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INSECTS ASSOCIATED WITH FABA BEAN, *VICIA FABA* (FABALES: FABACEAE), IN SOUTHERN FLORIDA

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ABSTRACT

One hundred faba bean (*Vicia faba* L., Fabales: Fabaceae) accessions from the USDA-NSSL Seed Repository in Prosser, WA were grown outdoors in southern Florida from December 2000 through April 2001 and October 2001 through April 2002 to both evaluate their potential as a forage crop and to initiate selections of superior genotypes. Insect herbivores and their predators were observed for feeding associations and collected for identification throughout the two seasons of trials. Sixty-one species of insect herbivores and nectaring predators and parasitoids were observed feeding on or were captured on faba bean leaves, stems, flowers, extra-floral nectaries or pods. Additionally, thirty-two species of predacious and parasitic insects were observed eating herbivorous insects or captured while searching for prey or hosts on faba beans plants. The most significant damage was caused by large populations of *Aphis craccivora* Koch (Hemiptera: Aphidae) that fed on terminals and young leaf and stem tissue. Six Coccinellidae species fed upon aphids and reproduced on the crop. Pods were damaged by reproducing populations of *Leptoglossus phyllopus* (L.) (Hemiptera: Coreidae) and *Nezara viridula* (L.) (Hemiptera: Pentatomidae).

Key Words: *Aphis craccivora*, *Leptoglossus phyllopus*, *Nezara viridula*, bidens mottle mosaic, faba bean, *Vicia faba*

RESUMEN

Cien accesiones de haba (*Vicia faba* L., Fabales: Fabaceae) del Repositorio de Semillas de USDA-NSSL en Prosser, WA fueron sembradas en el campo en el sur de Florida de diciembre 2000 hasta abril 2001 y de octubre 2001 hasta abril 2002 para evaluar su potencial como cultivo de forraje y para iniciar la selección de genotipos superiores. Los insectos herbívoros y sus depredadores fueron observados para determinar las asociaciones alimentarias y recolectados para identificarlos durante dos estaciones de pruebas. Sesenta y una especies de insectos herbívoros y depredadores que se alimentaban del néctar, parasitoides que fueron observados alimentándose de la planta, o fueron capturados en las hojas, tallos, flores, néctar extra-floral o las vainas de haba. Además, treinta y dos especies de insectos depredadores y parasíticos fueron observados alimentándose de insectos herbívoros, o capturados mientras estaban buscando presas u hospederos sobre el haba. El daño más significativo fué causado por la alta población de *Aphis craccivora* Koch (Hemiptera: Aphidae) que se alimentó de los terminales y del tejido tierno de las las hojas y el tallo. Seis especies de Coccinellidae se alimentaron de los áfidos y se reprodujeron en el cultivo. Las vainas fueron dañadas por poblaciones de *Leptoglossus phyllopus* (L.) (Hemiptera: Coreidae) y de *Nezara viridula* (L.) (Hemiptera: Pentatomidae) reproduciéndose sobre el cultivo.

The faba bean, *Vicia faba* L., is a cold hardy, grain legume originally domesticated in the Hindustani region of central Asia, but 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). In Florida, faba bean production is uncommon, and broad beans are only rarely seen in Florida gardens (Stephens 1994). However, Florida does have significant and diverse legume based indus-

tries throughout the state, which range from exotic oriental vegetables such as the winged bean (*Psophocarpus tetragonolubus* (L.) DC.) to forage legumes including clovers. Large commercial industries are in place for peanuts (*Arachis hypogaea* L.) and fresh market beans (*Phaseolus vulgaris* L.), with smaller production of cowpea (*Vigna unguiculata* (L.) Walp.) (Florida Agricultural Statistics Service 2001). Additionally, uses of feral legumes such as *Aeschynomene* spp. vacillate from weed to cover crop to domesticated forage. 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 could enlarge the array of winter vegetable crops or be inserted into a silage cropping system that includes corn (*Zea mays* L.) and sorghum (*Sorghum bicolor* Moench) to support the cattle and dairy industries. It has the ancillary benefits of nitrogen fixation and thus a reasonably low fertility requirement.

