

Peony Flower Anatomy

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Synopsis of Part I

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Although cultivated peonies are descended from natural species having as few as five petals, the preservation of natural mutations in cultivated peonies has resulted in forms having hundreds of petals per flower. The variations commonly seen in peony flowers' anatomy have led to the standard American Peony Society flower form classifications. A vocabulary of terms has arisen for purposes of name registration description, the identification of individual cultivars and in evaluation and selection both for commerce and end users. Terminology related to the Singles form was defined and illustrated. Although similar variations of flower form will be seen in some tree peonies, this series is specifically applicable to herbaceous peonies.

PART II

FLOWER FORM CLASSIFICATIONS

In addition to the Single flower form already treated, the American Peony Society flower forms classifications currently in use for herbaceous peonies are Japanese, Anemone, Bomb, Semi-double and Double. These APS classifications result from the outward expression of different underlying genetic factors.

Because variations in petal expression among the standard flower classifications are the result of heritable changes, these variations have constancy, repeating in all plants of a particular cultivar. Nevertheless, different seasonal growing conditions and

site limitations can and do lead to additional variation in the outward expression of the underlying genetics. When variations due to heritable and environmental influences are understood, they empower useful description and identification. We make use of this understanding to describe a cultivar flower form such that it can be identified in general and often can be reliably separated from other similar cultivars.

This installment will deal with the transformation of the normal pollen-bearing stamens into petals or petal-like structures. Two distinctly different patterns of stamen transformation are seen in the flowers of cultivated peonies. For purposes of this discussion we will use the terms “all-over stamen transformation” and “progressive stamen transformation”.

All-over transformation leads to obvious contrasts in the flower. The contrasts are in form and color expressed in different plants to different degrees and are continuously variable across the spectrum, ranging from minimal change of the natural stamens to inner petals quite alike in color and texture to the guard petals. For purpose of assigning the standard flower form classifications the segment series is divided into three more or less definable structures termed staminodes, petalodes and inner petals. These names coincide with the classification Japanese, Anemone and Bomb, respectively. The degree of all-over transformation may be quite uniform across the space from guard petals to the inner margin. However, when not of uniform size it is unique to this type of transformation the larger, more advanced segments are found at the inner margin (nearer the center), sometimes of a contrasting inner petals form, called “flag” petals. There is often seen a band of smaller, petalodes segments forming a distinctive “collar” next to the guard petals.



KAREN GRAY (Krekler, 1965)



MAHOGANY (Glasscock, 1937)



WALTER MAINS (Mains, 1957)



LE CHARME (Eliason, 1964)

***Staminodes** are the closest in form to the natural stamens from which they derive, usually showing the filament color of the underlying stamens genetics, always accented by lumpy texture, this most often including yellow color reminiscent of the natural stamen pollen capsules. Peony cultivars producing the distinctive staminode form were first received from Japan, resulting in the flower type class name Japanese. Staminodes become petalodes when transformation has progressed to the point where all visible evidence of stamen origin, except for yellow color, has disappeared.*



BELLEVILLE (Wolfe, H. / Hollingsworth, 1998)



LAUREN (Niva / Snelson, 1999)

Petalodes are always of smoother texture compared to that of staminodes, absent the lumpy remnants of pollen capsules, in color ranging from a pale contrast to a dilution of the guard petal hue. Compared to the guard petals and inner petals, petalodes may be of thinner texture, somewhat translucent and always smaller, taken together resulting in the Anemone class flower, a “center ball” of contrasting size resting on a flat or cupped “saucer” formed by the guard petals.



**RED GRACE (Glasscock /
Klehm, R. G., 1980)**



ANGEL CHEEKS (Klehm, Carl G., 1970)

Inner Petals

constitute the most advanced petal form taken by transformed stamens, being similar in color and texture to guard petals, but somewhat narrower and typically capable of growing to a length greater than that of the guards as the flower matures. This petal form leads to the flower class Bomb, the model characterized by a large center ball of smooth silhouette, sometimes growing so large as to obscure the guard petals. The name Bomb is said to have been adapted from “bombe”, the name of a molded frozen desert popular in the 1920s.

Progressive stamen transformation is not as obvious, the transformed segments being entirely inner petals similar to the guards in color and texture, only smaller, and no staminodes or petalodes. Unlike all-over transformation, the inner petals' size will be largest next to the guards, grading smaller inward along a spiral ending either at a remnant of stamens or, less obvious,



continues with complete transformation of natural stamens. When a remnant of stamens is obvious in the opened flower the standard classification may be Semi-double. The amount of stamen segments converted to petals

Un-named Seedling

is subject to the plant's state of growth, such that the remnant of stamens may range in quantity from quite obvious to obscure. When stamens are somewhat obscure it may lead to uncer-



PINK VANGUARD (SEIDL / HOLLINGSWORTH, 2005)

tainty whether the specimen is most suitably staged as a Double or a Semi-double in exhibitions. The implications of this will be discussed at greater length in the next installment.

