

PROCEEDINGS
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NEW SPECIES OF NORTH AMERICAN *AMMOPHILA*,
PART II¹ (HYMENOPTERA, SPHECIDAE)

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Several workers conducting biological studies on *Ammophila* in North America have sent material to me for identification. In some cases undescribed species are involved. It is desirable therefore, to establish these names now so that they will be available to biologists. Because descriptive terminology will be dealt with in my revision of the genus (now in progress), no explanation of terms is given here. Likewise, discussion of species variation, relationships and distribution are minimal in this paper. The following abbreviations have been used to indicate deposition of type material:

AMNH—American Museum of Natural History, New York; ASU—Arizona State University, Tempe; CAS—California Academy of Sciences, San Francisco; CIS—California Insect Survey, Berkeley; CMP—Carnegie Museum, Pittsburgh; CNC—Canadian National Collection, Ottawa; CNHM—Chicago Natural History Museum, Chicago; CSDA—California State Department of Agriculture, Sacramento; CUI—Cornell University, Ithaca; LACM—Los Angeles County Museum, Los Angeles; NSDA—Nevada State Department of Agriculture, Reno; OSU—Oregon State University, Corvallis; PARIS—Museum d'Histoire Naturelle, Paris, France; SDM—San Diego Natural History Museum, San Diego; UCB—University of Colorado, Boulder; UCD—University of California, Davis; UCR—University of California, Riverside; UKL—University of Kansas, Lawrence; UMSP—University of Minnesota, St. Paul; USNM—United States National Museum, Washington, D. C.

The first six *Ammophila* described here belong to a large assemblage of species I am calling the *urnaria* group. All members have a short preëpisternal sulcus. The clypeus, frons, and pronotal lobe are covered with appressed silver hair and the erect body hair is pale. The pronotal collar and scutum are usually smooth, without transverse ridges. The metapleural flange usually is not lamellate and the male clypeus is commonly emarginate. This New World group includes the following United

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States species: *aberti* Haldeman, *bellula* Menke, *cleopatra* Menke, *juncea* Cresson, *kennedyi* (Murray), *leoparda* (Fernald), *parkeri* Menke, *picipes* Cameron and *urnaria* Dahlbom. The following extralimital forms belong in the *urnaria* group: *dejecta* Cameron (Mexico), *gracilis* Lepeletier, *lampei* Strand, *rufipes* Guérin-Méneville, *arechavaletai* Brèthes, *platensis* Brèthes, and *suavis* Burmeister (all South American).

***Ammophila aellos* Menke, new species**

Holotype male: Length 18 mm.

Color: Black; tegula reddish; petiole tergite red laterally, black above; gastral segments I–II red, tergite I with a median black stripe, II broadly black posteriorly; front and middle femora apically, and tibiae red; wings clear, veins brown.

Vestiture: Appressed clypeal hair thinning anteromedially, gena along outer orbit sparsely covered with appressed silver hair; mesopleuron with band of appressed silver hair along mesopleural suture from base of mid coxa to top of hypopimeral area; inferior metapleural area with band of appressed silver hair near base of hind coxa which crosses metapleural sulcus and extends onto propodeal side, ending anterior to propodeal spiracle, band weaker on propodeal side.

Structure: Labrum truncate; collar densely micropunctate, moderately macropunctate; scutum densely micropunctate and macropunctate; scutellum ridged and punctate; mesopleuron densely macropunctate anteriorly, moderately so posteriorly; inferior metapleural area and propodeal side densely macropunctate.

Female: Length 18 mm.

Color: As in male except tegula, petiole, and gastral segments I–III and tergite IV laterally, red, tergite III broadly black posteriorly; front and middle legs red except coxa, trochanter and base of femur; hind femoral apex and tibia red.

Vestiture: As in male except gena densely covered with appressed silver hair; pronotal collar with appressed silver hair; scutum with a posteromedian longitudinal band of appressed silver hair.

Structure: Labrum truncate but bearing a median projection; clypeal disk moderately bulging, sparsely to moderately macropunctate, median free margin projecting, teeth well formed; inner orbits moderately converging below.

Types: Holotype male: 8 mi. S Guadalajara, Jalisco, Mexico, 10 July 1963, L. Stange and F. Parker (UCD). Nine male and three female paratypes as follows: MEXICO, GUERRERO: Chilpancingo, 24 July 1961, R. and K. Dreisbach (UCD). 3 mi. N Taxco, 5500 ft, 1 June 1959, H. E. Evans (CUI). JALISCO: 8 mi. S Guadalajara, 10 July 1963, L. Stange and F. Parker (UCD). Guadalajara, no further data (UCD). MORELOS: Atlatlahucán, 24 July 1963, F. Parker and L. Stange (UCD). Xochicalco Pyramid, 16 July 1963, F. Parker and L. Stange (UCD).

Discussion: In some males the front and middle legs have only a small red spot at the femoral apex and no red on the tibiae. This species

is most similar to *mescalero* but the form of the collar is distinctive in the latter. Males of *mescalero* usually lack the black spot on gastral tergite II which is not true for *aellos*. *Ammophila aellos* is known only from Mexico.

***Ammophila aucella* Menke, new species**

Holotype male: Length 22.5 mm.

Color: Black; petiole tergite red laterally; gastral segment I red, tergite with elongate median black spot; wings clear, veins brown.

