

Revision of *Doniophyton* (*Compositae*, *Barnadesioideae*)*

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Abstract: This revision describes, illustrates and documents morphological variation in *Doniophyton* (*Compositae*, *Barnadesioideae*), restricted to Argentina and Chile. Two species are recognized, *D. anomalum* and *D. weddellii* (sp. nova), possessing distinct morphological and chromosomal features, elevational tolerances, and nearly allopatric distributions. *Doniophyton weddellii* occurs primarily in central to northern Andean Chile and Argentina from 1900–4000 m a. s. l.; *D. anomalum* is found principally in central-western Argentina and south into Patagonia at 0–1800 m a. s. l. Close relationship exists with *Chuquiraga* of subfam. *Barnadesioideae*. It is hypothesized that *Doniophyton* evolved out of *Chuquiraga* in the high central Andes between Chile and Argentina. It is suggested that *D. weddellii* differentiated first, correlating with an aneuploid chromosomal decrease from $n = 27$ (in *Chuquiraga*) to $n = 25$. Further evolution and chromosomal decrease to $n = 24$ resulted in *D. anomalum*, with accompanying migration into southern Andes and Patagonia. Nomenclatural changes result from examination of protologues and type specimens: *Doniophyton anomalum* replaces the commonly used name *D. patagonicum*, and a new species, *D. weddellii*, is described for the taxon masquerading under the routinely used superfluous name *D. andicola*.

Interest in subfam. *Barnadesioideae* of *Compositae* has increased in recent years, due to the discovery that these genera lack a 22 kb inversion in the chloroplast genome that occurs in all other members of the family (JANSEN & PALMER 1987). Hence, these data suggest that *Barnadesioideae* are evolutionarily basal. Primarily due to macromolecular data, BREMER & JANSEN (1992) recently recommended elevation of the group from a traditional subtribal placement within *Mutisieae* (as *Barnadesiinae*) to subfamilial status.

* This paper is dedicated with admiration and respect to emer. Univ.-Prof. Dr FRIEDRICH EHRENDORFER, one of the world's outstanding plant systematists, and a leading scientist and administrator of the Institute of Botany of the University of Vienna

Because of the obvious evolutionary importance of *Barnadesioideae* for understanding the origin and early evolution of *Compositae*, recent investigations in the laboratory of the junior author have focused on reconstructing phylogeny and interpreting biogeography of the subfamily. To date work has focused on time and place of origin of the group with reference to *Goodeniaceae* and *Calyceraceae* (DEVORE & STUESSY 1995), phylogeny and biogeography among the genera (STUESSY & al. 1996), flavonoid evolution within the group (BOHM & STUESSY 1995) and within *Calyceraceae* (BOHM & al. 1995), and autofluorescence of connective bases of anthers and systematic implications (PESACRETA & STUESSY 1996).

In the course of these evolutionary studies, it has also been judged helpful to revise certain taxa of *Barnadesioideae* in need of taxonomic attention. Such was the case with *Arnaldoa*, a genus endemic to northern Peru (STUESSY & SAGÁSTEGUI 1993). *Barnadesia* is also under investigation currently by E. URTUBEY of the Museo de La Plata, although an older revision exists (CHUNG 1965). In addition to these recent studies, satisfactory revisions have been completed for *Chuquiraga* (EZCURRA 1985) and *Dasyphyllum* (CABRERA 1959).

During field work in Argentina and Chile, we observed variation in natural populations of *Doniophyton* WEDD. that suggested that a comprehensive revision would be useful. Two species had been recognized by CABRERA (1977), but plants of apparently intermediate morphology were seen in Mendoza Province, Argentina, indicating possible hybridization or perhaps suggesting varietal status for the two taxa. The habit of *Doniophyton* heightens evolutionary interest in the group because it is an herbaceous member of the predominantly woody *Barnadesioideae* which include trees to 30 m (e.g., *Dasyphyllum excelsum* at Cerro Campana, Chile).

The present revision summarizes taxonomic history, generic relationships, and morphological and chromosomal variation within the genus, and presents evidence for treating two distinct species with nearly allopatric distributions. Nomenclature is adjusted to conform to typification, resulting in name changes for both species.

Taxonomic history

The scientific christening of *Doniophyton* went almost unnoticed, first appearing as a new species of *Chuquiraga* (*C. anomala*) described by DON (1832) from material collected by GILLIES in Chile in 1825. CANDOLLE (1838) gave a distinct context to this species by placing it alone in his unranked unit “anomales” within *Chuquiraga*. This was followed by REMY (1848), who placed the species in its own section, *Gymnophoranta*, within the same genus, but added (REMY 1848: 277) that it “...podría formar un género propio...” This distinction was further stressed by WEDDELL (1855) who segregated *C. anomala* into its own genus, *Doniophyton*. But instead of using DON'S epithet, which was cited in the protologue by WEDDELL, he baptized the only species of his new genus with the superfluous name *D. [“andicolum”] andicola*.

