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Insects That Feed on Faba Bean in Southern Florida[1]

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The faba bean, *Vicia faba* L., is a cold hardy grain legume originally from central Asia, and now cultivated from tropic to sub-arctic climates (Zeven & Zhukovsky 1975). This taxa has been artificially divided by seed size into three subspecies (Polhill & van der Maesen 1985). The broad bean (*V. faba* var. *major* Harz) is mostly grown as a grain vegetable because of its large seed size, while the horse bean (*V. faba* var. *equina* Pers.) and the pigeon or tick bean (*V. faba* var. *minor* Beck) are grown primarily for animal feed or as a green manure crop. In Europe, these two later species are referred to as "field beans" (Bond et al. 1985). With the rare exception of the Austrian pea (*Pisum sativum* var. *arvense* (L.) Poiret) used by recreational hunters for deer browse, most legumes grown in Florida are warm season crops and frost intolerant. The faba bean is one of a few freeze tolerant winter legumes that could be integrated into Florida agriculture as either a vegetable or forage crop. It is currently being evaluated as part of three-crop rotational silage cropping system that includes corn (*Zea mays* L.) and sorghum (*Sorghum bicolor* Moench) to support the cattle and dairy industries. It has the additional benefits of nitrogen fixation and thus a reasonably low fertility requirement. The information provided below is the result of a two-year study to document insects and insect-transmitted diseases that may have to be considered as pests to this potential crop for Florida (Figure 1). This list of plant and insect feeders will also serve as a reference to help growers, scouts and home gardeners determine which insects they may find on faba beans.

Figure 1. Senior author examining insects and insect-transmitted diseases.

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Fifty-five species of insect herbivores and nectaring predators and parasitoids have been observed feeding on faba bean leaves, stems, flowers, extra-floral nectaries or pods (Table 1) between October and April at the Everglades Research and Education Center, Belle Glade, Florida.

Leaf and Stem Feeders

Cowpea aphids (*Aphis craccivora* Koch) (Figure 2) feed mostly on the youngest leaf and stem tissue resulting in stunted terminal growth and distorted leaves. They are known as faba bean pests throughout the Mediterranean and some subtropical and tropical areas where they cause damage from both direct feeding and virus transmission (Cammell & Way 1983). The pea aphid, *Acyrthosiphon pisum*, feeds on the underside of leaves in the more protected middle region of the canopy. Pea aphids are known for causing more damage from virus transmission than from direct feeding damage (Cammell & Way 1983).

Figure 2. Cowpea aphid.

Bidens mottle mosaic virus (Figure 3) is transmitted to faba beans (Baker et al. 2001) by cowpea aphids, pea aphids, green peach aphids (*Myzus persicae* (Sulzer)) and spirea aphids (*Aphis spiraecola* Patch). Its causes stunted terminal growth and chlorotic, disfigured leaves and pods. Virus-infected plants may serve as better hosts of cowpea aphids allowing them to produce more young on infected than on non-infected plants (El-Kady & Salem 1974).

Two species of leafminers attack leaves, but not pods, of faba bean leaves. Damage includes mines,

Figure 3. Bidens mottle mosaic virus.

and feeding and egg deposition scars. Mines produced by American serpentine leafminer larvae, *Liriomyza trifolii* (Burgess), are common during the first months of growth. A second, unidentified species of leafminer fly produced much wider and longer leaf mines lined with a dark residue. These larger mines closely resembled those produced by the blotch leafminer, *Amauromyza maculosa* (Malloch) (Diptera: Agromyzidae), which occasionally attacks leafy vegetables in our area.

Species from several insect orders chew on faba bean leaves. A grasshopper species, *Chortophaga australior* Rehn & Hebard and a katydid, *Microcentrum rhombifolium* (Saussure), eat large jagged edge sections from leaves. Granulate cutworm larvae, *Feltia subterranea* (F.), cut off seedling faba beans at their base. The adults of both cucumber beetle species found in southern Florida, banded cucumber beetle (*Diabrotica balteata* Leconte) and southern corn rootworm (*D. undecimpunctata howardi* Barber), produce irregular sized holes on the edge and middle of the youngest fully expanded leaves. These cucumber beetles have a wide adult host feeding range and *D. balteata* is a pest of leafy

vegetables (Nuessly and Webb 2003a) and sweet corn in southern Florida (Nuessly and Webb 2003b). West Indian sugarcane root borers (*Diaprepes abbreviatus* (L.)) feed on leaf edges. Larvae of the tiger moth (*Spilosoma virginica* (F.)) and Io moth (*Automeris io io* (F.)) have been the only Lepidoptera observed to complete development on the plants. Larvae of other species, including the southern armyworm (*Spodoptera eridania* (Cramer)), were collected on plants, but were likely predated by wasps, beetles, and assassin bugs before they could complete development.