Vestiture: Mesopleuron with band of appressed silver hair along mesopleural suture from base of mid coxa to top of hypoepimeral area; inferior metapleural area with band of appressed silver hair near hind coxal base which crosses metapleural sulcus and extends onto propodeal side, band ending anterior to propodeal spiracle, band weaker on propodeal side.

Structure: Labrum broadly acuminate; collar moderately macropunctate; scutum densely macropunctate; scutellum punctate, ridged; pleura and propodeal side densely macropunctate.

Female: Average length 23 mm, range: 20–23 mm.

Color: As in male except gastral segments I–II red, distal half of tergite II black, tergite V red.

Vestiture: As in male except gena sparsely covered with appressed silver hair; scutal furrows with appressed silver hair.

Structure: Labrum acuminate; clypeal disk moderately bulging, moderately macropunctate, median free margin projecting, teeth well formed; inner orbits moderately converging below; collar sparsely macropunctate.

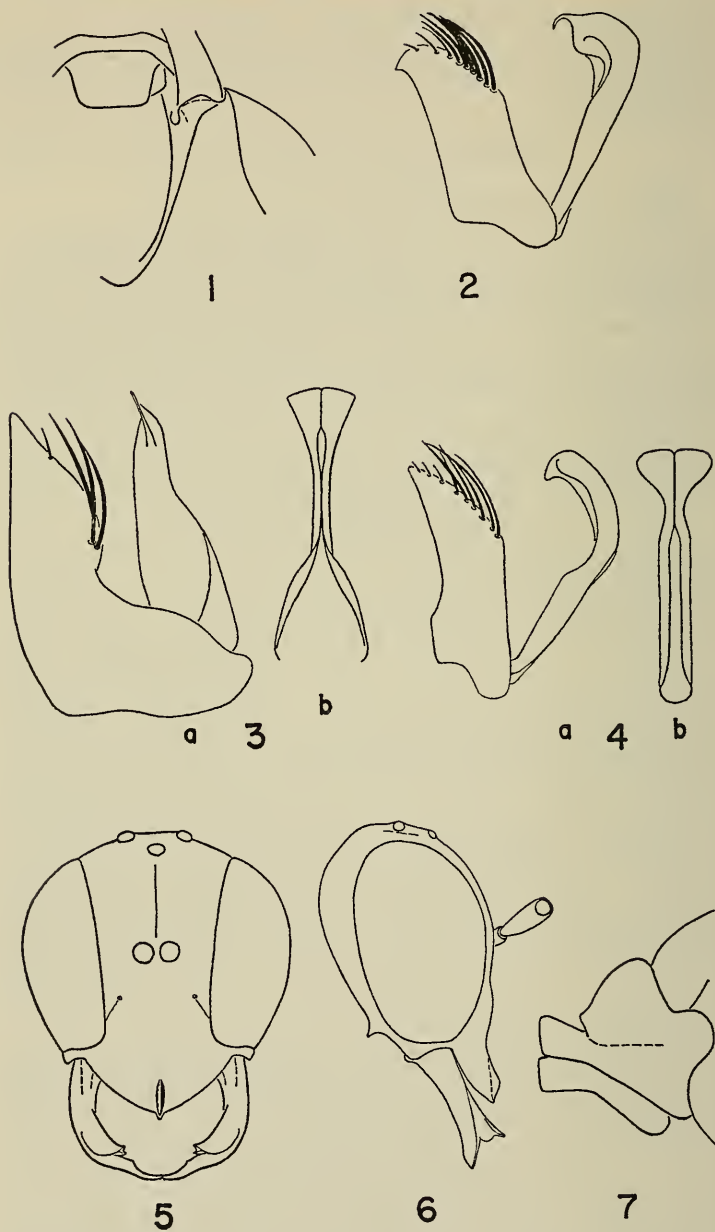
Types: Holotype male: 3 mi. SE Plan de Barrancas, Jalisco, Mexico, 8 July 1963, F. Parker and L. Stange (UCD). Six male and six female paratypes as follows: MEXICO, GUERRERO: Iguala, 30 June 1935, A. Pritchard (UMSP). JALISCO: 3 mi. SE Plan de Barrancas, 8 July 1963, F. Parker and L. Stange (UCD). GUADALAJARA, no further data (UCD). MICHOACAN: Apatzingán, 1200 ft, 18 August 1941, H. Hoogstraal (CNHM). NAYARIT: Compostela, 16 November 1957, R. and K. Dreisbach (UCD). SANTIAGO IXCUINTLA, 29 July 1953, C. and P. Vaurie (AMNH). SINALOA: Concordia, 700–1000 ft, 4 July 1963, F. Parker and L. Stange (UCD). One headless metatype female from Zacapa, Guatemala, 29 November 1929, D. M. Bates (UCD).

Discussion: This species is most similar to *juncea* Cresson, *dejecta* Cameron and *picipes* Cameron, but the abdominal coloration and pleural hair patterns in both sexes of *aucella* are distinctive. *Ammophila aucella* is known only from Mexico and Guatemala.

***Ammophila bella* Menke, new species**

Holotype male: Length 17.5 mm.

Color: Black; petiole sternite apicoventrally and tergite laterally, red; gastral segments I–II red, tergite I with median black stripe, II



with median black stripe anteriorly, posterior half broadly black; closing face of femoral apex red; wings clear, veins brown.

