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# Oldenburgieae, a new tribe of the African Mutisieae s. l. (Asteraceae)

SANTIAGO ORTIZ

Laboratorio de Botánica, Facultade de Farmacia  
Universidade de Santiago  
15782, Santiago de Compostela, Galicia, Spain  
santiago.ortiz@usc.es

## Abstract

The new tribe Oldenburgieae (Asteraceae) is described to include the single genus *Oldenburgia* LESS., a member of the African Mutisieae s. l. *Oldenburgia* has four shrubby species restricted to the Western and Eastern Cape Province of South Africa.

## Introduction

Several phylogenetic studies using molecular markers carried out during the last years (KIM et al. 2002, PANERO & FUNK 2002, FUNK et al. 2005, PANERO & FUNK 2008) confirmed that the tribe Mutisieae s. l. is paraphyletic. In accordance with these studies and the author's own approaches (ORTIZ et al. in press, ORTIZ in press, ORTIZ et al. unpubl.) four tribes can be recognized for the 12 genera currently known within the African Mutisieae s. l.: 1) Dicomeae PANERO & FUNK with the genera *Cloiselia* S. MOORE, *Dicoma* CASS., *Erythrocephalum* BENTH., *Gladiopappus* HUMBERT, *Macladium* CASS., *Pasaccardoa* KUNTZE, and *Pleiotaxis* STEETZ; 2) Tarchonantheae KOSTEL. with *Brachylaena* R. BR. and *Tarchonanthus* L.; 3) Mutisieae CASS. s. str. with *Gerbera* L. and *Perdicium* L. The fourth is Oldenburgieae, a tribe which is described here, with the sole genus *Oldenburgia* LESS. *Oldenburgia* is situated in an isolated clade within a monophyletic unresolved Carduoideae (FUNK et al. 2005, ORTIZ et al. unpubl.) or it is the sister group of Tarchonantheae (PANERO & FUNK 2008, ORTIZ et al. in press, ORTIZ in press), a tribe from which *Oldenburgia* is distinctly different from a morphological point of view (ORTIZ in press).

## Description

### **Oldenburgieae S. ORTIZ, trib. nov.**

Typus: *Oldenburgia* LESS. in *Linnaea* 5: 252 (1830).

Suffrutices pulviniformes vel arbusculae, foliis alternis, integris, coriaceis; capitulisque solitariis, magnis, radiatis, floribus quidem radii bilabiatis, disci autem plerumque actinomorpha; cypselae denique lineares vel anguste ellipsoideae, vilano barbellato aut plumoso.

Dwarf cushion-forming shrubs to small trees. Leaves alternate, entire, mainly coriaceous. Involucre campanulate to urceolate, pluriseriata; phyllaries coriaceous and acuminate, pungent, white-tomentose. Receptacle flat, alveolate, epaleate. Capitula large, solitary or on sparsely ramified peduncles, heterogamous radiata. Marginal florets white, bilabiate with the inner lip of two linear-coiled lobes, with sterile stamens and the style as in disc florets; disc florets very numerous (80–1000), white, cream or pinkish-brown, often actinomorphic, rarely slightly zygomorphic, with narrow tube and limb, deeply 5-lobed; anthers 5, caudate and calcarate, with long tapering tails, ramified, with obtuse branches, these being retrorse along the tail and antrorse at the apex; apical appendage acuminate; endothecial tissue polarized; pollen grains smooth to echinate; style with very short branches, rounded at the apex, smooth to papillose, rarely with apical acute sweeping hairs, the stigmatic area covering the entire ventral side. Cypselae narrowly ellipsoid to linear, ribbed, glabrous to densely hairy, with barbellate to plumose pappus, testa of *Gochnatia* type (GRAU 1980).

As pointed out above the tribe Oldenburgieae includes the sole genus *Oldenburgia*, endemic to the Cape Province of South Africa. *Oldenburgia* comprises the four following species: *O. grandis* (THUNB.) BAILL., *O. intermedia* BOND, *O. papionum* DC., and *O. paradoxa* LESS. (BOND 1987).

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# *Senecio valerianifolius* WOLF ex LINK (Compositae), an enigma revealed

J.F. VELDKAMP <sup>1)</sup> & C. LUT <sup>2)</sup>

National Herbarium Nederland, Leiden University  
PO Box 8514, 2300 RA Leiden, The Netherlands

<sup>1)</sup> [Veldkamp@nhn.leidenuniv.nl](mailto:Veldkamp@nhn.leidenuniv.nl)

<sup>2)</sup> [lut@nhn.leidenuniv.nl](mailto:lut@nhn.leidenuniv.nl)

## Abstract

*Senecio valerianifolius* WOLF ex LINK (Compositae) was invalidly published in the “*Index Sem. Hort. Berol.*” (late 1825 / early 1826) and the 1826 Appendix to the 1825 Padua seed list (actually published in 1827), as no description was given. Validation was by SPRENGEL (Jan–Mar 1826). The species is presently known as *Erechtites valerianifolia* (LINK ex SPRENG.) LESS. ex DC.

## Introduction

Brazilian fire weed is a widespread pantropical weed generally known as *Erechtites valerianifolia* LESS. ex DC. (Compositae), based on *Senecio valerianifolius* WOLF ex LINK or LINK ex SPRENG. However, the correct application of these combinations have long been obscure as the earliest references go back to a seed list issued by the Berlin Botanischer Garten in end 1825 / early 1826. No one seemed to have seen a copy of this afterwards and therefore the application of the names was more due to general tradition than to the actual proof of an original description or specimen. And who was this WOLF?

Seed lists are ephemeral, for as today with post order guides they generally were discarded after use. However, nomenclaturally they may be important, for in quite a few there are footnotes or appendices diagnosing or describing new taxa or proposing new combinations. Because of their temporary nature (and in the larger institutes most likely used by the Garden staff, and not filed in the Library) these novelties were not entered into data bases such as the *Index kewensis*, now IPNI on the internet. Novelties in some of these lists were later made available to the general botanical public by journals like *Flora* and the *Annales des Sciences Naturelles* (Paris) and the new taxa or names are often recorded to have been published in these journals and attributed to their editors.

The second author has initiated a database for 19<sup>th</sup> century seed lists and has visited numerous institutes in search of these publications. See <http://www.nationaalherbarium.nl/seedlists/home.htm>. Through his efforts Leiden (L) now may have the most extensive collection in the form of originals, photocopies, or microfiches. In the summer of 2007 he was in Padua (PAD) and to his happy surprise he discovered among other rarities a copy of the Berlin 1825 seed list there.

In the Botanical Garden of Berlin (and Halle) there flowered in the summer of 1825 plants by the name of *Senecio valerianifolius* WOLF. Possibly it was earlier, as in 1825 plants under that name were also reported for some other gardens as well. The plants apparently did well enough to produce fruits, for the name was included in the seed list of the Berlin Botanischer Garten published in late 1825 or early 1826 presumably by LINK. However, this has become so rare that later authors (e.g. BELCHER 1956, NICOLSON 1991) could not discover a copy anywhere to check whether the reference was correct, nor whether there was a validating diagnosis. They sent out pleas in their articles, but apparently in vain.

Such seed lists are usually undersigned by the Director of the Botanic Garden, but in the Berlin case there was no author, so it probably was LINK. “*Senecio valerianaefolius* WOLF” is listed, but there is no diagnosis, so here it is a nomen nudum. In the copy in PAD the name has been marked, apparently for ordering, for the name was taken up in the 1826 Appendix to the 1825 Padua seed list. Of this there was also a copy in PAD, also anonymous, but it is accompanied by a letter from VISIANI, dated 31 January 1827. As BONATO was the Director then we assume that he was also the author of the list. Again there was no diagnosis.

The first to publish one was SPRENGEL (Jan / Mar 1826) who attributed the name to LINK (not to WOLF!), and possibly saw the plant in his botanical gardens in Halle. It seems logical to assume that the plants flowered there in 1825 (or even before) and that he had obtained both the seeds and the name from LINK. The diagnosis clearly refers to the species as we know it today. Final proof would be an original specimen. The SPRENGEL herbarium has been incorporated in the COSSON herbarium, which now is in P. Unfortunately, nothing applicable could be found there (Ms. C. LOUP, in litt.).

REICHENBACH (1827), also in 1825, saw flowering plants apparently from Berlin and from the garden of a certain Mr. RAFFEL, about whom we have no further data. Attributing the combination to WOLF and SPRENGEL, he gave a detailed illustration and a description very different from that by the latter. Was there perhaps a more extensive description by WOLF in this enigmatic seed list from which selections had been made? Anyway, REICHENBACH's interpretation seems

not to have been questioned since. In his herbarium in W are specimens labeled “*Senecio valerianaefolius* LINK, *Hort. Berol.*”, and “*Senecio valerianaefolius ex h. Raffeliano 1825*”.

DESFONTAINES (1829) published what appears to be a later homonym for plants grown at an unreported date in the Jardin de Plantes, Paris (“*H. p.*”). The type is now in FI (*Herbarium Webb 101432*). As BELCHER (1956: 26) regarded it as a synonym, it seems most likely that Berlin, again, was the source of the name and fruits.

