser, short pubescence; uniformly covered with very close, moderately fine pits as on frons; pits of lateral face of mesepisternum similar in size but averaging about one pit width apart; enclosure of propodeum rather evenly striate but laterally with broad flat spaces between striae, nonstriate along posterolateral margin; lateral face of propodeum with pits averaging slightly less than one pit width apart, with tuberculate, transversely striate roughenings on posterior portions; midtibial spur pale testaceous, with numerous setalike teeth joined at their bases.

Abdomen.—Tibial scopa completely pale, not obscuring integument; apical white hair bands absent on tergum I, lateral only on tergum II, complete but thin medially on tergum IV, uniformly complete on tergum V; tergal pits finer than in male, averaging about two pit widths apart in denser central areas; anal fimbria testaceous.

Type Series

Holotype male: Sain Alto, Zacatecas, Mexico, elevation 2100 m, October 4, 1966 (G. E. Bohart and A. S. Bohart). Allotype female same as holotype. **Paratypes:** Nine males, two females, same as holotype; three males, two females, Rio Grande, Zacatecas, Mexico October 4, 1966 (G. E. Bohart and A. S. Bohart).

Discussion

D. mexicana bears some resemblance to *D. oryx* (Viereck) and *D. cupreoviridis* n. sp. The male differs from either in the flat, triangular projection of sternum VIII. The female differs in having the thorax essentially without metallic green or coppery reflections.

DUFOUREA molderkei n. sp.

Holotype male: Length about 6 mm, of anterior wing 3.8 mm; integument with dark blue reflections on head, poorly defined bluish tinge on thorax, black on legs, abdomen; pubescence entirely yellowish white.

Head.—Length of face to width 70-80; inner eye margins distinctly converging below; distance from clypeus to antennal scrobe as great as scrobal diameter, at least two-thirds as great as distance between scrobes; scape

parallel sided, about four times as long as broad; first flagellomere circular in cross section (remaining flagellomeres missing in holotype, single paratype); length of eye to galea to maxillary palpus to labial palpus to lacinia 44-45-32-23-23; maxillary palpomere III subequal to VI, nearly twice as long as IV or V; labial palpomere II over twice as long as III. Pits of frons, vertex, clypeus coarse, close, much less than one pit width apart, those on small zones along lower margin of supraclypeal area, lateral to ocelli widely separated, those on central parafacial area slightly less than one pit width apart; those of cheeks ranging from one pit width apart near upper eye margin to nearly impunctate ventrally; pubescence of lower cheek, mandible about equal to that of clypeus, lower frons, parafacial area.

Thorax.—Pits of scutum, scutellum moderately coarse, mostly averaging slightly less than one pit width apart, but somewhat sparser medially; pits of mesepisternum as coarse as those on scutum but generally from one to two pit widths apart, sparse on hypoepimeral area; thoracic pubescence long, scattered (worn on holotype); horizontal portion of propodeal enclosure nearly one-half longer than metanotum; gradually bent downward near posterior angle; striations of enclosure irregular, not unusually close, becoming feeble to nearly absent on posterior third; lateral aspect of propodeum strongly roughened, with setigerous punctures, fine transverse wrinkles; forefemur compressed on outer face of anteroapical area; antenna cleaner of forebasitarsus as long as remainder of spur; basitarsus nearly four times as long as wide; tarsomers II-IV about as wide as long; midbasitarsus about $3\frac{1}{2}$ times as long as broad; hind trochanter with carinalike process near mediobasal corner; hind femur swollen, about twice as long as broad; hind tibia expanded subapically, about three times as long as broad, with long, dense subapical hairs, mostly directed medially; hind basitarsus about twice as long as broad; hind tarsomere II about as broad as long; wings not smoky but with dark wing hairs; veins dark brown.

Abdomen.—Terga with very sparse pits, those on tergum I, two to three pit widths apart in densest areas, nearly absent medially, in

front of apical impunctate border, those on II slightly more than one pit width apart mediobasally, much sparser in front of apical impunctate border; those on III-VI sparser than on preceding terga; sternum II with gentle subapical, sublateral swelling; sternum III with sublateral carina developed at middle as inwardly directed teeth; sternum IV with similar structure in slightly more apical position; sternum V distinctly emarginate but with median flat, triangular, tufted projection nearly twice as long as broad; sternum VI with broad, polished median trough extended apically onto apical, triangular projection whose converging lateral carinae join for half their lengths, the entire projection as long as median length of remainder of sternum VI, projection in profile parallel sided, angled 45° ventrally; VII with triangular, flat pair of apical lobes about twice as long as broad, with stiff row of bristles directed at right angle along inner margin of triangle, with long apical hair tuft, with basal flap about one-fourth as long as rest of lobe; VIII with total length (including basal lobes) to breadth to length of median apical projection 59-27-25, with apical projection only slightly narrowed before apical truncation, its broadest portion near middle less than twice narrowest portion; genital capsule with distal portion of gonostylus sharply narrowed, densely tufted on interior margin, the volsella with distal projection slightly over three times as long as broad, with apical hairs as long as projection.

Type Series

Holotype male: Chile-California Biological Program Site at Mt. Laguna, San Diego Co., Calif., elevation 1500 m, on Hydrophyllaceae, May 13, 1970 (A. R. Moldenke). **Paratype:** One male, same as holotype (head missing).

Discussion

D. moldenkei is related to *D. cuprea* Bohart but differs in being smaller, having a more pointed apical projection of sternum VI, and in having a tooth-shaped production of hind trochanter. *D. trochantera* Bohart and *D. nemophilae* (Michener) have a similar trochanter but much more swollen femora and tibiae.

DUFUREA neoscintilla n. sp.

Holotype male: Length about 5.5 mm, of anterior wing 3.2 mm; color of pubescence and integument as in *D. sparsipunctata* n. sp. except as noted below.

Head.—Facial proportions, mouthparts, as in *sparsipunctata*; flagellomeres II-VI slightly but distinctly longer than broad; flagellomeres II-XI with smooth areas brownish orange to orange, occupying all but inner one-third of each segment beyond flagellomere IV; pits of supraclypeal area lateral to subantennal suture circular; pits of frons between upper half of eyes mostly less than one pit width apart.

Thorax.—Mesoscutum with distinct short and long pubescence partially obscuring surface in lateral view, with pits almost uniformly about one pit width apart; posterior tarsomere IV slightly longer than broad; wings very slightly grayish, forewing posteriorly, apically with medium brown veins.

