

Poorly known names authored by Antonio Raimondi

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Academic editor: G. Galasso | Received 8 December 2020 | Accepted 24 January 2021 | Published 21 April 2021

Citation: Molinari-Novoa E (2021) Poorly known names authored by Antonio Raimondi. Italian Botanist 11: 63–76. <https://doi.org/10.3897/italianbotanist.11.61796>

Abstract

Nine nomenclatural acts by Antonio Raimondi are assessed and commented. These include a new genus, six new species and two new combinations that are absent from or incorrectly cited in major databases. A new combination, *Jacaranda acutifolia* var. *punctata* is proposed for an endemic plant from central Peru. Lastly, *Jacaranda punctata* Raimondi and *Puya raimondii* Harms are neotypified and lectotypified, respectively.

Keywords

Andean flora, endemism, nomenclature, Peruvian flora, taxonomy

Introduction

Giovanni Antonio Raimondi dell’Acqua was born in Milan (currently in Italy) in 1824, the seventh child of a family of bakers (Cossia 2009). His affection for the natural sciences is well attested: writings on his personal notebooks reflect his interest in botany, chemistry, and other subjects. Little is known about his early life in Italy (Villacorta 2010a). He arrived in Peru on July 28th, 1850, during the National Holiday, fulfilling his dream of travelling to that country. Further remarks on the life of this outstanding naturalist, and his importance for the Italo-Peruvian community, can be found in the work of Bonfiglio (2004).

During his exploration, he put together a considerable collection of minerals, pressed plants, skinned animals, and archaeological findings. Nevertheless, he was first and foremost a botanist (Mariotti 2009). Some of his observations on plant life were

reported in his textbooks, intended to be read by his undergraduate students at the Medical School of the University of San Marcos in Lima (Raimondi 1857a, b). In the first tome of his magnum opus “El Perú” (Raimondi 1874), he published the description of a now famous plant: *Puya raimondii* Harms. However, most of his taxonomical work is known from indirect references by third parties.

Methods

A thorough bibliographic research was done on the published botanical work of Antonio Raimondi. Additionally, his herbarium preserved at USM (herbarium acronyms follow Thiers 2021+) was reviewed. For the Peruvian composites assessed here, the author also consulted the works of Cabrera (1954) and Cuatrecasas (1950).

Several short visits at former rural areas of Lima were made each summer to identify possible surviving individuals of *Jacaranda punctata* Raimondi, since it was the only plant that was not readily identified while reviewing the descriptions and herbarium material. A neotype is selected for the species, here considered a variety of *J. acutifolia* Bonpl.

No lectotypes were designated as no original material was found for most of the species listed below. Since every name by Raimondi, except *J. punctata*, is currently synonymised, no neotypes were selected for them.

Here, I present a full catalogue of the new plant species and combinations made by Antonio Raimondi in his scientific books published as a result of his expeditions in the Peruvian Andes: the two volumes of “Elementos de Botánica”, the first subtitled “Anatomía, fisiología y patología vegetal” (Raimondi 1857a) and the second subtitled “Taxonomía, fitografía y geografía botánica” (1857b), and the first volume of “El Perú” (Raimondi 1874), with brief notes and referring to the types of his species, when available. The full transcriptions of his protologues in Spanish and Latin are provided in Suppl. material 1.

Results and discussion

In total, Raimondi published one new genus, six new species (one of which accepted here at the varietal rank, newly proposed as a new combination) and two new combinations.

Family Asteraceae Bercht. & J.Presl

Cryptochaete Raimondi, Elem. Bot. (Raimondi) 2: 187. 1857.

Type: *Cryptochaete andicola* Raimondi.

= *Senecio* L.

Cryptochaete andicola Raimondi, Elem. Bot. (Raimondi) 2: 187. 1857.

Type: not designated.

= *Senecio violifolius* Cabrera, Darwiniana 10: 577. 1954.

Type (holotype). PERU. Lima: prov. Yauyos, Huacracocha, 17 km de Tupe, 4400 m, 22 January 1952, E. Cerrate & O. Tovar 1222 (LP barcode LP000707 [digital image!]).