LESSING (1830) transferred the species to *Crassocephalum* MOENCH and gave “Jalapa” (Mexico) as its provenance. DE CANDOLLE (1838) noted that the combination only referred to the basionym (“*ex syn.*”), but what the actual material represented he did not state (only this single reference was given by his indexer BUEK, 1840). LESSING’s herbarium is now in CW. DE CANDOLLE placed the species in *Erechtites* RAF. and later authors have agreed to this. He mentioned several collections from Brazil and a possible one from Mexico.

GARDNER (1845) in an account of a hundred new (!) species of plants from Brazil described another *Senecio valerianifolius*, a later homonym, which CABRERA (1950) renamed to *Erechtites gardneriana*. The holotype should be in BM. BELCHER (1956: 26, 28) in his revision of *Erechtites* mentioned an isotype in K and regarded both names as synonyms of *E. valerianifolia* forma *valerianifolia*. He accepted WOLF as the author, but pointed out that *if* the basionym was invalidly published, the correct reference should be to SPRENGEL. Obviously, the type then should have been selected from the SPRENGEL herbarium, but BELCHER appointed the “*Senecio valerianaefolius ex h. Raffeliano 1825*” of REICHENBACH (W) as the ‘neotype’. As long as the SPRENGEL specimen is missing this neotypification is acceptable, but if it is recovered this choice is to be rejected.

NICOLSON (1991: 40) remarked “I find no trace of a WOLF, WOLFF, WULF, or WULFF associated with the Berlin Garden at that or any other time”. No WOLF nor any variant of that name as an early 19th century collector in C or S America is mentioned by VEGTER (1988). This person still remains a mystery. Perhaps he was an unknown gardener, just as the equally obscure RAFFEL?

### Acknowledgements

The second author is very grateful for the hospitality and assistance of the PAD staff during his visit there. Ms. C. LOUP is thanked for her fruitless search for the SPRENGEL collection in P. Dr. R. BALDINI confirmed the presence of the DESFONTAINES type in FI.

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**Preliminary research:  
Potency of *Mikania cordata* (BURM. f.) B.L.  
ROBINSON (Compositae )  
as hyperaccumulator plant**

**SYAMSUL HIDAYAT**

**Center for Plant Conservation- Bogor Botanic Garden**

**Jl. Ir. H. Juanda. No.13, Bogor, Indonesia**

**hidayatkbri@yahoo.com**

**Abstract**

Many plants have a good adaptation for growing in a site burdened with heavy metal pollutants. The plant which accumulates heavy metal is termed hyperaccumulator. Nowadays, hyperaccumulator plants have an important role in phytoremediation efforts for they can accelerate degradation of contaminants. Some research has been done to improve the efficiency of phytoremediation by selecting suitable hyperaccumulator plants. So far, few Compositae species have been reported to have such important role in polluted crop plantation areas. This preliminary research was done with specific aim to collect information on the Compositae plants that exist on polluted paddy fields in Nanggung subdistrict, Bogor, West Java.

**Introduction**

Some Compositae plants are often regarded as noxious weeds or useless plants in various crop plantations, even though there is much evidence suggesting that various medicines can be derived from wild members of the family. Recently, some species of this family are also used in phytoremediation activities such as Sunflower (*Helianthus annuus*) for arsenic (As) accumulation, Woolly grassland senecio (*Senecio coronatus*) for nickel (Ni) accumulation and Heartleaf hempvine (*Mikania cordata*) for lead (Pb) accumulation (HIDAYATI 2004). Phytoremediation is a specific term applied to a group of technologies that use plants to reduce, remove, degrade, or immobilize environmental toxins, primarily those of anthropogenic origin, with aim of restoring sites to a condition useable for private or public application (PEER et al. 2006). To date phytoremediation efforts have focused on the use of particular plants to accelerate degradation of organic contaminants, usually in concert with root rhizosphere microorganisms, or remove hazardous heavy metals from soils or water. A plant is said to be a hyperaccumulator if it can

concentrate pollutants in an appreciable minimum amount which varies according to the pollutant involved (for example: more than 1000 mg/kg of dry weight for nickel, copper, cobalt, chromium or lead; or more than 10,000 mg/kg for zinc and manganese).

In Indonesia, there are many areas of gold exploitation that are run by legal gold mining companies or by illegal private gold mining communities. Unfortunately, many of these gold miners, especially the illegal ones, are still using mercury (Hg) for processing the product, thus providing a hazardous pollutant to the neighbouring areas. Quite often the gold mining activities are established nearby villages where people live and grow their agricultural crop plantations, such as rice and maize. Therefore, the threat is existing, since mercury is a toxic substance to humans and depending on the form it takes, can cause severe neurological disorders. Serious efforts must be made to overcome the problem. These may include the use of phytoremediation techniques that require identification of suitable Hg hyperaccumulator plants.

### Methodology

The study was done by means of field and laboratory observations.

#### a. Field observation

Observation was conducted in three villages, located in Nanggung subdistrict, Bogor, West Java, where many private/illegal gold mining enterprises traditionally use Hg for processing the products. Some characteristics of the observation sites are presented in Table 1.

**Table 1. Site location of observation**

Village name	Latitude	Altitude	Soil pH	Light
Leuwi Bolang	S 06°38'05.6" E 106°33'20.4"	407 – 410 m asl	5.6 – 6.2	100%
Kampung Muara	S 06°38'06" E 106°33'29.9"	415 – 419 m asl	4.8 – 5.8	100%
Leuwi Jamang	S 06°37'917" E 106°27'599"	617 – 750 m asl	6.0 – 6.6	100%

Sampling plots were established by selecting four large paddy fields in each village within the contaminated areas. Inventory of wild Compositae on the paddy

fields was then conducted. Microclimate conditions and other weed species in the areas were also recorded.

### b. Laboratory observation

The dominant weed species found from the field observation (i.e. *Mikania cordata*) was cultivated in the greenhouse of Bogor Botanic Garden. There were 36 tubes of cuttings maintained for further observation. Hg solution was dropped in the media supporting the cuttings, in which 12 tubes received 0 ppm Hg/tube, 12 tubes received 10 ppm Hg/tube and the remaining 12 tubes received 20 ppm Hg/tube. The growth of the resulting plant and its capacity of accumulating Hg were observed.

## Result and Discussion

The result of the field observation showed that *Mikania cordata* was the most dominant species among the Compositae. The plant is relatively large and apparently invasive on the paddy fields found in the three villages observed, with frequency of occurrences ranging from 75-100% and the average dominance from 10-15% (Table 2).

**Table 2. Species of Compositae existing in the field**

Village (plot)	Species	Frequency (%)	Dominancy (%)
Leuwi Bolang	<i>Eclipta alba</i>	25	2.5
	<i>Bidens pilosa</i>	50	2.5
	<i>Emilia sonchifolia</i>	25	0.5
	<i>Spilanthes acmella</i>	25	0.5
	<i>Ageratum conyzoides</i>	75	10
	<i>Erechtites hieracifolia</i>	25	5
	<i>Mikania cordata</i>	75	15
Kampung Muara	<i>Eclipta alba</i>	25	0.5
	<i>Bidens pilosa</i>	50	0.5
	<i>Emilia sonchifolia</i>	25	0.5
	<i>Spilanthes acmella</i>	50	0.5
	<i>Ageratum conyzoides</i>	50	10
	<i>Erechtites hieracifolia</i>	50	0.5
	<i>Elephantopus scaber</i>	25	0.5
	<i>Mikania cordata</i>	100	10
Leuwi Jamang	<i>Ageratum conyzoides</i>	75	10
	<i>Erechtites hieracifolia</i>	25	0.5
	<i>Elephantopus scaber</i>	50	2.5
	<i>Mikania cordata</i>	100	15
	<i>Wedelia biflora</i>	75	10

Note:

frequency = number of plots where a species occurs/ total plots

dominancy = average of covering area of a species

*Mikania cordata* (BURM.f.) B.L. ROBINSON is a native species of Southeast Asia and the Pacific Islands. It grows well in the tropics especially on a damp soil and usually emerges as a weed along rivers and streams, of forest borders and clearings, open disturbed areas, roadsides, or tree plantations. It is a rapidly-growing, creeping or twining perennial vine up to 10 m long. The plant is considered as a serious weed for it twines around young tree crops, smothering them and forming dense, tangled masses. In addition, it can propagate easily by wind-borne achenes or, most importantly, by vegetative parts of the plant. Roots can develop from stem nodes, and even from small stem fragments with a single node. Stem fragments may be dispersed by cultivation or other means. *M. cordata* also produces a substance that inhibits growth of other plants (ANON. 2008).

Beside Compositae species there were some other wild plants such as *Nasturtium montanum*, *Centella asiatica*, *Commelina nudiflora*, *Monochoria hastata* and *Limnocharis flava* that were found in the study areas. These plants may also be capable of conducting a role as accumulators, but this research focused primarily on the Compositae family as it is the most dominant family in the study area and in most paddy fields of the villages. The diversity of Compositae species was higher in Kampung Muara than in two other villages observed. This suggest that Kampung Muara may provide good material for future research on accumulator Compositae (Table 2).

