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SPIDER WASPS OF COLORADO (HYMENOPTERA, POMPILIDAE): AN ANNOTATED CHECKLIST

Howard E. Evans

ABSTRACT—One hundred forty-three species of Pompilidae are recorded from Colorado, slightly more than half the number occurring north of Mexico. Some of these occur principally at higher altitudes or in the northern part of the state; this group includes 5 species of Holarctic distribution. Others (such as the tarantula hawks, Pepsis) are prevalent across the southern third of the state and range south into New Mexico and often into Mexico. Still others are widely distributed wherever there is friable soil suitable for nesting. Certain genera are more or less restricted to preying upon certain spider taxa, while others are generalists and a few are cleptoparasites of other Pompilidae.

Key words: Hymenoptera, Pompilidae, spider wasps, distribution.

Spider wasps are ubiquitous insects, occurring wherever there are spiders. They use these arthropods to provision their nests, employing a single paralyzed spider per cell. In Colorado they are most plentiful on the eastern plains, especially in sandy country along the valleys of the Arkansas and South Platte rivers. However, they also occur widely in the western two-thirds of the state, including the mountains. I have taken 61 species around my home, in open ponderosa pine-Douglas-fir woodland at 2300 m in Larimer County. The Holarctic species Anoplius nigerrimus (Scopoli) has been taken above timberline, at 3600 m on Trail Ridge, in Rocky Mountain National Park (Evans 1951). A female of Anoplius tenebrosus (Cresson), in good condition in the University of Colorado collection, is labeled as having been “caught in a snow drift” at 13,000 feet (3900 m) on Mt. Rogers, Clear Creek County. This individual was undoubtedly blown there by the wind.

Most Colorado species are believed to be univoltine, the adults active mid-June through early September. Only 1 species, Anoplius tenebrosus (Cresson), is known to overwinter as an adult; all others are believed to overwinter as diapausing larvae or pupae in their nest cells.

In this report I list 143 species from Colorado, slightly more than half the species known to occur north of Mexico. Only minimal data are included concerning habitat and behavior. Evans and Yoshimoto (1962) reviewed the nesting behavior of species occurring in the northeastern states, and many of these same

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species (and all genera) occur in Colorado. The most recent catalog of North American Hymenoptera (Krombein et al. 1979) includes further references. Major papers on the systematics of Nearctic Pompilidae are those of Evans (1950-51) and Townes (1957), although there have been several refinements in the classification in the decades since those papers were published.

The Colorado fauna includes 5 species that also occur in Eurasia. These species range throughout the northern hemisphere and occur chiefly in the northern mountains: Evagetes cassinensis (Shuckard), Anoplius nigerrimus (Scopoli), Arachnospila junipennis (Zetterstedt), Calathurgus fasciatus (Spinola), and Ceropales maculata (Fabricius). In contradistinction, quite a number of species characteristic of the deep Southwest and Mexico enter Colorado in the southernmost third of the state, for example, the species of Pepsis and Psorhaspis. Three species have been reported only from Montezuma County in extreme southwestern Colorado: Calopompilus pyrrhomenas (Walker), Priocnemis oregona Banks, and Aporus luxus (Banks).

Recently several species characteristic of eastern forests have appeared in Colorado, such as Priocnemis minorata Banks and Auplopus mellipes varitarsatus (Dalla Torre). Similarly, several typically West Coast species have been taken here, such as Cryptochelitrus hesperus (Banks) and Dipogon seireusce (Banks). It is possible that some of these species have been introduced in commerce.

Most spider wasps prepare simple nests in the soil, but a few make mud cells aboveground. A few oviposit on spiders directly, without taking them to a nest, and some are parasites of other Pompilidae (species of Ceropales and Evagetes). Most spider wasps are black in color, with translucent or fumose wings. A few have banded wings, and some (mostly larger species) have bright orange wings. Orange is an aposematic (warning) color in insects; it is believed that birds learn to associate this color with undesirable qualities (in this case a potent sting) and to avoid attacking such insects. Fifteen species occurring in Colorado have orange wings, forming a complex of what are often called Mullerian mimics. There are other examples of apparent mimicry: species with yellow banding, suggesting social wasps, and others with orange patterns on the body, suggesting Mutillidae (velvet ants).