Raimondi named the new genus and species within the main text. Then, in the same page, he included a generic-specific description in a footnote.

The name *Cryptochaete* Raimondi is an earlier homonym to *Cryptochaete* P.Karst., a peniophoraceous genus of fungi currently synonymised under *Peniophora* Cooke (Kirk et al. 2008). The description of *C. andicola* fits neatly with that of *Senecio violifolius* (Cabrera 1954), who described the new species unaware of Raimondi's work. Despite it is not the oldest, legitimate name of the species, the epithet *violifolius* is the earliest available when *C. andicola* is considered a species of *Senecio*, since its epithet *andicola* is preoccupied by *S. andicola* Turcz. No original material was traced in the Raimondi herbarium at USM.

Herrera (1921) cited *C. andicola* as a synonym of *Laccopetalum giganteum* (Wedd.) Ulbr. in a mistake, since *C. andicola* is clearly a composite, not a member of the Ranunculaceae (Coloma 2016). This confusion is probably due the common name that both *L. giganteum* and *S. violifolius* share in Peruvian Spanish, “huamanripa”, and their ethnobotanical use as expectorant (Bussmann and Sharon 2015; Llacta and Quispe 2018).

Culcitium discolor Raimondi, Elem. Bot. (Raimondi) 2: 186. 1857 [as “*disclor*”].

Type: not designated.

≡ *Senecio discoloratus* Cuatrec., Fieldiana, Bot. 27(1): 43. 1950.

= *Senecio tephrosioides* Turcz. Bull. Soc. Imp. Naturalistes Moscou 24(2): 92. 1851.

Type (holotype). ECUADOR. Pichincha: Quito, Antisana volcano, 3650 m, W. Jameson 846 (KW barcode KW001001543 [digital image!]).

Raimondi gave a brief diagnosis of the species and provided a few ethnobotanical notes in the main text. In the footnote, he gave a formal description in Latin. The protologue is short, so any element present was taken into consideration to interpret the name, recently considered of dubious identity by Salomón et al. (2018).

Among the species of *Senecio* ser. *Culcitium* (Bonpl.) Cabrera, we searched for the following characteristics: plants villose, with discoloured leaves and campanulate involucre, living in the central Peruvian Andes, with medicinal properties attributed. Taking all of these into consideration simultaneously narrowed the selection. While *S. tephrosioides* is sparsely hairy and does not always present discoloured leaves, specimens collected at high altitudes conform to Raimondi's description. Furthermore, the common names in Quechua, which are words including “*ticlla*”, an adjective meaning “discolour” (Sánchez 1995) and “*warmi*” (“woman”), or “*wasá*” (“back”, referring to the abaxial side of the leaf, as reported by Raimondi 1874) are consistent with current ethnobotanical knowledge, as is the medicinal use originally attributed to the plant by Raimondi and Herrera (Valdivia 2013; Bussmann and Sharon 2015).

Cuatrecasas (1950) transferred this species to *Senecio* as *Senecio discoloratus*, a replacement name for *C. discolor*, due the pre-existence of *S. discolor* DC. He cited the replaced name as *C. discolor* Raimondi ex Herrera, using the entry of the *Index Kewensis* referring to the paper by Herrera (1921) as the original publication place. However, this is not true, because Herrera made a catalogue of species, using the original description as a source. A similar mistake has been made with regards to *Chloraea undulata*. However, since Herrera did not write the original place of publication and gives a full description in Spanish, it should be interpreted as an indirect reference to the original place of publication (Art. 41.3 of the ICN: Turland et al. 2018). No original material was traced in the Raimondi herbarium at USM.

Family Bignoniaceae Juss.

Jacaranda punctata Raimondi, Elem. Bot. (Raimondi) 2: 166. 1857.

Type (neotype, designated here). PERU. Lima: Santiago de Surco (WGS84: 12.1293783S, 76.9792395W), 68 m, 7 December 2020, *Molinari 712* (MOL!; isoneotype: USM!).

≡ *Jacaranda acutifolia* var. *punctata* (Raimondi) Molinari & Mayta, comb. et stat. nov.