Being the most dominant species, *Mikania cordata* was selected to be planted in the greenhouse for further observation. The laboratory observations demonstrated that the species was effective in accumulating mercury solution as indicated by relatively high ratio of Hg leaves/roots. After a month following the treatment, ratio of Hg found in leaves and roots was 0.9 for 10 ppm Hg solution treatment and 0.42 for 20 ppm Hg solution treatment. It has been generally suggested that a plant is said to be a potential hyperaccumulator if it is capable of accumulating metal in the leaves and roots in the ratio of approximately one, because metal translocation system from roots to leaves of hyperaccumulator plants is supposed to be more efficient than in other type of plants (HIDAYATI et al. 2004).

Another interesting result was that the visual appearances of the plants were different morphologically with the addition of Hg solution. Most leaves of the plants treated with Hg were curly and semi-dried with many white spots, conditions hardly found in the control plants (0 ppm Hg treatment). It is clear therefore that Hg soluble in the plant tissue can affect the development of the plant, but to what extent it may be fatal to the plant requires further detailed observation.

## Conclusion

There are various Compositae species found in sites contaminated with mercury from private gold mining in Nanggung, Bogor, West Java. Among the existing species, *Mikania cordata* was the most dominant species and has been shown to have a potential role as a Hg accumulator plant. Nevertheless, further research is needed to extend the observations among other weedy Compositae species to investigate their potency as hyperaccumulator plants.

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# A new species of *Gynoxys* (Asteraceae: Senecioneae) from Peru

HAMILTON BELTRÁN<sup>1</sup> & SEVERO BALDEÓN

Museo de Historia Natural, Universidad Nacional Mayor de San Marcos  
Av. Arenales 1256 Apartado 14-0434, Lima, Peru  
<sup>1</sup>wilmersantiago@hotmail.com

## Abstract

*Gynoxys tabaconasensis* H. BELTRÁN & S. BALDEÓN (Asteraceae: Senecioneae), a new species from Peru with fulvous indument and large leaves is described, illustrated and compared to morphologically similar species.

## Resumen

*Gynoxys tabaconasensis* H. BELTRÁN & S. BALDEÓN (Asteraceae: Senecioneae), una especie nueva del Perú con indumento pardo amarillento y hojas grandes es descrita, ilustrada y comparada con otras especies morfológicamente similares.

## Introduction

*Gynoxys* CASS. is a Neotropical genus of approximately 60 species (BREMER 1994) or perhaps as many as 120 species (NORDENSTAM 2007), with limits still unclear. Thus species were segregated to *Paracalia* (CUATREC.) CUATREC. (CORREA 2003) and *Nordenstamia* LUNDIN (LUNDIN 2006, NORDENSTAM 2006). Most *Gynoxys* species are Andean. HERRERA (1980) provides a general account of the genus in Peru, with a key and descriptions. Later new species were recorded by SAGÁSTEGUI & DILLON 1985, SAGÁSTEGUI & TELLEZ 1987, DILLON & SAGÁSTEGUI 1988, FUNK & ROBINSON 1989, ROBINSON & CUATRECASAS 1992. DILLON & HENSOLD (1993) recognized 51 species of *Gynoxys* in Peru and 45 of these considered as endemic to Peru were evaluated and categorized according to the IUCN criteria (BELTRÁN et al. 2006).

Here, based on recently collected material in Northern Peru we recognize a new species.

***Gynoxys tabaconasensis* H. BELTRÁN & S. BALDEÓN, sp. nov. (Fig.1).**

**Type:** PERU, Departament Cajamarca. Province San Ignacio. District Tabaconas. Lagunas Arrebiatadas, Santuario Nacional Tabaconas-Namballe. Bosque de Ladera, pendiente de 70°, dominado por *Weinmannia* y *Clusia*, 3150–3180 m, 9 April 2003, SEVERO BALDEÓN & LUIS ADRIANZEN 5160 (Holotype: USM; Isotypes: MO, S).

Arbor 5 m alta, indumento pilis fulvis usque ad 1.3 cm longis obsita. Folia membranacea ad basim valde cordata. Capitulum phyllariis glabris. *Gynoxiae tomentosissimae* similis, quae tamen pilis minoribus et densioribus, capitulis phyllariis dense pubescentibus.

Tree 5 m tall, cylindric branches densely pubescent, hairs pale yellowish nearly 1.3 cm long on young shoots. Leaves simple, opposite, petioles 2–4 cm long, pubescent, slightly flattened, slightly amplexicaul at the base; lamina membranaceous, bicolorous, broadly elliptic to subcordate, 13–23 cm long, 7–16 cm wide, base cordate to auriculate, apex acute, margins entire to slightly denticulate with teeth spaced, 1–1.5 mm long, green, puberulent adaxially, hairs copious, yellowish fulvous, conspicuous on primary and secondary veins, abaxially with pubescence slightly more developed and densely covering the veins; venation pinnate, with 15–16 pairs of secondary veins some bifurcating towards the margin. Capitula terminal, broadly corymbose with branches densely corymbose up to 19 cm long; peduncles 6–8 mm long, bracteolate, bracts triangular 10 mm long, attenuate at the apex, pubescence similar to the abaxial indument of leaves. Capitula radiate, 10–11 mm long, 3–4 mm wide; involucre cylindric, calyculate bracts small, narrowly triangular, 2 mm long, 0.5 mm wide, pilose at the apex; phyllaries 5, glabrous, subequal, membranaceous, external linear-lanceolate, 7 mm long, 1.5 mm wide, internal oblong, 7 mm long, 2.1 mm wide, margins scariose. Ray florets 2; corolla yellow, glabrous, tube 5–6 mm long, limb 5 mm long, 2.1 mm long at its broadest width, 5-nerved, apex 3-dentate; achenes oblong, 2 mm long, glabrous, pappus bristles scabrid, yellowish, biseriate, 5 mm long. Disc florets 3 or 4, yellow, glabrous, ca. 11 mm long, tube 3–3.5 mm long, limb campanulate, ca. 5.5 mm long, 0.8 mm wide, markedly 5-lobed for half its length, lobes linear-lanceolate, ca. 4 mm long, revolute, acute at apex; anthers 3.1 mm long, theca 2 mm long, 0.1 mm wide, sagittate at base, 0.1 mm long, connective appendix 0.3 mm long, anther collar 0.8 mm long, cylindric; stylar branches linear, dorsally papillose, with triangular apices ending in a cluster of papillae, longer at the centre. Achenes (immature) oblong, 2 mm long, glabrous. Pappus bristles biseriate, scabrid, yellowish, 5 mm long.

### **Taxonomic discussion**

*Gynoxys tabaconasensis* is characterized by its indument of fulvous hairs, more than 1 cm long, large membranaceous leaves with cordate base, and glabrous phyllaries; a combination of characters not found in any known Peruvian *Gynoxys* (HERRERA 1980, DILLON & SAGÁSTEGUI 1988). At first hand, this taxon could be confused with *G. tomentosissima* CUATREC. from northern Peru, however this species has shorter and more dense hairs, leaves ovate and less than 8 cm long, capitula with more florets, and phyllaries densely tomentose adaxially. The new species also resembles *Paragynoxys meridana* (CUATREC.) CUATREC., mainly by the arborescent habit, by the incision of the corolla limb to half its length, the few florets (5), and the short and briefly sagittate thecae, however the latter can be distinguished by discoid capitula with white florets and by the presence of callosities or warts on the main nerve.

### **Distribution and ecology**

*Gynoxys tabaconasensis* is only known from the reduced populations in the type locality, where it grows in a cloud forest of stunted trees with abundant epiphytes. It flowers in June.

### **Etymology**

The specific epithet alludes to the name of the sole locality, a site within the Tabaconas-Namballe National Sanctuary in northern Peru.

