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A TAXONOMIC REVISION OF THE *ANTENNARIA ROSEA*  
 (ASTERACEAE: INULEAE: GNAPHALIINAE) POLYPLOID COMPLEX

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Bayer, Randall J. (Department of Botany, University of Alberta, Edmonton, Alberta T6G 2E9, Canada). A taxonomic revision of the *Antennaria rosea* (Asteraceae: Inuleae: Gnaphaliinae) polyploid complex. *Brittonia* 41: 53–60. 1989.—The *Antennaria rosea* species complex is circumscribed to contain four subspecific taxa. A complete synonymy and key to the subspecies of *A. rosea* is presented. The following new combinations are proposed: *Antennaria rosea* subsp. *arida* (E. Nels.) R. Bayer, *A. rosea* subsp. *confinis* (Greene) R. Bayer, and *A. rosea* subsp. *pulvinata* (Greene) R. Bayer. The affinities of *A. rosea* to other species of *Antennaria* are discussed and a key to separate *A. rosea* from related polyploid complexes is provided.

*Antennaria rosea* Greene is a morphologically diverse, polyploid, agamic complex that is widely distributed in western North America from Arizona and New Mexico north to the Northwest Territories and Alaska and east to Hudson Bay. It also occurs as disjunct series of populations on the shores of James Bay, the Thunder Bay district of Ontario north of Lake Superior, and in Atlantic Canada. The species is almost entirely pistillate, a gametophytic apomict, and staminate plants are extremely rare. Chromosome numbers include triploid, tetraploids, and pentaploids, but the tetraploid cytotypes predominate (Bayer, 1987a; Bayer & Stebbins, 1987). The reported diploid counts for *A. rosea* (Chmielewski & Chinnappa, 1988) are spurious because these collections should instead be referred, in my view, to sexual species such as *A. microphylla* Rydb. and *A. umbrinella* Rydb., not *A. rosea*.

Traditionally, many authors have recognized *A. rosea* as those clones with rose-colored phyllaries (Bayer, in press). Field studies have indicated that there can be tremendous amounts of variation with respect to number of heads per flowering stalk and phyllary color even within a small population. Phyllary color can range from white, to pink, red, and brown within a small population (see the following population diversity sample collections at ALTA and RM: Bayer & Lebedyk M-607, UT-615; Bayer & Stebbins I-304; Bayer et al. CO-459, CO-460, ID-603, UT-618, WY-505). As originally described by Greene (1898), *A. rosea* represents only a few apomictic clones (microspecies or agamospecies) in a much larger aggregate of related clones that is circumscribed here as *A. rosea* sens. lat.

*Antennaria* Gaertner has its greatest morphological diversity in western and arctic North America. Until about 1896 only a handful of species had been described for North America, primarily by Europeans. Beginning in 1897 and continuing to about 1950, several North American botanists began collecting and describing new species of *Antennaria*. Merritt L. Fernald (eastern North America), E. L. Greene (North America), M. O. Malte (North American arctic), E. Nelson (western United States), A. E. Porsild (North American arctic and subarctic), P. A. Rydberg (western United States), and others described almost 300 taxa for North America during that period. Realistically, about 40 species of *Antennaria* probably should be recognized world-wide (Bayer, 1987a).

Some past and a few present authors have acknowledged each apomict at the rank of species, leading to cumbersome classifications that could only be used by those who constructed them or those familiar with the type collections of these microspecies. At least 40 microspecies that can be referred to *A. rosea* have been described and it is apparent to most that it is impossible to construct a key to

these microspecies, even if someone familiar with the type specimens can recognize them. Recently, Chmielewski and Chinnappa (1988) have advocated retaining the numerous microspecies of northwestern Canada and Alaska described by Porsild, but I agree with Welsh (1974) that they are not sufficiently distinct to warrant recognition (Bayer, in press). Clearly, the best solution to this problem is to combine the apomicts into related groups of apomicts and recognize them as an agamic species complex, as has been done for the *A. neodioica* Greene and *A. parlinii* Fern. species complexes for eastern North America (Bayer & Stebbins, 1982). The purpose of this paper is to provide a morphological description for *A. rosea* sens. lat. and four subspecific taxa, as well as provide a list of nomenclatural and taxonomic synonyms.

