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## New species and new records of the flora in Amotape-Huancabamba Zone: Endemics and biogeographic limits

### Nuevos registros y nuevas especies de la flora de la zona de Amotape- Huancabamba: Endemismos y límites biogeográficos

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#### Abstract

The taxonomy of the *Ribes andicola* group and *Urtica* is investigated for the relict forests in the Amotape-Huancabamba Zone and especially the relict forests of NW Peru. Three new species of *Ribes* are described, *Ribes contumazensis* as local endemic from Contumazá, *R. colandina* as widespread across the Andes from Lambayeque and La Libertad to Amazonas and *R. sanchezii* as endemic to forests overlooking the Marañón. Additionally, Ecuadorean *R. austroecuadorensis* is recorded for the first time from Peru from forest relicts in Huancabamba (Piura) and Chota (Cajamarca). Two new species of *Urtica* are described, *U. urentivelutina* as a local endemic on the slopes overlooking the Marañón near Chagual (La Libertad), and *U. lalibertadensis* which is widespread in La Libertad from Otuzco to Tayabamba. *Urtica longispica* is reported as new to the flora of Peru and *U. macbridei* is reported from northern Peru for the first time. Both *Urtica* and the *Ribes andicola* group can be considered as indicators of former forest cover, since they tenaciously persist after the felling of the forests. Their distribution indicates that a) some of the current forest fragments were once largely coherent forest belts (e.g., those of Santa Cruz and San Miguel) and b) some areas which have no coherent forest cover at present once had large and coherent montane forests (e.g., large parts of the Prov. Otuzco). Comparing the known distribution data for *Urtica*, the *Ribes andicola* group, the *Passiflora lobbii* group and *Nasa* (Loasaceae) it becomes evident, that a) the relict forests are still very poorly known, b) they are exceptionally rich in narrowly endemic taxa, some of which are here described and many of which undoubtedly remain to be discovered and c) they represent southernmost outposts for many Ecuadorean species and species groups.

**Key words:** *Urtica*, *Ribes*, relict forests, biodiversity, Amotape-Huancabamba zone.

#### Resumen

Se investiga la taxonomía del grupo de *Ribes andicola* y *Urtica* para los bosques relictos presentes en la zona de Amotape-Huancabamba y especialmente aquellos de la vertiente NO del Perú. Se describen tres nuevas especies de *Ribes*: *Ribes contumazensis* como especie local endémica de Contumazá, *R. colandina* distribuida en los Andes desde Lambayeque y La Libertad hasta Amazonas y *R. sanchezii* como endémica a los bosques de altura del Marañón. Adicionalmente, la especie ecuatoriana *R. austroecuadorensis* es registrada por primera vez para el Perú procedente de los bosques relictos de Huancabamba (Piura) y Chota (Cajamarca). Así mismo, se describen dos nuevas especies de *Urtica*: *U. urentivelutina*, endémica local a las laderas altas del Marañón cerca a Chagual (La Libertad), y *U. lalibertadensis* distribuida desde Otuzco hasta Tayabamba en el departamento de La Libertad. *Urtica longispica* es registrada como nueva especie para la flora del Perú y *U. macbridei* es registrada por primera vez para el norte del Perú. *Urtica* y el grupo *Ribes andicola* pueden ser considerados como indicadores de la cubierta de bosques anteriores, puesto que persisten después que los bosques han sido talados. Su distribución indica que a) alguno de los actuales fragmentos de bosque fueron alguna vez grandes bosques coherentes a modo de una faja continua (como los de Santa Cruz y San Miguel) y b) algunas áreas que en el presente no tienen ninguna cubierta de bosques continuos, en el pasado fueron grandes y coherentes bosques montanos (e.g., grandes partes de la Prov. Otuzco). Comparando los datos de distribución conocida para *Urtica*, el grupo de *Ribes andicola*, el grupo de *Passiflora lobbii* y *Nasa* (Loasaceae), es evidente, que a) los bosques relictos son aún muy pobremente estudiados, b) ellos son excepcionalmente ricos en taxa estrechamente endémicos, algunos de los cuales son aquí descritos y muchos de ellos indudablemente permanecen aún sin ser descubiertos y c) ellos representan los límites más sureños para muchas especies ecuatorianas y ciertos grupos de especies.

**Palabras claves:** *Urtica*, *Ribes*, bosques relictos, biodiversidad, zona de Amotape-Huancabamba.

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## Introduction

The existence of relict forests in NW Peru has been known for a long time and their ecology is discussed at length in, e.g., Koepcke (1961). The most well-known forest fragments from a botanical point of view are found in the Department of Cajamarca (Bosque de Cutervo, Bosque de Monte Seco, Bosque de Cachil), but there are actually quite a large number of forest fragments also in Piura, Lambayeque and La Libertad. These relict forests are largely found on the western slope of the Andes and in the upper reaches of the interandean valleys. The northern parts of the Department Cajamarca (Provinces Jaén and Cajamarca) also have some interandean forests which are more or less continuous with the eastern slopes of the Andes (Depto. Amazonas).

Recent years have led to the description of numerous new and usually narrowly endemic taxa of various plant families from these forest fragments. However, there are still many plant groups which are very incompletely known in these relict forests, including some abundant and widespread elements. The present article wants to resolve some taxonomic questions in *Ribes* (Grossulariaceae) and *Urtica* (Urticaceae), both of which are typical and often abundant elements of the cloud forest vegetation and - unlike many other plant groups - persist for a long time in former cloud forest areas, which have been cleared for agriculture. Both *Urtica* and *Ribes* are then found in hedges and along dry stone walls. Since both taxa are present throughout the year and often dominant or subdominant in the vegetation we would expect them to be very well documented in herbaria, i.e., we would think that their documentation would be a good indicator of how much we actually know about the flora of the relict forests. Conversely, a forest from which neither of the genera is documented can be considered as botanically virtually unknown. Both genera have not been taxonomically

revised for a very long time - the last monograph including South American *Ribes* is nearly 100 years old (Janczewski, 1907) and the last comprehensive treatment of *Urtica* is over 135 years old (Weddell, 1869). The Flora of Peru (1941) treatments for both taxa are best completely ignored.

Additionally, both genera have numerous widespread species and are thus useful for looking for phytogeographic relationships. The data are presented in the context of the phytogeography of the Amotape-Huancabamba Zone, so that distribution data will be given for all relevant taxa from the region. The following questions will be addressed:

- Which taxa of the respective groups are found in the relict forests of NW Peru?
- What are the phytogeographical affinities of the taxa associated with the relict forests?
- Are they mostly narrowly endemic, or are they mostly wide-ranging taxa?
- From which of the known forest fragments are *Urtica* and/or *Ribes* documented?

## Materials and methods

Field studies were carried out in all Andean departments of Peru between 1997 and 2004. Additionally, herbarium material was revised in all major international herbaria (*Ribes*) or a selection of European herbaria and the local Peruvian herbaria (*Urtica*). All protologues and, where necessary, type elements were studied for identification.

## Results

### *Urtica* (Urticaceae)

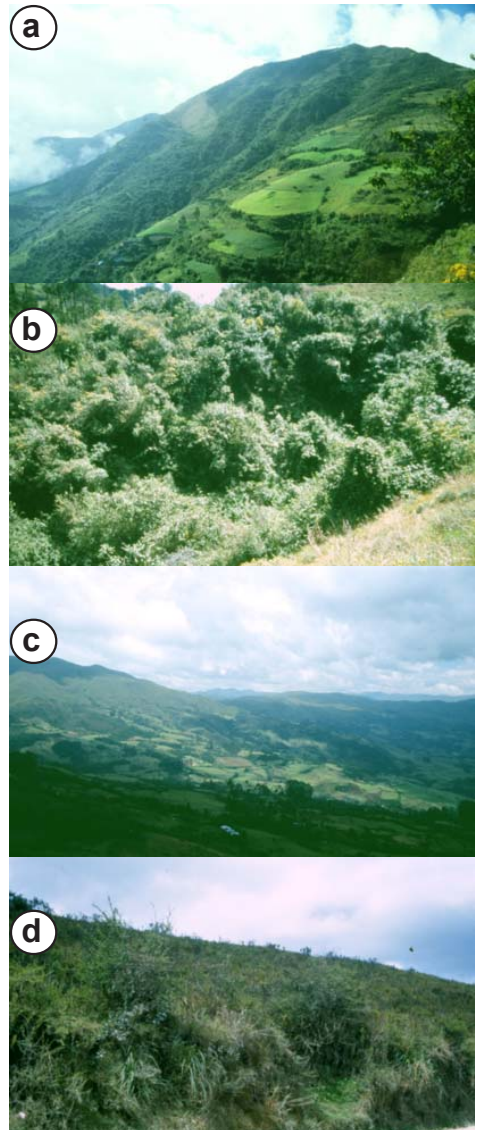
#### *Urtica* in northern Peru

The genus *Urtica* is present with 6 native species in Peru (according to Brako & Zarucchi, 1993), since then one new species has been described from the relict forests in NW Peru (Prov. Contumazá, Depto. Cajamarca; Geltman, 1998). The Peruvian *Urtica* can be tentatively subdivided into two

ecological groups, a high-Andean group of relatively small annual or perennial herbs ( $<<0.5$  m, *U. echinata*, *U. trichantha*, *U. flabellata*) from paramo and puna habitats and a second group from intermediate elevations which is found in cloud forest and in places where cloud forest has been replaced by secondary vegetation due to anthropic activity. The latter taxa are all perennial, often suffrutescent or lianescent with at least basally woody shoots, have at least basally united stipules and are much larger ( $>1$  m, sometimes  $>5$  m) and include the taxa *U. macbridei*, *U. ballotaefolia*, *U. peruviana*, *U. longispica*. These species of *Urtica* are typically found along rivulets in forest, along the forest margins, on (natural and man-made) landslides and generally disturbed sites. This species group is widespread from Costa Rica to Patagonia and would be expected in all mesic forest remnants of NW Peru. However, the current literature gives very few data on the presence and taxonomy of these *Urtica*-species in the relict forests, and this article aims at giving some first data to close that gap. The crucial problem here is, however, that the systematics of *Urtica* in the Andes is very poorly resolved at present and both the names and the distribution data are highly ambiguous.

In reporting *U. magellanica* from Peru and the relict forests in the north Brako & Zarucchi (1993) follow Macbride (1941), which in turn gets his species definition from Weddell (1858, 1869). The Bolivian material previously attributed to *U. magellanica* has since been removed to a new species (*U. pseudomagellanica*, Geltman, 1998), but no new treatment has been proposed for the Peruvian material, although it definitely does not belong into *U. magellanica*, a south temperate species restricted to Argentina and Chile.

For the relict forests in NW Peru and for the Amotape-Huancabamba Zone there are few if any citations of *Urtica* and Brako & Zarucchi (1993) list not a single species/specimen for the departments of Piura, Lambayeque, Amazonas and La Libertad –



**Figure 1.** Relict forests in the Amotape-Huancabamba Zone. (a) Westfacing, forest-covered slope above Guzmano, note destruction of most parts in the foreground (Prov. Contumazá, Cajamarca). (b) tiny forest fragment, dominated by *Ribes colandina* (Prov. Contumazá, Cajamarca). (c) *Ribes colandina* in full flower near Celendin (Prov. Celendin, Depto. Cajamarca). (d) Fragmented forest near Agua Blanca with *U. longispica* and *R. colandina* abundant in the hedges (Prov. San Miguel, Depto. Cajamarca).

which is implausible given the universal presence of *Urtica* in Andean habitats. Recent field studies and herbarium studies yielded material of various species of *Urtica* from the relevant area and taxonomical interpretations are here offered for these.

