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# TRANSFER OF TWO SPECIES OF ANAPHALIS TO CHIONOLAENA

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ABSTRACT. The Mexican species *Anaphalis aecidiocephala* Grierson (= *Gnaphalium aecidiocephalum* (Grierson) Williams) and *A. concinna* (A. Gray) Grierson (= *G. concinnum* A. Gray) (Asteraceae, Gnaphalieae) are transferred to the genus *Chionolaena* DC. of the same tribe. The new combinations *Chionolaena aecidiocephala* (Grierson) Anderb. & Freire and *Chionolaena concinna* (A. Gray) Anderb. & Freire are made. An illustration and a brief discussion of the morphology of the taxa, their systematic position, and the distribution of their diagnostic characters in the Gnaphalieae in general is presented.

## INTRODUCTION

The Mexican species *Anaphalis aecidiocephala* was described by Grierson (1972), who in the same paper stated the closest relative of the new species to be *Gnaphalium concinnum* A. Gray. In consequence, Grierson transferred the latter taxon to *Anaphalis*, to have the closely related species in the same genus. Later, Williams (1973), using a broad generic concept, included *A. aecidiocephala* in *Gnaphalium* as *G. aecidiocephalum*.

In preparing a generic monograph of the Gnaphalieae, one of us (Anderberg) found *Anaphalis aecidiocephala* to be anomalous in *Anaphalis*, as well as in *Gnaphalium* s. ampl. A search for the closest relative of the two species among other genera of the Gnaphalieae was necessary. The systematic position of *A. aecidiocephala* and of *A. concinna* was reconsidered. In the following paragraphs we discuss the relation of *Gnaphalium aecidiocephalum* to other groups of the tribe.

## RELATION TO ANAPHALIS

When the morphology of *G. aecidiocephalum* (Fig. 1 A–J) was scrutinized it became obvious that it could not be reinstated in *Anaphalis*. Although provided with the same type of style branches as those found in *G. aecidiocephalum*, *Anaphalis* differs in having involucral bracts with divided stereome (Drury, 1970; Hilliard & Burtt, 1981) while *G. aecidiocephalum* has undivided stereome. The pappus bristles are free in *Anaphalis* but basally fused in a ring in *G. aecidiocephalum* (Fig. 1 G). The coloration of the corolla, which is something that seems to be surprisingly constant in different genera of the Gnaphalieae, also differs between *Anaphalis* with its yellow flowers and *G. aecidiocephalum* in which the flowers are purple tinged. *Anaphalis* has subdioecious capitula with functionally male central flowers in which the shape of the cypselas is conspicuously different depending on whether the flowers are situated in a predominantly male or female capitulum. In male capitula the cypselas of the male flowers are extremely short and reduced, while in predominantly female capitula these cypselas are as long as the fertile cypselas, although they do not

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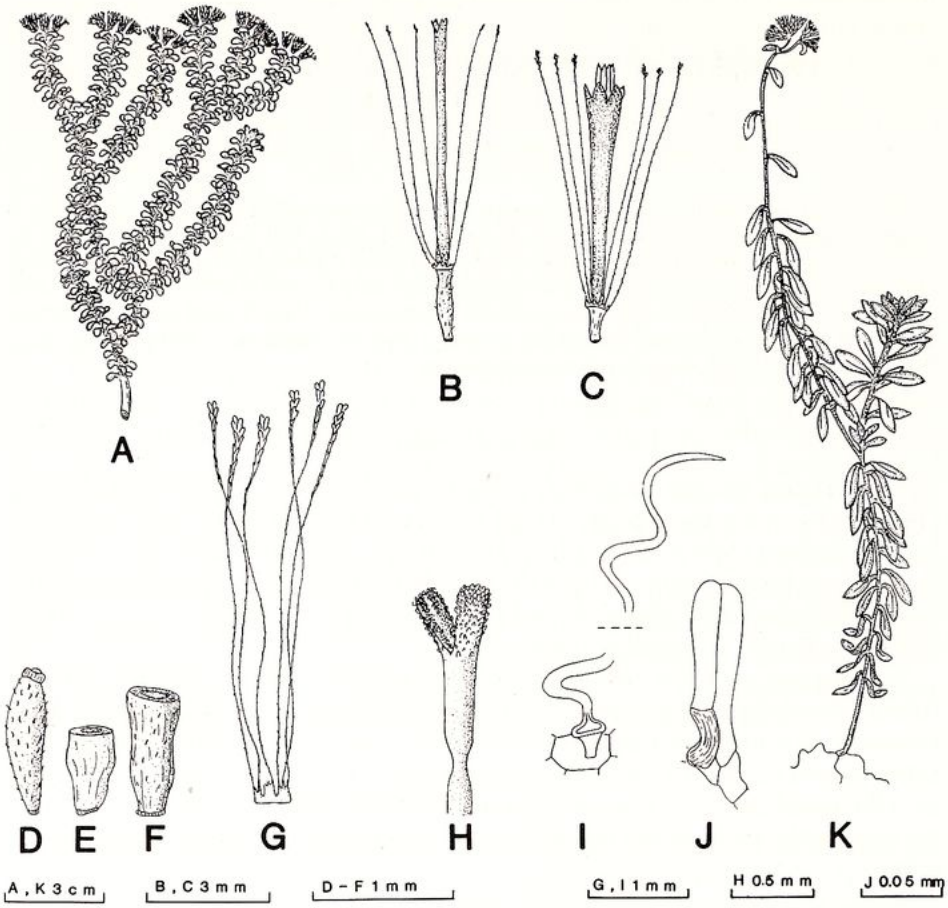


