



<https://doi.org/10.11646/phytotaxa.361.2.7>

A new species of *Andinia* (Orchidaceae, Pleurothallidinae) from Huánuco, Peru, and the first Peruvian locality for *Andinia schizopogon*

ALEX GUSTAVO DIAZ HERNÁNDEZ¹, LUIS ANTONIO OCUPA HORNA¹, LUIS ENRIQUE YUPANQUI GODO² & MARK WILSON³

¹Área de Botánica, Facultad de Ciencias Biológicas, Universidad Nacional Pedro Ruiz Gallo, Ciudad Universitaria, Juan XXIII 391, Lambayeque, Peru

²Universidad Nacional Agraria de la Selva, Ciudad Universitaria, Carretera Central Km. 1.21 Tingo María, Peru

³Department of Organismal Biology and Ecology, Colorado College, Colorado Springs, CO 80903, USA;

e-mail: mwilson@coloradocollege.edu

Abstract

A new species of *Andinia* in subgenus *Andinia* from Tingo María National Park is described, illustrated and compared to the most similar species pair. *Andinia tingomariana* is distinguished by unguiculate, reniform, ciliate petals, a longer column without the terminal dilation and a trilobed, ciliate lip in which the narrow, semi-auriculate lateral lobes project upward around the column, adnate in the middle, creating a furrowed surface. The floral morphology of the new species is compared to that of the phylogenetically unrelated *Salpistele* group of *Stelis* and possible convergent evolution of pollination syndromes is discussed. Finally, the first confirmed locality of *A. schizopogon* is reported and a preliminary list of *Andinia* species in Peru is provided.

Resumen

Una nueva especie de *Andinia* del subgénero *Andinia* del Parque Nacional Tingo María se describe, ilustra y compara a otras especies morfológicamente cercanas, *A. dielsii* y *A. pensilis*. *Andinia tingomariana* se distingue por sus pétalos unguiculados, reniformes y ciliados, la columna más larga sin dilatación terminal y por el labio trilobulado, ciliado en el cual los lóbulos laterales angostos, semi-auriculados se proyectan hacia arriba alrededor de la columna, adnados al medio, creando una superficie rugosa. La morfología floral de la nueva especie se compara con la *Salpistele* del grupo *Stelis*, filogenéticamente no relacionada, y se discute la posible evolución convergente hacia un síndrome de polinización similar. Finalmente, se reporta la primera localización confirmada de *A. schizopogon* y se muestra una lista preliminar de las especies de *Andinia* del Perú.

Keywords: *Andinia*, Peruvian orchid flora, *Salpistele*, *Stelis*, pleurothallid taxonomy

Introduction

Luer (1986) transferred two unusual species of *Lepanthes* Swartz (1799: 85), *L. dielsii* Mansfeld (1937: 72) and *L. pensilis* Schlechter (1921: 55), to the then recently created genus *Salpistele* Dressler (1979: 6). Recognizing the morphological differences among the species, Luer (1991) subdivided *Salpistele* into subgenera *Salpistele*, including *S. brunnea* Dressler (1979: 6), *S. dressleri* Luer (1991: 128), *S. lutea* Dressler (1979: 8) and *S. parvula* Luer & Dressler (in Luer 1991: 132), and *Andinia* Luer (1991: 123), including *S. dielsii* (Mansf.) Luer (1986: 57) and *S. pensilis* (Schltr.) Luer (1986: 57). Only later did Luer (2000) decide that the morphological differences between species of the two subgenera were sufficient to elevate *Salpistele* subgenus *Andinia* to the generic level, a segregation that was fully supported by subsequent phylogenetic studies (Pridgeon *et al.* 2001, Wilson *et al.* 2017).

Andinia (Luer) Luer (2000: 5) was recently re-circumscribed based on phylogenetic analysis to contain 72 species in five subgenera: *Aenigma*, *Andinia*, *Brachycladium*, *Masdevalliantha* and *Minuscula* (Wilson *et al.* 2017). Species of this genus are confined to the Andes and distributed from northern Colombia to northern Bolivia. Of relevance

here, *Andinia* subgenus *Andinia* includes the species *A. dielsii* (Mansf.) Luer (2000: 6), *A. lappacea* (Luer 2000: 129) Pridgeon & Chase (2001: 251), *A. pensilis* (Schltr.) Luer (2000: 6) and, tentatively, pending further study, *A. vestigipetala* (Luer 1977: 404) Pridgeon & Chase (2001: 252).

Recently, during exploration of Tingo María National Park, Department of Huánuco, Peru, a plant was collected that belongs to *Andinia* subgenus *Andinia*, but which bore even more resemblance to the species of *Salpistele* than does either *A. dielsii* or *A. pensilis*. The species is here described and compared morphologically to other members of the subgenus. We speculate on the remarkable convergence to similar floral morphology between the new species and species of *Salpistele*, now part of *Stelis* (Karremans *et al.* 2013). Additionally we report the first confirmed occurrence of *Andinia schizopogon* (Luer 1979: 179) Pridgeon & Chase (2001: 251) in Peru and provide a preliminary list of Peruvian *Andinia* species.

Materials and Methods

The plant material was collected in Tingo María National Park, Huánuco, Peru (Fig. 5). Photographs *in situ* were taken with a Nikon D5000 with a 105 mm Nikkor Macro lens. A flower was dissected to allow measurement and was examined and photographed using an Alpha Optics stereomicroscope with an 8 MP camera on a Motorola Moto G cellphone. The specimen was drawn using a Rotring Rapidograph and 0.1 mm bond paper 75 g. The sample was deposited at HUT. The plant was compared to all species of *Andinia* in subgenera *Aenigma*, *Andinia*, *Masdevalliantha* and *Minuscula* to determine its novelty and with species of the former genus *Salpistele* for the discussion of convergent evolution. In particular, the new species was compared in detail to the most similar species *Andinia dielsii* and *Andinia pensilis* (Table 1).

