FABACEAE. PART 2

THE ALL IMPORTANT PEA SUBFAMILY, PAPILLIONOIDEAE

The pea subfamily is by far the largest and most diverse of the family and prominent in many parts of the world.

- The term for the papillionaceous flower comes from the French word papillon, meaning butterfly
- A typical flower consists of a back petal, the banner, which attracts pollinators,
- Two side petals, the wings, and
- Two partly fused middle petals (between the wings) called the keel because of its boat-shaped structure
- The keel contains the stamens and pistil

The cut-away view of this peanut flower shows the upright banner, a wing, and the curved keel

These *Robinia* or locust blossoms also show the three kinds of petals. This genus of trees is native to the Southwest and Southeast, although the black locust is naturalized in California

The typical legume or pea pod is long and narrow with a single chamber, and often twists open to eject the seeds as seen in this lupine.

Despite this, the legume has been modified in many members of the subfamily relating to seed dispersal. For example, the genus *Astragalus* or loco weed has inflated legumes carried by the wind. Here you see the speckled pods of *A. whitneyi*.

By contrast, the furry inflated pods of *A. purshii* seem to hint at the need to insulate the seeds although this is certainly not known for definitely.

The genus *Astragalus* is a major one in the north temperate areas including California. Many species accumulate toxic metals from the soil and/or have poisonous alkaloids although a few species are also used medicinally. Here you see the hummingbird-pollinated *A. coccineus* from the desert.

Another striking species is *A. kentrophyta*, a prickly cushion-forming plant from the high dry mountains in eastern California.

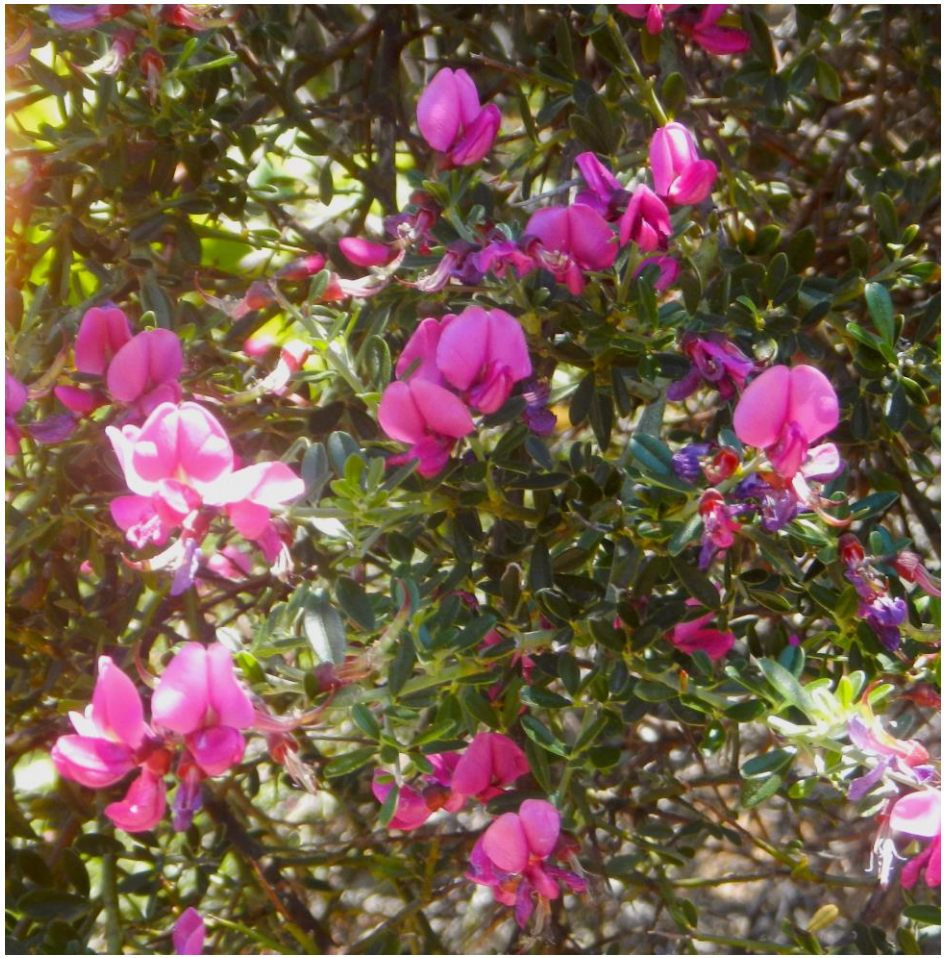
Another good example of a modified legume is the coiled pods of bur-clover, *Medicago lupulina*, an invasive weed that is carried on animal fur and human clothing.

