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A NEW GREEN-FLOWERED *AA* (CRANICHIDEAE) FROM PERU

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Abstract. A new species from the Peruvian Andes, *Aa olivacea*, is described and illustrated. Information concerning distribution, habitat, ecology, and conservation status is provided. The new species is similar to *A. hieronymi* by its dense spikes of dark green and brown flowers with translucent whitish floral bracts; but differs from it by its elliptic to lanceolate leaves, 60 to 100-flowered spikes, glabrous rachis, lateral sepals with the margin entire to occasionally minutely erose near the apex, petals with slightly erose to sinuate apical margin, lip unlobed with lacerate to erose margin, and ovary with scarce hairs. Furthermore, *A. tenebrosa* is proposed as a synonym of *A. hieronymi*, *A. nigrescens* is recognized as a distinct species from *A. leucantha*, and *A. lehmannii* is confirmed to be an illegitimate, superfluous name for *A. leucantha.*

Resumen. Se describe e ilustra una nueva especie de los Andes peruanos, *Aa olivacea*. Se proporciona información sobre su distribución, hábitat, ecología y estado de conservación. La nueva especie es similar a *A. hieronymi* en su espiga densa de flores de color verde oscuro con marrón, con brácteas florales blanquecinas y translúcidas, pero se diferencia de ella por sus hojas elípticas a lanceoladas, espiga de 60 a 100 flores, raquis glabro, sépalos laterales con el margen entero y en ocasiones diminutamente eroso cerca al ápice, pétalos con el margen apical ligeramente eroso a sinuado, labelo sin lóbulos con el margen lacerado a eroso y el ovario con escasos pelos. Además, se propone *A. tenebrosa* como sinónimo de *A. hieronymi*, *A. nigrescens* es reconocida como una especie distinta de *A. leucantha* y se confirma que *A. lehmannii* es un nombre ilegítimo, superfluo para *A. leucantha*.

Keywords / Palabras clave: *Aa hieronymi*, *Aa leucantha*, *Altensteinia*, Andes peruanos, Orchidaceae, Peruvian Andes, sinónimo, synonym

Introduction. The Neotropical orchid genus *Aa* Rchb.f. occurs in Costa Rica and throughout the Andean region, from Venezuela to northern Argentina. The genus is characterized by its inflorescences with an elongated peduncle completely enclosed by many hyaline, imbricating sheaths, sub-dense to dense cylindrical spikes of tiny, non-resupinate, protandrous flowers that rarely exceed one centimeter in length (including the ovary). The floral bracts are hyaline to diaphanous, and the ovary may be glabrous to pubescent. The flowers have straight or spreading lateral sepals, a reflexed dorsal sepal and petals, and a calceolate or globose lip

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that conceals the short column with an erose, denticulate, or lacerate margin (Szlachetko & Nowak, 2014; Trujillo & Vargas, 2011).

According to the literature and field notes on herbarium labels, the flower color of *Aa* species has mainly been described as white, whitish, white and green, and brownish white. However, there are also some species with orange or dark green and brown flowers (Martín, Zanotti & Scrocchi, 2020; Trujillo & Vargas, 2011)

Despite several recent studies documenting new populations, describing new species, and transferring species wrongly placed in *Aa* to *Myrosmodes* Rchb.f. (Martín *et al*., 2020; Szlachetko & Kolanowska, 2014; Szlachetko & Novak, 2014; Trujillo & Delgado Rodriguez, 2011; Trujillo & Vargas, 2011), the genus *Aa* remains poorly understood. The taxonomic circumscriptions of most accepted species remain unclear, and several populations may represent undescribed species. So far, excluding the basionyms of species now placed in *Myrosmodes*, 29 names are referable to *Aa*.

Many *Aa* specimens remain unidentified or misidentified in herbaria; for example, in Peruvian herbaria, specimens with different floral features, which clearly represent different species, have been identified as *Aa paleacea* (Kunth) Rchb.f. or *Aa mathewsii* (Rchb.f.) Schltr.

Recent botanical surveys conducted in the departments of Lima and San Martín, Peru, led to the discovery of a new species of *Aa* with dark green flowers (Fig. 1). Additional specimens of the new species were located at USM, and photographic records are also available in iNaturalist (2024).

Based on the revision of type material and the protologues of other species of *Aa* with dark green flowers previously described from Argentina and Colombia, we determined during our studies of the new species of *Aa* from Peru that *Aa tenebrosa* C.M.Martín & Scrocchi is a synonym of *Aa hieronymi* (Cogn.) Schltr., that *Aa nigrescens* Schltr. is a distinct species from *A. leucantha* (Rchb.f.) Schltr. (proposed by Garay, 1978), and that *A. lehmannii* Rchb.f. ex Szlach. & Kolan. is an illegitimate, superfluous name for *A. leucantha* (Shenzhen Code Art. 52.1 in Turland *et al.*, 2018).

Material and methods. Fieldwork was carried out in 2023 in Lima and San Martín departments, Peru. Notes on the habitat and phenology, as well as detailed photographs of the vegetative and floral details of the new species, were taken *in situ*. Specimens were deposited at herbaria HOXA, HSP, KUELAP, and MOLF. Additional specimens of *Aa* were examined at USM. Flowers preserved in 70% ethanol or rehydrated flowers from herbarium specimens were examined and drawn under a stereomicroscope. Measurements were made on the herbarium specimens -*exsiccata*- and the alcohol-preserved flowers.

The relevant literature on the genus *Aa* was revised, including the protologues of all previously described species of *Aa*, floristic and taxonomic treatments, and other works that include descriptions and illustrations of this group (e.g., Garay, 1978; Schweinfurth, 1958). Flower sketches were digitized and processed with Paint.NET v 5.0.13. A map was prepared with SimpleMappr and edited with Paint.NET v 5.0.13.