Raimondi wrote about the plant's common name and ethnobotanical uses; he then gave the description in a footnote. Since no original material was traced, a neotype is here designated.

For comparison, living material was taken from a tree belonging to the author of this article, raised from seed in and bought from the Forestry Vivarium of La Molina National Agrarian University to ensure its correct taxonomical placement. Additionally, the types of *J. acutifolia* and *J. mimosifolia* D.Don. were consulted.

Gentry (1992) does not include this species in his treatment; it keys out with *J. acutifolia*, although it does not match the description completely. Raimondi was aware of the Bonpland species, which he listed after his novelty, even having a scientific water-colour painting of it made during his expeditions (Villacorta 2010b). While this is not a guarantee of taxonomical distinctiveness, it is worth noting that Raimondi found this ornamental tree distinct enough to not confuse it with the then common *J. acutifolia*.

To clarify the identity of this species, I surveyed the former rural areas of Lima, the place where Raimondi found this plant in cultivation. A healthy tree, fully corresponding the description, was found in an old garden at Santiago de Surco, a district which, in Raimondi's time, was outside the city, dotted with villas and manorial houses (Fig. 1).

The tree differs from *J. acutifolia* by its leaves with suborbicular-elliptical, strongly apiculate leaflets with non-revolute margins and a dusty appearance on both sides. Additionally, the vein impression is visible on the adaxial side, and small, cylindrical secretions of dry resin, ca. 1 mm wide, appear on the abaxial side (Fig. 2).

The impression on the leaves places the plant close to *J. mimosifolia*, the sister species of *J. acutifolia* (Ragsac et al. 2019), occurring in Peru exclusively as an introduced ornamental, currently extremely common in Lima. However, the smaller pinnae (Fig. 3) and



Figure 1. General habit of *Jacaranda acutifolia* var. *punctata*. Clockwise: general view of the tree, leaf (adaxial view), leaf (abaxial view), and inflorescence. Tree from which the neotype (Molinari 712) was collected.

the deeper blue colour of the flowers (Fig. 4) put our tree decisively within the variability of *J. acutifolia*. This was confirmed by comparing the specimen with the lectotype of *J. mimosifolia* and the lectotype of its heterotypic synonym *J. chelonina* Griseb.

After confirming the specific identity of the collection, it became apparent that it differs from the type of *J. acutifolia* by the smaller leaves with fewer pinnae; shorter, rounder, thicker leaflets with obtuse bases, resin secretions on the abaxial side and strong vein impressions on the adaxial side resembling those of *J. mimosifolia*; the colour of the corolla paler than the typical variety and not consistently purple but becoming greyish towards the base of the tube. For a comparison with the autonymic variety of *J. acutifolia* and the widely cultivated *J. mimosifolia*, see Table 1.

When treating the Bignoniaceae, leaf differences are essential to determine subspecific taxa: Wood (2008) created a key to the subspecies of *Tecoma fulva* (Cav.) D. Don with leaf characters as the first steps towards determination of the subspecies. This