FIG. 1. *Chionolaena aecidiocephala* (A–J), *C. concinna* (K): A, Portion of plant; B, Outer female flower; C, Disc-flower; D, Cypsela of outer female flower; E, Cypsela of disc-flower from a homogamous capitulum; F, Cypsela of disc-flower from heterogamous capitulum; G, Pappus of disc-flower; H, Style-branches; I, Foliar trichome; J, Cypsela trichome; K, Portion of plant; A–J, *MacDougall* 4129 (S); K, *Parry & Palmer* 423 (E).

have an embryo (Beauverd, 1913). A pronounced cypsela dimorphism, as outlined above, is not found in *G. aecidiocephalum* which, however, also has two types of capitula, viz. homogamous capitula with all flowers functionally male as well as heterogamous capitula with pistillate, female flowers as well as male central flowers (neuter according to Grierson, 1972). The cypselas of the male flowers in the homogamous capitula are only slightly shorter than those of the central flowers of the heterogamous capitula (Fig. 1 D–F).

The other characters mentioned by Grierson as evidence for including the taxon in *Anaphalis* are found in many other genera: the dimorphic pappus is also found in e.g. *Loricaria, Antennaria*; subdioecious capitula are found in e.g. *Ewartia, Leontopodium*. The pollen morphology found by Grierson in *A. aecidiocephalum* is one which is common in all taxa of the Gnaphalieae (Stix, 1960; Besold, 1971), and its chromosome number $2n = 28$ (Grierson, 1972) is a very common karyotype in the Gnaphalieae (Anderberg unpubl.; Merxmüller et al., 1977).

## Relation to Gnaphalium

*Gnaphalium* is Linnaeus' name for many taxa of everlastings. At one time most taxa of the Gnaphalieae were included in *Gnaphalium*, and in spite of the numerous contributions towards an improvement of the taxonomy of the tribe, *Gnaphalium* is still heterogeneous.

During the preparation of a generic monograph of the tribe Gnaphalieae (sensu Bremer 1987; Anderberg, in press), Anderberg showed that the genus *Gnaphalium* sensu Merxmüller et al (1977) is an artefact, which is defined by symplesiomorphies, i.e. the use of absence of the diagnostic character or character states of other genera. *Gnaphalium* as traditionally understood is polyphyletic, an assemblage of several monophyletic groups where each one is related to different genera, respectively. The conservative use of an artefact taxon like *Gnaphalium* s. ampl., is an obstacle, rather than a propagator of scientific progress. This will be further discussed in a forthcoming paper (Anderberg, in prep.).

Even if *Gnaphalium* is considered as a genus in a traditional sense, *G. aecidiocephalum* is anomalous. The diagnostic synapomorphies of each of the monophyletic subgroups of *Gnaphalium* are lacking in this species. *G. aecidiocephalum* has style-branches with sweeping-hairs dorsally and not confined to the apex of the branches. This character is prevalent in the taxa which are the closest relatives of the Gnaphalieae, but is found only in a few genera among the apomorphic groups of the Gnaphalieae proper. Most of the taxa with this style-type belong to well-defined clades (e.g. *Loricaria, Lucilia*) from which *G. aecidiocephalum* differs considerably in lacking their respective diagnostic properties.

In fact, the only taxa furnished with the same type of styles which also share a number of derived characters with *G. aecidiocephalum*, are *Gnaphaliothamnus* and *Chionolaena*.

