

Observations on Variation in the Ornamental Flowers of *Hydrangea macrophylla* (Thunb.) Ser. (Hydrangeaceae)

Hideaki Ohba^{1*} and Shinobu Akiyama²

¹Department of Botany, the University Museum, the University of Tokyo,
Hongo 7-3-1, Tokyo 113-0033, Japan

²Department of Botany, National Museum of Nature and Science,
Amakubo 4-1-1, Tsukuba, Ibaraki 305-0005, Japan

* E-mail: ohba@um.u-tokyo.ac.jp

(Received 14 August 2014; accepted 24 September 2014)

Abstract Variation in the ornamental flowers of *Hydrangea macrophylla* (Thunb.) Ser. in wild populations at Jogasaki on the east coast of the Izu Peninsula, Honshu, Japan, is reported. Forma *macrophylla*, which was known only in cultivation, was found growing in the wild. Two forms with peculiar features are described as new forms, f. *isobue* and f. *isonotaki*.

Key words : *Hydrangea*, Izu, Japanese flora, ornamental flowers.

Introduction

Hydrangea macrophylla (Thunb.) Ser. f. *macrophylla* has been cultivated as an ornamental plants since at least the Edo period in Japan and abroad. *Hydrangea macrophylla* f. *normalis* (E. H. Wilson) H. Hara, also cultivated for a long time, occurs naturally on the Boso, Miura, and Izu peninsulas on the Pacific Ocean side of central Honshu, and also in the Izu Islands and the Volcano Islands, south of Tokyo. Siebold (1828) and Siebold and Zuccarini (1839) described several species allied to *H. macrophylla* cultivated in Japan. Variations in flowers and leaves have been known in the plants under cultivation since Siebold's time, but the range of variation in wild populations of f. *normalis* is extremely narrow (Sugimoto, 1926; Ohba, 2001). Recently, a number of forms showing diversity in the sepals of the ornamental flowers have been named as cultivars by Mallet (2008, 2009), Arai (2012), and others.

Mallet visited the Izu Peninsula and collected wild plants of *H. macrophylla* at Jogasaki with the cooperation of Mr. Hirasawa (www.izu.fm/hydrangea/j-izu.html). Mallet (2008) mentioned

that some cultivars named by her were growing wild at Jogasaki. Various forms of *H. macrophylla* occur there on steep rocky slopes under trees and on cliffs near the sea (Hirasawa, www.izu.fm/hydrangea/j-izu.html).

Thus, thinking that *Hydrangea macrophylla* is a species with a wide range of variation in the sepals of the ornamental flowers, we observed variation in the populations in the Boso and Izu peninsulas in 2013 and 2014.

Results and Discussion

A large number of wild populations of *H. macrophylla* occur near the sea on the Boso and Izu peninsulas mainly in sunny place (Fig. 1: A, B) and rarely in shady place (Fig. 1: C). The populations in the Boso Peninsula are rather constant and stable in the shape of their ornamental flowers, but not in color. The color of the sepals of the ornamental flowers are white, pink or pale blue, but we found no flowers with deep blue sepals.

In the Izu Peninsula we encountered several individuals with features represented by f. *macrophylla* and also double sepaled forms at the