Abdomen.—Central portion of disk of tergum I with pits three to four pit widths apart; tergum II with pits about one pit width apart except posterolaterally near impunctate border; terga II-VI with well-defined basal fascia composed of many long hairs, especially on III to V; sterna II-IV with apical hair bands poorly developed medially except for median subapical tuft on IV; VIII with median apical projection not emarginate terminally in profile.

Allotype female: Length about 5 mm, of anterior wing 3.9 mm; color of pubescence, integument as in *sparsipunctata*, tibiae darker, flagellum with outer three-fourths ochraceous.

Head.—Facial proportions similar to

sparsipunctata except antennal scrobe slightly smaller compared to interscrobal distance; clypeus more uniformly pitted; frons uniformly punctate with pits averaging slightly less than one pit width apart.

Thorax.—Mesoscutellum nearly uniformly punctate, with pits laterally slightly less than one pit width apart, medially slightly sparser, mesoscutum with sparse long hair, dense, short pubescence partially obscuring surface in lateral view; propodeal enclosure posteriorly roughened rather than striate.

Abdomen.—Tergum I with disk covered by scattered pits averaging three to four pit widths apart; terga with basal fascia complete, even on II.

Type Series

Holotype male: 64 km west of San Ignacio, Baja, California del Sur, Mexico on *Oenothera*, February 23, 1974 (G. E. Bohart and W. Rubink).

Allotype female: Same as holotype. **Paratypes:** Four males, five females, same as holotype.

Discussion

This species is closely related to *D. scintilla* (Cockerell) and *D. sparsipunctata* n. sp. Both sexes of *D. neoscintilla* can be distinguished by the orange flagellum and the more complete basal hair bands on the terga. *D. neoscintilla* also differs in both sexes from *D. sparsipunctata* in having more closely pitted frons and mesoscutum.

DUFUREA neovernalis n. sp.

Holotype male: Length about 10 mm, of anterior wing 7 mm; integument black, without metallic tints, legs, abdominal venter, tarsi, apical margins of terga dark brown, mandibular tip dark reddish brown; pubescence white to yellowish white, grading to dark brown on frons, toward apex of tergum, nearly black interior to mandibular base, basally golden along ventral mandibular margin.

Head.—Face with length to breadth 60-69; inner eye margins almost imperceptibly

converging below; distance from clypeus to antennal scrobe about equal to scrobal diameter, slightly less than interscrobal distance; area lateral to lateral ocellus shallowly concave; clypeus raised at base, otherwise nearly parallel to remainder of face; antenna reaching middle of mesoscutum; scape about twice as long as broad; flagellomere I about two-thirds as long as II, at least three-fourths as long as each of III-X; II about twice, III about 1-2/3 times as long as broad at base;

inner surface of III-IX bearing long, dark, apically thickened, from two to eight gently curved hairs, X with several much shorter hairs, outer surface of III to XI each with smooth basal areas grading from one-fourth of total length on III to three-fourths on X; length of eye to galea to maxillary palpus to labial palpus to lacinia 69-95-69-49-40; lacinia reaching to beyond middle of maxillary palpomere III; clypeus, supraclypeal area obscured by long, prostrate hair; ventral margin of mandible with thick fringe of long, coarse hair, golden at base, as long, dense but coarser than that of ventral cheek area; area of frons between lateral ocellus, eye distinctly, broadly concave; distance from clypeus to antennal scrobe about three-fourths scrobal diameter, slightly over half interscrobal distance; face with pits mostly less than one pit width apart except more sparsely pitted near ocelli, lateral corners of vertex, inner eye margins, ventral portion of cheek.

Thorax.—Mesoscutum, scutellum covered with long, pale pubescence mixed on scutellum with several pale brownish hairs, on scutum posteriorly with sparse patch of short white pubescence; mesoscutum, scutellum covered with moderate pits averaging about one pit width apart; mesepisternum similarly pitted except more sparsely so on hypoepimeral area, becoming nearly impunctate ventrally; propodeal enclosure covered with close, coarse longitudinal striae becoming more transverse apically; lateral propodeal face nearly impunctate on lower half, posterior face impunctate except for scattered setigerous protuberances; anterior femur swollen, nearly globose; anterior tibia about three times as long as broad; anterior basitarsus expanded, less than twice as long as broad; tarsomeres II and III broader than long; midfemur over half as broad as long; midtibia nearly half as broad as long, with several slender spines proximal to usual apical projection, margined with long, dense anterior, posterior hair tufts; midbasitarsus nearly three times as long as broad; posterior femur about half as wide as long; posterior tibia strongly expanded apically, less than three times as long as broad; tarsomeres II to IV expanded dorsally, slightly broader than long; wings clear hyaline, veins dark brown.

Abdomen.—Terga with pits about one pit width apart in densest areas, with poorly developed apical fascia; sterna with narrow ventral concavities, IV with pair of very small mounds (not spicules) near edge of concavity; V with low median subapical swelling surmounted by thin hair tuft; VI with median area defined laterally by sutures, parallel-sided portion about three times as long as broad; apical projection flame shaped, slightly longer than broad, flat (not differentiated by seam or elevation from remainder of sternum), its surface densely pubescent, the hairs on apical third longer than width of projection; VII with apical lobes broadly rounded, projecting portion less than twice as long as broad, margined inwardly, apically by very long, dense hair fringe; basal flaps triangular, separated by V-shaped space; VIII with total length (including basal lobes) to breadth to length of median apical projection 56-28-27; projection broadest basally, with narrowed apical half about one-fourth as wide as base, with apex only slightly widened; projection in profile parallel sided, with slightly emarginate apex; genital capsule with gonostylus long, narrow, tapering to point but not sharply differentiated from remainder of gonocoxite; volsella fingerlike, length of free end about three times narrowest width, with setae slightly longer than width of free end.

Allotype female: Length about 10 mm, of anterior wing 6.3 mm, integument black, without metallic tint, pubescence yellowish white except mixed with brown on lower parafacial area, frons, light brown on dorsal edge of tibial scopa, pits of frons less than one pit width apart medially, about one pit width apart on parafacial area, somewhat sparser on cheek, very sparse on clypeus (practically impunctate except on basal third); clypeus strongly convex in profile; mandible with coarse hair fringe, laterally as long as mandible length; flagellomeres brown above.

Head.—Inner eye margins parallel; length of face to breadth 55-60.

Thorax.—Mesoscutum, scutellum not obscured by pubescence, pits averaging about one pit width apart; thoracic sculpturing otherwise as in male except striation of propodeal enclosure finer, ventral surface of mesepisternum less polished; midtibial spur

brown, with eight to nine well-separated teeth on apical two-thirds; tibial scopa long, dense, yellowish white, with scattered dark hairs along dorsal margin.