Flower and Nectar Feeders

Insects found feeding on flowers and nectar include aphids (Figure 4), thrips, beetles, skippers and wasps. The thrips *Frankliniella bispinosa* (Morgan), *F. insularis* (Franklin), and *F. kelliae* (Sakimura) feed on pollen, anthers, and other flower parts, but have not been observed to negatively effect pollination or seed set. Adults of three chafer beetle species feed on pollen and nectar within faba bean flowers. Two of these, *Anomala marginata* (F.) and *Euphoria sepulcralis* (F.) (Figure 5), are common flower feeders, and the latter species feeds at ear tips and armyworm feeding holes of sweet corn (*Zea mays* L.) ears. The third, *Trigonopeltastes delta* Forster, also feeds on fragrant inflorescences of many plants, including the sable or cabbage palm (*Sabal palmetto* (Walt. Lodd.)). Adult soldier beetles *Chauliognathus marginatus* (F.) feed on nectar and pollen within flowers during late afternoon and early evening, when mating pairs are frequently observed. The skipper butterfly *Lerema accius* (J.E. Smith) nectars from faba bean flowers. Various bees (Anthophoridae, Halictidae and Apidae), paper wasps (Vespidae), spider wasps (Sphecidae), and the cuckoo wasp *Chrysis* sp. all feed from flowers during the day. Two Chalcidoidae species feed from extra floral nectaries.

Pod Feeders

Insects that feed on pods composes the largest guild of faba bean herbivores. The stainer *Dysdercus mimulus* Hussey, four species of leaf-footed bugs and seven species of stink bugs feed on developing pods. *Leptoglossus phyllopus* (L.) (Figure 6) is the most common and destructive leaf-footed bug. Their

Figure 4. Aphids feeding on flowers and nectar.

Figure 5. A common flower feeder, *Euphoria sepulcralis* (F.).

nymphs feed in small groups on pods. Pod feeding by these plant bugs produces raised, pitted black bumps on the pod surface and black spots on developing seeds. This species feeds on a wide variety of cultivated crops, including cowpea (Baranowski & Slater 1986). The other leaf-footed bugs listed here are more commonly found associated with native plants and are not currently identified as pests of leguminous plants (Baranowski & Slater 1986). Nymphs and adults of the southern green stink bug (*Nezara viridula* (L.)) cause pod damage similar to

that by *L. phyllopus*. Six other stink bug species feed on pods but have not been observed to reproduce on faba beans. Three of these, *Acrosternum hilare* (Say) (Simmons & Yeargan 1990), *A. marginatum* (Palesot de Bearvois) (Hallman et al. 1985), and *Thyanta perditor* (F.) (Saunders et al. 1983), are known to cause at least some damage to soybeans or other cultivated beans.

Figure 6. *Leptoglossus phyllopus* (L.), the most common and destructive leaf-footed bug

Summary

Several species of insects cause damage to faba bean. Aphid (*Aphis craccivora*) feeding on terminals and virus infection (Bidens mottle mosaic) by colonizing and non-colonizing aphids reduces the growth and reproduction of the crop. Leaf feeding by cutworms and armyworms can result in reduced stand count and leaf cover if unchecked by natural enemies. Feeding by leaf-footed bugs (*Leptoglossus phyllopus*) and stink bugs (*Nezara viridula*) causes damage to seeds developing within pods. Other potential pests to faba bean in Florida include black bean aphids (*Aphis fabae* Scopoli) and other species with known pest associations with warm season beans in Florida such as melon thrips (*Thrips palmi* Karney), cowpea curculio weevil (*Chalcodermus aeneus* Bohemanor), the skipper known as the bean leafroller (*Urbanus proteus* (L.)) and the snout moth known as the lesser cornstalk borer (*Elasmopalpus lignosellus* (Zeller)) (Capinera 2001). Additional insects may successfully colonize faba beans in other growing areas of Florida.

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Table 1. Insects found feeding on leaves, stems, flowers, extra-floral nectaries and pods of faba beans at Belle Glade, Florida.