Any assessment of a crop's potential in a new region would be aided by the knowledge of the insect fauna that would be associated with its production. Insect and nematode pests of faba beans were broadly reviewed by Bardner (1983) and Cammel & Way (1983). Economically important faba bean insect pests include aphids that cause direct feeding damage and transmit plant viruses (e.g., *Aphis fabae* Scopoli, *A. craccivora* Koch, *Acyrthosiphon pisum* (Harris), and *Megoura viciae* Buckton) (Hemiptera: Aphidae), as well as leafhoppers, thrips, moth larvae, leafmining fly larvae, seed beetles and weevils. Many insect species are found on warm season legumes in Florida, some of which are considered to be commercial pests (Pernezny et al. 2004). It is reasonable to assume that some of these insects would overlap onto faba beans, but an actively growing legume crop in the winter season could host additional insect species not typically found on warm season legumes. The purpose of this research was to identify insects and their association (i.e., herbivorous, predacious, parasitic) with experimental plots of faba beans grown from October to April in southern Florida. Our findings are discussed in relation to other known insect pests of faba beans in the western hemisphere and of Florida legumes in general.

Materials and Methods

One hundred faba bean accessions in the range from PI 301011 through PI 577748 were acquired from the USDA-NSSL Seed Repository in Prosser, WA. The accessions were split planted in two seasons at the Everglades Research and Education Center, Belle Glade, Palm Beach County, Florida. Sixty-seven of these accessions were planted on December 1, 2000 and grown through April 30, 2001. Selections were made based on horticultural and agronomic characters and planted with the remaining 33 accessions in October 2001 and grown through April 2002. Plants were grown outdoors in 40 above-ground, concrete-walled production bins, 76.2 cm deep and 2.1 m long, filled with Palm Beach soil mix (50% compost, 25% clean sand, 25% bark, Odum's, West Palm Beach, FL). Seeds were planted 10 to 15 cm apart in rows spaced 46 cm on center, five rows per bin. Six seeds of each accession were planted in a row with final plant density averaging four plants per row and 20 plants per bin. Plots were provided with a complete fertilizer plus micro nutrients mixed with the soil at planting. Additional fertilizer (20-20-20 plus micro nutrients and ammonium nitrate) was applied at label rates on a regular basis from early February to early April in both seasons. The plants were grown insecticide free until March of both years when imidacloprid (Provado 1.6 Flowable, Bayer CropScience LP, Research Triangle Park, NC) was applied at 3 fl. oz per acre to control excessive populations of cowpea aphids, *Aphis craccivora*. A composite population of PI lines from seeds left over from selections from the previous season was mixed together and planted in the field on 31 October 2001 for observation and collection of associated insects. Hand-held planters (Almaco, Nevada, IA) were used to plant the seeds 10 cm apart in 4 rows 76 cm on center and 114 m long in a Lauderhill organic soil (i.e., euic, hyperthermic Lithic Medisaprists) at the Everglades Research and Education Center, Belle Glade, FL.

Plants were examined weekly for presence of insects at various times from early morning to early evening to survey the entire photophase. Observations of feeding associations with faba bean leaves, stems, flowers, and pods, as well as predacious and parasitic activity against insect herbivores was recorded whenever possible before specimens were collected and preserved for identification. Insects were identified to species where possible through the use of published systematic keys and direct comparisons with museum specimens housed at the Division of Plant Industry in Gainesville, Florida.

Results and Discussion

Plant and Nectar Feeders

Insects found in association with faba beans during the two seasons are divided into plant and nectar feeders (Table 1) and predators and parasitoids (Table 2). Notes on feeding associations are included for only those directly observed. Insects that caused visible damage to terminals,

TABLE 1. INSECTS FOUND FEEDING ON LEAVES, STEMS, FLOWERS AND PODS OF FABA BEANS AT BELLE GLADE, FLORIDA IN 2001 AND 2002.

