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Ammophila nancy Menke, a new species in the *pruinosa* complex (Hymenoptera: Sphecidae: Ammophilinae)

ARNOLD S. MENKE
Ammophila Research Institute, Bisbee, Arizona 85603. E-mail: waspman@cableone.net

Abstract

Ammophila nancy new species (Hymenoptera, Sphecidae), is described from Arizona, California, Nevada, New Mexico, Texas and Mexico (Sonora and Baja California). The new species is a member of the *pruinosa* complex which also contains *californica* Menke, 1964, and *pruinosa* Cresson, 1865. A key is provided for the identification of the three species.

Key words: New species, *Ammophila*, Sphecidae, *pruinosa* complex, *californica*, Arizona

Introduction

The *pruinosa* complex consists of three known species, *pruinosa* Cresson, *californica* Menke, and the species described here, *nancy* Menke. The complex is characterized by the uniformly dense covering of appressed silver setae that obscure the integument of the thoracic pleura (Figs. 1–2). The dorsum of the thorax is less densely covered and the propodeal enclosure is glabrous laterally. The *pruinosa* complex belongs to the *azteca* species group as defined by me (Menke, 1967). In this group the episternal sulcus extends ventrad from the subalar fossa to the sternal region of the mesopleuron. In species of the *pruinosa* complex, the dense setal covering of the pleura obscures this sulcus.

Species discrimination in this complex is fairly easy for the taxa included in this paper. Useful features are the penis valve head of the male genitalia, shape of the clypeal free margin, shape of the labrum, length of mouthparts, and length of flagellomere I compared to the least interocular distance of the face.

Specimens of the *pruinosa* complex are abundant in collections. Male genitalia, male clypeal shape, and flagellomere proportions suggest that other cryptic species remain to be recognized. Sorting them out will require careful study, possibly including molecular analysis. The *pruinosa* complex would make a wonderful thesis problem.

My wife Nancy and I have been collecting *Ammophila* in southeastern Arizona for the past 10 years. The new species described below is a product of these surveys. A key to the three known *pruinosa* complex species is provided.

Techniques

Measurements for proportions of facial dimensions and flagellomere lengths were made with an ocular micrometer at 50X on a Wild M5 dissecting microscope. Least interocular distance and upper interocular distance are abbreviated LID and UID. The UID is measured along a line tangential to lower edge of mid ocellus.

Images for plates were acquired through an EntoVision micro-imaging system. This system included a Leica M16 zoom lens attached to a JVC KY-75U 3-CCD digital video camera that feed image data to a desktop computer. The program Archimed 5.3.1 was then used to merge an image series (representing typically

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30–50 focal planes) into a single in-focus image. Lighting was achieved using techniques summarized in Buffington *et al.* (2005).

Terminology

Bohart and Menke (1976) is the source for terms used here. Menke and Fernández (1996) can also be consulted.

Sources of material

The bulk of material is from the Ammophila Research Institute, Bisbee, Arizona (ARI). Other specimens are from the California Academy of Sciences, San Francisco (CAS), the Bohart Museum, University of California, Davis, California (UCD), the California Insect Survey, Berkeley, California (CIS), the American Entomological Institute, Gainesville, Florida (AEI), the American Museum of Natural History, New York (AMNH), and the National Museum of Natural History (USNM). The initials ANSP represent the Academy of Natural Sciences, Philadelphia, Pennsylvania.

***Ammophila nancy* Menke, new species**
(Figures 3, 6, 9, 11, 15)

Holotype male: Length: 20 mm.

Color: Head including antenna, thorax, coxae, trochanters, and petiole sternum black. Mandible brownish red at midlength, scape with small brownish red area apically. Tegula orange red. Forewing veins orange red at base, and anal vein this color to end of subbasal cell, other veins extensively brown. Forefemur, tibia and tarsus orange red; midfemur black dorsobasally, but remainder orange red, as are midtibia and tarsus; hindfemur black dorsally almost to apex, this color less extensive ventrally, remainder of femur orange red, hind tibia and tarsus orange red (distal tarsomeres darker). Petiole tergum black above, orange red laterally. Gaster orange red except as follows: gastral tergum I with black middorsal band that ends three quarters distance to apex; gastral terga IV–VI largely black; sternum VI black.