### Relationships

Recent phenetic analyses of *A. rosea* and related sexually reproducing species (Bayer, 1987b; Bayer, in press) have indicated that *A. rosea* is a polyploid compositespecies, the result of hybridization from among several amphimictic species of *Antennaria*, namely *A. aromatica* Evert, *A. corymbosa* E. Nels., *A. marginata* Greene, *A. microphylla*, *A. pulchella* Greene, *A. racemosa* Hook., and *A. umbrinella*. Some authors (Cronquist, 1955; Sharsmith, 1960; among others) place *A. microphylla* in synonymy under *A. rosea*. However, the transition from *A. rosea* is just as evident with many of the other sexual species, especially *A. corymbosa* and *A. umbrinella*, as it is with *A. microphylla* (Bayer, in press). *Antennaria rosea* may be readily distinguished from its sexual progenitors by the fact that populations of the sexual species have approximately equal frequencies of staminate and pistillate plants, while those of *A. rosea* almost always consist entirely of pistillate clones. Chmielewski and Chinnappa (1988) have maintained that staminate plants are apparently quite frequent in the southern portion of the range of *A. rosea*, but I would refer most of these staminate plants to the sexual relatives of *A. rosea*, especially *A. corymbosa*, *A. microphylla*, and *A. umbrinella*. Staminate *A. rosea* clones, as discussed in the context of this paper, are "aberrant males" (terminology of Stebbins, 1932), which are sterile, in very low frequency in populations, and as a result contribute nothing to the reproductive effort of the population. This is in contrast to "normal males" (Stebbins, 1932), which are in equal frequency with pistillate clones, are fertile, and are vital contributors to the reproduction effort of the population. Consequently, I maintain that populations of *A. rosea* containing staminate clones are infrequent and when they do occur they are in a very low frequency within the population. Chmielewski and Chinnappa (1988) have not provided critical information concerning the type (i.e., normal or aberrant) of the staminate clones of *A. rosea* they reported.

*Antennaria gaspensis* (Fern.) Fern. is considered a synonym of *A. rosea*, based not only on morphology, but on the fact that the habitat of *A. gaspensis* is similar to that of many western segregates of *A. rosea* (Bayer, in press). Some *A. rosea* segregates from western North America are indeed morphologically inseparable from *A. gaspensis*, as was alluded to by Fernald in his original description of the species (Fernald, 1905). In Atlantic Canada, where *A. rosea* (= *A. gaspensis* (Fern.) Fern.) is sympatric with *A. neodioica* Greene subsp. *neodioica* and *A. neodioica* subsp. *petaloidea* (Fern.) Bayer & Stebbins, *A. rosea* can be recognized based on the presence of flags, those linear-lanceolate, scarious appendages at the apices of the upper cauline leaves. Additionally, *A. rosea* can be readily separated from *A. neodioica* subsp. *canadensis* (Greene) Bayer & Stebbins based on the pubescent nature of the adaxial upper leaf surfaces as opposed to glabrous ones in *A. neodioica* subsp. *canadensis*. In western North America, four other polyploid agamic com-

plexes may sometimes be confused with *A. rosea*, because some morphological overlap occasionally occurs. *Antennaria alpina* (L.) Gaertner, *A. media* Greene, *A. neodioica* subsp. *howellii* (Greene) Bayer, *A. parvifolia* Nutt., and *A. rosea* can be readily separated using the following key.

Key to the western North American *Antennaria* agamic complexes

- 1 Basal leaves glabrous adaxially, 1–3-nerved ..... *A. neodioica* subsp. *howellii*
- 1 Basal leaves sometimes glabrescent adaxially to mostly pubescent, 1-nerved.
  - 2 Phyllary tips green-black or black.
    - 3 Upper cauline leaves with a flat, subulate, scarious, tip (flag), similar to the tips of the phyllaries ..... *A. alpina*
    - 3 Upper cauline leaves acuminate, not tipped by a scarious appendage similar to the tips of the phyllaries ..... *A. media*
  - 2 Phyllary tips zoned combinations of white, green, pink, rose, sanguine, or light to deep brown.
    - 4 Pistillate involucre 4–8 (10) mm high; flowering stems usually 8–35 cm tall ..... *A. rosea*
    - 4 Pistillate involucre 8–15 mm high; flowering stems usually 2–8 cm tall ..... *A. parvifolia*

Taxonomy of *A. rosea*

Specimens from ALTA, CAN, CAS, DAO, DAV, GH, ID, MONT, MONTU, NDG, NY, RM, and US were used in numerical taxonomic studies of *A. rosea* (Bayer, in press) in which 42 morphological characters were measured from 110 herbarium specimens. The following description is based on data obtained in that analysis (Bayer, in press), as well as direct observations of field and herbarium material.

