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Argyreia akoensis (Convolvulaceae), a new species from southern Taiwan

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ABSTRACT: A new species, *Argyreia akoensis* S.-Z. Yang, P.-H. Chen & Staples (Convolvulaceae) from southern Taiwan, is described and illustrated. Compared to its congeners in Taiwan and neighboring areas, *Argyreia akoensis* can be differentiated by the corolla lobing, sepal size, and exserted pistil and stamens. A morphological description, diagnosis, line drawings, photographs, and conservation status, as well as a key to similar species are provided to aid in identification.

KEY WORDS: *Argyreia formosana*, biogeography, endemism, Liangshan, Pingtung, Taiwan.

INTRODUCTION

The genus *Argyreia* Loureiro is the most taxonomically complex and difficult of the Asian genera of Convolvulaceae and no revision or monograph for the whole genus exists (Traiperm and Staples, 2014). The number of species reported varies from 90 species (Ooststroom and Hoogland, 1953, Mabberley, 2008) to 125 species (Staples and Brummitt, 2007) and was recently increased to 135 species (Traiperm and Staples, 2014). For Taiwan, Staples and Yang (1998) treated one endemic species, *A. formosana* Ishigaki ex T. Yamazaki, with a second species, *A. nervosa* (Burm. f.) Bojer introduced and cultivated only. In 2014, one unknown *Argyreia* species was collected in southern Taiwan; while morphologically similar to *A. formosana* (Fig. 1) in vegetative characters the corolla morphology and color are quite different from that species.

We have compared this unknown plant with several species already described that could possibly be conspecific with it (Table 1), and consulted floras for East Asia and Malesia (Ooststroom and Hoogland, 1953), particularly the Philippines. None of the previously described species matches this unknown Taiwan plant and we conclude that there is no specific name available for it; it is here described as a new species, *Argyreia akoensis*.

TAXONOMIC TREATMENT

Argyreia akoensis S.-Z. Yang, P.-H. Chen & G.W. Staples***, sp. nov.*** 屏東朝顏 Figs. 2–5

Similar to *Argyreia sumbawana* Ooststr. (in Ooststroom and Hoogland, 1953: 499) in having a shallowly 5-lobed corolla, pistil much longer than corolla, but differing from that species by obovate-oblong bracts, 5–7 mm long, 2–5 mm wide; leaves subcordate at base; corolla tube 3 cm long; staminal filaments inserted at the mouth of the corolla tube; ovary bilocular; and short peduncles.

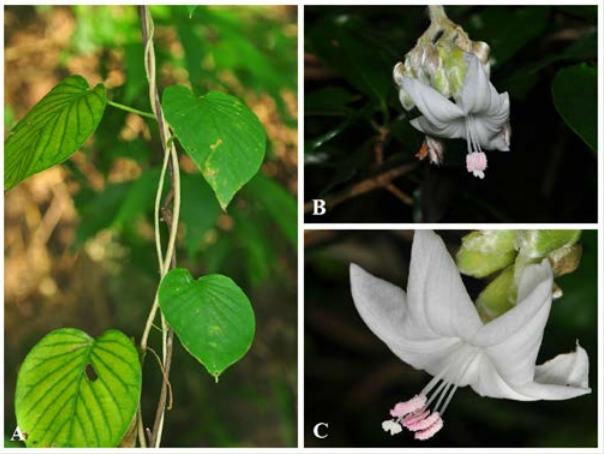


Fig.1. *Argyreia formosana.* A: Habit, leaves ovate-cordate. B: Inflorescence, about 4–6 flowered, peduncle distinctly shorter than the petiole. C: Corolla funnel-form, deeply 5-lobed, all white in color; pistil and stamens obviously exserted.

Type: **TAIWAN**: Pingtung County: Machia Township, Liangshan, elev. 150–200 m; 30 October 2014, *P.-H. Chen 499* (holotype K!; isotypes A!, PPI!).