*Urtica macbridei* was described from Huánuco and is apparently widespread on the E slope of the Andes, but absent from the western slope including the N Peruvian relict forests, where it is replaced by the very closely related *U. longispica*, which is widespread in Colombia and Ecuador and only known from the forests of Ayavaca (Depto. Piura) and San Miguel (Depto. Cajamarca), i.e., has a few isolated SW outposts in the relict forests of NW Peru. It is likely present also in most other relict forests, but I have not yet seen any specimens from there. *Urtica longispica* is replaced by *U. peruviana* south of the Río Jequetepeque in the Prov. Contumazá, a recently described species which is easily differentiated by the possession of strongly ramified (vs. unbranched) inflorescences. South of Contumazá both *U. peruviana* and *U. longispica* are absent and only widespread *U. leptophylla* is found. Other forest fragments in the Amotape-Huancabamba zone have so far not been systematically investigated with regards to their *Urticas*, but a collection trip in 2004 brought two new endemic species: A densely pubescent liana apparently restricted to the residual montane cloud forests on the east-facing slopes of the Marañón valley is described as *Urtica urentivelutina* and a very widespread species from areas with former forest cover and some relict forests in Otuzco is described as *Urtica lalibertadensis*. Thus the relict forests in the Amotape-Huancabamba Zone are home to two morphologically well-differentiated and very narrowly endemic species of *Urtica*, one in the relict forests on the Pacific slope and one in the relict forests in an interandean valley. These are the only narrowly endemic species of *Urtica* between Mexico and Central Chile.

http://sisbib.umms.edu.pe/BVRevistas/biologia/biologiaNEW.htm

### Key to the rhizomatous species of *Urtica* with at least basally fused stipules in northern Peru

1. Inflorescences unisexual, male inflorescences usually much longer than the subtending leaves.

2. Plants finely and shortly pubescent with simple trichomes typically <0.5 mm long; stipules subglabrous, with scattered trichomes along the margin; perigon of female flowers without stinging hairs.

*Urtica macbridei*

2. Plants densely and long pubescent with simple trichomes typically 1 mm long; stipules completely pubescent; perigon of female flowers with stinging hairs.

*Urtica urentivelutina*

1\*. Inflorescences androgynous, if lower ones male, then much shorter than the subtending leaves.

3. Inflorescences completely unbranched and continuously set with sessile glomerules, distinctly catkin-like, interspersed with small, hyaline bracts.

*Urtica longispica*

3\*. Inflorescences at least marginally, with some glomerules over 5 mm, distinctly irregular and interrupted, without hyaline bracts.

4 Stem only with deflexed setae, otherwise glabrous; perigon (male and female) with stinging hairs.

*Urtica lalibertadensis*

4\*. Stem with scattered, erect setae and additionally with numerous, usually appressed white trichomes; perigon (male and female) without stinging hairs.

5. Inflorescences laxly branched, with at least some branches of mature inflorescences 10—15 mm long; lamina margin with 20—30 teeth on each side.

*Urtica peruviana*

5\*. Inflorescences densely branched, with at least branches of mature inflorescences ca. 5 mm long; lamina margin with <20 teeth on each side.

*Urtica leptophylla*

### *Urtica* - formal taxonomy

#### *Urtica macbridei* Killip.

Journ. Wash. Acad. Sci 15: 49. 1925. - Type: Peru, Depto. Huánuco, Muña, 2400 m, *Macbride* 4271 (F, neg. nr. 69600!, US!).

Lianescent shrub 1,5—3 (—4?) m, rarely erect subshrub from lignescent rhizome ca. 3—5 mm thick, stems erect or lax, with scattered stinging hairs and densely covered with simple, often appressed trichomes ca.

0,2—0,4 mm long. Leaves opposite, interpetiolar stipules united in pairs but deeply incised for ca. 50% of their length, subcircular, ca. 5—8 mm long and wide, with conspicuous white cistoliths and with scattered, white simple trichomes ca. 0.5—0,8 mm along the margin only; petioles 4—6 (—8) cm long, widely ovate to cordate, 10 x 8,5 — 12 x 9 cm, apex acuminate, base deeply cordate (sinus to 15 mm deep), margin coarsely simply serrate with 20—30 teeth on each side, both surfaces finely pubescent and covered with scattered short stinging hairs (ca. 1 mm), cistoliths largely punctiform. Inflorescences unisexual, rarely a few male flowers in the proximal portion of female inflorescences, arising in pairs from the leaf axils, male inflorescences up to 15 cm long, female inflorescences up to 4 cm long, flowers in dense, sessile ebracteose glomerules, female flowers ca. 1 mm long (including plumose stigma) with finely pubescent, esetulose perigon, male flowers with perigon ca. 1 mm long; fruit ovate, ca. 1—1,25 x 0,75—1 mm with very short apex, largely included in finely pubescent, esetulose perigon.

**Specimens seen:** ECUADOR, Prov. *unknown*, Guataxi, *Spruce 6536* (BM). PERU, [Depto. Huánuco, Muña?] *Ruiz & Pavón s.n.* (B!). Depto. Amazonas, Prov. Chachapoyas, Leimebamba, Laguna de los Condores, Pampa, 2600—3500 m, 15.05.2004, *Schwarzer 05* (B, USM).

This species seems to be very widespread along the eastern slope of the Andes in Peru and Ecuador, but fails to penetrate into inner-andean valleys, where it is replaced by other species. The following species, *U. urentivelutina*, is apparently its closest relative, but is readily differentiated on the basis of its much denser indument and replaces *U. macbridei* in the seasonally dry forest fragments W of the Marañón.

*Urtica urentivelutina* Weigend, *spec. nov.*

**Holotype:** Peru, Depto. La Libertad, Prov. Sánchez Carrión, road Huamachuco-

Chagual-Pataz, after Chugay and before reaching Aricapampa, in the village Molino Viejo, 3048 m, 20.04.2004, *Weigend & Schwarzer 7907* (male, USM, iso: B, HUT).

*Urtica frutescens, scandens, perennis, monoica. Caulis robustus, stimulosus et densissime pilosus; paniculae unisexuales, masculi petiolo multo longiori, perigonium laciniis pilosis.*

Liana 3—5 (—6?) m tall from ligneous rhizome ca. 8—10 mm thick, stems lax, with scattered stinging hairs 1,5—2 mm long and very dense, white cover of simple trichomes 1—1,5 mm long. Leaves opposite, interpetiolar stipules united in pairs but deeply incised for ca. 30—40% of their length, subcircular, ca. 8—10 mm long and wide, completely covered with white simple trichomes ca. 0,5—1 mm; petioles 2—4 (—8) cm long, lamina widely ovate, 9 x 6 — 15 x 8 cm, apex acuminate, base cordate (sinus ca. 8 mm deep), margin coarsely simply serrate with 18—25 teeth on each side, lamina strongly bullate, both surfaces with scattered stinging hairs ca. 1,5 mm long and completely covered with white, simple trichomes ca. 1—1,5 mm long, cistoliths largely punctiform. Inflorescences unisexual, male inflorescences ca. 12—15 (—18) cm long during anthesis, female inflorescences ca. 3—6 cm long, arising in pairs from the leaf axils, flowers in dense, sessile glomerules, female flowers ca. 1 mm long (including plumose stigma), perigon lobes densely pubescent, with 1—3 (—5) stinging hairs on each of the larger perigon lobes, male flowers with perigon ca. 1,5 mm long, perigon lobes densely pubescent, filaments ca. 3 mm long, anthers reniform, ca 1 mm in diameter; fruit ovate, ca. 1,5 x 1 mm with very short apex, largely included in pubescent perigon.

**Specimens seen:** Peru, Depto. La Libertad, Prov. Sánchez Carrión, road Huamachuco-Chagual-Pataz, after Chugay and before reaching Aricapampa, in the village Molino Viejo, 3048 m, 20.04.2004, *Weigend & Schwarzer 7906* (female, USM, B, HUT).

This new species is closely allied to *U. macbridei* from the eastern slope of the Peruvian Andes, but clearly differs in its much

denser and longer (1—1,5 vs. ca. 0,3 mm) indument, especially on the stipules (subglabrous in *U. macbridei*) and the presence of stinging hairs on the perigon of the female flowers. The leaves are very densely pubescent and also irregularly bullate between the veins, which is a character not known from the other Peruvian species here discussed. The taxon is so far only known from a single collection near Molino Viejo just W of the Marañón rives. It is found in the remnants of cloud forest vegetation, which has here been largely destroyed. In indument it closely resembles *Nasa urentivelutina*, which is found in a perfectly analogous geographical position between Balsas and Celendín somewhat further North (Cajamarca, Prov. Celendín) and also is an atypically densely pubescent and stinging species closely allied to less pubescent species E of the Marañón, i.e., shows the same differentiation from its congeners as *U. urentivelutina*.

### *Urtica longispica* Killip.

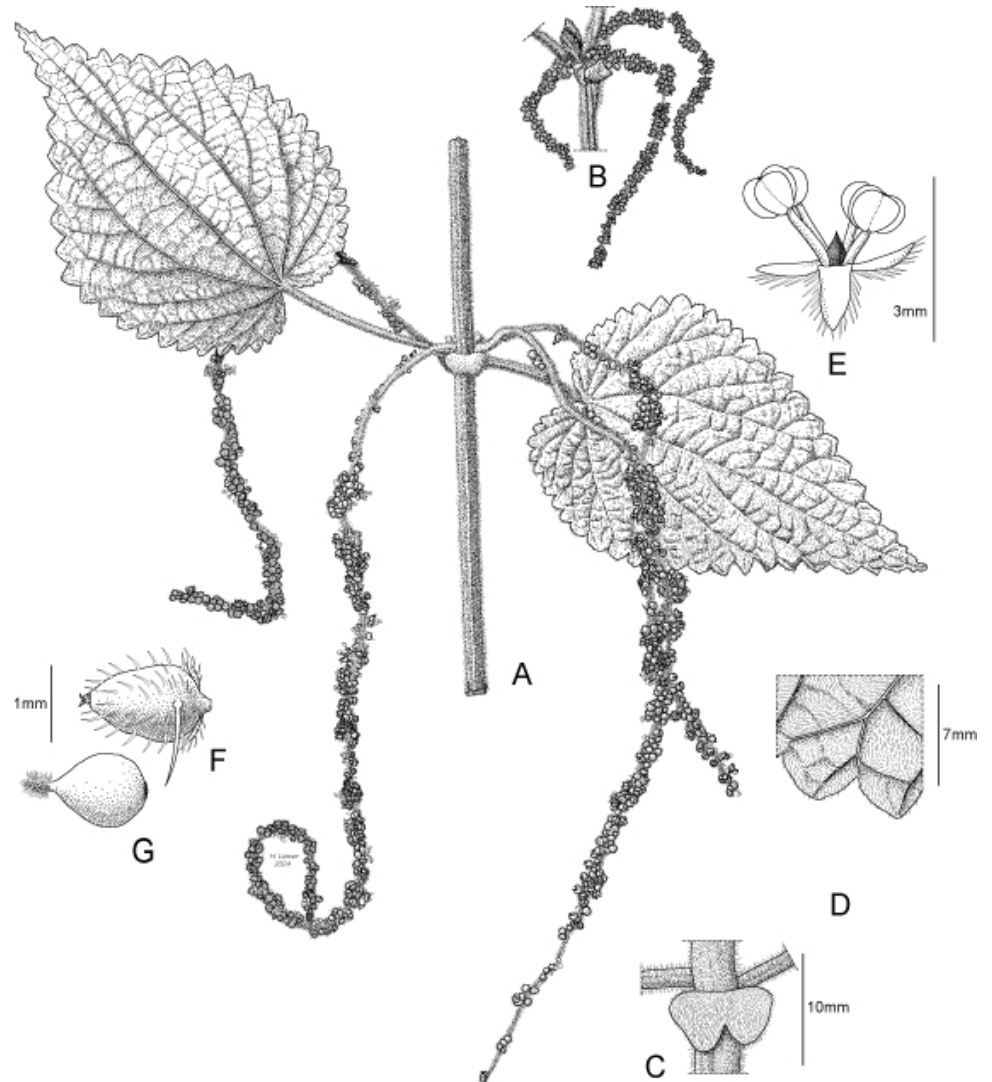
J. Wash. Acad. Sci. 19(10): 191. 1929. a» *Urtica ballotaefolia* Wedd. var. *macrostachya* Wedd., Monogr. Urticaceae: 74. 1856. — Syntypes: Colombia, Prov. Cundinamarca, near Bogotá, San Antonio, Boqueron de la Mesa, *Goudot 4* (Pl), without precise locality, *Triana 163* (P?, BM!). — Lectotype: Colombia, Prov. Cundinamarca, near Bogotá, San Antonio, Boqueron de la Mesa, *Goudot 4* (Pl).