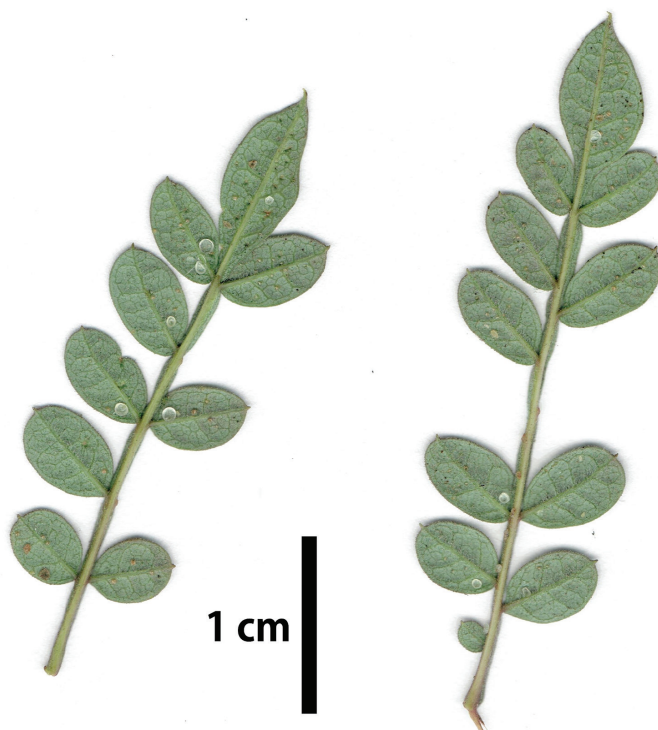


Figure 2. Resin dots on the abaxial side of the leaf of *Jacaranda acutifolia* var. *punctata*. The resin dots appear irregularly under the leaflets and are more common in younger leaves. From the tree from which the neotype was collected.

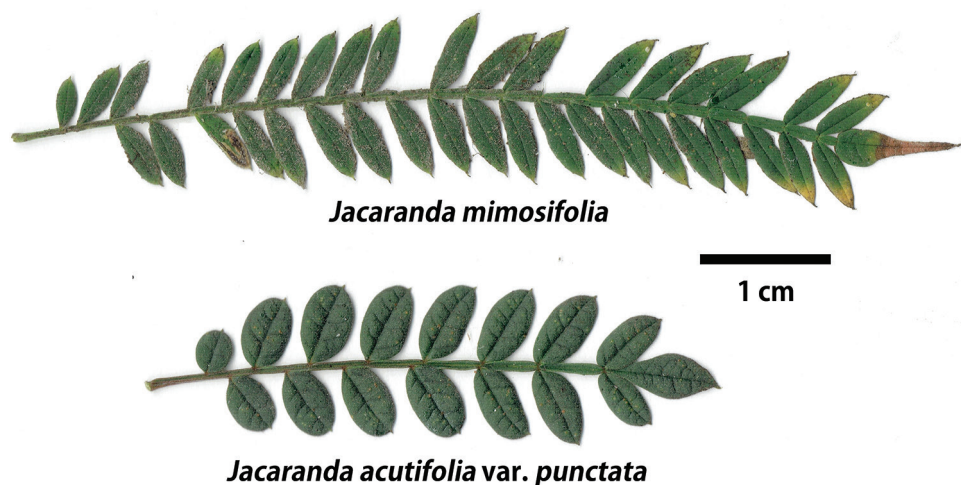


Figure 3. Comparison of pinnae from *Jacaranda mimosifolia* and *Jacaranda acutifolia* var. *punctata*. Note the difference in the length of the pinnae and the general form of the leaflets. The leaf of *J. mimosifolia* was taken from a cultivated tree in the author's garden, the leaf of *J. acutifolia* var. *punctata* was taken from the tree from which the neotype was collected.



Figure 4. Comparison of flowers from *Jacaranda mimosifolia* and *Jacaranda acutifolia* var. *punctata*. Note the difference in the colour of the corolla, the latter being slightly darker. The flower of *J. mimosifolia* was taken from a cultivated tree in the author’s garden, the flower of *J. acutifolia* var. *punctata* was taken from the tree from which the neotype was collected.

Table 1. Diagnostic characters of *J. acutifolia* var. *punctata*. Compared with the autonymic variety and *J. mimosifolia*, a species of the genus common in Lima. Description based on the examined plants and Gentry (1992).

Morphological traits	<i>Jacaranda acutifolia</i> var. <i>acutifolia</i>	<i>Jacaranda acutifolia</i> var. <i>punctata</i>	<i>Jacaranda mimosifolia</i>
leaves	pinnae 2.0–3.0 cm apart	pinnae 1.0–2.0 cm apart	pinnae 1.3–2.1 cm apart
pinnae	11–33 leaflets	9–17 leaflets	13–41 leaflets
leaflets	5–16 mm long, 2–4 mm wide, narrowly elliptic, sharply acuminate, the base cuneate, chartaceous, the surface smooth above	2–5 mm long, 1–3 mm wide, suborbicular, apiculate, the base obtuse, coriaceous, with vein impressions above, resin dots below	3–12 mm long, 1–4 mm wide, narrowly elliptic, sharply acuminate, the base cuneate, chartaceous, with vein impressions above
corollas	deep purplish blue, consistently so through the length of the tube, or becoming slightly paler towards the base	somewhat paler than the typical variety, becoming greyish towards the base	pale purplish blue, becoming white towards the end, with the tube white inside