*Antennaria rosea* Greene

Mat-forming perennial herbs, odorless, with 3–7 leafy stolons per basal rosette; rosette-leaves spatulate to cuneate, 4–20 (24) in number, 8–40 mm long, 2–10 mm wide, without distinct petioles, glabrescent to canescent, occasionally with purple glandular hairs. Stolons decumbent, (1) 2–7 cm long, with 7–32 leaves, the proximal leaves in the basal rosette 3–14 mm long, 0.5–3 mm wide, the distal rosette leaves 7–38 mm long, 2–10 mm wide. Flowering stem (4) 8–40 cm high; cauline leaves (5) 7–20, linear-oblongate, the lower 9–36 mm long, 2–16 mm wide, the upper 6–17 mm long, 1–3 mm wide, only those about the heads sometimes possessing linear-lanceolate, scarious appendages at their tips (flags). Pistillate heads 3–16 (20), corymbose, occasionally racemose-corymbose; involucre 4–8 (10) mm high; phyllaries in 2 or 3 series, subulate, scarious, the longest 3.5–7.5 mm long, 0.7–1.8 mm wide, colors extremely various, white, green, pink, rose, sanguine, stramineous, light brown, deep brown, to blackish-red, colors zoned, with base of a darker shade or different color than the tip. Florets 40–150 per head; corollas 2.5–5 (6) mm long, pappus 3.5–6.5 mm long, achenes 0.7–1.8 mm long, with or without papillae. Staminate plant extremely rare, staminate heads 8, corymbose; involucre 6 mm high; phyllaries 4.5 mm long; 1.5 mm wide, corolla 3.5 mm long; pappus clavate, 3.5 mm long.  $2n = 42, 56, \text{ or } 70$ .

Cluster analysis (Bayer, in press) indicated that the *A. rosea* complex contained several distinct clusters of OTUs. Further inspection of the specimens belonging to those clusters has disclosed that morphological characters exist that can be used to circumscribe these intraspecific groups. Each group is recognized as a subspecies of *A. rosea*. Additionally, each subspecific taxon morphologically resembles one or two of the sexual progenitor species most closely (Bayer, in press). For example, *A. rosea* subsp. *rosea* most closely resembles the sexual species *A. corymbosa* and *A. racemosa*, whereas *A. rosea* subsp. *pulvinata* is most similar to sexual *A. aro-*

*matica*. *Antennaria rosea* subsp. *confinis* is most closely related to *A. pulchella* and *A. umbrinella*, but *A. rosea* subsp. *arida* is morphologically similar to the sexual species, *A. microphylla*. A stepwise discriminant analysis (Dixon, 1981) disclosed characters that can be used to reliably separate the subspecific taxa. These characters were subsequently used to produce the following key to the four subspecies of *A. rosea*.

#### Key to the subspecies of *Antennaria rosea*

- 1 Longest leaves of flowering rosettes 20 mm or more in length; phyllaries shades of white, pink, green, or red, but usually not brown ..... 1. *A. rosea* subsp. *rosea*
- 1 Longest leaves of flowering rosettes less than 20 mm in length; phyllaries of various shades of white, pink, green, red, and brown.
  - 2 involucre 6.5 mm or greater in length; corolla 3.5–6 mm long, pappus usually greater than 5 mm long; cauline leaves sometimes tipped with a flat, lanceolate, scarious appendage; phyllaries of various colors.
    - 3 Flowering stalks greater than 17 cm high; lowermost cauline leaves usually greater than 19 mm long; heads usually 6–12 in number ..... 2. *A. rosea* subsp. *arida*
    - 3 Flowering stalks less than 17 cm high; lowermost cauline leaves usually 19 mm or less in length; heads usually 3–5 in number ..... 4. *A. rosea* subsp. *pulvinata*
  - 2 involucre less than 6.5 mm in length; corolla 2.5–3.5 mm long, pappus usually 5 mm or less in length; cauline leaves tapering to a slender, subulate tip; phyllaries usually various shades of cream, pale yellow, grayish, or brown ..... 3. *A. rosea* subsp. *confinis*

The following formally recognizes the three new subspecific combinations as well as the subspecific autonym of *A. rosea* sens. lat.