The list of ornamental pea goes on and on but this presentation will focus mainly on the Mediterranean regions of the world. We'll start with California's shrubs. Here you see the desert indigo bush in the genus *Psorothamnus*

This distinctive species, *P. spinosus*, is called smoke tree because of the grayish branches that from a distance look like puffs of smoke

Psorothamnus flowers are covered with dotlike glands that give an intense aroma as a defense mechanism against being chewed.

The beautiful but spiny chaparral pea, *Pickeringia montana*, produces masses of pink flowers in late spring. It is seldom available in the trade because of difficulties propagating it.



A close up of chaparral pea shows the typical papillionaceous form. When a bee visits, it weights down the keel exposing the stamens to the bee's belly

Arguably the most diverse genus in California is *Lupinus* or lupine, a name meaning wolf. Here is the shrubby silver-leaf bush lupine, *L. albifrons* with fragrant flowers attractive to bees

Another shrubby species found along the coast is *L. arboreus*, the yellow bush lupine. These are fast-growing in gardens but live only a few years.

Besides the shrub lupines, there is an array of annual species that light up spring grasslands like this sky lupine, *L. nanus* that often grows with the orange California poppy.

The most unusual annual species is *L. stiversii* or harlequin lupine, found in the Sierra foothills.

Although most lupines are dry growers, this perennial bog lupine, *L. polyphyllus*, prefers wet soils. It is the parent of the popular Russell lupines

In addition to the true lupines, we have a colonizing perennial called *Thermopsis* or false lupine. Its trifoliate leaves are different from the palmately compound leaves of true lupines

Another widespread California genus was *Lotus* (it has now been split up), which is not to be confused with the Indian lotus. This species was *L. scoparius* or deerbroom, a small shrub.

A counterpart for its color pattern to the harlequin lupine, is the coastal wetlands perennial, formerly *L. formosissimus*.

A third major California genus is *Trifolium* or clover. Several species have been introduced like this red clover, *T. incarnatum*.

Most native clovers have trifoliate leaves, the origin of the genus name, and mass many small flowers in a head. This widespread annual, *T. wildenovii*, is also known as tomcat clover.

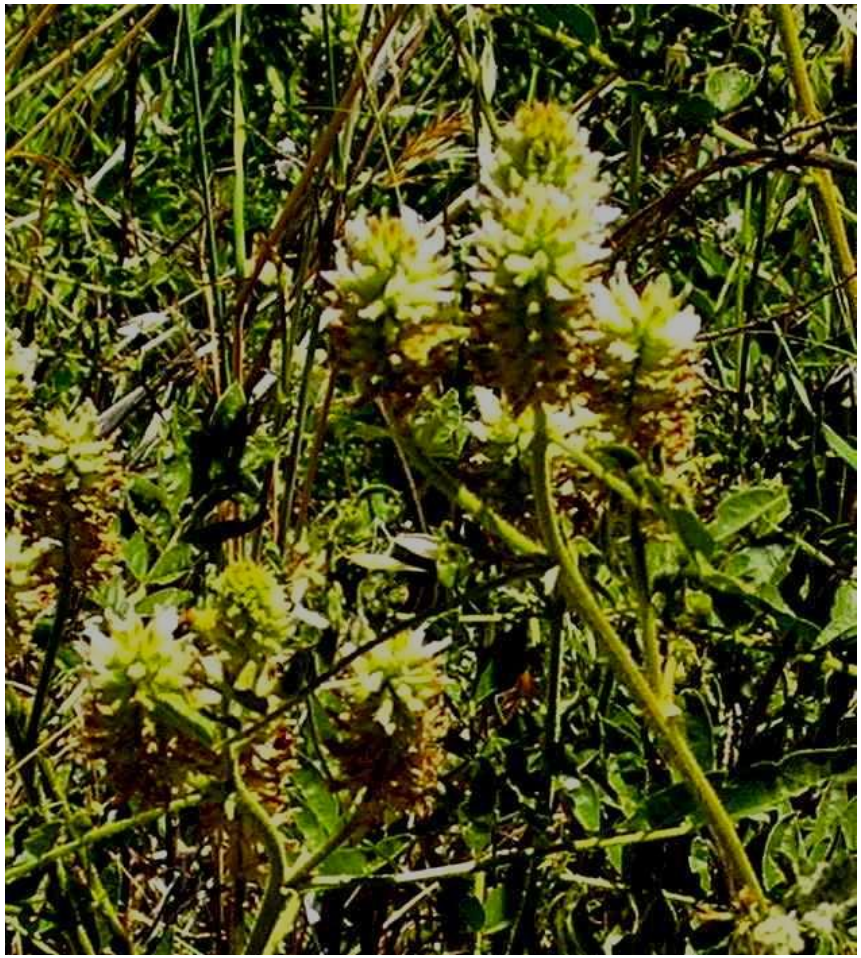
The fragrant vernal pool clover, *T. variegatum*, forms carpets around these temporary wetlands.