Additionally, specimens were physically reviewed at AMES, K, NY, and W. High-resolution digital images of the specimens housed at CORD, F, G, GOET, and SI were examined through the online platforms *Catalogue des herbiers de Genève* (CHG, 2023), Field Museum's online Botanical Collections Database (F, 2023), JSTOR Global Plants (JSTOR, 2023), and Repositorio Digital UNC Herbarios (UNC, 2023).

The conservation status of the new species was assessed using the IUCN criteria (IUCN, 2012, 2024), based on estimates of the Extent of Occurrence (EOO) and Area of Occupancy (AOO), both calculated through the GeoCat Geospatial Conservation Assessment Tool (Bachman *et al.*, 2011).

Taxonomic treatment

Aa olivacea D.Trujillo, Rob.Fern. et Edquén, ***sp. nov.*** (Fig. 1–3).

TYPE: Peru. Department of Lima: province Oyón, district Oyón, laderas frente a Oyón, 3740 m, 16–22 May 2023, *R. Fernandez-Hilario, A. A. Wong Sato, I. Revilla. K. Bernabé, & M. Zea 2459* **(**holotype: HOXA-083298!; isotypes: MOLF000170!, HSP!).

Diagnosis: *Aa olivacea* is similar to *Aa hieronymi* (Cogn.) Schltr., from which it can be distinguished by having elliptic to lanceolate leaves, 60–100-flowered spikes, glabrous rachis, olive green to chestnut brown flowers, lateral sepals with the margin entire to oc-

casionally minutely erose near the apex, petals with slightly erose to sinuate apical margin, lip unlobed, and ovary with scarce hairs.

Plant terrestrial, small, 28–50 cm tall. *Roots* fleshy, fasciculate, to 7 cm long, 3.5–6.0 mm in diameter. *Leaves* withered or green at flowering time, forming a basal rosette; conduplicate, sheathing the stem, blade elliptic to lanceolate, acute, 6.0–6.2 × 1.1–2.5 cm. *Inflorescence* erect, 27.0–48.5 cm long; peduncle terete, 3–5 mm in diameter, enclosed by 10–19 translucent, whitish sheaths with brown veins, these tubular-infundibuliform with ovate to lanceolate, acute to acuminate free apical portion; spike dense, 3–6 cm long, 0.6–1.0 cm in diameter, with 60–100 flowers opening in succession; rachis glabrous. *Flowers* non-resupinate, protandrous; sepals and petals chestnut brown to olive green with cream to light brown apex, lip dark chestnut brown with olive green with a light olive green and creamy white margin, 3–5 mm long (including the ovary). *Floral bracts* translucent brown with cream white apex, broadly elliptic, ovate to lanceolate, acute, distal margin somewhat irregularly erose, 4.2–7.5 × 2.4–3.7 mm, exceeding the length of the flowers. *Ovary* olive green to greenish brown, sessile, obovoid to cylindric, with scarce hairs mainly near its junction with the lateral sepals, 1.2–2.6 × 0.9–1.9 mm. *Dorsal sepal* reflexed, ovate to oblong, obtuse, 1-veined, 1.4–2.9 × 0.9–1.3 mm. *Lateral sepals* spreading almost horizontally in mature flowers, perpendicular to the floral axis, obliquely oblong to lanceolate, obtuse, margin entire to occasionally minutely erose near the apex, shortly connate by <1 mm at base, dorsally with scarce hairs at base, 1-veined, 2.0–3.0 × 0.9–1.0 mm. *Petals* reflexed, ovate to oblong or elliptic, obtuse, distal margin slightly erose to sinuate, 1-veined, 1.6–2.1 × 0.6–1.0 mm. *Lip* globose, oblate in side view, slightly inflexed, shortly unguiculate, unlobed, with a fleshy disc and a narrow opening, the margin lacerate to erose, base with two spherical calli, 1.4–2.4 mm long, 1.8–2.7 × 3.9–4.9 mm when spread out. *Column* short, olive green and brownish, thickened above, straight in young flowers and slightly bent backward in old flowers, 0.75–1.40 × 0.73–1.35 mm. *Anther* dorsally brown with cream-white margins, erect, subquadrate, 0.5–0.8 × 0.60–1.05 mm. *Pollinarium* made up of 4, cream yellow, clavate pollinia, united apically to a translucent white, drop-like viscidium. *Stigma* subrectagular to transversely elongate, 0.45–0.63 × 0.60–1.00 mm. *Fruit* an ellipsoid capsule, 3.0 × 2.5–2.7 mm.

Figure 1. Inflorescence of *Aa olivacea* (from *Fernandez-Hilario et al. 2459*, HOXA-083298). **A**. In habitat. **B**. Pressed and dried. Photographs by A. A. Wong Sato (A) and D. Trujillo (B).

Paratypes: Peru. Departamento de San Martín: provincia de Rioja, distrito Pardo Miguel Naranjos, Bosque de Protección Alto Mayo, sector Chisquilla en orientación al Cerro Campanario o Siete Lagunas, 3348 m, 1 Abr 2023, *J. D. Edquén, K. Edquen, M. Enco & E. Yrigoín 6943* (KUELAP-004023!). Departamento de Lima, provincia de Cajatambo, distrito Copa, Anexo Huayllapa, 3690 m, 2 Ago 2017, *H. Beltrán, S. Castillo & S. Rivera 8220* (USM-305454!). Departamento de Pasco: provincia de Pasco, distrito Huariaca, Fundo Chaprin, 3200 m, 19 May 2012, *S. Baldeón, S. Baldeón & J. Baldeón 7536* (USM-289632!).

