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On the genus *Dendrophorbium* (Compositae) in Ecuador: a new species and identification key

Joel Calvo & Álvaro J. Pérez

Abstract

CALVO, J. & Á.J. PÉREZ (2023). On the genus *Dendrophorbium* in Ecuador: a new species and identification key. *Candollea* 78: 91–97. In English, English and Spanish abstracts. DOI: <http://dx.doi.org/10.15553/c2023v782a1>

The new species, *Dendrophorbium frezierifolium* J. Calvo & Á.J. Pérez, is described from southern Ecuador, where it thrives at the edge of low montane forests near the limit with the paramo ecosystem. It differs from the most similar species *D. dodsonii* (H. Rob. & Cuatrec.) B. Nord. by its larger, chartaceous leaves with denser indumentum beneath, the stems with arachnoid indumentum, the shorter involucre bracts, and the lower number of disc florets. The species is preliminary assessed as “Endangered” [EN] using the IUCN Red List Categories and Criteria. Furthermore, images of living plants, a distribution map, and the first identification key to the species of *Dendrophorbium* (Cuatrec.) C. Jeffrey in Ecuador are provided.

Resumen

CALVO, J. & Á.J. PÉREZ (2023). Acerca del género *Dendrophorbium* (Compositae) en Ecuador: una nueva especie y clave dicotómica. *Candollea* 78: 91–97. En inglés, resúmenes en inglés y español. DOI: <http://dx.doi.org/10.15553/c2023v782a1>

La nueva especie, *Dendrophorbium frezierifolium* J. Calvo & Á.J. Pérez, se describe del sur del Ecuador, donde crece en los márgenes del bosque montano bajo cerca del límite con el ecosistema de páramo. Difiere de *D. dodsonii* (H. Rob. & Cuatrec.) B. Nord., la especie más similar, por sus hojas más grandes, cartáceas y con mayor indumento en el envés, los tallos con indumento aracnoideo, las brácteas involucrales más cortas y un menor número de flores del disco. De forma preliminar, se asigna la categoría IUCN “En peligro” [EN] a esta especie. Asimismo, se proporcionan imágenes, un mapa de distribución y la primera clave dicotómica para las especies del género *Dendrophorbium* (Cuatrec.) C. Jeffrey en Ecuador.

Keywords

ASTERACEAE – *Dendrophorbium* – Andes – Ecuador – Senecioneae – Taxonomy

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Introduction

The current circumscription of the genus *Dendrophorbium* (Cuatrec.) C. Jeffrey (Compositae, Senecioneae) has extensively been discussed in previous papers (CALVO & BUIRA, 2018; CALVO & ROQUE, 2018; PRUSKI, 2018). The genus comprises suffrutescent and tree-like species with usually moderately large, dentate leaves, and terminal synflorescences composed of radiate capitula (rarely discoid). Its distribution ranges from Venezuela to northwestern Argentina mainly through the Andean montane forests and a second disjunct area is located in the domain of the Atlantic Forest in southeastern Brazil. Lastly, *D. lucidum* (Sw.) C. Jeffrey occurs in the Caribbean islands of Dominica, Guadalupe, and Martinica.

In Ecuador, 17 species (14 of them endemic) were recorded in the “Catalogue” (NORDENSTAM, 1999). Some taxonomic adjustments were made later (CALVO, 2017; PRUSKI, 2018; CALVO et al., 2019), and *Dendrophorbium azoguesense* J. Calvo & Minga was described as a new species. However, no identification key was available until now, which probably hindered a better understanding of this plant group. Among the species listed by NORDENSTAM (1999), it should be noted that (1) *D. kleinioides* (Kunth) B. Nord. was recorded on the basis of a specimen here identified as *Pentacalia floribunda* Cuatrec. (i.e. Jaramillo & Proaño 1927; AAU, QCA); (2) *Dendrophorbium moscopanum* (Cuatrec.) C. Jeffrey was supported by a specimen here referred to *D. tipocochense* (Domke) B. Nord. (i.e. Boeke & Jaramillo 2651; NY, US); (3) *D. reflexum* (Kunth) C. Jeffrey was included as a dubious name, which is certainly a species restricted to Colombia and Venezuela. These species are therefore excluded from the flora of Ecuador. On the other hand, the species *D. chingualense* (Cuatrec.) S. Díaz & Cuatrec. and *D. sibundoyense* (Cuatrec.) C. Jeffrey (described from southern Colombia) are cited for the first time in the country. The record of *D. chingualense* is based on the collection Funk & Freire 11079 from NW Sucumbíos. The presence of *D. sibundoyense* is supported by Boeke & McElroy 403, Holm-Nielsen et al. 26422, 26605, and Jaramillo et al. 11991, 12037; these collections come from the surroundings of Baeza and Cosanga in Napo and most of them were previously identified in sched. as *D. lloense* (Hieron.) C. Jeffrey. *Dendrophorbium sibundoyense* differs from this latter species in having 8(–10) supplementary bracts (vs. 12–14), which mainly are $\frac{1}{2}$ as long as the involucre bracts (vs. as long as the involucre bracts), and puberulous (vs. hirsute-pilose marginally). The involucre bracts are also shorter ((–)5–6–8 mm vs. 9–10 mm).