PHILIPPI (1863) added another name to the genus, but once again as a new species of *Chuquiraga* (*C. patagonica*). However, PHILIPPI had doubts about this new taxon, both by his indication “nueva especie?” (p. 455) and his comments that “Talvez [sic] solo una variedad de la *Ch. anomala* DON” (PHILIPPI 1863: 455) and

“Sumamente parecida a la *Ch. anomala* de DON” (PHILIPPI 1863: 466). He emphasized the presence of female florets in the outside of the head and a difference in pubescence as discriminating characters (the former not now viewed as a differentium, but the latter still holds true). This was, in fact, a synonym of *C. anomala*, the latter of which was subsequently moved into *Doniophyton* by KURTZ (1893).

Chuquiraga patagonica was transferred into *Doniophyton* by HIERONYMUS (1885) and later independently by CABRERA (1939). The latter continued the theme of closeness of the two taxa with the comment (CABRERA 1939: 320) “Es muy próxima a *D. anomalum* (DON) KURTZ, de la que tal vez sea solamente una forma menos pubescente y con involucro y espinas mas desarrollados.” This position was echoed by SCHWABE (1950) based on similarity of leaf anatomical features. CABRERA (1962), however, maintained the two as distinct species in his treatment of *Compositae* for the Flora Patagónica.

The present study affirms the close relationship of two taxa within *Doniophyton* and recognizes them at the specific level based on consistent morphological, cytological, elevational, and phenological differences plus having nearly allopatric distributions. Nomenclatural difficulties have arisen in part because of early collections from in and around Mendoza, where both taxa occur. Resolving problems of typification and nomenclature results in: application of the name *D. anomalum* for what used to be called *D. patagonicum*; and description of a new species, *D. weddellii*, for the taxon routinely labelled with the superfluous name *D. andicola*.

Generic relationships

Doniophyton has always been regarded as closely related to *Chuquiraga* (e.g., HIERONYMUS 1886), in which two species of *Doniophyton* were originally described and from which both were eventually segregated. Obvious shared features include yellow florets, long-caudate bases of anthers, and smooth pollen grains. The only view to the contrary has been provided recently by BREMER (1994). In a morphological cladistic analysis of *Barnadesioideae*, he placed *Doniophyton* as sister group to *Duseniella* K. SCHUM., both of which then joined with *Schlechtendalia* LESS. in a line independent from the rest of the genera that began with basal *Chuquiraga* and led step-wise to *Barnadesia* MUTIS in L. f. and *Huarpea* CABRERA. A reevaluation of morphological relationships in the subfamily based on cladistic analyses (STUESSY & al. 1996), however, places *Doniophyton* and *Chuquiraga* as extremely close relatives, and suggests possible origin of the former from out of the latter. More recently K. BREMER (pers. comm., Kew *Compositae* Conference, 1994) concurs that *Doniophyton* is a close relative of *Chuquiraga*.

Other data also suggest that *Doniophyton* is closely related to *Chuquiraga*. PARRA & MARTICORENA (1972) investigated the pollen morphology of *Doniophyton weddellii* (as *D. anomalum*), and they found it similar to several species of *Chuquiraga* (“*Chuquiraga* group”). Chromosomally, among genera of *Barnadesioideae*, *Chuquiraga* is known to have $n = 27$ or 54 (see STUESSY & al. 1996, for summary) and *Doniophyton* $n = 24$ and 25 (*D. anomalum* the former and *D. weddellii* the latter; reported by WULFF 1990 as *D. patagonicum* and *D. anomalum*,

respectively). Among genera of the subfamily, these numbers are found only in *Barnadesia* ($n = 25, 50$; STUESSY & al. 1996), a genus believed to be in an $x = 12$ line and considerably divergent from *Chuquiraga* and *Doniophyton* (STUESSY & al. 1996; see also CABRERA 1977). Even though the $n = 24, 25$ counts in *Doniophyton* are not the same as the $n = 27$ counts of *Chuquiraga*, phyletic evidence suggests a tie through descending aneuploidy in the origin of the former genus from the latter (WULFF 1990).

Within this context, one can hypothesize further that *D. weddellii* ($n = 25$) should be more primitive than *D. anomalum* ($n = 24$) forming a cytological transition. This further suggests that the genus may have originated in the higher elevations of the south-central Andes followed by speciation into lower elevations as *D. anomalum* migrated south into Patagonia with a corresponding aneuploid chromosomal loss. It is noteworthy that the index of karyological asymmetry is higher in *D. anomalum* than in *D. weddellii* (WULFF 1990), which correlates with the concept that more derived taxa within a group are often karyologically more asymmetrical (specialized) than their progenitors (STEBBINS 1971).

Taxonomy

Doniophyton WEDD.

Doniophyton WEDD., *Chloris Andina* 1: 7, 8. 1855. Type species: *Chuquiraga anomala* D. DON [= *Doniophyton anomalum* (D. DON) KURTZ].

Chuquiraga JUSS. sect. *Gymnophoranta* REMY, in GAY, *Hist. Chile Bot.* [Flora Chilena] 3: 276. 1848. Although REMY did not indicate the rank of this infrageneric unit in the protologue, he used the same sign (§) and format for units in *Chaetanthera* RUIZ & PAVÓN (p. 301) that were specifically so designated as sections in the text.