Although many clovers are annuals, the perennial *T. wormskjoldii*, forms mats in moist places near the coast.

Besides the seeds of some of these natives providing food (many had to be detoxified first), one of the so-called Indian hemps (*Hoita macrostachya*) was used for its strong stem fibers. It grows in wetlands. Here are the trifoliate leaves and…

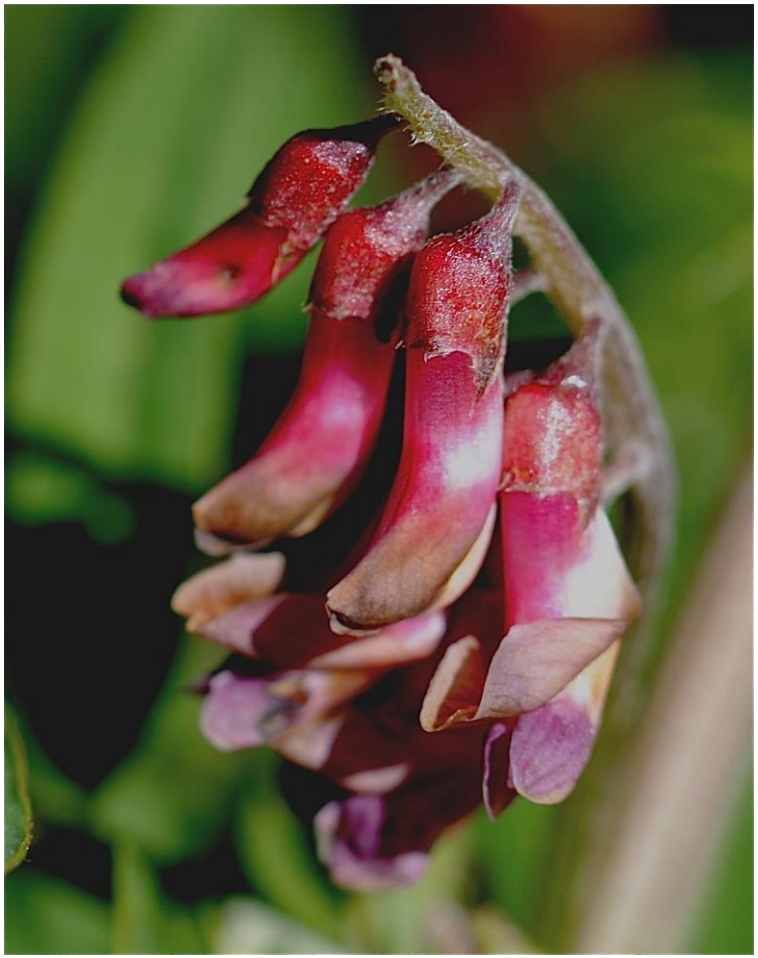
…and here is a spike of the purple flowers, often carried 6 to 8 feet above the soil

Other native genera were used medicinally, especially the root of the wild licorice, *Glycyrrhiza lepidota*, which favors banks near streams.



Finally, two viny genera are found across North America and Europe: *Vicia* (vetch) and *Lathyrus* (sweet pea). Here you see our native giant vetch, *Vicia gigantea*.

