Silver Linings

by Michael Meisenburg, University of Florida / IFAS, Center for Aquatic and Invasive Plants. Photos by the author unless otherwise noted.

People like butterflies. Not everyone, but many do. They make butterflies the subject of photographs, paintings, and poems. They landscape with plants to attract these colorful creatures; plants as nectar sources and—for the devoted butterfly gardener—plants as caterpillar hosts. They buy books to help identify the many species and books to teach them which plants to plant. They may keep life lists or yard lists, with some taking cross-country vacations to add species to these lists. They certify their yards with the National Wildlife Federation as backyard habitats; habitats for many species, including butterflies. They may even…(pause added for dramatic effect) plant exotic plants for their butterflies because, like it or not, many butterflies do benefit from introduced plants.

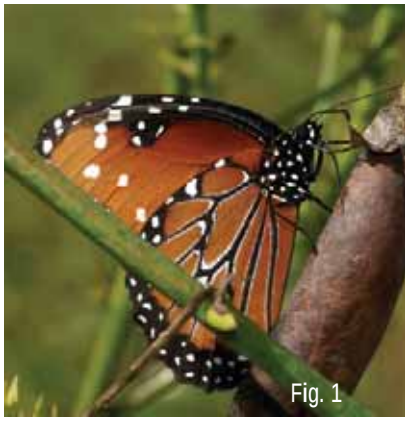
The extent to which any particular butterfly species benefits from introduced plants varies. Some plants, such as lantana (*Lantana camara*) and musky mint (*Hyptis mutabilis*), are excellent sources of nectar for many butterflies. Find these plants on a hot summer day and you will often see many butterflies hovering around them. Introduced plants such as these rival native species for their attractiveness to adult butterflies. However, while these plants benefit the insects by feeding adults, a butterfly's range depends more on larval host plants than adult nectar sources (Cech and Tudor 2005). For most butterfly species, adults live a few weeks or less, and non-migratory species usually remain fairly close to their larval host plants.

Some butterfly species have undergone population increases or range expansions in recent years because invasive exotic plants are being used as larval host plants. Some species even colonize the United States from other countries (Smith et al. 1994, Cech and Tudor 2005). The degree of invasiveness of the plants being utilized ranges from none to FLEPPC Category I designations.

*Small and easily overlooked, Ceraunus blue butterflies are common around Gainesville near patches of their larval host plants; usually the non-native trailing indigo (*Indigofera spicata*).*

Exotic opportunism

Butterflies benefit from introduced plants in many ways. An unusual example is this Queen imbibing alkaloids from showy rattlebox (*Crotalaria spectabilis*, Figure 1). Much like their close relatives Monarchs, Queens have coevolved to use alkaloid-producing plants to their advantage. Plants in the genus *Crotalaria* produce alkaloids as a defense against herbivory; the male (pictured) must collect these chemicals to synthesize pheromones and attract a mate.



LINDA COOPER

Fig. 1

Flying north into new counties

Several native butterfly species previously confined to the more-southerly latitudes of Florida have spread north in recent years, and their expansion appears to follow changes in the state's flora.

Native to Florida, Long-tailed skippers use legumes for rearing their caterpillars. They readily use introduced plants in the genus *Desmodium*, such as *D. incanum* and *D. tortuosum* (commonly known as beggarticks or ticktreefoils). These two species are often found in disturbed areas around the state. Young larvae fold small pieces of leaves over to hide from predators (Figure 2), while older larvae (Figure 3) sometimes attach two leaves together with their silk for the same purpose. A common fall butterfly, Long-tailed skippers appear to be expanding their range to the north as their populations have grown throughout the state. The Long-tailed skipper is an agricultural pest, as the caterpillars seem to prefer cultivated beans (*Phaseolus* spp.) as host plants over any other legume.


Fig. 3


Fig. 2


Fig. 5

LINDA COOPER


Fig. 4

Plants in the genus *Senna* often are utilized by Florida's butterflies, in this case sulphurs (family Pieridae). One is the Cloudless sulphur, a familiar yellow butterfly that is especially abundant during late summer. Their caterpillars often are found on the introduced septicweed (*Senna occidentalis*, Figure 4). The caterpillars are primarily green, but may be bright yellow as well (see sidebar). The green larvae of Sleepy oranges also can be found on sennas, such as coffeeweed (*Senna obtusifolia*, Figure 5). Both of these sulphurs are common butterflies. Another, the Orange-barred sulphur, is expanding its range north based on, it seems, the planting of valamuerto or Christmas senna (*Senna pendula*) in central and northern Florida. Figure 6 shows a female depositing an egg on this FLEPPC Category I species near Kanapaha Prairie in western Alachua County (Gainesville).