Abdomen.—Hair bands well developed basally, poorly developed apically; tergal pits ranging from slightly less than one pit width apart basally on each segment to about two pit widths apart apically; anal fimbria bright testaceous.

Type Series

Holotype male: Jacolitos Canyon, Fresno Co., Calif., March 25, 1967 (R. M. Bohart).

DUFOUREA orovada n. sp.

Holotype male: Length about 6 mm, of anterior wing 4.2 mm; integument black, without metallic bluish or greenish tints except mouthparts and upper side of apical three-fourths of flagellum dark brown; pubescence entirely pale yellowish white to white.

Head.—Face with length to breadth 87-94; in lateral view with distance from eye to posterior margin of head equal to eye width; distance from clypeus to antennal scrobe equal to diameter of antennal scrobe, slightly less than interscrobial distance; area lateral to lateral ocellus flat; frons and vertex with moderate-sized pits slightly less than one pit width apart, slightly sparser on parafacial area opposite scape, near ocelli; scape thickened, about 1½ times as long as broad; flagellum reaching about to posterior margin of scutum; flagellomeres without specialized sensory hairs; flagellomere I about three-fourths as long as II to X which grade from about 1½ times as long as broad (II) to only slightly longer than broad (X); flagellomeres II-VIII expanded subapically along inner margins; length of eye to galea to maxillary palpus to labial palpus to lacinia 52-66-43-36-32; lacinia about four times as long as broad.

Thorax.—Scutum with pits ranging from slightly more than one pit width apart on anterior portion to slightly more than two pit widths apart on posterior portion; scutellar pits from one to three pit widths apart, often in transverse rows; mesepisternum with sides

Allotype female: Same as holotype except April 8, 1966 (R. O. Schuster). **Paratypes:** 16 males, 25 females, same locality, March, April, 1966, April 1967 (R. O. Schuster, C. R. Kovacic, and R. Rust).

Discussion

D. neovernalis is closely related to *D. vernalis* Timberlake but is distinguishable by its larger size, in the male by the apical dilation of the hind basitarsus, and in the female by the more limited extent of dark hair on the dorsal margin of the tibial scopa.

sparsely pitted, the pits generally several pit widths apart, with venter slightly more densely pitted; metepisternum impunctate; propodeal enclosure strongly, regularly striate, the striae diverging, weakening somewhat on posterior margin; sides of propodeum polished, impunctate except for several setigerous pits; wings slightly yellowed, veins brown; femora slightly swollen, about twice as long as broad, anterior one broadest at middle, posterior one broadest near base; hair fringe of anterior femur about two-thirds as long as femur; hind tibia broadest just beyond middle, slightly over three times as long as broad, the longest fringe hairs not over two-thirds as long as tibia; fore and midbasitarsus with longest hairs about half as long as segment; hind basitarsus slightly over four times as long as broad, succeeding three tarsomeres slightly broader than long.

Abdomen.—Pits of most densely pitted areas of terga I to III averaging about two pit widths apart, those of succeeding terga slightly sparser; terminal hair fascia of terga rather sparse, not concealing basal fascia of succeeding terga; sterna III, V each with sublateral swelling but no hooklet; sternum IV with inward directed sublateral hooklet; sterna II-V with dense apical margin of short, white pubescence; sternum VI with median differentiated area (excluding projection) mostly with short dense pubescence, about twice as long as apical projection breadth, with lateral sutures straight, gently converging;

apical projection flame shaped, about as broad as long, testaceous, with nearly clear marginal area, with entire surface covered by long dense tuft of white hair; VII with apical lobes roughly triangular, the area beyond basal flaps about $1\frac{1}{2}$ times as long as broad; basal flaps nearly transverse apically; hair fringe long, dense, confined to apex, inner margin of lobes; VIII with total length (including basal lobes) to width to length of median apical projection 60-35-27; projection broadest at base, narrowest near middle, gradually broadening to apex, narrowest part about one-fourth as broad as basal area; genital capsule with gonostylus long, slender, gently tapered, well differentiated from remainder of gonocoxa; volsella with free end fingerlike, about four times as long as broad, with hairs of inner fringe slightly over half as long as segment.

Allotype female: Length about 6.2 mm, of anterior wing 4.5 mm; pubescence ranging from white to yellowish white; integument black, without bluish or greenish metallic reflections; apical three-fourths of anterior face of flagellum yellowish brown.

Head.—Face with length to breadth 88-94; inner eye margins almost imperceptibly diverging below; eye length nine-tenths as great as interocular distance at antennal insertion; distance from ocelli to vertex margin about three-fourths interocular distance; distance from antennal scrobe to clypeus slightly less than scrobal diameter, two-thirds interscrobal distance; clypeus with upper anterior margin well rounded, with surface distinctly convex, polished, with only a few scattered large pits, except basally; pits of interscrobal area, lower half of parafacial area sparse, two to three pit widths apart, those of upper lateral area of frons averaging about one-half pit width apart.

Thorax.—Pubescence of mesoscutum, scutellum very sparse, not concealing integument; mesoscutum with moderate-sized pits averaging about two pit widths apart in most median areas, slightly over one pit width apart more laterally; mesepisternum with sides

sparsely, irregularly pitted, with vertex roughened posteriorly; tibial scopa nearly white, sparse, not concealing tibia; midtibial spur nearly straight, pale testaceous with numerous fine teeth not more than one-fourth as long as spur width; propodeal enclosure with rather fine even striae, about 16 on either side of midline; areas between striae shining, generally wider than striae, with posterior enclosural margin distinctly transversely striate; wings slightly smoky, venation dark brown.

Abdomen.—Terga with testaceous to clear apical margins, with pits of I-III anteriorly averaging from two to three pit widths apart; posterior tergal hair borders white, developed only laterally on I, II; anal fimbria bright testaceous.

Type Series

Holotype male: Battle Mountain, Lander Co., Nev., on *Oenothera claviformis*, June 12, 1962 (G. E. Bohart). **Allotype female:** Same data as holotype. **Paratypes:** Four males, three females, same as holotypes; 15 males, 5 females, Orovalda, Humboldt Co., Nev., on *Oenothera claviformis*, June 6, 1961 (G. E. Bohart); one male, Jump Creek Canyon, Owyhee Co., Idaho, *Oenothera claviformis*, June 1, 1963 (P. H. Raven); one male, Rio King, Humboldt Co., Nev., *Oenothera claviformis*, June 7, 1961 (G. E. Bohart).