The coastal giant vetch produces one-sided clusters of flowers combining blue, green, and pink



Few are aware of our native sweet-peas. *L. vestitus* is our most common kind.

Two other native sweet-peas of note include *L. littoralis*, or beach sweet-pea, which buries its trailing stems under the sand and…

…and *L splendens* or pride of California, a species from the far south with hummingbird-attracting flowers

Sweet-peas are also abundant in the Mediterranean region, which has given California the weedy *L. latifolius*, often seen along shaded roadsides.

While many sweet-peas are perennial, the popular garden sweet-pea, *L. odoratus*, also from the Mediterranean, is an annual

The Mediterranean basin is home to many peas, but perhaps most prominent are the shrubby ones referred to as brooms, referring to the broomlike branches. Here is Scotch broom, *Cytisus scoparius*, invasive in California

One of the worst broom invaders is *Genista monspessulanus*, the French broom, common in Bay Area woodlands

Spanish broom, *Spartium junceum*, is a common invasive in hot dry sites, especially in Southern California. Note the green, photosynthetic, broomlike stems

Related to the brooms, and invasive along the coast, is the spiny gorse, *Ulex europaeus*

A close view of gorse flowers. Note the leaves are modified into green spines

Not necessariy from true Mediterranean-climate regions, the genus *Erythrina* is often found in seasonally dry areas of the subtropics. Here you see *E. speciosa*.

Erythrinas live in several parts of the world, are dry deciduous trees and large shrubs, and feature long tubular red or orange flowers attractive to birds. Here you see the upside down flowers of *E. crista-galli*.

Most erythrinas are frost tender and thrive better in Southern California gardens. Here you see the Hawaiian endemic, *E. sandwicensis.*

Many of the South African peas are poorly known although more are being introduced to Bay Area horticulture over time. Currently, the best known is the feather pea, *Psoralea pinnata*, a fast growing small evergreen tree

The genus has been split up; formerly several psoraleas were also native to California. Here you see the feathery foliage and pale blue flowers of *P. pinnata*.

Another South African species is *P. flita*, with gracefully drooping branches.

Australia is a major player in the pea subfamily with many beautiful shrubs and ground covers. The following are some of the many examples. Here you see *Gastrolobium celsimium*, the Swan River pea a sprawling shrub with simple leaves

The color and long shape of the Swan River pea flowers indicates bird pollination.

Another “poison” pea is *Gastrolobium praemorsum*, a woody ground cover. The cultivar ‘Bronze Butterfly’ refers to the unusual leaves.

Western Australia is home to several “flame” peas, shrubs and vines with brightly colored flowers. This sprawling shrub is *Chorizema cordatum*, now available at several nurseries.

A close view of *C. cordatum* flowers shows the brilliant color combinations, making the common name highly appropriate.

