Part 4C

Hosta Species: Petioles and Leaves

Morphology

By W. George Schmid ®2006 for the Hosta Library

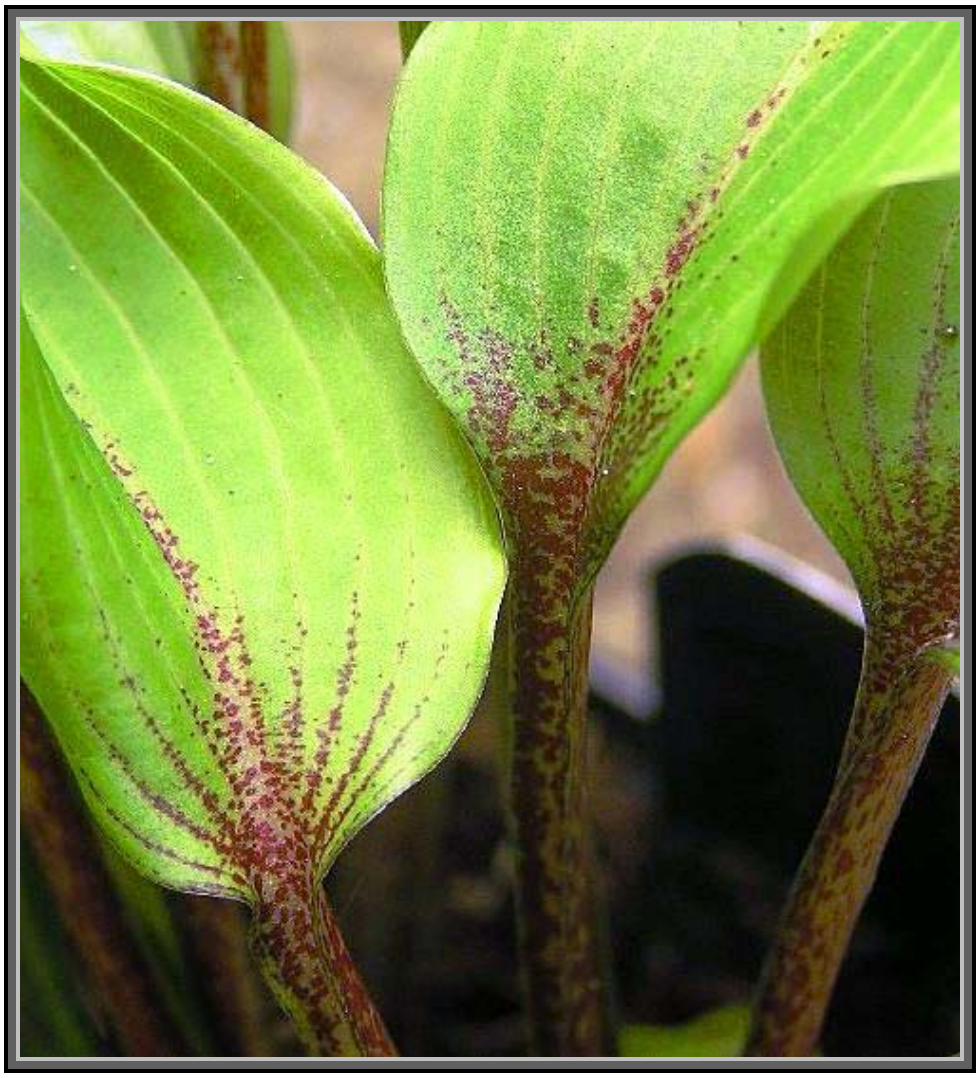
The leaf-carrying petiole in *Hosta* species is highly variable as seen in other macromorphological features. Some species have a distinct petiole with a highly visible petiole-leaf transition as shown in the illustration *Petiole-Leaf Transitions* shown on Page 3 under Leaf Shapes. Some species, such as *H. longissima* var. *longifolia* lack a visible transition and have a linear character, where the petiole becomes part of the leaf without transition with the leaf appearing to emanate directly from the rhizome. Theoretically, this may be called attenuate but some leaves are strap-shaped with only minor narrowing towards the plant base.