Order	Family	Insect	Life stage[1]	Plant part
Orthoptera	Acrididae	*Chortophaga australion* Rehn & Hebard	A	Leaf
	Tettigoniidae	*Microcentrum rhombifolium* (Saussure)	A	Leaf
Thysanoptera	Thripidae	*Frankliniella bispinosa* (Morgan)	L & A	Flower
		Frankliniella insularis (Franklin)	A	Flower
		Frankliniella kelliae (Sakimura)	A	Flower
Hemiptera	Miridae	*Creontiades rubinervis* (Stal)	A	Leaf
	Lygaeidae	*Oncopeltus cayensis* Torre-Bueno	A	Stem /pod
		Oncopeltus fasciatus (Dallas)	A	
		Ozophora trinotata Barber	A	Leaf
	Pyrrhicoridae	*Dysdercus mimulus* Hussey	A	Pod
	Coreidae	*Acanthocephala femorata* (F.)	A	Pod
		Anasa scorbutica (F.)	A	Pod
		Leptoglossus phyllopus (L.)	N & A	Pod
		Zicca taeniola (Dallas)	A	Pod
	Alydidae	*Stenocoris tipuloides* (DeGeer)	A	
	Pentatomidae	*Acrosternum hilare* (Say)	N & A	Pod
		Acrosternum marginatum (Palesot de Bearvois)	A	Pod
		Edessa bifida (Say)	A	Pod
		Euschistus ictericus (L.)	A	Pod
		Euschistus quatrator Raulston	A	Pod
		Nezara viridula (L.)	N & A	Pod
		Thyanta perditor (F.)	A	Pod
	Cicadellidae	*Draeculocephala mollipes* (Say)	N & A	Leaf
		Gypona sp.	N & A	Leaf
	Delphacidae	*Perkinsiella saccharicida* Kirkaldy	A	
	Aphidae	*Acyrthosiphon pisum* (Harris)	N & A	Leaf
		Aphis craccivora Koch	N & A	Leaf and stem
	Pseudococcidae	*Planococcus citri* (Risso)	A	Root and stem
Coleoptera	Scarabaeidae	*Anomala marginata* (F.)	A	Pollen/nectar
		Euphoria sepulcralis (F.)	A	Pollen/nectar
		Trigonopeltastes delta Forster	A	Pollen/nectar
	Cantharidae	*Chauliognathus marginatus* (F.)	A	Pollen/nectar
	Chrysomelidae	*Diabrotica balteata* Leconte	A	Leaf
		Diabrotica undecimpunctata howardi Barber	A	Leaf
	Curculionidae	*Diaprepes abbreviatus* (L.)	A	Leaf
Lepidoptera	Pyralidae	*Hellula rogatalis* (Hulst)	A	
		Herpetogramma phaeopteralis (Guenee)	A	
		Spoladea recurvalis (F.)	A	
	Arctiidae	*Spilosoma virginica* (F.)	L	Leaf
	Noctuidae	*Feltia subterranea* (F.)	L	Seedling stem
		Spodoptera eridania (Cramer)	L	Leaf
	Saturniidae	*Automeris io io* (F.)	L	Leaf
	Hesperiidae	*Lerema accius* (J. E. Smith)	A	Flower
Diptera	Stratiomyidae	*Hedriodiscus trivittatus* (Say)	A	
		Hermetia illucens (L.)	A	
	Otitidae	*Euxesta annonae* (F.)	A	
	Tephritidae	*Xanthaciura insecta* (Loew)	A	
	Agromyzidae	*Liriomyza trifolii* (Burgess)	L & A	Leaf
Hymenoptera	Chrysididae	*Chrysis* sp.	A	Nectar
	Halictidae	*Agapostemon splendens* (Lepeletier)	A	Nectar
		Halictus sp.	A	Nectar
	Anthophoridae	*Xylocopa micans* Lepeletier	A	Nectar
	Apidae	*Apis mellifera* L.	A	Pollen/nectar

[1]Life stage: L, larva; N, nymph; A, adult.

TABLE 2. INSECTS FOUND FEEDING ON OR SEARCHING FOR INSECT HERBIVORES OF FABA BEANS AT BELLE GLADE, FLORIDA IN 2001 AND 2002.