was a methodological approach made already by Gentry (1992), who used vegetative characters in numerous occasions to determine varieties and subspecies of this family, often accompanied by subtle reproductive traits. He even recognised new species on the grounds of foliar characteristics (Gentry 1985), as did Morawetz (1979), who, nevertheless, supported their taxonomical opinions with reproductive traits.

Specimina visa

***Jacaranda acutifolia* var. *acutifolia*.** PERU. **Cajamarca:** in calidis fluvii Guancambamba prope Sn. Phelipe, *A. Humboldt* & *A. Bonpland* s.n. (B [digital image!], type of *Jacaranda acutifolia*). **Huánuco:** Acomay, 3200 m, 11 November 1964, *Ferreyra 16116* (USM!). **Lambayeque:** 13 km E of Olmos on road to Pucara, 410 m, 10 January 1978, *A. Gentry 22683* (USM!). **Lima:** Canta, Santa Rosa de Quives, 940 m, 2011, *P. Gonzales 1742* (USM!).

***Jacaranda mimosifolia*.** ARGENTINA. **Tucumán:** raro prope La Cruz, 1872, *P. Lorentz* s.n. (GOET [digital image!], type of *Jacaranda chelonia*). BRAZIL: cultivated near Bayswater, England, Bot. Reg. 8: pl. 631, 1822 (type of *Jacaranda mimosifolia*). PERU. **Arequipa:** Provincia de Arequipa, distrito de Cayma, cultivada, 2400 m, 2019, *H. Carrillo* s.n. (HUSA!); Provincia de Arequipa, distrito de Uchumayo, cultivada, 1970 m, 2019, *H. Carrillo* s.n. (HUSA!). **Lima:** Jardín Botánico “Octavio Velarde Núñez”, La Molina, August 2010, *A. Arista 9* (MOL!).

Family Bromeliaceae Juss.

Pourretia gigantea Raimondi, Perú 1: 295. 1874.

Type: not designated.

= *Puya raimondii* Harms, Notizbl. Bot. Gart. Berlin-Dahlem 10: 213. 1928.

Type (lectotype, designated here). PERU. Áncash: Cajamarquilla, auf der Cordillera negra bei Huaraz, 3800 m, 16 November 1903, *A. Weberbauer 3746* (MOL!; isolecotype: B barcode B-100247173 [digital image!]).

Probably the best-known plant described by Raimondi, the description starts on page 295 and continues with ecological and phenological data to end, on page 297, with the formal naming of the species. All the botanical description is interlayered with geographical information, personal impressions, travel anecdotes and reflections about the Andean landscape. More information on the description of the species can be found in Mariotti (2009).

Harms (1928) considered, erroneously, that the species was not validly published since it lacked a Latin description, which was not required before 1935 (Art. 39.1 of the ICN). However, he was aware of the fact that transferring *Pourretia gigantea* with its epithet to the genus *Puya* Molina would create a later homonym, since there was already a *Puya gigantea* Phil., so he opted to describe a new species based on Weberbauer’s material sent from Peru (syntypes according to Art. 9.6 of the ICN), from which a lectotype is here selected.

The authority of the species is incorrectly listed in IPNI (2021+) as “*Pourretia gigantea* Raimondi ex Herrera”. No original material was found in the Raimondi herbarium at USM.

Other specimens examined (syntypes). Peru. Áncash: Huaraz, Umgebung des Dorfes Aija, grasige, etwas steinige Abhänge, 4000 m, April 1903, *A. Weberbauer 2955* (B barcodes B-100247174 [digital image!], B-100247175 [digital image!], B-100247176 [digital image!]).

Family Caricaceae Dumort.