Erect subshrub 0,8—1,5 (—2?) m, more rarely lianescent, from lignescent rhizome ca. 3—5 mm thick, stems erect or lax, with scattered stinging hairs ca 1,5 mm long and very short, appressed, simple trichomes ca. 0,1 mm long. Leaves opposite, interpetiolar stipules united in pairs but deeply incised for ca. 50% of their length, subcircular, ca. 3—6 mm long and wide, with conspicuous white cistoliths and with scattered, white simple trichomes ca. 0,1—0,3 mm along the margin only; petioles 2—4 (—5) cm long, widely ovate to triangular-ovate, 10 x 5—12 x 6 cm, apex acuminate, base truncate to subcordate (sinus to 7 mm deep), margin coarsely simply, rarely doubly serrate with 15—20 teeth on each side, both

surfaces very finely pubescent to subglabrous and covered with scattered short stinging hairs (ca. 1—2,5 mm), cistoliths largely punctiform. Inflorescences androgynous, ca. 30—40 mm long during anthesis, elongating to >12 cm in fruit, with male flowers in the proximal portion (5—10 mm) and female flowers in the distal (10—25 mm) portion of inflorescences, arising in pairs from the leaf axils, flowers in dense, sessile glomerules with tiny (to 1 mm), often at last marginally hyaline bracts, female flowers ca. 1 mm long (including plumose stigma), perigon lobes finely pubescent, without stinging hairs, male flowers with perigon ca. 1 mm long, perigon lobes finely pubescent; fruit ovate, ca. 1—1,25 x 0,75—1 mm with very short apex, largely included in pubescent perigon.

**Specimens seen:** COLOMBIA, Depto. Caldas, above Salento, path from Romerales to Saineto, Amarguras, 3200 m, 29.09.1948, *Hawkes 417* (BM). ECUADOR, Prov. Pichincha, old road Chillagallo-San Juan – Chiriboga – Empalme, km 27, 00°17' S, 78°38' W, 3180 m, 23.02.1986, *Zak 970* (GB, MO). Prov. Napo-Pastaza, ENE Cayambe, 3600 m, *Cazalet & Pennington 5555* (B, NY). Prov. Bolívar, Parroquia Simiatug, Guaranda, 3200 m, 28.02.1982, *Bravo-Falconi 331* (GB). Prov. Loja, Celica-Zapotillo road, km 5, 2100—2200 m, 23.02.1985, *Harling & Andersson 22444* (GB). PERU, Depto Piura, Prov. Huancabamba, near Huancabamba, 1950—2150 m, 18.07.1994, *Yarupaitán 1405* (B, USM). Depto. Cajamarca, Provincia Cajamarca, El Molino (San Pablo), 2340 m, «ishguin», *Sagástegui et al. 7993* (HUT, MO). Prov. San Miguel, San Miguel to Agua Blanca, 07°02' 51" S, 78°59' 17" W, 2762 m, 01.05.2003, *Weigend et al. 7485* (B, USM, M, HUT). Alrededores de El Tingo (Agua Blanca), 2950 m, 5.7.1986, «ishguin», *Mostacero et al. 1323* (HUT, F, MO). Road San Miguel to Tongod (Santa Rosa-Hualgayoc), S 06°58' 03,4", W 078°50' 10,3", 2917 m, 02.05.2003, *M. Weigend et al. 7488* (B, HUT, USM).

*Urtica longispica* was explicitly created as nomen novum for *U. ballotaefolia* var. *macrostachya* Wedd. by Killip, and thus is automatically homotypical. Both Geltman (1998) and Jørgensen and León (1999) consider *U. longispica* as a distinct species from *U. ballotaefolia* and the voucher cited Jørgensen and León (1999: *Cazalet & Pennington 5555*) is indeed clearly distinct and agrees perfectly with one type specimen in Paris (*Goudot 4*), which is here selected as



**Figure 2.** *Urtica urentivelutina*. A, flowering node, male plant. B, flowering node, female plant. C, stipules. D, leaf margin, abaxial. E, individual male flower. F, fruit with tepals. G, fruit, tepals removed. (A, C—E, Weigend & Schwarzer 7907; D, F, G, Weigend & Schwarzer 7907).

the lectotype. The isosyntype at British Museum (*Triana 163*), however, is clearly identical to *U. leptophylla* (= *U. ballotaefolia*).

The taxon is characterized by its unbranched, androgynous inflorescences and very dense, unbranched infructescences. The flowers are interspersed by tiny, hyaline bracts not found in any of the other species. The specimen *Harling & Andersson 22444* is at first glance very

aberrant, but probably belongs here: fruiting material from that population would be highly desirable. This species ranges from Colombia to Ecuador and has its southernmost populations in the relict forests of NW Peru. Apparently the southern limit of the species is marked by the Jequetepeque-valley, since it is abundant in the Prov. San Miguel, but replaced by *U. peruviana* just south of that valley in Contumazá.





**Figure 3.** *Urtica leptophylla* and *U. longispica*. (a) apex of flowering plant of *U. leptophylla* (in cultivation, Weigend et al. 7763). (b) inflorescence of *U. leptophylla* (Yauyos, Depto. Lima, Weigend et al. 7246). (c) inflorescence of *U. longispica* (San Miguel, Depto. Cajamarca, Weigend et al. 7488).

***Urtica leptophylla* Kunth in Humb.**

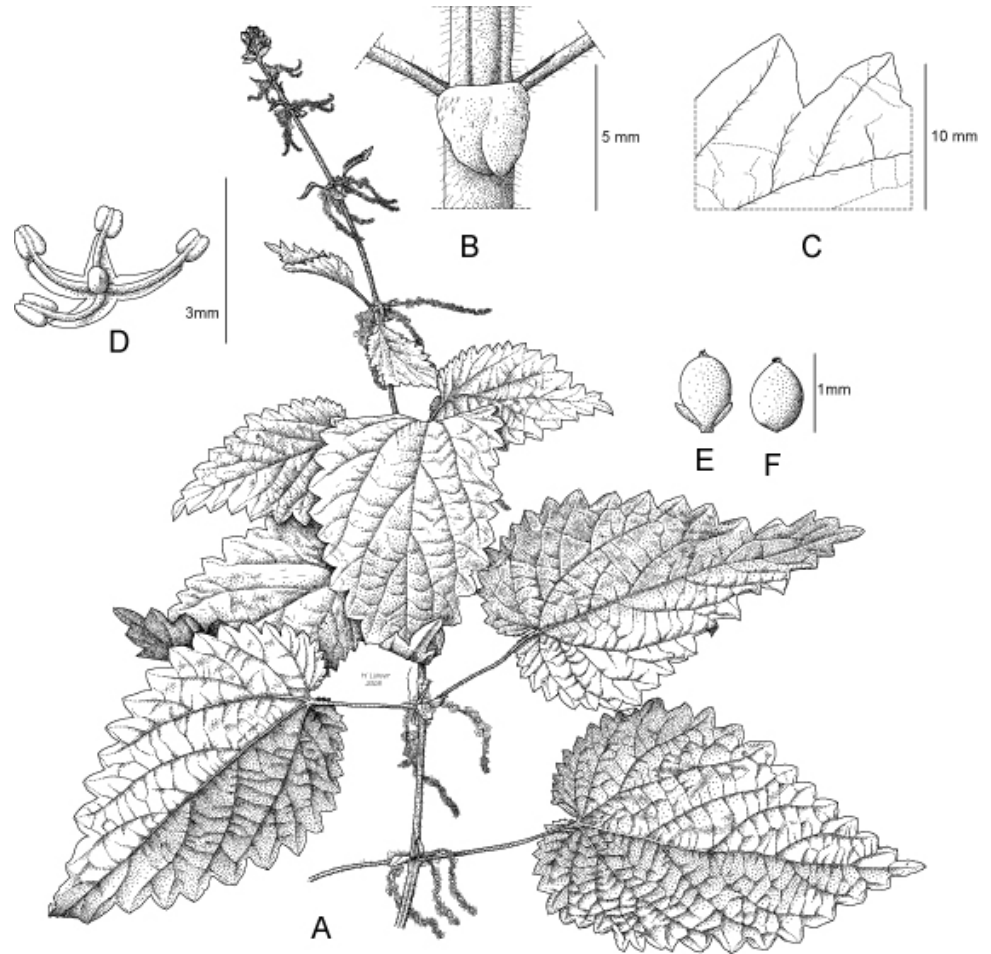
Bonpl. & Kunth, Nov. Gen. Sp. Pl. 2: 39. 1815. – Types: [Colombia], Nova Granata, [Cauca]: Almaguer, Meneses, *Humboldt & Bonpland s.n.* (P-Bonpl., photo Field # 39594!), Bonpland 2438 (Pl., 2 specimens). – Lectotype (here designated): [Colombia], Nova Granata, [Cauca]: Almaguer, Meneses, *Humboldt & Bonpland s.n.* (P-Bonpl., photo Field # 39594!).

= *Urtica ballotaefolia* Wedd., Ann. Sci. Nat. Ser. 3, 18: 197. 1852. – Type: [Colombia, Cundinamarca] near Bogotá, August 1844, *Goudot 3* (Pl! – Field Museum neg. nr. 40272!).

Erect perennial herb 0,6—1,5 (—2) m tall, basally not or slightly lignified, from short, lignescent rhizome ca. 3—4 mm thick, stems stiffly erect, with numerous stinging hairs ca 1—1,5 mm long and very short, appressed, simple trichomes ca. 0,1—0,2 mm long. Leaves

opposite, interpetiolar stipules united in pairs but deeply incised for ca. 50—70% of their length, subcircular, ca. 4—8 mm long and wide, without conspicuous white cistoliths and with scattered, white simple trichomes ca. 0,1—0,3 mm over the entire surface; petioles (2,5—)4—6 (—8) cm long, lamina widely ovate, (6 x 3) 8 x 5—10 x 7 cm, apex acuminate, base truncate to subcordate (sinus to 6 mm deep), margin coarsely simply, rarely doubly serrate with 15—20 teeth on each side, both surfaces very finely pubescent to subglabrous and covered with scattered short stinging hairs (ca. 1—2,5 mm), cistoliths largely punctiform. Inflorescences androgynous, lowest ones often pure male, upper one often pure female, ca. (25—) 30—60 mm long during anthesis, elongating to >12

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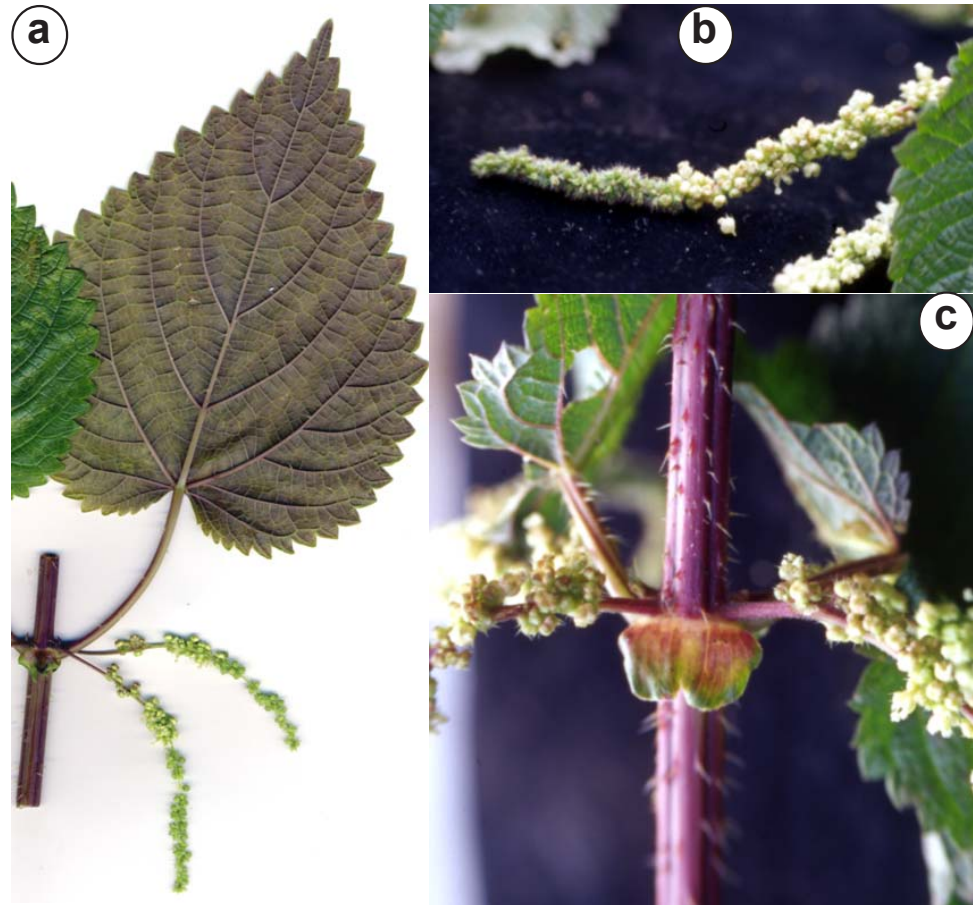


**Figure 4.** *Urtica longispica*. A, apex of flowering plant. B, stipule. C, leaf margin, abaxial. D, male flower. E, fruit with tepals. F, fruit, tepals removed. (Weigend et al. 7488).

cm in fruit, typically with male flowers in the proximal half and female flowers in the distal half, arising in pairs from the leaf axils, inflorescences irregularly interrupted, with flowers in ebracteose glomerules up to 7 mm long, female flowers ca. 1 mm long (including plumose stigma), perigon lobes finely pubescent, without stinging hairs, male flowers with perigon ca. 1 mm long, perigon lobes finely pubescent; fruit ovate, ca. 1,25 x 1 mm with very short apex, largely included in pubescent perigon.