Order	Family	Insect	Life stage[1]	Observed association
Predators				
Dermaptera	Forficulidae	*Doru taeniatum* (Dohrn)	A	General predator
Hemiptera	Reduviidae	*Repipta taurus* (F.)	N & A	General predator
		Sinea sp.	A	General predator
		Zelus longipes (L.)	N & A	General predator
	Pentatomidae	*Podisus maculiventris* (Say)	A	General predator
Coleoptera	Carabidae	*Calleida decora* (F.)	A	General predator
	Coccinellidae	*Brachiacantha decora* Casey	L & A	Aphid predator
		Coelophora inaequalis (F.)	L & A	Aphid predator
		Cycloneda sanguinea (L.)	L & A	Aphid predator
		Harmonia axyridis (Pallas)	L & A	Aphid predator
		Hippodamia convergens Guerin-Meneville	L & A	Aphid predator
		Olla v. nigrum (Mulsant)	L & A	Aphid predator
Diptera	Dolichopodidae	*Condylostylus* sp.	A	
		Plagioneurus univittatus Loew	A	
	Syrphidae	*Allograpta oblique* (Say)	A	
		Palpada vinetorum (F.)	A	
		Toxomerus sp.	A	
	Calliphoridae	*Phaenicia caeruleiviridis* (Macquart)	A	
	Sarcophagidae	*Sarcodexia* sp.	A	
	Tachinidae	*Lespesia* sp. 1	A	
		Lespesia sp. 2		
		Nilea sp.	A	
		Winthemia sp.	A	
Hymenoptera	Mutillidae	*Timulla* sp.	A	
	Vespidae	*Eumenes fraternus* Say	A	Lepidoptera predator/ nectar
		Pachyodynerus nasidens (Latreille)	A	Lepidoptera predator/ nectar
		Polistes dorsalis (F.)	A	Lepidoptera predator/ nectar
		Polistes major Beauvois	A	Lepidoptera predator/ nectar
		Polistes metricus Say	A	Lepidoptera predator/ nectar
	Pompilidae	*Anoplius* sp.	A	
	Sphecidae	*Liris* sp.	A	Lepidoptera predator/ nectar
Parasitoids				
Hymenoptera	Braconidae	*Bracon* sp.	A	
		Cotesia sp.	A	
	Ichneumonidae	*Coccygomimus marginellus* (Brulle)	A	
		Exetastes sp.	A	
		Pterocormus sp.	A	
		Trogomorpha trogiformis (Cresson)	A	
	Chalcididae	*Brachymeria* sp.	A	Extra floral nectary
		Conura sp.	A	Extra floral nectary

[1]Life stage: L, larva; N, nymph; A, adult.

leaves and pods appeared to be evenly distributed across the tested accessions and none were observed to be more attractive than another to the insect herbivores and natural enemies. Collection records in Tables 1 and 2 are pooled across all accessions and both study years. Sixty-one species of insect herbivores and nectaring predators and parasitoids were observed feeding or captured on faba bean leaves, stems, flowers, extra-floral nectaries or pods.

Cowpea aphids were the most abundant insects feeding on faba bean leaves in both years of the study. Their feeding was concentrated on the youngest leaf and stem tissue and resulted in stunted terminal growth and distorted leaf expansion. 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*, was a late season colonizer of the crop after initiation of pod set in February 2001, but not in 2002. It utilized a different microhabitat of the plants compared with *Aphis craccivora*, concentrating instead on the underside of leaves in the more protected middle region of the canopy. Lowe (1967) found that *A. pisum* first preferred faba bean stems in the growing terminal before moving to developing leaves. Pea aphids are known for causing more damage from virus transmission than from direct feeding damage (Cammell & Way 1983). *Aphis fabae* is known from Florida (Halbert & Nuessly 2001) and is an aphid pest of faba bean in Nova Scotia, Canada (Patriquin et al. 1988), but it was not observed feeding on the crop in our studies.

A crippling virus, Bidens mottle mosaic, infected the PI accessions tested during the middle of the first year causing stunted terminal growth and chlorotic, disfigured leaves and pods (Baker et al. 2001). While the disease is known from southern Florida on leafy vegetables, and both of the aphids colonizing the plants in our study are known vectors, faba beans are a new host for this virus. No difference is colonization rates of accessions were observed for either cowpea or pea aphids. Two other aphid vectors of Bidens mottle mosaic, *Myzus persicae* (Sulzer) and *Aphis spiraecola* Patch (both Hemiptera: Aphidae), are known from the area (Halbert & Nuessly 2001), but they were not found feeding on or colonizing faba beans during this study. Aphid transmitted viruses have also been reported on faba bean in Guatemala (Vasquez 1988). Plants infested with broad bean mosaic virus in Egypt serve as better hosts of *A. craccivora* allowing them to produce more progeny on infected than on non-infected plants (El-Kady & Salem 1974).

Other piercing-sucking insects observed feeding on leaves (Table 1) included the plant bug *Creontiades rubinervis* (Stal), the seed bug *Ozophora trinotata* Barber, and the leafhoppers *Draeculocephala mollipes* (Say) and *Gypona* sp. Other mirids, including *Lygus* sp., have been reported to produce necrotic spots on leaves that later collapse to form holes (Bardner 1983). Leafhopper feeding damage was also noted by Bardner (1983) to produce distorted growth and stunting on faba beans. While necrotic lesions were observed on leaves in our plantings, it was not confirmed whether they were the result of feeding by these heteropterous and homopterous insects. The lygaeid *Oncopeltus cayensis* Torre-Bueno was observed probing stems and pods, while *O. fasciatus* (Dallas) was not observed feeding on any of the plant structures. Both are known to specialize on various milkweeds (Slater & Baranowski 1990).