Chuquiraga JUSS. “*anomalae*” [unranked unit below genus] DC., *Prodr.* 7: 10. 1838.

Herbs, but with secondary growth (see discussion). Stems ascendent or decumbent, pubescent with fascicled nodal spines. Leaves alternate, linear to linear-lanceolate, sessile; lamina entire, mucronate-spiny at apex, with midrib pubescent; margins entire, involute or plicate. Heads terminal, solitary, sessile or shortly pedunculate. Involucre hemispherical or campanulate; phyllaries 4-5-seriate, imbricate, lanceolate to linear, long-attenuate, spiny at apex; outer bracts leafy, erect, pubescent; inner bracts scarious, yellow or yellow and purple, erect, subglabrous. Receptacle naked, flat or convex, alveolate or tuberculate, pubescent. Florets numerous, yellow, actinomorphic, 5-merous, narrowly cylindrical, pubescent to villous; ray-florets carpellate, few, with corollas 5-toothed and pubescent; style cylindrical, purple, papillose, at apex rounded and shortly bifid; disc-florets hermaphroditic, numerous, corollas 5-lobed and villous; stamens 5, with filaments inserted at base of corolla tube; anthers connate, at base long-caudate, with apical appendage entire, lanceolate to oblong, acute, apiculate or caudate; style as in ray florets. Cypselas turbinate, densely villous. Pappus bristles 15–20, uniseriate, plumose, persistent, brownish.

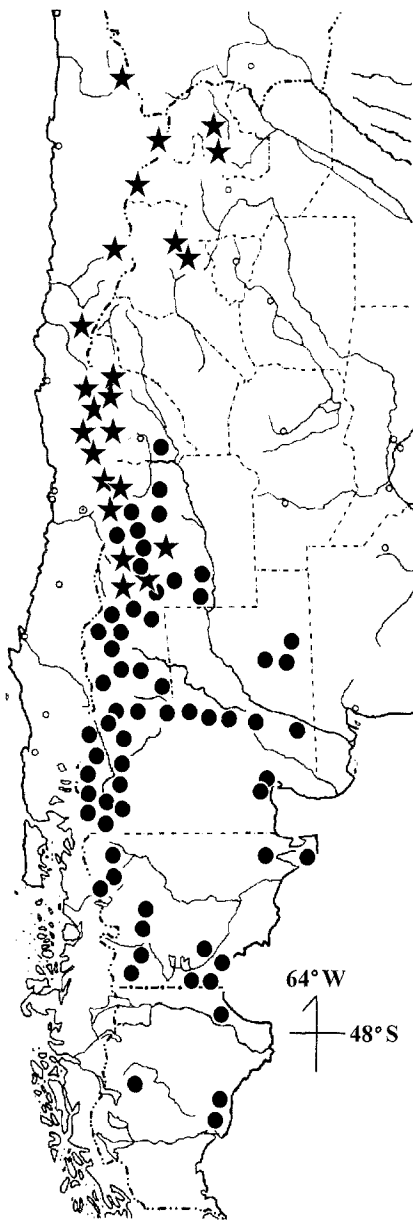


Fig. 1. Distribution of *Doniophyton weddellii* (stars) and *D. anomalum* (dots) in Argentina and Chile

A genus of two species distributed from northern Chile and Argentina to Patagonian Argentina (Fig. 1).

Although both species of *Doniophyton* are herbaceous in appearance, examination of anatomy in stems of cross-sections of *D. anomalum* clearly reveals secondary xylem. Strictly speaking, therefore, these species might be considered shrubs; we prefer to treat them as herbs with secondary xylem reflecting origin from truly shrubby *Chuquiraga* ancestors.

The vestiture in *Doniophyton* consists of three types of hairs that deserve comment. The first are the "barnadesioid" hairs (BREMER & JANSEN 1992), typical for the subfamily (e.g., *Dasyphyllum*, CABRERA 1959; *Chuquiraga*, EZCURRA 1985)

and found on phyllaries, florets and cypselas. The apical cell is very long, tapering above, with thick walls. The basal cell is broader than long, also with thickened walls; it articulates to a normal adjacent epidermal cell. The second type of trichome in *Doniophyton* are "malpighian hairs" (= "two-armed," RAMAYYA 1962), which are T-shaped, with one arm shorter than the other, and supported by a unicellular, thick-walled cylindrical stipe. The third type are glandular trichomes ("biseriate capitate glandular hairs"; RAMAYYA 1962) occurring on the inner phyllaries, consisting of a unicellular basal foot cell, a multicellular biseriate stalk, and a 2–7-celled head.