Vestiture: Gena along outer orbit with appressed silver hair; collar with transverse band of appressed silver hair along posterior margin, scutum with median longitudinal stripe of appressed silver hair; mesopleuron with appressed silver hair, hair densest near mid coxa and lacking ventrally and on hypopleural area; inferior metapleural area with a small patch of appressed silver hair near hind coxa, patch continuous with band of hair on propodeal side of metapleural sulcus, propodeal band extending to superior metapleural pit, hairs perpendicularly oriented to metapleural sulcus; erect body hair long, dense.

Structure: Labrum rounded; collar densely micropunctate, moderately macropunctate; scutum densely micropunctate and macropunctate; scutellum punctate and ridged; mesopleuron, inferior metapleural area and propodeal side densely micropunctate and macropunctate.

Female: Average length 17 mm, range: 15–19 mm.

Color: As in male but tegula and petiole red (petiole sternite sometimes black), gaster red but tergite III black medially and segment IV black; femur, tibia and tarsus of front leg red; mid femur and tibia red; hind femur red.

Vestiture: Appressed hair as in male but denser; erect mesosomal hair very short.

Structure: Labrum rounded; clypeal disk moderately to strongly bulging, densely macropunctate, median free margin strongly projecting; inner orbits moderately converging below; propodeal side rugosopunctate.

Types: Holotype male: 3 mi. N Petlalcingo, Puebla, Mexico, 21 August 1963, F. D. Parker and L. A. Stange (UCD). Forty-seven male and 12 female paratypes as follows: MEXICO, GUERRERO: 24 mi. S Iguala, 18 July 1963, F. Parker and L. Stange (UCD). Mexcala, 29 June 1951, P. D. Hurd (CIS). Zumpango, 22 July 1963, L. Stange and F. Parker (UCD). PUEBLA: 5 mi. S Izúcar de Matamoros, 1 August 1963, L. Stange and F. Parker (UCD). Petlalcingo, 3 August 1963, L. Stange and F. Parker (UCD). 3 mi. N. Petlalcingo, 3 and 21 August 1963, F. Parker and L. Stange (UCD). Tehuacán, 1903, L. Digue (PARIS). SINALOA: Concordia, 4 July 1963, F. Parker and L. Stange (UCD). 8 mi. S Elota, 2 July 1963, F. Parker and L. Stange (UCD). SONORA: 10 mi. W Alamos, 21 July 1954, M. Cazier and W. Gertsch (AMNH).

Discussion: The metapleural hair pattern will separate *bella* from

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FIG. 1, ventral view of male head of *A. imitator*. FIGS. 2–4, male genitalia of *Ammophila coachella* (Fig. 2), *A. imitator* (Fig. 3, a = lateral view, b = dorsal view of aedeagus), *A. mimica* (Fig. 4, a = lateral view, b = dorsal view of aedeagus). FIGS. 5–6, anterior and lateral view, respectively, of male head of *Ammophila coachella*. FIG. 7, lateral view of prothorax of *Ammophila mescalero*.

other red-legged Mexican species such as *mescalero* and *aellos*. *Ammophila bella* is most similar to *bellula*, a species known so far only from Arizona and New Mexico, but the male clypeus is emarginate in the former and the mesosoma has much erect hair. The aedeagus of *bellula* is distinct also. Females of these two species are difficult to separate. The collar in *bellula* is more strongly humped in lateral view and has a slight overhang at the transverse line. The collar in *bella* is shorter. This species is known only from Mexico.

***Ammophila dysmica* Menke, new species**

Holotype male: Length 15 mm.

Color: Black; petiole tergite and gastral segments I–II red with elongate dorsal black spots; wings clear, veins dark brown.

Vestiture: Gena without appressed silver hair; mesopleuron with a band of appressed silver hair along mesopleural suture from base of mid coxa to bottom of hypoepimeral area.

Structure: Labrum obtusely acuminate; collar densely micropunctate, moderately macropunctate; scutal surface rather dull, densely micropunctate, the punctures tending to elongate transversely, moderately macropunctate, furrows transversely rugose; scutellum sparsely punctate, nearly completely ridged; mesopleuron densely micropunctate, moderately macropunctate; inferior metapleural area moderately punctate, interspaces smooth anteriorly becoming roughened posteriorly; propodeal side rugosopunctate.

Female: Average length 18 mm, range: 15–20 mm.

Color: As in male except petiole tergite and gastral segments I–II completely red, tergite III laterally and sternite, red.

Vestiture: As in male with addition of a poorly defined patch of appressed silver hair on inferior metapleural area adjacent to metapleural sulcus near hind coxa; femoral psammophore hairs often brownish.

Structure: Labrum acuminate; clypeal disk moderately bulging, densely micropunctate, sparsely to moderately macropunctate, median free margin projecting, teeth well formed; inner orbits slightly converging below; collar densely micropunctate, sparsely macropunctate; scutum densely micropunctate, the punctures tending to elongate transversely, sparsely to moderately macropunctate, scutal furrows with transverse microridges and a few large rugae; mesopleural surface generally covered by irregular microsculpture, becoming finely, vertically microridged anteriorly, sparsely to moderately macropunctate; inferior metapleural area with irregular microsculpture which tends to form vertical microridges, especially posteriorly, sometimes irregularly rugose, sparsely macropunctate; propodeal side weakly, vertically rugosopunctate with microridges between rugae.

