

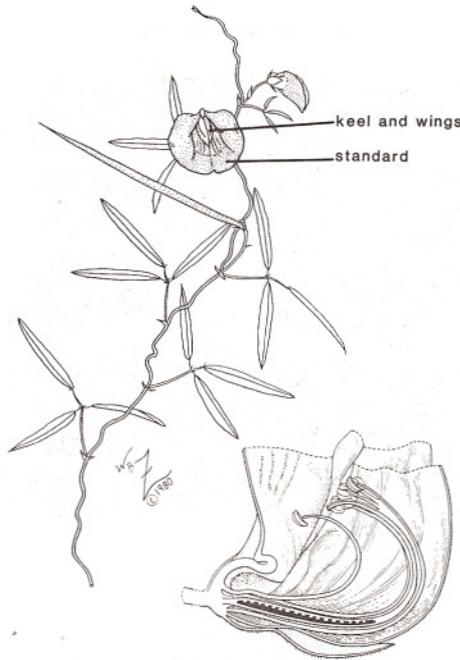
The Upside-Down Flower

by Jose E. Godts

For several years, I have enjoyed my morning stroll and my indulgence in the observation of beautiful light-purple fabaceae flowers in the spring and early summer. The 1½" diameter flowers are not fragrant and their beauty is of but a day's duration, but the flower's abundance compensates for its short life.

The plant's name is butterfly pea (*Centrosema virginianum*) and, to my limited knowledge, three of its relatives with very similar characteristics are also living in central Florida: 1. *Centrosema arenicola* (= *C. floridanum*), 2. *Clitoria fragrans*, and 3. *Clitoria mariana*.

A noticeable characteristic of these plants is that their flowers are always oriented upside-down. The fabaceae ("leguminosae" in most of the world's botanical communities) have normally their standard on top of the flower and the keel at the bottom. The *Centrosema* and *Clitoria* of Florida run their flower petiole away from, then under, the main stem, so as to invert the flower and have their standard at the bottom and their keel at the top.



Centrosema virginianum

morning, the sun was barely above the far tree tops when a large bumblebee came to the flowers, flying from one to the next. The insect, *Bombus pennsylvanicus*, landed every time on the standard, then with its powerful back pushed up the flower keel well above its body, and penetrated the flower to reach the honey pool. At the same time the stamen and the pistil were uncovered and rubbed the hairy back surface of the bee's body, loading it with pollen.

Re-examination of the flower disclosed that the curvature of the androecium and the gynoecium (stamen and pistil) were very adequately curved and completely independent of the keel, which was freely raised to expose them. These features discourage feebler insects such as bees, or long proboscis insects such as moths and butterflies, which could not fertilize the flowers. The heavy relative weight of the bumblebee is also responsible, in all logic, for the upside-down position of the flower because in the top position the standard cannot support the bee. I did not observe any other type of *Bombus* than *pennsylvanicus*, but I cannot see why other large bumblebee species could not feed on these flowers.

Most of the flowers possessing honey pools are raided by stealing insects such

**"Each nature fragment
has its mystery
and its beauty,
its logic
and its explanation."**

Dr. G.V. Legros,
in "La vie de J.H. Fabre, Naturalist"

as wasps and ants. The flowers of *Centrosema* showed no signs of honey pool violation by hole drilling by such insects biting holes to reach the pool. Further inspection revealed that the sepals of the calix were very sticky and, as such, would discourage "unlawful" acts. The insects have no drilling platform to operate from.

Much more has to be learned about the relation of these flowers and the bumblebee, such as where the bee's habitat is in relation to the plant's habitat, because, if we want to save one, the other has to be saved also.

From the available literature, it appears that the bee lives in rabbit burrows and burrowing owl furrows. In this neighborhood, the furrows have been bulldozed during the last decade. In the area where I found *Centrosema*, according to old timers the bees were much more numerous than today, and the plants bore many more seeds. The seed pods are now scarce, and the housing development has destroyed practically all wild habitats for the bumblebees, including the other honey-producing, bumblebee-visited plants such as citrus trees.

The butterfly pea is now uncommon in central Florida, although it was frequent 25 years ago when I began my Floridian botanical interest. Cement surfaces and nicely kept lawns are not adequate for bumblebees to live. Many similar life mysteries have to be investigated if we want some wild beauties to survive, and adequate steps must be taken to protect all related environments.

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Keel: In a pea flower, the two lowest petals united along their lower margins.
Standard: The upper petal or banner of a pea flower.

Once I had observed that the flower inversion was a generalized characteristic, my curiosity was aroused. I sat on a nearby garbage can and tried to figure out the "why". It was seven o'clock in the morning, and after about an hour I could no longer find a comfortable position on the garbage can, and my patience evaporated.

Back at home, I consulted *Common Angiosperm Families, Part I*, the work of Wendy Zomlefer, in detail, but with the book upside down. In the drawing it is striking that the flower nectary is just above a fold in the base of the standard, and thus results in a honey pool (don't forget that you must look at the reference with the book upside down to see it realistically).

I resumed my observations of the flowers at various times of the day. One

The cover photo of the butterfly pea is by Steve Shiran of Ormond Beach.