

SEPARATION OF *NEJA* (ASTERACEAE: ASTEREEAE) FROM
HYSTERIONICA

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ABSTRACT

The six species of *Neja* D. Don are segregated from *Hysterionica* Willd. as a distinct genus, with the hypothesis that they are as close or more closely related to *Leptostelma* and *Apopyros* than to *Hysterionica*. *Neja* is distinct from *Hysterionica* in its branching, lignescent caudices, filiform, basally disposed leaves, solitary heads on nearly scapose stems, and fusiform-cylindric achenes with 7-10 raised, longitudinal, orange-resinous nerves. All four of these genera occur primarily in southeastern Brazil and adjacent Uruguay, Paraguay, and Argentina, although one of the *Neja* species is endemic to western Cuba. Four new combinations are required in *Neja*: *N. dianthifolia*, *N. marginata*, *N. pinifolia*, and *N. pulvinata*. The taxonomy of *Hysterionica* sensu stricto, which comprises seven species, is also summarized.

KEY WORDS: *Neja*, *Hysterionica*, Astereae, Asteraceae

In an earlier paper (Nesom 1993), I noted that the genus *Hysterionica* Willd. comprises two groups of species, the "jasionoides group" (the typical element) and the "pinifolia group." With a clearer understanding of the limits and variability of genera closely related to *Hysterionica*, it now appears that the distinction between these two infrageneric groups is more significant than previously supposed, and the "pinifolia group" is segregated (or re-segregated) as the genus *Neja* D. Don. The following contrasts separate *Neja* from *Hysterionica*:

1. Plants perennial, with branching caudices; leaves filiform to linear-oblongate, primarily basally disposed; heads solitary on long scapes or merely bracteate stems; achenes fusiform-cylindric with 7-10 prominently raised, orange-resinous nerves. *Neja*

1. Plants annual or perennial, taprooted with a simple caudex, the stems sometimes branched at the very base; leaves obovate, the basal sometimes persistent but the cauline also prominent and little reduced upwards; heads solitary or in loose clusters on leafy stems with long to relatively short peduncles; achenes flattened with 2 lateral nerves.
 *Hysterionica*

The difference in habit and leaf morphology between the two genera is immediately distinctive, and there is no species that might be interpreted as intermediate. It also is remarkable that the terete, multinerved achenes of *Neja* apparently have not been described or emphasized in earlier literature, but this morphology is clearly observed from mounted achenes (on slides) with the embryo removed as well as from mature achenes without any preparation. The numerous, raised, orange-resinous nerves are easily observed because the strigose vestiture is primarily restricted to the areas between the nerves, giving the achenes a longitudinally striped appearance, the orange nerves alternating with strigose lines. Achenes of *Hysterionica sensu stricto* are consistently flat and only 2-nerved; achenes of *H. montevidensis* Baker rarely may produce an extra nerve on each of the faces (e.g., Krapovickas 14949-TEX).

Neja has been united with *Hysterionica* because of an overall resemblance reflective of a close degree of relationship (see characteristics and comments below), especially their tendency to produce yellow rays, and their production of an outer pappus series that tends to be prominently scaly. In *Neja*, however, the outer pappus varies from short seta-like bristles to broad scales, or it may not be differentiated from the inner series. In *N. marginata* (Griseb.) Nesom, the pappus consists of 2-3 series of ca. 50-60 bristles of somewhat variable length, although there also may be a few long setae in the outermost series; in *N. pulvinata* (Cabrera) Nesom, the outer pappus is a series of slightly flattened bristles about 1/5 as long as the inner series; in *N. pinifolia* (Poir.) Nesom, the outer series consists of broad, lanceolate to obovate scales, with an inner series of ca. 10-15 bristles. In *Hysterionica*, the pappus is usually of bristles and scales, but in *H. aberrans* (Cabrera) Cabrera, the pappus consists of only a corona of connate scales, the inner series apparently completely absent.