Types: Holotype male: Sagehen Creek near Hobart Mills, Nevada Co., California, 5 July 1962, E. J. Montgomery Parker (UCD). Seventy-five male and 86 female paratypes (CAS, CIS, UCD, LACM, AMNH, CSDA, CUI, USNM, OSU, NSDA) collected from June 4 to August 3, 1909–1964 at the following localities:

CALIFORNIA, ALPINE Co.: Hope Valley. ELDORADO Co.: Angora Lake; China Flat; Echo Lake; Fallen Leaf Lake; Glen Alpine Creek; Lake Tahoe; Strawberry; Strawberry Valley; Tahoe; Tahoe Valley. LASSEN Co.: Bridge Creek Camp; Summit Camp; Westwood. MODOC Co.: Canby; Davis Creek; Straw. NEVADA Co.: Boca; near Hobart Mills; Sagehen Creek near Hobart Mills; Truckee, 7 mi. SE; Upper Sagehen Creek. PLACER Co.: Carmelian Bay. PLUMAS Co.: Blairsden; Bucks Lake; Graeagle; Johnsville. SHASTA Co.: Burney, 5 mi. E; Hat Creek; Hat Creek, 4 mi. S; Moose Camp. SIERRA Co.: Calpine; Gold Lake; Smith Mill, 15 mi. SE Sierraville. SISKIYOU Co.: McCloud, 5 mi. E. TEHAMA Co.: Deer Creek. TRINITY Co.: Coffee Creek. TULARE Co.: Bearpaw Meadow, Sequoia National Park; Hackett Meadow to Shotgun Creek, Sequoia National Park. TUOLUMNE Co.: Dardanelles; Sonora Pass, 9624 ft; Strawberry. NEVADA, WASHOE Co.: Galena Creek. OREGON, BAKER Co.: Wallowa Mountains. DESCHUTES Co.: Bend, 10 mi. W; Century Drive, Bend; Sisters; Tumalo Reservoir. KLAMATH Co.: Lake of the Woods.

Discussion: This species is similar to *kennedyi* and *urnaria*. *A. dysmica* females can usually be separated from these two species by the silver face and minutely roughened pleura. The appressed facial hair of *kennedyi* and *urnaria* females is usually brown. The completely red first gastral tergite of *kennedyi* males will usually separate this species from *dysmica*. The separation of *dysmica* and *urnaria* males is more difficult. Most specimens can be identified on the basis of distribution since the ranges of the two species overlap only along the eastern Rocky Mountains. As far as known, *urnaria* males have red only on gastral segment I, whereas *dysmica* males have red on both I and II. Completely black-legged *parkeri* males can be confused with *dysmica* but the gastral sternites are red in the former.

Ammophila dysmica is known from California, Oregon, Nevada, Idaho, and Colorado.

***Ammophila hermosa* Menke, new species**

Holotype male: Length 17.5 mm.

Color: Black; petiole tergite red laterally, black above; gastral sternites I–IV red, tergite I red with median black stripe, tergite II red, III–IV red laterally; femur red below, black above, front tibia red, middle and hind tibia red below, black above; wings clear, veins black.

Vestiture: Gena along outer orbit with dense appressed silver hair; collar and scutum with sparse silver to brownish appressed hair; scutum with posteromedian stripe of appressed silver hair; mesopleuron largely covered with appressed silver hair, hair densest along mesopleural suture forming a band from mid coxa to top of hypopleural area; inferior metapleural area with a poorly defined patch of appressed silver hair near hind coxa.

Structure: Labrum obtusely acuminate, nearly truncate; collar densely

micropunctate, moderately macropunctate; scutum densely micropunctate, moderately finely macropunctate, shining; scutellum densely micropunctate, sparsely macropunctate anteriorly, ridged posteriorly; inferior metapleural area densely micropunctate, moderately macropunctate; propodeal side densely macropunctate.

Female: Average length 18 mm, range: 15.5–19.5 mm.

Color: As in male except mandibles and clypeal margin sometimes red; pronotum sometimes with small reddish spot just above lateral line; tegula usually red; inferior metapleural area and propodeum red, or only propodeal side red, mesosoma infrequently entirely black; abdomen red, gastral tergites II–IV occasionally with small black spots; femur, tibia and tarsus red.

Vestiture: As in male except pleural bands denser and more clearly defined.

Structure: Labrum rounded but with median projection; clypeal disk slightly bulging, densely micropunctate, moderately macropunctate, free margin produced, teeth well formed; inner orbits very slightly converging below; scutum densely micropunctate, sparsely, finely macropunctate; scutellum smooth, sparsely, finely macropunctate; propodeal side finely rugose.