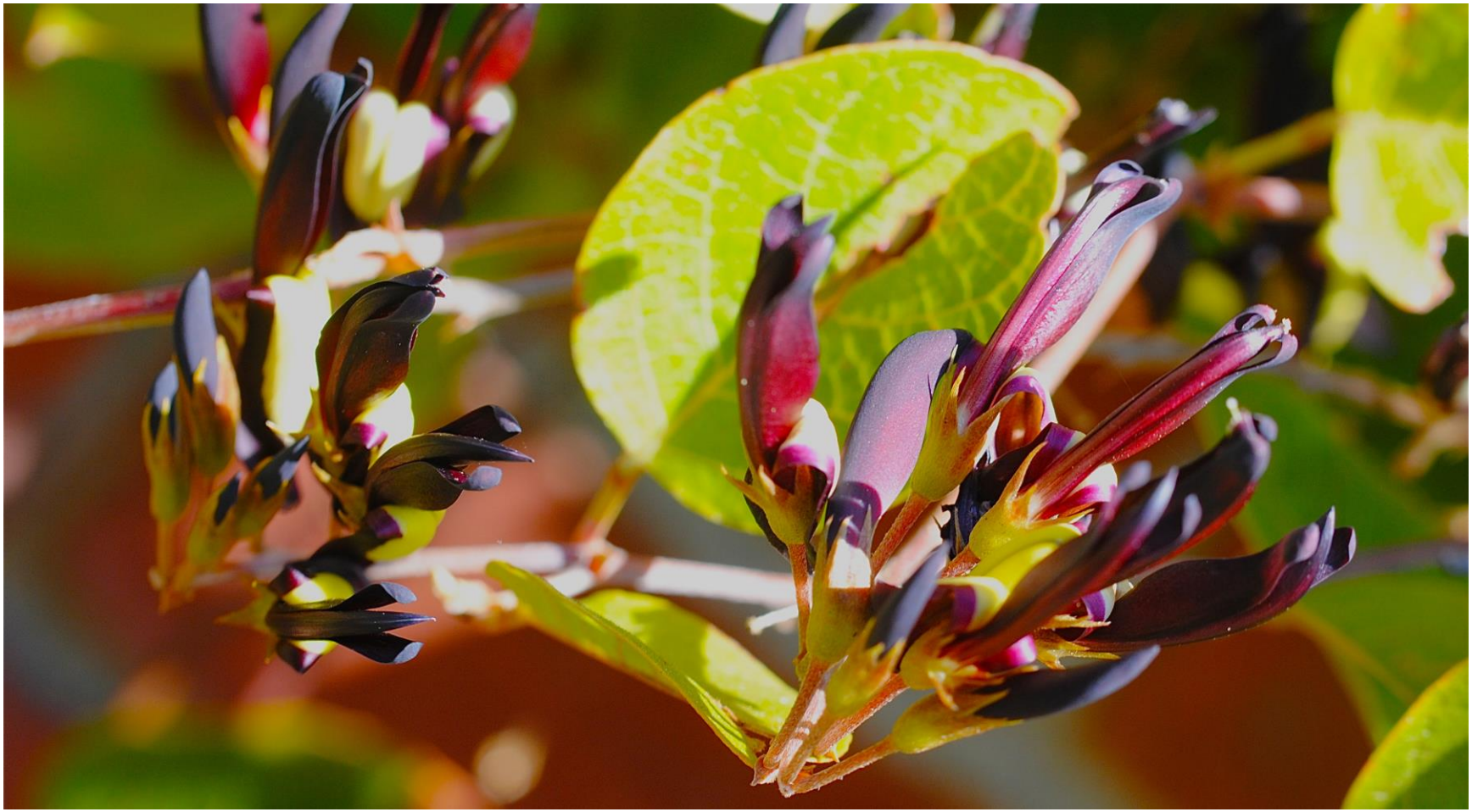
A second flame pea, *C. diversifolium*, grows as a twining evergreen vine.

The twining flame pea offers equally brightly colored flowers.

The genus *Kennedia* or coral pea also offers striking color combinations. Here are the flowers of the twining vine with trifoliate leaves called *Kennedia coccinea*.

Meanwhile, the ground cover *K. prostrata* or “running postman” offers red flowers on creeping stems

Perhaps the most unique species, *K. nigricans* or black coral pea, displays long flowers of purple-black and pale yellow



Black coral pea grows quickly to cover an arbor.

The best known of the pea vines from Australia is *Hardenbergia violacea* or Australian wisteria from the forests of Eastern Australia.

Like many of the Australia peas, hardenbergia leaves are reduced from a compound leaf of several leaflets to a single, tough, leathery leaf

Many Australian peas are evergreen shrubs. One that is now available is called *Eutaxia obovata* or bacon and eggs for the color combo of the flowers.

The genus *Hovea* offers up vines and shrubs with clear blue flowers. This one is *H. elliptica* from moist eucalypt forests in southwestern Australia

Many of the woody peas are various shades of yellow. Here you see the low-growing *Pultenaea villosa*.

The large shrubby book pea, *Daviesia cordata*, displays yellow and red flowers. Many of these shrubs are seriously poisonous, not just the seeds but also the leaves

From Eastern Australia come shrubs called butterfly peas in the genus *Dillwynia* owing to the butterfly winglike banner.

From the moist karri forests of southwestern Australia comes the water pea (*Bossiaea aquifolium*), an understory shrub that from a distance resembles French broom

A flower cluster of the water pea

One of the choicest shrubs from southwestern Australia is the lady pea, *Burtonia scabra*

And one more shrubby pea, known as mountain pea or *Oxylobium atropurpureum* from the Sterling Mountains of Southwestern Australia