**Specimens seen:** COLOMBIA, Depto. Cundinamarca, Chiquinquirá, 2500 m, 17.02.1950, von *Snejdem* 5823 (BM). Depto. Cundinamarca, Bogotá, 2660 m,

anno 1854, *Triana* 874 (BM). Depto Cauca, Páramo de Ruiz, 2200–3000 m, Sept. 1883, *Lehmann* 3159 (BM). - ECUADOR, Prov. Riobamba, Riobamba, 3000 m, Dez. 1932, *Rimbach s.n.* (B). Prov. Cañar, Ingapirca, 3200 m, 02°33' S, 78°52' W, 3200 m, *Lajtnant et al.* 14871 (GB). - PERU, Depto Lima, Prov. Yauyos, Cruz Pampa, 2950 m, 07.01.1952, *Cerrate* 1112 (B, USM). Depto Lima, Prov. Huarochiri, Huaquicha, above Surco, 2900 m, 09.03.1974, *Cerrate* 5811 (B, USM). Near Santiago, 3600 m, 16.05.1953, *Cerrate* 1926 (B, USM). Depto Lima, Cruz Pampa above Supe, 2950 m, 07.01.1952, *Cerrate* 1112 (B, USM). - Depto. Ancash, Prov. Carhuaz, without precise locality or elevation, 10.03.1964, *Wright* 4308 (B, USM). Depto. Ancash, Prov. Huaraz, Río Grande/Río Chacchan, towards Pariacoto, 18L 0200571 UTM 8942645, 3000 m,



**Figure 5.** *Urtica lalibertadensis*. (a) leaf and inflorescence (in cultivation, Weigend & Schwarzer 8018). (b) inflorescence (in the wild, Weigend & Schwarzer 7932). (c) stipule (in the wild, Weigend & Schwarzer 7932).

16.05.2003, Weigend et al. 7698 (B, M, USM). Prov. Huaylas, between Pamparomas and Laguna Negra Huacanan, just before Karka, 12.10.2002, Weigend et al. 7407 (B, HUT, M, USM). Just above Pamparomas on road to Caraz, 18L 0173333 UTM 8994296, 3133 m, 14.05.2003, Weigend et al. 7682 (B, M, USM). Between Pamparomas and Pampap, 09°03' S, 77°58' W, 2850 m, 26.09.2001, Weigend & Skrabal 5895 (B, HUT, M, USM).

The descriptions, the material I have seen and cultivated, and the type specimens (photographs) I have revised all agree with the judgement, that Geltmann (1998) gives in passing: The taxa *U. ballotaefolia* and *U. leptophylla* are indistinguishable. Weddell (1858, 1869) and Macbride (1941) consider

*U. leptophylla* as a synonym of *U. magellanica*, which, however, is not present in Colombia (nor anywhere north of Chile), whereas W.C. Burger (Fieldiana 40. 1977) first recongized that *U. leptophylla* is a valid taxon and that both *U. nicaraguensis* and *U. copeyana* (from Costa Rica) are synonymous with that taxon. The Central American material differs superficially from the Andean material in shorter inflorescences and smaller leaves, but Burger's judgement will probably turn out to be correct once more material is revised. The Peruvian material is very clearly conspecific with *U. leptophylla/U. ballotaefolia*. *U. leptophylla* will remain the

oldest name for the taxon even if it should turn out that one of the Chilean species is conspecific, since the relevant names are all younger (e.g., *U. pseudodioica*, *U. buchtienii*, Taylor, 2003).

The name *Urtica magellanica* is often erroneously employed for introduced, weedy *U. urens* from Europe, but also for at least three different native species, most commonly for *U. leptophylla*, the most widespread and abundant *Urtica* species in Peru (Ancash to Arequipa). Of all Central and Northern Andean taxa *U. leptophylla* is most similar to the north-temperate *U. dioica*-complex and many reports of (presumably introduced) *U. dioica* from South America probably refer to this taxon. It is particularly close to variable (monoecious) *U. dioica* subsp. *gracilis* from North America (Woodland, 1982) and future studies will be required to establish taxon limits.

*Urtica leptophylla* is present both north and south of the Amotape-Huancabamba Zone, but is apparently absent from the Amotape-Huancabamba Zone and its relict forests, where it is replaced by endemic taxa such as *U. urentivelutina*, *U. lalibertadensis* and *U. peruviana*.

*Urtica lalibertadensis* Weigend, *spec. nov.*

**Holotype:** Peru, Depto. La Libertad, Prov. Pataz, between Huancaspata and Tayabamba, S 08°18,053', W 077°17,032', 3071 m, 24.04.2004, *Weigend & Schwarzer 8018* (USM, iso: B, HUT).

*Urtica herbacea*, *perennis*, *monoica*. *Caulis robustus, stimulosus, glabrescens; paniculae androgynae, petiolo multo longiorae, perigonium laciniis valde hispidis.*

Lianescent subshrub or erect perennial herb 0,6—1,5 (—3) m tall, basally slightly lignified, from liganescent rhizome ca. 3—5 mm thick, stems erect, with numerous deflexed stinging hairs ca 1.5—2 mm long, otherwise glabrous. Leaves opposite, interpetiolar stipules united in pairs but deeply incised for ca. 50—70% of their length, subcircular, ca. 6—10 mm long

and wide, without conspicuous cistoliths and with scattered, white simple trichomes ca. 0,1—0,3 mm only along the margins; petioles (2,5—)4—6 (—8) cm long, lamina widely ovate, (6 x 3) 8 x 4 — 14 x 9,5 cm, apex acuminate, base subcordate to cordate (sinus to 13 mm deep), margin coarsely simply, rarely doubly serrate with (20—)25—33 teeth on each side, adaxial surface subglabrous with scattered short stinging hairs (ca. 1—2,5 mm), abaxial surface with scattered pubescence on the veins and with scattered stinging hairs. Inflorescences androgynous, lowest ones often pure male, upper one often pure female, ca. (25—) 50—100 mm long during anthesis, elongating to >12 cm in fruit, typically with male flowers in the proximal half and female flowers in the distal half, arising in pairs from the leaf axils, inflorescences irregularly interrupted, with flowers in ebracteose glomerules up to 5 mm long, female flowers ca. 1 mm long (including plumose stigma), perigon lobes finely pubescent, with (1—) 3—5 stinging hairs each, male flowers with perigon ca. 1 mm long, perigon lobes finely pubescent, often with individual stinging hair; fruit ovate, ca. 1,25—1,5 x 1 mm with very short apex, largely included perigon in pubescent.

**Specimens seen:** Peru, Depto La Libertad, Prov. Sánchez Carrión, road Huamachuco to Cahgual, before Chugay and Aricapampa, S 07°48,626', W 077°52,879', 3005 m, 20.04.2004, *Weigend & Schwarzer 7896* (B, HUT, USM). Prov. Otuzco, road Otuzco to Agallpampa, Motil, 19.04.2004, *Weigend & Schwarzer 7886* (B, HUT, USM). Otuzco, 2900 m, 23.11.1973, *López & Sagástegui 8051* (HUT). Debaajo de Shitahuara (al Norte de Salpo), 3020 m, 1.4.1999, *Leiva & Guevara 2274* (HAO, HUT, F). San Vicente-Chota (Otuzco), 3100 m, 6.12.1997, *M. Rodríguez E. 356* (HUT). San Pedro (Motil, Otuzco), 2980 m, 10.5.1997, *M. Rodríguez E. 18* (HUT). Distrito Agallpampa (Caserío La Florida), 2800 m, 4.4.2003, «ortiga negra», *Medina 52* (HUT, HAO). Road Otuzco to Agallpampa, Motil, S 07°59,120', W 078° 32,364', 19.04.2004, *Weigend & Schwarzer 7885* (B, HUT, USM). Prov. Santiago de Chuco: Santiago de Chuco, 2600 m, 20.6.1954, «ortiga de león», *López 2340* (HUT). Prov. Pataz, road Chagual-Buldibuyo-Tayabamba, between Parcoy and Buldibuyo, S 08°07,162', W 077°25,016', 3564 m, 22.04.2004, *Weigend & Schwarzer 7944* (B, HUT, USM). Between Parcoy and Buldibuyo, 5 km S of Parcoy, 22.04.2004,

*Weigend & Schwarzer 7932* (B, HUT, USM). Road Buldibuyo to Zona Maderas, Pass height towards Zona Maderas, S 08°05,106', W 077°16,731', 3775 m, 23.04.2004, *Weigend & Schwarzer 7990* (B, HUT, USM). Depto. Ancash, Prov. Huaylas, Cordillera Negra, road (Caraz to) Huaylas to Jimbe, San Toribio, S 08°51,411', W 077°55,098', 3143 m, 29.04.2004, *Weigend & Schwarzer 8070* (B, HUT, USM).

This new taxon is now known from La Libertad and neighbouring Ancash and is evidently closely allied to *U. leptostachya*. It differs from the latter in the often subsacandent habit and the deflexed stinging hairs on the otherwise glabrous stem and most importantly by the presence of numerous stinging hairs on the perigon of the female flowers (and fruits) and individual stinging hairs on the perigon of the male flower. It is an extremely abundant species and its distribution probably marks all the areas with former forest cover – it is often found in residual stands of *Alnus acuminata*. Its distribution area includes the region where *U. urentivelutina* is found, but that taxon is restricted to a seasonally dry forest fragment overlooking the Marañon river and differs in its very dense and soft indument and the distribution of male and female flowers in different inflorescences.

*Urtica lalibertadensis* replaces widespread *U. leptophylla* all across the Andes from the western slope to the eastern slope along the southern margin of the Amotape-Huancabamba Zone.

### *Urtica peruviana* Geltman

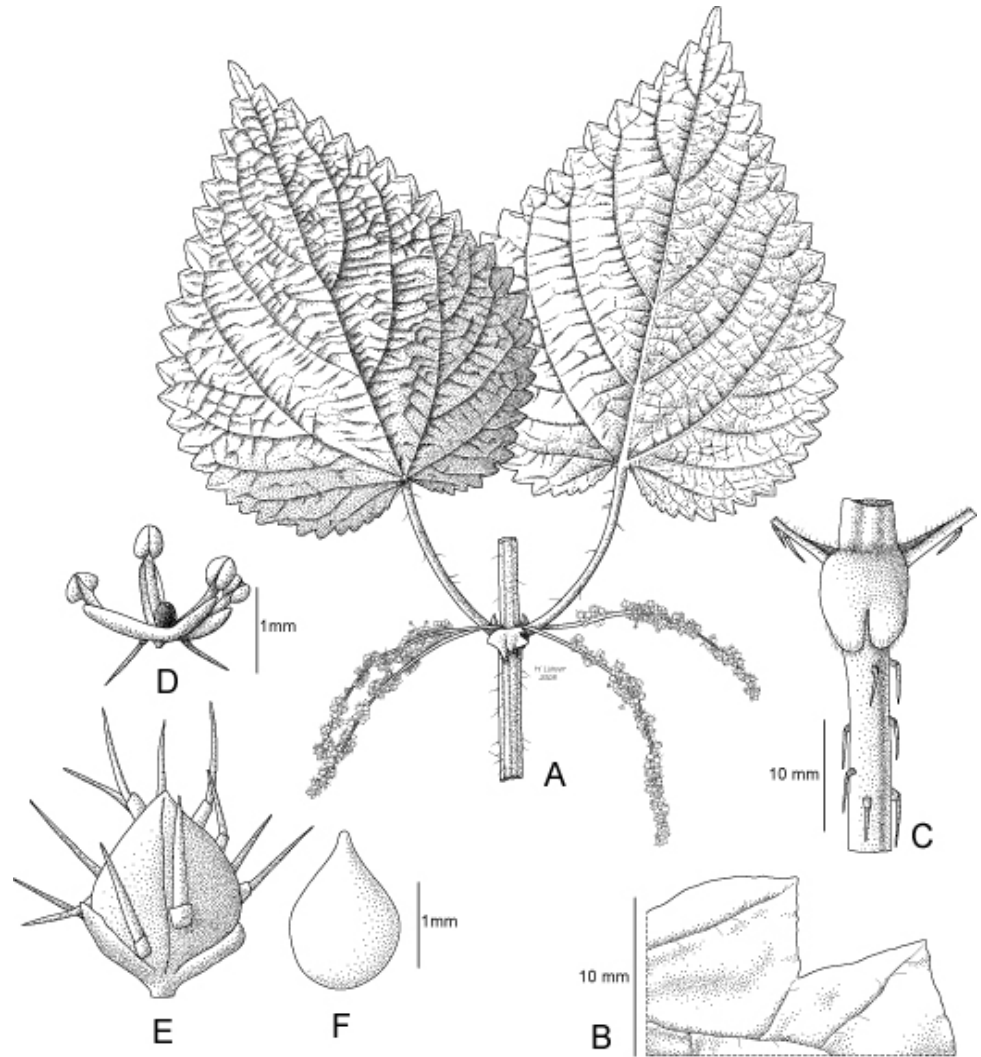
Novon 8: 15. 1998. – Type: Peru, Depto Cajamarca, Prov. Contumazá, El Tunel between Cascas & Contumazá, 2700 m, *Sagástegui et al. 12630* (holo MO!, iso: HUA, HUT!).