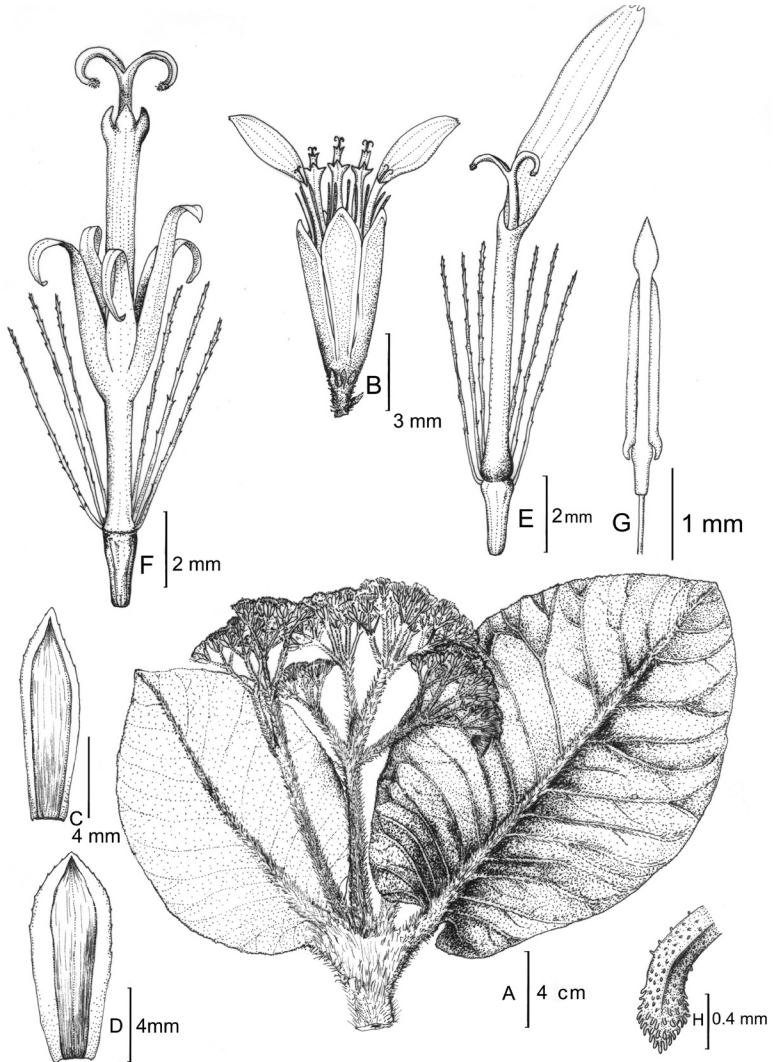
### **Conservation status**

According to IUCN criteria (2001), this new species should be considered in the category of endangered (EN), since the known populations are found within a protected area. This area is established to conserve endangered species such as *Tremarctos ornatus* “spectacled bear”, *Tapyrus pinchaque* “highlands tapir or ante”, in addition to populations of tree species considered at risk such as “romerillos”, viz., *Podocarpus oleifolius* D. DON ex LAMB. and species of *Prumnopitys* and *Retrophyllum*.

### **Acknowledgements**

We wish to thank B. LEON for review and translation to English, A. GRANDA for reviewing the manuscript in an early draft, and G. PINO for the Latin diagnosis.





**Fig 1.**

*Gynoxys tabaconasensis* H. BELTRÁN & S. BALDEÓN.

A Flowering branch. B Capitulum. C Phyllary (ventral view). D Phyllary (dorsal view). E Ray floret. F Disc floret. G Stamen. H Style branch of disc floret. – Drawn from BALDEÓN & ADRIANZÉN 5160 (USM).

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# ***Senecio lusitanicus* (Asteraceae, Senecioneae), a new combination for a species from Iberian Peninsula**

RAFAEL PÉREZ-ROMERO, CARMEN PÉREZ-MORALES,  
ROSA M. VALENCIA BARRERA & ÁNGEL PENAS MERINO  
Departamento de Biodiversidad y Gestión Ambiental (Área de Botánica)  
Facultad de Ciencias Biológicas y Ambientales, Universidad de León  
Campus de Vegazana s/n, 24071 León, Spain  
rperr@unileon.es

## **Abstract**

A new combination *Senecio lusitanicus* (COUT.) R. PÉREZ-ROMERO is proposed for a taxon previously treated as a subspecies of *S. doronicum* (L.) L. or *S. lagascanus* DC. It is endemic to the west of the Iberian Peninsula.

## **Introduction**

A study of morphological and palynological characters of *Senecio* sect. *Crociseris* (Asteraceae, Senecioneae) from Iberian Peninsula (PÉREZ ROMERO 2007, unpubl.), reveals that the following new combination is necessary:

***Senecio lusitanicus* (COUT.) R. PÉREZ-ROMERO, comb. et stat. nov.**

Basionym: *Senecio doronicum* (L.) L. subsp. *lusitanicus* COUT., Fl. Port.: 641 (1913). Synonym: *Senecio lagascanus* DC. subsp. *lusitanicus* (COUT.) P. SILVA, Fl. Voy. Portugal Link (Hist. Desensolv. Ciênc. Portugal, 2): 955 (1987).

PEREIRA COUTINHO (1913) described a new subspecies: *S. doronicum* subsp. *lusitanicus* COUT. It is characterized by subentire leaves, small capitula, supplementary bracts which are smaller than involucre bracts, and lower part of stems arachnoid-lanate (AMARAL FRANCO 1984). In contrast, CHATER & WALTERS (1976) recognized that *S. doronicum* subsp. *lusitanicus* was probably referable to *S. lagascanus* and PINTO DA SILVA (1987) regarded this taxon as a subspecies of *S. lagascanus*. Detailed morphological study (PÉREZ ROMERO 2007, unpubl.) shows that *S. lusitanicus* is morphologically different from other species (Table 1).

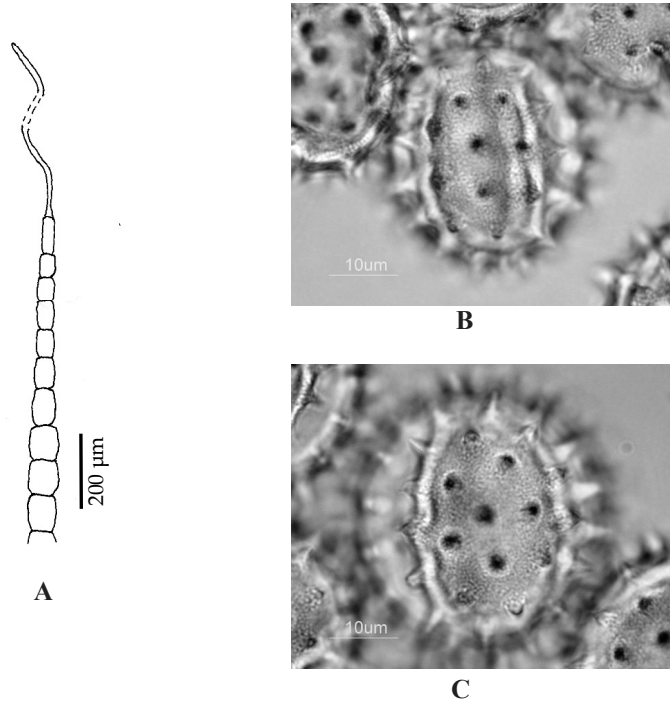
A limited number of pollen morphology studies have previously been undertaken for the genus *Senecio* (STIX 1960, TORMO et al. 1985, DIEZ 1987, BLANCA et al. 1988, 1991, OTIENO & TADESSE 1992, HODÁLOVÁ & MÁRTONFI 1995, PÉREZ ROMERO

et al. 2003). As a result of our study (PÉREZ ROMERO 2007, unpubl.), we conclude that pollen of *S. lusitanicus* is clearly distinct in size and ornamentation from the related species of *Senecio* (Table 1; Figs. 1B, C).

We consider the differences between the taxa studied important enough to elevate the taxonomic status (Table 1).

**Table 1. Comparison between *Senecio lusitanicus* and related species.**

Characters	<i>S. doronicum</i>	<i>S. lagascanus</i>	<i>S. lusitanicus</i>
Plant height	30–60 (27–73) cm	24–60 (18–68) cm	14–23 (50) cm
Leaf base	gradually narrowed into the petiole	gradually narrowed into the petiole	truncate to attenuate
Indumentum	sparsely hairy, more abundant lower part of stems and petioles	sparsely hairy, more abundant lower part of stems and petioles	arachnoid-lanate, more abundant lower part of stems and petioles
Trichomes	10 or more short or elongated cylindrical cells and a long (< 300 µm), curled apical cell	8–10 short or elongated cylindrical cells and a long (> 300 µm), curled apical cell	8–10 short or elongated cylindrical cells and a long (> 500 µm), curled apical cell (Fig. 1A)
Length of involucre bracts	10–13 mm	6,5–10,5 (12) mm	8–10 mm
Length of ligulate flowers	22–37 mm	15–25 mm	13–19,5 mm
Length of pappus	6–9 mm	5,5–8 mm	5–6,5 mm
Pollen size: polar axis (in equatorial view)	37–40,5 (33,5–45,5) µm (Fig. 1C)	30,5–34 (27,5–36) µm	31–35 (28–38) µm (Fig. 1B)
Pollen size: equatorial axis (in equatorial view)	35,5–40 (30–44,5) µm (Fig. 1C)	28,5–34 (25,5–37) µm	30–32 (27–35) µm (Fig. 1B)
Ornamentation of pollen grains (SEM)	Perforate-fossulate-reticulate	Perforate-fossulate-reticulate	Fossulate, little perforate



**Fig 1.**

- A. Uniseriate trichome of *S. lusitanicus*.
- B. Pollen grain of *S. lusitanicus* (equatorial view, LM).
- C. Pollen grain of *S. doronicum* (equatorial view, LM).

*S. lusitanicus* is endemic to the west of the Iberian Peninsula (Portugal; Fig. 2), on the other hand *S. doronicum* is distributed in the north of Spain and *S. lagascanus* in the middle north and east of Spain.



**Fig. 2.**

Map of Iberian Peninsula: geographic distribution of *S. lusitanicus* (+).

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# **A new tribe *Platycarpheae* and a new genus *Platycarphella* in the Cichorioideae (Compositae or Asteraceae)**

V. A. FUNK & HAROLD ROBINSON

U.S. National Herbarium, Department of Botany, MRC 166  
National Museum of Natural History  
Box 37012, Smithsonian Institution, Washington, DC., 20013-7012, USA

## **Abstract**

A new tribe *Platycarpheae* with three species is described in the Cichorioideae and two of the species are placed in a new genus *Platycarphella*.