TABLE 1. Comparison (all in mm) of *Andinia tingomariana* with *A. pensilis* and *A. dielsii*.

	<i>Andinia tingomariana</i>	<i>Andinia dielsii</i>	<i>Andinia pensilis</i>
Whole flower	8.0		
Dorsal sepal	5.0 × 1.5	4.0–6.0 × 2.5–3.0	4.0–5.0 × 2.5
Synsepal	5.0 × 1.4	4.0–6.0 × 2.5	4.0–6.0 × 2.0
Petals	1.2 × 1.0	3.0 × 3.0	1.0 × 0.2
Column length	2.5	2.0	2.0
Labellum	4.0 × 1.5	1.0 × 1.5	3.0 × 3.0

Taxonomy

Andinia tingomariana A.Díaz & MarkWilson, *sp. nov.* (Figs. 1–5)

Type:—PERU. Huánuco: Tingo María National Park, districts of Mariano Dámaso Beraun and Rupa Rupa of the Province of Leoncio Prado of the Huánuco Region, Peru, S9.34238° W76.00451°, 1285 m, 12 March 2017, Díaz, Ocupa & Yupanqui (holotype: HUT!).

Andinia tingomariana is distinguished from the most closely related species, *A. dielsii*, by a number of attributes, including a smooth ovary versus echinate in *A. dielsii*, unguiculate, reniform, ciliate petals versus narrowly linear, non-ciliate in *A. dielsii*; a longer column ~2.5 mm versus ~2 mm in *A. dielsii*, an undilated column apex versus dilated into a flattened, ovate extension in *A. dielsii* and attachment to the lip on terminal third of the column versus half-way in *A. dielsii*.

Epiphytic herbs, 4.0–7.5 cm tall. Rhizome 2–3 mm between ramicauls. Ramicaul abbreviated, 12–21 × 2–4 mm, enclosed by 1 or 2 tubular, ribbed sheaths. Leaf conduplicate, erect, oblong to subacute, smooth, the base cuneate, trinervate, and apex minutely tridentate, petiole 2–3 mm long. Inflorescence successively several 1–6-flowered, arching, raceme to 3 cm long, floral bracts oblique, acuminate, 1 mm long; pedicels 2 mm long. Ovary smooth, furrowed, 1.20 × 0.65 mm; sepals yellow to orange, intensifying towards apices becoming violet, margins irregularly ciliate, carinate, triveined, dorsal sepal elliptic, concave, slightly acuminate, 5.0 × 1.5 mm, lateral sepals free, oblique,

flat, 5.0×1.4 mm, apices acute, acuminate; petals yellow to orange, bilobed, reniform, unguiculate, obtuse, long cilia, 1.2×1.0 mm; lip violaceous reddish, trilobed, reniform, triveined, 4.0×1.5 mm, finely ciliate, slightly expanded in the centre, geniculate, apex rounded, surrounding the column, to which it joins adaxially in the outer third with a thin ciliate claw. Column orange-purple, terete, minutely ciliate, 2.5 mm long, slightly dilated apically, anther subapical, stigma subapical, bilobed; capsule not observed.