Vestiture: Head and thorax including coxae with erect silver setae; foretrochanter and femur with setal fringe ventrally. The following densely covered with appressed silver setae: face (except vertex), gena, pronotal lobe and thoracic pleura, coxae and trochanters of mid and hindlegs. Ventral surface of trochanter, femur and tibia of foreleg with appressed silver setae. Thoracic dorsum less densely covered with appressed silver setae, integument somewhat visible, propodeal dorsum glabrous laterally.

Structure: Flagellomere I length 0.8 X lower (least) interocular distance and 1.23 X flagellomere II length. Free margin of clypeus broadly, shallowly emarginate. Labrum rectangular, apex straight. Apex of folded proboscis ending about at midpoint of stipes. Scutum smooth, with scattered shallow punctures (ca. 2–3 diameters apart). Ventral process of penis valve head long, extending basad (Fig.11).

Male variation: Length 13–20 mm. Length of galea from apex to palpal socket 0.73 –0.85 X galea length (as much as 0.94 X galea length in tiny specimens). Petiole sternum sometimes orange red ventally or entirely orange red. Flagellomere I length varies from 0.77–0.86 X least interocular distance (0.86 is a small specimen). Flagellomere I length 1.23 to 1.41 X flagellomere II length. The penis valve spine varies in length, but its apex is always directed basad.

Female: Length 11–21 mm.

Color: As in male except clypeal free margin red brown to black at center, and legs more extensively orange red: only coxae, hindtrochanter and dorsum of hindfemur black. Gaster orange red except tergum I with stripe as in male, and IV with large basal black spot. Spot on tergum IV sometimes absent or reduced to two small maculae.

1 *pruinosa* ♀ 2 *californica* ♂

3 *nancy* ♀ 4 *pruinosa* ♀ 5 *californica* ♀

6 *nancy* ♂ 7 *pruinosa* ♂ 8 *californica* ♂

FIGURES 1–8. 1–2, left side of thorax. 1. *Ammophila pruinosa* female. 2. *Ammophila californica* male. **3–8,** faces. 3. *Ammophila nancy* female. 4. *Ammophila pruinosa* female. 5. *Ammophila californica* female. 6. *Ammophila nancy* male. 7. *Ammophila pruinosa* male. 8. *Ammophila californica* male.

FIGURES 9–10. underside of head showing mouthparts and labrum. Note that in males of the *pruinosa* complex, genal setation reaches hypostomal carina. In females setation is confined to the upper part of the gena. 9. *Ammophila nancy* male. 10. *Ammophila californica* female.

Vestiture: As in male except free clypeal margin asetose; foreleg with psammophore, the femur with an upper and lower row of rake setae.

Structure: Inner orbits converging ventrad. Clypeal disk moderately swollen, lower part asetose, shiny; free margin of clypeus a narrow, impunctate, asetose flange; clypeal lobe usually defined by poorly formed angles that tend to be rounded (lateral angles or teeth rarely sharp and projecting), edge of lobe essentially straight, sometimes with shallow median notch, lobe width 0.51–0.58 X least interocular distance, usually ca. 0.58X. Flagellomere I length 0.55–0.64 X least interocular distance; flagellomere I length 1.45–1.61 X flagellomere II length (Fig. 15). Labrum apex almost straight, but lateral corners more rounded than in male, sometimes with weak apical angle. Apex of proboscis when folded ending slightly beyond middle of stipes; length of galea from apex to palpal socket less than length of stipes (0.68–0.8 X length of stipes). Scutum with scattered macropuntures (0.5 –3 diameters apart), sometimes weakly rugose laterad.

Identification: The truncate labrum common to both sexes (Fig. 9), the elongate flagellomere I in the female (at least 0.56 X the LID), and the sinuate ventral spine of the penis valve head (Fig. 11) separate *nancy* from the similar *pruinosa*. The labrum of *pruinosa* typically is more elongate, and rounded apically, and flagellomere I is shorter in the female (0.47–0.53 X LID). The ventral spine of the penis valve head of *pruinosa* forms a diagnostic C-shape in lateral view (Fig. 12). The short mouthparts of *nancy* (and *pruinosa*) separate the species from *californica* (compare Figs. 9–10). The clypeus of male *pruinosa* generally has a narrower emargination than in *nancy*.