Herein, as part of ongoing studies of the Ecuadorian Senecioneae, a new species of *Dendrophorbium* is described based on morphological evidence and the first key to the Ecuadorian species is presented. Pictures of living plants accompany the description, as well as a distribution map.

Materials and methods

This contribution is the result of field work carried out in Ecuador and the revision of herbarium specimens kept at AAU, G, HA, HUTPL, LOJA, Q, QAP, QCA, QCNE, and QPLS. The qualitative characters of the herbarium specimens examined were studied with the aid of a binocular dissecting microscope (Leica M60) when needed, whereas the quantitative characters were recorded using a Mitutoyo digital calliper, CD-15DC. The preliminary conservation status of the new species was assessed following IUCN Red List Categories and Criteria (IUCN, 2012, 2022). We calculated the extent of occurrence (EOO) and the area of occupancy (AOO, with a 2×2 km grid) using the online “GeoCAT” software (<http://geocat.kew.org>; BACHMAN et al., 2011).

Taxonomy

Dendrophorbium frezierifolium J. Calvo & Á.J. Pérez, **sp. nov.** (Fig. 1, 2).

Holotypus: ECUADOR. Morona-Santiago: Guala-
ceo–Sigsig–Gualaquiza road, 28 km SSE of Sigsig,
3°10'S 78°42'W, 3250 m, 2.XII.1990, Luteyn, Jørgensen
& Ulloa 14276 (QCA [QCA237372]!; iso-: AAU, K,
NY [NY04348943] image!, US [US03066642] image!).

Among the species with c. 8 involucre bracts, this species differs in having leaves lanceolate with indumentum on both surfaces. It can be differentiated from D. dodsonii (H. Rob. & Cuatrec.) B. Nord., *the most similar species, by its larger, chartaceous leaves with denser indumentum beneath, the stems with arachnoid indumentum, the shorter involucre bracts, and the lower number of disc florets.*

Shrubs 2–2.5 m tall, erect, not branched or with branches only at upper half. *Stems* terete, with scattered arachnoid indumentum, finally glabrescent, distal parts with arachnoid indumentum. *Leaves* alternate, simple, petiolate; laminas lanceolate, 9.5–15 $\times$ 3.5–6.2 cm, base obtuse to rounded (basal cauline leaves subcordate), apex acute to attenuate, margins dentate, pilose on adaxial surface, pilose-tomentose on abaxial surface, with secondary and tertiary venation noticeable on abaxial surface (on dried specimens and living plants), chartaceous; petioles 1–2.8 cm, with scattered arachnoid indumentum. *Synflorescences* corymbose-paniculiform; lower synflorescence bracts foliose, similar in shape to cauline leaves, upper synflorescence bracts linear-subulate. *Capitula* 25–65, heterogamous, radiate, pedunculate; peduncles 7–15 mm long, with arachnoid indumentum and 2–4 bracteoles. *Involucre* cylindrical, 3.2–4.6 $\times$ 2.9–4.1 mm, with remnants of arachnoid trichomes; receptacle flat, foveolate; involucre bracts 8, linear-oblong, 3.1–3.9 $\times$ 0.9–1.3 mm, covered with scattered trichomes to glabrescent; supplementary bracts (calyculus)



Fig. 1. – Holotype of *Dendrophorbium frezierifolium* J. Calvo & Á.J. Pérez at QCA.
[Luteyn et al. 14276, QCA237372; © Pontificia Universidad Católica del Ecuador, Quito]