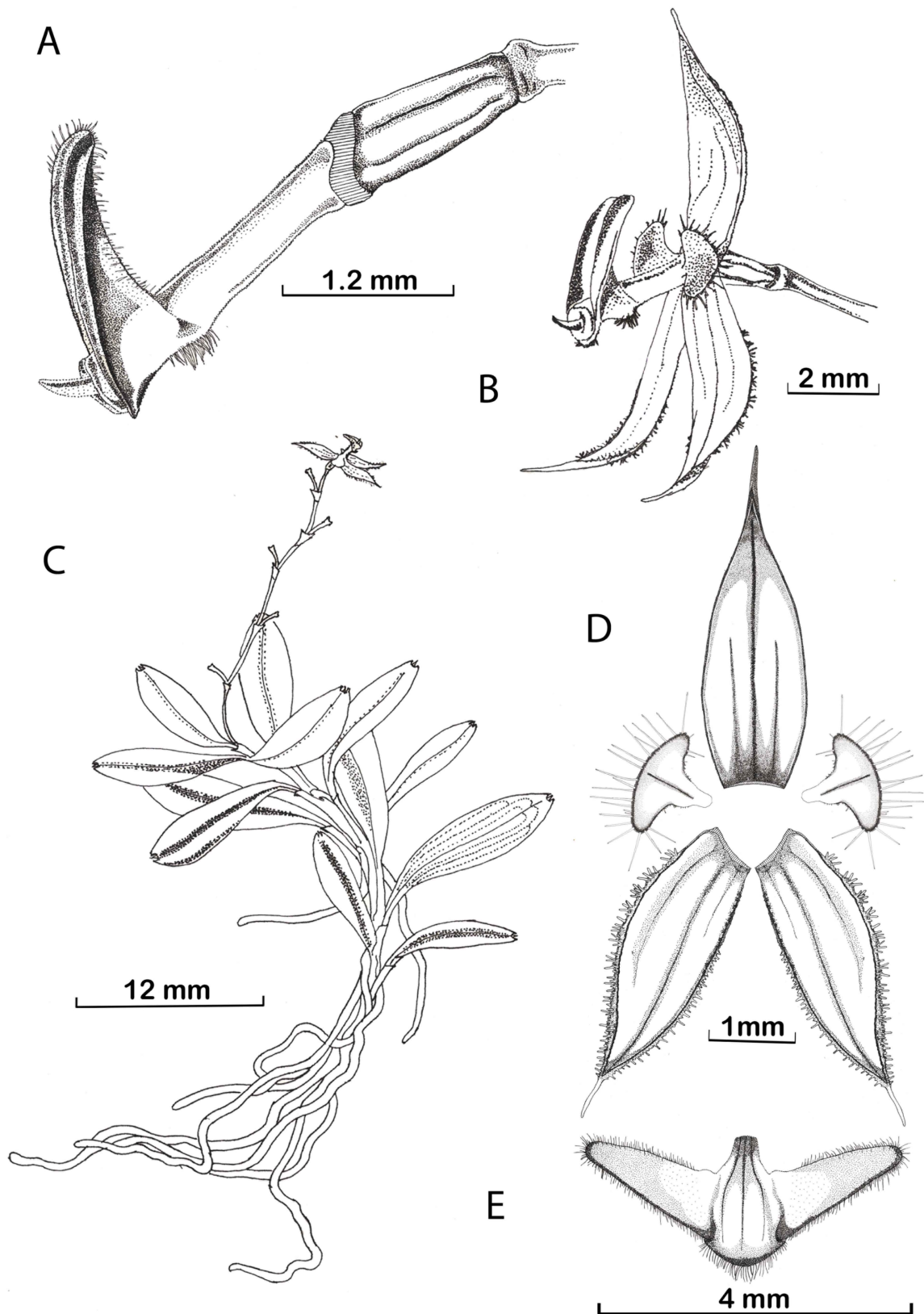


FIGURE 1. *Andinia tingomariana*. A. Ovary, column and labellum. B. Whole flower (partial side view). C. Whole plant. D. Corolla. E. Labellum. Drawn from material used to prepare the holotype by Alex Diaz.

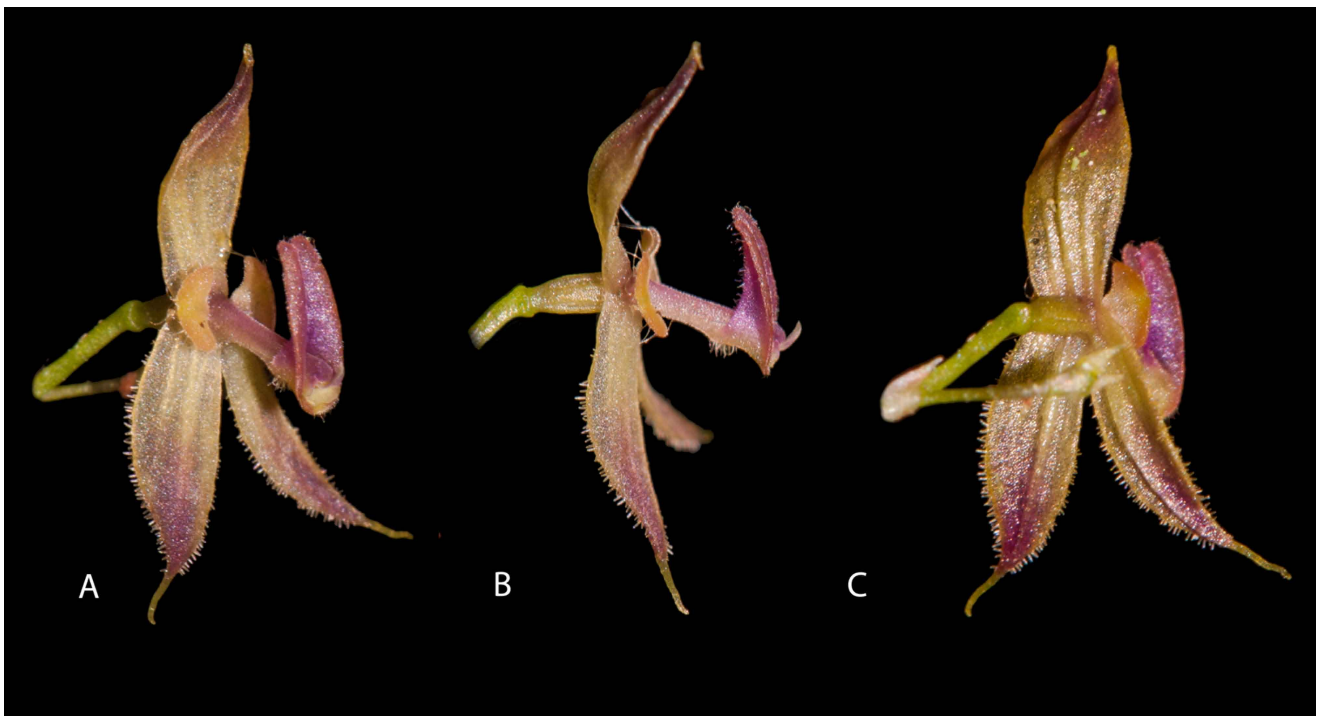


FIGURE 2. *Andinia tingomariana*. A. Partial side view. B. Lateral view. C. Rear view. Photographs by Alex Diaz.



FIGURE 3. *Andinia tingomariana* in situ on a liana. Photograph by Alex Diaz.



FIGURE 4. *Andinia tingomariana* in situ with mosses and *Selaginella*. Photographs by Alex Diaz.