The largest spider wasp in our fauna (and one of the largest in the world) is Pepsis formosa (Say), in which large females may have a body length of 5 cm and a wing span of 9 cm. In contrast, males of some of the smaller species of Ageniella have a body length of <2 mm, with a wing span of about 3 mm.

Adult spider wasps of most species take nectar at flowers, and it is here that most are taken by collectors. Flowers with shallow corollas, such as Apiaceae (Umbelliferae), are especially favored. Other genera that are frequently visited include Asclepias, Baccharis, Cleome, Euphorbia, Melilotus, Sapindus, Solidago, and Tamarix. Honeydew from extrafloral nectaries and from aphids and other sucking insects is also visited frequently, especially on Helianthus.

In this paper I accept the stricures of Menke (1990), though with misgivings, as these result in the use of several unfamiliar names for well-known species. Some of these novel synonymies are based on the discovery by Day (1977) of broken specimens with incorrect locality data that are claimed to represent North American species. Others are based on the rejection of secondary homonyms, an unfortunate procedure now evidently part of the code of zoological nomenclature.

I also accept the nomenclatural changes suggested by Shimizu (1994), based on his research and that of several European workers, most especially Day (1981). Arrangement of the genera follows that in the Catalog (Krombein et al. 1979) except in a few cases and with some changes in generic names. The list is based primarily on specimens in the collections of Colorado State University, Fort Collins; the University of Colorado, Boulder; and the Denver Museum of Natural History. Some records have been taken from the literature.

**SUBFAMILY PEPSINAE**

**Genus Calopompilus Ashmead**

This genus was called Chirodomus by Townes (1957), but the type of that genus is a South American species of doubtful affinities with North American species. These wasps are infrequently collected and nothing is known of their predatory or nesting behavior. Our 1 species has brilliant orange-red wings.

*pyrromelas* (Walker). Montezuma Co. A single female was collected 7 August 1929 by
GENUS PEPSIS FABRICIUS

These are the “tarantula hawks,” of large size and with bright orange wings. Females hunt for mygalomorph spiders (“tarantulas”), paralyze them by stinging, and place them either in the spider’s burrow or in a shallow nest dug in the soil. Hurd (1952) reviewed the North American species and summarized data on behavior. Our 5 species are mostly confined to the southern third of the state.

angustimarginata Viereck. Otero and Pueblo counties.

formosa formosa (Say). Bent Co. Say described this species from the Arkansas Valley, and Hurd recorded it from several unspecified sites in southern Colorado, but it has rarely been collected there in recent years.

mildei Stal. Baca, Bent, Crowley, Otero, Prowers, and Pueblo counties.

coloradensis (Banks). Boulder, Clear Creek, and Larimer counties.

Genus HEMIPEPSIS DABLBOM

These wasps are superficially similar to species of Pepsis and, like them, are predators on mygalomorph spiders (Williams 1956).

ustulata ustulata Dahlbom. Archuleta, Baca, Bent, El Paso, Fremont, Huerfano, Las Animas, Mesa, Montezuma, and Otero counties.

Genus PRIOCNESSUS BANKS

Compared to the previous 3 genera, these are smaller, slender-bodied wasps. The 2 species recorded from Colorado are rarely encountered, and nothing is known of their behavior. There are several records of an eastern species, nebulosus (Dahlbom), preying upon grass spiders of the genus Agelenopsis.

apache (Banks). Huerfano and Larimer counties. Townes (1957) recorded this species only from southern Arizona and Texas.

coloradensis (Banks). Boulder, Clear Creek, and Larimer counties.

Genus ENTYPUS DABLbOM

These are wasps of moderate size, most of the species having orange wings and resembling small tarantula hawks. Several of the species have been found to prey on wolf spiders of the genus Lycosa, but so far as I am aware the nests have never been found.

aratus (Townes). Baca, Bent, and Otero counties.

austrinus austrinus (Banks). Bent, Boulder, Kiowa, Las Animas, and Otero counties.

fulvicornis (Cresson). Bent and Larimer counties.

texanus texanus (Cresson). Baca, Bent, Crowley, Huerfano, Kiowa, Larimer, Las Animas, Otero, Prowers, and Pueblo counties.

