

Part 5A

The Genus *Hosta*

Systematic Summary for Genus and Subgenera

By W. George Schmid ©2006 for the Hosta Library

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Introduction

Part 2 contains a taxonomic treatment of the genus *Hosta* from a historical standpoint. In Part 5A, I deal with the taxonomic, systematic, morphological (including palynological) facts to provide a complete summary for the genus *Hosta* as well as the accepted subgenera. It also contains habitat maps. This is for scientific readers. Those who have had no instructions in botany/taxonomy may find the habitat maps helpful in determining where the species grow. This part also deals with all alternative phyletic classification systems proposed.

PHYLETIC/SYSTEMATIC PLACEMENT

SPERMATOPHYTA (seed plants)

ANGIOSPERMAE (sex organs within the flower and seeds in a fruit)

MONOCOTYLEDONEAE (Monocots = flowering plants with a single seed leaf)

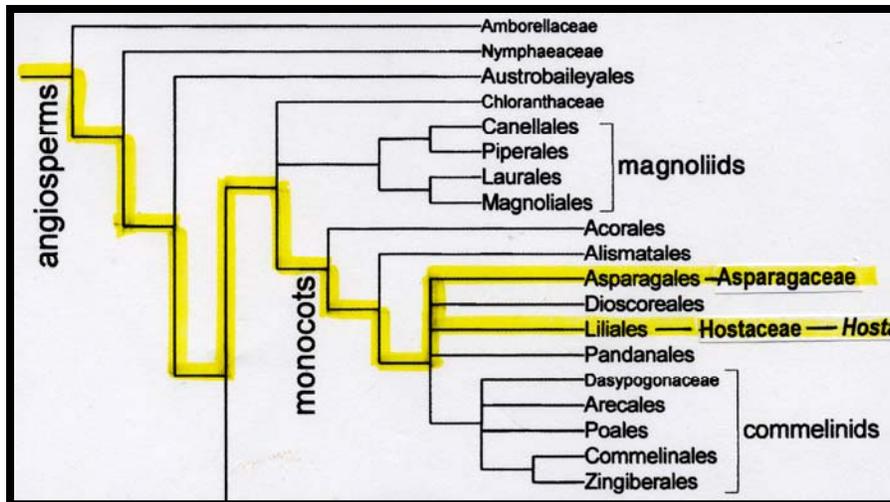
= Cronquist LILIOPSIDA ► LILIIDAE ► LILIACEAE ► *Hosta* [in Cronquist, A., 1981. *An Integrated System of Classification of Flowering Plants.*]

= Takhtajan LILIOPSIDA ► LILIIDAE ► LILIANAE ► AMARYLLIDALES ► HOSTACEAE ► *Hosta* [in Takhtajan., A., 1997. *Diversity and Classification of Flowering Plants*]

= Thorne LILIOPSIDA ► LILIIDAE ► LILIANAE ► LILIACEAE ► *Hosta* [in Thorne., A.F., 1992. *Classification and Geography of Flowering Plants*]

= APG II NOT-COMMELINOIDS ► ASPARAGALES ► AGAVACEAE
= (optional synonym) of ASPARAGACEAE in Asparagales [in APG II. 2003. *An update of the Angiosperm Phylogeny Group classification*]

(See the Phenogram on Page 2 showing possible paths for *Hosta* Phylogeny)



APG II Phenogram (Yellow Path by the Author) of 1) Path to *Hosta* from Asparagales to Agavaceae [alternate Asparagaceae] and 2) Possible Alternate Path under Liliales to Hostaceae to *Hosta* (preferred by the Author)

Family HOSTACEAE, Mathew (Here accepted)

[in *Kew Bulletin*, 43, 2:302 1988]

Synonyms:

FUNKIACEAE: Dahlgren, et al., *The Families of Monocotyledons*, 1985 (*nom. illegitimum*).

LILIACEAE: As listed under MONOCOTYLEDONEAE above

HOSTEAE: Traub ex Hylander: *Acta Horti Bergiani*, Vol. 16, 11:339 1954 (with respect only to the *nom. tribus* in Liliaceae)

Genus HOSTA, Trattinnick.