## Relation to Gnaphaliothamnus and Chionolaena

The monotypic genus *Gnaphaliothamnus* was described by Kirpichnikov & Kuprijanova (1950) for a frutescent species of *Gnaphalium* from central America. The elevation of this taxon to generic rank has received little support, and in modern floras it is often found under the name *Gnaphalium salicifolium* (McVaugh, 1984). Similarly the species of *Chionolaena* are sometimes included in *Gnaphalium* (e.g. Blake, 1926). However, both *Chionolaena* and *Gnaphaliothamnus* belong to a different clade of the Gnaphalieae from *Gnaphalium* itself and its segregates (Anderberg, unpubl.). Together, however, they form a monophyletic group and we consider the monotypic genus *Gnaphaliothamnus* to be the sister group of *Chionolaena*, differing mainly in its branching, and by having basally free instead of fused pappus bristles, lacking clavate apical pappus cells. Recent studies indicate that if *Chionolaena* and *Gnaphaliothamnus* are to be included in *Gnaphalium*, almost every other genus of the tribe must also be included in *Gnaphalium* in order to make it monophyletic (Anderberg, unpubl.).

The woody stems without fibers in the phloem, the involucral bracts with undivided stereome, the subdioecious capitula, the purple flowers, and the xeromorphic, deflexed leaves with revolute margins are all characters that *Gnaphalium aecidiocephalum* has in common with both *Gnaphaliothamnus* and

*Chionolaena*. Considering that *Chionolaena* has the same dichotomous branching, deflexed leaves, clavate apical pappus cells etc., *Gnaphalium aecidiocephalum* is better treated as a species of *Chionolaena*. The chromosome number of *G. aecidiocephalum*, 2n = 28 (Grierson, 1972), is the same that has been found in *Chionolaena* (DeJong & Longpre, 1963).

*Gnaphalium concinnum* A. Gray (Fig. 1 K), which was transferred to *Anaphalis* by Grierson (1972) as the closest relative of *G. aecidiocephalum*, has the same kind of deflexed leaves with slightly revolute margin, but differs in being more herbaceous, having a subdichotomously branched stem, larger, obovate leaves, and only heterogamous capitula arranged in corymbs. From the material we have seen of this taxon there is no reason to doubt Grierson's notion about a close relationship with *A. aecidiocephala*. We consider this species also to be a member of *Chionolaena*.

At present, *Chionolaena* is a genus comprising 15 species of shrubs, nine occurring in the mountains of southeastern Brazil, two in the Andean region of Colombia, and four in the mountains of Mexico. Baker (1882) placed the species of *Chionolaena* in two groups: sect. *Leucopholis* characterized by capitula with 8–10 flowers, and sect. *Euchionolaena* with many-flowered capitula. The circumscription of Baker's sections will be tested when the interrelationships of the species of this genus in relation to the sister group *Gnaphaliothamnus* are elucidated in a forthcoming revision and cladistic analysis of *Chionolaena* (Freire, in prep.).

## Conclusion

Neither *Gnaphalium aecidiocephalum* nor *G. concinnum* are congeneric with the type of *Gnaphalium* (i.e. *G. uliginosum* L.). The morphological characters and the chromosome number of *G. aecidiocephalum* and *G. concinnum* corroborate our hypothesis that they belong to the genus *Chionolaena*. Therefore, the following two new combinations are made:

**Chionolaena aecidiocephala** (Grierson) Anderb. & Freire, **comb. nov.** Fig. 1 A–J.
Basionym: *Anaphalis aecidiocephala* Grierson in Notes RBG Edinb. 31: 389 (1972).
Syn.: *Gnaphalium aecidiocephalum* (Grierson) L. Williams in Phytologia 25: 459 (1973).
Type: Mexico, Oaxaca, Ixtlan, Comaltepec, Cerro de Humo Chico, 2 iii 1968, *MacDougall* 412S (holo. E, iso. S).
*Note*: The label of the isotype at the Swedish Museum of Natural History reads MacDougall 4129 instead of MacDougall 412S as in the protologue. This is likely to be a transcription error. All the other information on the labels is identical.

**Chionolaena concinna** (A. Gray) Anderb. & Freire, **comb. nov.** Fig. 1 K.
Basionym: *Gnaphalium concinnum* A. Gray in Proc. Amer. Acad. 15: 34 (1879).
Syn.: *Anaphalis concinnum* (A. Gray) Grierson in Notes RBG Edinb. 31: 392 (1972).
Type: Mexico, San Luis Potosi, *Parry & Palmer* 423 (BM,E).
Other material examined: San Luis Potosi, ix 1879, leg. *Schaffner* 222 (BM).

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