## **Introduction**

The *Platycarpheae* of Namibia and South Africa is validated as a distinct tribe and is found to contain two genera, *Platycarpha* LESS. and a new genus *Platycarphella* V.A. FUNK & H. ROB. The tribe has a total of three species. These two genera form a monophyletic group that is unique in that its members are acaulescent perennial herbs with complicated secondary head structures, leaves that are elongate and prostrate, and stolons that emanate from the crown at the base of the secondary head. This unusual morphology combined with the results of the molecular analysis support the recognition of *Platycarpheae* as a monophyletic group within the subfamily Cichorioideae. According to phylogenies based on molecular data, *Platycarpheae* is on a long branch and it is associated with the base of the Vernoniae-Liabeae clade but this placement is not strongly supported. *Platycarpheae* is hypothesized to be an old radiation because of the many molecular and morphological differences between this lineage and other members of the subfamily.

Each of the three species of the new tribe *Platycarpheae* is easily identifiable. Within the tribe, the monotypic *Platycarpha* and the new genus *Platycarphella* with two species, form a sister group. The two genera are morphologically very distinct in styles, pollen, habit, and leaves. Photographs of all three species are available in FUNK et al. (in press).

## Taxonomy

### **Platycarphaeae V. A. FUNK & H. ROB., tribus nov.**

TYPE: *Platycarpha glomerata* (THUNB.) LESS.

Plantae perennes herbaceae acaulescentes rosettiformes in rhizomatis proliferatae, non laticiferae. Folia pinnate venosa, integra vel pinnate lobata, subtus albotomentosa margine interdum spinosa. Capitula sessilia in capitulis secundariis condensata, bracteis involucri 7–40 in seriebus 3–5 inaequalibus. Flores 3–60 in capitulo bisexuales; corollae purpureae vel roseatae, lobis elongatis, cellulis loborum elongatis laevibus; thecae antherarum base calcaratae non fimbriate vel breviter fimbriate caudatae, in cellulis endothecialibus elongatis apice uninoduliferae, appendices apicales oblongo-ovatae; basi stylorum angusti non noduliferi, scapi stylorum distaliter dense spiculiferi, partibus scapi spiculiferis rami multo brevioribus vel multo longioribus; rami stylorum elongati vel breviores et oblongi vel lineari-lanceolati, in superficiis interioribus omnino stigmatiferi. Achenia 3 aut 5 angulata cylindrica et laevia vel turbinata et inferne rugosa non phytomelaninifera; squamae pappi persistentes albae apice acuminatae non contiguae vel lateraliter imbricatae. Grana pollinis ca. 25 µm in diametro excaveata simpliciter tricolporata et echinata vel prenanthiformia.

Perennial herbs, prostrate, acaulescent, rhizomatous, forming mats and dense colonies or the individuals can be separate from one another; no milky sap. *Leaves* prostrate, radiating from a central crown, in 2–6 rings with oldest leaves in the lowermost ring and larger; blades oblanceolate, lanceolate, elliptic, or linear, varying in length (1–35 × 0.5–11.0 cm), margins entire, dentate, or pinnatisect, adaxially green and mostly glabrous, with or without spines; abaxially with dense, white tomentum. *Inflorescence* sessile, 1–many headed, grouped in a secondary head on the crown, secondary receptacle 2–10 cm in diameter. *Heads* subglobose to cylindrical, discoid, 3–25 mm in diameter. *Involucral bracts* (phyllaries) 7–40 in 3–5 series, lanceolate to linear, usually glabrous (some collections of *P. carlinoides* with tufts of tomentum at apices), outer bracts 6–20 × 1–5 mm, inner bracts becoming smaller and more slender with innermost bracts resembling paleae; margins entire, apices acuminate. *Florets* 3–60, bisexual; corollas purple, mauve, lilac, or pink, occasionally white, varying in size from 8 to 23 mm long, lobes 3.0–3.5 mm long with glands on abaxial surface of apex of each lobe; tubes sparsely hispid at distal end; anthers purple, 4–13 mm, bases of thecae spurred, without or with short fimbriate tails; apical appendages oblong-ovate; styles lavender, 9–29 mm long, in *Platycarpha* the branches longer, terete, hairy nearly to tip, in *Platycarphella* the branches shorter, slightly tapered with hairs scarcely developed distally. *Achenes* 3 or 5 sided, turbinate and wrinkled proximally or long-cylindrical and smooth, glabrous or sparsely hairy basally, dark but without

phytomelanin. *Pappus* of 7–12 persistent white scales 2–6 mm long, apex acuminate, longer and not contiguous in *Platycarpha*, truncated and overlapping in *Platycarphella*.

Traditionally the genus *Platycarpha* has contained three species. In the process of preparing a book chapter (FUNK et al., in press) and a monograph (FUNK & KOEKEMOER, in prep.) two of the species were found to be distinct from the type species. Therefore we here describe a new genus *Platycarphella* to accommodate the two species.

### Key to the genera of the Platycarphaeae

1a. Inflorescence with large compact head or group of heads with (20–) 60–100 florets; corollas 20–23 mm long; style branches 3.0–3.5 mm long, much longer than pubescent upper shaft of style; pollen with bow-tie shaped rims around colpi, with bridge at middle over pore; pappus segments acuminate without overlapping margins ..... *Platycarpha*

1b. Inflorescence with heads smaller, with 3–14 florets; corollas 8–13 mm long; style branches ca. 1 mm long, shorter than pubescent upper part of style shaft; pollen echinate tricolporate, colpi narrowly lenticular without elaborated bow-tie shaped margins or bridge over pore; pappus segments truncate and with overlapping margins ..... *Platycarphella*

The two genera are as follows.

***Platycarpha* LESS.**, *Linnaea* 6: 688. 1831.

Monotypic: *P. glomerata* (THUNB.) LESS.

South-eastern and eastern South Africa.

Vegetative plants are distinct from *Platycarphella* by their larger size and the deeply pinnatisect leaves with spine-tipped lobes.

***Platycarphella* V.A. FUNK & H. ROB., genus nov.**

TYPE: *Platycarpha carlinoides* OLIV. & HIERN

In habitis rosettiforibus acaulescentibus et in inflorescentibus sessilibus *Platycarpham* similis sed in floribus 3–14 versus (20–) 60–100 in capitulo et in corollis 8–13 versus ca. 23 mm longis et in ramis stylorum ca. 1 versus ca. 3 mm longis et in colpis pollini non ornate marginatis distincta.

Perennial, rosettifor, acaulescent plants with sessile inflorescences, proliferating by rhizomes; without latex. Leaves prostrate in rosettes, radiating from a woolly

root crown, leaves oblanceolate, 8–60 mm long, margins entire, somewhat undulating or minutely dentate, rarely pinnatisect. Inflorescences of secondary heads; heads with 3–14 florets; corollas 8–13 mm long; style branches ca. 1 mm long, shorter than the papillose part of the upper shaft of the style; branches slightly tapered, papillae or hairs becoming obsolete toward tips. Pappus of truncated and overlapping white scales. Pollen grains echinate, tricolporate, without elaborated border on colpi and without bridge across pore, non-caveate. – Species 2.

***Platycarphella carlinoides* (OLIV. & HIERN) V.A. FUNK & H. ROB., comb. nov.**

*Platycarpha carlinoides* OLIV. & HIERN, Fl. Trop. Afr. 3: 430, 1877.

Namibia and South Africa.

***Platycarphella parvifolia* (S. MOORE) V.A. FUNK & H. ROB., comb. nov.**

*Platycarpha parvifolia* S. MOORE, J. Bot. 41: 136, 1903.

South Africa.

### Acknowledgements

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# The South African aquatic genus *Cadiscus* (Compositae-Senecioneae) sunk in *Senecio*

BERTIL NORDENSTAM<sup>1</sup>, PIETER B. PELSER<sup>2</sup> & LINDA E. WATSON<sup>2</sup>

<sup>1</sup>Department of Phanerogamic Botany  
Swedish Museum of Natural History  
Box 50007, S-104 05 Stockholm, Sweden  
bertil.nordenstam@nrm.se

<sup>2</sup>Oklahoma State University, Botany Department  
104 Life Sciences East, Stillwater  
Oklahoma 74078-3013, USA  
pieter.pelsler@okstate.edu  
linda.watson10@okstate.edu

## Abstract

The South African monotypic genus *Cadiscus* E.MEY. ex DC. (Asteraceae–Senecioneae) is an aquatic herb with some morphological features that are unusual in the tribe (white ray-florets and coarse, awn-like pappus bristles) and others that are reminiscent of species of subtribe Othonninae (ecalyculate capitula, relatively few, broad and connate involucre bracts, and sterile disc-floret styles). Unexpectedly, however, both plastid and nuclear phylogenies provided strong evidence that the genus is deeply nested in *Senecio* s.str. of subtribe Senecioninae. The unusual morphology is explained as adaptations to an aquatic habitat, and the genus is sunk in *Senecio* as *Senecio cadiscus* B.NORD. & PELSER, nom. nov.