Other records: Peru. Department of Ancash: province of Bolognesi, -10.127985° lat., -77.177197° lon., 14

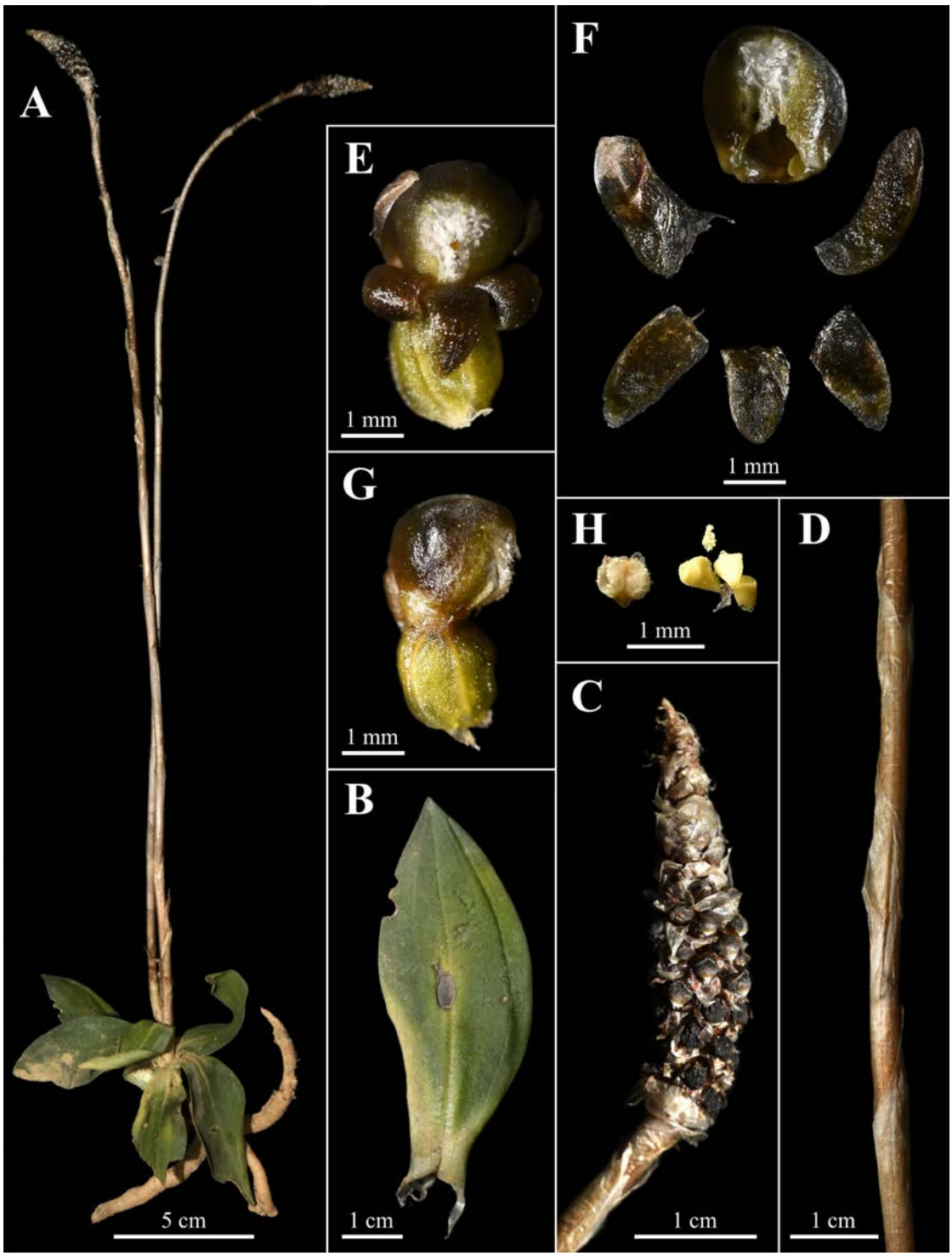

FIGURE 2. *Aa olivacea* (from *Edquén 6943*). **A**. Habit. **B**. Leaf. **C**. Inflorescence. **D**. Peduncle. **E**. Flower, front view. **F**. Dissected perianth. **G**. Lip and ovary, side view. **H**. Anther and pollinarium. Photographs by J.D. Edquén.