Genus CRYPTOCHIEILUS PANZER

The members of this genus closely resemble those of Entypus, but average smaller. As in Entypus, the females prey on wolf spiders of the genus Lycosa. The nests are multicellular and are dug from preexisting cavities in the soil.

attenuatus Banks. Boulder, Denver, Jefferson, Larimer, Mesa, and Otero counties.

hesperus (Banks). Crowley, Fremont, Lincoln, and Otero counties.


Genus Priocnemis Schiodte

This is a large genus of small wasps that prey upon a great diversity of ground-dwelling spiders. Nests are multicellular and are often dug from preexisting cavities in the soil.

aequais (Banks). Larimer Co.: a single female taken 21 km W of Livermore, at 2300 m elevation.
corrica (Say). Baca, Denver, Garfield, Kiowa, Larimer, Mesa, Teller, and Weld counties.

germana (Cresson). Delta and LaPlata counties.

kevini Wasbauer. Larimer Co.: 2 males taken in a malaise trap, 21 km W of Livermore, 2300 m.

minorata Banks. Larimer and El Paso counties.
navojo navaajo Banks. Garfield, Larimer, Mesa, Mineral, and Routt counties.

notha notha (Cresson). Boulder, Garfield, Huerfnano, LaPlata, Larimer, Morgan, and Routt counties. This and the preceding species are broadly sympatric and differ in details of the male terminalia; navaajo in the past has been considered only subspecifically distinct from notha, but the two are clearly full species.


scitula relicta Banks. Larimer Co.: Fort Collins.

Genus Caliadurgus Pate

This is a small genus with a single uncommon species in Colorado. Prey is reported to be orb-weaving spiders that are flushed from their webs. The nest is a shallow burrow in the soil.

fasciatellus alienatus (Smith). Logan and Pueblo counties.

fasciatellus excoctus (Townes). Larimer Co.

Genus Dipogon Fox

Females of this genus have paired tufts of bristles on the maxillae (hence the name Dipogon, “two-beard”). They nest in hollow twigs and some will accept wooden trap nests. Cells are provisioned with small spiders of various genera, but most commonly crab-spiders (Thomisidae). Cells are separated by barriers of debris (bits of soil, wood, seeds, dead insects), the particles being carried with the help of the “beards.” Members of this genus have rarely been collected in Colorado, being more partial to deciduous forests.

iracundus Townes. Boulder Co.: a single female taken by C.C. Lanham at Nederland, 2500 m.
lignicolus Evans. Larimer Co.: type locality and only records, 21 km W of Livermore, 2300 m.
sayi nigrior Townes. Larimer Co: a single female collected by David Leatherman at Estes Park, 2400 m. Townes (1957) recorded the species from Colorado, but without a specific locality.

sericeus Banks. Larimer Co.: a series of both sexes, taken in a malaise trap in Hewlett Gulch, 15 km NW Fort Collins, 1900 m.

Genus Minagenia Banks

Although Townes (1957) placed this genus in the subfamily Ceropalinae, I regard it as a probable derivative of Priocnemis. These are delicate wasps that do not build nests but oviposit directly upon lycosid spiders, which are left in place (Kaston 1959).


Genus Ageniella Banks

This is the first of 3 genera of unusually slender body form, in which the females normally amputate some or all of the spiders’ legs before transporting them to the nest. Species of Ageniella use a great variety of small spiders as prey, and so far as studied place them in short burrows dug from preexisting cavities in the soil. Sixteen species are reported from Colorado.

accepta (Cresson). Baca, Bent, Boulder, Huerfnano, Larimer, Mesa, Moffat, Otero, Prowers, Pueblo, and Weld counties.

agenioides (Fox). Boulder and Larimer counties.

arapaho Evans. Larimer Co.: type locality and only records, 21 km W Livermore, 2300 m.
arquitana (Banks). Boulder, Larimer, Logan, and Montezuma counties.
arizonica arizonica (Banks). Otero Co.: 28 km S LaJunta.

cupida (Cresson). Larimer Co.: Poudre Canyon, 1600 m (Townes 1957).

euphorbiae (Viereck). Alamosa, Bent, Boulder, Conejos, Crowley, Huerfano, Larimer, Montezuma, Otero, Saguache, and Weld counties.

fulgfrons (Cresson). Larimer Co.: Fort Collins.

