

A New Species of *Adonis* (Ranunculaceae) from Shikoku, Western Japan

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Abstract A new species of *Adonis*, *A. shikokuensis* Nishikawa & Ko.Ito, is here described. This species is the fourth species of the genus *Adonis* in Japan, and a key to the four species is presented.

Key words: *Adonis*, chromosome, Japan, new species, Ranunculaceae

Based on the chromosome number and morphology the Japanese *Adonis* was classified into the following three species: *A. amurensis* Regel & Radde, *A. ramosa* Franch. and *A. multiflora* Nishikawa & Ko. Ito (Nishikawa, 1989a). Among these three species, *A. ramosa* with $2n=32$, endemic to Japan, is distributed from Hokkaido to Honshu, and its range overlaps those of the other two species; *A. amurensis* with $2n=16$ distributed in mainly northern and eastern Hokkaido, and *A. multiflora* with $2n=16$ from northern Honshu to Kyushu. Cross experiment between *A. amurensis* and *A. multiflora* was succeeded and fertile offspring were obtained (Nishikawa, 1988). These facts suggested that the hybridization has occurred between them in the field. Thus, *A. ramosa* with $2n=32$ is considered as allotetraploid.

Triangular cross was successively carried out among the three species (Nishikawa, 1988, 1989b). In the case of the combination *A. ramosa* and *A. multiflora* hybrids showed hybrid vigor. Crossing between *A. ramosa* and *A. amurensis* yielded dwarf-formed hybrids. When *A. amurensis* was selected as a maternal species, this kind of crossing produced hybrids of which neither anthers nor ovules developed (Nishikawa, unpublished). These results suggested that *A. amurensis* has less cytological relation to *A. ramosa* and that unknown *Adonis* plants with the chromosome number $2n=16$ may be involved in the origin of *A. ramosa*, an allotetraploid.

As the results of Nishikawa's field survey in southern Japan plants belonging to an undescribed taxon were found in Kochi Prefecture, Shikoku. This paper aims to describe these plants as a new species, *A. shikokuensis*.

Adonis shikokuensis Nishikawa & Ko.Ito sp. nov.

Haec planta *Adonidi ramosae* Franch. affinis; ab ea foliis et receptaculiis glabris,