Liana, stems dextrorsely twining, up to 8 cm diam., younger parts sparsely appressed-pilose. Leaves alternate, ovate, 5.5–17.5 × 4–12.5 cm, upper surface sparsely appressed-pilose, lower surface densely appressed-pilose, apex acute, base subcordate, margin entire, venation reticulate, nerves 8–14 on either side of midrib; petioles 2.5–8.5 cm long, sparsely appressed-pilose. Inflorescence cymose, 1–6-flowered; peduncles 2–5 cm long, distinctly shorter than the petioles; pedicels 4–6 mm long, appressed-pilose; bracts obovate-oblong, 5–7 × 2–5 mm, outside brown

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Table 1. Morphological comparison of *Argyreia akoensis* with five similar species

Characters	*Argyreia akoensis*	*Argyreia formosana*	*Ipomoea harmandii*	*Argyreia mollis*	*Argyreia nervosa*	*Argyreia sumbawana*
LEAF						
Leaf size (cm)	5.5–17.5 × 4–12.5	6–11 × 5–9	5–10 × 6–9	4–15 × 1.5–7	10–30 × 8–25	6–13 × 3–8.5
Leaf shape	ovate	ovate- cordate	kidney or suborbicular	elliptic to narrowly oblong	ovate to orbicular	ovate
Leaf base	subcordate	cordate or subtruncate	deeply cordate	acute or attenuate	deeply cordate	slightly emarginate to truncate or shortly attenuate
Leaf upper surface	sparsely appressed-pilose	glabrous	sparsely sericeous, glabrescent	densely to sparsely appressed-hairy or glabrous	glabrous or nearly so	densely appressed-sericeous
Lateral nerves	8–14	7–10	4–5	9–18	11–16	9–14
FLOWER						
Petiole length (cm)	2.5–8.5	1.5–6	6–10	1–6	<10	2.5–6
Peduncle length (cm)	2–5	1.5–2	0.7	0.5–2.5	>20	3–11
Bracts shape	obovate- oblong	oblong	-	obovate- oblong	ovate to oblong or elliptic	ovate- lanceolate
Bract length (mm)	5–7	6–4	-	-	35–50	-
Sepal length (mm)	6–9	5–8	10–20	8–10	>15, 10–12	5–6.5
Corolla length (cm)	3.6	1.8–2.0	-	5-6.5	6	2.5
Corolla 5-lobed	shallowly	deeply	deeply	shallowly	shallowly	shallowly
Pistil & stamens included or exserted	exserted	exserted	included	included	included	exserted
Number of ovary locules	2	2	2	4	4	4
FRUIT						
Fruit color	unknown	red	unknown	red or orange red	yellowish brown	unknown

and densely appressed-pilose, inside brown and glabrous, soon caducous. Flowers pendant; sepals 5, imbricate, orbicular or oblong, outside green and densely appressed-pilose, inside green and glabrous, outer 2 orbicular, 7–9 × 7–9 mm, inner 3 oblong, 6–7 × 5–6 mm; corolla broadly campanulate, outside white-pink, inside center purple-red, the midpetaline bands sericeous, for the rest glabrous, corolla tube about 3 cm long, limb about 4 cm diam., ruffled; stamens 5, exserted, filaments filiform, 13–15 mm long, glabrous, inserted at the mouth of the tube, dilated and densely pilose at the base, with septate hairs; anthers dorsifixed, pink, 2–3 mm long; pistil exserted, style 1, about 2.7 cm long; stigma capitate, 2-lobed, about 2 mm long; disc annular, margin entire; ovary globose, glabrous, about 2 mm long, 2-loculed, 4-ovuled. Fruits immature, seeds not seen.

Phenology: Flowering in October to November. The plants were discovered in vegetative condition on 24 May 2014; the first flowers were observed on 30 October. During subsequent visits (22 Nov., 20 Dec., 2014 and 25 Jan., 2015) the leaves were yellowing, flowering had ended, but the ovaries were not maturing into fruits. We continued to visit the plants but still haven't found the fruit stage. Further observations are needed to record details of the fruits and seeds.

Ecology: Three populations grow along the trail sides on a mountain slope in the forested area, on a gravel substrate, exposed to full sun and lower humidity. Vines twine around *Dimocarpus longan* Lour. and *Flueggea virosa* (Willd.) Voigt. and its associated species included *Albizia procera* (Roxb.) Benth., *Bauhinia championii* (Benth.) Benth, *Broussonetia papyrifera* (L.) Vent., *Callicarpa formosana* Rolfe var. *glabrata* Chen & Yang, *Kleinhovia hospita* L., *Lepidagathis formosensis* Hayata and *Mallotus repandus* (Willd.) Muell.-Arg.

Distribution: known so far from three populations distributed in the Liangshan area, Pingtung County, Taiwan.

Elevation: 150–200 m.

Conservation assessment: There is not yet enough information about the distribution, abundance, nor threats to this species; we consider it Data Deficient (DD) at this time.

Additional specimen examined: **TAIWAN**: Pingtung County: Liangshan, 26 October 2014, *P.-H. Chen 498* (TAI).