Two species of leafminers were found attacking faba bean leaves. The American serpentine leafminer, *Liriomyza trifolii* (Burgess), is a common pest of leafy vegetables throughout Florida (Spencer & Stegmaier 1973). Damage by this insect consisted of feeding and oviposition stipples and mines on leaves, but not pods. Another species of dipterous leafminer produced much wider and longer tunnels lined with a dark residue that was quite obvious without light transmission. This leafminer remains unidentified because repeated attempts to rear adults from larvae in infested leaves held in plastic cups at room temperature were unsuccessful.

Species from several orders were found chewing on faba bean foliage (Table 1). The grasshoppers *Chortophaga australion* Rehn & Hebard and *Microcentrum rhombifolium* (Saussure) ate large jagged edge sections from leaves. Granulate cutworm, *Feltia subterranea* (F.), cut off seedling faba beans at their base. Both cucumber beetle species found in southern Florida, banded cucumber beetle (*Diabrotica balteata* Leconte) and spotted cucumber beetle (*D. undecimpunctata howardi* Barber), produced irregular sized notches on the edge and holes within the youngest fully expanded leaves. These cucumber beetles have a wide adult host feeding range and *D. balteata* is a pest of leafy vegetables and sweet corn in southern Florida (Nuessly & Webb 2002a, b). A single adult Diaprepes root weevil (*Diaprepres abbreviatus* (L.)) was found feeding on the edge of a leaf. The adults of this species have been reported to feed on a variety of vegetables and weeds and the larvae are pests of many crops, including citrus and sugarcane (Simpson et al. 1996), which are grown extensively throughout central and southern Florida. Larvae of the tiger moth (*Spilosoma virginica* (F.)) and Io moth (*Automeris io io* (F.)) were 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, bees and assassin bugs (Table 2) before they could complete development. Adults of three species of pyralids were captured while they rested on the plants (Table 1).

Flower and nectar feeders included thrips, beetles, skippers and wasps (Table 1). The thrips *Frankliniella bispinosa* (Morgan), *F. insularis* (Franklin), and *F. kelliae* (Sakimura) fed on pollen, anthers, and other flower parts, but did not cause any noticeable problems with pollination or seed set. Adults of three scarab beetle species were

found feeding on pollen and nectar within faba bean flowers. *Anomala marginata* (F.) and *Euphoria sepulcralis* (F.) are common flower feeders, with the latter species found feeding at ear tips and armyworm feeding holes of sweet corn (*Zea mays* L.) ears (Nuessly et al. 1999). *Trigonopeltastes delta* Forster is commonly found feeding on fragrant inflorescences of many plants, including the sable or cabbage palm (*Sabal palmetto* (Walt. Lodd.)) (G.S.N., unpublished data). The soldier beetle *Chauliognathus marginatus* (F.) became very common as the seasons progressed, feeding on nectar and pollen within flowers during late afternoon and early evening. Mating pairs were frequently observed. Adults of the hesperiid *Lerema accius* (J.E. Smith) were observed feeding on faba bean flowers. Various bees (Anthophoridae, Halictidae and Apidae) were observed feeding at the flowers (Table 1). While wasps are discussed below, paper wasps (Vespidae), spider wasps (other Sphecidae), and the cuckoo wasp *Chrysis* sp. (Tables 1 and 2) were also observed flying between and feeding from numerous flowers during the day. Two Chalcidoidae species were also observed feeding from extra floral nectaries.

Pod feeders composed the largest guild of faba bean herbivores observed in the experiments (Table 1). The pyrrhocorid *Dysdercus mimulus* Hussey, four species of Coreidae and seven species of Pentatomidae fed on developing pods. *Leptoglossus phyllopus* (L.) was the most common and destructive of the Coreidae that fed and reproduced on the crop. Their nymphs were observed to feed in small groups on pods. This species feeds on a wide variety of cultivated crops, including cowpea (Baranowski & Slater 1986). Pod feeding produced raised, pitted black bumps on the pod surface and black spots on developing seeds. The other coreids found on faba beans in our studies, *Acanthocephala femorata* (F.), *Anasa scorbutica* (F.), and *Zicca taeniola* (Dallas), are more commonly found associated with native plants and have not been identified as pests of leguminous plants (Baranowski & Slater 1986). Pod damage similar to that caused by *L. phyllopus* also was produced by the most commonly encountered stink bug, *Nezara viridula* (L.). This insect also reproduced on the faba beans, although few were observed to complete development. Six other stink bug species (Table 1) were not commonly encountered and were not observed to reproduce on faba beans. Three of these six species, *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 legumes.