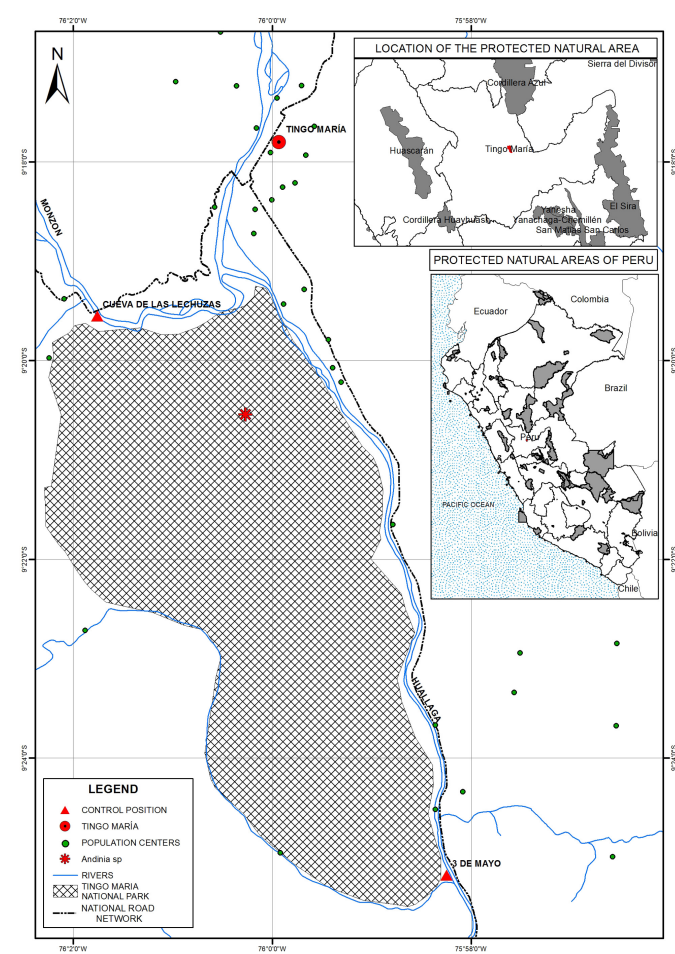


FIGURE 5. Type locality of *Andinia tingomariana* (red star) in Tingomaria National Park (hatched), Huánuco, Peru.

Etymology:—Named for the type locality in Parque Nacional Tingo María, Huánuco, Peru (Fig. 5).

Distribution and habitat:—To date, *A. tingomariana* has only been observed in this one location, a mountain range running longitudinally north-south through Tingo María National Park. *Andinia tingomariana* was observed growing epiphytically among mosses and *Selaginella* on tree trunks and vines (Figs. 3–4). in a humid forest exposed to moisture-laden winds at an elevation of 1285 m in the same habitat as *Cranichis muscosa* Swartz (1788: 120) and *Masdevallia concinna* König (1982: 101).

Conservation status:—Although the type locality of *Andinia tingomariana* is in a protected area, Tingo María National Park, the limited number of plants observed and distribution suggest that it may be vulnerable. However, until further information on distribution and abundance can be collected it should be listed as Data Deficient according to IUCN criteria.

Andinia schizopogon (Luer 1979: 179) Pridgeon & Chase (2001: 251)

PERU:—Cajamarca: Province of Chota, District of Querecoto, Bosque de Protección Pagaibamba (BPP) Diaz (HUT!).

Taxonomic notes:—*Andinia tingomariana* described here (Figs. 1–4) is remarkable for the resemblance of the flowers to those of members of the former genus *Salpistele* (Fig. 6), now part of *Stelis* (Karremans *et al.* 2013). The *Salpistele* group currently contains five species: *Stelis deutroadrianae* Shaw (2014: 77; syn. *Salpistele adrianae* Luer & Sijm in Luer, 2009: 18; Fig. 6a), *Stelis brunnea* (Dressler) Pridgeon & Chase (2001: 261) (syn. *Salpistele brunnea*; Fig. 6b), *Stelis maculata* Pridgeon & Chase (2002: 99; syn. *Salpistele lutea*; Figs. 6c) and *Stelis gnoma* Pridgeon & Chase (2002: 99; syn. *Salpistele parvula*; Fig. 6d). The floral morphology of the group is unique in *Stelis*, the flowers exhibiting a longer than usual column, modified with a flattened extension at the apex with a clasping lip in which the lateral lobes project above the column on both sides. Presumably the unique morphology in this group reflects a different pollination syndrome from the other clades of *Stelis*. Comparing *Andinia dielsii* (Figs. 7a, 8b) and *A. pensilis* (Figs. 7b, 8c) to these *Salpistele* species, it is not difficult to see why Luer initially placed these two *Andinia* species in *Salpistele*. However, *A. dielsii* and *A. pensilis* are not phylogenetically closely related to the *Salpistele* clade of *Stelis* (Wilson *et al.* 2017).

Floral morphology of the new species, *Andinia tingomariana* (Figs. 1–4, 8a) resembles that of the *Salpistele* group of *Stelis* (Fig. 6), particularly that of *Stelis maculata* (Figs. 6c, 8d), even more than do those of *A. dielsii* (Figs. 7a, 8b) and *A. pensilis* (Figs. 7b, 8c). Although *A. tingomariana* does not exhibit the columnar apical dilation seen in *A. dielsii*, *A. pensilis* and the *Salpistele* species, it is possible that the furrowed surface created by the adnate lateral lobes of the lip serves a similar purpose during pollination. Presumably, the similar floral morphologies between the *Salpistele* group of *Stelis* and these three *Andinia* species represent convergent evolution due to similar pollination syndromes. Such convergent evolution has been observed also between *Andinia* subgenus *Brachycladium* and *Lepanthes*, in which pollination through sexual deceit (pseudocopulation by male dipterans) has resulted in similar floral morphology in phylogenetically distant clades (Wilson *et al.* 2017). However, to date, no pollination data have been reported for either *Salpistele* group of *Stelis* or *Andinia* subgenus *Andinia*, so we can do no more than speculate.