H. longissima* var. *longifolia
Variegated Form (*H.* 'Ki Fukurin Mizu')
Showing near linear leaf shapes ● Hosta Hill
June 2006 (W. G. Schmid Photo)

Most species have a petiole color similar to that of the leaf, principally green. The green is sometimes overlaid with a glaucous layer giving the green base color a white surface effect. This occurs with *H. hypoleuca*, *H. pycnophylla* and several *H.*

longipes **variants. The "color" appears near white, but is actually a coating of a very opaque, fine, white or whitish powder.**

Red Petioles: **Recently hybridizing programs have concentrated on bringing out the pink, red and maroon color seen at the petiole base, sometimes extending the full length of the petioles and scapes and coloring the veins at the leaf bases. The coloration is natural and exists in a number of species. It can be intensified by clever hybridizing. While this coloration is a permanent feature, it appears to be darker during the early spring season and will fade slightly later in the year. In 2006 "Red is In" among hosta enthusiasts and a number of hybridizers are working to make this the next attractive line of red-spotted hybrids having its origin in a number of species like some populations of *H. longipes* and related taxa.**



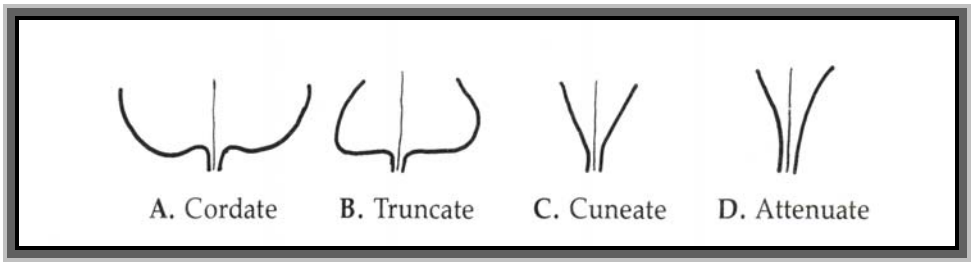
H. **'Katsuragawa Beni'**
(Photo ©J. Linneman ● Hostavalley.com)

***Petiole Attitude*: Some species have very erect, upright petioles. The include *H. nigrescens* and *H. rectifolia.* Of these, most have vase-shaped, upright petiole bundles with the leaves either in line with the petioles or angled away from them. These plants retain an erect, vase-shaped posture even as mature plants after their petioles have elongated considerably and so are classified as erect types as seen in that cultivar *H.* `Krossa Regal'. This group also contains a number of plants bearing long, upright leaves with short petioles like the members of the *H. sieboldii* group. Some species, like *H. kikutii*, have spreading petioles, resulting in a flat mound.**

Leaf Shape, Surface, Color/Margin Characteristics

Three main components make up the outline shape of a leaf: The basic shape together with the shape of the leaf tip and the shape of the leaf base. It is the combination of these three attributes that makes up the actual leaf shape. For the purpose of classification these three main leaf shape components have been recognized by botanists. These data have been systematized by the Systematics Association (1962), Committee for Descriptive Biology. Mathematical ratios of length to breadth used as guide lines in these descriptions are standardized ratios as published by W. B. Turrill (1925; cfr. Stearn, 1986). I have correlated Turrill's mathematical organization of leaf shapes but I am not listing the numbers quoted in the Systematics Association (1962), Descriptive Terminology, Chart 1a. The following illustrations are drawn by W. George Schmid and taken from *The Genus* Hosta – *Giboshi Zoku*; Timber Press; 1991).

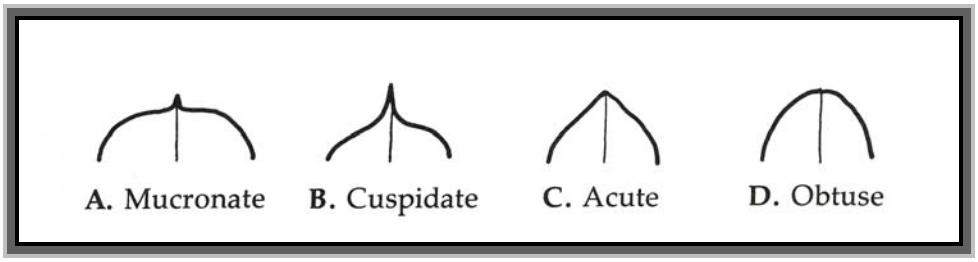
The shape of the leaf base showing petiole to leaf transition



***Leaf bases:* The shape of the leaf base also indicates the petiole leaf-transition, which aids in the descriptions. The following are seen in *Hosta* leaves:**

Cordate, heart-shaped (*cordatus*), having two equal, rounded lobes
Truncate (*truncatus*), as if cut straight across
Cuneate, wedge-shaped (*cuneatus*), with straight sides converging
Attenuate (*angusatus*), with curved sides converging