Lianescent shrub 1.5—2 (—3) m, more rarely erect, from ligneous rhizome to 10 mm thick, stems erect or lax, with scattered stinging hairs ca 1.5 mm long and very short, appressed, simple trichomes ca. 0.1 mm long. Leaves opposite, interpetiolar stipules united in pairs but deeply incised for ca. 50% of their length, subcircular, ca. 4—7 mm long and wide, with conspicuous white cistoliths and pubescent

white simple trichomes ca. 0,1—0,5 mm; petioles 2—4 cm long, lamina widely ovate, 6 x 3 — 13 x 10 cm, apex acuminate, base rounded to subcordate (sinus to 5 mm deep), margin coarsely simply, rarely doubly serrate with 20—30 teeth on each side, both surfaces very finely pubescent to subglabrous and covered with scattered short stinging hairs (ca. 1—2,5 mm), cistoliths largely punctiform. Inflorescences androgynous [with male flowers in the proximal portion (5—30 mm) and female flowers in the distal portion of inflorescences], or largely unisexual (lower ones largely or completely male, upper ones largely or completely female), ca. 30—80 mm long during anthesis, elongating to >12 cm in fruit, arising in pairs from the leaf axils, inflorescences branched with some ebracteose glomerules scattered on lax branches up to 15 mm long, female flowers ca. 1 mm long (including plumose stigma), perigon lobes finely pubescent, without stinging hairs, male flowers with perigon ca. 1 mm long, perigon lobes finely pubescent; fruit ovate, ca. 1,5—1,7 x 1,3—1,7 mm with very short apex, largely included in pubescent perigon.

**Specimens seen:** Depto. Cajamarca, Contumazá, Cascas to Contumazá, near Tunel, 2700 m, 20.02.2002, *Dostert & Rodríguez R. 2002/03* (BSB, M, HUT). 7,5 km from Contumazá on road to Guzmango, 2700—2800 m, 11.05.2003, *Weigend et al. 7625* (BSB, M, USM, HUT). La Herilla (Guzmango), 2800 m, 2.04.1981, *Sagástegui et al. 9704* (HUT, MO). Alrededores de Guzmango, 2700 m, 2.04.1981, *Sagástegui et al. 9646* (HUT, MO). Alrededores de Guzmango, 2400 m, 21.04.1984, *Sagástegui 11413* (HUT, MO). Ariba de Lledén, 2500-3000 m, 28.06.1983, *Sagástegui et al. 10833* (HUT). Alrededores de Guzmango, 2500 m, 22.05.1978, *Sagástegui & Mostacero 9132* (HUT, MO). Santiago, Guzmango, 2660 m, 30.05.1959, *Sagástegui & Samamé 2935* (HUT, NY). Dto. San Benito, caserío La Montaña, 2440-2680 m, *M. Binder et al. 1999/31* (HUT).

As noted by Geltman (1998), the species resembles *U. leptophylla*, *U. longispica* and *U. macbridei* at first glance, but it is the only species with distinct inflorescence branches and differs from *U. longispica* and *U. macbridei* in its larger fruits and from *U. macbridei* by its androgynous (not unisexual) inflorescences. It is thus a well-characterized



**Figure 6.** *Urtica lalibertadensis*. A, flowering node. B, leaf margin, abaxial. C, stem with stipule. D, male flower. E, fruit with tepals. F, fruit, tepal removed (in cultivation, Weigend & Schwarzer 8018).

species. So far the species is only known from the forests of the Prov. Contumazá and it is replaced by *U. lalibertadensis* (see below) in the southern neighbouring Prov. Otuzco and by *U. longispica* in the northern neighbouring Prov. San Miguel de Pallaques.

***Ribes andicola* group (Grossulariaceae)**

**The *Ribes andicola* group in northern Peru**

*Ribes* usually forms the upper margin of the relict forests where these forests grade into the

jalca/paramo vegetation and – especially in moderately disturbed habitats – can form a broad transition zone between cloud forest and jalca which largely consists of a single species of *Ribes*. Also, in areas where the degradation of the forest vegetation has far progressed, *Ribes* (and *Urtica* and *Hesperomeles*, Rosaceae) are often the last witnesses of former forest cover and constitute the small hedges (cercos) between the fields.

The genus *Ribes* has numerous species in

Peru, but only one species group has is so far known from the NW Peruvian relict forests. According to the existing taxonomy (Janczewski, 1907; Freire Fierro, 2004) these specimens would be placed into *Ribes andicola* Jancz., a somewhat heterogenous species group from Venezuela, Colombia and Ecuador. *Ribes andicola* has not been previously reported from Peru (Brako & Zarucchi, 1993). However, both from the upper margins of cloud forests in the Amotape-Huancabamba Zone and from hedges and forests remnants of formerly forested areas a large number of collections are now know which roughly correspond to the Ecuadorean species *R. austroecuadoreense* and *R. andicola*. A closer examination shows that all these specimens from relict forests and montane forest of the eastern slope are actually specifically distinct from *R. andicola*, and only two of them can be tentatively placed in *R. austroecuadoreense*, whereas the remaining material is here placed into three new species, one widespread in relict forests and forest remnants from Piura to Cajamarca (*R. colandina*), another apparently endemic to Contumazá (*R. contumazensis*) and a third one endemic to the subparamo of the eastern slope of the Andes (*R. sanchezii*).

#### Key to the species of the *Ribes andicola* group in northern Peru

1. Inflorescences erect.  
*Ribes austroecuadoreense*
- 1\*. Inflorescences pendulous.
2. Leaves and inflorescences exclusively with stalked, glandular trichomes, without simple, white trichomes.  
*Ribes contumazensis*
- 2\*. Leaves and inflorescences with – usually many – simple white trichomes and additionally with few to many stalked glandular trichomes.
- 3\*. Adaxial leaf surface shiny dark green, abaxial surface with simple, white trichomes only along the veins, lamina subentire with one very small lobe c. 1/3<sup>rd</sup> from base; fruits strongly resupinate.  
*Ribes sanchezii*
- 3\*. Ad- and abaxial leaf surface matt green and

(mostly densely) pubescent from simple, white trichomes, lamina subentire to five-lobed, fruits not resupinate.

4. Leaves typically 15–30 x 15–20 mm, entire or unevenly three-lobed, with lateral lobes absent or much smaller than central lobe, calyx dark red, but petals orange-yellow, fruits yellow.

*Ribes andicola*

4\*. Leaves typically 35–90 x 30–100 mm, three- to five-lobed, with lateral lobes well developed, calyx and petals dark red, fruits dark red to black.

*Ribes colandina*

#### Formal taxonomy

##### *Ribes andicola* JANCZ.

Bull. Int. Acad. Sci. Cracovie, Cl. Sci. Math. 10: 760. 1905. – Lectotype (designated in Freire Fierro 2004: 56): Ecuador, Pichincha, *Jameson* 69 (AAU photo ex K, K).

See Freire Fierro 2004 for description and illustration.

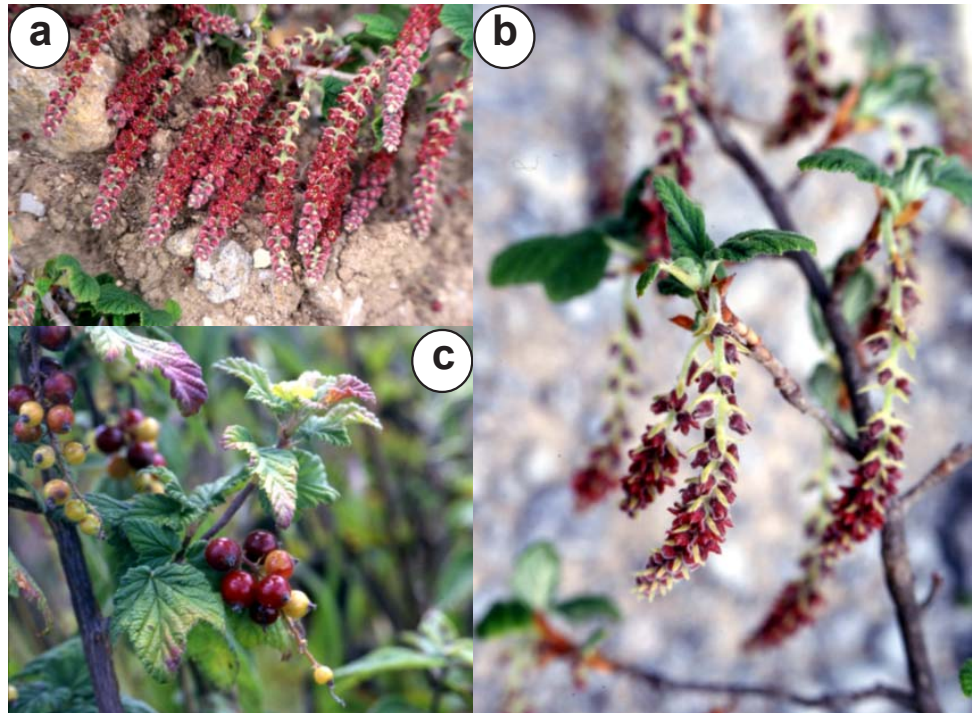
**Distribution:** VENEZUELA (Mérida, Trujillo), COLOMBIA (Valle de Cauca, Cauca), ECUADOR (Pichincha, Chimborazo, Cotopaxi, Tungurahua, Bolívar, Napo, Azuay).

A somewhat variable species with varying degrees of pubescence on its leaves. The new species described below is at first glance quite similar, but differs in consistently black (versus yellow) fruits and distinctly larger and wider leaves and longer inflorescences. *Ribes andicola* appears to be absent from the extreme S of Ecuador, where it is replaced by *R. austroecuadoreense* (see below), and consequently also from Peru. Our northernmost collection of the *R. andicola* group (Piura – Huancabamba: Weigend & Dostert 98/271) has the black fruits typical of *R. colandina*, not the yellow fruits typical of *R. andicola*.

##### *Ribes austroecuadoreense* Freire Fierro

Novon 8: 356. 1998. – Holotype: Ecuador, Prov. Loja, Parque Nacional de Podocarpus, E of Nudo de Cajanuma, S 04°05', W 79°10', 3100–3200 m, Ølgard 90339 (QCA, isotypes: AAU, QCNE).

See Freire Fierro 2004 for description and illustration.



**Figura 7.** *Ribes colandina*. (a) flowering shoot (Weigend et al. 2000/760). (b) flowering shoot (Weigend et al. 2000/779). (c) fruits (Weigend et al. 7627).

**Distribution:** ECUADOR (Loja, Azuay), PERU: **Depto Piura**, Prov. Huancabamba, km 38—42 on road from Huancabamba to (Sondor) Tabaconas, mixed jalca and forest remnants, 2600—2700 m, 18.5.1998, Weigend & Dostert 98/211 (M, USM). **Depto Cajamarca**, Prov. Chota, Miracosta, between Miracosta and Pampa del Lirio, 3150 m, 11.11.2000, Sánchez Vega et al. 10300 (B, CPUN).

The determination of these two specimens as *R. austroecuadorensis* is still somewhat tenuous – the specimen from Piura is sterile, but agrees well with the leaf characters described in Freire Fierro (2004). The Cajamarca-specimen is a male plant in full flower and appears to have the typical erect (not pendulous) inflorescences of *R. austroecuadorensis*. Clearly, both localities should be revisited at other times of the year to clarify the identity of these specimens.

