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Asarum shinguense, a new species of the genus *Asarum* (Aristolochiaceae), from Wakayama Prefecture, Japan

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ABSTRACT: *Asarum shinguense*, a new species of *Asarum* from Shingu City, Wakayama Prefecture, Japan, is described and illustrated. Morphologically and geographically, the species resembles *A. rigescens*, *A. kooyanum*, and *A. kinoshitae*, but differs in its smaller leaves and flowers, slightly constricted calyx-tube throat, pale pink flowers with yellow mottling, and pubescence restricted to the margins of the calyx lobes. The species is currently known only from a single locality and is assessed here as Critically Endangered.

KEY WORDS: Aristolochiaceae, *Asarum kinoshitae*, *Asarum kooyanum, Asarum rigescens,* Kii Peninsula, Wakayama Prefecture.

INTRODUCTION

The genus *Asarum* L. comprises approximately 130 currently accepted species (POWO, 2026), making it one of the most species-rich genera in Aristolochiaceae. In the past 15 years, nearly 15 new species of this genus have been described (POWO, 2026). The greatest taxonomic diversity occurs in East Asia. Japan is particularly rich in *Asarum*, with at least 50 documented species and likely many more yet to be described. Sinn *et al*., (2015) recognized three subgenera [*Asarum*, *Geotaenium* (F.Maek.) B.T.Sinn, *Heterotropa* (Morr. & Decne.) O.C.Schmidt], six sections [*Asarum*, *Geotaenium* (F.Maek.) L.Kelly, *Asiasarum* (F.Maek.) Araki, *Heterotropa* (Morr. & Decne.) A.Braun, *Longistylis* B.T.Sinn, *Hexastylis* (Raf.) Araki], and that treatment is adopted in this study (Sinn *et al*., 2015).

Most species of *Asarum* grow in the shaded understory of forests. The species distributed in Japan share highly similar morphological characters, making identification extremely difficult, and have therefore been the subject of numerous taxonomic revisions.

For nearly 20 years, the second and third authors have conducted extensive field surveys on the Kii Peninsula. In 2025, they reported to the first author an unusual population of *Asarum* discovered in Shingu City, Wakayama Prefecture. We compared the specimens they had previously collected, as well as those we collected in the field, with morphologically similar and presumably related species in sect. *Heterotropa*. As a result, we confirmed that it represents a new species of the genus *Asarum*. Given its extremely small population size and the urgent need for conservation, we formally describe this new species herein.

MATERIALS AND METHODS

The plants examined in this study were collected from a native habitat in Shingu City, Wakayama Prefecture, Japan. Voucher specimens of the new species were deposited in the Makino Herbarium of Tokyo Metropolitan University (MAK) and Herbarium of the University of Tokyo (TI).

Approximately 100 individuals were observed at the type locality. To minimize the impact on the habitat, a total of 20 individuals from the type locality were examined over the period between 2012 and 2026 to evaluate morphological stability. As the floral morphology of *Asarum* is often distorted in herbarium specimens, our comparison was primarily based on fresh flowers.

TAXONOMIC TREATMENT

Asarum shinguense Barn., Kido, M.Harada & Iwamura, ***sp. nov.*** **Figs. 1–3**

Type: JAPAN. Wakayama Prefecture: Shingu City, 14 February 2026, *L.J.K. Barnett LB00001* (holotype: MAK!, MAK483039; isotype: TI!, TI00353839).

Diagnosis: This species differs from *Asarum rigescens* F.Maek. and *A. kooyanum* Makino by its smaller leaves (4–6 × 3–5 cm vs. 6–11 × 5–9 cm in *A. rigescens* and 6–10 × 4–8 cm in *A. kooyanum*); flowers with a slightly constricted throat, pale pink coloration, and yellow mottling (vs. flowers with the throat not constricted, deep purple in *A. rigescens*, and flowers with the throat not constricted, greenish or greenish purple in *A. kooyanum*); and calyx-lobe pubescence restricted to the margins (vs. pubescence covering the entire upper surface of the calyx lobes in *A. rigescens* and calyx-lobes glabrous in *A. kooyanum*). It further differs in flowering