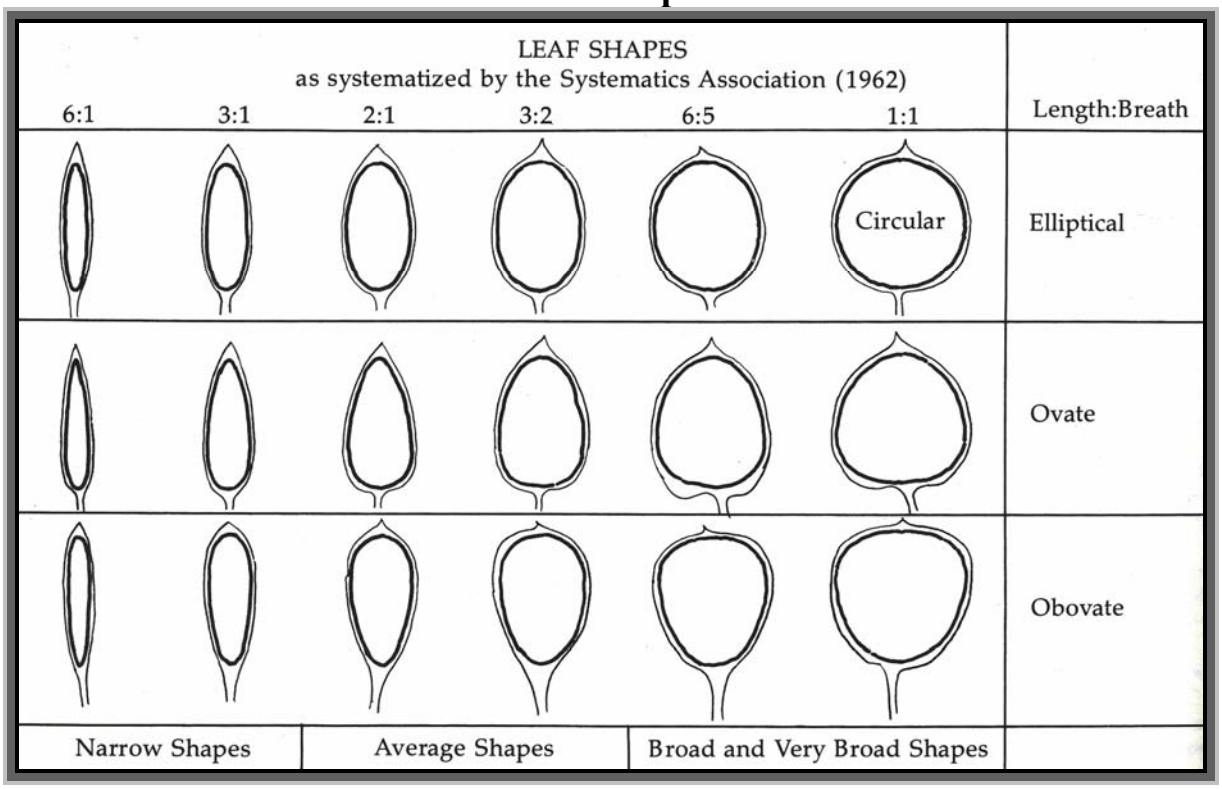
The shape of the leaf tip (apex)



***Leaf Tips (Apices)*: The manner in which the leaf tip (apex) is formed is of considerable importance in the identification of leaves. Several very distinct tip shapes are recognized:**

Mucronate (*mucronatus*), abruptly terminated by a sharp point
Cuspidate (*cuspidatus*), tapering gradually to a sharp point
Acute (*acutus*), coming straight to a point
Obtuse, blunt-pointed (*obtusus*), terminated by a rounded end

Basic leaf shapes



***Definitions of Leaf Shapes*: The combination of these three attributes illustrated above make up the actual leaf shape: Leaf shapes, tip shapes (apices), and base shapes recognized by botanists. Not all leaves will fit this schematic. *H. longissima* var.**

***longifolia*, for example has slender leaves that exceed a ratio of 6:1, being as much as 10:1, as illustrated here.**

H. longissima* var. *longifolia
◄ (M. Pratt Photo)

Showing a leaf shape ratio that far exceeds 6:1. Note each leaf is somewhat different in shape

Leaf Surface (Topography)

***General*. The leaf itself can take on several distinct surface forms: Flat and even, cupped, wavy, twisted, contorted or distinctly ribbed. The surface shape of the leaf in combination with margin characteristics make for compound shapes which are, again, extremely difficult to describe so illustrations are provided. Fortunately, a majority of leaf surface and margin features belong to well recognized types. A few quite unusual ones are provided with additional comment in their descriptions. The leaf surface features are determined by a combination of several factors: 1) Markings or evenness, 2) superficial processes, and 3) polish or texture.**