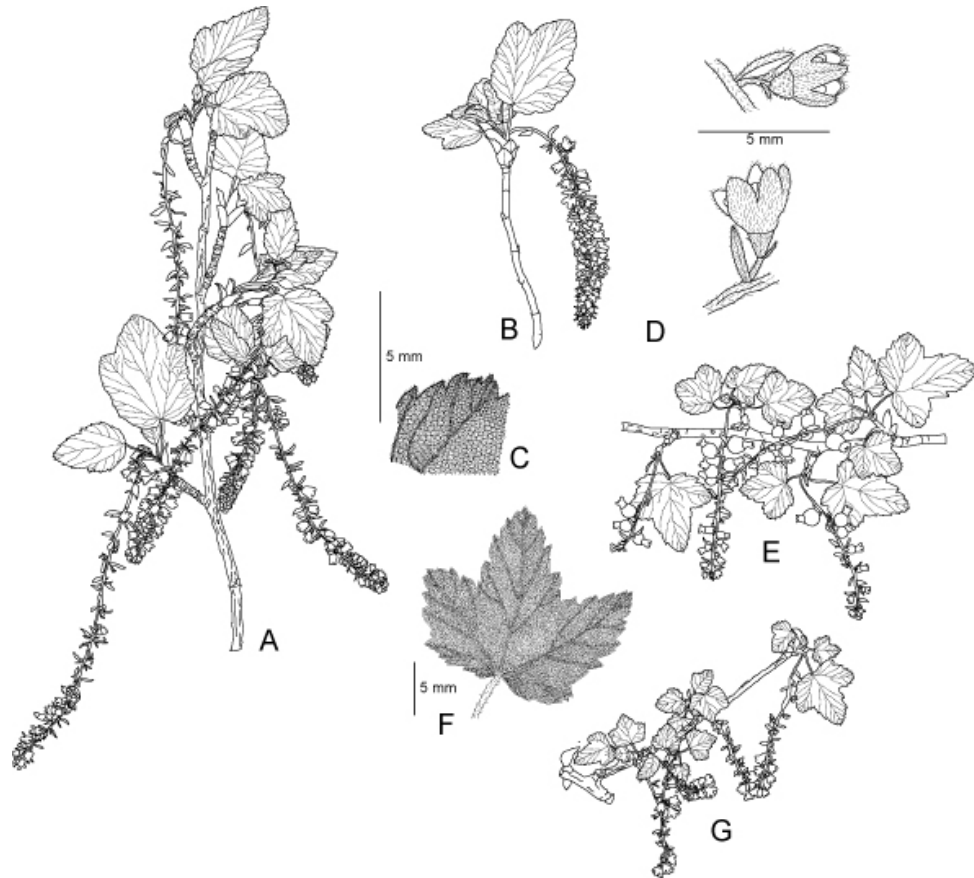
*Ribes colandina* Weigend, spec. nov.

**Holotype:** PERU, Depto. La Libertad, Prov. Bolívar, Bolívar, path to Laguna Shopol, 3280—3600 m, S 10°17' 57'', W 078°02' 50'', 18.10.2000, Weigend et al. 2000/823 (holotype: USM; isotypes: HUT, M, B).

*Ribes fruticosum*, usque ad 4 m alta, dioica; folia magna, triloba vel subquingueloba, utrinque latere densissime pubescentes; racemis pendulis (10—) 30—50-floris, floribus vineis, pubescentibus, baccis nigris, sparse pilosis.

Dioecious shrub (1—) 1,5—4 m tall; very densely to moderately tomentose from simple, curly trichomes 1—2 mm long and with scattered subsessile glands, especially on young shoots and the abaxial leaf surface. Leaves deciduous, petiole 15—35 mm long, 1 mm wide; stipules well differentiated, united with petiole for 6—10 mm, stipulate region 3—





**Figure 8.** *Ribes colandina*. A, B, flowering shoot (Weigend et al. 2000/823). C, leaf margin, abaxial (Sánchez V. 10300). D, flowers (Sagástegui 11077). E, female inflorescence (West 8101). F, leaf, abaxial (Sagástegui A. 11077). G, male inflorescence (West 8101).

5 mm wide, free apex of stipules not differentiated, distal margin deeply lacinate with plumose setae up to 2 mm long; lamina subcoriaceous, widely ovate to subcircular; 35–90 x 30–100 mm, distinctly three- to five-lobed with central lobe slightly (1,5–2 x) longer than lateral lobes, lobes triangular-ovate, free portion of central lobe up to 50 x 40 mm, margin irregularly serrate to lobulate; lobules up to 9 x 14 mm, with up to 4 serrations per lobule, base rounded to deeply cordate (sinus to 15 mm deep); adaxial surface subglabrous with scattered simple hairs 0,1–1 mm long, eglandular, abaxial surface densely to very densely pubescent (often appearing snow-white) with simple hairs up to 2 mm long,

without or with scattered sessile glands. Inflorescences terminal on short lateral shoots (brachyblasts); racemes pendent with (10–) 30–50 flowers and 40–80 (–120) mm long, peduncle 5–10 (–15) mm long; densely pubescent with numerous simple hairs 1 mm long, eglandular or with scattered sessile glands; pedicels c. 1 mm long, c. 2–4 mm apart in open flowers; bracts 4–6 x 1 (–2) mm, narrowly ovate, bracteoles 1 x 0,5 mm, narrowly ovate to linear, persistent. Flowers narrowly cyathiform, calyx and corolla very dark red; 4 x 3–5 mm; covered with simple hairs 0.2 mm long, ovarian portion glandular; ovary conical, 1 x 1 mm; hypanthium 1–2 mm long; calyx lobes ovate acuminate, 2 x 1,5 mm, erect or half-spreading;

petals inserted c. 1 mm from base of hypanthium, 1 x 0.8 mm, narrowly ovate; filaments inserted c. 0.5 mm from base of hypanthium; filaments and anthers 0.3 (female) to 0.5 mm (male) long; style apically bifid, 1 mm long. Fruit spherical, 8—12 mm in diameter, with scattered shortly stalked glands, pendulous, black.

PERU: **Depto. Piura.** Prov. Ayabaca: Frías, Las Pircas, 3000 m, 17.10.1988, *Díaz & Vasquez 3003* (MO). Prov. Huancabamba: Huancabamba 2900—3100 m, 20.5.1998, *Weigend & Dostert 98/271* (M). **Depto Lambayeque.** Prov. Ferreñafe, Sinchihual, Incahuasi, 3400 m, 3.10.1985, *Llatas Quiroz 1294* (F); around Incahuasi, 2750 m, 13.9.1985, *Sagástegui et al. 12875* (F). **Depto. Amazonas.** Prov. Chachapoyas footpath from Granada to Siete Lagunas, 3600 m, 4.12.1999, *T. Hofreiter & Th. Franke 1/172* (B, HUT, M, USM). **Depto. Cajamarca:** Prov. Contumazá, Road Contumazá to Guzmango, 5-10 km W of Contumazá, 2600 m, 20.6.1998, *Weigend et al. 98/564* (M). 5 km from Contumazá on road to Cascas, 2600—2700 m, 10.05.2003, *Weigend et al. 7607* (B, HUT, M, USM). 22 km from Contumazá on road to Guzmango, above Cruz Grande, 3000—3600 m, 11.05.2003, *Weigend et al. 7627* (B, HUT, M, USM), same locality, *Weigend et al. 7638* (B, HUT, M, USM). 7.5 km from Contumazá on road to Guzmango, above Cruz Grande, 2700-2800 m, 11.05.2003, *Weigend et al. 7624* (B, HUT, M, USM). - Prov. Cajamarca, between Hualgayoc and Bambamarca, 2650—3550 m, 16.11.1948, *R. Scolnik 1349* (NY). W of Cajamarca, road to Cumbemayo, 3350 m, 24.9.1991, *Sánchez Vega 5817* (F); Huacataz, 20 km NE of Cajamarca, 3000 m, 21.11.1981, *Sánchez Vega & Medina 2687* (USM, F). Cerro Sexcemayo, W of Cajamarca, 3430 m, 2.4.1991, *Vega 5426* (F). Surroundings of Cajamarca, 2700—3700 m, 5.6.1986, *Becker et al. 1339* (USM). - Prov. Celendin, near Agua Colorada on road Cajamarca to Celendin, 3324 m, S 06°58'19", W 078°11'16", 15.10.2000, *Weigend et al. 2000/760* (M, B, USM, HUT). 64 km E of Cajamarca on the road to Celendin, 3500 m, 5.2.1997-2.4.1997, *Weigend et al. 97/372* (F, M). Ca. 10 km before Celendin on road from Cajamarca, 3100 m, 06°55'11"S, 78°11'23"W, 16.10.2000, *Weigend et al. 2000/779* (B, HUT) - Prov. Chota, Cangana above Chota, 2700 m, 6.10.1993, *Llatas Quiroz et al. 9396* (USM). Miracosta, between Miracosta and Pampa del Lirio, 3150 m, 11.11.2000, *Sánchez Vega et al. 10300* (CPUN, B). - Prov. San Miguel de Pallaques, Agua Blanca to Prado-San Miguel, S 07°00'57.0", W 079°02'31.2", 2900 m, 11.05.2001, *Henning & Schneider 194* (HUT, BSB, M, USM). Above Agua Blanca, Cerro Quillón, 3320—3500 m, S 07°01'54", W 079°04'10", 14.10.2000, *Weigend et al. 2000/739* (HUT, B, M, USM). Road San Miguel to Tongod, S 06°55'09", W 078°48'22", 3434 m, 02.05.2003,

*Weigend et al. 7495* (B, USM, HUT, M). Cerro Minis, Distrito Unión Agua Blanca, 2980 m, 16.02.2000, *Rodríguez et al. 2288* (F, HUT, M, NY). El Tingo, Dist. Unión Agua Blanca, 3200 m, 17.02.2000, *Rodríguez et al. 2310* (F, HUT, MO, NY). El Tingo (camino Taulis), Dist. Unión Agua Blanca, 3000-3250 m, 18.02.2000, *Rodríguez et al. 2359* (F, HUT, M, NY), 2367 (HUT, NY). - Prov. San Marcos, below of Totorilla, Río Shitamalca, 3450 m, 31.10.1992, *Vega & Torres 6415* (F, MO). **Depto. La Libertad:** Prov. Otuzco, Chota between Yamoabamba und Shorey, 2900 m, 15.11.1983, *Sagástegui et al. 11077* (NY). Prov. Bolívar, Balsas to Bolívar, 72 km from Balsas, 3600 m, S 07°04' 16", W 077°50'05", 17.10.2000, *Weigend et al. 2000/820* (HUT, M, USM, B). - Prov. Pataz, road Huamachuco-Chagual-Buldibuyo, between Parcoy and Buldibuyo, 5 km S of Parcoy, 22.04.2004, *Weigend & Schwarzer 7934* (B, HUT, USM). - Prov. Huamachuco, outskirts of town, 26.11.1936, *West 8101* (HUH, UC), same locality, *Weigend et al. 97/253* (F, M).

This new species replaces *R. andicola* just south of the Ecuadorean border and appears to be very widespread in Piura, Lambayeque, Cajamarca and La Libertad. A close search in Ancash yielded not a single specimen of this taxon, it is there replaced by *R. viscosum*. The material here referred to this new species is slightly heterogenous and includes some very small leaved specimens from the southern part of the range (e.g., *West 8101*). Also, documentation is highly unsatisfactory from Piura and Lambayeque and many apparent distribution gaps in areas of known subparamo vegetation show a considerable degree of undercollection. *Ribes colandina* differs from *Ribes andicola* in uniformly dark red flowers (petals red, not orange-yellow as in *R. andicola*), black instead of yellow fruits and wider, more deeply lobed leaves.

**Etymology:** the specific epithet is an anagram of the epithet of its apparent closest relative, *R. andicola*.

*Ribes sanchezii* Weigend, spec. nov.

**Holotype:** PERU, Depto. Amazonas, Prov. Chachapoyas, Balsas road to Leymebamba, just below Abra Callacalla, 3559 m, S 06°43' 49", W 077°53'18", 19.10.2000, *M. Weigend et al. 2000/862* (M, B, BM, USM, HUT).