Order	Family	Species Name	Common Name	Life Stage	Plant Part
Orthoptera	Acrididae	*Chortophaga australior* Rehn & Hebard	short-horned grasshopper	A	Leaf
	Tettigoniidae	*Microcentrum rhombifolium* (Saussure)	long-horned grasshopper	A	Leaf
Thysanoptera	Thripidae	*Frankliniella bispinosa* (Morgan)	Florida flower thrips	L & A	Flower
		Frankliniella insularis (Franklin)	thrips	A	Flower
		Frankliniella kelliae (Sakimura)	thrips	A	Flower
Hemiptera	Miridae	*Creontiades rubinervis* (Stal)	plant bug	A	Leaf
	Lygaeidae	*Oncopeltus cayensis* Torre-Bueno	seed bug	A	Stem & Pod
		Ozophora trinotata Barber	seed bug	A	Leaf
	Pyrrhicoridae	*Dysdercus mimulus* Hussey	stainer	A	Pod
	Coreidae	*Acanthocephala femorata* (F.)	leaf-footed bug	A	Pod
		Anasa scorbutica (F.)	leaf-footed bug	A	Pod
		Leptoglossus phyllopus (L.)	leaf-footed bug	N & A	Pod
		Zicca taeniola (Dallas)	leaf-footed bug	A	Pod
	Alydidae	*Stenocoris tipuloides* (DeGeer)	broad-headed bug	A	Stem & Pod

Table 1. Insects found feeding on leaves, stems, flowers, extra-floral nectaries and pods of faba beans at Belle Glade, Florida.

Order	Family	Species Name	Common Name	Life Stage	Plant Part
	Pentatomidae	*Acrosternum hilare* (Say)	green stink bug	N & A	Pod
		Acrosternum marginatum (Palesot de Bearvois)	stink bug	A	Pod
		Edessa bifida (Say)	stink bug	A	Pod
		Euschistus ictericus (L.)	stink bug	A	Pod
		Euschistus quatrator Raulston	stink bug	A	Pod
		Nezara viridula (L.)	Southern green stink bug	N & A	Pod
		Thyanta perditor (F.)	stink bug	A	Pod
	Cicadellidae	*Draeculocephala mollipes* (Say)	leafhopper	N & A	Leaf
		Gypona sp.	leafhopper	N & A	Leaf
	Aphidae	*Acyrthosiphon pisum* (Harris)	pea aphid	N & A	Leaf
		Aphis craccivora Koch	cowpea aphid	N & A	Leaf & Stem
	Pseudococcidae	*Planococcus citri* (Risso)	mealybug	N & A	Pollen/Nectar
Coleoptera	Scarabaeidae	*Anomala marginata* (F.)	shining leaf chafer	A	Pollen/Nectar
		Euphoria sepulcralis (F.)	flower chafer	A	Pollen/Nectar
		Trigonopeltastes delta Forster	flower chafer	A	Pollen/Nectar
	Cantharidae	*Chauliognathus marginatus* (F.)	soldier beetle	A	Pollen/Nectar
	Chrysomelidae	*Diabrotica balteata* Leconte	banded cucumber beetle	A	Leaf
		Diabrotica undecimpunctata howardi Barber	southern corn rootworm	A	Leaf
	Curculionidae	*Diaprepes abbreviatus* (L.)	sugarcane root borer	A	Leaf
Lepidoptera	Arctiidae	*Spilosoma virginica* (F.)	tiger moth	L	Leaf
	Noctuidae	*Feltia subterranea* (F.)	granulate cutworm	L	Seedling stem
		Spodoptera eridania (Cramer)	southern armyworm	L	Leaf
	Saturniidae	*Automeris io io* (F.)	Io moth	L	Leaf
	Hesperiidae	*Lerema accius* (J. E. Smith)	skipper	A	Flower
Diptera	Otitidae	*Euxesta annonae* (F.)	picture-winged fly	A	Extra floral nectary
	Tephritidae	*Xanthaciura insecta* (Loew)	fruit fly	A	Extra floral nectary
	Agromyzidae	*Liriomyza trifolii* (Burgess)	serpentine leafminer	L & A	Leaf
Hymenoptera	Chalcididae	*Brachymeria* sp.	chalcidid parasitic wasp	A	Extra floral nectary
		Conura sp.	chalcidid parasitic wasp	A	Extra floral nectary

Table 1. Insects found feeding on leaves, stems, flowers, extra-floral nectaries and pods of faba beans at Belle Glade, Florida.

Order	Family	Species Name	Common Name	Life Stage	Plant Part
	Chrysidae	*Chrysis* sp.	cuckoo wasp	A	Nectar
	Halictidae	*Agapostemon splendens* (Lepeletier)	solitary bee	A	Nectar
		Halictus sp.	solitary bee	A	Nectar
	Anthophoridae	*Xylocopa micans* Lepeletier	carpenter bee	A	Pollen/nectar
	Apidae	*Apis mellifera* L.	honey bee	A	Pollen/nectar
	Vespidae	*Eumenes fraternus* Say	paper wasp	A	Nectar
		Pachyodynerus nasidens (Latreille)	paper wasp	A	Nectar
		Polistes dorsalis (F.)	paper wasp	A	Nectar
		Polistes major Beauvois	paper wasp	A	Nectar
		Polistes metricus Say	paper wasp	A	Nectar
	Sphecidae	*Liris* sp.	spider wasp	A	Nectar