Key to *Doniophyton* species

- A. Plants 2.5–8 cm tall; capitula with outer phyllaries erect, hirsute; inner phyllaries often purple toward apex; stamens with apical appendage acute (rarely apiculate) 1. *D. weddellii*
 A. Plants 8–40 cm tall; capitula with outer phyllaries reflexed, pubescent, at margin hispid; inner phyllaries yellow (sometimes with a purple midrib); stamens with apical appendage caudate 2. *D. anomalum*

1. *Doniophyton weddellii* KATINAS & STUESSY, sp. nova

Typus: Chile, Region IV, Prov, Elqui, 21.4 kms N of Juntas del Toro (aduana chilena) on rd to Baños del Toro, high altitude desert scrub, 3100 m a. s. l., 20 Jan. 1993, T. F. STUESSY & E. RUIZ P. 12780 (Holotypus, CONC; isotypus, OS). Fig. 2.

Plantae 2.5–8 cm altae. Caules ascendentes, basi ramificantes, 1–3 spinis axillaribus (raro 4–5). Folia 2.8–4.5 cm longa, 0.15–0.3 cm lata, involuta, super sericea, subter glabrata. Capitula 2.5–3.5 cm longa, 1.5–3 cm diametro, 40–50 flosculis. Involucrum phyllariis externis erectis; series prima 10–20, linearolanceolata, 7–10 mm longa, 1.5–2 mm lata; series secunda 10–16, linear vel linearolanceolata, 9–14 mm longa, 1–2 mm lata, hirsuta; series tertia 13–15, elliptica, 10–20 mm longa, 1–2 mm lata, hirsuta; series quarta 10–12, elliptica, 15–28 mm longa, 1.8–2 mm lata, hirsuta; series quinta 20–40, linearis, 15–35 mm longa, 1–2 mm lata, lutea vel purpurea (praesertim ad apicem). Receptaculum planum. Flosculi radii ca. 10; corollae 6–9 mm longae, lobis 1–1.5 mm longis; stylus 9–14 mm longus. Flosculi disci 30–40; corollae 8–9 mm longae, lobis 1–3 mm longis; stylus 10–12 mm longus; antherae 5–6 mm longae, caudis 0.5–1 mm longis et appendice ad apicem acutis vel raro apiculatis. Cypselae 4.5–6.5 mm longae, 1–2.5 mm diametro. Pappus setis 5–7 mm longis.

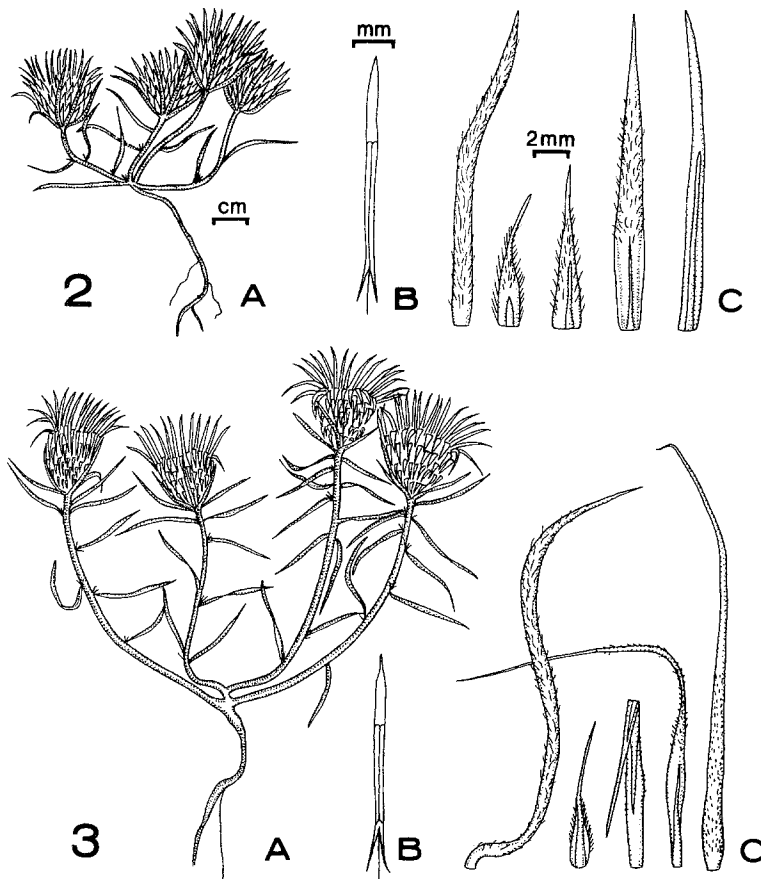
Distribution. Northwestern and western Argentina from Jujuy to Mendoza, and northern Chile from Antofagasta to Elqui (Fig. 1).

Ecology. Open, dry habitats; 1900–4000 m a. s. l.

Phenology. December to March.

Conservation status. Scattered in small populations but frequently encountered; abundant in and around Baños del Toro, Chile.

This taxon has hid for many years under the superfluous and illegitimate name, *D. andicola* (belonging properly in synonymy under *D. anomalum*). For our new species we have selected an epithet that honors HUGH ALGERNON WEDDELL (1819–



Figs. 2, 3. Diagnostic features of *Doniophyton weddellii* (Fig. 2; CABRERA & al. 24418, LP) and *D. anomalum* (Fig. 3; SPEGAZZINI s. n., LP;). A habit; B anthers; C leaf (left) and phyllaries. Scale same for both species

1877), describer of the genus *Doniophyton*, and productive taxonomist on the flora of South America. The plate in his *Chloris Andina* (WEDDELL 1855: 4B) provides another good drawing of this taxon.