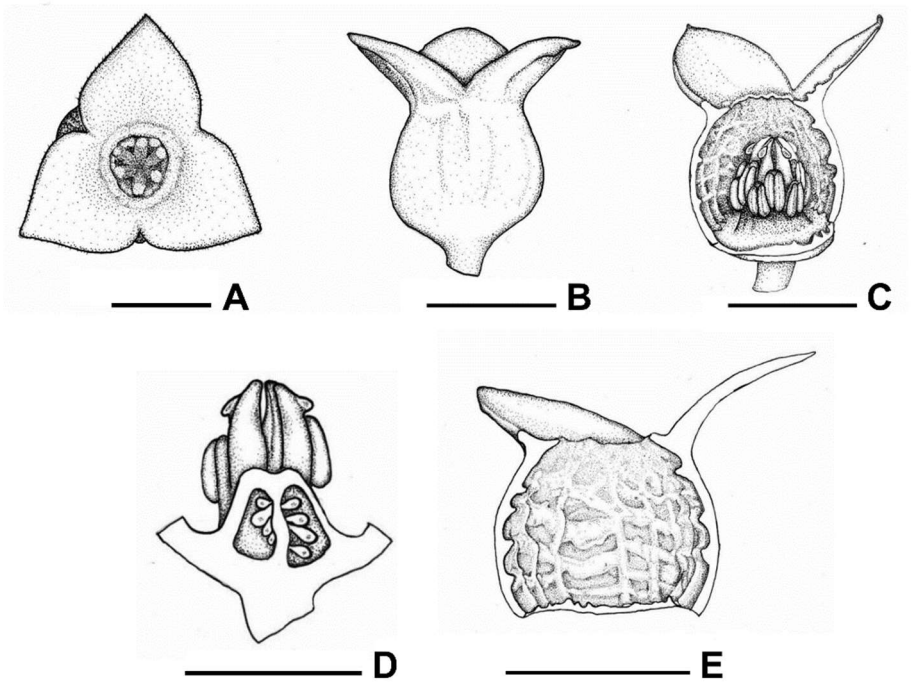

Fig. 1. Illustration of flowers of ***A. shinguense***. **A.** Flower, viewed from above. Scale bar = 5 mm. **B.** Flower, lateral view. Scale bar = 5 mm. **C.** Flower, half of calyx tube removed. Scale bar = 5 mm. **D.** Longitudinal section of lower part of flower, showing ovary position. Scale bar = 5 mm. **E.** Inner surface of the calyx-tube, showing tessellate ridges. Scale bar = 5 mm. Illustration by second author.

Fig. 2. Holotype of ***Asarum shinguense***. Scale bar = 5 cm.

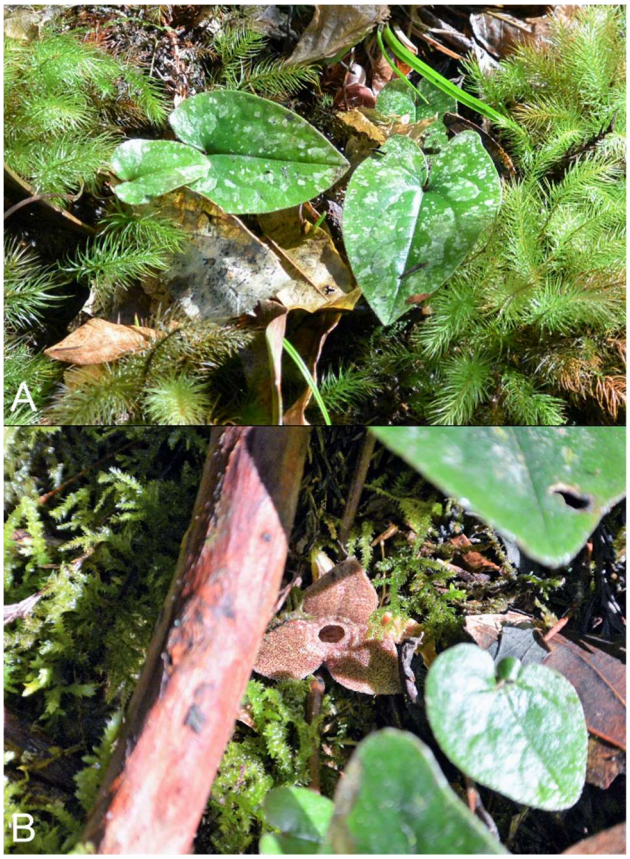

Fig. 3. Habit of ***Asarum shinguense*** at anthesis. **A.** Leaves. **B.** Flowers under the leaves.