#### 1. ANTENNARIA ROSEA Greene subsp. ROSEA

- Antennaria dioica* var. *rosea* D. Eaton in S. Wats. Bot. King Exp. 186. 1871, nomen nudum. TYPE: U.S.A. "In Nevada and Utah, from the Havallah Mountains to the Uintas; 6000–10000 feet elevation," S. Watson 652.
- Antennaria rosea* Greene, Pittonia 3: 281. 1898. TYPE: U.S.A. IDAHO: "Mountain Meadows, Kootenai Co.," Jul 1891, J. B. Leiberg 646 (LECTOTYPE—designated here: NDG–058611!).
- Antennaria imbricata* E. Nels., Bot. Gaz. 27: 211. 1899. *A. rosea* var. *imbricata* (E. Nels.) E. Nels., Proc. U.S. Natl. Mus. 23: 707. 1901. TYPE: U.S.A. WYOMING: "North Fork of Crow Creek," 11 Jul 1896, E. Nelson 2036 (HOLOTYPE: RM–15191!; ISOTYPE: US–244816!).
- Antennaria bracteosa* Rydb., Mem. New York Bot. Gard. 1: 143. 1900. TYPE: U.S.A. MONTANA: "Jack Creek Cañon, Altitude 7000 feet," 15 Jul 1897, P. A. Rydberg & E. A. Bessey 5144 (LECTOTYPE—designated here: NY!; ISOLECTOTYPES: US–960721! & 361295!, NDG–04031! & 57979!).
- Antennaria oxyphylla* Greene, Pittonia 4: 284. (26 Jan) 1901. TYPE: U.S.A. MONTANA: Gallatin Co., Spanish Peaks, 28 Jun 1897, P. A. Rydberg & E. A. Bessey 5148 (LECTOTYPE—designated here: NDG–052390!; ISOLECTOTYPE: US–361298!).
- Antennaria speciosa* E. Nels., Proc. U.S. Natl. Mus. 23: 705. (4 Jun) 1901. TYPE: U.S.A. CALIFORNIA. San Bernardino Co.: "Bear Valley, San Bernardino Mountains, and their eastern base. Alt. 6500 feet," 23 Jul 1894, S. B. Parish 3354 (HOLOTYPE: US–214332!).
- Antennaria rosea* subsp. *divaricata* E. Nels., Proc. U.S. Natl. Mus. 23: 707. 1901. TYPE: U.S.A. IDAHO: "Divide on the road from Custer to Challis," L. F. Henderson 3636 (HOLOTYPE: US).
- Antennaria hendersoni* Piper, Bull. Torrey Bot. Club 29: 221. 1902. TYPE: U.S.A. WASHINGTON: Mt. Adams, 6 Aug 1892, L. F. Henderson 2290 (HOLOTYPE: US–529407!).
- Antennaria acuminata* Greene, Ottawa Naturalist 27: 202. 1904. TYPE: CANADA. BRITISH COLUMBIA: "International Boundary Commission Collection. Chilliwack Valley, B.C. Between Lat. 49° and Lat. 49° 10'; and Long. 121° 25' and Long. 122°," 8 Aug 1901, J. M. Macoun 26179 (LECTOTYPE—designated here: NDG–57794!; ISOLECTOTYPE: CAN–105595!).
- Antennaria chlorantha* Greene, Ottawa Naturalist 28: 38. 1904. TYPE: CANADA. BRITISH COLUMBIA: "Mts. N. of Chilliwack Lake, B. C., rocky slopes, alt. 6500'," 23 Jul 1901, J. M. Macoun 26197 (LECTOTYPE—designated here: NDG–58053!; ISOLECTOTYPES: CAN–105180!).
- Antennaria lanulosa* Greene, Ottawa Naturalist 28: 38. 1904. TYPE: CANADA. BRITISH COLUMBIA: "Chilliwack Valley, between Lat. 49° and Lat. 49° 10'; and Long. 121° 25' and Long. 122°, alt. 6000 ft.," 29 Aug 1901, J. M. Macoun 26194 (LECTOTYPE—designated here: NDG–52162; ISOLECTOTYPE: CAN–105190!).
- Antennaria formosa* Greene, Leaf. Bot. Observ. Crit. 1: 145. 1905. TYPE: U.S.A. COLORADO: "Plants

of West Central Colorado, Region of the Gunnison Watershed," 1901, *C. F. Baker 580* (LECTOTYPE—designated here: NDG—058172!; ISOLECTOTYPE: US—412217!). The isolectotype provides this additional information: "Gunnison, Jul 24, 7680 ft."

*Antennaria alborosea* A. Pors., *Canad. Field-Naturalist* 60: 85. 1947. TYPE: CANADA. YUKON: "Canol Rd.: East side of Rose R. valley; granite mountain opposite mile 85–90. Elev 5000–6000'," 6 Jul 1944, *A. E. Porsild & A. J. Breitung 10190* (HOLOTYPE: CAN—105619!; ISOTYPE: US—2052153!).

Rosette-leaves 20–40 mm long; stolons decumbent, 20–70 mm long; flowering stem 10–40 cm high; with cauline leaves, the lower 15–36 mm long, the upper 8–17 mm long; pistillate heads 6–20; involucre 5–8 mm high; phyllaries 4.5–6.5 mm long; florets 50–150 per head; corollas 3–4.5 mm long; pappus 4–6 mm long.

Representative specimens examined: CANADA. BRITISH COLUMBIA: 9 mi N of Summit Lake along Hart Hwy., N of Prince George, *J. A. Calder et al. 12480* (DAO); Copper Mtn., 8 mi SW of Nelson, *J. A. Calder & D. B. O. Savile 11061* (DAO), Manning Park, Blackwall Peak, N of ranger station on Hope–Princeton highway, *11639* (DAO). NORTHWEST TERRITORIES: Fort Smith, *W. J. Cody & C. C. Loan 4209* (RM—256327). U.S.A. COLORADO: Gunnison Co.: Rock Creek, S of Schofield Pass, *R. J. Bayer et al. CO-431* (RM), 1 mi S of Gothic, *CO-421* (RM). Grand Co.: Arapaho Natl. Forest, Sawmill Gulch, *R. J. Bayer et al. CO-474* (RM). Eagle Co.: Red Cliff, 26 Jun 1900, *G. E. Osterhout s.n.* (RM—170016). Lake Co.: 9 mi NE of Leadville on road to Climax, *R. J. Bayer et al. CO-454* (RM). IDAHO: Custer Co.: Lolo Creek campground, 25 mi NW of Stanley, *R. J. Bayer & G. L. Stebbins I-304* (RM); Stanley Lake, *C. L. Hitchcock & L. Muhlick 9611* (RM—198147). MONTANA: Granite Co.: Skalkahoe Pass road, at Crystal Creek, *R. J. Bayer & G. L. Stebbins M-334* (ALTA), Meadow/Carp creek divide, *M-329* (RM), Meadow Creek, *M-331* (RM). UTAH: Summit Co.: Dollar Lake, *B. Maguire & R. Maguire 14578* (RM—186592). WASHINGTON: Clellam Co.: Olympic Mts., *G. B. Rossbach & R. P. Rossbach 515* (RM—197200). WYOMING: Yellowstone Natl. Park, *B. Maguire & R. Maguire 1240* (RM—136977). Crook Co.: Black Hills, Missouri Buttes, highest butte, *H. Marriott 7829* (RM).