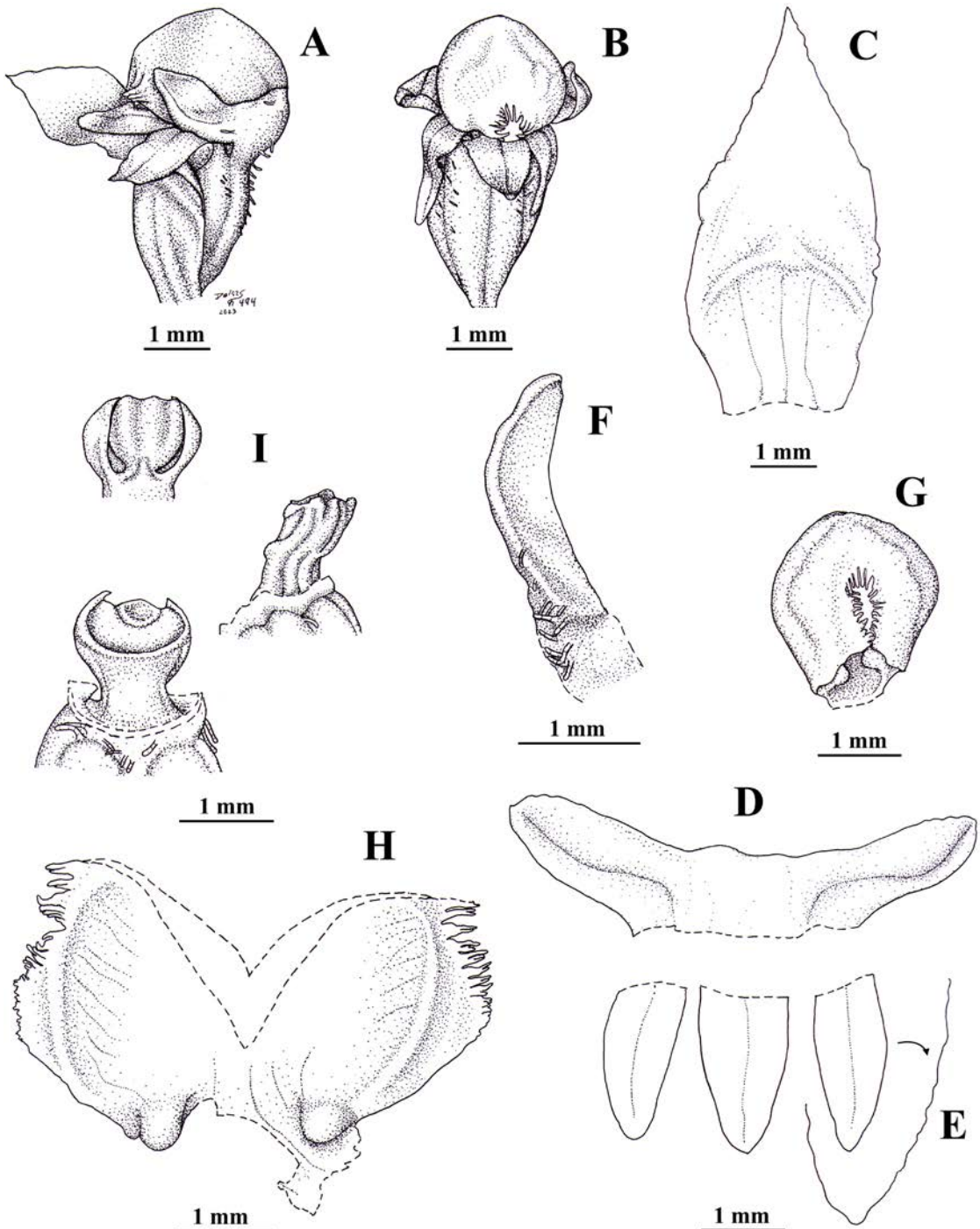

FIGURE 3. *Aa olivacea*. **A**. Flower, side view. **B**. Flower, front view. **C**. Floral bract. **D**. Dissected perianth. **E**. Detail of petal margin. **F**. Lateral sepal, dorsal view. **G**. Lip, adaxial view. **H**. Lip spread out, adaxial view. **I**. Column, dorsal, side and front view. Drawing by D. Trujillo, based on *Fernandez-Hilario et al. 2459*, MOLF000170.

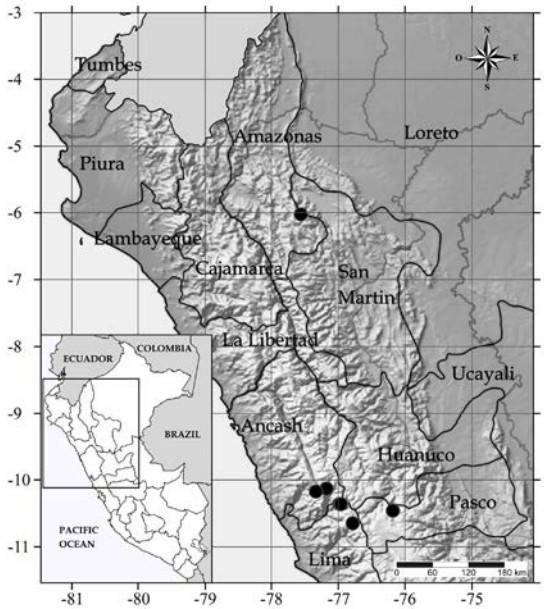

FIGURE 4. Distribution map of *Aa olivacea* (black circles) in Peru. Created by D. Trujillo.

Jun 2015, *R. Ripley s.n.* (Ripley, 2015a); province of Bolognesi, -10.127963° lat.; -77.177267° lon.,14 Jun 2015, *R. Ripley s.n.* (Ripley, 2015b); province of Bolognesi, -10.17151° lat., -77.337193° lon., 16 Jun 2015, *R. Ripley s.n.* (Ripley 2015c); Department of Lima, province of Cajatambo, -10.359417° lat., -76.961656° lon., 21 Jun 2023, *Chauncey s.n.* (Chauncey, 2023).

ETYMOLOGY: From the Latin *olivaceus*, referring to the olive-green color of the flowers.

DISTRIBUTION: Known only from the Peruvian Andes, in the Ancash, Lima, Pasco, and San Martin departments, at elevations of 3200 to 3740 m (Fig. 4).

HABITAT AND ECOLOGY: Terrestrial in wet grasslands (jalca) and shrublands, among rocks on stony hillsides (Fig. 5A–B). In the San Martin location, the grassland reaches 50 cm height, with abundant ferns and *Puya* sp. (Bromeliaceae), scattered shrubs of *Brachyotum* sp. (Melastomataceae), *Senecio* sp. (Asteraceae), and herbs such as *Gentiana* sp. (Gentianaceae), *Rockhausenia nubigena* (Kunth) D.J.N.Hind (Asteraceae), and orchids of the genera *Elleanthus* C.Presl, *Pachyphyllum* Kunth, and *Stelis* Sw. in rocky areas. At Oyón, Lima, the species was recorded in shrublands on slight to moderate slopes dominated by *Alonsoa meridionalis* (L.f.) Kuntze (Scrophulariaceae), *Austrocylindropuntia subulata* (Muehlenpf.) Backeb. (Cactaceae), *Baccharis buxifolia* (Lam.) Pers., *B. tricuneata* (L.f.) Pers. (Asteraceae), *Monnina salicifolia* Ruiz & Pav. (Polygalaceae), *Proustia berberidifolia* (Cuatrec.) Ferreyra (Asteraceae), and *Satureja revoluta* (Ruiz & Pav.) Briq. (Lamiaceae).