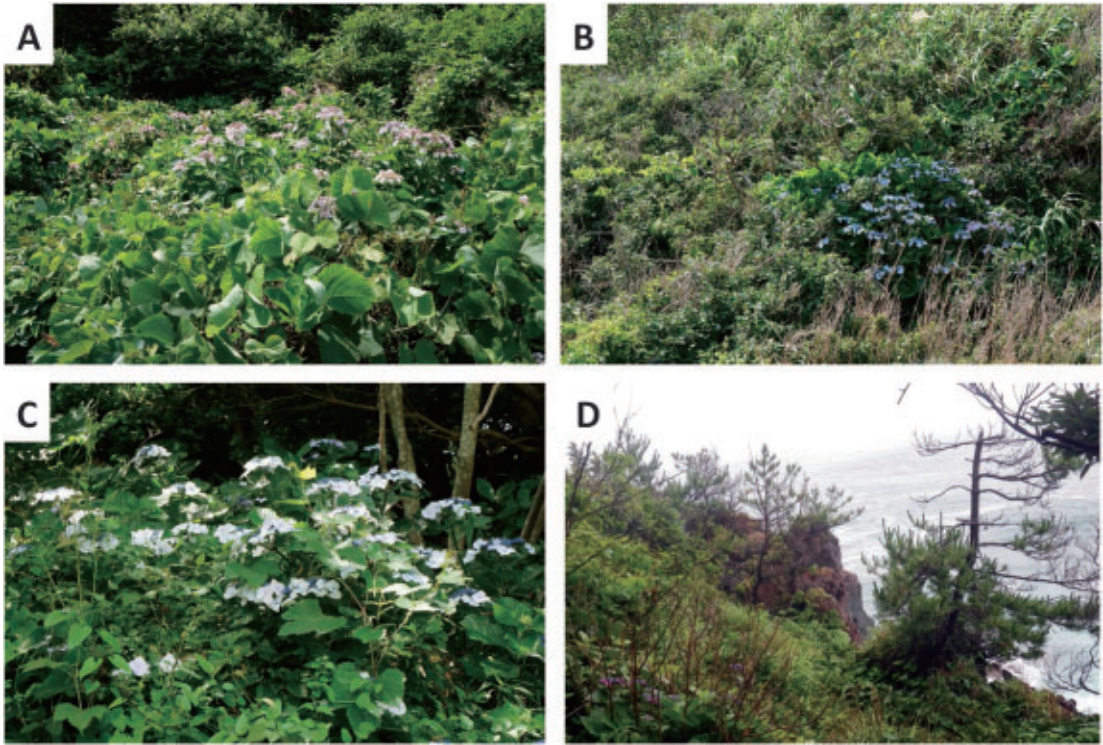


Fig. 1. A. *Hydrangea macrophylla* f. *normalis* in sunny place near the sea on the Boso Peninsula with *Pueraria lobata*. B. *Hydrangea macrophylla* f. *normalis* in sunny place near the sea on the Boso Peninsula. C. *Hydrangea macrophylla* f. *normalis* in shady place on the Boso Peninsula. D. *Hydrangea macrophylla* f. *macrophylla* (lower left, purple flowers) at the margin of a coastal forest at Jogasaki on the Izu Peninsula.

margin of a coastal forest at Jogasaki (Figs. 1: D, 2: A, B). Moreover, we observed a considerable number of individuals with peculiar features in plants transplanted from Jogasaki to Hirasawa's nursery (Fig. 2: C–F). Our findings indicate that the sepals of the ornamental flowers are extremely variable in wild populations on the Izu Peninsula, but not so on the Boso Peninsula. The difference between the two peninsulas is significant. On mountain sides on the Izu Peninsula are two additional species of *Hydrangea*, *H. serrata* (Thunb.) Ser. (var. *serrata* and var. *angustata* (Franch. & Sav.) H.Ohba) and *H. luteovenosa* Koidz. Their flowering times overlap with that of *H. macrophylla*. On the Boso Peninsula, however, there are no other species of *Hydrangea* in natural situations near the sea. The populations of *H. macrophylla* on the Izu Peninsula might possibly receive genetic affects from the two

sympatric species of *Hydrangea*, but populations of *H. macrophylla* on the Boso Peninsula are hardly likely to receive genetic influence from other species. We considered this to be one of the reasons that *H. macrophylla* on the Izu Peninsula shows rather wide variations.

The variation in the sepals of the ornamental flowers found in wild is worth recognizing taxonomically at the infraspecific taxa. In this paper two new forms with peculiar feature in the sepals on the ornamental flowers are described.

Number of sepals

Hydrangea macrophylla is known to usually have four petaloid sepals in ornamental flowers (Ohba, 2001), although as cultivars some plants have more than four petaloid sepals, i.e. double sepaled flowers. Previously, no wild plants with double sepaled flowers are known, but recently