## 2. *Antennaria rosea* Greene subsp. *arida* (E. Nels.) R. Bayer, comb. nov.

*Antennaria arida* E. Nels., *Bot. Gaz.* 27: 210. 1899. TYPE: U.S.A. WYOMING: "Tipton, S.W. Wyoming," 17 Jun 1898, *A. Nelson 4798* (HOLOTYPE: RM—15367!).

*Antennaria scariosa* E. Nels., *Bot. Gaz.* 27: 210. 1899. TYPE: U.S.A. WYOMING: Uinta Co.: Leroy, 7 Jun 1898, *A. Nelson 4587* (HOLOTYPE: RM—15368!).

*Antennaria arida* subsp. *viscidula* E. Nels., *Proc. U.S. Natl. Mus.* 23: 710. 1901. TYPE: U.S.A. WYOMING: "Laramie Peak," 10 Jul 1900, *A. Nelson 7570* (HOLOTYPE: RM—29391!).

Rosette-leaves 10–20 mm long; stolons decumbent, 15–45 mm long; flowering stem 19–30 cm high; with cauline leaves, the lower 19–26 mm long; the upper 9–15 mm long; pistillate heads 6–12, involucre 6.5–8 mm high; phyllaries 5–7.5 mm long; florets 60–120 per head; corollas 3.5–6 mm long; pappus 5–6 mm long.

Representative specimens examined: CANADA. ALBERTA: W of Ft. Saskatchewan, *G. H. Turner 3486* (RM—214370). BRITISH COLUMBIA: 5 mi on road from Riske Creek to Hanceville *J. A. Calder et al. 18283* (DAO); near Manson Creek village N of Ft. St. James, *J. A. Calder et al. 13656* (DAO); about 3 mi S of Revelstoke, *J. A. Calder & D. B. O. Savile 8921* (DAO); 3 mi N of Kingsgate customs near Idaho border, *R. L. Taylor & D. H. Ferguson 1142* (DAO). QUEBEC: Rimouski Co.: Cap aux Corbeaux, limestone barren, *J. Rousseau 26439* (MT). YUKON: Pelly crossing on Dawson–Whitehorse road, *J. A. Calder & J. M. Gillett 25848* (DAO); Conglomerate Mt., between mile 63 & 67 on Dawson–Whitehorse road, *J. A. Calder & J. M. Gillett 24956* (DAO). U.S.A. ALASKA: Shaw Creek, mile 289 on Richardson highway, *W. J. Cody & T. M. J. Webster 4920* (DAO); NW end of Kenai Lake, Kenai Peninsula, *J. A. Calder 5557* (DAO). COLORADO: Grand Co.: Tabernache campground, *R. J. Bayer et al. CO-469* (RM). Conejos Co.: San Juan Natl. Forest along road at Stunner Pass, *R. J. Bayer et al. CO-406* (ALTA). IDAHO: Custer Co.: Pahsimeroi Mts., along forest service road 116 at Doublesprings Pass, *R. J. Bayer et al. ID-602* (DAO, CAN, RM). NEW MEXICO: Rio Arriba Co.: Carson Natl. Forest, above Hopewell Lake, *R. J. Bayer et al. NM-418* (RM). UTAH: La Sal Mts., Brumley creek, *P. A. Rydberg & A. O. Garrett 8918* (RM—169766). WASHINGTON: Naehis River, *E. Nelson 1501* (RM—101591). WYOMING: Crook Co.: Black Hills, about 23 air mi SE of Sundance, *H. Marriott 8662* (RM).

## 3. *Antennaria rosea* Greene subsp. *confinis* (Greene) R. Bayer, comb. & stat. nov.

*Antennaria confinis* Greene, *Pittonia* 4: 40. (17 Mar) 1899. TYPE: U.S.A. ARIZONA: "Santa Catalina Mountains," Jun 1880, *J. G. Lemmon s.n.* (LECTOTYPE—designated here: NDG—058058!).