In the population of Lima, we observed a cellophane bee, *Colletes* sp. (Colletidae), visiting the flowers of *A. olivacea*. The bee apparently searched for nectar by inserting its proboscis into the lip of the flower (Fig. 5C–D). Celophane bees have also been recorded visiting flowers of *Aa weddelliana* (Rchb.f.) Schltr. in Lomas de Amara, department of Ica, Peru (D. Trujillo, pers. obs.). These floral visits, along with the evidence of protandry from anatomical studies of *Aa erosa* (Rchb.f.) Schltr. (Trujillo, Franke & Agerer. 2011), suggest that *A. olivacea* may be a cross-pollinating species.

PHENOLOGY: Flowering occurs in the field from April to August. Developing capsules were observed at the bottom of the spikes in all the specimens examined.

CONSERVATION STATUS: *Aa olivacea* is endemic to the central-northern Peruvian Andes. It is known from six locations: five in the central departments of Ancash, Lima, and Pasco, and one in the northeastern department of San Martin. The main threats to the species are habitat loss and degradation due to land conversion for agriculture, overgrazing, and the traditional practice of burning of grasses on hillsides by farmers (Roman *et al.*, 2024). Two of the populations were recorded within protected areas: Bosque de Protección Alto Mayo and Private Conservation Area Huallapa, which are expected to effectively protect the habitat of these respective populations. Based on the six known locations, the estimated Extent of Occurrence is 31,176.781 km^2, but the Area of Occupancy is only 28 km^2. However, considering the large areas of potential habitat between the central and northern populations, further research is expected to record new populations in the departments of Amazonas, La Libertad, and northern Ancash. Therefore, the species is assessed as Near Threatened (IUCN, 2012, 2024).

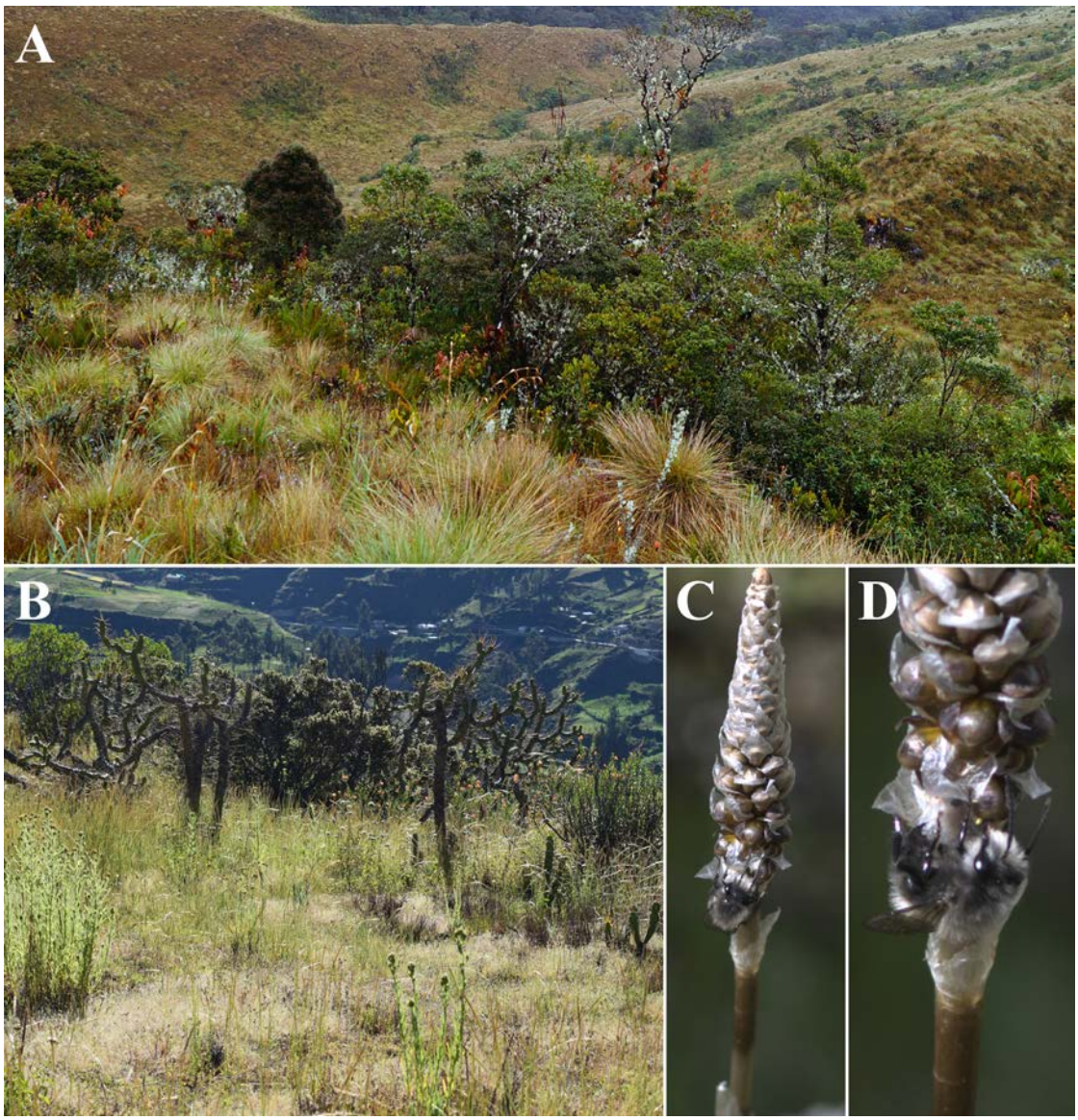

Figure 5. *Aa olivacea*. **A**. Habitat in San Martin. **B**. Habitat in Lima. **C**. Cellophane bee visiting flowers. **D**. Cellophane bee inserting its proboscis into the lip. Photographs by J.D. Edquén (A), R. Fernandez-Hilario (B) and A. A. Wong Sato (C, D).