Archiv der Gewaechskunde, 1/2:55 1812 (*nom. conservandum*).

Type: *H. plantaginea* (Lamarck) Ascherson (as *H. japonica*).

Synonyms:

SAUSSUREA

[in Salisbury: *Transactions of the Linnean Society*, London, 8:11 1807]

FUNKIA

[in Sprengel: *Anleitung zur Kenntniss der Gewaechse*, 2. Ausgabe, II, I:246 1817; Miquel: *Verslag Mededelingen Akademie Wetenschappen, Amsterdam*, Vol. 2, 3:295–305 1869; Baker: *J. of the Linnean Society*, London, 11:366–368 1870; Regel: *Gartenflora*, 25:161–163 1876.]

FUNCKEA

[in Kuntze: *Revisio Generum Plantarum*, 2:711 1891]

BRYOCLES

[in Salisbury: *Transactions of the Horticultural Society*, London, I:335 1812 (with respect only to *H. ventricosa*).

NIOBE

[in Salisbury: *Transactions of the Horticultural Society*, London, I:335 1812 (with respect only to *H. plantaginea*).

MORPHOLOGY, INCLUDING PALYNOLOGY

PERENNIAL. ROOTS rhizomes short, non-fusiform, long fibrous thick roots covered with hairs, white, some elongated, rhizomatous, spreading; some with fibrous remains of leaf sheath; multi-crowned. **PETIOLE** canaliculate, broadly expanded top, margins smooth, very short to very long. **LEAVES** radical, spirally arranged, petiolate, unsheathed, linear-lanceolate to cordate to orbicular; flat to wavy, or rugose; some cupped; with parallel campylodrome venation; margins smooth never serrate (with rare atypical exceptions); dark green or dark-bluish green to light yellow green, some pruinose; annual. **SCAPE** straight erect or obliquely arching; racemes simple, terminal, occasionally branched, overtopping the leaves, some much shorter, bracteate; some with bracteate leaves. **FLOWERS** horizontal or pendulous, bracteate, pedicellate, campanulate, perianth formed by 6 tepals in 2 series combining calyx and corolla, gamopetalate, in the lower part tubular, expanding lobes, fleshy, imbricate in bud, white to deep bluish-purple. **STAMENS** free (with rare atypical exceptions), 6 in two series; filaments filiform, white, smooth, elongated, thickened at the tip, superior, curving ascending to tip. **ANTHERS** small, versatile, oblong, 2-locular, parallel, introversely dehiscent, yellow or purple, several distinct color hues and patterns. **POLLEN** globose, ovoid, principally oblate-spheroidal, oblate and suboblate, yellow. **PISTIL** superior, overtopped by stamens, style smooth, filiform, elongated. **STIGMA** capitate, 3-lobed. **OVARY** superior, 3-locular. **CAPSULES** round or triangular, sub-horizontally inclined or pendulous, loculicidal, 3-valved. **SEEDS** many, broad wings, testa shiny black, embryo linear to ovoid-oblong.

KARYOTYPE—CHROMOSOMES: Normal 60; 12 large, 48 small, (2n), rarely triploid (2n = 90) or tetraploid (2n = 120).



Where Systematic Botany Began • Carl von Linné Garden
Svarthäcksgatan 27, Uppsala, Sweden

PALYNOLOGICAL CHARACTERISTICS

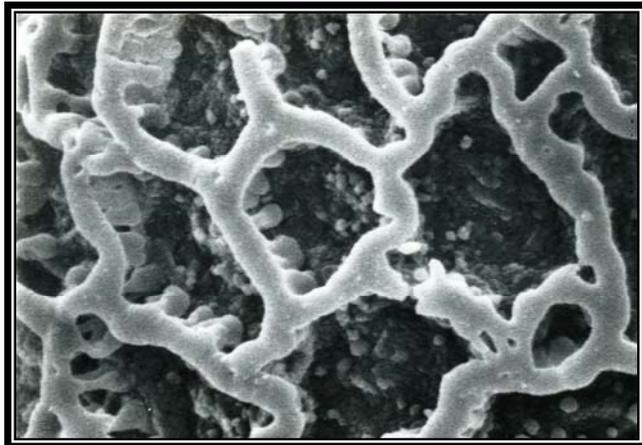
(As typified by Chung and Jones, 1989; pollen shape after Erdtman, 1966): At least 5 distinct pollen grain types with sizes given in $\mu\text{m} \pm 2\text{--}10\%$ polar axis (P) \times equatorial axis (E):

Type R (reticulate) as found in *H. plantaginea*; shape oblate-spheroidal; size P 100–120 \times E 90–110. This taxon has the largest pollen grains in the genus.