A consistent difference exists between *D. weddellii* and *D. anomalum* in coloration of the inner phyllaries, with the former purplish and the latter yellowish. Occasionally in *D. weddellii*, however, variation is seen in this feature. WERDERMANN 953 (K; Chile, Dept. Copiapó) has four plants on the one sheet. The lower left plant has less darkened phyllaries than in the other three, and all are relatively short (5–7 cm tall). Another example is KALIN A. 81576 (CONC; Chile, Dept. Huasco) with three plants, two with heads with completely yellow phyllaries and one with purple-tipped phyllaries. It is apparent, therefore, that some variation occurs in this feature in *D. weddellii* despite its usual consistency in separating the two taxa.

Doniophyton weddellii is insect-pollinated as evidenced by notes on label of WAGENKNECHT 264 (LP): “flores favoritas de las abejas silvestres *Lithurgus dubius* y *Megachile distinguenda*.”

Representative specimens examined (Provinces and departments of Argentina are cited in alphabetical order; regions of Chile are cited in numerical order, with provinces within regions in alphabetical order; acronyms of herbaria after HOLMGREN & al. 1990.) Argentina: Prov. Catamarca. Dept. Belén: Laguna Blanca, 24 Feb. 1981, CABRERA & al. 32472 (SI). Prov. Jujuy. Dept. Cochinoca: Abra Pampa, 20 Jan. 1976, CABRERA & al. 27396 (SI). Dept. Tumbaya: El Moreno, 15 Feb. 1985, KIESLING & al. 5263 (SI). Prov. Mendoza. Dept. Las Heras: Puente del Inca, 3 Jan. 1950, ARAQUE M. 1028 (LP); Dept. Luján: Punta Vacas, 4 Feb. 1939, BURKART 9314 (SI). Dept. Malargüe: Portezuelo del Choique, 5 Jan. 1966, RUIZ LEAL 24362 (LP). Dept. San Carlos: vegas de Llanca, 19 Jan. 1941, RUIZ LEAL 7218 (LP). Dept. San Rafael: altos valles de El Sosneado, 19 Feb. 1942, BURKART & al. 14432 (LP, SI); Dept. Tunuyán: valle del Alto Tunuyán, near Real de las Leñas Amarillas, 8 Feb. 1934, RUIZ LEAL 2093 (LP). Prov. Salta: Dept. Los Andes: región de la Puna, Vega de Socompa, 24 Jan. 1949, CABRERA & SCHWABE 68 (LP). Prov. San Juan: Dept. Calingasta: Manantiales, 27 March 1971, VOLPONI & ZARDINI 175 (LP, MO, SI); Dept. Iglesia: Quebrada del Agua Negra, 18 Jan. 1974, CABRERA & al. 24418 (LP); Quebrada del Pingo, 22 March 1951, J. HUNZIKER & CASO 4886 (LP); al W del refugio de Agua del Godo, 22 Feb. 1984, KIESLING 4575 (SI); Paso Agua Negra, 12 Feb. 1993, STUESSY & KATINAS 12853, 12857 (LP, OS).

Chile: Región II. Prov. El Loa: campo Lapananto, 10 March 1993, BAUMANN 172 (CONC). Región III. Prov. Copiapó: Aguada Tambería, 7 Jan. 1973, MARTICORENA & al. 565 (CONC); Cordillera Río Turbio, Cerro Cadillal, Jan. 1926, WERDERMANN 953 (CONC, K, MO, SI). Prov. Chañaral: Potrerillos-Salar de Maricunga, Río La Ola, 14 Feb. 1966, RICARDI & al. 1609 (CONC); 38 km al interior del tranque La Ola, 14 Feb. 1966, RICARDI & al. 1613 (CONC); Salar de Pedernales, a 80 km más al N del camino Timogasta-Copiapó, 20 Jan. 1966, ZÖLLNER 759 (LP). Prov. Huasco: Quebrada Vizcachas, entre Portezuelo Cantarito y Vizcachas, 11 Feb. 1981, KALIN A. 81576 (CONC). Región IV. Prov. Elqui: camino entre embalse La Laguna y campamento del embalse, 8 Jan. 1981, ARROYO 81095 (CONC); Cordillera de Elqui, Jan 1979, JILES 6513 (CONC); Baños del Toro, 5 Feb. 1939, MORRISON 17251 (MO); Vega Pastalito, 24 Feb. 1938, PÉREZ MOREAU s.n. (LP 68987); cerro oeste Canchas de sky [esqui], 6 Jan. 1988, SQUEO 88001 (CONC); Baños del Toro, 25 Jan. 1948, WAGENKNECHT 264 (LP), Dec. 1923, WERDERMANN 201 (CONC, K). Prov. Limarí: Cordillera de Ovalle, 8 Jan. 1956, JILES 2920 (CONC).

