**H. fluctuans F. Maekawa 1940**

**H. fluctuans f. parvifolia F. Maekawa 1940**

*Journal of the Faculty of Science*, Sect. 3 Botany, Vol. 5:355–356, ic. 17, 18, 19, 20 1940

クロナミギボウシ = 黒波擬宝珠 = Kuronami Gibōshi (Maekawa 1940)

コバクロナミギボウシ = Kobano Kuronami Gibōshi (Maekawa 1940)

**H. sieboldiana var. fluctuans F. Maek. ex Y. Satake 1985**

**History and Nomenclature:** In Japan and elsewhere this species is not well known, but a variegated form of it called 寒河江擬宝珠 = Sagae Gibōshi is one of the most admired and popular hosta cultivars worldwide. In western gardens this variegated form is known as *H*. ‘Sagae’ and was formerly known by the incorrect name *H. fluctuans* ‘Variegated’. The species was established by Maekawa (1940). Also established was a morph with smaller leaves and less wavy margins. Maekawa gave general localities for several herbarium specimens, most without number, and he observed living specimens only in the cultivated setting of Koishikawa Botanical Garden (小石川植物園) of University of Tokyo (東京大). Most of the specimens were...
on loan from Hortus Kikuchi (Kyoto). The Japanese name assigned to *H. fluctuans* by Maekawa is "Kuro-nami Gibōshi" (クロナミギボウシ). This transliterates to Kuro-Kuro-nami Gibōshi, meaning “dark (colored) hosta with wavy leaves.” Concurrently, the phenotype established by Kikuchi (Kyoto). The Japanese name assigned to *H. fluctuans* by Maekawa is "Kuro-nami Gibōshi" (クロナミギボウシ). This transliterates to Kuro-
nami Gibōshi, meaning “dark (colored) hosta with wavy leaves.” Concurrently, the forma established by Maekawa under the name *H. fluctuans* f. *parvifolia* has the Japanese vernacular name コパクロナミギボウシ (= Kobano Kuronami Gibōshi), which translates to “small-leaved, dark (colored) hosta with wavy leaves.” The Latin specific epithet *fluctuans* means “wavy” and *parvifolia* stands for “small leaf.” The specimens forming the foundation for these taxa are listed to have come from collections in the former province of Mutsu (Mutsu-no kuni; 陸奥国), which today encompasses the prefectures of Fukushima, Miyagi, Iwate and Aomori, all in the northern area of Honshū, called Tōhoku region (Tōhoku-chihō; 東北地方). Specific collecting locations mentioned are in the vicinity of Hirosaki City (Hirosaki-shi; 弘前市) in Aomori (type 2 spec. s.n.); Iizaka-mura in Iwashiro province (Kikuchi No. 365); and Sendai City (Sendai-shi; 仙台市) in Rikuzen province (Kikuchi s.n.); Yamagata in Uzen Province (H. Iwata 1934; H.K. No. 186). All of Maekawa’s living specimens were observed in botanical gardens. Zilis (2009) states that he never saw it growing in the wild. Also observed in Iwate Prefecture, it ranges north to Aomori Prefecture. When further data were published on these taxa, the forma *H. fluctuans* f. *parvifolia* originally found by Kikuchi in northern Honshu, Aomori Prefecture, Hirosaki City area, was determined to be a morph of the species so considered a synonym by Ohwi (1965) and Maekawa (1969), who continued to list only the species. Fujita (1976) reclassified the *H. sieboldiana* complex, including *H. montana* and all of its related taxa as synonyms under *H. sieboldiana*. This classification is not accepted here based on palynology (Chung, M.G. and S. B. Jones, 1989) and RAPD/DNA analysis (Sauve, R.J., S. Zhou, Y. Yu, and W.G. Schmid. 2005). *H. sieboldiana* and *H. montana* remain separate taxa although their close relationship as determined by Zonneveld, B.J.M. and F.Van Iren. (2001) is recognized. Under Fujita’s 1976 classification both *H. fluctuans* and *H. nigrescens* become part of *H. sieboldiana* var. *glabra*. According to Fujita (1976), natural populations do exist in northern Nagano Prefecture. Fujita’s type specimen and description characterize a type that is different in a number of traits, including leaf shape and anther coloration and the number of principal leaf veins (max. 14 vs. max. 10 for *H. fluctuans*). In this case, *H. sieboldiana* var. *glabra* and *H. fluctuans* are easily differentiated based on gross morphology. Fujita’s very broad approach to classification is noted but not accepted. His placement of this taxon is based on his decision to consider *H. sieboldiana* and *H. montana* to be synonymous. In 1985, the species was reclassified as *H. sieboldiana*
var. fluctuans Maekawa ex Satake, adding still another, albeit horticultural placement. Schmid (1991) retained species rank for this taxon based on the observation of natural populations, which are identical morphologically to Maekawa’s original diagnosis (see photo page 1). The plants observed were not in flower so the diagnosis could not be fully confirmed. However, further field investigation has shown that *H. fluctuans* and *H. fluctuans* f. par var. fluctuans Maekawa ex Satake, adding still another, albeit horticultural placement. Schmid (1991) retained species rank for this taxon based on the observation of natural are
related to *H. montana* but are differentiated by key morphological features. Although considered by some a cultivar (as *H. ‘Fluctuans’* or *H. montana ‘Fluctuans’*), cultivar status is not accepted based on morphometric grounds as well as fertility based on the taxon’s high percentage of stainable pollen (98%). *H. fluctuans* and *H. montana* occur in different geographic areas as morphologically distinct populations. *H. fluctuans* may have speciated in northwestern Tōhoku region (Tōhoku-chihō; 東北地方) after having been geographically isolated for a long time.