Types: Holotype male: Black Lake, Mono Co., California, 10 August 1962, L. A. Stange and A. S. Menke (UCD). Twenty-three male and 25 female paratypes as follows: ARIZONA, COCHISE Co.: 7 mi. W Tombstone, 29 November 1963, V. L. Vesterby (UCD). MARICOPA Co.: Granite Reef Dam, 9–22 October 1964, J. M. Davidson (ASU). PIMA Co.: Organ Pipe Cactus National Monument, 16 April 1948, on *Baileya*, A. L. Melander (UCR). Tucson, 1 November 1940, Bryant (CAS). YUMA Co.: Castle Dome Mountains, 31 March 1959, A. S. Menke and L. A. Stange (LACM). Palm Canyon, Kofa Mountains, 8 April 1963, J. Powell and G. Tamaki (CIS). Yuma, 17 September 1952, H. A. Hill (SDM). CALIFORNIA, INYO Co.: Mazourka Canyon, 2 July 1953, on *Salix*, H. Nakakihara (UCR). Westgard Pass, 18 June 1942, R. M. Bohart (UCD). 7 mi. W Westgard Pass, 24–26 June 1953, J. W. MacSwain (CIS). MONO Co.: Black Lake, 10 August 1962, L. A. Stange (UCD). Topaz Lake, 26 June 1957, J. W. MacSwain and J. M. Burns (CIS). RIVERSIDE Co.: Magnesia Canyon, 29 April 1953, J. C. Hall (UCD). SAN DIEGO Co.: Anza State Park, 28 October 1955, T. R. Haig (UCD). COLORADO, BACA Co.: Regnier (AMNH). NEVADA, WASHOE Co.: Gerlach, 28 June 1939, M. A. Cazier (CIS). MEXICO, CHIHUAHUA: Santa Clara Canyon, 5 mi. W Parrita, 6 July 1954, J. W. MacSwain and E. I. Schlinger (CIS).

Discussion: *Ammophila hermosa* can usually be identified by the reddish legs and posteromedian silver scutal stripe. *Ammophila juncea* and *mescalero* are similar but the former has black legs and the latter has a cariniform collar. *Ammophila hermosa* is known only by the types.

***Ammophila mescalero* Menke, new species**

Holotype male: Length 16 mm.

Color: Black; tegula brownish; petiole tergite red laterally, black above; gastral sternites I–III red, tergites I–II red but with elongate median black spots, tergite III red laterally; front and middle femur and tibia red, hind femur, tibia and tarsus largely black; wings clear, veins reddish brown.

Vestiture: Gena with appressed silver hair; collar and scutum sparsely covered with appressed silver hair; scutum with posteromedian longitudinal silver stripe; mesopleuron covered by appressed silver hair, hair densest along mesopleural suture; inferior metapleural area with a patch of appressed silver hair near base of hind coxa, patch crossing metapleural sulcus and extending onto propodeal side as far as propodeal spiracle.

Structure: Labrum truncate; collar strongly cariniform anteriorly, overhanging transverse line (Fig. 7), collar surface densely micropunctate, moderately macropunctate, shining; scutellum punctate, ridged posteriorly; mesopleuron, inferior metapleural area and propodeal side densely micropunctate, densely macropunctate, shining; metapleural sulcus poorly defined.

Female: Average length 17.5 mm, range: 15–18 mm.

Color: About as in male, petiole sometimes all red, gaster red, tergite I with small black spot, III–IV with large black spots; wing veins reddish brown to dark brown.

Vestiture: As in male except mesopleural appressed hair forming a distinct band along mesopleural suture.

Structure: Labrum rounded, sometimes with a median projection; clypeal disk moderately bulging, densely micropunctate, moderately to densely macropunctate, median free margin projecting, teeth well formed; inner orbits moderately converging below; mesosomal sculpture as in male except propodeal side sometimes weakly rugosopunctate.

Types: Holotype male: Cacaloapan, Puebla, Mexico, 26 April 1962, L. A. Stange (UCD). Nineteen male and 7 female paratypes as follows: UNITED STATES, ARIZONA, SANTA CRUZ Co.: 10 mi. E Sonoita, 9 August 1940, E. S. Ross (CAS). COLORADO, BACA Co.: Regnier, 6–9 June 1919 (AMNH). TEXAS, "Texas," Belfrage (USNM). BREWSTER Co.: Alpine, 11 July 1938, L. W. Hepner (UKL). MEXICO, AGUASCALIENTES: Aguascalientes, 18 August 1953, C. and P. Vaurie (AMNH). CHIHUAHUA: 38 mi. S Hidalgo del Parral, 24 October 1957, H. A. Scullen (OSU). JALISCO: Encarnación de Díaz, 28 July 1951, P. D. Hurd (CIS). Lagos de Moreno, 12 August 1954, R. R. Dreisbach (UCD); 19 August 1960, Arnaud, Ross and Rentz (CAS). MEXICO: Teotihuacán Pyramids, 15 June 1951, P. D. Hurd (CIS). OAXACA: Mitla, 3 July 1955, P. and C. Vaurie (AMNH). 8 mi. N Oaxaca, 12 December 1948, E. S. Ross (CAS). PUEBLA: 8 mi. S Puebla, 13 July 1953 (UKL). 49 mi. E Puebla, 7 June 1956, H. A. Scullen (OSU). Tehuacán, 12 July 1935, A. E. Pritchard

(UMSP). QUERÉTARO: 28 mi. E Querétaro, 13 June 1956, H. A. Scullen (OSU). ZACATECAS: 4 mi. N Fresnillo, 20 August 1960, Arnaud, Ross and Rentz (CAS) 15 km E Sombrerete, 30 July 1951, P. D. Hurd (CIS). 55 km marker, highway 45, 3 July 1961, R. R. Dreisbach (UCD). One meta-type female from Oaxaca, Oaxaca, Mexico, 20 April 1947, B. Malkin (AMNH).

Discussion: In the male the petiole sternite varies from black to red and gastral tergite II may be all red. This species is most similar to *hermosa* and *aellos* but the form of the pronotum is distinctive (Fig. 7). *Ammophila mescalero* is known only by the types.

The following two new species belong to the *procera* group which has been defined by Menke (1964).