2. *Doniophyton anomalum* (D. DON) KURTZ

Bol. Acad. Nac. Ci. Córdoba **13**: 195. 1893. *Chuquiraga anomala* D. DON, Phil. Mag. Ann. Chem. **11**: 392. 1832. Type: Argentina, "on both flanks of the Chilian Andes, between the parallels of 32° and 35° south, and west longitude 34° and 72°" (DON 1832: 387) "above and below El Hoyo Colorado, Andes of Mendoza" (from label; also cited by Hooker 1835: 110), Nov. 1824-Jan. 1825, J. GILLIES 38 (lectotype chosen, E-GL!; isolectotype, BM! K!). Fig. 3.

Doniophyton ["*andicolum*"] *andicola* WEDD., Chloris Andina **1**: 8. t. 4B. 1855. Nom. superfl., nom. illegit. The protologue cites the previously described *Doniophyton anomalum* as a synonym as well as one of its syntypes.

Chuquiraga patagonica PHIL., in COX, Anales Univ. Chile **23**: 466. 1863 (also published in Linnaea **33**: 111. 1864). *Doniophyton patagonicum* (PHIL.) Hieron., Ic. Descr. Pl. **25**. 1885 (also published in Actas Acad. Nac. Ci. Córdoba **2**: 34. 1886). Type: Argentina, Prov. Neuquén, "Pampa de Patagonia" [probably between Lago Lácar and Lago Caleufú; C. MARTICORENA, in litt.], 1863 [probably 8–14 Jan., 22–24 Feb., or 16–19 March; C. MARTICORENA, in litt.], G. E. COX s.n. [SGO 061901]

(Holotype, SGO!; isotype B, photo MO!). CABRERA (1939) unnecessarily made the same new combination into *Doniophyton*, apparently overlooking the earlier combination by HIERONYMUS (1885).

Doniophyton flavescens SUESS., Revista Sudamer. Bot. 7: 275. 1943. Type: Argentina, Prov. Neuquén, Cerro Mesa, "auf Sand," 1000 m, Sep.-Nov. 1927, E. AMMANN 30 (Holotype, M, photocopy!).

Plants 8–40 cm tall. Stems ascendent or decumbent, with 2–7 axillary spines. Leaves 1.8–5 cm long, 0.15–0.3 cm wide, involute or plicate, glabrescent to sericeous on both surfaces. Heads 3.5–4 cm long, 3.7–6 cm diam., with 80–135 florets. Involucre with outer phyllaries recurved to reflexed; first series 5–10, linear-lanceolate, 8–12 mm long, 1–2 mm wide; second series 12–45, linear to linear-lanceolate, 16–25 mm long, 1–2 mm wide, pubescent, hispid at margins; third series 18–40, linear, 20–40 mm long, 0.7–1 mm wide, pubescent, hispid at margins; fourth series 12–36, linear, 21–30 mm long, 1–1.5 mm wide, subglabrous; fifth series 10–50, linear-elliptical, 20–32 mm long, 0.8–2 mm wide, strigose; sixth series 20–90, 20–40 mm long, 0.5–1.5 mm wide, yellow (occasionally with a medial purple line). Receptacle flat or convex. Ray florets 30–40; corollas 11–15 mm long, with lobes 0.5–1.5 mm long; style 12–22 mm long. Disc florets 50–95; corolla 9–12 mm long, with lobes 2–4 mm long; style 11–18 mm long; anthers 6–8 mm long with tails 0.8–1 mm long, and with apical appendage caudate. Cypselas 3–5 mm long, 0.8–1.5 mm diam. Pappus with bristles 7–12 mm long.

Distribution. Western Argentina, from Prov. San Juan to Santa Cruz, Patagonian Argentina, and rarely in Chile in Prov. Cautín.

Ecology. Open, dry habitats; 0–1800 m a. s. l.

Phenology. November to March.

Conservation status. Scattered over a broad range, but never locally common; usually only a few plants seen.

The protologue of *Chuquiraga anomala* specifies only a GILLIES collection from "both flanks of the Chilian Andes between the parallels of 32° and 35° south, and west longitude 34° and 72°" (DON 1832: 387), which includes part of present-day Andean Chile and Argentina. GILLIES' material of this taxon located at several institutions (BM, E-GL, K) all comes from three specific localities near Mendoza in the Andes of Argentina: "Andes of Mendoza," "Los Arbolitos," and "El Hoyo Colorado." At K are four syntypes, two (both s. n.) from "Los Arbolitos" [sic] and grading toward *D. weddellii*, and a third similar single specimen (s. n.) from the "Andes of Mendoza." These three specimens appear somewhat intermediate morphologically between the two species, but tend more toward *D. anomalum* in the five nodal spines, more hispid and slightly recurved phyllaries, and more numerous disc florets. In stature, head size, and leaf length, however, some individuals approach *D. weddellii*. It is possible that they represent a hybrid combination or morphological convergence in the area around Mendoza. The fourth specimen at K from "El Hoyo Colorado" [sic] is unmistakably *D. anomalum*. BM contains three syntypes collected by GILLIES, including a collection from "above and below Oyo [sic] Colorado" that likewise does not tend toward *D. weddellii*. The material of GILLIES at E-GL is just one sheet from "above and below El Hoyo Colorado" and is clearly *D. anomalum*. Because this collection shows no

intergradation toward the other taxon, and because GILLIES' personal herbarium is believed to have been deposited at Edinburgh (N. HIND, in litt. 7 July 1986, filed at K with *Chuquiraga* herbarium material), it is selected as lectotype. The BM and K duplicates are designated as isolectotypes. The other former syntypes now receive paralectotype status (following the useful, but unofficial, terminology of HANSEN & SEBERG 1984; not adopted for the ICBN, GREUTER & al. 1994).