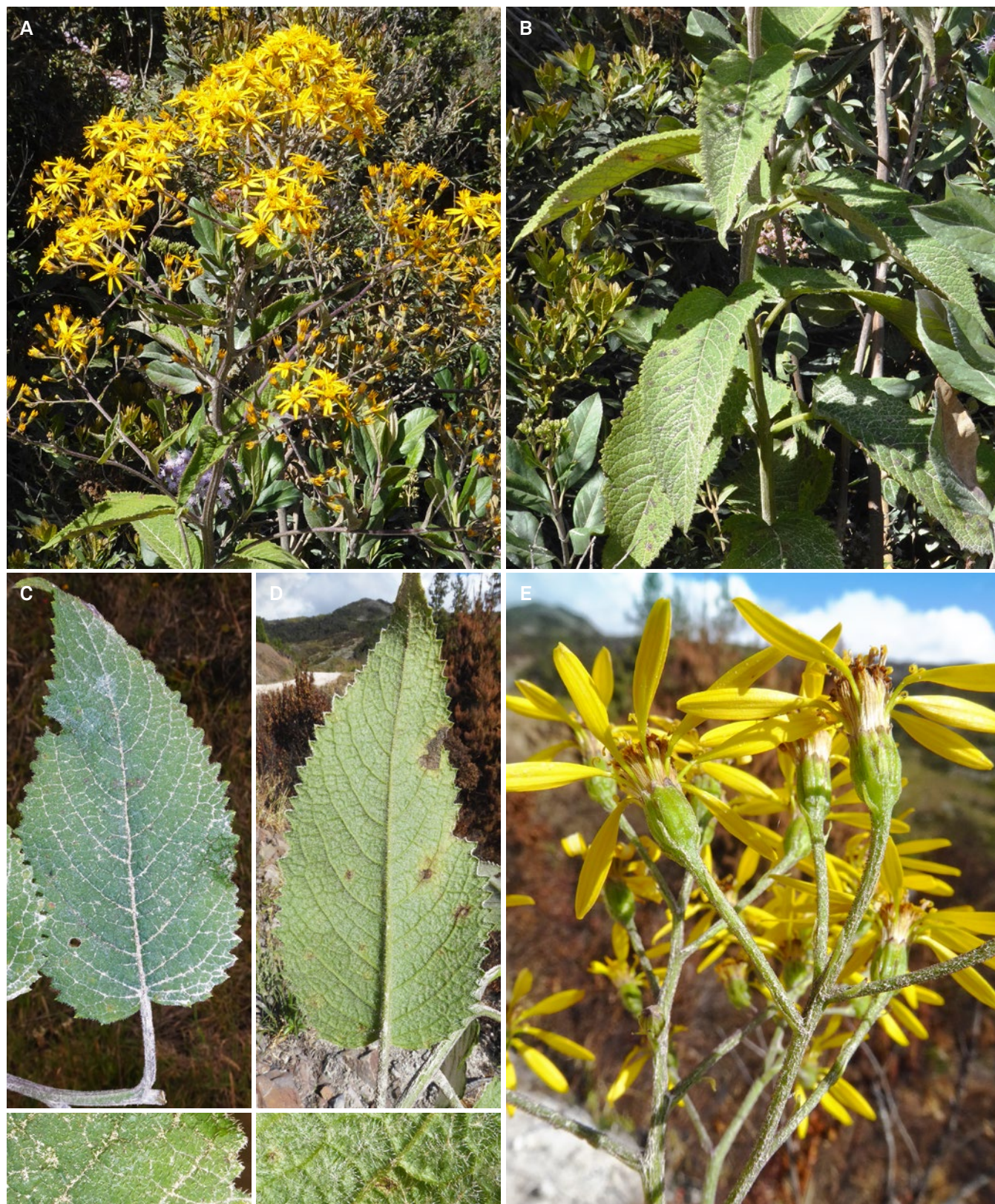


Fig. 2. – *Dendrophorbium frezierifolium* J. Calvo & Á.J. Pérez. A. Habit; B. Stem; C. Adaxial leaf surface and detail of the indumentum; D. Abaxial leaf surface and detail of the indumentum; E. Capitula. [Photos: J. Calvo, near Urdaneta (Azuay)]

2–5, linear, $1.2\text{--}2.0 \times 0.3\text{--}0.5$ mm, with scattered trichomes to glabrescent. *Ray florets* 8–10(–13), pistillate; corollas $7.1\text{--}9$ mm long, limbs c. $4.3\text{--}6 \times 1.5\text{--}1.8$ mm, patent to erect-patent, apex subentire to 2–3-toothed, glabrous, yellow. *Disc florets* c. 10, hermaphrodite; corollas $5.1\text{--}6.1$ mm long, tubular, 5-lobed, yellow, limbs $3.9\text{--}4.1$ mm long; filament collar balusterform; anthers c. 4 mm long, yellowish, bases acute, appendages c. 2.2×0.9 mm; style branches truncate with a crown of sweeping trichomes, yellowish. *Achenes* cylindrical, c. $2.1\text{--}2.6 \times 0.5\text{--}0.9$ mm, 5–8-ribbed, glabrous; pappus 4–5 mm long, barbellate, white.