Carica integrifolia Raimondi, Elem. Bot. (Raimondi) 2: 230. 1857.

Type: not designated.

= *Vasconcellea candicans* (A.Gray) A.DC., Prodr. [A. P. de Candolle] 15(1): 417. 1864.

Type (holotype). PERU, Lima: Amancaes Mts., in ravines between Lima and Obrajillo, Wilkes *Exploring Expedition s.n.* (US barcode US- 00115148 [digital image!]).

Raimondi provided a Spanish diagnosis of this species within the text, comparing it with the better-known *C. papaya* L., and pointed to a footnote where he proposed a formal description.

This species was previously described three years earlier by Gray (1854) as *C. candicans*, from the same Lomas ecosystems near Lima. It was later transferred to *Vasconcellea* by de Candolle (1864), a change upheld by Badillo (2000) and currently accepted. No original material was found in the Raimondi herbarium at USM.

Family Orchidaceae Juss.

Chloraea undulata Raimondi, Elem. Bot. (Raimondi) 1: 143. 1857.

Type (lectotype, designated by Trujillo and Paredes-Burneo 2020: 93): Peru, Lima, *A. Raimondi s.n.* (USM-Raimondi Herbarium No. 9904!).

= *Chloraea pavonii* Lindl., Gen. Sp. Orchid. Pl.: 404, 1840.

Type (holotype): “Chile” [Peru]: *Pavon s.n.* (BM barcode BM000095631 [digital image!]).

Raimondi provided his description after casually naming the species a page before, as an example of plant with gynostemia, and referred to a footnote with a Latin protologue, preceded by a brief introduction in Spanish.

This name is commonly attributed to Miguel Fernández de Colunga, specifically in the second volume of his “Lecciones de botánica” (Fernández de Colunga 1878). The author, a disciple and close friend of the Italian scientist (Raimondi 1991), only copied the original description on page 187 and should not be credited with the authorship, as has occurred recently (Lleellish 2015). A review of the nomenclatural history of this species, with the corresponding typification of Raimondi’s name and other synonyms, was published while this article was in preparation (Trujillo and Paredes-Burneo 2020), where the priority of the name by Lindley (1840) was asserted.

Family Polypodiaceae J.Presl & C.Presl

Niphobolus ccallahuala (Ruiz) Raimondi, Elem. Bot. (Raimondi) 2: 57. 1857 [as “*calaguala*”].

≡ *Polypodium ccallahuala* Ruiz, Disert. Ratánhia Calaguala Canchalagua: 37. 1796, nom. rej. prop.

Type (lectotype, designated by León 2016: 1424): “Polypodium”, inedit colour and ink drawing by Isidro Gálvez (MA No. MA-AJB04-D-1680 [digital image!]).

- = *Campyloneurum densifolium* (Hieron.) Lellinger, Amer. Fern J. 78(1): 19. 1988, nom. cons. prop.
 ≡ *Polypodium angustifolium* f. *densifolium* Hieron., Bot. Jahrb. Syst. 34(4): 532. 1904.
 Type (lectotype, designated by Lellinger 1988: 19): Ecuador, Azuay: ad arborum truncos et locis lapidosis (Porphy-Schotter) prope Las Yervas Buenas in declivibus occasum solis spectantibus montium Cordillera occidental de Cuenca, 2500–2900 m, *F.C. Lehmann* 5723 (US No. 832728 [barcode 00065745, digital image!]; isotypes: B barcode B 20 0093585, F No. 771612 [barcode V0075791F, photo neg. 65683]).

The new combination was made effective by an indirect reference in the text, where Raimondi named both the basionym and its author, Ruiz (1796). Then, again in a footnote of the same page, he gave a brief description in Latin of the genus.

The basionym of this name has been proposed for rejection by León (2016), because a new combination under the genus *Campyloneurum* would replace the well-established *C. densifolium* (Lellinger 1988; Zuloaga et al. 2008). The proposal was recommended by the Nomenclature Committee for Vascular Plants (Applequist 2019). To the best of my knowledge, this is the only combination made with the original name by Ruiz (1796).