***Leaf Markings or evenness*. These are most difficult to qualify and quantify. Usually not all leaves of a given plant show the same amount and density of markings or evenness. When combined with general leaf and margin forms, such as cupping, waviness, undulations, curling and uneven twisting and contorting, characterization of the leaf becomes very complicated.**

***Leaf Surfaces:* Botanists have specific terms which can be applied, such as rugose (*rugosus*) and furrowed (*sulcatus*). Horticulturists and gardeners use terms such as dimpled, puckered, pursed, ruffled, pleated, embossed, wrinkled, crinkled, and, of course, smooth. All of these characterizations are attempts to describe surfaces which are very difficult to describe in words alone. To simplify matters, many of these terms have been combined into the most frequently seen types and illustrations are provided to typify these characters in the individual species descriptions.**

***H.* 'Big Daddy' (Aden)**
Showing Rugose/Dimpled Leaf Surface
W. G. Schmid Photo ● Hosta Hill May 1988

H. montana f. macrophylla Schmid 1991
Showing a Furrowed Leaf Surface
W. G. Schmid Photo ● Hosta Hill; June 1988

***Rugose, wrinkled* (*rugosus*). Any leaf surface with uneven surface features. This includes dimpled, puckered, pursed, embossed, ruffled, pleated, wrinkled and crinkled leaf surfaces. Examples include *H. sieboldiana* and its hybrids.**

***Furrowed* (*fulcatus*). Most cultivars have principal veins impressed on the leaf surface. Nonetheless, the leaf is quite flat and can be considered smooth in broad terms. In some, the principal veins are very deeply impressed with the intervening leaf surface arching highly and forming rather deep V-shaped channels or furrows. The depth of these furrows can reach 1/8 in. (4 mm) or more. In these cases the leaf surface called furrowed, as in *H. montana* f. *macrophylla* shown to the ◄ left.**

Even, smooth **(*aequatus*). Although having slightly impressed principal veins, most hosta leaves have a relatively even, smooth surface. For this reason any species not definitely rugose or furrowed has be classified as having a "flat," smooth, even surface with no rugosity but not "flat as a board."**

***Leaf Hair Coverings and Superficial processes*.** **Hair coverings are not found in leaves of *Hosta* species. Superficial processes include mealy (*farinosus*) coatings. But since mealy is also treated as polish or texture, it has been combined with this category and is included under Surface Coatings.**

***Leaf Polish and Texture*.** **Disappearing or permanent polish and texture features, such as powdery white or grey coatings (*dealbatus, pulverentus*), glaucous blooms (*glaucus*, *glaucescens*, *caesius*) and others are treated as color phenomena falling into the blue/grey category and are included under Surface Coatings, below. The leaf polish of most cultivars is smooth (*laevis*, *glaber*), with some leaves having either a shiny (*nitidus*) or dull (*opacus*, *impolitus*) surface. In rare cases a very smooth, polished (*laevigatus*, *politus*) surface exists. The following descriptions are applied to leaf polish and texture are:**

Shining (*nitidus*). Having a smooth even, very shiny surface, as in *H. tardiflora* and *H. longipes*.
Smooth, glabrous (*glaber*). Being free of unevenness, as in *H. lancifolia*.
Polished (*politus*, *laevigatus*). Having the appearance of a polished substance, as in *H. laevigata* or *H. yingeri*.
Opaque (*opacus*, *impolitus*). Dull, the reverse of shining.

***H. yingeri* S.B.Jones 1989**
Showing a Polished Leaf Surface
W. G. Schmid Photo ● Hosta Hill; June 1989

The polish of the leaf surface changes with the season in most taxa of the genus so it is difficult to characterize it. In late spring, after the disappearance of surface effects, such as pruinosity, most leaves have a more or less shiny surface. Some have a polished surface lasting all season, as for example *H. yingeri* and *H. laevigata* and when this is the case it is mentioned in the species descriptions. In most cases, however, no mention is made of the leaf polish because it is considered changeable during the prime season of observation and more or less shiny during summer and fall.