Discussion

In our efforts to identify this Taiwan *Argyreia* we compared it with species from nearby geographical areas including China, Vietnam, and the Philippines, as well as using the keys for identification in the Flora of China (Fang and Staples, 1995) and the Flora Malesiana accounts for Convolvulaceae (Ooststrooom and Hoogland, 1953). Among the several species we compared the Taiwan plants with are: *A. mollis* (Burm.

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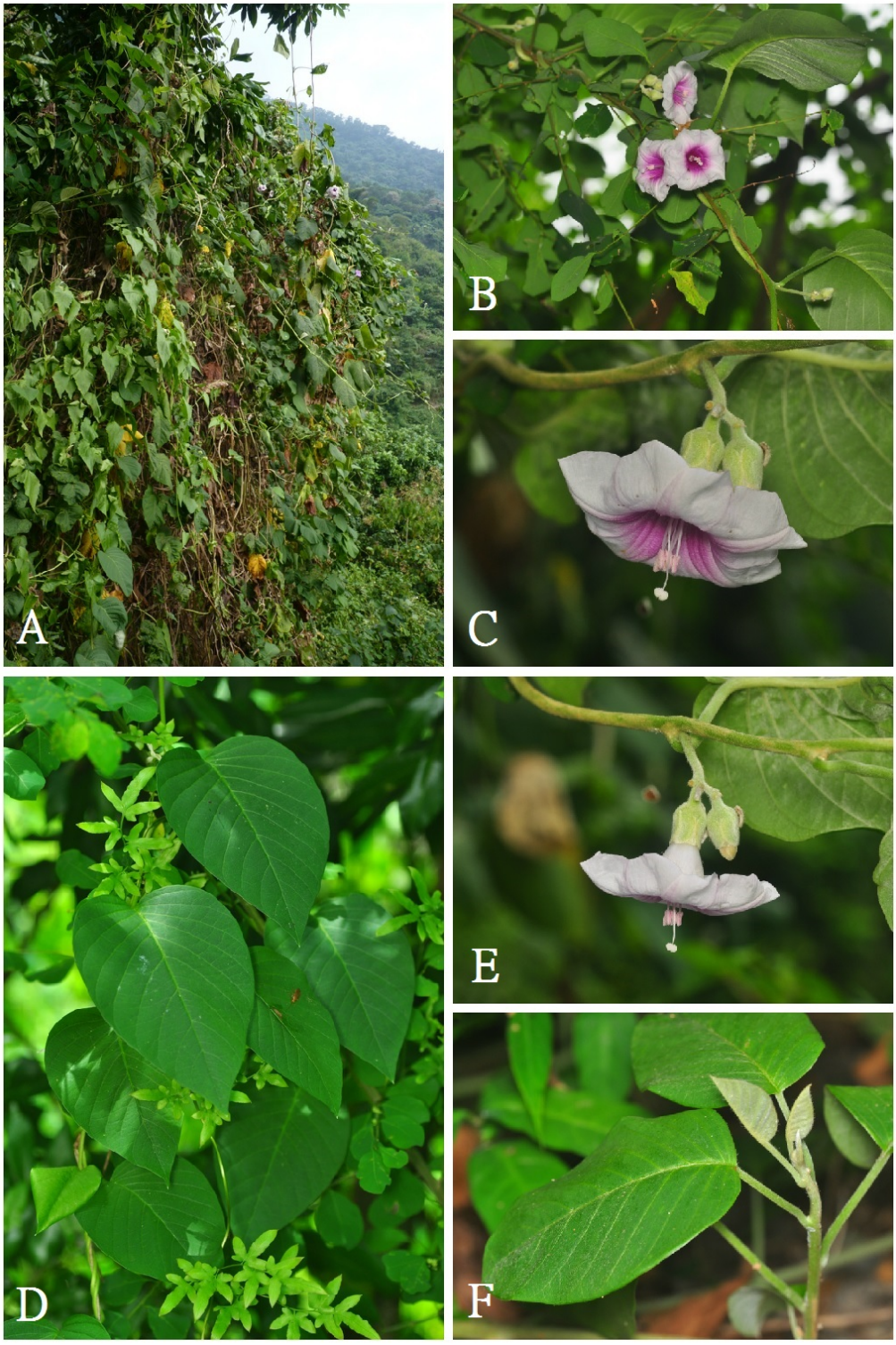


Fig. 2. ***Argyreia akoensis.*** **A: Habit, the population growing at hillside. B: Inflorescence cyme, about 1–6 flowered, peduncle distinctly shorter than the petiole. C: Corolla funnel-formed, shallowly 5-lobed, abaxial white-pink in color, adaxial center purple-red in color. D: Leaves, adaxially sparsely appressed-pilose, abaxially densely appressed-pilose. E: Pistil much longer than corolla, stigma capitate, 2-lobed; stamens 5, nearly as long as corolla; anther dorsifixed, pink. F: Petiole 2.5–8.5 cm long.**