**Habitat and Biology:** The habitat of this species covers the prefectures of northern Yamagata and Fukushima, Akita, Miyagi, Iwate, and Aomori, all in the northern region of Honshū, called Tōhoku region (Tōhoku-chihō; 東北地方). Fujita (1976) confirmed the existence of what he classified as *H. sieboldiana* var. *glabra* populations in northern Nagano, Shimane, Toyama, and Niigata prefectures but these populations are not this taxon (See above in History and Nomenclature). These locations are much further south than *H. fluctuans* locations reported by Maekawa (1940). The habitat includes forested mountains and along the western coast where mountains meet the Pacific Ocean. The area has a rainy season beginning in July and many areas in higher elevations are covered with snow from December until April. In open areas, this species competes successfully with tall grasses and subshrubs.
**Plant Morphology:** *H. fluctuans* is rarely represented in gardens. Published dimensions of a cultivated sport of *H. fluctuans*, namely *H. ‘Sagae’*, often exceed those of wild plants. This popular and desirable cultivar receives extraordinary care in gardens and frequently grows much larger than the wild plants and morphological data obtained in gardens is not representative of wild plants. It should be pointed out that the key differences between *H. sieboldiana* var. *glabra* and *H. fluctuans* are the size and shape of the leaf, number of principal veins, and color of the anthers. Maekawa (1940) cultivated several wild-collected specimens in Koishikawa Botanical Garden (小石川植物園) and reported no increase in size under cultivated conditions and his photographs show mature clumps (see Photographs 19 and 20, above). Maekawa’s diagnosis has also been verified in collected specimens and is used in the following (with maxima noted in parenthesis): Plant size 60–70 (100) cm dia., 65 cm high (24–28 (40) by 26 in.). Petiole 25–50 by 1.5 cm (1–20 by 0.65 in. wide), horizontally spreading, forming a dome-shaped plant, pruinose, glaucous sea-green, purple-dotted, dark basal section, lighter above. Leaf 20–30 by 12.5–17.5 cm (8–12 (14) by 5–7 (9) in.), ovate-cordate (f. *parvifolia* rounded to 20 by 20 cm (8 by 8 in.), transition tight and contracted, truncate base, tip suddenly cuspidate, wavy, fluctuating, waves irregular, first pruinose then shiny light green above, glaucous green below, smooth. Venation 9–10, sunken above, projected, smooth below. Scape length to 130 cm (52 in.), farinose, glaucous sea-green, often bending, leaning horizontally to sub-horizontally during anthesis, solid, terete, with several large sterile bracts, withering, but persisting after anthesis. Fertile bracts flat and broad, thick and fleshy, green or whitish green, developing and opening in a stellar form as seen from above. Raceme 25 cm (10 in.), 25–35 flowers, densely clustered. Flowers 5–6 cm long, 3.5 cm broad (2–2.50 by 1.50 in.), whitish, suffused violet to pale purple in bud stage, perianth expanding, funnel-shaped, in the central part dilated bell-shaped, lobes ±angled to the axis of perianth, stamens not superior, equal or slightly shorter than perianth; tepals white with very light pale violet coloration; type A ▲ (Schmid 1991). Anthers purple. July/August. Fertile.

**Karyotype-Chromosomes:** Sporophytic Count = 60; 12 large, 48 small; (2n).

**Genome Size:** DNA content (2C) in pg (one \(10^{-12}\) gram) for *H. fluctuans* = 23.1 (Ratio D1/DAPI n. d.); for *H. fluctuans* ‘Sagae’ = 23.2 ± 1.16 (Zonneveld 2001).

**Pollen:** Pollen type was not determined by M.G. Chung and S.B. Jones, 1989.

**DNA Banding:** Recent RAPD analysis did not include *H. fluctuans*. (Y. Yu, 2002; Sauve, R.J., S. Zhou, Y. Yu, and W.G. Schmid. 2005).
**Taxonomic Type and Synonymy:**

*H. fluctuans* Maekawa.