Table 1. Comparison of ***Asarum shinguense***, ***A. rigescens***, ***A. kooyanum*** and ***A. kinoshitae*** (Sugawara, 2006; Maekawa, 1932; Makino, 1931; Kinoshita, 1989)

Character	***A. shinguense***	***A. rigescens***	***A. kooyanum***	***A. kinoshitae***
Leaf				
Size	4–6 cm long, 3–5 cm wide	6–11 cm long, 5–9 cm wide	6–10 cm long, 4–8 cm wide	6–9 cm long, 3–6 cm wide
Calyx				
Calyx-tube shape	cupuliform to urceolate, throat slightly constricted	cupuliform, throat not constricted	cupuliform, throat not constricted	tubiform, throat constricted
Size	5–8 mm long, 7 mm wide	6–8 mm long, 10 mm wide	7–10 mm long, 10–12 mm wide	13–16 mm long, 7–9 mm wide
Inner surface of the calyx-tube	tessellate, longitudinal ridges usually 12–16	tessellate, longitudinal ridges 9–12	weakly tessellate, longitudinal ridges 9–12	weakly tessellate, longitudinal ridges usually 9
Calyx lobes	spreading horizontally or obliquely, deltoid to ovate	spreading horizontally or obliquely, deltoid to ovate	spreading obliquely, widely ovate	spreading horizontally, ovate to deltoid
Upper surface of the calyx lobe	margin pubescent, with multicellular trichomes	densely pubescent, with multicellular trichomes	glabrous	glabrous
Flowering	Nov. to Feb.	Feb. to Mar.	May to Jun.	Dec. to Jan.
Distribution	Shingu City, Wakayama Prefecture	Southern part of Kii Peninsula	Southern part of Kii Peninsula	Owase City, Mie Prefecture

time, blooming from November to February (vs. February to March in *A. rigescens* and May to June in *A. kooyanum*).

Description: Perennial herb. *Rhizomes* short. *Leaf* blade cordate, 4–6 × 3–5 cm, thick, base auriculate, apex acute to attenuate; upper surface dark green, variegated, lustrous, sparsely pubescent; lower surface pale green, midrib sparsely pubescent; *petiole* usually dark greyish brown, sparsely pubescent, 3–7 cm long. *Flowers* pale pink with yellow mottling, solitary, terminal, flowering from November to February, and decumbent on the ground; *pedicel* usually less than 1 cm; *calyx tube* cupuliform to urceolate, 5–8 × ca. 7 mm, throat slightly constricted, with an orifice ring, outer surface glabrous, inner surface tessellate, with longitudinal and transverse ridges, longitudinal ridges usually 12–16, limb 3-lobed; *calyx lobes* spreading horizontally or obliquely, deltoid to ovate, 6–11 mm long, upper surface margin pubescent, with multicellular trichomes, lower surface glabrous; *stamens* 12, in 2 whorls of 6, subsessile; *anthers* extrorse, 1.5–2 mm long; *ovary* superior, *styles* 6, free, apex with short horn-like protuberance, *stigma* ovate, extrorse.

Distribution: Only known from Shingu City, Wakayama Prefecture.

Habitat: Growing on the forest floor of a *Chamaecyparis obtusa* (Siebold & Zucc.) Endl. plantation and a natural evergreen broadleaf forest dominated by *Quercus salicina* Blume. Individuals were found directly on soil among leaf litter.

Conservation status: Critically Endangered (CR) under IUCN (2022) criteria C2a(i). *Asarum shinguense* is currently known from only a single locality with a very small population. Based on field observations, the population consists of approximately 100 individuals, including approximately 30 – 40 mature individuals. It is highly vulnerable to habitat loss and illegal collection. It is therefore recommended that this species be legally protected.

Etymology: The specific epithet refers to Shingu City in Wakayama Prefecture, the type locality of this species.

Japanese name: nachi kan-aoi (ナチカンアオイ)

Notes: This species is a new taxon that belongs to subg. *Heterotropa* and is clearly distinguishable from *A. rigescens*, *A. kooyanum* and *A. kinoshitae* (F.Maek. ex Kinosh.) T.Sugaw., which are distributed in the southern Kii Peninsula and are considered morphologically similar (Fig. 4). A comparative summary of the morphological characteristics of the four species is provided in Table 1 (Makino, 1931; Maekawa, 1932; Kinoshita, 1989; Sugawara, 2006).