tongula (Cresson). Larimer Co.: a single female taken 8 km NE of Livermore.

minatka Brimley. Bent, Crowley, Delta, Huerfano, Larimer, Prowers, and Weld counties.

neglecta Banks. Boulder and Larimer counties.

placita sonorensis Townes. Delta Co. This is an unusual range extension for this species. A single female was collected by U.N. Lanham 5 mi N of Delta, 30 June 1938.

reynoldsi (Banks). Bent and Las Animas counties.

rufescens (Banks). Boulder and Larimer counties.

semittincta (Banks). Bent, Boulder, Huerfano, Larimer, Mesa, Montezuma, and Otero counties.

Genus Phanagenia Banks

This is a small genus of wasps in which the females utilize spiders of several kinds and place their paralyzed prey in oval mud cells built beneath stones or logs.

bombycina (Cresson). Boulder, Larimer, and Montezuma counties.

Genus Auplopus Spinola

This is a large genus of worldwide distribution. The females make mud cells in protected places by carrying water from pools or puddles and making pellets from dry soil; the pellets are carried in the mouthparts and applied to the nest cells by use of the tip of the abdomen as a trowel. Spiders of diverse groups are used as prey.


caricernis subcorticalis (Walsh). Boulder Co.


SUBFAMILY POMPILINAE

Genus Aporus Spinola

Members of this genus prey on trap-door spiders (Ctenizidae) using the spider's burrow as a nest.

luxus (Banks). Montezuma Co.: several males taken in a malaise trap at Arriola by T. Marquardt. This is primarily a species of the western coastal states.

Genus Psorthaspis Banks

This is another genus of predators on trap-door spiders. The species show strong sexual dimorphism, the females of our species being patterned with orange, similar to many Mutillidae, while the males are all black, a presumed example of Mullerian mimicry.

nigriceps (Banks). Montrose Co.: Uravan. A species of the deep Southwest.

sanguinea (Smith). Baca and Otero counties.

Genus Evagetes Lepeletier

Members of this genus are nest parasites of other Pompilidae. Females seek out and dig into nests of other spider wasps, destroy the egg, and lay an egg of their own on the spider.

assignus Dreisbach. Alamosa, Bent, Huerfano, Larimer, Prowers, Weld, and Yuma counties.

calefactu, Evans, Larimer Co. A single female of this evidently rare species was taken by the author 10 km E of Livermore PO on 9 August 1996 on foliage of Helianthus annuus. This is the first Colorado record of a species previously known from California, Arizona, Texas, and (questionably) Montana.

crassicorns consimilis (Banks). Boulder, Larimer, Mesa, Mineral, Park, and Teller counties.

crassicorns crassicornis (Shuckard). Larimer Co.: Fort Collins.

hyacinthinus (Cresson). Alamosa, Baca, Boulder, Conejos, Gilpin, Huerfano, Jefferson, Larimer, Mesa, Otero, and Weld counties.

ingenius (Cresson). Alamosa, Bent, El Paso, Larimer, Morgan, Otero, Prowers, and Yuma counties.
Genus *Agenioideus* Ashmead

These are small wasps of delicate build, nesting (so far as known) from inside crevices in the soil.

*biedermanni* (Banks). Bent, Larimer, and Weld counties.

*birkmani* (Banks). Larimer, Mesa, and Otero counties.

*humilis* (Cresson). Alamosa, Boulder, El Paso, and Larimer counties. This is a predator on orb-weaving spiders, often around buildings.

Genus *Sericopompilus* Howard

This is a small genus of slender wasps that prey on diverse spiders and nest in the soil, usually from the side of a rodent burrow or the burrow of another wasp.

*angustatus* (Cresson). Bent, Boulder, El Paso, Prowers, Weld, and Yuma counties.

*apicalis* (Say). Baca, Bent, and Prowers counties.

*neotropicalis* (Cameron). Otero Co.: Hawley.

Genus *Episynus* Schiodte

These small wasps prey exclusively on orb-weaving spiders (Araneidae), which they flush from their webs, sting, and carry to a simple nest dug in the soil. So rapid are their actions that George and Elizabeth Peckham (1898) called 1 species "the tornado wasp."

*biguttatus biguttatus* (Fabricius). Baca, Bent, Larimer, and Otero counties.