***Ammophila monachi* Menke, new species**

Holotype male: Length 11.5 mm.

Color: Black; mandible, tegula, subalar area, peritreme, superior metapleural area and flange, and propodeal side red; petiole tergite and gaster red; legs red except coxa, trochanter and femur above; wings clear, veins black.

Vestiture: Gena and pronotal lobe with dense appressed silver hair; pronotal collar and scutum with sparse appressed silver hair; meso- and metapleuron with dense appressed silver hair; erect hair pale and restricted to head.

Structure: Flagellomere I longer than II (29:19), length less than least interocular distance (29:36); shape of collar as in *nearctica* Kohl, surface with many fine microridges; scutum with many fine microridges; propodeal side diagonally ridged; metapleural flange not lamellate.

Female: Average length 12.5 mm.

Color: Red; ocellar triangle, transverse line of pronotum, propodeal enclosure, mesosternal region and inferior metapleural area near hind coxa, black; gastral tergites I–IV with transverse brownish bands; dorsal surface of mid and hind coxa, trochanter and femur, black.

Vestiture: Appressed silver hair restricted to anteroventral region of mesopleuron.

Structure: Clypeal disk moderately bulging, surface sparsely macropunctate, median free margin slightly projecting, teeth absent; flagellomere I longer than II (41:24); inner orbits very slightly converging above; pronotal collar as in male but more evenly arcuate in lateral view; scutal ridges stronger than in male, obliterated along midline; mesopleuron along mesopleural suture smooth, sparsely macropunctate; hypoepimeral area and superior metapleural area with horizontal ridges; propodeal side closely, diagonally ridged, ridges continuous over inferior metapleural area.

Types: Holotype male: Mount Montgomery, 7000 ft, Mineral Co., Nevada, 21 June 1942, R. M. Bohart (UCD). Three male and three female paratypes with same data (UCD).

Discussion: The reddish body is distinctive in female *monachi*. *Ammophila wrightii* Cresson is similar but the pronotum is much flatter than in *monachi*. Males of *monachi* have a narrower face than *wrightii* males and the body of the latter is largely red. *Ammophila monachi* is known only by the types. The name *monachi* is the Yokut Indian word for the Mono Indians.

***Ammophila unita* Menke, new species**

Holotype male: Length 15.5 mm.

Color: Black; metapleural flange brownish; petiole tergite red laterally, black above; gastral segments I–II red, tergites I–II with median black spots; apex of front and middle femur below and front and middle tibia below, red; wings clear, veins black.

Vestiture: Gena, pronotal side, scutal furrows, mesopleuron and metapleuron covered with dense appressed silver hair; collar and scutum sparsely covered with appressed silver hair; erect mesosomal hair pale, sparse, shorter on head.

Structure: Labrum broadly emarginate, emargination V-shaped; clypeal free margin reflexed; flagellomere I longer than II (43:25), length less than least interocular distance (43:48); pronotal collar similar to female *ferruginosa* Cresson except disk slightly more arched in profile, collar surface with about five feeble transverse ridges which do not reach pronotal side, surface otherwise smooth and sparsely finely macropunctate; scutum ridged, interspaces shining, sparsely punctate; propodeal side diagonally rugosopunctate; metapleural flange lamellate, outer margin strongly angulate.

Female: Average length 18.5 mm, range: 18–19 mm.

Color: As in male except mandibles, clypeal free margin, scape frequently, tegula, subalar area frequently, metapleural flange, and propodeum adjacent to petiole socket, red; petiole sternite usually red, gastral tergite I sometimes with narrow black spot, tergites III–IV largely black; legs more extensively red than in male.

Vestiture: As in male but no erect mesosomal hair except occasionally on pronotal collar.

Structure: Labrum truncate; clypeal disk slightly bulging near free margin, surface shining, sparsely macropunctate, median free margin slightly produced, teeth well formed; flagellomere I more than twice length of II (62:28); inner orbits parallel; pronotal collar similar to male except only slightly or not at all cut off anteriorly, surface with a few wrinkle-like ridges or smooth.

Types: Holotype male: Castle Park, Dinosaur National Monument, Moffat Co., Colorado, 30 June 1948, H. G. Rodeck (USNM). Seventeen male and five female paratypes as follows: ARIZONA, COCONINO Co.: Fredonia, 10 October 1954, K. Goodarzy and G. Knowlton (UKL). COLORADO, county unknown: Caisson, 1 July 1931, J. Nottingham (UKL). Red Wash, 29 July 1953, R. R. Dreisbach (UCD). DELTA Co.:

Delta, 25 June 1938, U. Lanham (UCB). LA PLATA Co.: Bondad, 27 June 1919 (AMNH). MOFFAT Co.: Castle Park, Dinosaur National Monument, 30 June 1948, H. G. Rodeck (UCB). Red Rock Ranch, Dinosaur National Monument, 6 July 1949, H. G. Rodeck (UCB). NEVADA, LINCOLN Co.: Panaca, 30 August 1961, F. D. Parker (NSDA). UTAH, BEAVER Co.: Beaver Creek Hills (USNM). DUCHESNE Co.: Roosevelt, 27 July 1953, R. R. Dreisbach (UCD); 29 June 1954, G. Knowlton (UKL). GRAND Co.: Moab, 2 September 1964, F. D. Parker (UCD). MILLARD Co.: Delta, 8 July 1954, G. Knowlton (UKL). UINTA Co.: no locality, 10 July 1911 (CMP). WYOMING, PARK Co.: Buffalo Bill Reservoir, 2 August 1950, R. R. Dreisbach (UCD).