*Ribes fruticosa*, usque ad 4 m alta, dioica; folia magna, sub-triloba, supra

*obscure virides, glabrescentes, infra sparse pubescentes; racemis 30—50-floris, floribus vineis, pubescentibus et sparse glandulosibus.*

Dioecious shrub (1—) 1,5—4 m tall; shoots and adaxial leaf surfaces sparsely pubescent to glabrous, abaxial leaf surfaces, inflorescence axis, petioles moderately pubescent from simple, trichomes c. 1 mm long, leaves deciduous, petiole 15–25 mm long, 1 mm wide; stipules well differentiated, united with petiole for 6—10 mm, stipulate region 3–5 mm wide, free apex of stipules not differentiated, distal margin deeply lacinate with plumose setae up to 2 mm long; lamina subcoriaceous, ovate to elliptical; 40–65 x 30–50 mm, subentire with one very small lobe c. 1/3<sup>rd</sup> from base, lateral lobes up to 5—10 x 10 mm, central lobe much (4—5 x) longer than lateral lobes, lobes ovate, margin irregularly lobulate; lobules up to 10 x 15 mm, with up to 4 serrations per lobule, base cuneate, rarely nearly truncate; adaxial surface subglabrous, dark green and shiny, with very few simple hairs 0,1–0,5 mm long towards the margin, eglandular, abaxial surface densely short pubescent only on primary and secondary veins with simple hairs up to 1 mm long, eglandular. Inflorescences terminal on short lateral shoots (brachyblasts); racemes pendent with 30—50 flowers and 80–130 mm long, peduncle 5–10 (—15) mm long; densely pubescent with numerous simple hairs 1 mm long, eglandular or with scattered stalked glands c. 0,5 mm long; pedicels c. 1 mm long, c. 2–4 mm apart in open flowers; bracts 4—6 x 1 (–2) mm, narrowly ovate, bracteoles 1 x 0,5 mm, narrowly ovate to linear, persistent. Flowers narrowly cyathiform, calyx and corolla dark red; 5 x 5 mm; covered with simple hairs 0,2 mm long, ovary with 1—5 stalked glands and very few simple trichomes; ovary conical, 1 x 1 mm; hypanthium 1–2 mm long; calyx lobes ovate acuminate, 2 x 1,5 mm, erect or half-spreading; petals inserted c. 1 mm from base of hypanthium, 1 x 0,8 mm, narrowly ovate; filaments inserted c. 0,5 mm from base of hypanthium; filaments and anthers 0,3 (female) to 0,5 mm (male) long;

style apically bifid, 1 mm long. Fruit strongly resupinate, otherwise unknown.

PERU: **Depto. La Libertad**, Prov. Bolívar, between Sant Luisa and Uchumarca turnoff, S 07°04', W 077°49', 3700 m, 11.11.2001, *Sánchez Vega et al. 11192*(CPUN, B).

This new species of *Ribes* is very clearly distinct from both *R. andicola* and *R. colandina* because of its ovate to elliptical leaves with a very poorly developed lateral lobe and particularly its aberrant indument: Both other taxa have leaves with pubescence (albeit in varying densities) on both the adaxial and abaxial surface and the adaxial leaf surface is matt green, whereas *R. sanchezii* a shiny dark green upper leaf surface and pubescence abaxially restricted to the primary and secondary veins. *Ribes sanchezii* also has strongly resupinate fruits, whereas the fruits of *R. andicola* and *R. colandina* are pendulous. It replaces widespread *R. colandina* on the wetter eastern slopes of the Cordillera Oriental and forms dense stands at the upper limit of the cloud forest at the Abra CallaCalla, where it is one of the most abundant shrub species in the vegetation.

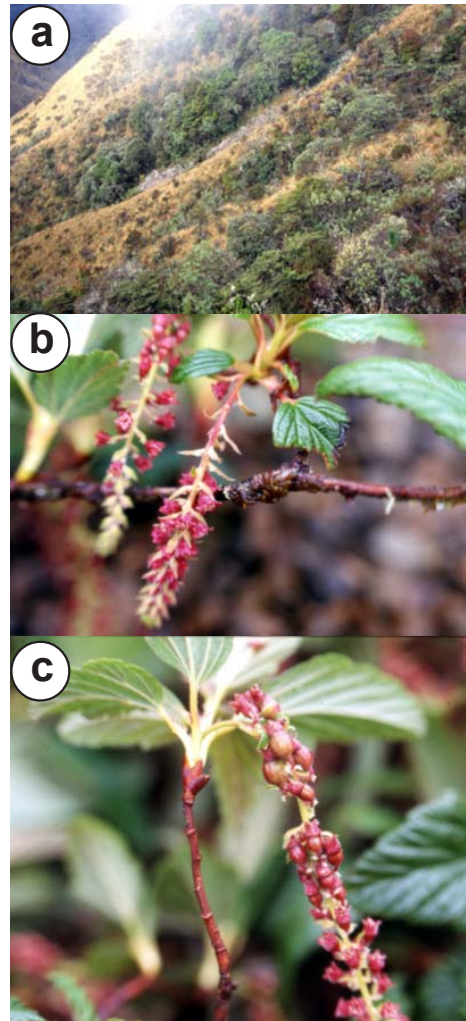
**Etymology:** Named in honour of the distinguished Peruvian botanist ISIDORO SÁNCHEZ VEGA of Cajamarca, who made the second known collection of this taxon.

***Ribes contumazensis*** Weigend, spec. nov.

**Holotype:** PERU, **Depto. Cajamarca**, Prov. Contumazá: Between Magdalena and Contumazá, 3100 m, Dec. 1916, *Weberbauer 7221* (HUH!, isotype: US!).

*Ribes fruticosum*, usque ad 2 m alta, dioica; folia parva, triloba vel subquineloba, utrinque latere dense glandulosa; racemis 30—50-floris, floribus luteo-rubris, glandulosibus.

Dioecious shrub 1—2 (—4?) m tall; shoots and adaxial leaf surfaces covered only with scattered stalked glands < 0,5 mm long. Leaves deciduous, petiole 10–15 mm long, 1 mm wide;



**Figure 9.** *Ribes sanchezii*. (a) Habitat of *R. sanchezii* (Callacalla, E slope, Depto. Amazonas). (b) male inflorescence (Weigend et al. 2000/862). (c) female inflorescence (Weigend et al. 2000/862).

stipules well differentiated, united with petiole for 3—4 mm, stipulate region 3—4 mm wide, free apex of stipules not differentiated or triangular, glandular-serrate; lamina subcoriaceous, subcircular; 25—30 x 25—30 mm, with one distinct lobe on each side, lateral lobes up to 5—10 x 10 mm, central lobe much (1,5—2 x) longer than lateral lobes, lobes ovate, margin irregularly lobulate; lobules up to 5 x 5 mm,

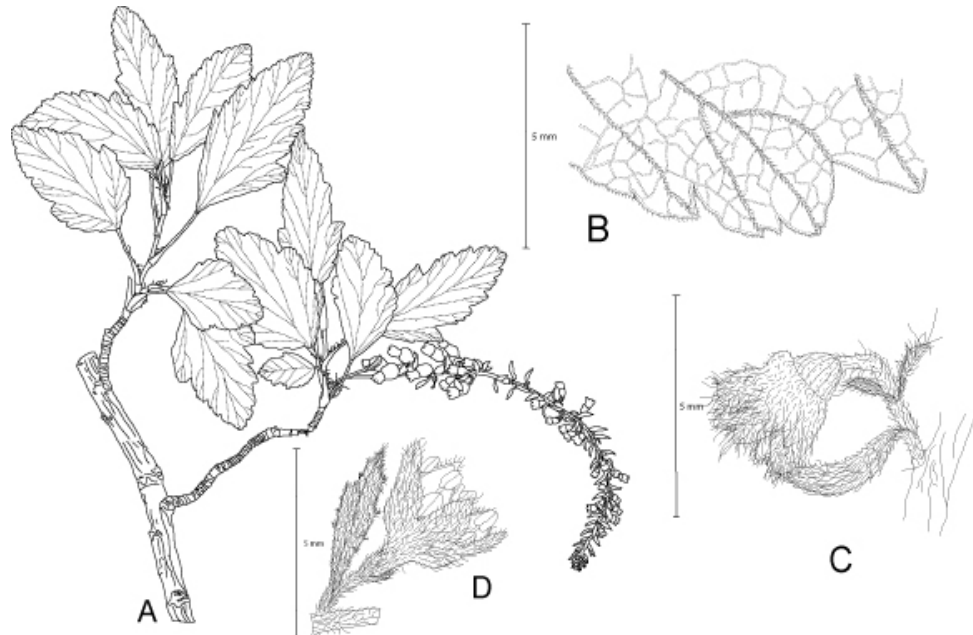
with up to 4 serrations per lobule, subcordate, rarely nearly truncate; adaxial surface subglabrous, eglandular, abaxial with scattered stalked glands especially on primary and secondary veins. Inflorescences terminal on short lateral shoots (brachyblasts); racemes pendent with 15—25 flowers and 30—50 mm long, peduncle 5—10 (—15) mm long; with scattered stalked glands, pedicels c. 1 mm long, c. 2—4 mm apart in open flowers; bracts 1,5—2 x 1 mm, narrowly ovate, bracteoles 1 x 0,5 mm, narrowly ovate to linear, glabrous, glandular-serrate. Flowers narrowly cyathiform, brownish yellow; 5 x 5 mm; covered with scattered glandular trichomes, ovary with 1—5 stalked glands and very individual few simple trichomes (<5 per flower); ovary conical, 1 x 1 mm; hypanthium 1—2 mm long; calyx lobes ovate acuminate, 2 x 1,5 mm, erect or half-spreading; petals inserted c. 1 mm from base of hypanthium, 1 x 0,8 mm, narrowly ovate; filaments inserted ca. 0,5 mm from base of hypanthium; filaments and anthers 0,3 (female) to 0,5 mm (male) long; style apically bifid, 1 mm long. Fruit unknown.

Only known from type collection.

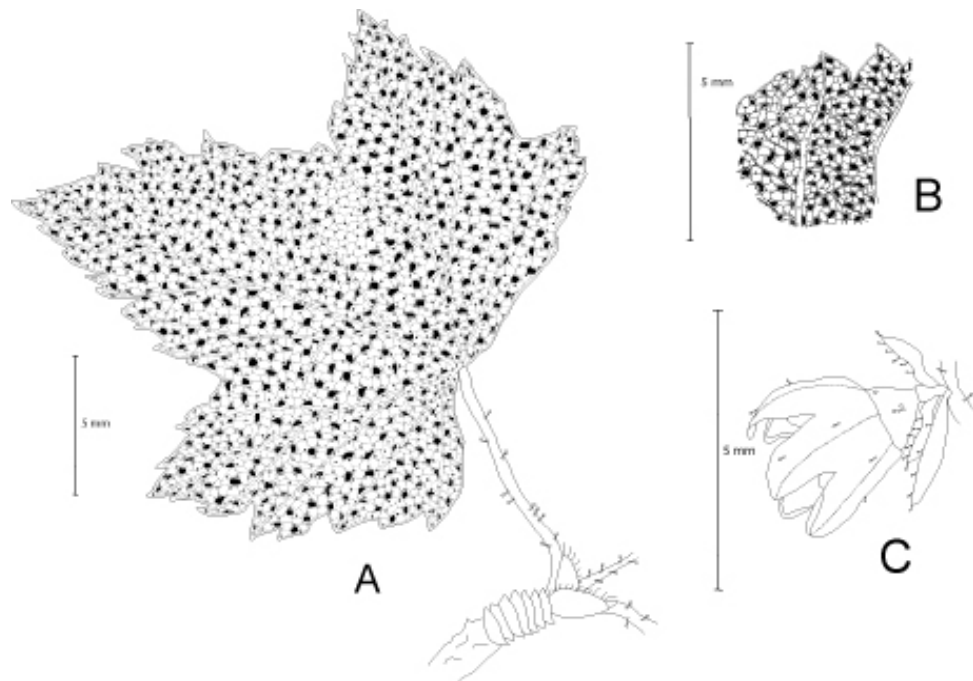
In spite of the fact that a lot of collections are generally known from the Contumazá area, not least because ABUNDIO SAGÁSTEGUI ALVA of Trujillo (HAO) has worked there for a very long time, the only collection we have of this taxon is by WEBERBAUER. I hesitated for a long time before recognizing this species as distinct, but the fact that it is completely glabrous apart from the stalked glands clearly separates it from *R. colandina* from the same region. Additional collections of this taxon are clearly desirable.

## Conclusions

Both groups here studied, the *Ribes andicola* group and the rhizomatous species of *Urtica* are present with often narrowly endemic species in the Amotape-Huancabamba Zone and more especially in the relict forests of NW Peru. Three new species of *Ribes* and two new species of *Urtica* are described, three of these new



**Figure 10.** *Ribes sanchezii*. A, flowering shoot. B, leaf margin, abaxial. C, female flower. D, male flower (Weigend et al. 2000/862).