Type RL (reticulate-like) as found in cultivars with *H. plantaginea* parentage (*H.* ‘Honeybells’; *H.* ‘Royal Standard’); shape suboblate; size P 70–72 \times E 54–56.

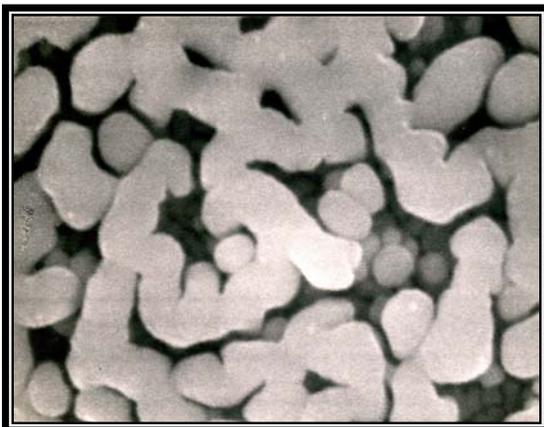


H. plantaginea
Type R (reticulate) Polar View
SEM \times 350 (UGA)

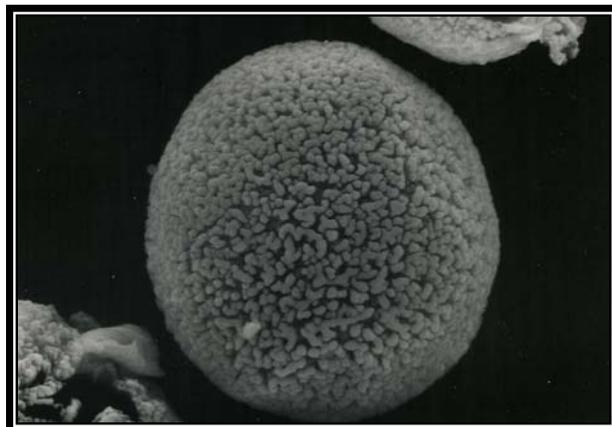


H. plantaginea
Type R (reticulate) Grain Surface Detail
SEM \times 2000 (UGA)

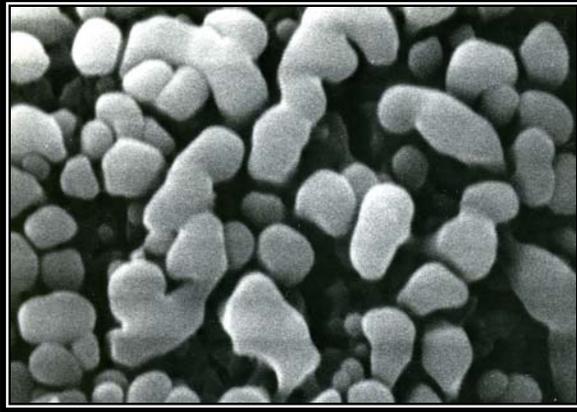
Type RU (rugulate) as found in *H. ventricosa*; shape oblate-spheroidal; size P 79–90 \times E 72–83.