***Leaf Color and Surface Coatings*: The color in "blue" leaves is a bluish or greyish green, which is enhanced by an epidermal, opaque, waxy coating. Technically, this color is a sea-green (*glaucus*, *thalassicus*, *glaucescens*), defined as a dull green passing into greyish blue. It is commonly accompanied by surface features listed below. It is these surface coatings which contribute to the manifestation of what is referred to as a "blue" color, but is not really blue but blue-green. It should be mentioned that some species have coatings on the top and bottom surface, while others have it either top or bottom. In some cases, the top may have a less pronounced coating than the bottom. Either way, this is noted in the species descriptions.**

***Green.* The base color of all species is green. Notwithstanding, it can be a complex green. The complexity of classifying the green colors are many surface effects characterized by terms such as frosted, shiny, glossy, dull, opaque and metallic. Some of these surface effects change with the seasons and affect the hue and shading of the green coloration. Frequently a green color is composed of two or three shades of different greens which are obvious at close range but may blend into a monochrome appearance at a distance. This must be assessed during the prime growing season.**

Grass-green (*smaragdinus*, *prasinus*).
Clear green (*viridis*, *viridescens*).
Verdigris-green (*aeruginosus*), deep green with a mixture of blue.
Sea-green (*glaucus*, *thalassicus*, *glaucescens*), a dull green passing into greyish blue.
Deep green (*atrovirens*), a green verging on black.
Yellowish green (*flavovirens*).
Olive-green (*olivaceus*).

***Surface Effects:* Adding to the complexity of classifying green colors are many surface effects characterized as frosted, shiny, glossy, dull, opaque and metallic. Some surface effects change with the seasons and affect the hue and shading of the green coloration. Frequently, a green color is composed of two or three shades of different greens which are obvious at close range but may blend into a monochrome appearance at a distance.**

Pruinose, frosted (*pruinosus*) a frosted, dewy appearance, as with *H. pycnophylla*.
Powdery (*pulverentus*) covered with a fine bloom.
Glaucous (*glaucus*) a fine bloom the color of cabbage, as with *H. sieboldiana*.
Caesious (*caesius*) like glaucous, but greener, as with *H. nigrescens*.
Whitened (*dealbatus*) powdered with very opaque white, as with *H. hypoleuca* and *H. pycnophylla* (see photo on Page 9 below ▼)

H. pycnophylla **F. Maekawa 1976**
Showing Whitened Underside
W. G. Schmid Photo ● Hosta Hill July 1986

Leaf Texture and Substance:

Identification is quite often visual only. In this case, texture means visible texture, as in Texture and Polish, above. Botanists recognize a *tactile texture* which is more akin to substance and can be determined only by touch. Claims are made that thick leaves (= of heavy substance) can actually be "seen," but this has no basis in fact. Since heavy texture or substance is approximately equal to thickness, it can be measured for scientific applications with a micrometer, but this is beyond the needs of the average gardener. Aside from thickness, other factors, such as stiffness and succulence, enter into the determination of texture and substance, another matter too complicated to be defined in great detail.

Papery (*papyraceus*, *chartaceus*). Having the substance of writing paper in combination with being opaque.
Coriaceous, leathery (*coriaceus*). Having the consistency of leather, as with *H. rupifraga*.
Carnose, carnous, fleshy (*carnosus*). Firm, juicy. (Rarely in hostas)
Thick (*crassus*). Thicker than usual, thick, as with *H. crassifolia*.
Succulent (*succulentus*). Very thickly cellular and juicy. (Rarely in hostas)
Herbaceous (*herbaceus*). Thin, green and cellular, as the tissue of membranous leaves.

Leaf Venation; number of vein pairs and prominence

Variability in Veining Count. **All species show some variability in the number of veins and so the count given in the descriptions is the average, maximum number of principal veins normally seen. Occasionally, this number may be exceeded by one or two, and, while the younger summer leaves may produce fewer. It is best to make a count on one half of a leaf to arrive at a number of vein pairs and make the count on several, mature, vernal leaves and then take the average count of vein pairs.**

Abbreviated Veins. **One significant point must be made: The outermost vein or veins are often abbreviated and do not extend to the leaf tip usually terminating at the leaf**

margin between a third and half way up from the petiole intersection. Although these veins end at the margin and are thus incomplete they must be counted. In some cases they are hard to detect on the upper side of the leaf so it is helpful to search for them on the underside, where they are typically more prominent. In the taxa belonging to section *Helipteroides* (*H. sieboldiana*) these outer veins are usually submarginally connected (*conjoined*) and appear to merge with the next vein, but close examination shows they actually terminate and are merely cross-connected.

Conjoined Leaf Veining
(W.G.Schmid Photo ● Hosta Hill 1988)

Abbreviated Leaf Veining
(W.G.Schmid Photo ● Hosta Hill 1988)