## Introduction

*Cadiscus* E.MEY. ex DC. is a monotypic genus of the tribe Senecioneae erected for *Cadiscus aquaticus* E.MEY. ex DC., a rare and endangered aquatic herb confined to a few seasonal ponds or vernal pools in the Western Cape Province of South Africa. DE CANDOLLE (1838) placed it among Compositae incertae sedis, and later authors (e.g., BENTHAM 1873a, 1873b, HARVEY 1865, HEMSLEY 1887) treated the genus in the Helenieae on the basis of its coarse and rigid pappus (ORNDUFF et al. 1967). In 1967, ORNDUFF et al. noticed morphological similarities between *Cadiscus* and *Othonna* and allied genera and referred the genus to the Senecioneae, which was followed by later authors (e.g., NORDENSTAM 1968, 1977, 2007, BREMER 1994).

More specifically, ORNDUFF et al. (1967) sought its affinities among members of subtribe Othonninae with which *Cadiscus* shares an ecalyculate involucre composed of relatively broad phyllaries that are connate in their basal half, a chromosome number of  $n = 10$ , sterile disc floret styles, and white ray florets. These features are, however, not present in all Othonninae species. In addition, the styles of *Cadiscus* are quite different from those of *Othonna*. The *Cadiscus* style is distinctly branched, has a truncate tuft of sweeping-hairs, and even shows traces of a divided stigmatic surface on the inside of the branches, whereas the *Othonna* style is simple, apically obtuse or conical with a collar of very short sweeping-hairs or papillae, and no stigmatic surface. In addition, taxa with white rays do occur in different genera within Senecioneae (e.g., *Dolichoglottis*, *Urostemon*, *Dauresia*, *Stenops*, *Senecio* s. str.) and not only in South Africa. The assignment of *Cadiscus* to the Othonninae has therefore remained dubious or at least uncertain, and NORDENSTAM (1968 p. 31f.) remarked that “the closer affinities of this little-known genus should be further investigated”. Indeed, with its elongated stems rooting in the mud, erect flowering shoots with linear or lanceolate leaves, ecalyculate capitula borne singly on simple peduncles from the upper leaf-axils, a uniseriate involucre of 8 to 10 partly connate phyllaries, coarse, basally flattened pappus bristles of ray-florets, and sterile disc-floret styles, *C. aquaticus* is unique in Senecioneae and has therefore been hard to place.

Our ongoing molecular systematic studies in the Senecioneae recently shed new light on the phylogenetic affinities of *Cadiscus*, placing it nested within *Senecio* s.str. (sensu PELSNER et al. 2007). This phylogenetic position is well supported in both nuclear and plastid trees (PELSNER et al. in prep.), and we therefore advocate a transfer of the single species of *Cadiscus* to *Senecio*.

***Senecio cadiscus* B. NORD. & PELSNER, nom. nov.**, pro *Cadiscus aquaticus* E.MEY. ex DC., Prodr. 7(1): 255 (1838), non *Senecio aquaticus* HILL nec *S. aquaticus* LOISEL. nec *S. aquaticus* BOISS. - Lectotype (designated here): South Africa, [Western Cape], Zwartland in Dumpfel R. I., DRÈGE 1734, “*Cadiscus aquaticus* E.M.” (G-DC sheet 1).

Original material collected by DRÈGE is present in other herbaria, viz. DRÈGE s.n. , “*Cadiscus aquaticus* E.M. a” (G-DC, K, NY, S, SAM); “*Cadiscus aquaticus* E.M. b” (S). – DE CANDOLLE (1838) cites the locality as “ad Zwartland, in Dumpfel”, whereas DRÈGE (1843) has two more generalized localities, viz., “Am Dassenberg, (zwischen Paardeberg und Groenekloof), unter 500 Fuss. September” (litt. a on his herbarium labels; DRÈGE 1843, p. 102), and “Zwischen Groenekloof und Saldanhabaai, unter 500 Fuss. September, October” (litt. b; DRÈGE 1843, p. 113).

The lectotype chosen here is the only specimen with locality statement agreeing exactly with the protologue.

Some of the morphological peculiarities of the species are no doubt explained by the unusual habitat. The development of narrow leaves, some of which may be floating, and white flowers, is reminiscent of other water plants such as subgenus *Batrachium* of *Ranunculus* (Ranunculaceae). The coarse and awn-like pappus bristles may be an adaptation to zoochory, perhaps dispersal by waterfowl. This may also be an explanation for the presence of myxogenic hair tufts on the cypsela base. Mucilaginous cypsela hairs, due to being soaked in water, occur in different taxa within the subtribe Senecioninae, particularly among those adapted to dry areas (e.g., *Bolandia*, *Dauresia*, *Euryops* spp., *Jacobaea*, *Mesogramma*, *Psednotrichia*), however the concentration of such hairs to the basal part of the fruit is an unusual or even unique feature. The flowering capitula of *S. cadiscus* are exposed to pollinators on erect peduncles above the water surface, but its fruiting heads seem to be borne more or less at the water surface level (Fig. 1). A possible dispersal scenario is that in the fruiting stage, when the phyllaries are broken up and shed, the fruits are exposed to dispersal agents. In this stage, the mucilage on the cypsela base might make the fruits adhere to the receptacle until the coarse pappus bristles stick to a disperser, such as a waterfowl, and the diaspore is carried away. Observations on dispersal agents and mechanisms should be made in order to confirm these speculations and empirically ascertain the role of the unusual pappus and myxogenic cypsela hairs.

*Senecio cadiscus* is locally endemic in the Western Cape Province, nowadays endangered and found only in some vernal pools or ponds between Malmesbury and Hopefield (GOLDBLATT 1978, BOND & GOLDBLATT 1984, GOLDBLATT & MANNING 2000). In 2007, ERNST VAN JAARSVELD found the species to be still locally common in ponds at Philadelphia turnoff from Malmesbury road (Tierhoogte) and at Mamre Road near Darling.

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**Fig. 1.**

*Senecio cadiscus* B. NORD. & PELSER in its natural habitat, South Africa, Western Cape Province, Hopefield, August 1995. Photo J. MANNING.

# ***Lomanthus*, a new genus of the Compositae-Senecioneae from Ecuador, Peru, Bolivia and Argentina**

**B. NORDENSTAM<sup>1</sup>, P. B. PELSER<sup>2</sup> & L. E. WATSON<sup>2</sup>**

**<sup>1</sup>Department of Phanerogamic Botany**

**Swedish Museum of Natural History**

**P.O. Box 50007, S-104 05 Stockholm, Sweden**

**bertil.nordenstam@nrm.se**

**<sup>2</sup>Oklahoma State University, Botany Department**

**104 Life Sciences East, Stillwater, Oklahoma 74078-3013, USA**

**pieter.pelsler@okstate.edu**

**linda.watson10@okstate.edu**

## **Abstract**

*Lomanthus* B. NORD. & PELSER is segregated from *Senecio* L. as a new genus of the Compositae-Senecioneae. It is distributed in Ecuador, Peru and Bolivia, from coastal lowlands to Andean upper slopes, with two species also extending into Argentina. The 17 species so far recognized are perennial herbs or subshrubs with usually lobed or incised leaves that are often densely tomentose beneath, sessile or pseudo-petiolate, and often have auriculate and sometimes decurrent bases. In corolla and style morphology *Lomanthus* resembles genera like *Dorobaea* and *Talamancalia*, which also have relatively long corolla tubes, tubular and gradually widening disc floret corollas, and obtuse style tips with short and few sweeping-hairs. Molecular evidence from nuclear and plastid DNA sequences place *Lomanthus* in a clade with i.a. *Dorobaea*, *Talamancalia*, *Charadranaetes*, *Pseudogynoxys*, and *Werneria*. All of these are Central and South American genera with a distant position within subtribe Senecioninae in relation to the core genus *Senecio*.

## **Introduction**

The tribe Senecioneae is one of the largest tribes of the Compositae with about 3,500 species in c. 160 genera and a worldwide distribution. During ongoing phylogenetic studies of nuclear and plastid DNA sequences (PELSER et al. 2007, PELSER et al. in prep.), the generic limits within the tribe have been clarified and

better defined and it has been possible to circumscribe the core genus *Senecio* as a monophyletic taxon (PELSER et al. 2007, NORDENSTAM et al. 2009). In this process some traditionally recognized genera had to be included in *Senecio*, and some groups within *Senecio* need to be segregated as separate genera. Among the latter is an assemblage of South American species corresponding to the ten species of *Senecio* sect. *Senecio* ser. *Lomincola* H. BELTRÁN & GALÁN DE MERA (BELTRÁN & GALÁN DE MERA 1996) and seven additional species (*Senecio albaniae* H. BELTRÁN, *S. bangii* RUSBY, *S. fosbergii* CUATREC., *S. mollendoensis* CABRERA, *S. putcalensis* HIERN, *S. subcandidus* A. GRAY, and *S. velardei* CABRERA). The close relationships between ser. *Lomincola* and some of these seven species was first suggested by BELTRÁN (2002) on the basis of morphological resemblance and is supported in our ongoing molecular systematic studies of the Senecioneae which included sequences of *Senecio abadianus* DC., *S. albaniae*, *S. arnaldii* CABRERA, *S. bangii*, *S. cerrateae* CABRERA, *S. fosbergii*, *S. lomincola* CABRERA, *S. tovari* CABRERA, and *S. yauyensis* CABRERA. These nine species were found to form a well supported clade with the Central and South American genera *Caxamarca*, *Charadranaetes*, *Dorobaea*, *Garcibarrigoa*, *Jessea*, *Misbrookea*, *Pseudogynoxys*, *Talamancalia*, *Werneria*, and *Xenophyllum* (PELSER et al. in prep.). This assemblage is only remotely related to *Senecio* s.str. and also different in morphology, as detailed below. Its distant relationship to *Senecio* s.str. was already noticed by NORDENSTAM & PRUSKI (1995) and NORDENSTAM (1996), who transferred two of its species (*Senecio putcalensis* and *S. fosbergii*) to *Talamancalia*. Our DNA sequence studies, however, indicate that this assemblage does not form a monophyletic group with *Talamancalia* s.str. (PELSER et al. in prep.) and should be described as a new genus, which we name *Lomanthus* B. NORD. & PELSER.