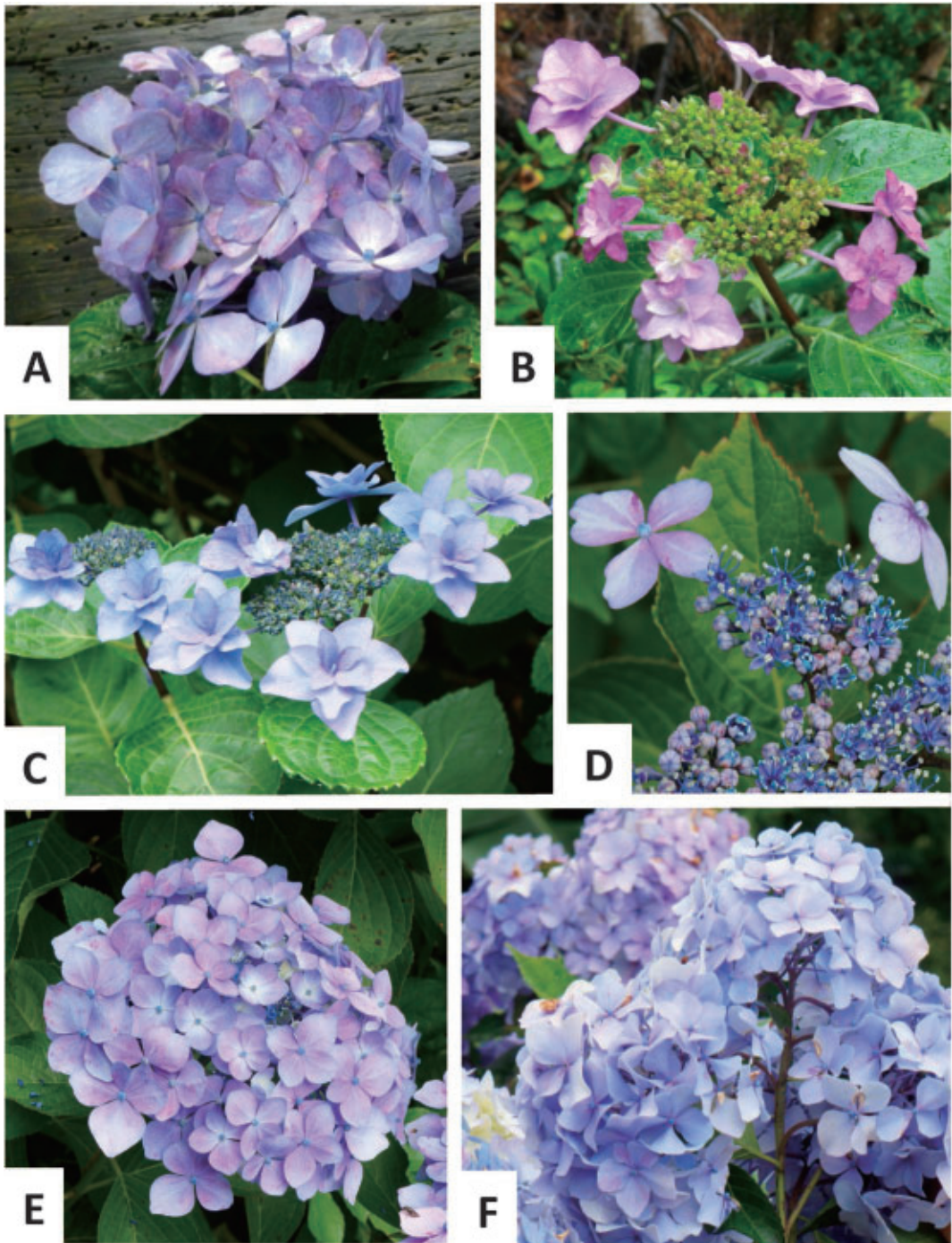


Fig. 2. Wild forms of *Hydrangea macrophylla* in the Izu Peninsula. A, E and F. Forma *macrophylla*. B and C. Forma *isobue*. D. Forma *isonotaki*.



Fig. 3. *Hydrangea macrophylla* (Thunb.) Ser. f. *isobue* H. Ohba & S. Akiyama (H. Ohba and S. Akiyama 2014139, TI-holotype).



Fig. 4. *Hydrangea macrophylla* (Thunb.) Ser. f. *isonotaki* H.Ohba & S.Akiyama (H. Ohba and S. Akiyama 2014146, TI-holotype).

double sepaled forms were found on the Izu Peninsula and on Izu-oshima Island.

A plant with deep blue sepals, discovered in the wild at Jogasaki, was named 'Iso-bue' as a cultivar by Hirasawa (www.izu.fm/hydrangea/j-izu.html), and another cultivar, perhaps derived from it, was named 'Shamrock' by Mallet (2008). These names, however, have no formal taxonomic status.