Discussion

D. orovada is closely related to *D. boregoensis* (Michener) and somewhat less so to *D. nudicornis* Timberlake. It differs from *D. boregoensis* by its larger size, longer mouthparts, and more slender posterior lobes of sternum VII in the male. It differs from *D. nudicornis* by its slightly grayish wings, dark-brown stigma, and dark yellowish brown rather than light yellowish brown areas on the flagellomeres. It also has a slightly longer face in both sexes, with more parallel to slightly converging inner eye margins.

DUFOUREA snellingi n. sp.

Holotype male: Length about 9 mm, of anterior wing 6.0 mm; integument black

without metallic blue, green, or bronze reflections; abdomen, legs, tegula dark brown to

nearly black, mandible testaceous (except dark basally), flagellum dark brown; pubescence pale (except dark on lower parafacial area), mixed with dark hairs on frons, vertex, scape; pubescence sparse throughout, not concealing integument, except on clypeus.

Head.—Face with length to breadth 53-63; inner eye margins approximately parallel; anterior margin of clypeus nearly straight, with strong subapical transverse groove, surface nearly flat; distance from clypeus to antennal scrobe less than half scrobal diameter, about half interscrobal distance; supraclypeal area nearly impunctate; area lateral to lateral ocellus broadly, very slightly concave; mandible expanded, with strong groove dorsally on basal two-thirds, with single tooth, with bright ochraceous row of dense hair underneath; scape swollen, about twice as long as broad; flagellomeres I-III swollen, convex above, cupped, foveate beneath; VI with long, spatulate extension beneath extending beyond apex of VII; VII with angle beneath at point of departure from extension of preceeding flagellomere; IX twice as long as X beneath; flagellum not reaching beyond middle of scutum; length of eye to galea to maxillary palpus to labial palpus to lacinia 64-80-62-47-45; lacinia reaching to end of labial palpomere III; clypeus very densely pitted except on basal margin; subantennal area nearly impunctate; upper parafacial area, frons, preocellar area irregularly pitted with average space between pits slightly larger than one pit diameter; vertex densely pitted.

Thorax.—Mesoscutum, scutellum with fine to coarse pits irregularly distributed but mostly rather sparse, averaging more than one pit width apart except anteriorly, laterally; mesepisternum slightly more densely pitted than central area of mesoscutum; median three-fourths of propodeal enclosure finely, closely striate, lateral area shining, with only two to three widely placed carinae; wings lightly yellowed, the veins light brown except subcosta, junction at lower end of basal vein dark brown; anterior femur swollen (16-30); anterior tarsomeres III, IV not produced but much broader than long; midfemur swollen (17-30); posterior femur swollen (22-33); anterior tibia expanded beyond middle (15-42) (not including

genal plate); posterior tarsomere I parallel sided (8-25); posterior tarsomeres II-IV not produced posteriorly but II, III broader than long.

Abdomen.—Tergum I polished, nearly unpitted apically, basally with pits about two pit widths apart; other terga sparsely but distinctly pitted; sterna I to III moderately clothed with short, pale pubescence, with pits ranging from one to two pit widths apart; sternum IV bare, unpitted except on apical fringe, with strong recurved hooklet near apicolateral corner; sternum V bare (except apically), with posterior margin medially rounded, sublaterally emarginate; sternum VI gently emarginate apically except for median, spatulate projection, thickened basally, slightly widened subbasally, about twice as long as broad, densely haired beneath, with basal hairs shorter, denser, bright ochraceous; sternum VII with apical pair of sharp, flat, triangular lobes about twice as long as broad, with apical tuft about one-tenth as long as lobe, with basal flap of lobe about one-third as long as lobe; sternum VIII with total length (including basal lobes) to width to length of median apical projection 100-50-44, the projection slightly thickened and blunted apically, slightly narrowed beyond middle, about twice as thick dorsoventrally at middle as just before apex; genital capsule with distal portion of gonostylus not sharply differentiated from remainder of gonocoxa, less than three times as long as broad, nearly half as long as basal portion; volsella with distal lobe about four times as long as broad, bearing numerous long ochraceous hairs.

Allotype female: Length about 8 mm, of anterior wing 5.6 mm; integument generally black, without blue, green, or bronze reflections, brown on outer face of apical two-thirds of flagellum, anterior third of clypeus, mandible (darker brown toward tip), tibiae, tarsi, wing veins; wing membrane clear hyaline; pubescence pale testaceous to yellowish white except mixed with dark hair on frons, vertex, lower parafacial area near clypeus, bright testaceous on apical fimbria.

Head.—Face with length to width 98-118; eyes distinctly diverging below; anterior margin of clypeus only slightly rounded between tubercles, surface nearly flat; distance from clypeal margin to antennal scrobe less than half

scrobal diameter or distance between scrobes; pits of vertex much less than one pit width apart, of frons variable in size, averaging slightly less than one pit width apart, of parafacial area about one pit width apart, of clypeus deep, dense on upper half, shallow, broad, separated by one to two pit widths on lower half, supraclypeal area with broad impunctae band adjacent to clypeus.

Thorax.—Mesoscutum, scutellum with moderately fine pits averaging about one pit width apart except denser anterolaterally; mesepisternum with sides rather finely pitted, pits averaging slightly over one pit width apart, slightly finer, denser on hypopimeral area; propodeal enclosure considerably longer than metanotum, very finely striate, the striae absent on apical half medially; sides of propodeum finely, rather densely pitted, with setigerous projections and wrinkles nearly imperceptible; midtibial spur with about 10 fine but distinctly separated teeth; antenna cleaner with emarginate tip, strong apical projection, with comb about two-fifths basitarsal length; tibial scopa dense but not concealing integument.

Abdomen.—Disk of tergum I with pits fine, sparse, ranging from one to three pit widths

apart in densest areas, more separated lateroposteriorly; disk of II finely, densely pitted basally, pits about one pit width apart, much more scattered apically; III, IV progressively more sparsely pitted than II; apical hair bands of terga I to III poorly developed, lateral only; basal hair bands denser, more distinct than apical.

Type Series

Holotype Male: U. Covington Flat, Joshua Tree National Monument, Calif., April 30, 1960 (E. L. Sleeper). **Allotype female:** Same as holotype.

Description

D. snellingi is an extremely distinctive species. The basally expanded and cupped flagellum of the male suggests that of *D. sandhouseae* (Michener) or *D. versatilis* (Bridwell), but in other ways it bears no resemblance to these species. The female slightly resembles *D. vandykei* Bohart but is readily distinguished by its eyes, which are more divergent below, and by its largely orange mandibles.