H. plantaginea
Type RU (rugulate) Grain Surface Det.
SEM \times 4000 (UGA)



H. plantaginea
Type RU (rugulate) Polar View
SEM \times 650 UGA

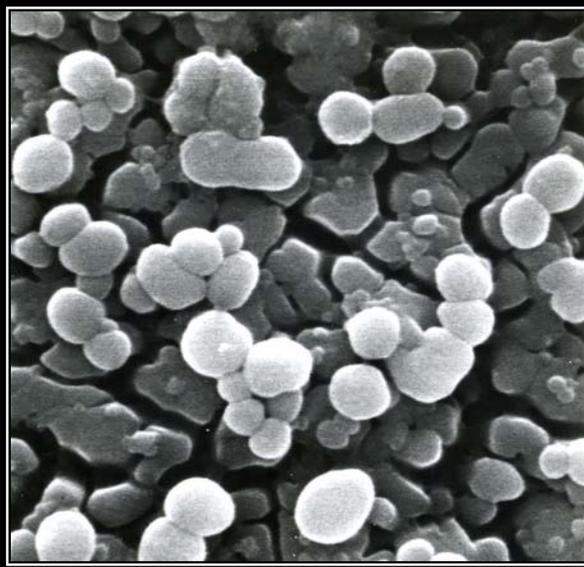


Type RB (rugulate-baculate) as found in *H. clausa*; shape suboblate; size P 79 × E 68 (Fig A-5).



H. clausa

Type RB (rugulate-baculate)
Grain Surface Detail
SEM × 4000 (UGA)



Type RG (rugulate-granulate) as found in species belonging to subgenus *Bryocles* or subgenus *Giboshi*;



H. tsushimensis

Type RB (rugulate-granulate)
Grain Surface Detail
SEM × 4000 (UGA)

Type RG Sub-Types: In this type, several subtypes with shape oblate-spheroidal (OS) and suboblate (SO) as follows:

1. Subtype RG(I): *H. minor*; SO; size P 73 × E 63.
2. Subtype RG(II-A): *H. capitata*; OS; size P 88 × E 81; *H. tardiva*; OS; size P 75 × E 67; *H. tsushimensis*; OS; size P 69 × E 65 (Fig. A-6); *H. pulchella*; OS; size P 78 × E 68;
3. Subtype RG(II-B): *H. sieboldii*; SO; size P 77 × E 65; *H. 'Crispula'*; OS; size P 73 × E 67.
4. Subtype RG(II-C): *H. 'Decorata'*; OS; size P 72 × E 64.
5. Subtype RG(III): *H. sieboldiana*; SO and OS; size P 74-96 × E 63-90; *H. 'Elata'*; SO; size P 74 × E 64.
6. Subtype RG(IV): *H. rectifolia*; OS; size P 80 × E 76.
7. Subtype RG(V): *H. longipes*; OS; size P 86-91 × E 83-86; *H. 'Tardiflora'*; OS; size P 83 × E 80.
8. Subtype RG(VI): *H. 'Undulata'*; SO; size P 56 × E 46 (Fig. A-7).
9. Subtype RG(VII): *H. longissima*; OS; size P 74-96 × E 66-86.
10. Subtype RG(VIII): *H. kiyosumiensis*; OS; size P 71-74 × E 65-67.

SUBGENERA

***Hosta*—Subgenus-*Hosta* (Salisbury) Maekawa.**

***Botanical Magazine*, Tokyo, 52:40–44 1938.**

(In accordance with the rules of the ICBN, the subgenus containing the generic type species must adopt the generic name, i.e., *Hosta*. In this listing the long used historical name *Niobe* has been maintained, but *Hosta* is also cited to draw attention to this ruling = Subgenus *Hosta* (= Subgenus-*Niobe*/ICBN)).

Type: *H. plantaginea*.

Synonyms:

Niobe Salisbury: *Transactions of the Horticultural Society*, London, 1:335 1812.
Funkia, section *Niobe*: Baker: *J. of the Linnean Society*, London, Bot. 11:367 1870.

Hosta, section *Niobe*: Engler and Prantl, *Die Natuerlichen Pflanzenfamilien*, 2/5:39 1888; Bailey, *Gentes Herbarum*, Vol. 2, Fasc. 3:125 1930.

Hosta, subgenus-*Niobe*: Maekawa

Hosta, subgenus-*Hosta*: Fujita: *Acta Phytotaxonomica et Geobotanica*, Vol. 27, 3/4:74 1976; Hensen (1985): *The Plantsman*, Vol. 7, p. 7 1985.