- Antennaria sordida* Greene, Pittonia 4: 81. (17 Mar) 1899, not Schultz-Bip. 1854. TYPE: U.S.A. COLORADO: "in Spruce belt, mountain at end of Clear Creek Cañon, 10,500 ft. alt.," 11 Sep 1899, T. Holm s.n. (LECTOTYPE—designated here: NDG-058639!; ISOLECTOTYPE: WIS!).
- Antennaria angustifolia* Rydb., Bull. Torrey Bot. Club 26: 546. (16 Oct) 1899. *Antennaria rosea* Greene var. *angustifolia* (Rydb.) E. Nels., Proc. U.S. Natl. Mus. 23: 706. 1901. TYPE: U.S.A. CALIFORNIA: "Yosemite Valley and Mountains," in 1865, J. Torrey s.n. (LECTOTYPE—designated here: NY!).
- Antennaria foliacea* var. *humilis* Rydb., Mem. New York Bot. Gard. 1: 414. 1900. *A. arida humilis* (Rydb.) E. Nels., Proc. U.S. Natl. Mus. 23: 710. 1901. TYPE: U.S.A. MONTANA: "Bridger Mountains, Altitude 7000 feet," 14 Jun 1897, P. A. Rydberg & E. A. Bessey 5149 (LECTOTYPE—designated here: NY!).
- Antennaria tomentella* E. Nels., Proc. U.S. Natl. Mus. 23: 701. 1901. TYPE: U.S.A. WASHINGTON: "Near Stevens Pass, Cascades; Alt. 1500 meters," 15 Aug 1893, J. H. Sandberg & F. D. Leiberger 751 (HOLOTYPE: US-288982!).
- Antennaria concinna* E. Nels., Proc. U.S. Natl. Mus. 23: 705. 1901. TYPE: U.S.A. WASHINGTON: "Olympic Mountains, Challam Co.," Jul 1900, A. D. E. Elmer 2417 (HOLOTYPE: US-390159!; ISOTYPES: US-960748!, NDG-58057!).
- Antennaria polyphylla* Greene, W. Amer. Pl. 2: 19. 1903, nomen nudum. TYPE: U.S.A. NEVADA: Ormsby Co.: "Head of Fall Creek," Jul 1902, C. F. Baker 1328 (TYPE: CAN-190899!).
- Antennaria sedoides* Greene, Ottawa Naturalist 28: 37. 1904. TYPE: CANADA. ALBERTA: "Lake Road at Banff, Rocky Mts.," 28 May 1901, N. B. Sanson 26861 (LECTOTYPE—designated here: CAN-105343!; ISOLECTOTYPE: NDG-052561!).
- Antennaria dioica* var. *kernensis* Jepson, Manual Fl. Pl. Calif. 1071. 1925. TYPE: U.S.A. CALIFORNIA: Tulare Co.: "Basin of the Upper Kern River, . . . , at Volcano Meadows (originally known as Whitney Meadows), altitude 8500 feet," 25 Jul 1904, H. M. Hall & H. D. Babcock 5473 (SYNTYPES: UC; RM-52730!).
- Antennaria laingii* A. Pors., Rhodora 41: 293. 1939. TYPE: U.S.A. ALASKA: "S. E. Alaska: near head of Chitina River," 13 Jun 1925, H. M. Laing 210 (HOLOTYPE: CAN-105373!).
- Antennaria leuchippi* Pors. Canad. Field-Naturalist 60: 85. 1947. TYPE: CANADA. YUKON: "Gravel benches, W. horse," 11 Jul 1944, Axel Porsild & R. T. Porsild s.n. (HOLOTYPE: CAN-281550!; ISOTYPE: CAN-105639!).
- Antennaria elegans* A. Pors., Canad. Field-Naturalist 64: 18. 1950. TYPE: CANADA. YUKON: "Canol Rd.: Mile 95. Upper Rose R. valley. Elev. 3600', dry gravel benches," 14 Jul 1944, A. E. Porsild & A. J. Breitung 10411 (HOLOTYPE: CAN-105446!).
- Antennaria breitungii* A. Pors., Canad. Field-Naturalist 64: 18. 1950. TYPE: CANADA. YUKON: "Whitehorse: Sandy and shaly bluffs and hillsides east of Lewes R.; Elev. 2100-2400', open sandy pine flat," 1-5 Jun 1944, A. E. Porsild & A. J. Breitung 9229 (HOLOTYPE: CAN-105588!).
- Antennaria incarnata* A. Pors., Canad. Field-Naturalist 64: 19. 1950. TYPE: CANADA. YUKON: "Canol Rd.: Mile 95. Upper Rose R. valley. Elev. 3600', turfy river terraces," 11 Jul 1944, A. E. Porsild & A. J. Breitung 10412 (HOLOTYPE: CAN-105585!).
- Antennaria leontopodioides* Cody, Canad. Field-Naturalist 70: 127. 1959. TYPE: CANADA. NORTHWEST TERRITORIES: District of Mackenzie, small clumps in very shallow soil in hollow of igneous rock, rare, Indi[?]n Lake, W. J. Cody & J. B. McCause 3473 (HOLOTYPE: DAO).