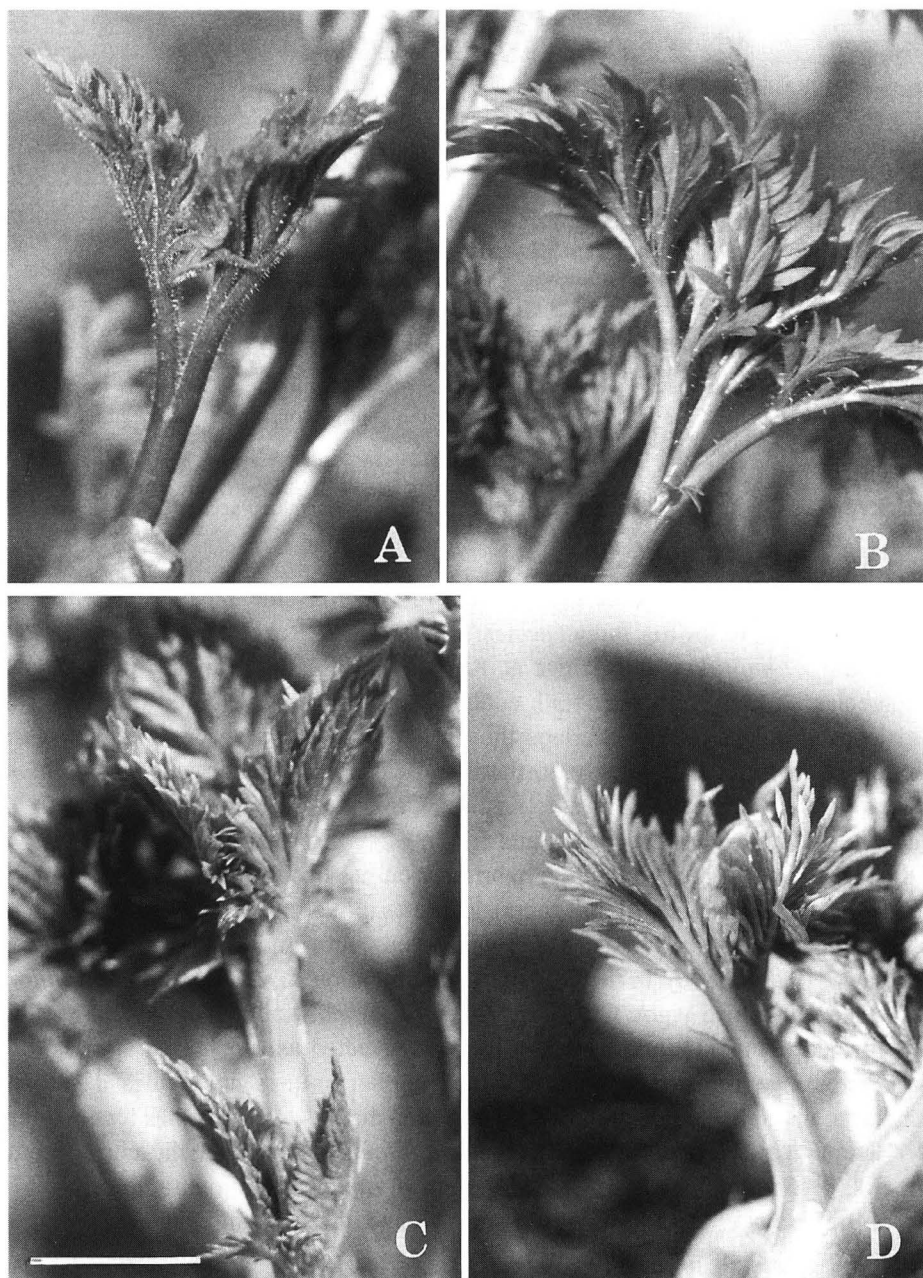


Fig. 1. Hairiness of leaf underneath at early flowering time in *Adonis* plants. A: *A. amurensis* (from Kita-tokoro, Kitami, Hokkaido). B: *A. ramosa* (from Hon-ubun, Asahikawa, Hokkaido). C: *A. multiflora* (from Obuke, Nishine, Iwate Pref.). D: *A. shikokuensis* (from Minamidaio, Ôtoyo-cho, Kochi). Scale indicates ca. 3 cm.

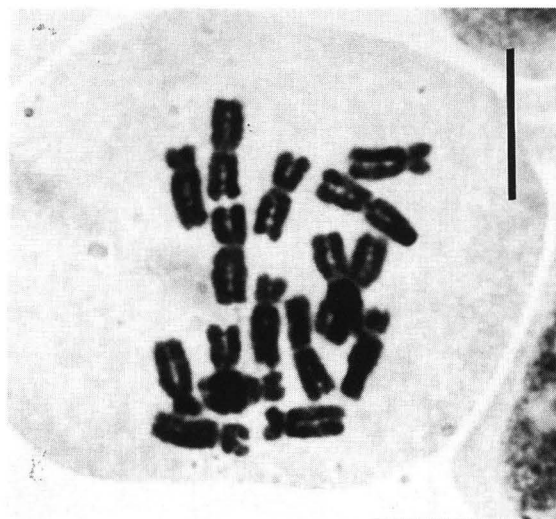


Fig. 2. Somatic chromosomes of *Adonis shikokuensis* Nishikawa & Ko. Ito, $2n=16$ (Nishikawa C-92-5, Minamidaio, Ôtoyo-cho, Kochi, TNS). Scale indicates $10\ \mu\text{m}$.

acheniiis brevio-pilosis, fructibus aggregatorum minoribus et numeris chromosomatibus $2n=2x=16$ differt.

Herba perennis. Rhizoma breve, crassum, radicosum. Caulis ca. 10–15 cm altus sub anthesin, elongatus ad 20–25 cm altus post anthesin, basibus divaricatis. Folia caulina petiolata, alterna vel opposita, glabra, bipinnata, ovata vel rhombica, folioliis 1–2 pinnatisectis vel pinnatipartitis, lanciniis lanceolatis, oblongis, acuminatis vel acutis. Flore 1–4, 4–7 cm diametro, plerumque 2–3, simul florentes, pedunculis glabris. Sepala 5 (–6), rhombico-ovata vel obovata, 16–24 mm longa, glabra, viridulo-purpurea, late flabo-marginata. Petala 10–16, oblonga vel obovata, 18–32 mm longa, paulo longiora sepaliis, flava vel xanthina. Achenia 35–70, dense brevi-pilosa, oblique ovata, 2.2–5.0 mm longa. Fructus aggregates subglobosus vel globosus, 12–16 mm longus, 11–16 mm latus. Styli breve, recurvi, appresi. Receptacula glabri. Numerus chromosomatis $2n=2x=16$. Fl. II–III. Fr. IV–V.