DUFOUREA sparsipunctata n. sp.

Holotype male: Length about 6 mm, of anterior wing 3.8 mm; pubescence entirely white to yellowish white; integument black with distinct (but not strong) greenish blue reflections, with dark-brown flagellum, tibiae, tarsi, abdominal vertex, and intertergal areas.

Head.—Face with length to breadth 92-84; inner eye margins slightly converging below; space lateral to lateral ocellus flat; distance from clypeus to antennal scrobes slightly greater than scrobal diameter or interscrobal distance; mandibular "beard" of delicate hairs nearly as long as mandible; frons between upper half of eyes with pits averaging nearly two pit widths apart; pits of supraclypeal area (external to subantennal suture) coarse, angled toward mandibular base, separated by about one pit width; area around ocelli sparsely pitted to nearly impunctate; antenna reaching about to middle of mesoscutum; scape thickened but not

bulbous, about twice as long as broad; flagellomeres approximately as broad as long; I only slightly shorter than each of II-X; II-VII gently expanded ventrally, bare except for extremely short general pubescence, smooth portions brown, restricted to upper half of each; length of eye to galea to maxillary palpus to labial palpus to lacinia 54-53-34-27-24; lacinia reaching distal end of maxillary palpomere III.

Thorax.—Scutum with long, sparse pubescence, its surface not concealed, with small, sparse pits averaging four to five pit widths apart except somewhat denser along lateral, posterior borders; sides of mesepisternum with pits two to three pit widths apart except closer near prothorax, nearly impunctate on anterior two-thirds of hypopimeral area; anterior femur slightly over half as broad as long, with sharp ventral margin; midfemur broadest subbasally, over

half as broad as long, with narrow but flattened ventral margin; posterior tibia about three times as long as broad, with generally polished outer surface, the ventral margin bearing long "beard" with some hairs nearly as long as tibia; posterior basitarsus about $3\frac{1}{2}$ times as long as broad; fore- and midtarsomeres II-IV symmetrical, broader than long; posterior tarsomeres II-IV produced dorsoapically, II slightly longer than broad, IV broader than long; wings clear hyaline, venation mostly pale testaceous; enclosure of propodeum with coarse, even striae, slightly diverging toward posterior margin.

Abdomen.—Tergum I, posterior half of II polished, nearly impunctate; sternum IV with sublateral, subapical hooklet; II-V each with prominent hair bands covering depressed apical borders; apical margin of V gently rounded apically; VI with broad, median, depressed area polished, bowed outwards at middle, with flat, nearly truncate apical projection almost twice as broad as long, with short, inconspicuous pubescence except denser on margin; VII with apical projections flat, roughly triangular, with exposed portions about three times as long as broad, with hair of inner apical margins dense but less than half as long as projection; basal flaps flat, about as long as broad, separated by semicircular arch; VIII with total length (including basal lobes) to width to length of median apical projection 56-32-25; projection broadest basally, narrowing to one-fourth basal diameter at one-third distance from apex, expanded at apex to about twice narrowest point, with apex slightly emarginate in profile; genital capsule with gonostylus slender, elongate, sharply delimited from remainder of gonocoxite; free portion of volsella fingerlike, narrowest near middle, at least four times as long as narrowest width, with marginal pubescence slightly less than half as long as "finger."

Allotype female: Length about 6.2 mm, of anterior wing 4.0 mm; pubescence entirely white to yellowish white except some scattered brownish hairs on upper frons, vertex; integument black with distinct dark-blue reflections (indistinct on clypeus), dark-brown legs, flagellum, tegula, abdominal venter.

Head.—Face with length to breadth 81-90;

inner eye margins parallel; area lateral to lateral ocellus convex; distance from clypeus to antennal scrobe about two-thirds scrobal diameter, three-fifths interscrobial distance; clypeus with well rounded anterior margin, convex surface, with anterior two-thirds impunctate except for few large median pits; frons between upper halves of eyes with pits averaging at least two pit widths apart, sparser medially.

Thorax.—Mesoscutum sparsely covered with about equal numbers of long, short hairs, not concealing surface; mesoscutum between parapsidal lines polished, with fine pits averaging at least three pit widths apart; mesepisternum with sides polished, pits averaging at least three pit widths apart, slightly more pitted ventrally where finely roughened on posterior half; tibial scopa long, sparse, not at all obscuring surface; midtibial spur pale testaceous with about 15 clear teeth joined at bases; wings clear but lightly grayed, with brown veins; propodeal enclosure with moderately coarse, well-defined striae, largely smooth, polished on posterior third except medially with four to five well-defined transverse striae.

Abdomen.—Tergum I polished, nearly impunctate; basal half of terga II, III with pits between one and two pit widths apart, sparser on apical half; terga with apical fascia poorly developed, with basal fascia obsolescent medially on II, complete but medially thin on III, well developed on IV, V; anal fimbria bright ochraceous.

Type Series

Holotype male: 2.4 km west of Bradley, Monterey Co., Calif., on *Oenothera campestris*, April 20, 1963 (P. H. Raven). **Allotype female:** 4 km south of Creston, San Luis Obispo Co., Calif., April 10, 1961 (R. W. Thorp). **Paratypes:** One male, same as holotype; three males, Bee Rock, San Luis Obispo Co., Calif., *Oenothera campestris*, May 5, 1963 (P. H. Raven); one male, 8 km west of Santa Margarita, San Luis Obispo Co., Calif., May 2, 1962 (C. A. Toschi); one male, three females, Creston, San Luis Obispo Co., Calif., April 11, 1961 (R. W. Thorp); one male, La Panza, San Luis Obispo Co., Calif., May 10, 1938; two females, 11 km southwest of Shandon,

San Luis Obispo Co., Calif., on *Oenothera campestris*, April 10, 1961 (J. W. MacSwain); one female, 29 km east of Bakersfield, Kern Co., Calif., on *Oenothera campestris*, April 11, 1958; one female, 48 km southwest of Bakersfield, April 1, 1931; two males, Tulare Airpark, Tulare Co., Calif., on *Oenothera campestris*, April 6, 1960 (E. G. Linsley), one male, 8 km south of Tulare, Tulare Co., Calif., *Oenothera campestris*, March 29, 1960 (C. A. Toschi); two males, Bagby, Mariposa Co., Calif., on *Clarkia dudleyana*, May 13, 1965 (J. W. MacSwain).