I have seen males from various localities with a smaller penis valve spine, combined with an apically arcuate labrum. While these variants may be *nancy*, I have identified them as *nancy* with a question mark. For example, Nancy and I collected 12 males at 4.5 mi. E. of Tecopa, Inyo Co., California (ARI). Six are typical *nancy* with a long penis valve spine, and a truncate labrum. The remaining six have a smaller spine and the labrum apex is rounded. These last six may be conspecific with the typical males, or they could be a separate taxon.

A female from Rifle, Colorado (AMNH) appears to be *nancy*, but this locality is far north of the rest of the material of this species, and it would be desirable to see males from this area to confirm the identity of the specimen.

Geographic range: *Ammophila nancy*, a desert dweller, occurs from western Texas to southern Nevada and southern California and south into Baja California and Sonora in Mexico.

Type material: Holotype male ARIZONA, Cochise Co., Geronimo Trail, Mile Post 19 (east of Douglas), September 12, 2003, Nancy Menke.(USNM).

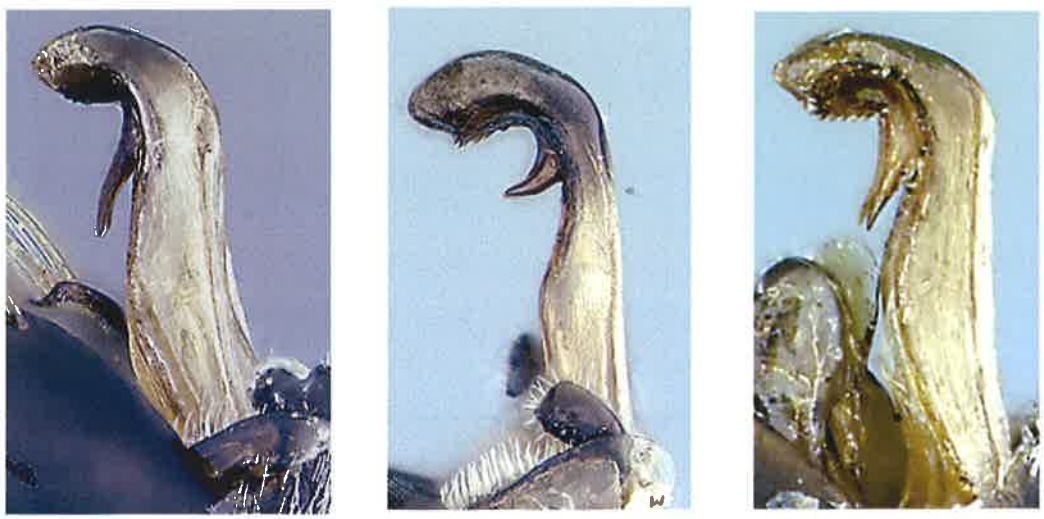
Paratypes (128 males, 92 females): ARIZONA, Cochise Co.: Douglas, June 16, 1942, E. C. Van Dyke (CAS). Douglas, September 3, 1974, H. and M. Townes (AEI). Geronimo Trail, Mile Post 19 (east of Douglas), August 30-September 1, 2002, Arnold S. & Nancy D. Menke (ARI); Geronimo Trail, Mile Post 19, August 30, 2003, A. S. Menke and N. D. Menke (ARI); Geronimo Trail, Mile Post 19, September 12, 2003, A. S. Menke and N. D. Menke (ARI); Geronimo Trail, Mile Post 19, September 12, 2004, A. S. Menke and N. D. Menke (ARI); Geronimo Trail, Mile Post 10.5 (east of Douglas), September 12, 2003, Nancy D. Menke (ARI). Portal, September 4, 1974, H. & M. Townes (AEI). 8 mi. NE Portal, May 15–19, 1956, M. Statham (AMNH). 2 mi. NE Portal, July 29, 1959, M. Statham (MNH). 7 mi. SW Roadforks, Chiricahua Mts., September 23, 1955, M. Cazier (AMNH). Maricopa Co.: Arlington, June 8, 1919, A. Wetmore (USNM). Black Gap, 12 mi. S. Gila Bend, March 22, 1946, C. D. Michener (AMNH). 18 mi. S. Gila Bend, May 15, 2005, Nancy D. Menke (ARI). Crater Range (S. of Gila Bend), March 22, 1946, C. D. Michener (AMNH). Maricopa Mountains, April 12, 1947, H. and M. Townes (AEI).Mesa, 20 mi. E., June 11, 1942, E. C. Van Dyke (CAS). Pima Co.: Lowell Ranger Station, July 6–20,1916 (AMNH). Organ Pipe Cactus Natl. Mon., March 22, 1946, C. D. Michener (AMNH). Tucson, November 1, 1940, Bryant (CAS); Tucson, October 24, 1939, R. H. Crandall (USNM). CALIFORNIA, Imperial Co.: Coyote Wells, April 12, 1938, E. P. Van Duzee (CAS). 3 mi. E. Plaster City, October 19, 2003, A. S. and N. D. Menke (ARI). Inyo Co.: 4.5 mi. E. Tecopa, August 11,