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Type: In TI; s.n., coll. Sin Narumi, Hirosaki City (Hirosaki-shi; 弘前市) in Aomori Prefecture (Aomori-ken; 青森県). Hab.: in mountain valleys in the vicinity of Iizaka-mura, (Type 2 spec. s.n.) in Iwashiro province (Kikuchi No. 365); and Sendai City (Sendai-shi; 仙台市) in Rikuzen province (Kikuchi s.n.); Yamagata in Uzen Province (H. Iwata 1934; H.K. No. 186).

**Botanical Synonyms:**


*H. fluctuans* f. *parvifolia* Maekawa (Kobano Kuronami Giboshi): *J. of the Faculty of Science*, Imperial University Tokyo, Section 3 Botany, Vol. 5:356 1940.

**Japanese Synonyms:**

クロナミギボウシ = 黒波擬宝珠 = Kuronami Gibōshi (Maekawa 1940)
コパクロナミギボウシ = Kobano Kuronami Gibōshi (Maekawa 1940)
**H. fluctuans in Cultivation:** The species itself is rarely seen in gardens. This is unfortunate, because it is an attractive, large leaf mound with very wavy leaves (see photo in situ, page 1). According the Summers (1972) no authenticated specimens were collected in Japan during the early days of collecting (1966-1972). This may be due to remoteness of the *H. fluctuans* habitat in northern prefectures, where collectors rarely ventured. It is well known and confirmed by the Japanese botanist A. Kikuchi (in Maekawa 1940) that leaves of this species have long been used for Ikebana (活花 = flower arranging) in Hirosaki City (弘前市). This species was popularized by one of its variegated sports, namely 寒河江擬宝珠 (Sagae Gibōshi), which was originally called by the invalid name *H. fluctuans* ‘Variegated’ (the term “Variegated” is invalid). This cultivar is easily the most famous and desired hosta both in Japan and western gardens. This sport was found near the city of Sagae (Sagae-shi; 寒河江市) in Yamagata Prefecture in an area where the species populations occur. Aside from academic specimens, the species has been offered in the trade but their true origin has not been confirmed. Reportedly, some are derived from all-green explants found in tissue-cultured batches of *H. ‘Sagae’,* which should be morphologically close to *H. fluctuans.* Photographs of *H. fluctuans f. parvifolia* in print may not be that taxon.
H. fluctuans
f. parvifolia
(cult. source unknown)
Leaf Length-to-width Ratio 3/1
Maekawa Diagnosis is
L/W Ratio 2/1
© Photo H. Philips

F. Maekawa describes its leaves as being 15 by 15 cm (6 by 6 inches), although larger cultivated specimens have been observed, measuring 20 by 20 cm (8 by 8 in.). A photograph of a purported H. fluctuans f. parvifolia does not show 1-to-1 (length-to-width) leaf proportion as reported by Maekawa (1940) for the species forma. The exact origin of the specimen shown above has not been determined and may yet to be another morph of the forma. In Japan波擬宝珠 (= Ogon Kuronami Gibōshi), an all yellow form that is also known as黄金寒河江 (= Ogon Sagae). Blue forms may be hybridized progeny of the species or H. ‘Sagae’.

Horticultural Progeny: Although H. ‘Sagae’ is involved in a number of named sports and hybrids, the species H. fluctuans is not directly involved in the creation of sports or hybrids (as a pollen parent) and has only one registered progeny listed in the Hosta Registry of The American Hosta Society, Kevin P. Walek, Inter-national Registrar for the Genus Hosta. Called H. ‘Upbeat’, it was registered in 2000 by P. Ruh as a hybrid of a H. fluctuans seedling. It looks much like the species. For culti-vars involving H. ‘Sagae’ refer to the Hosta Registry and Hosta Library.

H. ‘Upbeat’ © C. Brashear/HL
**H. fluctuans** (Cult.) Bud Initial
Coll. Iwate Prefecture (岩手県)
Hosta Hill R.G. © W.G. Schmid 1987.05.23

**H. fluctuans** Maekawa (1940)
Photo 18; Raceme
Koishikawa Botanical Garden

**H. fluctuans**
Maekawa (1940) Photo 18;
Raceme
Koishikawa Botanical Garden

**H. fluctuans** (Cult.)
Initial anthesis
Coll. Iwate Prefecture (岩手県)
Hosta Hill R.G.
© W.G. Schmid 1987.07.20
Toshihiko Satake Japanese Garden
Higashihiroshima-shi (東広島市) • Large Clump of *H. ‘Sagae’* in Background (see ▼)

*H. Sagae* (寒河江) K. Watanabe/AHS 1969 [*H. fluctuans ‘Sagae’*]  
Hosta Hill R.G. • © W.G. Schmid 1987.07.16
H. fluctuans
(H. sieboldiana var. fluctuans)
Flower bud with spreading fertile bracts

Court. © 宮城教育大学
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鵜川研究室
Miyagi University of Education
Environmental sciences

▼▼▼ H. fluctuans
(source unknown)
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References
Maekawa, F., 1940. J. of the Faculty of Science, Sect. 3 Botany, Vol. 5:355–356, ic. 17, 18, 19, 20

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