### Description and discussion

***Lomanthus*** B. NORD. & PELSER, gen. nov.

Type: *Lomanthus arnaldii* (CABRERA) B. NORD. & PELSER.

Herbae perennes vel suffrutices aut frutices humiles erecti ramosi. Folia alterna caulina membranacea plana sessilia vel breviter petiolata aut pseudo-petiolata integra vel lobati-pinnatisecta pinnatinervia supra subglabra subtus plerumque tomentosa, margine interdum serrata vel dentata, basi saepe auriculata. Capitula pauca vel plures cymoso-corymbosa, raro solitaria et longe pedunculata, heterogama radiata floribus flavis vel aurantiacis. Involucrum campanulatum calyculatum; involucri bractee 13–21 uniseriatae lineari-lanceolatae attenuatae. Receptaculum nudum alveolatum. Flosculi radii feminei fertiles, tubus longe cylindricus, lamina plerumque 5-venosa. Flosculi disci numerosi hermaphroditi, corolla tubulosa e tubo longo cylindrico sensim ampliata 5-lobata. Antherae

ecaudatae. Styli rami apice obtusi vel subtruncati pilis efferentibus brevibus, areis stigmaticis separatis. Cypselae oblongae teretes costatae breviter villosae. Pappi setae numerosae bi- vel pluriseriatae minute barbellatae albae persistentes.

Perennial herbs, subshrubs or shrubs, erect, branching, often from the base, pubescent, sometimes glabrescent. Leaves cauline, alternate, membranaceous (herbaceous), flat, sessile or shortly petiolate or pseudo-petiolate, often with auriculate leaf-base and/or winged petiole, entire or lobate-pinnatisect, pinnately veined, margins often dentate or serrate, often glabrous above or nearly so and usually densely tomentose beneath. Capitula few to several in cymose-corymbose arrangement, rarely solitary on elongated peduncles, heterogamous, radiate, yellow- or orange-flowered. Peduncles sparsely bracteolate. Involucre campanulate, calyculate; calyculus bracts few–several, narrowly linear–filiform; involucre bracts uniseriate, 13–21, linear-lanceolate–narrowly oblong, attenuate. Receptacle flat, nude, alveolate. Ray florets female, fertile; tube cylindric, 4–8 mm long; lamina strap-shaped, apically 3-toothed, 5(rarely 4–7)-veined. Disc florets numerous, hermaphroditic; corolla tubular with a rather long tube (often 5 mm or more), mostly gradually widening upwards, 5-lobed, glabrous or minutely glandular-pubescent at the junction between tube and limb; lobes lanceolate to narrowly ovate, midveined and with lateral veins. Anthers ecaudate, basally obtuse; endothelial tissue mainly radial or transitional with some cells with polar thickenings, apical appendage narrowly ovate–oblong-lanceolate, obtuse; filament collar elongate balusterform with basal cells somewhat dilated. Style branches apically obtuse–subtruncate with short sweeping-hairs, stigmatic surfaces inside separated; dorsal side minutely papillate distally. Cypselas oblong, terete, with 5–8 ribs and veins, shortly villous with papilliform mucilaginous duplex hairs; ovary wall crystals small, plate-like, hexagonal–rectangular or subquadratic; carpodium of 3–5 cell rows. Pappus bristles bi- or pluriseriate from an annular disc wider than the cypselas, very minutely barbellate with lax and short acute teeth, white, persistent.

The new genus is distinct from *Senecio* s.str. in floral morphology, both ray and disc florets mostly having relatively long tubes, and the disc corolla is usually gradually widening upwards, not conspicuously differentiated in a distinct tube and campanulate limb as is common in *Senecio* and related genera. In *Dorobaea* and *Talamancalia* the tubular corolla is even more extreme and the corolla lobes are more elongated, almost lanceolate. In the three genera *Dorobaea*, *Talamancalia* and *Lomanthus* the corolla lobes are midveined. A special feature of *Lomanthus* is the 5-veined rays, whereas *Senecio* and most other members of the subtribe Senecionineae usually have 4-veined rays. The disc floret style is subtruncate to obtuse with rather short and few sweeping-hairs in contrast to the typical *Senecio* style-branch, which is truncate with a distinct brush of sweeping-hairs.

In *Dorobaea* and *Talamancalia* the style branch tips are even more obtuse and provided with a short collar of sub-apical sweeping-hairs or small sub-apical and lateral tufts. The cypselar hairs in *Lomanthus* are generally short and myxogenic, the anther collars are elongated balusterform and the apical anther appendage is narrow, more lanceolate or narrowly oblong than ovate. In vegetative morphology, *Lomanthus* is different from most South American *Senecio* species in having a usually densely tomentose indumentum on the lower leaf surface, sometimes with strongly septate multicellular hairs. A tomentose indumentum is, however, also found in several Peruvian *Senecio* species such as *S. calcensis* CABRERA & ZARDINI and *S. mandonianus* WEDD. *Lomanthus* species have divided or at least serrate leaves. The leaf-bases are often characteristically auriculate and frequently half-clasping, sometimes decurrent on the stem.

Pending a taxonomic revision we presently refer 17 species to the new genus. They are low subshrubs or perennial herbs with the majority of species in Peru, a few in southern Ecuador and also in Bolivia and Argentina. Some of the species are characteristic of the ‘lomas y cerros bajos’ of Peruvian littoral areas. The generic name is formed from the Spanish ‘loma’ = hillock, hummock.

### 1. *Lomanthus abadianus* (DC.) B. NORD. & PELSER, comb. nov.

Basionym: *Senecio abadianus* DC., Prodr. 6: 423 (1838). – Type: Peru, “circa Limam” (not located; missing in G-DC).

Syn.: *Senecio pulchrifolius* CABRERA, Bol. Soc. Peruana Bot. 2: 23 (1950). – Type: Peru, Dep. Lima, Lomas de Atocongo, 200–300 m, 28.VIII.1946, M. O. VELARDE NUÑEZ 277 (LP holotype).

This Peruvian species occurs from low altitude ‘lomas’ to Andean upper slopes (200–3400 m, Dep. Lima, Arequipa and Moquegua).

DE CANDOLLE (1838) also recognized a variety, viz. *Senecio abadianus* DC. var. *araneosus* DC. The type is missing in G-DC and the taxonomic status of the variety is not clear.

### 2. *Lomanthus albaniae* (H.BELTRÁN) B. NORD. & PELSER, comb. nov.

Basionym: *Senecio albaniae* H. BELTRÁN, Novon 12: 35 (2002). – Type: Peru, Dep. Lima, Huarochiri, San Pedro de Casta, Mashca, Camino del pueblo San Pedro de Casta hacia Marcahuasi, 11°46’S, 76°35’W, 3680 m, 21.V.2000, H. BELTRÁN 3474 (USM holotype; B, F!, HAO, HUT, MO, NY, S!, TEX, US isotypes).

*Lomanthus albaniae* is known from mid- to high elevations (1900–3680 m) in Peru (Dep. Lima) and Argentina (Prov. Catamarca, Mendoza, and Salta).

**3. *Lomanthus arnaldii* (CABRERA) B. NORD. & PELSER, comb. nov.**

Basionym: *Senecio arnaldii* CABRERA, Notas Mus. La Plata, Bot. 18(89): 203 (1955). – Type: Peru, Dep. La Libertad, Prov. Trujillo, Lomas de Virú, 500 m, 3.IX.1949, A. LÓPEZ MIRANDA 0383 (LP holotype!, HUT isotype!).

The species is readily recognized by the large and deeply pinnatisect leaves which are white-tomentose beneath. It has been recorded in Ecuador (Prov. Loja) and Peru (Dep. Arequipa, Cajamarca, La Libertad, and Lambayeque) between 1700 and 3600 m.

**4. *Lomanthus bangii* (RUSBY) B. NORD. & PELSER, comb. nov.**

Basionym: *Senecio bangii* RUSBY in Mem. Torrey Bot. Club 3, no. 3: 64 (1893). – Type: Bolivia, Oruru, Capi, III.1890, M. BANG 778 (NY holotype, F isotype!).

*Lomanthus bangii* is a species growing at relatively high elevations (2900–3070 m) in Argentina (Prov. Rio Negro) and Bolivia (Dep. La Paz).

**5. *Lomanthus calachaquensis* (CABRERA) B. NORD., comb. nov.**

Basionym: *Senecio calachaquensis* CABRERA, Notas Mus. La Plata, Bot. 18(89): 227 (1955). – Type: Peru, Dep. Lima, Prov. Huarochirí, Calachaca, cerca a la primera cumbre entre Santiago de Anchucaya y Tuctucocha, en monte rígido a 3900 m s.m., 14.V.1953, EMMA CERRATE 1886 (LP holotype!, MO isotype).