Use of the epithet *andicola* instead of "*andicolum*" as originally published by WEDDELL merits brief comment. Although the gender of *Doniophyton* is neuter, the epithet *andicola* is a Latin noun deriving from Andes and -cola, referring to an inhabitant or dweller. Such epithets (as *monticola*, *rupicola*) in Latin must retain the -cola ending regardless of the gender of the associated generic name (STEARNS 1993: 209, 387). Hence, WEDDELL's original spelling *andicolum* must be changed (without change of authorship) to *andicola*. Because the name is a nomen illegitimum and cited here in synonymy, however, these points are only of minor nomenclatural import.

The distinctions between the two species of *Doniophyton* are quite good, and there is usually little difficulty with identification of material. Occasionally there are some problems, however, such as shorter plants and more hirsute phyllaries than usual in *D. anomalum* as represented by COMBER 111 (K, Prov. Neuquén, Dept. Zapala). In general, the specimens in the southern part of the range of *D. anomalum* are more divergent than those toward the north near Mendoza where the taxa overlap in distribution (Fig. 1). This tendency could be due to ecological convergence (even perhaps reflecting a south-north clinal pattern) or interspecific hybridization. To explore these alternatives, correlations of selected morphological features with latitude and elevation in *D. anomalum* were completed.

Height of plant and length of external phyllaries are useful discriminators between *D. weddellii* and *D. anomalum* with 2.5–8 cm in the former and 8–40 cm in the latter (for height) and 10–20 vs. 20–40 mm (for third series bract length, respectively). If hybridization were occurring between these two taxa in and around Mendoza (c. 33° S latitude), a lowering of stature and shortening of outer phyllary length in *D. anomalum* at this latitude would be expected. Lowering of plant height is seen in RUIZ LEAL 1823 (33.5°), but this also occurs scattered throughout the range of the taxon in RUIZ LEAL 23224 (35°), BOELCKE & al. 11166 (37°), NAVAS 56 (39°), S. & M. DE BIRABÉN 719 (40°), BOELCKE 1936 (41°) and further south into Patagonia (e.g., S. & M. DE BIRABÉN 572, 45.5°). Length of external phyllaries shows the same basic trend. It appears, therefore, that there is neither a clear clinal north-south trend in height of plants nor length of outer phyllaries in *D. anomalum*, nor is there convincing evidence of interspecific hybridization with *D. weddellii* in the area around Mendoza.

An alternative hypothesis is that reduction of stature in *D. anomalum* in selected populations may be due to elevation, as shortening of internodes is a well-known response to altitude (CRAWFORD 1989). Correlations of stature with elevation (for those collections for which data are available) do show a positive relationship, although MORELLO 3 and BOELCKE 4258 from latitude 38.5° and 39°, respectively, deviate from this general trend.

Representative specimens examined. Argentina: Prov. Chubut. Dept. Biedma: Puerto Madryn, 17 Feb. 1966, ESKUCHE 735 (LP). Dept. Cushamen: Ilegando a Paso del