Rosette-leaves 10–20 mm long; stolons decumbent, 15–45 mm long; flowering stem 9–25 cm high; with cauline leaves, the lower 10–20 mm long; the upper 6–10 mm long; pistillate heads 4–11, involucre 4–6.5 mm high; phyllaries 3.5–5.5 mm long; florets 60–120 per head; corollas 2.5–4 mm long; pappus 3.5–5 mm long.

Representative specimens examined: CANADA. BRITISH COLUMBIA: Mt. Pope, a few mi NW of Ft. St. James, J. A. Calder et al. 13781 (DAO); Hudson Bay Mt., 9 mi W of Smithers, J. A. Calder et al. 14677 (DAO); Mt. Apex, SW of Penticton, J. A. Calder & D. B. O. Savile 11732 (DAO); NE of Lillooet along road to Bralorne Mine, J. A. Calder et al. 17653 (DAO). YUKON: Whitehorse, J. M. Gillett & D. A. Mitchell 3538 (RM-220669). U.S.A. CALIFORNIA: Nevada Co.: Donner Pass, A. A. Heller 7025 (RM-46657). COLORADO: Gunnison Co.: SE slope of Galena Mt., R. J. Bayer et al. CO-436 (RM), Cottonwood Pass, slope S of highway, CO-448 (RM), Cumberland Pass road, 2.4 mi S of Tin Cup, CO-445 (RM). Grand Co.: Berthoud Pass, R. J. Bayer et al. CO-467 (RM). MONTANA: Missoula Co.: Lolo Natl. Forest, P. F. Stickney 2251 (RM-470507). Granite Co.: near head of Carp Creek, R. J. Bayer & G. L. Stebbins M-324 (RM). Jefferson Co.: Whitehall, W. E. Booth 56902 (RM-252808). Gallatin Co.: flat between the Gallatin River and U.S. 191, about 6.5 km N of the border of Yellowstone Natl. Park, R. J. Bayer et al. MT-631 (CAN, DAO, RM). UTAH: Summit Co.: La Motte Pk., E. B. Payson & L. B. Payson 5020 (RM-115273). WYOMING: Fremont Co.: Wind River Range, trail from WY 131 along Blue Ridge, slope of Cony Mt., R. J. Bayer & D. Lebedyk WY-505 (ALTA, RM).

4. *Antennaria rosea* Greene subsp. *pulvinata* (Greene) R. Bayer, comb. nov.

*Antennaria pulvinata* Greene, Pittonia 3: 287. 1898. TYPE: CANADA. ALBERTA: "Moose Mt., Elbow River, Alta., Mountain slope, Alt. 6,200–7,000," 29 Jun 1897, *J. M. Macoun 18491* (LECTOTYPE—designated here: CAN—105666!; ISOLECTOTYPE: NDG—52503!).

*Antennaria pulvinata* subsp. *albescens* E. Nels. Proc. U.S. Natl. Mus. 23: 702. 1901. *A. albescens* (E. Nels.) Rydb. Fl. Rocky Mts. 917. 1917. TYPE: U.S.A. IDAHO: "Mt. Fops, Salmon River Mts., Texas District," 17 Aug 1893, *L. F. Henderson 3870* (HOLOTYPE: US—228762!).

*Antennaria sansonii* Greene, Ottawa Naturalist 28: 37. 1904. TYPE: CANADA. ALBERTA: "Slope of Sulphur Mt., Banff," 16 Jul 1901, *H. B. Sanson 26857* (LECTOTYPE—designated here: NDG—52559!; ISOLECTOTYPE: CAN—105644!).

*Antennaria maculata* Greene, Ottawa Naturalist 28: 39. 1904. TYPE: CANADA. BRITISH COLUMBIA: "Chilliwack Valley, between Lat. 49° and Lat. 49° 10'; and Long. 121° 25' and Long. 122°, alt. 6000 ft.," 29 Aug 1901, *J. M. Macoun 26195* (LECTOTYPE—designated here: NDG—52191!; ISOLECTOTYPE: CAN—105179!).

*Antennaria neodioica* var. *gaspensis* Fern., Ottawa Naturalist 29: 156. 1905. *A. gaspensis* (Fern.) Fern., Rhodora 35: 341. 1933. TYPE: CANADA. QUEBEC: "In dry calcareous gravel, slopes and summit of Mt. Ste. Anne, Perce." 24 Jul 1905, *C. F. Collins & M. L. Fernald 142* (HOLOTYPE: GH!).