Family Pteridaceae E.D.M.Kirchn.

- Notholaena flavens* (Sw.) Raimondi, Elem. Bot. (Raimondi) 2: 59. 1857 [as “*Nothoclaena flava*”], probable isonym.
Notholaena flavens (Sw.) T.Moore, Index Fil. (T.Moore) 2: LXX. 1857 [April 1857] [as “*Nothoclaena*”].
 ≡ *Acrostichum flavens* Sw., Syn. Fil. (Swartz): 16 (204). 1806.
 Type (holotype): “America Meridional.” [Panama]: *Cavanilles s.n.* (S barcode S06-1742 [digital image!]).
 = *Argyrochosma nivea* var. *tenera* (Gillies ex Hook.) Ponce, Hickenia 2(38): 177. 1996.
 ≡ *Notholaena tenera* Gillies ex Hook., Bot. Mag. 58: pl. 3055. 1831.
 Type (holotype): Argentina, Mendoza: cultivated from spores collected near Villaviceñcio, February 1821, *Gillies s.n.* (K barcode K-000633290 [digital image!]).

The combination was made effective by an indirect reference to the basionym accompanied by a short description, complemented with a justification for the nomenclatural novelty in a footnote of the same page. Raimondi used the orthographic variant “*Nothoclaena*” by Kaulfuss (1824) and changed the epithet to “*flava*”.

The same combination was made by Moore (1857) in April of the same year. According to Pamo (1994), Raimondi was at Tingo María the first months of the year, and his book appeared after he returned to Lima. Therefore, it is most probable that Moore’s “Index Filicum” was published before “Elementos de Botánica”, making Raimondi’s combination an isonym with no nomenclatural standing (Art. 6 Note 2 of the ICN).

The referred name is currently considered a synonym for *Argyrochosma nivea* var. *tenera* in major floristic works (Ponce 1996; Zuloaga et al. 2008; Jørgensen et al. 2014). According to Tryon and Weatherby (1956), the original material of *Acrostichum flavens* was collected by Née in “South America”, however no indication of this is found on the herbarium labels, which state “E Nova Granata” (“from [the Viceroyalty of] New Granada”) and “Cavanilles misit” (“sent by Cavanilles [to Swartz]”). Considering the direction taken by the Malaspina Expedition, the most probable place of collection is Panama, then a part of the Viceroyalty of New Granada and the only place visited between the Viceroyalties of Peru and New Spain (Madulid 1989).

Conclusions

Raimondi was a notable botanist with an acute knowledge of the Peruvian flora, whose precision was hindered only by the lack of access to updated literature from Europe and the United States. In fact, he proposed new species that were total novelties at the time, but which were subsequently forgotten by later researchers. Despite all of this, Raimondi is mostly remembered as a geologist and geographer, and the reappraisal of his botanical skills came much later. May this work add to the knowledge of that aspect of this remarkable Italian explorer.

Acknowledgements

The author invested over five years in this little piece of research, to honour properly the memory of the great Raimondi. In his path, he was aided by some of the foremost scientists of Peru: Hamilton Beltrán (USM), who helped with the identification, taxonomy, and nomenclatural information of Asteraceae, Severo Baldeón and Mario Benavente, for granting access to the Raimondi Herbarium and the general collection at USM since 2014, Luis Mayta (HUSA), the co-author of the new combination based on *Jacaranda punctata*. Also, the staff of the Raimondi Museum is to be acknowledged, especially its director Luis Felipe Villacorta, who gave privileged access to their collections and bibliographic material. Finally, the author is grateful to the editor, Gabriele Galasso, Stefania Biondi and two anonymous reviewers for their comments, criticisms, and suggestions, which helped to greatly improve this work.

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Supplementary material I

Protologues and combinations by Antonio Raimondi

Author: Eduardo Molinari-Novoa

Data type: Nomenclatural information

Explanation note: Here we present the full protologues by Antonio Raimondi. The orthography and punctuation have been updated, but we tried to respect both the archaic prosodic tone of the text as well as its format.

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Link: <https://doi.org/10.3897/italianbotanist.11.61796.suppl1>