2001, A. S. & Nancy Menke (ARI). Tecopa Pass, 10 mi. E. Tecopa, August 11, 2001, A. S. & Nancy Menke (ARI). Los Angeles Co.: Palmdale May16–17, 1985, Jay Rosenheim (UCD). 28 mi. E. Palmdale, April 20, 1985, Jay Rosenheim (UCD). 12 km. E. Palmdale, April 28, 1985, Jay Rosenheim (UCD). Saddleback Buttes, May 16, 1985, Jay Rosenheim (UCD). Riverside Co.: Mecca, April 21, 1927, T. Craig (CAS). San Bernardino Co.: Needles, Dec. 17, 1921, J. A. Kusche (CAS). Zzyzx Springs, (6 mi. SW Baker), April 27, 1985, Jay Rosenheim (UCD). San Diego Co.: Borrego, April 18, 1956, F. X. Williams (CAS). Canebrake, October 9, 2003, A. S. and N. D. Menke (ARI). Scissors Crossing, May 6, 1974, H. and M. Townes (AEI). NEVADA, Clark Co.: Glendale, October 3, 1929, David E. Fox (CAS). Indian Springs, June 5, 1949, A. B. Gurney (USNM). Kyle Canyon, Charleston Mts., June 3, 1941, E. C. Van Dyke (CAS). Nye Co.: Beatty, September 28, 2003, A. S. and Nancy Menke (ARI). NEW MEXICO, Doña Ana Co.: Hatch, August 27–29, 1974, H. and M. Townes (AEI). Las Cruces (CAS). Las Cruces, May 30, 1952, Cazier et.al. (AMNH). Hidalgo Co.: Lordsburg, May 31, 1952, Cazier, et. al. (AMNH). TEXAS, Brewster Co.: Hot Spring, July 6, 1948, C. Vaurie (AMNH). Lajitas, April 15, 1961, J. E. Gillaspy (CAS); Lajitas, September 4, 1961, J. E. Gillaspy (CAS); 3 mi. W. Lajitas, October 2, 1960, J. E. Gillaspy (CAS). Terlingua, May 10, 1927, J. O. Martin (CAS). Terlingua, October 3, 1953, J. E. Gillaspy (AMNH). El Paso Co.: El Paso, May 29, 1952, Cazier et.al. (AMNH). MEXICO, Baja California: Palacio, , 20 mi. S., April 1939, C. D. Michener (CAS). Baja California Sur: San Ignacio, 15 m. N., September 29, 1941, Ross & Bohart (CAS). Venancio, July 17, 1938, Michelbacher & Ross (CAS); 20 mi. S. El Arco, September 28, 1941, Ross & Bohart (CAS). Sonora: Guaymas, April 10, 1921, E.P. Van Duzee (CAS).

Etymology. It is with great sadness that I dedicate this species to Nancy Menke, my loving wife, collecting buddy, and best friend. She passed away June 12, 2007, after a long battle with lung cancer and she never smoked. Nancy was a diligent and dedicated collector and captured hundreds of *Ammophila*. The name *nancy* should be treated as a noun in apposition.

Ammophila pruinosa Cresson
(Figures 1, 4, 7, 12, 14)

Ammophila pruinosa Cresson, 1865:455, Colorado, 10 females, 3 males (ANSP). Lectotype female, designated by Cresson,1916:94. Examined.



11 *nancy* ♂ 12 *pruinosa* ♂ 13 *californica* ♂

FIGURES 11–13, right side of penis valve of male genitalia. 11. *Ammophila nancy*. 12. *Ammophila pruinosa*. 13. *Ammophila californica*.

Identification: The ventral spine of the male penis valve forms a distinctive C-shape in lateral view, which immediately identifies this sex (Fig.12). Females have a short flagellomere I which is 0.47–0.53 X the LID. Female flagellomeres I–II are comparatively shorter, stouter than in *nancy* (compare Figs. 14–15) The labrum is more elongate than that of *nancy* and the apex is somewhat rounded. The short mouthparts differentiate *pruinosa* from *californica* (compare Figs 9–10).