Typus: JAPAN; Shikoku, Kôchi Pref., Ôtoyo-cho, Minami-Daiô, 28 Mar. 1996, T. Nishikawa 96-13 (TNS 702989–holotypus; Fig. 3).

Japanese name: Shikoku-fukujuso.

Adonis shikokuensis is morphologically similar to *A. ramosa* Franch. but differs from the latter by having leaves glabrous beneath (Fig. 1), glabrous fruit receptacles, shortly hairy achenes, smaller aggregate fruits and the chromosome number $2n=16$ (Fig. 2).

Specimens examined:

JAPAN. Shikoku; Tokushima Pref., Jinryo-mura, 25 Mar. 1952, S. Satomi s.n.

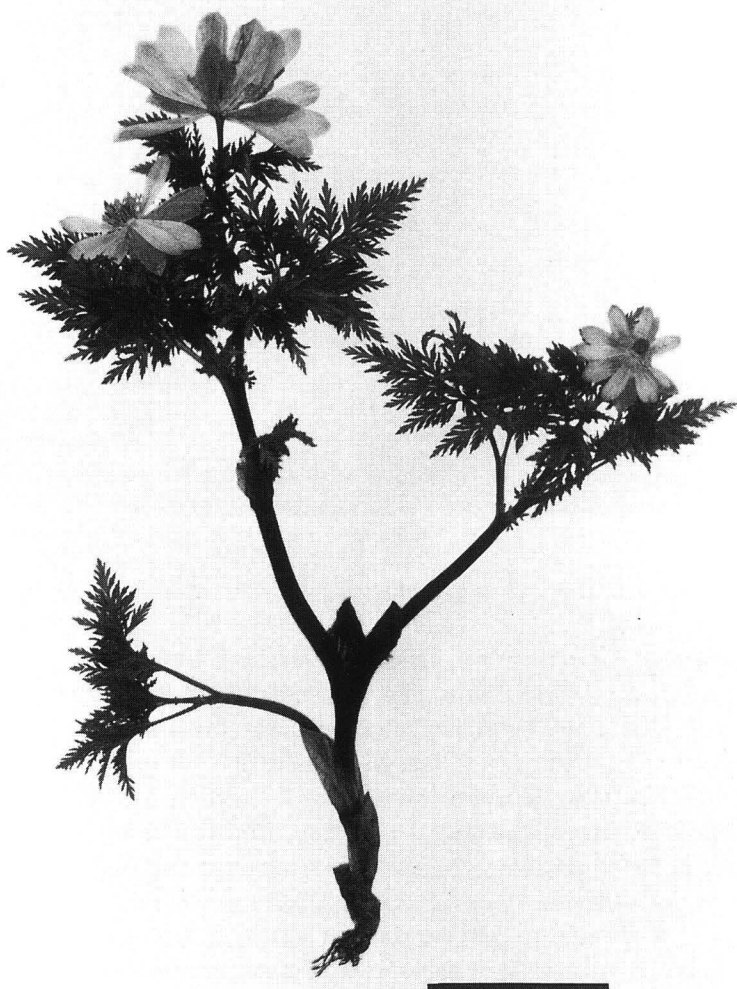


Fig. 3. Type of *Adonis shikokuensis* Nishikawa & Ko. Ito (T. Nishikawa 96-13, 28 Mar. 1996, holotype, TNS 702989). Scale indicates 5 cm.

(TNS 117121); Mt. Tsurugi-san, 24 Mar. 1960, S. Fukushima s.n. (TNS 146748). Kyushu; Kumamoto Pref., Mt. Nokeeboshi-dake, 30 Mar. 1916, K. Maebara s.n. (TNS 26122); Itsuki, 19 Mar. 1958, K. Maebara s.n. (TNS 5607); Kamimashiki-gun, Mt. Naidaijin-yama, 11 Mar. 1954, Y. Shimada s.n. (TNS 131032). Miyazaki Pref., Nishiusuki-gun, Takachiho-cho, 1 Mar. 1998, T. Minamitani s.n. (TNS 676411,

676412); Higashiusuki-gun, Morozuka-mura, 1 Mar. 1998, T. Minamitani s.n. (TNS 676413).

A key to four Japanese species

- A. Flower solitary; cauline leaves opposite, estipulate. *A. amurensis*
- A. Flowers solitary to several; cauline leaves opposite or alternate, stipulate
 - B. Sepals 1/2–2/3 times shorter than petals *A. multiflora*
 - B. Sepals nearly equal to or shorter than petals
 - C. Leaves sparingly pubescent beneath; receptacles pubescent *A. ramosa*
 - C. Leaves glabrous beneath; receptacles glabrous *A. shikokuensis*

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