The species described here, *Andinia tingomariana*, has been illustrated previously as *Andinia* sp. in a regional field guide for Tingo María National Park (Ocupa Horna *et al.* 2017) but to our knowledge has not been observed, recorded or illustrated elsewhere. This brings the number of *Andinia* species recorded for Peru to nine (Table 2). Among these species *Andinia schizopogon* is tentatively recorded for Peru by Luer (1994) “Without collection data, flowered in cultivation at Heidelberg Botanical Garden, *Senghas 799* (HEID).”, however, no record of this collection can be found at HEID (Sack, pers. comm.). Here we report the first confirmed location of *A. schizopogon* in Peru, in the regions of Cajamarca (Fig. 9) and San Martín. To date, only two species from subgenus *Aenigma* have been recorded for Peru, the aforementioned *A. schizopogon* and the recently described *A. sunchubambensis* Doucette & Janovec (2016: figs. 1–3; homotypic synonym *A. wayqechensis* Martel, Collantes, Maire & Thoerle 2016: 291). However, it would be surprising if the species *Andinia dalstroemii* (Luer 1984: 52) Pridgeon & Chase (2001: 251), *Andinia pentamytera* (Luer 1994: 58) Pridgeon & Chase (2001: 251) and *Andinia pogonion* (Luer 1994: 61; Pridgeon & Chase 2001: 251), which occur in the neighboring Ecuadorian provinces of Loja and Zamora Chinchipe, do not also occur in Amazonas and Cajamarca.

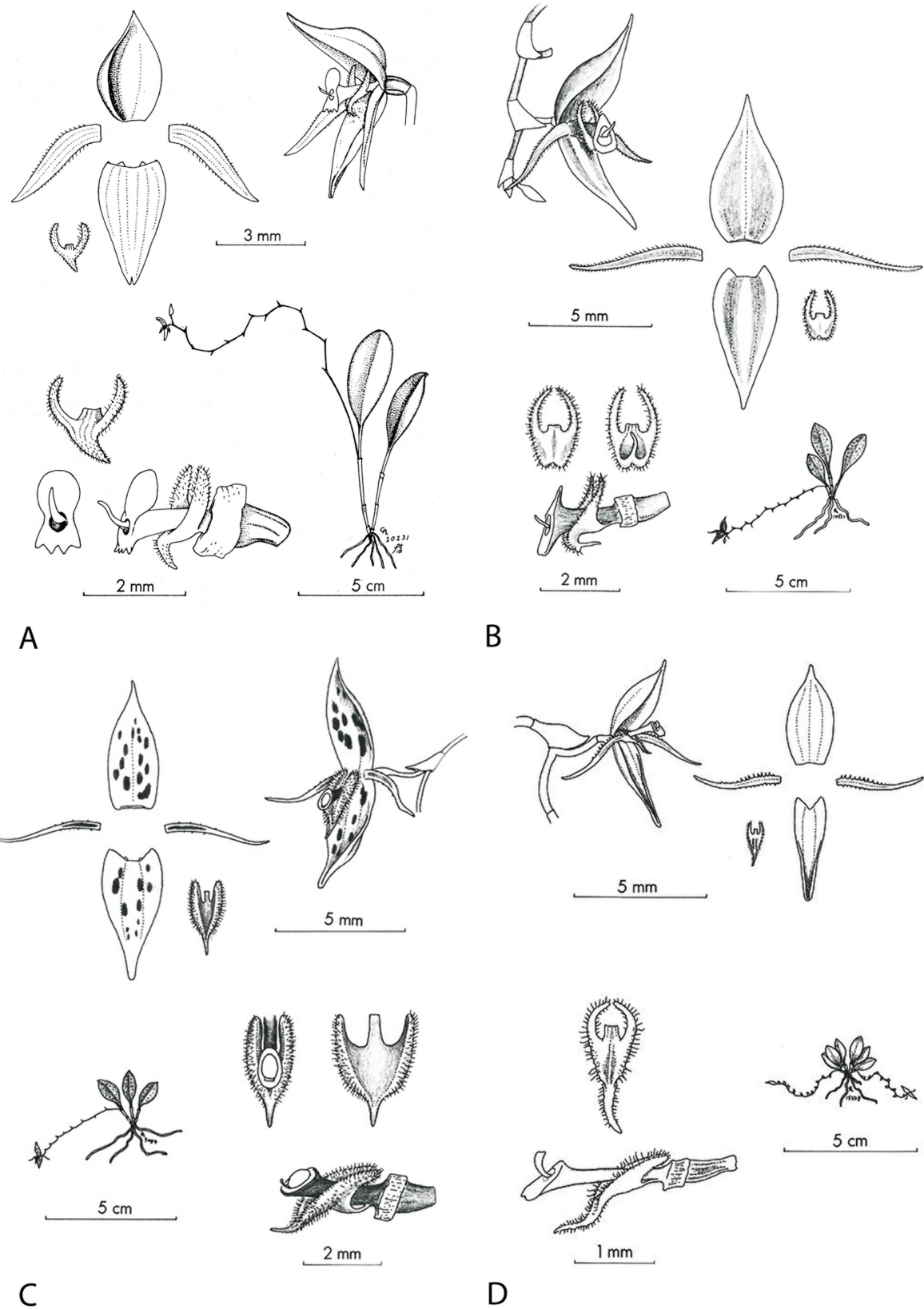


FIGURE 6. A. *Stelis deutroadrianae* (syn. *Salpistele adrianae*). B. *Stelis brunnea* (syn. *Salpistele brunnea*). C. *Stelis maculata* (syn. *Salpistele lutea*). D. *Stelis gnoma* (syn. *Salpistele parvula*). A. from Luer (2009), C., D., E. from Luer (1991), courtesy of Missouri Botanical Garden Press, St. Louis.