Rays are yellow in the two most commonly collected species of *Neja*, *N. filiformis* (Spreng.) Nees and *N. pinifolia*, as well as *N. nidorelloides* DC.; the other four species have white rays. Rays within *Hysterionica* are predominately yellow, but *H. montevidensis* has white rays (and probably also *H. glaucifolia* [O. Kuntze] Solbrig). *Neja* and *Hysterionica* have been associated with *Chrysopsis* (Nutt.) Ell. because of their tendency to produce yellow rays (e.g., DeCandolle 1836; Bentham 1873), but the similarity is convergent (Nesom 1991).

Hysterionica is among the closest relatives of *Neja*, but other genera equally close are *Leptostelma* D. Don (Nesom in press) and *Apopyros* Nesom (Nesom

1994a). *Erigeron* L. and *Conyza* L. are also closely associated with this group. Comments on other aspects of the interrelationships of these genera are given in the related papers (especially see Nesom in press). The plants of these genera are characterized by the following features: leaves often thick or rigid; phyllaries flat, more or less evenly herbaceous, and commonly 3-nerved, the nerves usually conspicuously orange-resinous; rays 1-3-(or more) seriate, the ligules variably (between species) yellow or white, but tending to dry yellowish even if white when fresh; disc corollas with a short tube; disc style branches short, with deltate collecting appendages; achenes eglandular, erostrate, flat and 2-nerved (terete and multinerved in *Apopyros* and *Neja*); and pappus 1-3-seriate, the outer series of bristles similar to the inner or variably usually reduced and modified. All have an "austro-brasilien" geographic distribution, occurring primarily in southeastern Brazil and adjacent Argentina, Uruguay, Paraguay, and the southeastern tip of Bolivia, although one of the *Neja* species (*N. marginata*) is endemic to western Cuba (Nesom 1993).

Apart from their similarity in the tendency to produce a prominently scaly outer pappus, there is no reason that *Neja* and *Hysterionica* should be considered as most closely related to each other. Within this group of austro-brasilien genera, *Apopyros* is the only other genus besides *Neja* with subterete, multi-nerved achenes, and *Leptostelma* and *Erigeron* tend to produce a distinctly multiseriate pappus. *Neja* is considered here to occupy a phyletic position coordinate with the other genera of the *Leptostelma* group and is provided with the according taxonomy. Plants with linear leaves and a habit more or less similar to that of *Neja* occur in the austro-brasilien *Inulopsis* O. Hoffm., but the latter apparently is more closely related to *Podocoma* Cass. and its relatives (Nesom 1994b).

In the following taxonomic summary of *Neja*, accepted taxa and synonyms are applied to what appear to be the major "nodes" of variation, with reliance in large part on the interpretations by Cabrera (1946). *Neja*, however, as well as *Hysterionica* sensu stricto, is in need of detailed revisionary study, especially since the studies by Cabrera and Espinar have both expressly avoided dealing with Brazilian taxa and names.

Neja D. Don in Sweet, *Hort. Brit.* (ed. 2) 299. 1830 [et Brit. Flow. Gard., ser. 2(1):78. 1831]. Type species: *Neja gracilis* D. Don. (= *Neja filiformis* [Spreng.] Nees).

Neja sect. *Podoneja* DC., *Prodr.* 5:325. 1836. Type species: *Neja gracilis* D. Don (= *Neja filiformis* [Spreng.] Nees).

Neja sect. *Monogyria* DC., *Prodr.* 5:325. 1836. Lectotype species (designated here): *Neja linearifolia* DC. (= *Neja pinifolia* [Poir.] Nesom).

1. *Neja dianthifolia* (Griseb.) Nesom, *comb. nov.* BASIONYM: *Erigeron dianthifolius* Griseb., *Symb. Fl. Argent.* 174. 1879. *Hysterionica dianthifolia* (Griseb.) Cabrera, *Notas Mus. La Plata* 11 (Bot. 53):352. 1946.
2. *Neja filiformis* (Spreng.) Nees, *Del. Sem. Hort. Vratisl.* 1839 (*et Linnaea* 14 [Litt.-Ber.]:168. 1840.). BASIONYM: *Erigeron filiformis* Spreng., *Syst. Veget.* (ed. 16) 3:520. 1826. *Polyactidium sprengelii* DC. [*nom. nov. illeg.*], *Prodr.* 7:274. 1838. *Hysterionica filiformis* (Spreng.) Cabrera, *Notas Mus. La Plata* 11 (Bot. 53):355. 1946.