Discussion

D. sparsipunctata is closely related to *D. scintilla* (Cockerell) and *D. neoscintilla* n. sp. It differs from the latter by its darker, more roughened flagellum, the more brownish hair of its frons, and its weaker basal tergal hair bands. It differs from *D. scintilla* by its more sparsely, irregularly pitted integument and its slightly larger size. On some female specimens, the pits are slightly denser than on the allotype. *D. sparsipunctata* may represent a geographical race of *D. scintilla* confined to the San Joaquin Valley and surrounding foothills.

DUFOUREA stagei n. sp.

Holotype male: Length about 6.6 mm, of anterior wing 4.3 mm; integument with moderately strong dark greenish blue reflections, less distinct on face below antenna, on femora and tibiae, on sterna I to IV; black or with nearly imperceptible bluish reflections on antenna, labrum, basal half of mandible (apical half reddish brown); tarsi, sternum V medium to dark brown, with faint bluish reflections. Pubescence entirely white to yellowish white, sparse, moderately long.

Head.—Face with length to breadth 87-99; inner eye margins slightly converging below; distance from clypeus to antennal scrobe slightly less than scrobal diameter, about three-fourths interscrobal distance; clypeus slightly depressed laterally, not elevated or tilted beyond facial plane; scape thickened, about 1½ times as long as broad; flagellum short, not reaching beyond middle of mesoscutum; flagellomere I nearly 1½ times as long as basal breadth, one-fourth longer than II or succeeding eight flagellomeres (all slightly broader than long); flagellomeres II-VI distinctly expanded subapically; all flagellomeres (except XI) with ventral surfaces flattened, covered with numerous long, pale, usually strongly curved hairs; length of eye to galea to maxillary palpus to labial palpus to lacinia 55-49-35-25-24; maxillary palpomere II subequal to I, about three-fourths as long as labial palpomere I, 1½ times as long as maxillary palpomere III or labial palpomere II; mandible slightly expanded beneath subapically; pubescence

nearly prostrate on subantennal area, tilted about 45° to 60° on densely pitted clypeus; subantennal area (except near tentorial pits) with pits about one pit width apart; parafacial area sparsely pitted close to antennal scrobe; large impunctate area extending from near antennal scrobe halfway to median ocellus; ocelli surrounded (except above) with nearly impunctate areas; frons otherwise irregularly, coarsely pitted, with pits averaging slightly less than one pit width apart; cheek with pits averaging from one to two pits widths apart except sparser on somewhat rugose area just posterior to mandible; antenna ranging from black basally to dark brown apically.

Thorax.—Mesoscutum with long, sparse pubescence, without perceptible shorter hair, generally sparsely pitted between parapsidal grooves, anterolaterally with pits about one pit width apart; lateral face of mesepisternum with coarse, irregular, setigerous pits, otherwise roughened, its ventral face closely sculptured with large, small pits; enclosure of propodeum with 10 to 12 well-separated carinae on either side of midline, extensively smooth (but transversely wrinkled) posteriorly; lateral face of propodeum with fine, close pits, larger tuberculate ones, with transverse wrinkling; posterior face impunctate except for several large tuberculate pits at hair bases; wings nearly clear hyaline with wing veins testaceous; femora (especially fore- and midfemur) distinctly swollen, midfemur over half as wide as long; tarsi beyond basitarsi as broad as or

broad than long; hind basitarsus about three times as long as broad; hind tibia with length to breadth 40-12, fringed with hairs ventrally, some of them two-thirds as long as tibia.

Abdomen.—Tergum I polished, with few widely separated pits; terga II-IV with sparse pits ranging from two pit widths apart basally to nearly impunctate before transparent apical borders; sternum IV with small sublateral, subapical tubercle surmounted by anteriorly directed hooklet; V with well-developed apical fringe of short hair, without emargination or other distinctive features; VI with pigmented portion of median, differentiated area (excluding apical projection) nearly as wide as long, nearly twice as wide at base of apical projection as at anterior end, densely covered with short, pale, feathery pubescence; apical projection flame shaped, deeply cupped ventrally, convex dorsally, with pale testaceous borders, bearing long, dense tuft of pale pubescence; VII with pair of apical lobes not differentiated from basal flaps (except by hairiness, poorly defined suture); lobes (including basal flaps) about twice as long as broad, tapered from near midpoint to narrowly rounded apex, with surface, inner, apical margins (not including flaps) covered with long pale pubescence; VIII with total length (including basal lobes) to breadth to length of median apical projection 66-37-31; projection broadest at base, tapered to narrowest zone (about one-fourth as broad as base) near middle, gradually widened to apex; in profile, projection about $1\frac{1}{2}$ times as thick subbasally as subapically, rounded at tip; genital capsule with gonostylus very slender, curved, tapered, well differentiated from remainder of gonocoxite; volsella with free end about $2\frac{1}{2}$ times as long as broad, with longest fringing hairs nearly as long as free end.

Allotype female: Length about 6 mm, of anterior wing 4.5 mm; pubescence entirely yellowish white, rather sparse; integument black, with faint greenish blue metallic reflections dorsally, fainter on sides of thorax.

Head.—Face with length to breadth 88-95; inner eye margins slightly diverging below; distance from clypeus to antennal scrobe about two-thirds scrobal diameter, one-half interscrobal distance; area lateral to lateral

ocellus almost imperceptibly convex; clypeus convex, with anterior third distinctly depressed, with about 25 scattered pits on polished, nonmetallic surface; apical third of mandible reddish brown; apical two-thirds of outer surface of flagellum yellowish brown; median one-third of frons covered with fine pits averaging about two pit widths apart, with lateral two-thirds more densely pitted, those of flattened area between ocellus, eye generally much less than one pit width apart.

Thorax.—Mesoscutum with scattered, mostly moderately long pubescence not concealing integument, with rather fine pits averaging slightly less than one pit width apart; sides of mesepisternum polished, with fine pits averaging about two pit widths apart, even sparser anteriorly on hypoepimeral area; tibial scopa entirely white; midtibial spur pale testaceous, with teeth connected basally; wings slightly yellowish, veins yellowish brown; propodeal enclosure completely, rather finely striate, transversely so on posterior fourth; sides of propodeum finely, rather densely pitted, posteriorly with pits much less than one pit width apart.

Abdomen.—Disks of terga I, II polished, pits averaging at least three pit widths apart on most densely pitted areas; apical tergal hair bands thin, inconspicuous, basal hair bands poorly developed; anal fimbria brownish orange.

Type Series

Holotype male: San Bruno Mountains, San Mateo Co., Calif., April 17, 1962 (G. E. Stage).
Allotype female: Same locality, May 5, 1961 (J. Powell).