Sapo, 8 Nov. 1972, CORREA et al. 4830, 4833 (LP). Dept. Escalante: 30 km N of Comodoro Rivadavia, 16 Feb. 1993, STUESSY & MORALES 12921 (LP, OS); 18 km W of jct rtes 3 & 39 toward Escalante, 16 Feb. 1993, STUESSY & MORALES 12930 (LP, OS); 96 kms E of Sarmiento, 17 Feb. 1993, STUESSY & MORALES 12939 (LP, OS). Dept. Futaleufú: ruta 40, a 50 km de Tecka, poco antes de río Pescado, 5 Jan. 1969, RUIZ LEAL 26637 (LP). Dept. Languiñeo: Tecka, 12 Dec. 1981, CABRERA & al. 33104 (SI). Dept. Sarmiento: parada km 163, 26 Feb. 1938, S. & M. DE BIRABÉN 546 (LP). Dept. Río Senguerr: Nueva Lubecka, 28 Feb. 1938, S. & M. DE BIRABÉN 572 (LP). Dept. Tehuelches: 44° 0'S, 70° 30'W, 8 Jan. 1902, MAYBEN s. n. (SI 8569). Prov. La Pampa. Dept. Utracán: al W de General Acha, 5 Nov. 1953, BURKART 19219 (SI). Prov. Mendoza. Dept. General Alvear: ruta 188, a 10 km al W de Río Salado, 12 Nov. 1969, ANCIBOR & al. s. n. (LP). Dept. Luján: dique Cipoletti, 27 Nov. 1954, SEMPER s. n. (LP 895791). Dept. Malargüe: estancia "El Sosneado," 24 Jan. 1964, RUIZ LEAL 23224 (LP). Dept. San Carlos: desvío Laguna Diamante, 2 Feb. 1950, BOELCKE 4023 (LP). Dept. San Martín: Río Seco del Quemado e inmediaciones, 11 Nov. 1954, RUIZ LEAL & CASTELLANOS 16409 (LP). Dept. San Rafael: El Sosneado, 10 Feb. 1942, BURKART & al. 14427 (LP, SI); ruta nacional 144, 3 km al N de Salinas del Diamante, 11 Jan. 1985, MARQUES & GOMEZ SOSA 92 (SI). Dept. Santa Rosa: Cienaguita, Jan. 1912, HICKEN 139 (SI). Dept. Tunuyán: cerca San Pablo, 9 Dec. 1933, RUIZ LEAL 1823 (LP). Prov. Neuquén: Dept. Añelo: Añelo, 22 Jan. 1952, MORELLO 3 (LP). Dept. Catán Lil: subida a la ladera W del cerro Chacay-có, 5 Feb. 1939, CHICCHI 65 (LP). Dept. Chos Malal: Riscos Bayos, detrás del campamento "Riscos Bayos," 25 Jan. 1964, BOELCKE & al. 11166 (LP). Dept. Collón Curá: 15 km al N del Paso Limay, Jan. 1960, FABRIS 2256 (LP). Dept. Confluencia: Plaza Huincol, 4 Dec. 1952, CABRERA 11058 (LP). Dept. Huiliches: Junín de los Andes, 10 Jan. 1941, BRIDAROLLI 2233 (LP). Dept. Lácar: San Martín de los Andes, río Quilquihué, 16 March 1938, S. & M. DE BIRABÉN 719 (LP). Dept. Loncopué: margen izquierdo río Agrio, frente a Loncopué, 17 Feb. 1974, M. GENTILI 227 (LP). Dept. Los Lagos: arroyo Yao-Yao, 17 Jan. 1945, SORIANO 1309 (LP). Dept. Minas: Piedra del Gallo, 30 Jan. 1964, BOELCKE & al. 11401 (LP). Dept. Ñorquin: arroyo Las Bayas, 9 Jan. 1970, RUIZ LEAL 26823 (LP). Dept. Zapala: Zapala, a 10 km camino a La Negra, 10 Feb. 1950, BOELCKE 4258 (LP); Zapala, 1 Nov. 1925, COMBER 111 (E, K, LP); Laguna Blanca, 17 Dec. 1965, NAVAS 56 (LP). Prov. Río Negro: Dept. Avellaneda: entre Duval y Chelforó, 6 Dec. 1981, CABRERA & al. 32818 (LP, SI). Dept. Bariloche: Parque Nacional Nahuel Huapi, estancia "San Ramón próximo al río Limay, 24 Jan. 1946, BOELCKE 1936 (LP). Dept. General Roca: vicinity of General Roca, Sep. 1914-Feb. 1915, FISCHER 7 (MO). Dept. Ñorquinco: arroyo Ñorquinco, 5 Jan. 1969, RUIZ LEAL 26619 (LP). Dept. Pichi Mahuida: Río Colorado, Jan. 1913, SCALA 8568 (SI). Dept. Pilcaniyeu: Comallo, 7 Nov. 1938, CABRERA 4799 (LP). Dept. San Antonio: Las Grutas, 30 Nov. 1965, CORREA & NICORA 3712 (CONC, LP). Prov. San Juan. Dept. Caucete: médanos al pie de Pie de Palo, 13 Feb. 1993, STUESSY & KATINAS 12887 (OS). Prov. Santa Cruz. Dept. Corpen Aike: ruta 3, a 92 km al S de San Julián, 12 Jan. 1967, BOELCKE & al. 12253 (SI). Dept. Deseado: Caleta Olivia, 20 Nov. 1929, DONAT 127 (MO, SI). Dept. Magallanes: San Julián, río Deseado, 1899, Ameghino s. n. (ex LPS 11715 in LP). Dept. Río Chico: El Paso, 1897-99, Ameghino s. n. (ex LPS 11691 in LP).

Chile: Prov. Cautín, Curarrehue, 29 Dec. 1946, CAÑULAF H. 16882 (CONC).

Excluded names

Doniophyton argenteum SPEG., Anal. Soc. Cient. Argentina **15**: 107. 1883. *Chuquiraga argentea* (SPEG.) SPEG., Anales Soc. Ci. Argent. **53**: 27. 1902. Nom. illegit., non *Chuquiraga argentea* (H.B.K.) Hieron., Engl. Bot. Jahrb. **28**: 649. 1901. Type:

Argentina, Santa Cruz, Feb. 1882, C. L. SPEGAZZINI s. n. (Lectotype [selected by EZCURRA, 1985] LP!; isolectotype, BA!). = *Chuquiraga morenonis* (O. KUNTZE) EZCURRA, *Darwiniana* **26**: 256. 1985.

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