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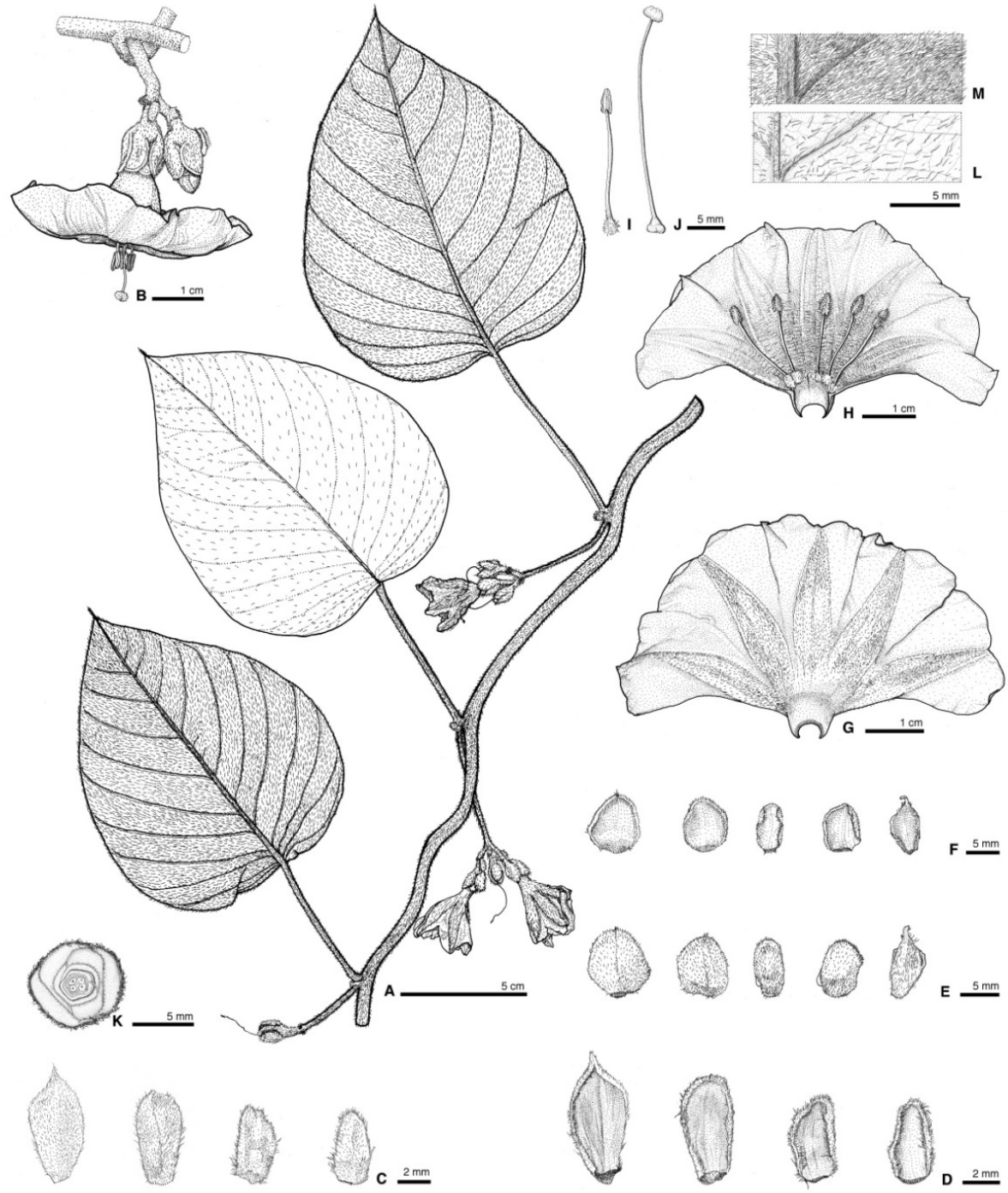


Fig. 3. ***Argyreia akoensis*** **S.-Z. Yang, P.-H. Chen & G. W.Staples. A. flowering branch; B. flower; C. bracts (abaxial view); D. bracts (adaxial view); E. sepals (abaxial view), outermost (left) to innermost (right); F. sepals (adaxial view), outermost (left) to innermost (right); G. dissected corolla (abaxial view); H. dissected corolla (adaxial view) and stamens; I. stamen; J. pistil; K. calyx and ovary (cross-sectional view); L. portion of leaf (adaxial view); M. portion of leaf (abaxial view). Drawn by Dr. Chun-kuei Liao from** ***P.-H. Chen 499*** **(holotype!).**