Discussion

D. stagei is related to *D. viridescens* (Crawford). The male can be distinguished by the broad apical lobes of sternum VII and by the longer apical projection of sternum VI. The female closely resembles that of several species in the same group. *D. stagei* is characterized by the combination of entirely pale pubescence, strong transverse striation of the propodeal enclosure, yellowish brown flagellum, and sparse median and dense lateral punctation of the frons.

DUFOUREA torchioi n. sp.

Holotype male: Length about 7.0 mm, of anterior wing 4.0 mm; pubescence entirely pale, integument black with dark-blue reflections becoming bronzy on apical terga; tibiae, tarsi, mouthparts dark brown; antenna black; wing membrane very faintly tinged with yellow, veins medium brown.

Head.—Face with length to breadth 78-99; inner eye margins strongly converging below; distance from clypeus (pitted) to antennal scrobe slightly greater than scrobal diameter, subequal to interscrobal distance; area lateral to lateral ocellus gently convex (nearly flat); frons, vertex with pits generally slightly less than one pit width apart, becoming much sparser (two to three pit widths apart on parafacial area near inner eye margin); clypeus densely pitted but with broad band of supraclypeal area (almost to scrobe) completely impunctate; cheek finely, sparsely pitted except near vertex; antenna reaching to propodeum; scape not swollen, about twice as long as broad; flagellomere I about three-fourths as long as II; flagellomeres II-X subequal, slightly less than $1\frac{1}{2}$ times as long as broad; all flagellomeres with several rows of numerous short, pale, bent, hairs on inner side, less than one-third as long as flagellum; flagellomeres entirely roughened except for small smooth areas at outer side near junctions of apical 6; length of eye to galea to maxillary palpus to labial palpus to lacinia 56-48-36-25-21; maxillary palpomeres I, II subequal, slightly shorter than III, IV, V combined or labial palpomere I.

Thorax.—Mesoscutum with moderately coarse pits averaging slightly less than one pit width apart; scutellum somewhat more closely pitted; sides of mesepisternum polished with fine, sparse pits, especially on hypoepimeral area; propodeal enclosure only slightly longer than metanotum, with strong, coarse, but nearly straight striae weakening medioapically; sides of propodeum roughened, with posterior portion slightly wrinkled. Forefemur moderately swollen, slightly more than half as wide as long; midfemur expanded just before middle, somewhat triangular; hind trochanter with nearly right-angled bend one-third distance

from base; inner faces of hind femur, tibia with long, loose, copious hair about half as long as segments; midbasitarsus bowed, about four times as long as broad; hind basitarsus flattened posteriorly, less than three times as long as broad, tarsomeres II, III produced behind, broader than long.

Abdomen.—Terga shining, sparsely, finely pitted; apical hair fascia conspicuous, complete, except medially on tergum I; sterna II-IV broadly concave, without sublateral protuberances or hooklets; sternum V with dense, subapical band of short pale hair; sternum VI produced triangularly, with dense ochraceous hair covering apical half of triangle, with median carina flattened apically, dividing basally to enclose narrow, white, membranous area, more basally dividing to form lunule at right angle to axis of sternum, with dense tuft of hair sublateral, posterior to lunule; VII with apical lobes roughly rectangular, about twice as long as broad, concave, with basal halves of concavity largely filled with short, dense hair, with apex bearing long, dense hair tuft; VIII with total length (including basal lobes) to width to length of projection 72-40-39; projection narrowed basally on apical half, slightly expanded at tip; genital capsule with gonostylus narrow, sharply differentiated from gonobase; volsella with free end fingerlike, about five times as long as broad, with stiff hair along inner margin about one-third as long as free end.

Type Series

Holotype male: Felton, Santa Cruz Co., Calif., May 26, 1956 (P.F. Torchio). **Paratype:** one male, same as holotype.

Discussion

D. torchioi is closely related to *D. californica* (Michener). The male differs most conspicuously by the long, dense pubescence of sternum VI. It can also be distinguished by the more extensive concave, hirsute area on the apicolateral lobe of sternum VII.

DUFOUREA zacatecas n. sp.

Holotype male: Length about 7 mm, of anterior wing 4.6 mm; integument black with faint bluish metallic reflections on face, fainter reflections on sides of thorax, almost imperceptibly bronzy ones on scutum, scutellum; abdomen black with dark-brown posterior tergal borders, apical sterna; pubescence yellowish white except mixed with brown on frons, lower parafacial area, middle of terga VI, VI.

Head.—Face with length to breadth 86-98; inner eye margins moderately converging below; distance from clypeus to antennal scrobe distinctly greater than scrobal diameter or interscrobal distance; area lateral to lateral ocellus almost imperceptibly concave; clypeus nearly flat, with well-rounded anterior half having a few large shallow pits but otherwise impunctate; length of eye to galea to maxillary palpus to labial palpus to lacinia 52-60-56-43-34; lacinia reaching slightly beyond tip of maxillary palpomere II; antenna reaching posterior margin of thorax; scape not swollen, about $2\frac{1}{2}$ times as long as broad; flagellum crenulate, flagellomeres mostly twice as long as basal breadth, VII to XI on margins opposite crenulations with row of numerous short hairs interspersed with one to three longer curled ones; frons, vertex coarsely, densely pitted, less than one pit width apart except sparser on parafacial area, near ocelli, cheek densely pitted above, gradually becoming nearly impunctate ventrally.

Thorax.—Mesoscutum, scutellum, metanotum with dense, coarse pits much less than one pit width apart except near anterolateral corner of scutum; mesepisternum coarsely pitted, pits mostly less than one pit width apart except posteriorly, ventrally; propodeal enclosure elongate, coarsely, densely striate, becoming irregularly rugose posteriorly; sides of propodeum roughened, with moderate pitting anteriorly, widely separated rugae posteriorly, with small, scattered setigerous callosities extending to more shining posterior face; legs slender, unmodified, with tarsomeres

II, III all longer than broad; wings lightly smoky, with dark-brown veins.

Abdomen.—Terga polished, pits fine, mostly widely separated, averaging much more than one pit width apart even on densest areas; venter broadly concave, without mounds or hooklets on any segments; sternum V with apical margin truncate, bearing only scattered hairs except laterally; VI with medioapical fringe about as long as flagellar width, broadly concave medially except for low, polished median ridge developed apically into sharp carina with rounded crest in profile, its tip flush with rounded apical margin of sternum; VII with hairy apical lobes inwardly directed, at least twice as broad as long, merged with much larger basal flaps, strongly cupped on ventral surface, with short ventrolaterally directed tip; VIII with total length (including basal lobes) to breadth to length of median apical projection 87-48-35; apical projection broadest basally, sharply narrowed at basal one-third, sharply broadened, flattened at apical knob; genital capsule with narrow, sharply pointed, well differentiated gonostylus; volsella with free end fingerlike, at least four times as long as broad, with inner fringe of long setae.