Discussion: Except for the presence of ridges on the collar and slight abdominal color differences this species is very similar to *Ammophila novita* (Fernald). The length of flagellomere I is slightly less than the least interocular distance in *unita* males whereas in *novita* the two measurements are equal. Also, the clypeal free margin is reflexed in *unita* males. Gastral tergites I and III–IV are partially black in *unita* females but in *novita* the gaster is usually all red. The ranges of the two species do not overlap. *Ammophila novita* occurs from southern California to southeastern Arizona. *Ammophila unita* is known only from the Great Basin Region and surrounding areas.

***Ammophila mimica* Menke, new species**

Holotype male: Length 16 mm.

Color: Black; mandible, tegula, metapleural flange, and a spot at side of petiole socket, red; petiole tergite red laterally, black above; gaster red, tergite I with elongate black spot; tergites III–V largely black; femur red apically, front and middle tibiae red, tarsus brownish; wings clear, veins black.

Vestiture: Clypeus, frons and gena with dense appressed silver hair; scutal disk, propodeal enclosure laterally and propodeal side along metapleural sulcus, covered with dense appressed silver hair; head and mesosoma with pale erect hair.

Structure: Labrum truncate; clypeus narrowly emarginate; flagellomere I nearly twice length of II (39:21), length equal to least interocular distance (39:39); pronotal collar abruptly rising at transverse line, disc arcuate, surface of collar smooth, sparsely macropunctate; scutum transversely ridged, interspaces punctate; scutellum longitudinally ridged; propodeal enclosure laterally with diagonal ridges, interspaces shining, impunctate; preëpisternal sulcus short, ending opposite pronotal lobe; propodeal side striatopunctate; metapleural flange lamellate, outer margin strongly angled; genitalia as in Fig. 4.

Female: Average length 17 mm, range: 17–18 mm.

Color: As in male except clypeal free margin and gastral tergite V red; scape, pronotal side, mesopleuron, propodeal side, and legs, often extensively red.

Vestiture: As in male.

Structure: Labrum truncate; clypeal disk slightly bulging below, surface shining, sparsely macropunctate, free margin with two teeth, median free margin slightly projecting in relation to lateral free margin; flagellomere I slightly longer than twice length of II (53:26); inner orbits parallel; pronotal collar curving up gradually from transverse line, disk arcuate in lateral view.

Types: Holotype male: Cronise Valley, San Bernardino Co., California, 29 April 1956, on *Prosopis* species, M. Wasbauer (CIS). Nine male and four female paratypes as follows: CALIFORNIA, IMPERIAL Co.: Palo Verde, 15 August 1946, W. F. Barr (CIS). INYO Co.: Furnace Creek, Death Valley, 27 February 1956, R. M. Bohart (UCD). Stovepipe Wells, Death Valley, 30 March 1953, J. W. MacSwain (CIS). RIVERSIDE Co.: Coachella Valley, 17 May 1917, E. P. Van Duzee (CAS); 10 July 1932 (USNM). SAN BERNARDINO Co.: Cronise Valley, 29 April 1956, B. J. Adelson, P. D. Hurd, J. Powell, and M. Wasbauer (CIS). SAN DIEGO Co.: Borrego Valley, 18 April 1957, R. M. Bohart (UCD). Two metatypes: ARIZONA, MARICOPA Co.: Gila Bend, 18 mi. S, 8 May 1965, ♂, M. A. Mortenson, J. M. Davidson, M. A. Cazier (UCD). PIMA Co.: Tucson, 8 mi. N, 5 June 1964, ♀, J. Davidson (UCD).

Discussion: This species appears related to the *procera* group but the male genitalia are unlike the type found in this assemblage. Externally, *Ammophila mimica* is very similar to *novita* (Fernald), and in fact, the females of these two species are very difficult to separate. Flagellomere I usually is slightly more than twice the length of II in female *mimica* but less than twice II in *novita*. Usually *mimica* females have a fair amount of erect hair on the mesosoma whereas in *novita* there is little or none at all. The ranges of the two species overlap to a large extent.

***Ammophila imitator* Menke, new species**

Holotype male: Length 19 mm.

Color: Black; mandible, pronotal lobe, tegula, subalar area, metapleural flange and propodeal side near petiole socket, red; petiole tergite red laterally, black above; gaster red, tergite I with a narrow black spot, tergites III-V with large black spots; femur red below, fore tibia red; wings clear, veins brown.

Vestiture: Clypeus, frons, gena and pronotal lobe covered with dense appressed silver hair; pronotum, and scutum anterolaterally, thinly covered with appressed silver hair; scutal furrows, propodeal enclosure medially, meso- and metapleuron, and propodeal side near petiole socket with dense appressed silver hair, metapleural hair densest along metapleural sulcus; head and collar with erect pale hair.

Structure: Labrum truncate; free margin of clypeus rounded, re-flexed, not emarginate; flagellomere I longer than II (43:26), length less than least interocular distance (43:50); hypostoma sharply elevated at mandible base (Fig. 1); pronotal collar elongate, flattened, abruptly

rising at transverse line, surface smooth except for very slight wrinkling on disk, sparsely macropunctate; scutum coarsely ridged, interspaces punctate; scutellum longitudinally ridged; propodeal enclosure rugose medially, diagonally ridged laterally, interspaces shining; preëpisternal sulcus short, ending opposite pronotal lobe; propodeal side punctato-striate anteriorly grading to moderately macropunctate posteriorly; metapleural flange lamellate, outer margin angulate; genitalia as in Fig. 3.