*biguttatus californicus* (Banks). Alamosa, Chaffee, Huerfano, Larimer, and Montezuma counties.

*oregon* Evans. Grand and Larimer counties.

*quinquenotatus hurdi* Evans. Alamosa, Conejos, Huerfano, Larimer, Mesa, Park, Saguache, and Weld counties.


Genus *Poecilopompilus* Howard

These are moderate-sized wasps that are frequently banded with black and yellow, much like social wasps of the genus *Polistes*. Like members of the preceding genus, they are specialists on orb-weaving spiders and nest in simple burrows in the soil.


*algidus willistoni* (Patton). Alamosa, Baca, Bent, Crowley, Larimer, Las Animas, Montezuma, Prowers, and Weld counties.

*interruptus interruptus* (Say). Baca, Bent, Kiowa, Las Animas, Montezuma, Otero, Prowers, Pueblo, and Weld counties.

Genus *Tachypompilus* Ashmead

These are large wasps of mostly reddish brown coloration. They prey largely on wolf spiders (*Lycosa* and *Dolomedes*) and place their paralyzed prey in shallow burrows in sandy or powdery soil, often close to buildings.

*ferrugineus ferrugineus* (Say). Arapahoe, Boulder, Larimer, and Jefferson counties.

*unicolor cerinus* Evans. Bent, Crowley, and Otero counties.

*unicolor unicolor* (Banks). Larimer Co.; 32 km N Fort Collins. This western subspecies has also been taken twice in Wyoming: Green River and 30 miles NE of Laramie.

Genus *Anoplius* Dufour

Subgenus *Notiochares* Banks

This is a small subgenus of mostly black or bluish wasps of moderate size. It is primarily a neotropical group, with 1 species that is occasionally taken in Colorado. The prey consists of wolf spiders that are most often taken in tall grasses in wet places.
lepidus atramenterarius (Dahlbom). Baca, Larimer, and Prowers counties.

Subgenus Lophopompilus
Radoszkowski

This is another small subgenus of rather large wasps, in this case Holarctic in distribution. Relatively large spiders of several families are used as prey. Nests are dug from flat soil or from the sides of preexisting holes.


averx (Dahlbom). Boulder and Larimer counties.

cleora (Banks). Alamosa, Baca, Delta, Mesa, Moffat, Prowers, Weld, and Yuma counties. Largely confined to the vicinity of streams and lakes.

Subgenus Arachnophroctonus
Howard

Species of this subgenus are inhabitants of open country where the soil is reasonably friable. Simple nests are dug in the soil and provisioned primarily with wolf spiders (Lycosidae).

acapukoensis (Cameron). Baca, Bent, Cheyenne, Otero, Prowers, and Pueblo counties.

americanus ambigus (Dahlbom). Mesa Co.

nigritus (Dahlbom). Alamosa, Baca, Bent, Boulder, Cheyenne, Conejos, Costilla, Crowley, Delta, Denver, Douglas, Elbert, El Paso, Garfield, Huerfano, Larimer, Las Animas, Logan, Mesa, Morgan, Otero, Prowers, Weld, and Yuma counties. This species has been called relatensis (Fox) for many years.

semicinctus (Dahlbom). Alamosa, Baca, Bent, Conejos, Costilla, El Paso, Huerfano, Kiowa, Las Animas, Morgan, Otero, Prowers, Weld, and Yuma counties. This species has been called marginalis (Banks) for many years.

semirufus (Cresson). Baca, Bent, Larimer, Mesa, and Weld counties.

Subgenus Pompilinus
Ashmead

This subgenus is closely similar to the preceding, but the species are smaller in size. Wolf spiders are the most common prey, but a variety of other ground-dwelling spiders are also used. Fifteen species are reported from Colorado.


clyter (Banks). Archuleta, Baca, Bent, Boulder, Crowley, Delta, Gilpin, Gunnison, Kiowa, Larimer, Mesa, and Otero counties.

cylindricus (Cresson). Prowers Co.: Carlton.

estellina (Banks). Delta and Larimer counties.

fraternus (Banks). Kiowa and Logan counties.


leona (Cameron). Larimer Co., 8–10 km E of Livermore PO: 3 females taken 4–5 August 1994 on Euphorbia marginata and a male taken 20 August 1996 on foliage of Helianthus annus. First Colorado record of a species described from Mexico and reported from Texas, New Mexico, and Arizona.