Taxonomic comments: The combination of morphological characteristics with the flower coloration makes specimens of *A. olivacea* readily distinguishable from those of all other species of the genus (Fig. 1–2). The olive green to chestnut brown color of its flowers turns dark brown to black when old and dried (Fig. 1B); whereas other *Aa* species, that have white, white and green or brownish white color flowers turns light brown to brown colors when old and dried; this feature distinguishes the species from others in herbarium collections. The new species is similar to *A. hieronymi* from northern Argentina (Fig. 6). Both species display dense spikes of dark green to brown flowers that turn black in old (and dried) flowers, with translucent, whitish floral bracts, lateral sepals spreading and perpendicular to the floral axis, and a globose, slightly inflexed lip. However, *A. olivacea* is recognized by its elliptic

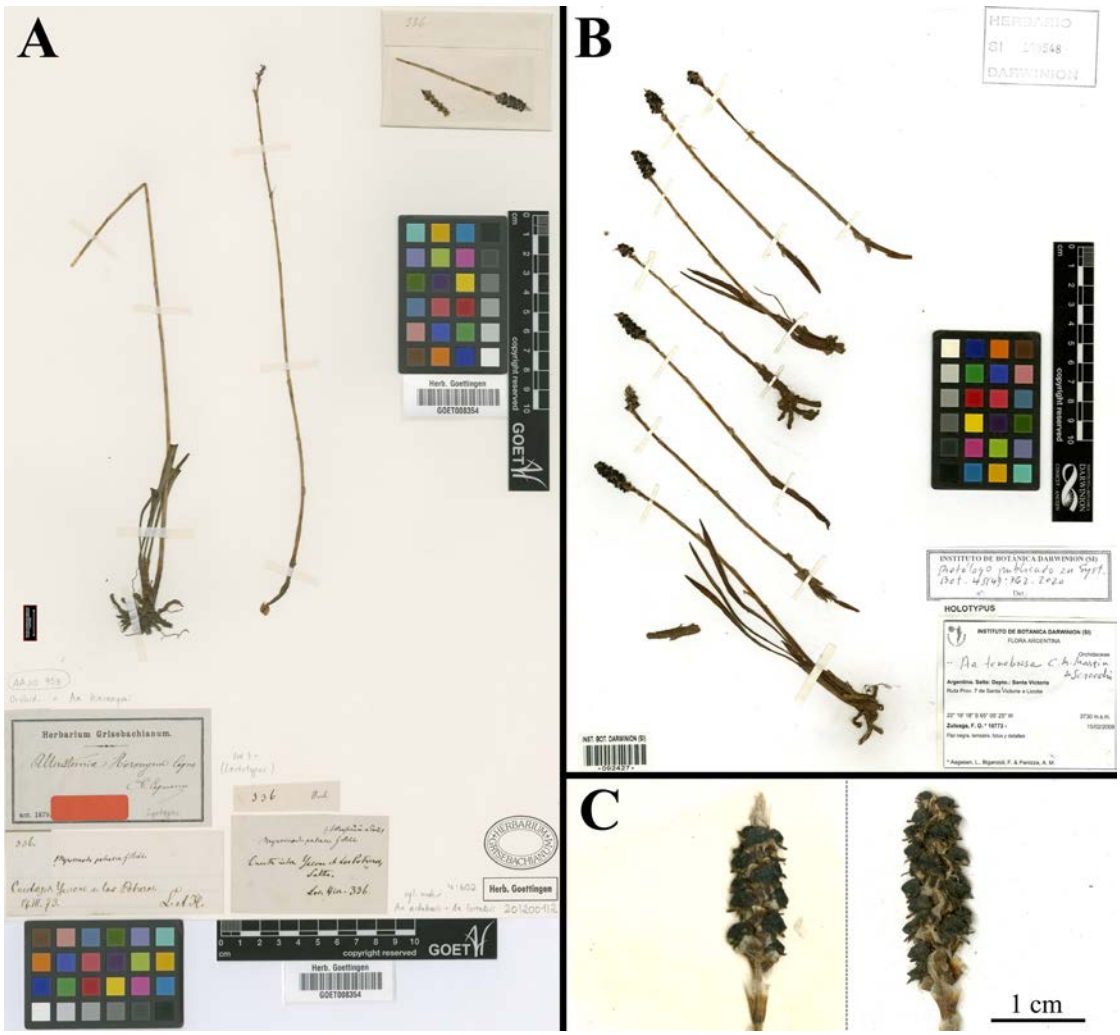

FIGURE 6. Type specimens of *Aa* from Argentina. **A**. Lectotype of *Aa hieronymi* **(**GOET008354). **B**. Holotype of *Aa tenebrosa* (SI092427). **C**. Close-up of inflorescences of *A. hieronymi* (left) and *A. tenebrosa* (right). Reproduced with the kind permissions of the herbaria of the University of Göttingen (A), and the Instituto de Botánica Darwinion (B).

to lanceolate leaves (*vs*. linear-lanceolate), 60 to 100-flowered spikes, (*vs*. 7 to 25-flowered spikes), a glabrous rachis (*vs*. pubescent), olive green to chestnut brown flowers (*vs*. emerald green to brown), lateral sepals with the margin entire to occasionally minutely erose near the apex (*vs*. apical margin slightly serrate), petals with the apical margin slightly erose to sinuate (*vs*. apical margin slightly serrate), an unlobed lip with lacerate to erose margin (*vs*. obscurely trilobed lip with deeply laciniate margins), and ovary with scarce hairs especially in the distal half (*vs*. many hairs distributed over almost all the ovary).