*Antennaria isolepis* Greene, Ottawa Naturalist 25: 41. 1911. TYPE: CANADA. NORTHWEST TERRITORIES: "Cape Eskimo, Hudson Bay, Lat. 61° 05'," 26 Aug 1910, *J. M. Macoun 79270* (LECTOTYPE—designated here: NDG—058251!; ISOLECTOTYPE: CAN!).

*Antennaria manicouagana* Landry, Naturalist Canad. 89: 284. 1962. TYPE: CANADA. QUEBEC: "Mont Reed, Compté de Saguenay: Lat. 52° 1' N, Long. 68° 05' W," 20 Jul 1961, *Landry 768* (HOLOTYPE: MT; ISOTYPES: CAN—273472!, GH!).

Rosette-leaves 8–18 mm long; stolons decumbent, 10–60 mm long; flowering stem 4–17 cm high; with cauline leaves, the lower 9–19 mm long; the upper 6–11 mm long; pistillate heads 3–5, involucre 6.5–10 mm high; phyllaries 5–7 mm long; florets 40–90 per head; corollas 3.5–5 mm long; pappus 5–6.5 mm long.

Representative specimens examined: CANADA. ALBERTA: Waterton Lakes Natl. Park, S slope of Mt. Carthew, *A. J. Breitung 13380* (ALTA—16578), Waterton Lakes Natl. Park, rock slide on Mt. Richards, *17460* (ALTA—16582), Waterton Lakes Natl. Park, rock slide in cirque of Mt. Rowe, *17518* (ALTA—16584); 10 mi SW of Cadomin, top of the divide, *M. G. Dumais & K. Anderson 4249* (ALTA—28407); Cheviot Mt., 5 mi in along Prospect Creek from Grave Flat road, S of Cadomin, *M. G. Dumais 5594* (ALTA—38713). BRITISH COLUMBIA: Mt. NE of Pollock, *R. L. Taylor & J. M. Ferguson 2973* (DAO); Akamina Ridge, adj. to Waterton Lakes Natl. Park, *R. L. Taylor et al. 3564* (DAO); MacDonald Creek at mi 397, Alaska highway, *J. A. Calder & I. Kukkonen 27360* (DAO). NEWFOUNDLAND: Humber district, Goose Arm Run, E of Penguin Head, limestone talus, *E. Rouleau 2968* (MT), St. Georges, Port au Port district, Port au Port peninsula, lower cove, *3695* (MT), Humber district, limestone quarry, *331* (MT), Middle arm, Penguin Head, Humber district, *1694* (MT). QUEBEC: Korok River, NE Ungava, *J. Rousseau 523* (MT). SASKATCHEWAN: Cypress Hills Park, *A. J. Breitung 4414* (RM—214016). U.S.A. COLORADO: Gunnison Co.: alpine peaks and slopes just S of Cottonwood Pass, *R. J. Bayer & D. Lebedyk CO-519* (ALTA); SW summit of Galena Peak, open fell field, *R. J. Bayer et al. CO-435* (RM). WYOMING: Park Co.: ridge NE of Windy Mt., limestone outcrops and adj. slopes, *R. L. Hartman 21887* (RM); Guitar Lake drainage, about 3 air mi S of Silver Gate, Montana, *R. L. Hartman & B. E. Nelson 21468* (RM).

## Excluded Taxa

*Antennaria chilensis* Remy in Gay, Hist. Chile Bot. 4: 235. 1849. TYPE: CHILE: Tierra del Fuego (TYPE: P).

*Antennaria magellanica* Schultz-Bip., Flora 38: 117. 1855. *A. chilensis* var. *magellanica* (Schultz-Bip.) Reiche, Anal. Univ. Chile 112: 97. 1903. TYPE: CHILE: "Punta Arenas," *W. Lechler 1049a* (TYPES: P, SGO, US—1706286!).

*Antennaria chilensis* and *A. magellanica* both occur in the southern tip of South America, principally Tierra del Fuego of Argentina and Chile, north to about 45°S lat. (Moore, 1983). They resemble segregates of the *A. rosea* complex, but additional study will be needed before the taxonomic position of these amphitropic disjuncts can be fully evaluated.

*Antennaria macounii* Greene, Pittonia 3: 276. 1898. TYPE: CANADA. BRITISH COLUMBIA: Revelstoke, hillsides, May 1890, *J. M. Macoun 11241* (HOLOTYPE: CAN—105650!).

This specimen probably represents a hybrid between *A. media* and *A. umbri-nella*.

*Antennaria acuta* Rydb., Bull. Torrey Bot. Club 37: 323. 1910. TYPE: CANADA. ALBERTA: "In a marsh near Lake O'Hara," 8 Aug 1904, *J. M. Macoun 65423* (HOLOTYPE: NY!; ISOTYPE: CAN).

This taxon may represent a black-phyllaried intraspecific variant of *A. corymbosa*. It is known from additional sites in Wyoming and Utah. (See *Bayer & Lebedyk WY-504* and *Bayer et al. UT-620* at ALTA and RM.)

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