Fig. 6

CECELIA LOCKWOOD

Is it global warming?

A recent article in *The Gainesville Sun* asserted that global warming is allowing certain butterfly species to expand their ranges northward due, presumably, to decreased winter mortality (Tuesday 10/11/05). However, for ten of the thirteen species used as examples, range expansions may in fact be aided by expanding populations of non-native plants being used as larval food-plants. Of the thirteen butterfly species listed in the article, four are using non-native plants that are now growing wild in Alachua County; four are using non-native plants common in home landscaping; and two are using native plants frequently found in disturbed habitats but uncommon in undisturbed natural areas. Many of the species referred to in the newspaper article are also used as examples in this magazine article. The bottom line: if introduced *Aristolochia* wasn't growing in Alachua County, there would be no Polydamas swallowtails, regardless of how warm it gets.

Another tropical species expanding to the north as far as Gainesville is the Polydamas swallowtail (Figure 7). In northern Florida, it is never far from dutchman's-pipe or *Aristolochia* vines, the obligatory host. One of these, the calico vine (*Aristolochia elegans*, formerly misapplied as *A. littoralis*), is a FLEPPC Category II species.


Fig. 7

ERIKA H. SIMONS

Crossing the state line

Knowing no political boundaries, butterflies often cross into Florida from the north. For the pierids (sulphurs and whites), this is due in no small part to the abundance of its more-temperate larval host plants: legumes and crucifers. In northern Florida, many of these plants are introduced ruderal and agricultural plants, such as sweet clover (*Melilotus albus*), white clover (*Trifolium repens*), alfalfa (*Medicago sativa*), black medic (*Medicago lupulina*), cabbage (*Brassica oleracea*), wild radish (*Raphanus raphanistrum*), and garden radish (*Raphanus sativus*).


Fig. 8

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Refugees from another country

The ultimate example of butterflies benefiting from introduced plants is when a species colonizes Florida from outside of the United States. For a species to succeed in this rare event, it must find its larval host plant to be adequately available. Thus, it is not surprising that they would use a plant species introduced from their native range. However, we do sometimes find non-native butterfly species that have colonized Florida utilizing native vegetation. A little tropical butterfly, the dingy purplewing, was observed doing so several years ago and is now established in southern Florida. Occasionally, Caribbean species establish ephemeral populations in southern Florida, only to die out after a few years. Butterflies are mobile creatures and, like their host plants, have populations that wax and wane as environmental conditions dictate.

A close relative of the Long-tailed skipper—the Dorantes longtail—uses many of the same legumes for larval host plants as the long-tailed, but seems to favor *Desmodium* over all others. After being found for the first time in southern Florida in 1969, the range of Dorantes skippers is expanding to the north and they can now be found throughout Florida. There is speculation that they are supplanting Long-tailed skippers in the state (Cech and Tudor 2005).


Fig. 9

HOLLY SALVATO


Fig. 10

LINDA COOPER

Three butterflies—Gray ministreak, Fulvous hairstreak, and Malachite—use FLEPPC-listed species and, while it is possible that they use other species, the only verified host plants are invasive.

Gray ministreaks use lead tree (*Leucaena leucocephala*, a Category II species) for their caterpillars, and lay their eggs on the unopened flower buds (Figure 8). One of—if not the—smallest butterflies in the U.S., gray ministreaks were first documented in Florida in 1973 (Cech and Tudor 2005). They are found throughout the Caribbean. At Fort De Soto Park (Pinellas County), Gray ministreaks may also be using woman's tongue (*Albizia lebbeck*, a Category I species) as a host plant (Lyn Atherton, personal communication).

During the same period, Fulvous hairstreaks (Figure 9) arrived in Florida from the Caribbean. Given that their sole (known) host plant is Brazilian pepper (*Schinus terebinthifolius*, a Category I species) (Minno et al. 2005), it is surprising that they have not become more widespread. Formerly abundant in certain regions of southern Florida (e.g. Homestead), they have become less common in the last year or two (Mark Salvato, personal communication).