***Hosta*—Subgenus-*Bryocles* (Salisbury) Maekawa em. and in the sense of Bailey and Grey.**

***J. of the Faculty of Science*, Imperial University, Tokyo, Section 3 Botany, Vol. 5:349 1940.**

Type: *H. ventricosa*.

Synonyms:

Bryocles Salisbury: *Transactions of the Horticultural Society*, London, 1:335 1812.

Funkia, section *Bryocles*: Baker, *J. of the Linnean Society*, London, 11:367 1870. *Funkia* *B. bracteae solitariae*: Regel: *Gartenflora*, 25:161 1876 (under *Funkia subcordata*);

Hosta, section *Bryocles*: Engler and Prantl, *Die Natuerlichen Pflanzenfamilien*, 2/5:40 1888; Ascherson and Graebner, *Synopsis der Mitteleuropaeischen Flora*, 3:54 1905; Bailey, *Gentes Herbarum*, Vol. 2, Fasc. 3:126 1930.

Hosta, section *Bryocles*, subsection *Eubryocles*: Maekawa, *J. Japanese Botany*, 13:892 1937.

Hosta, subgenus-*Giboshi*, section *Bryocles*, subsection *Eubryocles*: Maekawa, *Botanical Magazine*, Tokyo, 52:41,43 1938.

Hosta, subgenus-*Bryocles*, sections *Eubryocles*, *Lamellatae*, and *Stoloniferae* (but excluding sections *Helipteroides*, *Picnolepis*, *Rhynchophorae*, and *Tardanthae*): Maekawa, *J. of the Faculty of Science*, Imperial University Tokyo, Section 3 Botany, Vol. 5:349–351 1940.

***Hosta*—Subgenus-*Giboshi* Maekawa in the sense of Bailey and Grey.
Botanical Magazine, Tokyo, 52:40–43 1938 (in annotation).**

Type: *H. montana*.

Synonyms:

***Hosta*, section *Alcyone*: Bailey, *Gentes Herbarum*, Vol. 2, Fasc. 3:117–142 1930; Grey, *Hardy Bulbs*, 3, 292–293 1938.**

***Hosta*, subgenus-*Bryocles*, sections *Helipteroides*, *Picnolepis*, *Rhynchophorae*, and *Tardanthae* (and excluding sections *Eubryocles*, *Stoloniferae*, and *Lamellatae*):
Maekawa, *J. of the Faculty of Science*, Imperial University Tokyo, Section 3 Botany,
Vol. 5:349–351 1940.**

***Hosta*, subgenus-*Giboshi*: Hylander, *Acta Horti Bergiani*, Band 16, 11:339–340 1954
(in annotation).**



**Author at the Entrance to Carl von Linné Garden (1984)
Svarbäcksgatan 27, Uppsala, Sweden,**

Genus *Hosta* Species

Subgenus *Hosta*.

- H. plantaginea* (type).
- H. plantaginea* var. *japonica*.

Subgenus-*Bryocles*.

Section *Eubryocles*.

- H. ventricosa* (type).

Section *Lamellatae*.

- H. venusta* (type).
- H. minor*.
- H. capitata*.
- H. nakaiana*.

Section *Arachnanthae*.

- H. yingeri* (type).
- H. laevigata*.

Section *Stoloniferae*.

- H. clausa* var. *clausa* (type).
- H. clausa* var. *normalis*.
- H. clausa* var. *ensata*.
- H. clausa* var. *stolonifera*.

Subgenus-*Giboshi*.

Section *Helipteroides*.

- H. montana* (type).
- H. montana* f. *macrophylla*.
- H. montana* f. *ovatolancifolia*.
- H. sieboldiana* var. *sieboldiana*.
- H. sieboldiana* var. *glabra*.
- H. nigrescens*.
- H. fluctuans*.
- H. crassifolia*.

Section *Intermediae*.

- H. densa* (type).
- H. kiyosumiensis*.
- H. pachyscapa*.

Section *Rynchophorae*.

- H. kikutii* var. *kikutii* (type).

- H. kikutii* var. *kikutii* f. *leuconota*.
- H. kikutii* var. *caput-avis*.
- H. kikutii* var. *polyneuron*.
- H. kikutii* var. *tosana*.
- H. kikutii* var. *yakusimensis*
- H. shikokiana*.