Aa nigrescens also has a densely many-flowered spike whose flowers turn black upon drying; it was described by Schlechter (1920a) from Cauca, Colombia, based on *Madero 26* (holotype: B destroyed, copy of an analysis based on the type drawing at AMES00000005!). However, this species has narrowly elliptic leaves, larger sepals (3.5–4.0 mm long), erect lateral sepals (*i.e*. not spreading), obliquely ligulate and larger petals (3.5 mm long), and erect, larger lip (*ca*. 4 mm long).

Comments on other *Aa* species with dark green flowers that turn black upon drying

Aa hieronymi (Cogn.) Schltr., Repert. Spec. Nov. Regni Veg. 11: 150. 1912.

Basionym: *Altensteinia hieronymi* Cogn., Fl. Bras. (Martius) 3(4): 245. 1895.

TYPE: Argentina. Province of Salta: cuesta entre Yacone y Potreros, Mar 1873, *P. G. Lorentz & G. Hieronymus 336* (holotype: B, destroyed; lectotype (first step designated by Schlechter 1920c: 438, second step designated by *Martín, Zanotti & Scrocchi* 2020): GOET008354 [mixed] [photo seen]; isolectotype: CORD 00002206 [photo seen]).

Aa tenebrosa C.M.Martín & Scrocchi, Syst. Bot. 45(4): 762. 2020. *syn. nov.*

TYPE: Argentina. Province of Salta: department of Santa Victoria, Ruta Provincial 7, de Santa Victoria a Lizoite, 22°16'18"S, 65°05'25"W, 3730 m, 15 Feb 2009, *F. Zuloaga et al. 10773* (holotype: SI092427 [photo seen]; isotypes: CORD [photo seen], CTES0043314).

Cogniaux (1895) described *Altensteinia hieronymi* citing seven specimens (syntypes): *P. G. Lorentz & G. Hieronymus 336, P. G. Lorentz & G. Hieronymus 617, F. Schickendantz 264, G. Hieronymus s.n., G. Hieronymus s.n.*, *G. Hieronymus 796*, and *O. Schnyder 598*. Later, Schlechter (1912) transferred *Altensteinia hieronymi* to the genus *Aa*, and subsequently, Schlechter (1920b, c) proposed three new species based on various of Cogniaux's (1895) syntypes: *Aa achalensis* Schltr. (*G. Hieronymus 796*), *Aa lorentzii* Schltr. (*P. G. Lorentz & G. Hieronymus 617*), and *Aa schickendanzii* Schltr. (*F. Schickendantz 264*). Schlechter explicitly designated the specimen *P. G. Lorentz & G. Hieronymus 336* as the (lecto-)type of *A. hieronymi* and emended the species description, including some comments in German (Schlechter, 1920c). In the last lines, Schlechter pointed out: "… It is one of the few species in which the flowers take on a black color when dried". Duplicates of the specimen *P. G. Lorentz & G. Hieronymus 336* are housed at GOET and CORD, lectotype and isolectotype, respectively, as designated by Martín *et al.* (2020). The herbarium sheet GOET008354 has two attached specimens, with their spikes placed in the envelope in the upper right-hand corner of the sheet, each representing a different species (Fig. 6A). The specimen on the herbarium sheet that agrees with Schlechter's description and annotation in German of *A. hieronymi* is the inflorescence on the left (the one bearing leaves), and its spike (within the envelope) is the one with a portion of the peduncle.

Martín *et al*. (2020) published a taxonomic revision of the genus *Aa* from the southern central Andes, including the description of *A. tenebrosa*, a new species from Argentina, based on *F. Zuloaga et al. 10773* (Fig. 6B). They indicated that the dark or brownish green flowers of *A. tenebrosa*, in combination with other features, distinguish this species from other members of *Aa.* Nonetheless, it seems that Martin *et al*. (2020) overlooked Schlechter's comment about the black flowers upon drying of *A. hieronymi*, similar to those of *A. tenebrosa*, as they did not mention it.

Aa tenebrosa shows all the features of *A. hieronymi*, except for having shorter peduncles. Both species have dense and short spikes with relatively few flowers (compared to other species of the genus), pubescent rachis, oblong and obtuse lateral sepals, and lobed, transversely elliptic lip when viewed from the side (in dried flowers; Fig. 6C). The lip of *A. tenebrosa* is 3-lobed (see color photograph of the type in IBODA, 2023), whereas Schlechter (1920c) described the lip of *A. hieronymi* as "sub 5-lobed" (probably and artifact during flower dissection). Due to the similarities noted above, we determined that *A. tenebrosa* is a synonym of *A. hieronymi*.

Aa leucantha (Rchb.f.) Schltr., Repert. Spec. Nov. Regni Veg. Beih. 7: 213. 1920.

Basionym: *Altensteinia leucantha* Rchb.f., Flora 69: 548. 1886.

TYPE: [north Ecuador, on moist, boggy ground on the Páramo del Mojanda, 3300 m, 28 Jan 1881. *Lehmann 247*] (holotype: W0302214/W-R 612!) (Fig. 7–8.)

Aa lehmannii Rchb.f. ex Szlach. & Kolan., Ann. Bot. Fenn. 51(5): 330. 2014. *nom. illeg. superfl.*

TYPE: Ecuador. Páramo del Mojanda: 3300 m. 28 Jan 1881, *Lehmann 247* ["*244*" in error] (holotype: W0302214/W-R 612!).

FIGURE 7. Holotype of *Aa leucantha* (W0302214). Reproduced with the kind permission of the Herbarium, Naturhistorisches Museum Wien.