Etymology. – The epithet *frezierifolium* refers to the resemblance of the leaves with those of some species of *Freziera* Willd. (*Pentaphylacaceae*).

Distribution, ecology and phenology. – Putative endemic species known only from southern Ecuador (Azuay, Morona-Santiago), at elevations of 2900–3300 m (Fig. 3). It thrives at the edge of low montane forests near the limit with the paramo ecosystem. Specimens in bloom have been collected from September to December.

Conservation status. – *Dendrophorbium frezierifolium* is known from three locations with an estimated EOO of c. 123 km² and an AOO of 12 km². None of the known locations currently receive any formal protection, and the habitat is in constant decline due to agricultural activities. On this basis, the new species is assigned to a preliminary risk of extinction status of “Endangered” [EN B1ab(i,ii,iii)+2ab(i,ii,iii)] using the IUCN Red List Categories and Criteria (IUCN, 2012, 2022).

Dendrophorbium frezierifolium has an ornamental potential and should be propagated in *ex situ* collections.

Notes. – The new species keys out in the species group with capitula with c. 8 involucre bracts, which comprises *Dendrophorbium azoguesense*, *D. dodsonii* (H. Rob. & Cuatrec.) B. Nord., and *D. sotarense* (Hieron.) C. Jeffrey. The new species clearly differs from the former in having pubescent leaves (vs. glabrous; see CALVO et al., 2019: fig. 1). *Dendrophorbium dodsonii* is a species quite variable regarding the indumentum, which varies from irregularly pilose to nearly glabrous. *Dendrophorbium frezierifolium* might be confused with the pilose forms, but it has larger, chartaceous leaves (9.5–15 cm long vs. subcoriaceous, 6–7 cm long) with denser pubescent indumentum on the abaxial surface (vs. sparsely hirsute-pilose), stems with arachnoid indumentum (vs. with scattered stout trichomes), shorter involucre bracts (3.1–3.9 mm long vs. 4–5 mm long; Fig. 4A), and a lower number of disc florets (c. 10 vs. c. 17). The new species can be readily separated from *D. sotarense* by the shape of the ray florets because this latter species has reduced limbs curved downward (Fig. 4B).

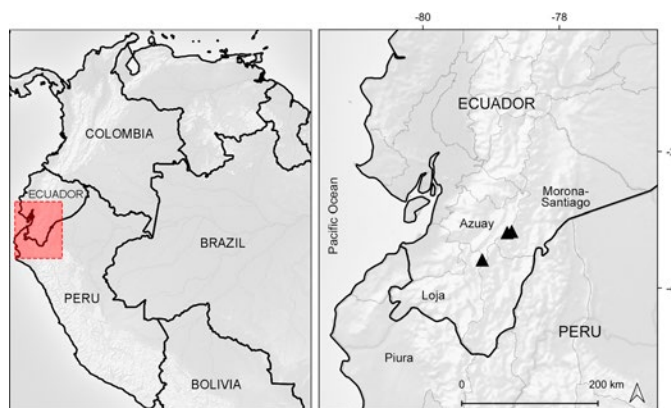


Fig. 3. – Distribution map of *Dendrophorbium frezierifolium* J. Calvo & Á.J. Pérez.

The leaves of *Dendrophorbium frezierifolium* slightly resemble those of *D. dielsii* C. Jeffrey and *D. gesnerifolium* (Cuatrec.) B. Nord. because of the indumentum; the latter two species, however, have involucre composed of 13–14 involucre bracts and whitish-lanate abaxial leaf surfaces.

Additional specimens examined. – ECUADOR. **Azuay:** Oña, subiendo al páramo de Yacuambi por Urdaneta, $3^{\circ}35'31''\text{S}$ $79^{\circ}08'00''\text{W}$, 2970 m, 30.X.2018, Calvo 7826 (HA). **Morona-Santiago:** along road between Gualaquiza and Chiquinda, 27.4 km SE of plaza in Sigsig, 21.9 km NW of Chiquinda, $3^{\circ}11'40''\text{S}$ $78^{\circ}46'30''\text{W}$, 2933 m, 13.IX.2007, Croat & Ferry 98550 (MO n.v., QCNE).