Both the leaves and flowers of *A. shinguense* are smaller than those of the three related species. It bears remarkably small flowers, even within the genus. Although the floral shape resembles that of *A. rigescens*, *A. shinguense* can be distinguished by its slightly constricted throat and its paler coloration, characterized by a pale pink coloration with yellow mottling.

Okuyama (2020) clarified the phylogenetic relationships of Japanese *Asarum*, revealing that *A. rigescens* and *A. kooyanum*, which were compared with *A. shinguense* above, occupy the same clade and form adjacent positions within it. *Asarum nipponicum* var. *nankaiense* (F.Maek.) T.Sugaw. is placed on the sister branch, suggesting that it is likewise closely related. Compared with *A. shinguense*, *A. nipponicum* var. *nankaiense* differs most conspicuously in having shorter calyx-lobes and non-undulate or only weakly undulate calyx-lobe margins. In terms of calyx-lobe pubescence, *A. shinguense* differs clearly from *A. rigescens*. Whereas *A. rigescens* bears hairs across the entire upper surface of the calyx-lobes, *A. shinguense* has pubescence restricted to the margins (Fig. 5). This difference in the distribution of pubescence provides an additional diagnostic character distinguishing the two species. Regarding flowering phenology, *A. shinguense* blooms slightly earlier than *A. rigescens,* and its flowering period overlaps with that of *A. kinoshitae*, while it is clearly separated from *A. kooyanum.*

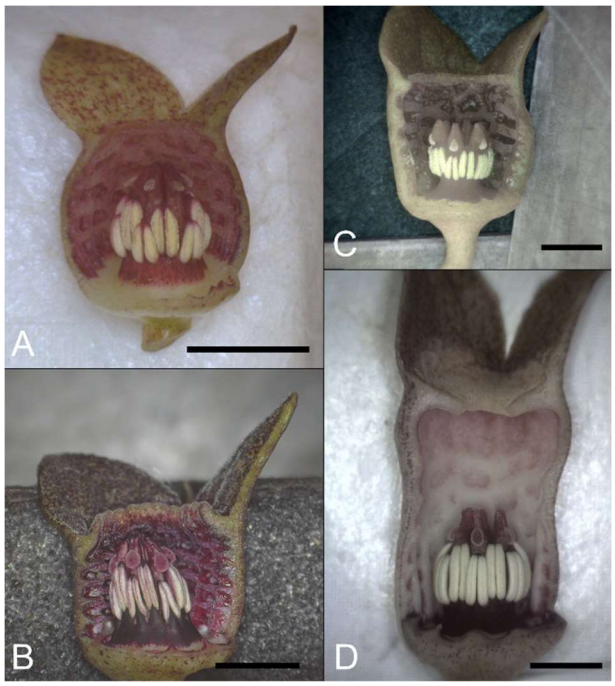

Fig. 4. Comparison of the transverse-section of flowers of ***Asarum shinguense*** and three related species. **A.** ***A. shinguense*****. B.** ***A. rigescens*****. C.** ***A. kooyanum*****. D.** ***A. kinoshitae.*** Scale bar = 5 mm.

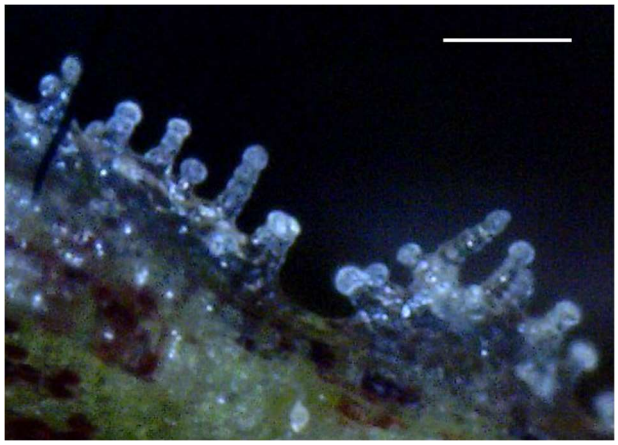

Fig. 5. Multicellular trichomes on the margin of the calyx-lobe of ***A. shinguense***. Scale bar = 0.2 mm.

The flowers of *A. shinguense* are generally rounded and pale in color. An orifice ring is present, but it is not prominent, and there is little color contrast.

In conclusion, based on 15 years of morphological observations and the clear differentiation from morphologically similar congeners, we conclude that this population represents a new species, *Asarum shinguense*.

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