Fried Eggs on Plants

To those among us whose cardiologists have declared fried eggs--or, for that matter, eggs of any kind--a forbidden pleasure, take "heart" in knowing that you can safely enjoy fried eggs on plants! We are playfully referring to broad, flat, pure-white flowers with domed yellow centers, resembling a fried egg, sunny-side up.

Our most unusual specimen, seen flowering at MEMBG during May and June, is *Oncoba spinosa* (family Flacourtiaceae), which garden manager Rand Plewak loves to call the "fried-egg plant." Planted on an island in the recirculating stream, this small tree has branches that reach over the water to show off gorgeous white, yellow-centered flowers. In this case, the sunny-side up eggs are actually upside-down. *Oncoba* has horrific spines, actually stem spines that arise from axillary buds along each shoot--hence the specific epithet *spinosa*. Flowers arise from buds formed at the bases of these spines. In addition to many yellow stamens, the center of the flower also contains numerous yellow stigmas. Honeybees, often observed working the flowers on this tree, forage for pollen and, in the process, coat the stigmas with pollen.

The archetype fried-egg flower would have to be the matilija poppy, *Romneya coulteri* (family Papaveraceae), which flourishes at MEMBG on the slope devoted to California natives. Its flower is up to twenty-two centimeters across (ours is up to twenty), with a central hemisphere of yellow stamens. The matilija poppy has the largest flower of any plant native to the state--there are 4839 native species listed in the current California flora (J. C. Hickman, editor. *The Jepson Manual*. 1993). Relatively uncommon in the wild, this shrub has been introduced around homes and on burned slopes in the neighboring Santa Monica Mountains and is a welcomed sight wherever it flowers during late spring. The hairy matilija poppy, *R. trichocalyx*, has similar but somewhat smaller flowers, and holds the honor of being California's second largest native flower.

Petals of *Romneya*--six of them--are crinkled (they look like slightly used white crepe paper), because they are crumbled in the bud and never lose the folds. The crinkled petal is a fairly common feature within the poppy family. Several other genera of Papaveraceae also have flat white flowers with yellow in the center, such as certain species of the Mexican prickly poppies, assigned to the genus *Argemone*.

Taking a broad view, one can assume that flowers are designed to optimize pollination, often by appealing to the senses of one type of animal as opposed to others. Pollination of flowers by animal visitors is considered to be an ecological and evolutionary partnership, typically a highly coevolved relationship called mutualism, in which both parties receive important benefits. For the plant, those benefits are pollination and seed set; for the animal, there is usually a reward, receiving either sweet nectar or nutritious pollen, or both. The reward for visitors to our fried-egg flower is a copious amount of nutritious pollen, but little or no nectar. In particular, bees, bumblebees, and beetles forage over the flower center, wherein the abdomen of the insect touches the pollen-discharging anthers and the sticky stigmas, thereby affecting pollination.

Specialists in pollination biology tell us the radially symmetrical, flat, "dish-shaped" or "disk" blossoms (shaped like flat circles) are flowers designed to be open to any type of pollinator. This design, which has evolved independently numerous times within the flowering plants, is uncommon among single flowers--and examples with very broad white petals are fewer yet.

Additional plants having large flat, white flowers with yellow stamens include another California endemic species and genus, *Carpenteria californica* (Philadelphaceae), called tree-anemone. Currently MEMBG does not have a living plant of this handsome shrub, originating from the Sierran foothills, but we have had it in the past and will again. Certain species of roses have this floral motif, too, such as *Rosa arvensis* (family Rosaceae) and the unrelated members of the rockrose family (Cistaceae), notably certain species of *Cistus*, *Halinum*, and even *Helianthemum apenninum*. In gardens of Southern California one can also find specimens of *Stewartia* and *Franklinia*, as well as white single cultivars of *Camellia* (family Theaceae). Some authors would probably classify white water lily (*Nymphaea*) on this list, as well--perhaps more like a poached egg! Certain peonies (*Paeonia*, family Paeoniaceae) and members of the family Dilleniaceae (e.g., *Dillenia indica*) also fit the motif. Many members of the buttercup family (Ranunculaceae), such as *Clematis*, *Anemone*, and *Helleborus*, can have dish-shaped white flowers, but these are most likely to offer nectar rewards from structures called nectar leaves.

Franklinia alatahama (family Theaceae), named to honor Benjamin Franklin, is by itself a botanical chapter worthy of repeating, if we had the space. This distant relative of the camellia, sometimes even called the "lost-camellia," is a small tree that was collected in late September 1765 by John and William Bartram from a stand along the Altahama River in Georgia. Land clearing and, in particular, over-collecting by plant enthusiasts caused its disappearance in the Georgia woodland since 1790. Now extinct in the wild this plant--with the misspelled specific epithet *alatahama*--can be found only in cultivation today.

Botanists have generally concluded that a large number of stamens within the flower is a primitive feature among dicotyledons and monocotyledons. Best estimates are that ancestral flowers had scores of stamens. The broad evolutionary tendency among angiosperms has been a reduction in the number of stamens--usually to five, four, or two in dicotyledons, and three to even one in monocotyledons. What we find in the fried-egg flowers, however, is that there probably has been a secondary increase in stamen number. Even though these families have a large number of stamens and relatively primitive floral features, our fried-egg species in particular appear to have many more stamens than the ancestral forms in their respective families. In the case of poppies, for example, a single

flower can produce several million pollen grains! Such increases in stamen number are well-known among other families, such as cacti (Cactaceae), wherein the least specialized forms may have less than one hundred stamens but highly specialized epiphytes of Central America may possess more than 1500 stamens in a large flower with a long, nectar-bearing tube. Stamen number increases are also well documented for Eucalyptus and ice plants (Aizoaceae).

At MEMBG, examples of fried eggs grade into forms with colored petals, such as the pink-flowered species of Cistus, the colorful, eye-popping poppies, and so forth. In fact, white is merely the absence of pigmentation--specifically, the absence of genetic information to make the pigments.

If we include the view from a distance, our tale of breakfast in the garden could also tell us of white Shasta daisies with yellow eyes. With their open, dish-shaped blossoms, these flowers appear to use the same pollination strategy, although the center is not a mass of erect yellow stamens but rather a cluster of narrow, tubular disk flowers. To reap their rewards, insects must probe these flower rather than bumbling over the surface. But we'll leave the Shasta daisies and their relatives for another essay.

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