Key to the species of *Dendrophorbium* in Ecuador

1. Involucre bracts c. 8 2
- 1a. Involucre bracts c. 13 6
2. Leaves glabrous to glabrescent 3
- 2a. Leaves with indumentum, at least on abaxial surface 4
3. Leaves lanceolate to narrowly elliptic, laminae 12.5–17 (–27) cm long, glabrous to glabrescent; involucre bracts 2.6–3 mm long *D. azoguesense*
- 3a. Leaves broadly lanceolate to broadly elliptic, laminae 6–7 cm long, irregularly pilose to nearly glabrous; involucre bracts 4–5 mm long *D. dodsonii*
4. Ray florets with reduced limbs, curved downward *D. sotarense*
- 4a. Ray florets with well-developed limbs, patent to erect-patent 5
5. Leaf laminae 9.5–15 cm long, densely pilose-tomentose on abaxial surface; stems arachnoid; involucre bracts 3.1–3.9 mm long *D. frezierifolium*
- 5a. Leaf laminae 6–7 cm long, sparsely hirsute-pilose on abaxial surface; stems with stout trichomes; involucre bracts 4–5 mm long *D. dodsonii*



Fig. 4. – A. *Dendrophorbium dodsonii* (H. Rob. & Cuatrec.) B. Nord. B. *Dendrophorbium sotarense* (Hieron.) C. Jeffrey.
[Photos: A: J. Calvo, near El Tiro (limit Loja/Zamora-Chinchipec); B: J. Calvo, near Lloa (Pichincha)]

- | | | | |
|---|---|---|-------------------------|
| 6. Cauline leaves sessile | 7 | 11. Uppermost cauline leaves attenuate into petiole; involu-
cral bracts c. 5 mm long; involucre wider than long in
dried specimens (NW Sucumbíos) | <i>D. chingualense</i> |
| 6a. Cauline leaves petiolate | 8 | 11a. Uppermost cauline leaves usually auriculate at base; invo-
lucral bracts (–5)6–8 mm long; involucre rather as long
as wide in dried specimens (Napo) | <i>D. sibundoyense</i> |
| 7. Leaves semiamplexicaul; synflorescences congested; upper-
most bracteoles and supplementary bracts somewhat
foliose, usually as long as involucre bracts or almost so
..... | <i>D. amplexicaule</i> | 12. Involucre bracts < 4.5 mm long; leaves usually narrowly
lanceolate to narrowly elliptic | <i>D. scytophyllum</i> |
| 7a. Leaves amplexicaul; synflorescences lax; supplementary
bracts linear-subulate, remarkably shorter than involucre
bracts | <i>D. pericaule</i> | 12a. Involucre bracts > 6 mm long; leaves usually broadly
elliptic to ovate | 13 |
| 8. Cauline leaves > 25 cm long; petioles ≥ 5 cm long; plants
that can reach several meters | 9 | 13. Leaves glabrous, cuneate to rounded at base ... | <i>D. elatum</i> |
| 8a. Cauline leaves < 20 cm long; petioles < 3 cm long; plants
usually < 3 m tall | 12 | 13a. Leaves whitish-lanate on abaxial surface, subcordate to
cordate at base | 14 |
| 9. Involucre bracts 2.5–3.5 mm long ... | <i>D. gr. tipocochense</i> ¹ | 14. Involucre bracts arachnoid; peduncles 5–20 mm long;
supplementary bracts ½–¾ as long as involucre bracts
..... | <i>D. dielsii</i> |
| 9a. Involucre bracts 5–10 mm long | 10 | 14a. Involucre bracts pilose; peduncles 20–30 mm long;
supplementary bracts ¼ as long as involucre bracts
..... | <i>D. gesnerifolium</i> |
| 10. Supplementary bracts 12–14, as long as involucre bracts,
hirsute-pilose marginally; involucre bracts 9–10 mm long
..... | <i>D. lloense</i> | | |
| 10a. Supplementary bracts 8(–10), ½ as long as involucre
bracts, puberulous; involucre bracts 5–8 mm long | 11 | | |

1 Preliminary studies suggest that *Dendrophorbium balsapampae* (Cuatrec.) B. Nord. and *D. ingens* (Benoist) B. Nord. fall within the variability of *D. tipocochense*. *Dendrophorbium pururu* (Cuatrec.) was placed in the synonymy of the latter species in CALVO (2017).

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