Neja gracilis D. Don in Sweet, *Hort. Brit.* (ed. 2) 299. 1830 [*et Brit. Flow. Gard.*, ser. 2(1):78. 1831.].

A combination in *Hysterionica* for this species, and for *Neja pinifolia* (below), has been attributed to Bentham (*in Benth. & Hook., Gen. Pl.* 2:253. 1873.), but in the interpretation here, the formal combination was not made by Bentham.

Diplopappus graminifolius Less., *Syn. Gen. Comp.* 165. 1832.

Diplopappus stenophyllus Hook. & Arn., *Comp. Bot. Mag.* 2:48. 1836.

Neja tenuifolia DC., *Prodr.* 5:326. 1836.

Neja ciliaris DC., *Prodr.* 5:326. 1836.

Hysterionica setuligera Gandoger, *Bull. Soc. Bot. France* 60:23. 1873.

3. *Neja marginata* (Griseb.) Nesom, *comb. nov.* BASIONYM: *Haplopappus marginatus* Griseb., *Catalog. Pl. Cubens.* 149. 1866. *Hysterionica marginata* (Griseb.) Gomez Maza, *Anal. Soc. Española Hist. Nat. Madrid* 19:272. 1890.
4. *Neja nidorelloides* DC., *Prodr.* 5:325. 1836.
5. *Neja pinifolia* (Poir.) Nesom, *comb. nov.* BASIONYM: *Erigeron pinifolius* Poir. in Lam., *Encycl. Method.* 8:40. 1808. *Hysterionica pinifolia* (Poir.) Baker in Mart., *Fl. Brasil.* 6(3):12. 1882.

Erigeron montevidensis Spreng., *Syst. Veget.* (ed. 16) 3:519. 1826.
Neja montevidensis (Spreng.) Sch.-Bip. in Seem., *Bot. Voy. Herald* [8]:302. 1856.

The combination by Schultz-Bipontinus was invalid, as he noted that the species should be regarded as a synonym of *Neja gracilis* DC. (= *N. filiformis* [Spreng.] Nees).

Erigeron resinosus Spreng., *Syst. Veget.* (ed. 16) 3:520. 1826. *Polyactidium sprengelii* Schlecht. [*nom. nov. illeg.*], *Linnaea* 10:475. 1835. *Neja sprengelii* (Schlecht.) Sch.-Bip. in Seem., *Bot. Voy. Herald* 8:302. 1856.

Erigeron dubius Spreng., *Syst. Veget.* (ed. 16) 3:520. 1826.

Considered by Schlechtendahl (*Linnaea* 10:475. 1835.) and Baker (in Martius, *Fl. Brasil.* 6(3):13. 1882.) to be conspecific with *Erigeron resinosus* Spreng.

Neja linearifolia DC., *Prodr.* 5:325. 1836. *Hysterionica linearifolia* (DC.) Baker in Mart., *Fl. Brasil.* 6(3):13. 1882.

Neja subvillosa DC., *Prodr.* 5:325. 1836. Not *Hysterionica subvillosa* Griseb. 1874 (= *Hysterionica bakeri* Hicken, see Cabrera 1946).

Diplopappus pinifolius Hook. & Arn., *Comp. Bot. Mag.* 2:48. 1836; not Less. *ex* Nees [*in syn.*], *Linnaea* 14 (Litt.-Ber.):169. 1840.

Neja falcata Nees, *Del. Sem. Hort. Vratisl.* 1839 (et *Linnaea* 14 [Litt.-Ber.):168. 1840.).

6. *Neja pulvinata* (Cabrera) Nesom, *comb. nov.* BASIONYM: *Hysterionica pulvinata* Cabrera, *Notas Mus. La Plata* 11 (Bot. 53):353. 1946. *Hysterionica dianthifolia* (Griseb.) Cabrera var. *pulvinata* (Cabrera) Espinar, *Darwiniana* 22:540. 1980.