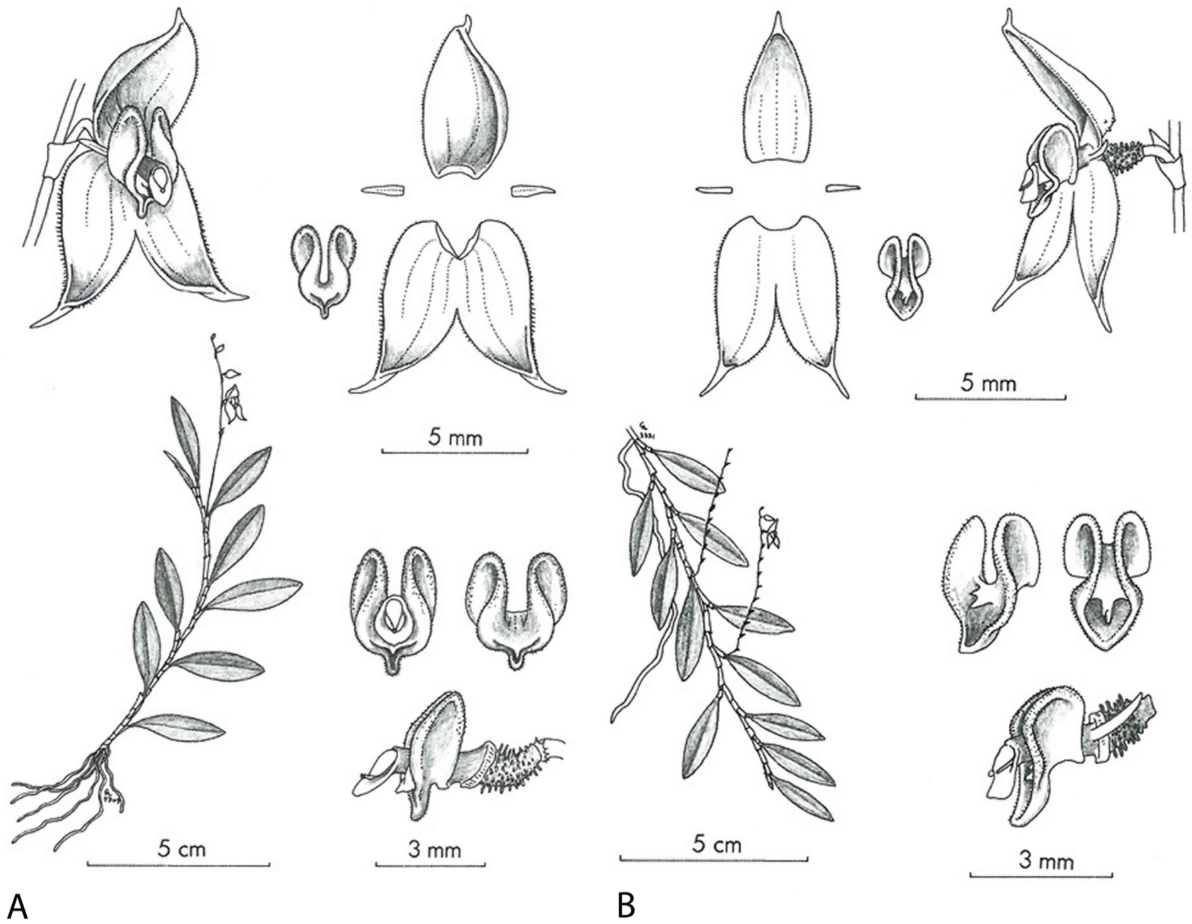


FIGURE 7. Drawings of similar *Andinia* species. A. *Andinia dielsii*. B. *Andinia pensilis*. From Luer (1991), courtesy of the Missouri Botanical Garden Press, St. Louis.



FIGURE 8. Comparison of flower morphology (lateral view). A. *Andinia tingomariana* (photograph by Alex Diaz). B. *Andinia* sp. aff. *dielsii* (photograph courtesy of Killian Zucker). C. *Andinia* sp. aff. *pensilis* (photograph by Mark Wilson). D. *Stelis maculata* (syn. *Salpistele lutea*) (photograph courtesy of Wiel Driessen).