Dipterous species in the families Stratiomyidae, Otitidae, and Tephritidae were captured while they rested on bin and field planted faba beans, but no feeding associations were noted for these flies. These fly species are commonly found on many species of agronomic crops and weeds throughout southern Florida (G.S.N., unpubl. data).

Predacious and Parasitic Insects

Twenty-seven species of predator and parasitoid insects were collected during our studies. Larvae of six coccinellid species (Table 2) fed on cowpea aphids and their adults were reared from pupae collected from stems and under leaves of test plants. Raymond et al. (2000) found that *Aphis fabae* feeding on *V. faba* attracted the coccinellid *Adalia bipunctata* L. in laboratory testing, whereas plants without aphids or ones with aphids recently removed did not attract the beetles. Larvae of all three syrphids feed on the sugarcane aphids *Melanaphis sacchari* (Zehntner) and *Sipha flava* (Forbes) (both Hemiptera: Aphidae) in Florida sugarcane fields (Hall 1988).

Calleida decora (F.) is a red and iridescent green predacious ground beetle commonly encountered on various cultivated crops throughout the southeastern and into the mid-western United States (Erwin et al. 1977). Larvae and adults of this species were found on the soil and up into the faba bean canopy. It is an important predator of several lepidopterous pests of cotton and soybean (Harris et al. 1985).

Solitary and social wasps (Sphecidae and Vespidae, Table 2) were frequently observed searching leaves that exhibited feeding damage. These wasps normally anesthetize their prey and then either macerate them into "meat balls" to bring back to their nests or use them to provision solitary mud or sub-soil nests for their progeny. Feeding damage associated with medium through large sized Lepidoptera larvae was not common on our faba beans and a few late instar southern armyworm, tiger, and io moth larvae were the only large larvae found. Resistance to armyworm pests in faba beans was not noted in the Clement et al. (1994) review of plant resistance achievements in cool season food legumes. Therefore, we believe that lepidopteran larvae in their early to mid instars succumbed to predation rather than to plant resistance mechanisms.

The assassin bugs *Repipta taurus* (F.), *Zelus longipes* (L.) and *Sinea* sp. were each observed to feed on Lepidoptera larvae, cucumber beetle adults and spiders on faba bean leaves. They are generalist predators found throughout the United States (Blatchley 1926; Reinert 1978; Altieri & Whitcomb 1980). The earwig *Doru taeniatum* (Dohrn) and velvet ant *Timulla* sp. were captured on faba beans without any specific feeding association, however, the former is known as a predator of armyworms, aphids and other soft bodied insects in corn (Jones 1985) and sugarcane (Hall 1988).

Several species of insects caused damage to the crop in our studies. Aphid (*Aphis craccivora*) feed-

ing on terminals and virus infection by colonizing and non-colonizing aphids reduced the growth and reproduction of the crop. Feeding by seed (*Leptoglossus phyllopus*) and stink bugs (*Nezara viridula*) also caused damage to seeds developing within pods. However, other species with known pest associations with warm season beans in Florida were not encountered on faba beans in these limited tests. These included the following important pests of snap beans in Florida (Pernezny et al. 2004; Capinera 2001): melon thrips (*Thrips palmi* Karney) (Thysanoptera: Thripidae), cowpea curculio (*Chalcodermus aeneus* Bohemanor) (Coleoptera: Curculionidae), bean leafroller (*Urbanus proteus* (L.)) (Lepidoptera: Hesperiidae) and lesser cornstalk borer (*Elasmopalpus lignosellus* (Zeller)) (Lepidoptera: Pyralidae).

Faba bean accessions grew well in the south Florida Winter climate during both seasons. Plants produced main stems up to 2.29 m long in the first season during which there were five freeze events, with one down to -6.1°C. These cool season plants grew main stems only 1.83 m long during the warmer second season during which there were no freeze events. Yields of accessions selected for greatest pod development and vegetative growth will be determined in larger block studies to be conducted in following seasons.

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