A species of central Peru (Dep. Ancash and Lima; VISION & DILLON, 1996) at altitudes between 2000 and 4000 m. Although CABRERA considered it related to *S. cuatrecasasi* CABRERA, this species seems to belong to *Lomanthus*. It was assigned to *Senecio* ser. *Lomincola* by BELTRÁN & GALÁN DE MERA (1996).

**6. *Lomanthus cerrateae* (CABRERA) B. NORD. & PELSER, comb. nov.**

Basionym: *Senecio cerrateae* CABRERA (“*cerratei*”), Notas Mus. La Plata, Bot. 18(89): 201 (1955). – Type: Peru, Dep. Lima, Prov. Huarochirí, alrededores de Anchuca, al NW. de Huarochirí, en monte bajo a 3600 m, 15.V.1953, EMMA CERRATE 1916 (LP holotype!).

A species of high altitude in Peru (Dep. Lima; VISION & DILLON 1996) with glabrous leaves, which are distinctly lobed and have dentate margins.

**7. *Lomanthus fosbergii* (CUATREC.) B. NORD. & PELSER, comb. nov.**

Basionym: *Senecio fosbergii* CUATREC., Fedde Repert. 55: 138 (1953). – Syn.: *Talamancalia fosbergii* (CUATREC.) B. NORD., Comp. Newsl. 29: 49 (1996). – Type: Ecuador, Loja, NE slope of Cerro Mataperro 3 km SW San Pedro, 10 km WNW of Catamayo, 1815 m, 10.II.1945, F. R. FOSBERG & M. A. GILER 22946 (US holotype!).

This species is related to *L. putcalensis*, differing by the larger and less dissected leaves, distinctly winged petioles and auriculate leaf-bases. It seems to be restricted to the Catamayo valley in the Loja district of southern Ecuador (cf. NORDENSTAM 1996).

**8. *Lomanthus icaensis* (H.BELTRÁN & GALÁN DE MERA) B. NORD., comb. nov.**

Basionym: *Senecio icaensis* H.BELTRÁN & GALÁN DE MERA, Anales Jard. Bot. Madrid 55(1): 168, fig. (1997). – Type: Peru, Dep. Arequipa, Prov. Caraveli, Los Cerrillos, al sur de Nazca, km 500 de la Panamericana Sur, 650–700 m, 26.VIII.1957, K. RAHN 104 (USM 29343 holotype).

**9. *Lomanthus lomincola* (CABRERA) B. NORD. & PELSNER, comb. nov.**

Basionym: *Senecio lomincola* CABRERA, Notas Mus. La Plata, Bot. 18(89): 195 (1955). – Type: Peru, Dep. Lima, Prov. Chancay, Lomas de Lachay, 700 m, X.1949, O. VELARDE NÚÑEZ 2247 (LP holotype!).

Widespread in Dep. Lima, Ancash, and Arequipa (VISION & DILLON 1996) at lower altitudes (300–900 m). This species is related to *L. abadianus* but differs by shortly lobed and acutely dentate leaves.

**10. *Lomanthus mollendoensis* (CABRERA) B. NORD., comb. nov.**

Basionym: *Senecio mollendoensis* CABRERA, Bol. Soc. Argent. Bot. 10: 35 (1962). – Type: Peru, Mollendo, R. S. WILLIAMS 2529 (K holotype).

A species found in Peru (Dep. Arequipa; VISION & DILLON 1996) at low altitudes (350–450 m).

**11. *Lomanthus okopanus* (CABRERA) B. NORD., comb. nov.**

Basionym: *Senecio okopanus* CABRERA, Bol. Soc. Argent. Bot. 10: 36, fig. 6 (1962). – Type: Peru, Dep. Arequipa, Prov. Caravelí, lomas de Chaparra, cerca de Chala, 400–500 m, 14.X.1956, R.A. FERREYRA 11975 (LP holotype!; F, USM isotypes).

**12. *Lomanthus putcalensis* (HIERON.) B. NORD., comb. nov.**

Basionym: *Senecio putcalensis* HIERON., Bot. Jahrb. Syst. 28: 635 (1901). – Syn.: *Talamancalia putcalensis* (HIERON.) B. NORD. & PRUSKI, Comp. Newsl. 27: 35 (1995). – Type: Ecuador, Pucala near Loja, 1800–2400 m, Oct. (year not given), LEHMANN 8007 (K lectotype!, selected by NORDENSTAM & PRUSKI 1995); B holotype, destroyed, photograph US!; K isotype!).

A rare species from the Loja and Chirinos districts in southern and northwestern Ecuador (NORDENSTAM & PRUSKI 1995), more recently also found in Peru (BELTRÁN

& PRUSKI 2000).

**13. *Lomanthus subcandidus* (A. GRAY) B. NORD., comb. nov.**

Basionym: *Senecio subcandidus* A. GRAY, Proc. Amer. Acad. Arts v. 141 (1861). – Type: Peru, Obraillo, Wilkes Expedition, GH 12206 (GH fragment, isotype).

*Lomanthus subcandidus* is found in Peru (Dep. Ancash, Arequipa, Cajamarca, Huanuco, and Lima; VISION & DILLON 1996) at various altitudes (180–3600 m). The taxonomic status and affinities of the varieties distinguished, viz. var. *glabrescens* CUATREC., var. *minor* A. GRAY, and var. *pinnatifidus* CUATREC., need further study.

**14. *Lomanthus tovari* (CABRERA) B. NORD. & PELSNER, comb. nov.**

Basionym: *Senecio tovari* CABRERA, Notas Mus. La Plata, Bot. 18(89): 198 (1955). – Type: Peru, Dep. Lima, arriba de Surco, 2000 m, 20.V.1949, R. FERREYRA 6056 (LP holotype!).

Distributed in Peru (Dep. Lima, Ayacucho, and Arequipa) at (100–)1800–3300 m.

**15. *Lomanthus truxillensis* (CABRERA) B. NORD., comb. nov.**

Basionym: *Senecio truxillensis* CABRERA, Notas Mus. La Plata, Bot. 18(89): 199 (1955). – Type: Peru, Dep. La Libertad, Prov. Trujillo, Cerro Campana, 550 m, 14.VIII.1948, A. LÓPEZ MIRANDA 0175 (LP holotype!, HUT isotype!).

A Peruvian species of mostly lower altitudes, 300–750(–2300) m, in the hills of Dep. Ancash, Cajamarca, and La Libertad (VISION & DILLON 1996). Its leaves are entire with sinuate-dentate margins.

**16. *Lomanthus velardei* (CABRERA) B. NORD. & PELSNER, comb. nov.**

Basionym: *Senecio velardei* CABRERA, Notas Mus. La Plata, Bot. 15(75): 109 (1950). – Type: Peru, Dep. Lima, Prov. Canta, Canta, 2500–2600 m, 23.V.1948, O. VELARDE 1024 (LP holotype! isotype!).

This species has large dissected and abaxially tomentose leaves somewhat like *L. arnaldii*, but the leaves are assembled near the base of the hexagonal stem, and the leaves are more profoundly dissected, more or less bipinnatisect, and the capitula are smaller and the rays shorter.

**17. *Lomanthus yauyensis* (CABRERA) B. NORD. & PELSNER, comb. nov.**

Basionym: *Senecio yauyensis* CABRERA, Notas Mus. La Plata, Bot. 18(89): 205, fig. 4 (1955) (same as Not. Mus., Eva Peron, Bot., 18: 205.1955). – Type: Peru, Dep. Lima, Prov. Yauyos, Chiella, cerro frente a Tupe, 3750 m, 10.I.1952, E. CERRATE & O. TOVAR 1140 (LP holotype!, MO isotype!).



Found in Central and South Peru (Dep. Arequipa, Lima, Cajamarca) at 3200–3900 m.

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## New taxa and combinations in this issue

- Gynoxys tabaconasensis* H. BELTRÁN & S. BALDEÓN, sp. nov.: p. 14
- Lomanthus* B. NORD. & PELSNER, gen. nov.: p. 34
- Lomanthus abadianus* (DC.) B. NORD. & PELSNER, comb. nov.: p. 36
- Lomanthus albaniae* (H. BELTRÁN) B. NORD. & PELSNER, comb. nov.: p. 36
- Lomanthus arnaldii* (CABRERA) B. NORD. & PELSNER, comb. nov.: p. 37
- Lomanthus bangii* (RUSBY) B. NORD. & PELSNER, comb. nov.: p. 37
- Lomanthus calachaquensis* (CABRERA) B. NORD., comb. nov.: p. 37
- Lomanthus cerrateae* (CABRERA) B. NORD. & PELSNER, comb. nov.: p. 37
- Lomanthus fosbergii* (CUATREC.) B. NORD. & PELSNER, comb. nov.: p. 37
- Lomanthus icaensis* (H. BELTRÁN & GALÁN DE MERA) B. NORD., comb. nov.: p. 38
- Lomanthus lomincola* (CABRERA) B. NORD. & PELSNER, comb. nov.: p. 38
- Lomanthus mollendoensis* (CABRERA) B. NORD., comb. nov.: p. 38
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