Section *Picnolepis*.

- H. longipes* var. *longipes* (type).
- H. longipes* f. *hypoglauca*.
- H. longipes* f. *sparsa*.
- H. longipes* f. *viridipes*.
- H. longipes* var. *caduca*.
- H. longipes* var. *latifolia*.
- H. longipes* var. *vulgata*.
- H. aequinoctiantha*.
- H. hypoleuca*.
- H. okamotoi*.
- H. pulchella*.
- H. pycnophylla*.
- H. rupifraga*.
- H. takiensis*.

Section *Tardanthae*.

- H. tardiva* (type).
- H. cathayana*.
- H. gracillima*.
- H. jonesii*.
- H. takahashii*.
- H. tibae*.
- H. tsushimensis*.

Section *Nipponosta*.

- H. sieboldii* (type).
- H. sieboldii* f. *angustifolia*.
- H. sieboldii* f. *campanulata*.
- H. sieboldii* f. *okamii*.
- H. sieboldii* f. *spathulata*.
- H. atropurpurea*.
- H. calliantha*.
- H. clavata*.
- H. ibukiensis*.
- H. rohdeifolia* f. *viridis*
- H. longissima* var. *longissima*.
- H. longissima* var. *longifolia*.
- H. rectifolia* var. *rectifolia*.
- H. rectifolia* var. *rectifolia* f. *pruinosa*.
- H. rectifolia* var. *australis*.
- H. rectifolia* var. *sachalinensis*.
- H. alismifolia*.

How Many Species?

Does it matter? On page 8 of this section is a list of species that includes every species covered in my book *The Genus Hosta — Giboshi Zoku*, which was published in 1991. Obviously, taxonomy marches on and while my book saw 5 printings, I never published a 2nd Edition. For this reason I felt I should revisit the classification as it appears in my book and discuss the proposed changes that have been published during the last 15 years beginning with my 1991 classification as a basis. I would like to point out that the American Hosta Society still uses my 1991 classification, because it has served *Hosta* horticulture well. Obviously, taxonomists pay little attention to practical subjects like horticulture.

As botanical science marches on, it pays very little attention to the practicality of horticultural nomenclature. During the last quarter century, gardeners and horticulturists have seen the onslaught of cladistics and the Phylocode. I am a member of the International Society of Plant Taxonomy and find more and more research and information dealing with phylogeny and evolution on the pages of *Taxon*, its journal. How this will play out, no one knows, even the scientists, who do earnest research and make these proposals. Nevertheless, I wonder where this ever increasing rift between phylogeny and the classic Linnean system will lead. On one side we have serious proposals that would do away with all ranks (Genus, Family, Class, Order, etc.). The proponents of this argue that ranks for groups above species are too subjective to present any meaningful information, and so should be abandoned. Thus, they have moved away from Linnaean taxonomy towards a simple hierarchy of clades. All of this is too involved to be defined here, but suffice to state that without Linnean taxonomy there will be not horticultural nomenclature. Let me point to Dr. Brummitt's quote on page 6 (bottom) of Part 1 and let it stand as quoted. I doubt that the world of horticulture will be able to abandon Linnean nomenclature that has served well for 250 years.

As to the nomenclature change proposals made during the last 15 years, I will deal with each as the individual species are presented and what their impact might be. I would like to say, however, that some changes do seem somewhat hasty and based on fractional evidence, to wit this example: Fujita (1976) and Maekawa (1984) established the species *H. alismifolia*, which has natural populations in Aichi-ken. This species is a sterile triploid but spreads aggressively by spreading rhizomes and has maintained its populations unabated for years. To simply call it a "hybrid" and reduce it to cultivar status does not reflect the actual existence of such populations. This species may not fit into a fixed definition as other species do, but we should consider their merit and find a scientific place for them. The genus *Hosta* has a number of species, which may be interspecific hybrids and they may even have low fertility. That alone should not reduce their standing in science. For this reason, I will look at each species from its taxonomic standing in 1991 and introduce all of the new research and evaluate it. To me, it is important that all scientific data be considered and applied to a taxon (species) of scientific standing.