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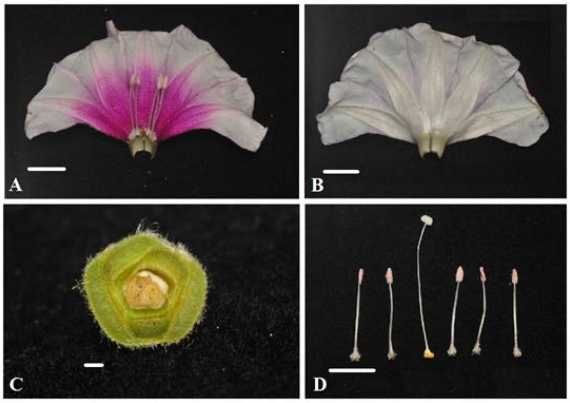


Fig. 4. *Argyreia akoensis.* A: Dissected corolla, adaxial view, purple-red in color. B: Dissected corolla, abaxial, with five midpetaline bands. C: Ovary 2-loculed, 4-ovuled. D: Stamens equal in length, dilated at the base with pilose hairs; pistil with ring-like disc at the base, yellow in color. Scale: A, B, D: 1 cm; C: 1 mm.

f.) Choisy from Hainan and Hong Kong; *Ipomoea harmandii* Gagnep. from Vietnam; and several species of *Argyreia* from Malesia. The Malesian species most similar to the Taiwan plants is *A. sumbawana* Ooststr., from the island of Sumbawa in Indonesia. The differences between *A. akoensis* and these similar species from nearby areas are summarized in Table 1 and the key to six similar *Argyreia* species is provided as an aid to identification.

1a. Pistil and stamens exserted from corolla; sepals less than 9 mm long……2
1b. Pistil and stamens included; sepals longer than 10 mm…….. ……..……..……..……...4
2a. Corolla deeply lobed, white…….....***Argyreia formosana***
2b. Corolla shallowly lobed, pinkish……..…… 3
3a. Corolla *ca* 3.6 cm long; ovary 2–loculed ……***Argyreia akoensis***
3b. Corolla *ca* 2.5 cm long; ovary 4–loculed…..***Argyreia sumbawana***
4a. Corolla deeply lobed; ovary 2-loculed…….....***Ipomoea harmandii***
4b. Corolla shallowly lobed, ovary 4-loculed ……..…….…….....5
5a. Peduncle 0.5–2.5 cm long; bracts small, caducous; fruit red …… ……..……..***Argyreia mollis***
5b. Peduncle longer than 20 cm; bracts large, persistent; fruit brown... ……..……..……..…***Argyreia nervosa***

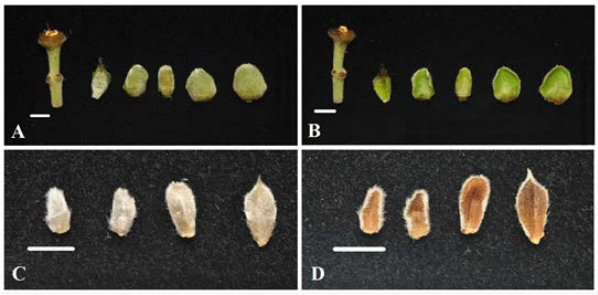


Fig. 5. *Argyreia akoensis.* A: Dissected calyx with densely appressed-pilose indumentum (abaxial view), innermost sepal (left) to outermost (right). B: Adaxial calyx green and glabrous, inner sepals 3, oblong (left), outer 2, orbicular (right). C: Bracts 4, soon caducous, abaxially brown in color and densely appressed-pilose. D: Adaxial bracts brown in color and glabrous. Scale: A–D: 5 mm.

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台灣南部旋花科的新種–屏東朝顏

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摘要：本文將台灣南部旋花科新種-屏東朝顏(*Argyreia akoensis* S.-Z. Yang, P.-H. Chen & G.W. Staples)，與台灣及鄰近地區相似種進行比較，屏東朝顏鑑別特徵為花冠裂片、花萼大小、突出的雌蕊和雄蕊。本文提供形態描述、判別特徵、手繪圖、照片、保育狀況以及相似種的檢索表以供鑑別之用。

關鍵詞：鈍葉朝顏、生物地理學、固有性、涼山、屏東。

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