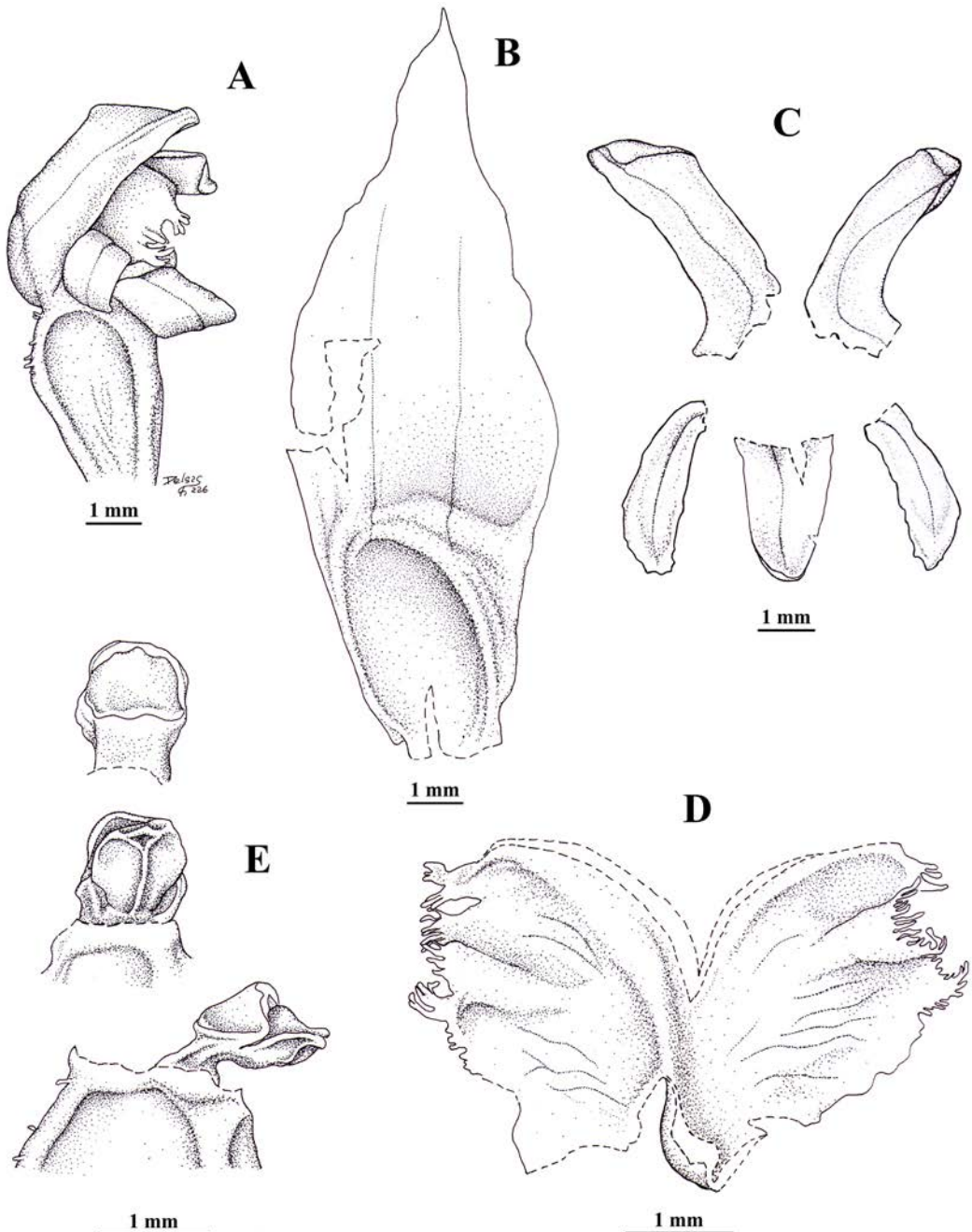

Figure 8. *Aa leucantha*. **A**. Flower, side view. **B**. Floral bract. **C**. Dissected perianth. **D**. Lip, spread out. **E**. Column, front, dorsal, side view. Drawing by D. Trujillo, based on *Lehman 247* (W0302214).

In the protologue of *Altensteinia leucantha* Rchb.f. (the basionym of *A. leucantha*), Reichenbach did not indicate the specimen on which he based the description. However, in the Reichenbach herbarium at W, there is a sheet containing an *Aa* specimen (composed of four inflorescences), a flow-

er illustration, and two (original) labels. One label, in F.C. Lehmann's handwriting, bears the number "*247*" and collection data (Fig. 7). The second label, in Reichenbach's handwriting, indicates: "*Altensteinia* (*Aa*) *lehmanni* […]" followed by a description that agrees with the original description of *Altensteinia* (*Aa*) *leucantha*. Garay, in his work on Orchidaceae in Flora of Ecuador (1978), referred to the specimen *Lehman 247* as the type of *A. leucantha*, and we agree.

Szlachetko and Kolanowska (2014) proposed *Aa lehmannii*, based on *Lehmann 244*, a specimen from Reichenbach's collection at W. The illustration published in their Fig. 1, indicated as having been drawn by A. Kröl, was originally prepared by D. Szlachetko in February 2009. A copy of Szlachetko's drawing, kept at W with collection number 2009-001251 (W-0302213)!, includes an annotation on the upper right-hand corner stating "WR-612"; which is, in fact, the Reichenbach Herbarium's sheet number of specimen *Lehmann 247*, the type specimen of *A. leucantha*. Therefore, *A. lehmannii* is an illegitimate, superfluous name for *A. leucantha* because both names were based on the same specimen (Shenzhen Code Art. 52.1 in Turland *et al.*, 2018).

Garay (1978) considered *A. nigrescens* a synonym of *A. leucantha*; however, we consider them to represent different species. *Aa nigrescens* can be distinguished by its flowers, which are drying black (*vs*. dark brown), an oblong to elliptic dorsal sepal 3.5 mm long (*vs*. ovate, 2.1–3.0 mm long), obliquely lanceolate lateral sepals (*vs*. obliquely obovate to oblong), obliquely ligulate petals with an entire margin (*vs*. obliquely elliptic to lanceolate or oblong with apical margin slightly erose to sinuate), and an obscurely pilose ovary from the middle to the apex (*vs*. sparsely pilose ovary only near its junction with the lateral sepals).

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