Type Series

Holotype male: 8 km north of Zacatecas, Zacatecas, Mexico, October 19, 1970 (G. E. Bohart and R. M. Bohart). **Paratypes:** Two males, same as holotype; one male, 16 km south of Rio Grande, Zacatecas, Mexico, November 4, 1966 (G. E. Bohart and A. S. Bohart).

Discussion

D. zacatecas is not closely related to any known species. Although it appears to be at least distantly related to *D. bifida* n. sp. and *D. marginata* Cresson. Sternum VI, with its apically thickened median carina, and sternum VII, with its broad apical lobes bearing an outwardly directed tip, are unique.

DUFOUREA gilia Bohart

Female: Length about 6.5 mm, of anterior wing 4 mm; integument with well-defined bluish green reflections on frons and vertex, poorly defined bronzy to purplish reflections on scutum, very weak greenish to bronzy reflections on abdomen; clypeus black, flagellum black basally to dark brown apically; translucent tergal borders dark brown basally, most of abdominal venter, apical two-thirds of mandible reddish brown; pubescence yellowish white except largely pale brown on apical half of abdomen, bright testaceous on anal fimbria, light testaceous on tibiae, interspersed with brown on frons; hair moderately long on cheek, scape, mesepisternum, propodeum, mostly very short, moderately dense on scutum with scattered slightly longer hairs.

Head.—Face with frons, clypeus unusually convex; face with length to breadth 62-55; distance from clypeal margin to antennal scrobe about one-third longer than scrobal diameter, slightly greater than interscrobal distance; inner eye margins nearly parallel, almost imperceptibly converging below; interscrobal distance about three-fourths distance from eye to scrobe; length to breadth of eye 37-17; length of eye to galea to maxillary palpus to labial palpus to lacinia 37-53-47-36-26; lacinia scarcely extending beyond maxillary palpomere II, the latter $1\frac{1}{2}$ times as long as I, about twice as long as labial palpomere II; clypeus shining; subantennal area sparsely, irregularly pitted; lower parafacial area with pits about one pit width apart, those of frons, vertex much closer except immediately above antennal scrobe, those of cheek fine, sparse, tending to be in rows parallel to eye margin, those of venter of cheek sparse, slightly larger, absent on polished zone near posterolateral corner of eye.

DUFOUREA vanduzeei Bohart

Female: Length about 6 mm, of anterior wing 3.7 mm; integument black, without metallic blue or green reflections except fairly dark blue on frons, vertex; pubescence pale yellowish white to white throughout.

Thorax.—Pits of scutum even, moderately coarse, less than one pit width apart, but separated by distinct interpunctural spaces, those of scutellum more irregular, slightly sparser, those of lateral aspect of mesepisternum irregular in size, mostly more than one pit width apart, those of ventral aspect very sparse, separated by minutely roughened interpunctural spaces, those of lateral aspect of propodeum setigerous, separated by roughened carinae becoming transverse posteriorly; wings moderately smoky with dark-brown to nearly black veins; midtibia with apical one-third bordered posteriorly by strong testaceous spines, partially hidden in pubescence.

Abdomen.—Disk of tergum I with strong pits slightly more than one pit width apart, that of tergum II with pits slightly finer but closer, that of terga III, IV with pits considerably finer, sparser; apical hair bands of terga extremely sparse but basal fascia (beneath transparent borders) well developed; anal fimbria bright testaceous.

Records

Mt. Hamilton, Santa Clara Co., Calif., April 18, 1956; two from La Panza Camp, San Luis obispo Co., Calif., April 25, 1968 (J. A. Chemsack); two from 16 km southeast of Creston, San Luis Obispo Co., Calif., April 25, 1968 (D. Viers and J. Powell).

Discussion

The female of *D. gilia* Bohart has a much longer face than any of its relatives such as *D. vanduzeei* Bohart. The female bears some resemblance to *D. versatilis* (Bridwell) but has a much shorter lacinia and more slender hind tibia.

Head.—Face with length to breadth 80-99; frons, vertex with rather fine pits slightly more than one pit width apart except sparser with shallow depression at middle of face; parafacial area next to scape nearly impunctate; clypeus

slightly convex in profile, well rounded apically, with about eight large pits on apical half extending to apical margin; area from ocelli to eye distinctly convex; flagellum with apical two-thirds dark brown on outer side.

Thorax.—Pronotal, scutal, scutellar pubescence mostly short, erect with few slightly longer hairs, that of lateral margins, lateral angle of pronotum obscuring integument; mesepisternal, lateral propodeal pubescence at least four times as long as mesonotal; pits of mesonotum ranging from slightly less than one pit width apart to slightly denser medially; scutellar pits averaging about one pit width apart; mesepisternum laterally with scattered fine pits, mixed with setigerous larger ones, ventrally nearly impunctate, polished on anterior half, finely pitted, roughened posteriorly; propodeal enclosure slightly longer than metanotum, its surface closely, evenly striate, with clear-cut transverse groove subapically; lateral aspect of propodeum polished with scattered setigerous punctures dorsoapically, roughened, finely and sparsely transversely wrinkled elsewhere; midtibial spur pale testaceous, with about 15 fine, closely spaced teeth on apical three-fourths.

Abdomen.—Tergum I with middle portion covered with moderate sized pits about one pit

width apart, pits sparser sublaterally near impunctate apical border; disks of terga II-VI with progressively finer pits ranging from average of one to two pit widths apart; apical fascia complete, conspicuous on all terga but reduced medially on tergum I; anal fimbria ochraceous.

Records

Localities: *D. vanduzeei* is recorded previously only from the holotype male. Additional data as follows: Bradley, Monterey Co., Calif., May 17, 1920 (E. P. Vanduzee); Lockwood Creek near Stauffer Post Office, Ventura Co., Calif., on *Linanthus aureus*, May 7, 1959 (P. S. Hurd); Hunter-Liggett Military Reservation, Nacimiento Road, Los Padres National Forest, Monterey Co., Calif., on *Linanthus liniflorus*, mid-April to mid-May, 1976, 1977 (P. Lincoln).

Discussion

The female of *D. vanduzeei* resembles that of *D. neocalifornica* Bohart and *D. californica* (Michener). It has a narrower face than the latter and differs from either in lacking long, dark hairs on the mesoscutum.

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