**Figure 11.** *Ribes contumazensis*. A, leaf. B, leaf margin, abaxial. C, flower (Weberbauer 7221)

<http://sisbib.ummsm.edu.pe/BVRevistas/biologia/biologiaNEW.htm>

species are found in the relict forests, and two of them are endemic to them. Additionally, two taxa previously only known from Ecuador, *Ribes austroecuadorensis* and *Urtica longispica* are reported from the forest fragments of NW Peru. While this in total signifies a considerable increase in known diversity for the region in general and these forests in particular, a close examination reveals that our knowledge of the area is still grossly insufficient.

#### State of our knowledge

Both groups studied in *Ribes* and *Urtica* can be considered as indicative of humid conditions and can be expected to be present in any montane forest fragment in this region. However, if we summarize the locality data, we find that we still lack any collections of these two plant groups from a large number of known forest fragments. Table 1 summarizes the number taxa known from individual forest fragments in four plant groups: *Urtica* and the *Ribes andicola* group (see above), the *Passiflora lobbii* group (Skrabal et al., 2001) and *Nasa* (Dostert & Weigend, 1999; Weigend, 2000, 2002, 2004, 2005; Weigend & Rodríguez, 2001, 2003; Weigend et al., 1998, 2003). All four groups can be expected to be present in every major relict forest with at least one species. There are more than 20 forest fragments recognized here, but there are only 2 forest fragments (San Mateo and Cruz Grande in Contumazá) and a «region» (Otuzco-Agallpampa) from which representatives of all four groups are currently documented, another five regions have at least three of the four groups documented (Canchaque, Kañaris, Cerro Quillón and Tongod). Both *Urtica* and *Passiflora* are currently known from less than half of the forest fragments. Moreover, moderately large (< 3000 ha), but well explored relict forests have 4–7 taxa of *Nasa* (Monteseo, Canchaque), whereas the huge relict forests of Kañaris (ca. 14000 ha) has only two species documented. It is immediately apparent that the documentation of the flora of these forests is extremely incomplete. New

taxa are still expected in this region. A typical example is a new species of *Ribes* of the *Ribes macrobotrys* group, which is so far only known from a sterile specimen [Depto. Cajamarca, Prov. San Miguel, Cerro Quillón, El Tingo, Agua Blanca, 3445 m, 17.02.2000, E. Rodríguez R. et al. 2333 (HUT, NY)].

Under-documentation of the *Passiflora lobbii* group is probably due to the fact that they are near-ubiquitous, but difficult-to-find plants, which moreover flower only part of the year and are not usually collected in the sterile stage (even though they can be determined in the vegetative state). Similarly, *Ribes* has a very short flowering period at the end of the dry season (usually October) and is not usually collected in fruit or in the sterile state. *Urtica* is present all around the year, but is often not collected for other, obvious reasons.

#### Indicators of former montane forests

Both groups studied in *Ribes* and *Urtica* indicate sites with humid conditions with former forest cover and can be considered as important markers for forests which have been completely destroyed. They persist in secondary vegetation for a much longer time, than most forest taxa, e.g. in Loasaceae, Orchidaceae etc. Many of the collections of *Urtica* and *Ribes* from outside present-day forest thus indicate the former presence of such forests. Particularly striking cases are the stands of *U. lalibertadensis* which, together with the abundance of scattered trees of *Alnus acuminata*, seem to indicate that montane forests once covered large parts of the the Provinces Otuzco and Pataz, where there are now barely any recognizable remnants left. Similarly, the near universal presence of *Ribes colandina*, *Urtica leptostachya* and scattered trees of *Alnus acuminata* and *Hesperomeles* in hedges and gullies strongly indicate that the Province San Miguel was at some stage largely covered with montane forests, of which now only a few fragments remain. The large communities of *Ribes colandina* above

**Table 1.** Documentation of the groups studied in the forest fragments of NW Peru (Departments: AM = Amazonas, PI = Piura, LL = La Libertad, CA = Cajamarca, LA = Lambayeque), «names» = forested zones outside the western slope, see page 189 in this volume for details, (names) = specimen from the region, but not the forest fragment itself, indet. – so far unidentified species, likely undescribed, † - possibly extinct.

Dep	Prov.	Forest name	<i>Urtica</i>	<i>Ribes</i> group	<i>andicola</i>	<i>Passiflora</i> group	<i>lobbii</i> <sup>1</sup>	<i>Nasa</i>
PI	Huancabamba	Canchaque	(longispica)	(colandina)	(cf. austroecuadoreense)			(humboldtiana subsp. tricolor), glandulossima, (triphylla subsp. flavipes), sagasteguii, (solata), picta, bicornuta
PI	Morropón	Chalaco	-	-	-	-	-	-
PI	Morropón	Mijal	-	-	-	-	-	-
PI	Ayabaca?	Huamba	-	-	-	exoperculata	-	-
PI	Ayabaca	El Toldo <sup>2</sup>	-	-	-	-	-	-
PI	Ayabaca	Aypate (Ayabaca)	(colandina)			(humboldtiana subsp. tricolor), (solata), amaluzensis, bicornuta		(colandina)
PI	Ayabaca	Los Molinos(Ayabaca)-	-	-	-	-	-	-
PI	Ayabaca	Bosque Cuyas(Ayabaca)-	-	-	-	-	-	-
AM	Chachapoyas	«CallaCalla»	macbridei	sanchezii		callacallensis		humboldtiana subsp. tricolor, picta
CA	Contumazá	Bosque de San Mateo (Cachil)	peruviana	colandina, contumazensis		sagasteguii		sp. nov., formosissima, driesslei
CA	Contumazá	Cruz Grande	peruviana	colandina		sagasteguii		laxa, cotumazensis, picta
CA	Santa Cruz/	Bosque de Monteseo -	-	-	-	-	-	contumazensis, picta,
CA	San Miguel de Pallaques	(La Florida, Tautlis)	-	-	-	-	-	dillonii, insignis, pteridophylla
CA	Cutervo	Bosque de Cutervo	-	-	-	indet.		subsp. genuiculata, humboldtiana subsp. obliqua
CA	Chota	Ocshahuilca (Pagaibamba)	-	(cf. austroecuadoreense)				cf. carnea, cf. triphylla subsp. elegans, picta
CA	Chota	Las Palmas	-	-	-	-	-	(picta)
CA	San Miguel de Pallaques	Tongod/Quellahorco	(longispica)	colandina		-		(carnea) (formosissima) (cf. triphylla subsp. elegans)
CA	San Miguel de Pallaques	Santa Rosa - El Palmo	(longispica)	(colandina)				(dillonii) (picta)
CA	San Miguel de Pallaques	La Oscurana (Niepos y Corral Viejo)	-	-	-	-	-	(carnea)
								insignis, humboldtiana subsp. obliqua

continues

Dep	Prov.	Forest name	<i>Urtica</i>	<i>Ribes</i> group <i>andicola</i>	<i>Passiflora</i> group <i>lobbiti</i> <sup>1</sup>	<i>Nasa</i>
CA	San Miguel de Pallaques	Cerro Quillón	(longispica)	colandina	-	(pongalamesa) (picta)
CA	Cutervo	Querocotillo-Granadillo	-	-	-	-
CA	San Miguel de Pallaques/ Santa Cruz	-Shinshin Sur - Río Chotano Los Cedros y Cascarilla	-	colandina	-	-
CA	Celendin	«Gelig»	-	(colandina)	sanchezii	urentivelutina, formosissima
LA	Ferreñafe	Kañaris (Upaipeta)	-	colandina	(sagasteguii)	(picta) (lambayequensis)
LA	Ferreñafe	Bosques de Yatrapa	-	-	-	-
LA	Ferreñafe	Bosques Chillama-Mamahuaca-Bosque del Cerro Pluto (Santa Lucía Kañaris)	-	-	-	-
LL	Gran Chimú	Bosque de Lucma	-	-	-	-
LL	Otuzco	(Callanquitas) «Otuzco - Agallpampa»	lalibertadensis	colandina	sagasteguii	otuzcensis, usquiliensis, flaxa, picta
LL	Sánchez Carrión	«Molino Viejo»	urentivelutina	-	-	longivalvis & sp. nov. ined.

<sup>1</sup> Skrabal et al. 2001<sup>2</sup> Vellinga et al. 2004



Guzmango (Prov. Contumazá) or near Celendín (Prov. Celendín), together with other floristic elements, clearly show that these areas once bore montane forest, where there is now degraded scrubland. The present habitat of *U. urentivelutina* is entirely secondary (in hedges) and there is possibly no undisturbed forest left in the area.

The value of these indicator species in reconstructing the ancient forests of NW Peru is underscored by the fact that there are some historical collections of more sensitive forest plants from areas which are now no longer suitable for their existence: Narrowly endemic *Nasa dilloniana*, currently known only from the Bosque de Montesecco, is also known from a historical collection (pre-1900) from Santa Rosa near San Miguel de Pallaques, where the species is now apparently extinct and no undisturbed forest remains, *U. longispica* is still abundant in the area.

#### Relationships between the relict forests

At present, none of the plant groups studied here (*Ribes*, *Urtica*) or elsewhere (*Nasa*, *Passiflora*, see above) is documented comprehensively from the relict forests and the surrounding areas. However, on the basis of what data we have, we can already draw some conclusions. There is apparently a relatively close relationship between the forest fragments of San Miguel de Pallaques and Santa Cruz, with the presence (current or historical) of *Nasa dilloniana*, *N. humboldtiana* subsp. *obliqua* and *N. insignis* in the Bosque de Oscurana, near San Miguel and in Monte Seco. This complex of forest remnants also presents the southernmost known localities for *Urtica longispica*, which is otherwise known from Piura (and Ecuador and Colombia). This San Miguel/Monte Seco complex apparently represents the southern end of the western Andean forest elements and its closest relationships at species and species group level appear to be towards Ecuadorian taxa. The forests of Lambayeque and Piura are at present so poorly known, that

little can be said about them, but what taxa are known from the area (*U. longispica*, *N. sagasteguii*, *N. glandulosissima*) appear to confirm this view. Similarly, the apparent presence of *Ribes austroecuadorensis* in Chota and Huancabamba also ties this region to Ecuador.

Both in *Nasa* and in *Urtica* the species are replaced by a new set of taxa in crossing the Jequetepeque river. Contumazá (San Mateo and Guzmango) have many local endemics (*N. contumazensis*, *U. peruviana*, *R. contumazensis*), but also share some elements with Otuzco (*N. laxa*).

Very little is currently known for the plant groups here studied in either Cutervo or Kañaris and this is possibly the region which is in the most urgent need of study. We expect a relatively close floristic relationship between these areas, and we also expect that the actual diversity in these two areas, especially in the huge forests of Kañaris, is very high.

Apart from these tentative relationships the most striking phenomenon is the transandean distribution of the few more widespread taxa: *R. colandina* and *U. lalibertadensis* are widespread from the W slope of the Cordillera Occidental to the west-facing slopes of the mountains overlooking the Marañón (the northernmost part of the Cordillera Central) and are replaced by local endemics (e.g. *U. urentivelutina*) on the drier east-facing slopes of the mountains overlooking the Marañón and by other species on the very wet eastern (amazonian) slope of the Cordillera Central (*U. macbridei*, *R. sanchezii* and species from other groups of *Ribes*).

#### Outlook

The data presently available on the flora of the relict forests of NW Peru are highly unsatisfactory. There are probably still a very considerable number of undescribed species to be discovered. Documentation of the biodiversity in the form of herbarium collection is currently fragmentary at best.

The former extent of the montane forests can probably be inferred from the current distribution of tenacious members of the secondary vegetation such as *Urtica*, *Ribes* and *Alnus*. Their present distribution strongly indicates that the former extent of these forests was very much larger than at present. Large parts of the Prov. Otuzco (La Libertad) - currently without any coherent forest cover - were probably completely and coherently forested. The relict forests of the provinces Santa Cruz and San Miguel de Pallaques (Tongo, Oscurana, Santa Cruz, Cerro Quillón, etc.) probably had a more or less coherent forest belt, possibly with interspersed paramo islands, not – as now – largely open vegetation with forest fragments and relict species in quebradas and hedges. Similarly, the forests of Guzmango and Contumazá were probably more or less coherent and there are at least close floristic links to the Otuzco region, but little is currently known about the intervening region. A detailed mapping of the distribution of the *Ribes andicola* groups, of *Urtica* and *Alnus* for the Amotape-Huancabamba Zone could probably give a detailed picture about the former overall extent of montane forests in the region.

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