Geographic distribution: Widespread in western North America (mostly west of the 100th Meridian) from Nebraska and Texas west to British Columbia and southern California and Baja California. The species occurs as far south in Mexico as the state of Oaxaca.

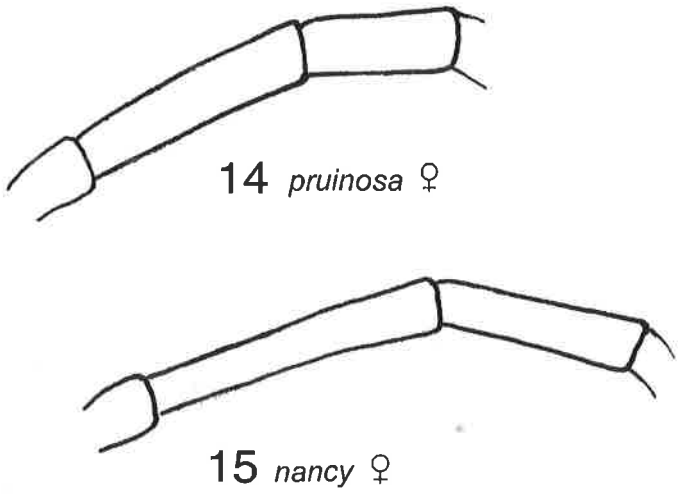
Ammophila californica Menke

(Figures 2, 5, 8, 10, 13)

Ammophila californica Menke, 1964:18. Holotype male, Mill Potrero, north side of Mt. Pinos, California (UCD).

Identification: The long mouthparts immediately separate *californica* from *pruinosa* and *nancy*. When folded, the apex of the proboscis reaches or exceeds the base of the stipes (Fig.10). The face between the inner orbits in females is noticeably narrower toward the clypeus than in *pruinosa* and *nancy* (compare Fig. 5 with 3 and 4), and the least interocular distance (LID) varies from 0.63 to 0.70 X the upper interocular distance (UID). In females of *pruinosa* and *nancy* the inner orbits are less convergent (Figs. 3–4). In these species the LID is at least 0.75 X the UID and is often as much as 0.81 X the UID. The ventral spine of the male penis valve head of *californica* is similar to that of *nancy* (compare Figs 11 and 13)

Geographic range: Most records are from California, but I have seen isolated specimens from Paradise Valley, Humbolt Co., Nevada (UCD), and Notus, Canyon Co., Idaho (UCD).



FIGURES 14–15. Flagellomeres 1 and 2 of females. 14. *Ammophila pruinosa*. 15. *Ammophila nancy*.

Key to species in the *pruinosa* complex

1. Apex of folded proboscis reaching base of stipes, or surpassing it (Fig. 10); if proboscis extended, then galea length from apex to palpal socket clearly longer than length of stipes (galea 1.14 X stipes length); female clypeus largely asetose, free margin usually arcuate (median lobe rarely defined by lateral teeth) and usually with narrow, median notch (Fig. 5); legs black or red and black ..... *californica* Menke
- Apex of folded proboscis extending only about one half to three fourths distance to base of stipes (Fig. 9);

if proboscis extended, then galea clearly shorter than stipes (galea 0.68 to 0.78 X stipes length, rarely .0.9X); female clypeus with silver setae at least on upper half (fresh specimens), free margin variable, sometimes with weak teeth defining a median lobe, at most with broad, shallow median emargination (Figs. 3–4); legs red and black..... 2

2. Female flagellomere I length equal to about half lower interocular distance (FI .47–.53X LID); female flagellomeres I–II as in Fig. 14; ventral process of penis valve head of male genitalia forming a C-shape (Fig. 12); labrum apex rounded, sometimes acuminate apically in both sexes ..... *pruinosa* Cresson

- Female flagellomere I length equal to about 3/5ths lower interocular distance (FI 0.56–0.62X LID); female flagellomeres I–II slender, elongate (Fig. 15); ventral process of penis valve head extending basad (Fig. 11); labrum rectangular, apex straight, without median projection in both sexes*nancy* Menke, **n. sp.**

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Eric Grissell of Sonoita, Arizona, arranged these figures for me using Photo Shop and Adobe Illustrator.

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