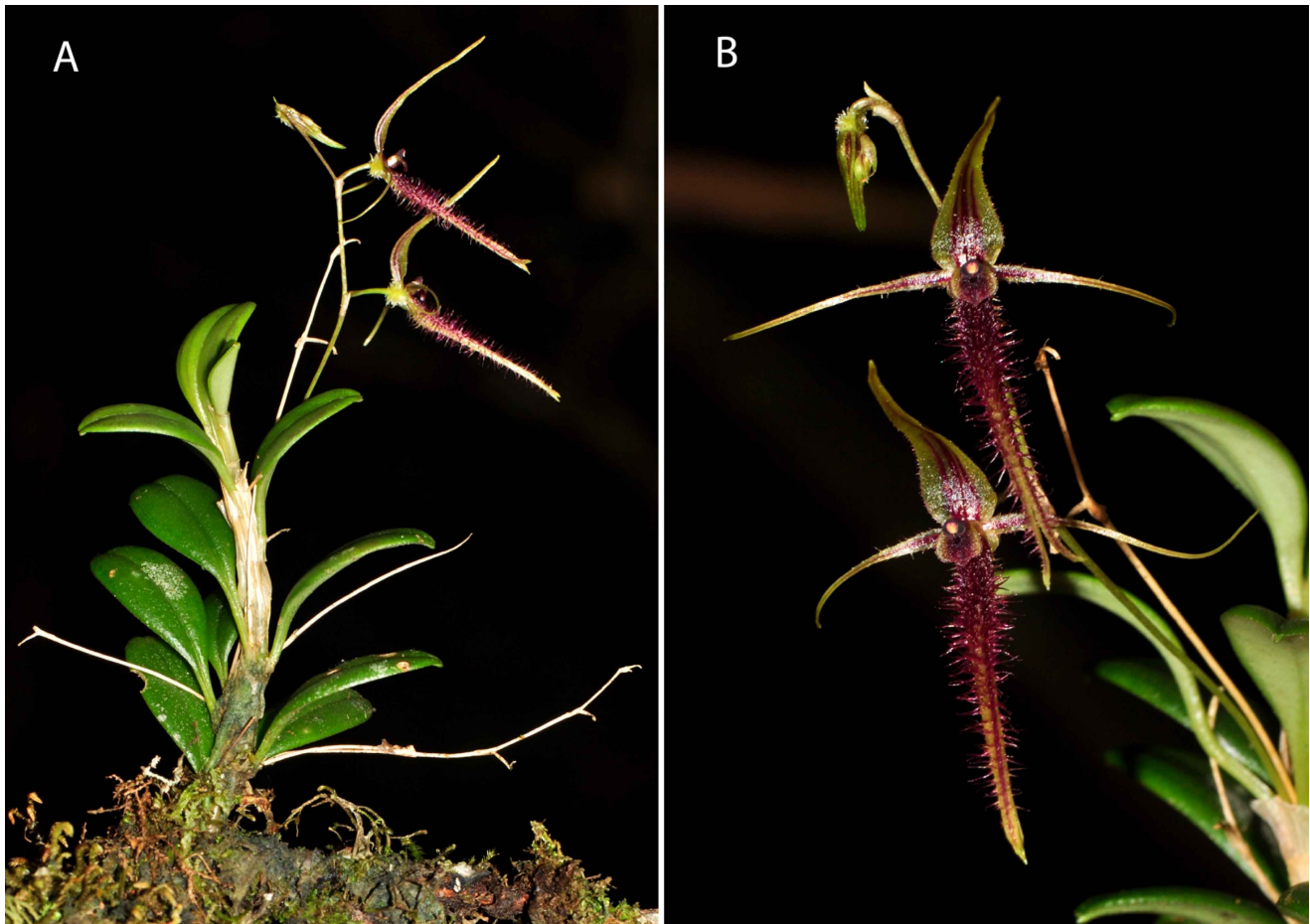


FIGURE 9. *Andinia schizopogon* in situ, region of Cajamarca, Peru. Photographs by Alex Diaz.

TABLE 2. A preliminary list of records for the genus *Andinia* in Peru.

Species	Subgenus	Localities
<i>Andinia caveroi</i> (Bennet & Christenson 2001: 670) Karremans & Uribe in Wilson <i>et al.</i> (2017: 124)	<i>Brachycladium</i>	Condorcanqui, Amazonas
<i>Andinia erepsis</i> (Luer & Hirtz 1986: 215) Karremans & Uribe in Wilson <i>et al.</i> (2017: 124)	<i>Brachycladium</i>	San Ignacio, Cajamarca
<i>Andinia longiserpens</i> (Schweinfurth 1942: 183) Karremans & Wilson in Wilson <i>et al.</i> (2017: 126)	<i>Masdevalliantha</i>	Huanta, Ayacucho; Huancavelica
<i>Andinia pholeter</i> (Luer 1994: 33) Karremans & Uribe in Wilson <i>et al.</i> (2017: 125)	<i>Brachycladium</i>	La Peca, El Parco, Amazonas
<i>Andinia schizopogon</i> (Luer) Pridgeon & M.W.Chase (2001: 251)	<i>Aenigma</i>	Querocoto, Chota, Cajamarca; Leimebamba, Chachapoyas, San Martin
<i>Andinia spiralis</i> (Ruiz & Pavon 1798: 237) Karremans & Wilson in Wilson <i>et al.</i> (2017: 126)	<i>Andinia</i>	Amazonas; Ancash; Ayacucho; Cajamarca; Huancavelica; Lambayeque, Incahuasi; Piura, Huarmaca, Huancabamba
<i>Andinia sunchubambensis</i> Doucette & Janovec (2016: 1)	<i>Aenigma</i>	Wayqecha, Paucartambo, Cusco
<i>Andinia tingomariana</i> Diaz & Wilson (this publication)	<i>Andinia</i>	Tingo Maria, Leoncio Prado, Huánuco
<i>Andinia vestigipetala</i> (Luer 1977: 404) Pridgeon & Chase (2001: 252)	<i>Andinia</i>	Oxapampa, Pasco; Huallaga, San Martín; Lambayeque, Incahuasi

Acknowledgements

The authors are grateful to the Park Ranger Emiliano Carrillo for the constant support during the monitoring, which allowed us access to the habitat of this species; to the headquarters staff responsible for the protection of the area and for the opportunity to conduct research; to Adam Karremans and Wiel Driessen for initial identification of this species as an *Andinia*; to Wiel Driessen for the image of *Salpistele brunnea* and Killian Zucker for that of *Andinia pensilis*; to Missouri Botanical Garden Press for permission to reproduce drawings by Luer; and to the anonymous reviewers and Editor for suggestions to improve the manuscript.