Female: Unknown.

Types: Holotype male: 6 mi. E Douglas, Cochise Co., Arizona, 5 September 1958, on *Haplopappus hartwegi*, P. D. Hurd (CIS). Two male paratypes as follows: MEXICO, SONORA: Alamos, 25 July–7 August 1953, F. S. Truxal (LACM). Cocorit, 23 May 1962, F. D. Parker and L. A. Stange (UCD).

Discussion: *Ammophila imitator* could be placed in the *procera* group if it were not for the peculiar male genitalia and the form of the hypostoma. The species is very similar in most other respects to *novita* (Fernald).

***Ammophila coachella* Menke, new species**

Holotype male: Length 15 mm.

Color: Black; mandible, tegula, and metapleural flange red; petiole red below, black above; gaster red, tergite I with elongate black spot, tergite IV with large black spot and V with small spot; legs largely red but coxa, trochanter and femur black dorsally; wings clear, veins black.

Vestiture: Clypeus, frons, gena, and mesostoma except propodeal enclosure laterally, with dense appressed silver hair which obscures the underlying sculpture; head and mesosoma, except propodeal enclosure, with pale erect hair.

Structure: Labrum truncate; inner tooth of mandible with a raised lamelliform carina (Figs. 5–6); free clypeal margin semicircular, with a median carinate tooth, the carina extending onto clypeal disk (Figs. 5–6); hypostoma with an incurved process at about two-thirds the distance to mandible base, hypostomal carina not evident between projection and mandible (Fig. 6); flagellomere I longer than II (40:25), length less than least interocular distance (40:48); pronotal collar abruptly rising at transverse line, then broadly curving towards scutum, disk irregularly transversely ridged, ridges fading before reaching lateral line; scutum transversely ridged, ridges strongest posteriorly and converging towards scuto-scutellar articulation; scutellum longitudinally ridged; propodeal enclosure laterally with diagonal ridges, interspaces shining, impunctate; preëpisternal sulcus short, ending opposite pronotal lobe; metapleural flange broadly lamellate, outer margin angulate; propodeal side diagonally rugose; right penis valve and gonoforceps as in Fig. 2.

Female: Average length 18.5 mm, range: 17.5–19.5 mm.

Color: As in male except clypeus largely red, scape red and petiole sternite often entirely black.

Vestiture: As in male except clypeus glabrous anteromedially; scutal welts glabrous; psammophore pale.

Structure: Labrum truncate; clypeus moderately bulging near free margin, margin with two weak teeth or angles, median free margin nearly twice width of lateral free margin (69:36); flagellomere I nearly twice length of II (61:34); inner orbits slightly converging above; hypostoma without process near mandible; pronotal collar gradually curving back from transverse line; scutum anterolaterally and furrows, rugosopunctate, area between furrows and median longitudinal sulcus welt-like, shining, sparsely to moderately punctate with a few converging ridges posteriorly.

Types: Holotype male: Boyd Desert Research Center (Deep Canyon), 4 mi. S Palm Desert, Riverside Co., California, 6 April 1963, on *Dalea schottii*, C. A. Toschi (CIS). Fourteen male and four female paratypes as follows: CALIFORNIA, RIVERSIDE Co.: Andreas Canyon near Palm Springs, 10 April 1955, W. R. Richards (CNC). Biskra Palms, 29 March 1957, E. I. Schlinger (UCD). Boyd Desert Research Center, 4 mi. S Palm Desert, 12 April 1963, P. D. Hurd (CIS). Thousand Palms, 23 March 1955, W. R. Richards (CNC); 9 April 1955, W. R. Richards (CNC); 13 April 1955, W. R. Richards (CNC). 6 mi. E Thousand Palms, 20 March 1960, D. P. Gregory (CIS). Willis Palms Oasis, Thousand Palms, 25 March 1955, W. R. Mason (CNC); 3 April 1955, W. R. Richards (CNC); 10 April 1955, W. R. Mason (CNC). SAN DIEGO Co.: Anza State Park, 23 April 1951, R. C. Bechtel (UCD).

Discussion: When *Ammophila nefertiti* was described (Menke, 1964) I included paratypic material from southern California. If I had checked the male genitalia of these southern specimens, I would have discovered that they represented another undescribed species. *Ammophila coachella* is very similar to *nefertiti*, and the only obvious external differences in the males are the form of the mandible and hypostomal process. In *coachella* males the inner tooth of the mandible bears a strongly elevated carina (Fig. 6). The hyposomal process in *coachella* is narrower and more acute than in *nefertiti*. Females of *coachella* can be separated from *nefertiti* females only by the broader median free margin of the clypeus. In *nefertiti* the median free margin is only slightly wider than the lateral free margin (55:45). The ranges of the two species do not overlap. *Ammophila nefertiti* is a western Great Basin species and *coachella* is known only from the southern California deserts.

I have seen one male of *coachella* labelled "Sylvia, Kansas, Oct. 8, 1952, H. A. Hill" (SDM), but suspect an error in labelling is involved.

LITERATURE CITED

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