Fig. 11

Certainly the most spectacular of our recent introductions is the Malachite (Figure 10), a green and black showstopper. It's only known larval host plant in Florida is the green shrimp plant or Browne's blechum (*Blechum pyramidatum*, a recent addition to the Category II listing) (Minno et al. 2005). This butterfly made periodic strays into southern Florida through the 1960's from Cuba, and by 1970 had become established (Smith et al. 1994, Cech and Tudor 2005). It ranges north to Sarasota and Vero Beach.

However…

These are some of the best examples of increasing butterfly diversity as a result of introduced plants in Florida. However, the examples are not a complete list, as many other cases exist. For instance, many species in our largest family of butterflies—the skippers (family Hesperiidae)—use grasses as host plants. Several skippers have successfully made the jump to non-native grasses, including torpedograss (*Panicum repens*), guineagrass (*Panicum maximum*), Johnsongrass (*Sorghum halapense*), and cogongrass (*Imperata cylindrica*), among others (Minno et al. 2005). Observations of skipper larvae on introduced grasses might lead to the conclusion that these plants are good for the species using it. However, assessing an exotic plant's benefit (or cost) to wildlife should be made by comparing it to the native plants that are displaced— a plant being utilized by an animal does not necessarily mean that the habitat has been enhanced. For example, observations of a Clouded skipper caterpillar on Johnsongrass (Figure 11) might lead some to assume that Johnsongrass is good for clouded skippers. But evaluating the plant's proposed benefit to butterflies should include the species it is displacing. If the Johnsongrass displaced Fakahatcheegrass (*Tripsacum dactyloides*), one of the butterfly's native host plants, then the *net* benefit of the Johnsongrass is canceled.

It also should be noted that new host plants may not always increase butterfly populations. Spicebush swallowtails use trees and shrubs in the laurel family, including the Category I invasive camphortree (*Cinnamomum camphora*). However, in several years of looking for their boldly colored larvae, only once have I found a spicebush swallowtail caterpillar on a camphortree, suggesting that host plants (or lack thereof) are not the limiting factor in Spicebush swallowtail populations.

Conclusion

The situation in Florida is not unique, as a similar situation exists in California where 14 of the 32 butterfly species found within the city of Davis (a low number by Florida standards) exist solely on introduced vegetation (Thacker 2004). A majority of the remaining species will also use non-native plants as caterpillar host plants. Like the Orange-barred sulphurs and Polydamas swallowtails in Florida, the Davis butterflies benefiting from the introduced flora are native species undergoing range expansions.

One may question whether having new butterflies in the state is a good thing, since they could be regarded as exotics. The situation is analogous to that of the cattle egret: the birds expanded their range after humans modified the environment and created conditions conducive to the egrets. But whether or not you call them exotics is a philosophical debate. Geopolitical boundaries don't matter to wildlife, and where the line is drawn only matters to us. Rather than calling the butterflies ìexotic,î a more appropriate description might be ìnaturalized.î And, of course, if these butterflies begin to displace our native species, then they might be considered ìinvasive.î

It is inescapable that invasive species displace native species and upset the complex food webs that make up natural communities. Understanding this big picture motivates many of us to keep up the battle against these invasives, a battle that increases in importance daily as the conversion of natural habitats to developments continues. However, hidden within this big picture is a silver lining of increasing butterfly diversity in Florida.

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Exotic plants: a double-edged sword

Florida's state butterfly, the Zebra heliconian (formerly Zebra longwing), uses native passion vines as its larval host plant. These vines produce cyanogenic (toxic) compounds and, in a tightly coevolved relationship, the boldly colored caterpillars sequester these chemicals for their own protection. The introduced scarlet passionflower (*Passiflora coccinea*) produces the same chemicals, but in greater—and lethal—quantities than our native species. To gravid (pregnant) Zebra heliconians, scarlet passionflower tastes the same as native passion vines, but the elevated chemical levels doom the soon-to-hatch larvae. Plants such as these could function as population sinks, having deleterious effects on local Zebra heliconian populations and resulting in unintended biological control of the state's butterfly, if you will.

Sennas and sulfurs

It all begins with a female laying an egg, in this case a Cloudless sulphur and a valamuerto bush in my mother-in-law's backyard. Eggs can be laid on either unopened flowers or leaves and, if they survive the voracious and abundant ants, they hatch in a day or two. From there the caterpillars grow yellow or green, depending upon whether the caterpillars eat primarily green leaves or the yellow flowers. Larval colors aside, both morphs produce the same yellow adults when they emerge from their chrysalides, looking just like mom.