marginatus (Say). Cheyenne, Costilla, El Paso, Kiowa, Larimer, Moffat, Morgan, Sedgwick, Weld, and Yuma counties.


rectangularis rectangularis (Dreisbach). Larimer and Yuma counties.

splendens (Dreisbach). Bent, Costilla, El Paso, Larimer, Lincoln, Logan, Morgan, Otero, Prowers, and Weld counties.


subtruncatus (Dreisbach). Bent, Elbert, Larimer, Otero, and Weld counties.


truncatus (Dreisbach). Bent, Larimer, Prowers, and Weld counties.

Subgenus Anoplus Dufour

These are small black or bluish wasps that nest primarily in niches, such as under stones or logs. Prey consists of various ground-dwelling spiders.
**Genus Hesperopompilus** Evans

This is a small genus of rare, little-studied species, most of them confined to the Southwest or Mexico.

**Genus Arachnospila** Kincaid

**Subgenus Ammosphex** Wilcke

These are black wasps, averaging larger than those of the preceding subgenus. Females prey upon various ground-dwelling spiders and make simple nests in friable soil.

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**Genus Apo1-inellus** Banks

These are minute wasps, all species extensively patterned with pale pubescence. Records indicate that jumping spiders (Salticidae) are the usual prey. Nests are simple burrows in the ground.

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**Subgenus Arachnospila** Kincaid

These are black wasps, averaging larger than those of the preceding subgenus. Females prey upon various ground-dwelling spiders and make simple nests in friable soil.


**Subgenus Anoplochares** Banks

Nothing is known of the behavior of the single species of this subgenus occurring in Colorado. A European species is known to attack burrowing wolf spiders, using the spider's burrow as a nest.

**Basilis** Banks. Alamosa, Bent, Delta, Jackson, Larimer, Otero, and Weld counties.

**Complettus** Banks. Bent, Chaffee, Delta, Huerfano, Jackson, Larimer, Mesa, Montezuma, Washington, and Weld counties.

**Medianus** Banks. Alamosa, Bent, Delta, Jefferson, Larimer, Teller, and Weld counties.


taeniolatus taeniolatus (Dalla Torre). Bent, Boulder, Delta, Larimer, and Pueblo counties.
unionis (Dalla Torre). Bent, Boulder, Delta, Douglas, Huerfano, Jefferson, Larimer, Mesa, Moffat, Montezuma, Otero, and Weld counties. For many years this species was called fasciatus (Smith).
yucatanensis (Cameron). Bent, Boulder, Delta, Douglas, Huerfano, Larimer, Mesa, Moffat, Montezuma, Otero, and Weld counties. For many years this species was called fasciatus (Smith).

Genus Paracyphononyx Gribodo

These large, black wasps do not build nests but attack wolf spiders in their burrows, the wasp larva developing on the spider as a parasitoid.

funereus (Lepeletier). Baca, Bent, Boulder, Delta, El Paso, Huerfano, Larimer, Las Animas, Mesa, Montezuma, Otero, and Prowers counties.

Subfamily Ceropalinae
Genus Ceropales Latreille

Members of this genus are parasites of other Pompilidae. Females are attracted to nesting females, then slip in and lay an egg in the book lungs of the spider. The Ceropales egg hatches before that of the host and the larva consumes the host egg and then the spider.

elegans elegans Cresson. Bent, Larimer, Otero, Prowers, and Weld counties.

SUBFAMILY CEROPALINAe
Genus Ceropales Latreille

Documents of this genus are parasites of other Pompilidae. Females are attracted to nesting females, then slip in and lay an egg in the book lungs of the spider. The Ceropales egg hatches before that of the host and the larva consumes the host egg and then the spider.

elegans elegans Cresson. Bent, Larimer, Prowers, and Weld counties.


robinsonii robinsonii Cresson. Larimer Co.: 21 km W Livermore, 2300 m.

robinsonii stigmatic Banks. Larimer Co. Taken at the same locality as the preceding and doubtless no more than a color form.

ruggata Townes. Bent, Delta, Huerfano, Larimer, Montezuma, Otero, and Weld counties.

Literature Cited


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