References

- Bennett, D.E. & Christenson, E. (2001) *Icones orchidacearum Peruvianarum*. Pastorelli de Bennet, Lima, 205 pp. [pls. 601–800.]
- Doucette, A. & Janovec, J.P. (2016) A new species of *Andinia* from Peru. In: *IOSPE (Internet orchid species encyclopedia) nomenclature note*, 5 Aug., 2016. Available from: <http://www.orchidspecies.com/nomenclature8516.pdf> (accessed 3 April 2018)
- Dressler, R.L. (1979) *Salpistele*, a new genus of the Pleurothallidinae. *Orquideología* 14: 3–17.
- Karremans, A.P., Bakker, F.T., Pupulin, F., Solano-Gomez, R. & Smulders, M.J.M. (2013) Phylogenetics of *Stelis* and closely related genera (Orchidaceae: Pleurothallidinae). *Plant Systematics and Evolution* 299: 151–176. <http://dx.doi.org/10.1007/s00606-012-0712-7>
- Königer (1982) *Masdevallia concinna*, *Masdevallia decumana*, *Masdevallia lineolata*, *Masdevallia pernix* - neue Arten aus Peru. *Orchidee (Hamburg)* 33: 100–107.
- Luer, C.A. (1977) Icones pleurothallidarum (Orchidaceae): miscellaneous species in the Pleurothallidinae. *Selbyana* 3: 203–407.
- Luer, C.A. (1979) Miscellaneous new species in the Pleurothallidinae (Orchidaceae). *Phytologia* 44: 164–171.
- Luer, C.A. (1984) *Pleurothallis dalstroemii*, sp. nov. *Orchidee* 5: 52.
- Luer, C.A. (1986) Icones pleurothallidarum I, systematics of the Pleurothallidinae. *Monographs in Systematic Botany from the Missouri Botanical Garden* 15: 1–81.
- Luer, C.A. (1991) Icones pleurothallidarum VIII, systematics of *Lepanthopsis*, *Octomeria* subgenus *Pleurothallopsis*, *Restrepiella*, *Restrepiopsis*, *Salpistele* and *Teagueia*, addenda to *Platystele*, *Porroglossum* and *Scaphosepalum*. *Monographs in Systematic Botany from the Missouri Botanical Garden* 39: 1–161.
- Luer, C.A. (1994) Icones pleurothallidarum XI, systematics of *Lepanthes* subgenus *Brachycladium* and *Pleurothallis* subgenus *Aenigma*, subgenus *Elongatia*, subgenus *Kraenzlinella*. Addenda to *Dracula*, *Lepanthopsis*, *Myoxanthus*, *Platystele*, *Porroglossum* and *Trisetella*. *Monographs in Systematic Botany from the Missouri Botanical Garden* 52: 1–68.
- Luer, C.A. (2000) Icones pleurothallidarum XX, systematics of *Jostia*, *Andinia*, *Barbrodia*, *Pleurothallis* and subgenera *Antilla*, *Effusia* and *Restrepioidia* with addenda to *Lepanthes*, *Masdevallia* and *Pleurothallis*. *Monographs in Systematic Botany from the Missouri Botanical Garden* 79: 1–140.
- Luer (2009) Miscellaneous new species in the Pleurothallidinae (Orchidaceae). *Selbyana* 30: 1–71.
- Luer & Hirtz (1986) Neue arten de gattung *Lepanthes* aus Ecuador: *Lepanthes asoma*, *erepsis*, *odobenella*, *pecunialis*. *Orchidee (Hamburg)* 37: 213–222.
- Mansfeld, R. (1937) Orchidaceae. In: Diels, L. (Ed.) Beiträge zur Kenntnis der Vegetation und Flora von Ecuador. *Bibliotheca Botanica, heft* 116: 70–74.
- Martel, C., Collantes, B., Maire, A.L. & Thorerle, L. (2016) *Andinia wayqechensis* (Orchidaceae), a new species from southern Peru. *Phytotaxa* 272: 294–300. <https://doi.org/10.11646/phytotaxa.272.4.7>
- Ocupa Horna, L., Diaz Hernández, A., Yupanqui Godo, L.E. & Carrillo Mena, E. (2017) *Orchidaceae del Parque Nacional Tingo María (field guide 966)*. The Field Museum, Chicago, 12 pp.
- Pridgeon, A.M. & Chase, M.W. (2001) A phylogenetic reclassification of Pleurothallidinae (Orchidaceae). *Lindleyana* 16: 235–271.
- Pridgeon, A.M. & Chase, M.W. (2002) Nomenclatural notes on Pleurothallidinae. *Lindleyana* 17: 98–101.
- Pridgeon, A.M., Solano, R. & Chase, M.W. (2001) Phylogenetic relationships in Pleurothallidinae (Orchidaceae): combined evidence from nuclear and plastid DNA sequences. *American Journal of Botany* 88: 2286–2308. <https://doi.org/10.2307/3558390>
- Ruiz, H.L. & Pavón, J.A. (1798) *Systema vegetabilium florum peruvianae chilensis, characteres prodromi genericos differentiales*. Gabrielis de Sancha, Madrid, 456 pp.

- Schlechter, R. (1921) Die Orchideenfloren der südamerikanischen Kordillerenstaaten, III. Ecuador. *Repertorium Specierum Novarum Regni Vegetabilis, Beihefte* 8: 1–172.
- Schweinfurth, C. (1942) Orchidaceae Peruviana. *Botanical Museum Leaflets (Harvard University)* 10: 173–216.
- Shaw, J.M.H. (2014) Quarterly supplement to the International Register and Checklist of Orchid Hybrids (Sander's List). *Orchid Review, supplement* 122: 60–78.
- Swartz, O. (1788) *Nova genera species plantarum, seu prodromus descriptionum vegetabilium maximam partem incognitorum quae sub itinere Indiam Occidentalem annis 1783–1787*. Swederi, Stockholm, 159 pp.
<https://doi.org/10.5962/bhl.title.4400>
- Swartz, O. (1799) Dianome epidendri generis. Linn. *Nova Acta Regiae Societatis Scientiarum Upsaliensis* 6: 61–88.
- Wilson, M., Frank, G.S., Jost, L., Pridgeon, A., Vieira-Uribe, S. & Karremans, A. (2017) Phylogenetic analysis of *Andinia* (Orchidaceae: Pleurothallidinae) and a systematic re-circumscription of the genus. *Phytotaxa* 295: 101–131.
<https://doi.org/10.11646/phytotaxa.295.2.1>