Hysterionica pulvinata was noted by Cabrera in its original description as differing from *H. dianthifolia* in its smaller leaves but Espinar added observations of differences in vestiture, these nearly analogous to the differences that separate *Neja filiformis* and *N. pinifolia*. Apparently in view of the otherwise close resemblance of *N. dianthifolia* and *N. pulvinata*, however, he preferred to recognize them as varieties within a single species. The only possible intermediate that he noted was a plant referred to *H. dianthifolia* but of a smaller stature more typical of *H. pulvinata*. Few specimens of these taxa have yet been critically examined by anyone, and Cabrera's original estimation of their status is accepted here until their taxonomy can be re-evaluated in more detail.

Species excluded from *Neja*:

Neja macrocephala DC., *Prodr.* 5:325. 1836. = *Neja* sect. *Phylloneja* DC., *Prodr.* 5:325. 1836. (Monotypic, *Neja macrocephala* DC. the type) = *Asteropsis macrocephala* Less. (see Nesom 1994c).

Hysterionica Willd., Ges. Naturfr. Freunde Berlin Mag. 1:140. 1807. Type species: *Hysterionica jasionoides* Willd.

For other synonyms within *Hysterionica* sensu stricto, see Baker (1882), Cabrera (1946), and Espinar (1980).

1. *Hysterionica aberrans* (Cabrera) Cabrera, Notas Mus. La Plata, Bot. 11:357. 1946. BASIONYM: *Hysterionica bakeri* Hicken var. *aberrans* Cabrera, Notas Prelim. Mus. La Plata 1:325, fig. 2. 1931.
 - a. *Hysterionica aberrans* (Cabrera) Cabrera var. *aberrans*.
 - b. *Hysterionica aberrans* (Cabrera) Cabrera var. *hunzikeri* Espinar, Darwiniana 22:543. 1980.
2. *Hysterionica bakeri* Hicken, Darwiniana 1:149. 1924.
3. *Hysterionica cabreræ* Espinar, Darwiniana 22:545. 1980.
4. *Hysterionica glaucifolia* (O. Kuntze) Solbrig, Bol. Soc. Arg. Bot. 6(1):29. 1955. BASIONYM: *Erigeron glaucifolius* O. Kuntze, Rev. Gen. Pl. 3(2):145. 1898.
5. *Hysterionica jasionoides* Willd., Ges. Naturfr. Freunde Berlin Mag. 1:140. 1807.
6. *Hysterionica montevidensis* Baker in Mart., Fl. Bras. 6(3):13. 1882. Not *Erigeron montevidensis* Spreng. (= *Neja pinifolia* [Poir.] Nesom, see comments by Cabrera 1946).

Hysterionica villosa (Hook. & Arn.) Cabrera [*comb. illeg.*], Notas Mus. La Plata 11 (Bot. 53):350. 1946. *Diplopappus villosus* Hook. & Arn. [*nom. illeg.*], Comp. Bot. Mag. 2:48. 1836. Not *Diplopappus villosus* Cass. 1819 (= *Aster*) or W.J. Hook. 1834 (= *Chrysopsis*).

7. *Hysterionica pulchella* Cabrera, Notas Prelim. Mus. La Plata 1:323. 1931.

The species of *Hysterionica* sensu stricto are divided into two groups. *Hysterionica montevidensis* and *H. glaucifolia* have uniseriate ray flowers with white, relative broad ligules; the other species have multiseriate ray flowers with yellow, filiform ligules.

A base chromosome number of $x=9$ has been reported for two species of *Hysterionica* (*H. jasionoides* and *H. montevidensis*, the latter as *H. villosa*; Solbrig et al. 1964; Bernadello 1986). A count of $n=18$ for *H. bakeri* was obtained by B.L. Turner (as annotated on the specimen, Sanderson 370-TEX!

from Tucumán, Argentina) but it was not published because of a possible "error in bud collection." Turner *et al.* (1979) reported counts of $n=15$ and $n=20$ for *H. jasionoides* from Argentina (vouchers TEX!), but I believe these counts of $x=5$ for *Hysterionica* are likely to have been from buds of some other genus. Hundreds of reported chromosome numbers from genera closely related to *Hysterionica*, including *Erigeron*, *Leptostelma*, and *Conyza*, are all based on $x=9$.

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