Progressive transformation is not present in the unnamed seedling image. The petals seen are all guard petals, the unexpected quantity of them attributable to ‘multipetally’, a heritable state that can contribute fullness in any specimens of the standard flower classifications. The



CHERRY RUFFLES (Hollingsworth, 1996

CHERRY RUFFLES image shows a near maximum extension of progressive transformation, the few remaining stamens evident adjacent to the carpels.

For the interest of breeders, the two types of stamen transformation are inherited separately, not as alleles (alleles being alternate genes at the same location).

All-over stamen transformation appears to be inherited as a simple recessive, meaning both parents must be carriers of the controlling form of the gene(s). Nevertheless, the extent of transformation in an individual flower is expected to also be subject to influence of additional genetic factors (“modifier” genes), as well as plant maturity and growing conditions.

The inheritance of progressive stamen transformation appears to be more complex, possibly inherited as a partially dominant complex of genes. As with all-over transformation, in an individual flower the extent to which the stamen cluster is changed may be modified under influence of both other genetic factors and the state of growth.

Yes, an individual cultivar can carry the genetic basis of both transformation types and may manifest both in the same flower. In fact, this dual condition is common in some flowers shown in the Doubles class. It is most easily recognizable when the all-over transformation is at the petalodes level and provides a color contrast. With this makeup a band of yellow petalodes is normally apparent between layers of petals as seen in the novelty Doubles GOLLY, FEATHER TOP, LAVON and LADONNA. Further discussion and illustration of doubling anatomy will be treated in the next installment.

The variations in flower anatomy outlined herein are, when

known, especially useful for purposes of verifying the identity of the correct plant for a peony cultivar name. For additional discussion of these factors, download the “The Registration Form Explained” at the American Peony Society web site, www.americanpeonysociety.org. On the home page select “Cultivar Registration”. At the landing page select “Registration Form” where will be found the link to download the article.

See Peony Flower Terminology — Part II on page 350-27. APS

PEONY FLOWER TERMINOLOGY — PART II

All-over stamen transformation — Denotes the pattern of stamen transformation seen in peony flowers wherein petal-like segments in various forms replace all of the natural pollen bearing stamens, no natural stamens remain. This is a heritable state specifically leading to the standard flower forms classifications Japanese, Anemone or Bomb.

Collar — A constricted band noticeable in the silhouette of a peony flower center ball, resulting from a layer of reduced size petalodes encircling that portion of the flower. Some cultivars characteristically produce flowers having a noticeable collar. Others may tend to do so on less than full size flowers of the cultivar.

Flag petal — A large inner petal seen occasionally at the inner margin of petalodes, of infrequent occurrence always next to the carpels outer perimeter, but not enclosed by them. The occurrence is believed to reflect the stage of the all-over stamen transformation pattern in which inner segments are commencing to change in size from petalodes to the larger inner petals.

Inner petals — Inner segments of a peony flower derived from stamen transformation and characterized by having the same color and texture as do the large outer petals (guard petals), although narrower in form. However, as the flower matures inner petals may be seen to reach lengths greater than the guard petals. Compare staminodes and petalodes. The full transformation of stamens to inner petals leads to the standard flower form classification Bomb.

Multipetally — The heritable increase in quantity of floral parts beyond the minimums seen in the natural species, generally much sought in cultivated varieties. Multipetally as seen in existing sorts varies from an extra row of guard petals to the very large amount of petallage seen in the most massive Doubles. Both between different individual cultivars and among flowers of the same cultivar the increase quantity will be seen in a continuously variable range rather than as an exact quantity per kind.

Petalodes — Denotes the middle size range of petal like segments resulting from all-over stamen transformation, more advanced toward petal form than staminodes, less advanced than inner petals. The segments are normally larger than staminodes, smoother and of evenly distributed coloration, yet do not have the color and texture of inner petals. The form of petalodes will generally be strap-like and show no obvious evidence of their stamen origin, no yellow lumps on the edges of petals or remnant of the filament stalk. When a cultivar typically produces petalodes the standard flower classification is Anemone. However, in its lesser flowers such cultivar may also produce staminodes.

Progressive stamen transformation — Denotes the distinctive pattern of partial change of the stamen cluster in which the altered segments always become inner petals, while a remnant of natural stamens remain. The resulting inner petals are largest next to the guards and usually grade noticeably smaller inward, at least do so near the remaining normal stamens. The extent of change produced in an individual flower will be seen in a range from only a small portion of the stamen cluster to almost all stamens having become inner petals. This is a heritable state seen in the standard flower classifications Semidouble and Double.

Stamen boss — A term sometimes seen in peony literature, designating the stamen cluster as a whole, the usage adapted from the vocabulary of ornamentation design, denotes a central prominence.

Staminodes — When all-over stamen transformation is present, the term that is applied to the altered segments nearest in form to the natural stamens from which they derive. The texture will be uneven, the coloration variable, reflecting the underlying filament color and including edge contrasts from embedded remnants of the pollen capsules. See also petalodes. Cultivars which typically produce the staminodes form of inner segments belong to the standard flower class Japanese. APS