

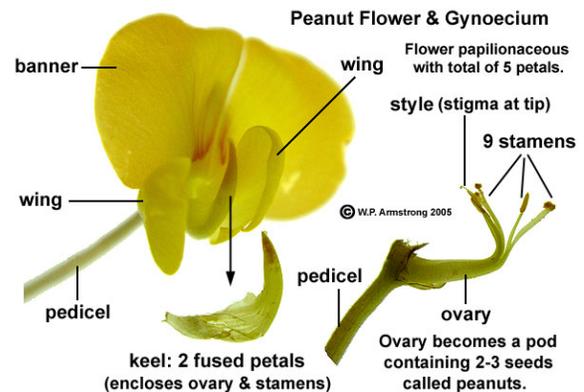
Structural Profile of the Pea or Bean Family

The Pea Family (Fabaceae) is the third largest family of flowering plants, with approximately 750 genera and over 19,000 known species. (FYI – the Orchid Family is the largest plant family and the Aster Family ranks second in number of species.)



I am sure that you are all familiar with the classic pea flower (left). It, much like the human body, is bilaterally symmetrical and can be split from top to bottom into two mirror-image halves. Botanists use the term **zygomorphic** when referring to a flower shaped like this that has two different sides. Zygomorphic flowers are different than those of a lily, which are radially symmetrical and can be split into more than two identical sections. (These are called actinomorphic flowers.)

Pea flowers are made up of five petals that are of different sizes and shapes (and occasionally different colors as well). The diagram at right shows a peanut (*Arachis hypogaea*) flower (another member of the Pea Family), that identifies the various flower parts. The large, lobed petal at the top is called the **banner** or **standard**. Below the banner are a pair of petals called the **wings**. And, between the wings, two petals are fused together to form the **keel**, which covers the male and female parts of the flower. Because of the resemblance to a butterfly, pea flowers are called **papilionaceous** (from Latin: papilion, a butterfly).



However, there is group of species in the Pea Family (a subfamily) with flowers like the pride-of-Barbados or peacock flower (*Caesalpinia pulcherrima*) shown to the left. Flowers in this subfamily are somewhat variable, but are generally zygomorphic or at least asymmetric. However, the petals are not arranged to form the banner, wings, and keel. The petals, calyx, and stamens can be quite showy as you can see in this photo. Some common Florida native plants in this group are partridge or sensitive pea (*Chamaecrista* spp.) and eastern redbud (*Cercis canadensis*).

A plant that is representative of the third subfamily in the Pea Family is the Florida native called powderpuff or sunshine mimosa (*Mimosa strigillosa*) (right). Its flowers are **actinomorphic** and grouped together in inflorescences that are generally round or globose. The petals of each individual flower are small and insignificant; the stamens, with their long, brightly colored filaments, are the showy parts of these flowers. In tropical areas, acacias or wattles (*Acacia* spp.) are important trees and shrubs that generally have yellow-colored inflorescences.





With all of this variation in their flowers, what other morphological features were used to place plants in the Pea Family? An older name for this family was Leguminosae. This name refers to the type of fruit produced by members of the Pea Family, which is a **legume**. An example of a legume is shown to the left. In the general vernacular, legume fruits are called pods. A legume can be distinguished from a “pod”



(technically a follicle) of a milkweed plant (*Asclepias* spp.) because legumes have two sutures or seams as opposed to only one on a milkweed fruit (right). Generally a ripe legume will open along one or both sutures to release the seeds (**dehiscence**).

Some species, such as partridge pea, have legumes that pop open at maturity and forcefully expel the seeds (**explosive dehiscence**). Other legumes, such as those of a honeylocust tree (*Gleditsia triacanthos*) do not open at all (they are **indehiscent**) and the whole pod is dispersed. A highly specialized indehiscent legume is represented by ticktrefoil (*Desmodium* spp.) shown to the right. This legume is constricted into segments that break apart when mature and the segment of the fruit, rather than the seed, is dispersed, in this case by sticking to animal fur or clothing. This type of fruit is called a **loment**.



Many members of the Pea Family can also be distinguished by their foliage. A majority of the plants in the family have **pinnately compound** leaves, like the powderpuff plant shown on the previous page. Pinnate means that the leaf has numerous leaflets on either side of a common axis or stalk. Another common arrangement is for pinnate leaves to be divided again to form bipinnately compound leaves, such as those of the mimosa tree or silk tree (*Albizia julibrissin*) shown to the left. Clover, a leaf of which is shown to the right, is a member of the Pea Family whose



pinnate leaves have only three leaflets. This leaf arrangement is called **trifoliate** and is the source of its genus name - *Trifolium*. Exceptions to the rule of pinnate leaves are gorse (*Ulex* spp.) that has simple (undivided), spiny leaves. And, several species of *Acacia*, whose mature “leaves” are actually flattened petioles without developed leaflets (left) called **phyllodes**.

And, finally most plants in the Pea Family form symbiotic associations with bacteria which live in nodules on their roots (right). These bacteria have the ability to take nitrogen from the air and chemically convert or fix it into a form that can be used both by the bacteria and the host plant. When the plant dies, a portion of this nitrogen is released to the soil for use by other plants.