Hydrangea macrophylla* (Thunb.) Ser. f. *isobue
H. Ohba & S. Akiyama, f. nov.

[Figs. 2: B, C, 3]

Petaloid sepals of ornamental flowers 12–14, in 3 whorls, deep blue, widely rhombic-elliptic (outer ones) to rhombic-elliptic (inner ones).

Type: Japan. Honshu. Shizuoka Pref., Ito-shi, Yawatano, cultivated (origin: Jogasaki) (H. Ohba & S. Akiyama 2014139 [Fig. 2: C], 21 June 2014, TI-holotype, TNS-isotype); Jogasaki, at the margin of the coastal forest (H. Ohba 2013002 [Fig. 2: B], 12 June 2013, TI-paratype).

The epithet, tentatively named by Hirasawa, comes from a Japanese, Isobue, which means the whistle-like heavily breathing of fishing woman diver after diving. A cultivar, 'Shamrock,' named by Mallet (2008), may have the same origin.

Color of sepals

In wild populations of *H. macrophylla* the petaloid sepals are white and usually slightly purplish (Ohba, 2001). A plant whose sepals of ornamental flowers are deep blue with a single white stripe on the Izu Peninsula was named as the cultivar, 'Iso-no-taki,' by Hirasawa (www.izu.fm/hydrangea/j-izu.html). Some plants with white striped sepals of ornamental flowers were also found at Jogasaki and transplanted in Hirasawa's nursery.

Hydrangea macrophylla* (Thunb.) Ser. f. *isono-taki
H. Ohba & S. Akiyama, f. nov.

[Figs. 2: D, 4]

Petaloid sepals of ornamental flowers usually 4, bluish purple with white stripes.

Type: Japan. Honshu. Shizuoka Pref., Ito-shi, Yawatano, cultivated (origin: Jogasaki) (H. Ohba

& S. Akiyama 2014146, 21 June 2014, TI-holotype, TNS-isotype).

The epithet, tentatively named by Hirasawa, comes from a Japanese, Iso-no-taki, meaning a waterfall by the sea near the original place of this plant. This is compared to the color pattern with white strips on a bluish purple ground of the sepals of ornamental flowers.

Specimens examined of wild plants of *Hydrangea macrophylla* (Thunb.) Ser. f. *macrophylla*

Japan. Honshu. Shizuoka Pref., Ito-shi, Jogasaki, at the margin of the coastal forest (H. Ohba 2013001, 12 June 2013, TI) (Fig. 2: A); Yawatano, cultivated (origin: Jogasaki) (H. Ohba & S. Akiyama 2014126, 2014133, 2014135 [Fig. 2: E], 2014143 [Fig. 2: F], 21 June 2014, TI, TNS).

Acknowledgments

We are deeply indebted to Mr. Tetsu Hirasawa and Mr. Taka-aki Sugimoto for permitting us to study their valuable collections and for giving us information. We greatly appreciate Dr. David E. Boufford's, Harvard University Herbaria, critical reading of the manuscript.

References

- Arai, T. 2012. *Ajisai Album 200* [Album of *Hydrangea* 200]. 222 pp. Toshio Arai, Sendai.
- Mallet, C. 2008. *Hydrangea*, trilingual ed. 207 pp. Eugen Ulmer, Trento.
- Mallet, C. 2009. *Hydrangea*, Japanese translation ed. [translated by Ohba, H. and Ohta, T.] 243 pp. Aboc-sha Inc., Kamakura.
- Ohba, H. 2001. *Hydrangea*. In: Iwatsuki, K., Boufford, D. E. and Ohba, H. (eds.), *Flora of Japan*, 2b: 84–94, Kodansha, Tokyo.
- Siebold, P. F. 1828. Synopsis *Hydrangeae* generis specierum Japonicarum. *Nova acta physico-medica academiae caesareae leopoldino-carolinae naturae curiosorum* 14: 686–692.
- Siebold, P. F. and Zuccarini, J. G. 1835–1841. *Flora Japonica*, vol. 1 (*Hydrangea*, pp. 101–119 and 172 in 1839 and 1841).
- Sugimoto, J. 1926. *Hydrangea* in Japan. *Nippon Journal of Botany* 1(1): (1)–(4).