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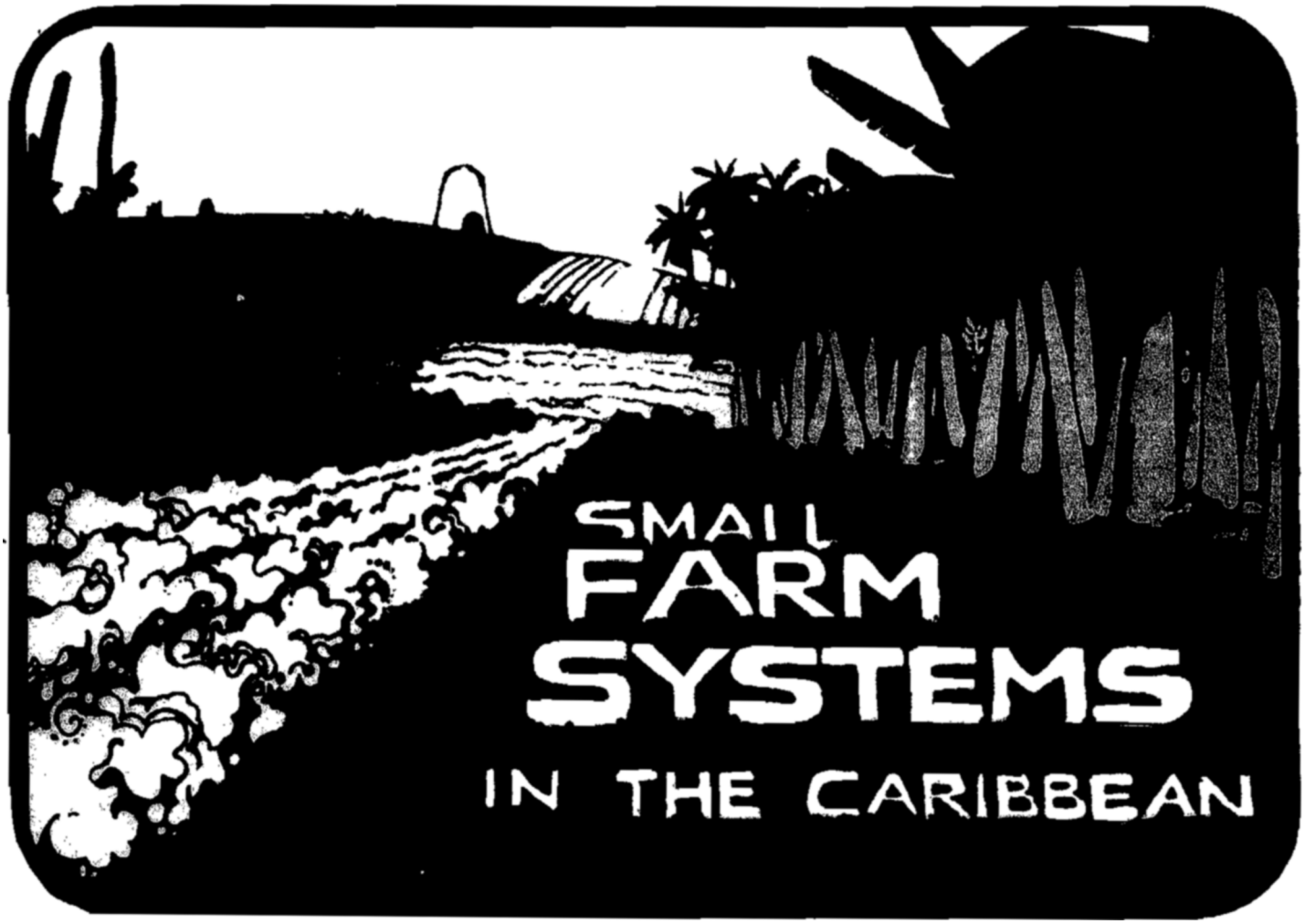

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Defoliators and Sap Sucking Insects of Pigeon-Pea in Barbados, West Indies

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Like most other crops, pigeon-peas are attacked by several insects, some of which cause heavy crop losses. These pests require special attention to artest their damage, while others cause limited damage and need few or no control measures.

During these studies, from twenty-two pest species recorded in Barbados, eight were feeding on leaves, and fourteen sucking sap from leaves, stems and pods. A number of indigenous natural enemies attacking these pest were also recorded.

Defoliators

1. Velvet Bean Caterpillar, *Anticarsia gemmatalis* (Hubner) (Lepidoptera:Noctuidae).

In Barbados, occasional outbreaks cause serious defoliation on peigeon-pea and beans.

The adults are 1.3-1.8mm long, with a wing span ranging from 3.3-4.0cm. Forewings ate pale greyish-brown; a narrow pale line, with a dark margin on either side of it, traverses borh wings diagonally. The larvae are relatively slender, either green marked with longitudinal lines, or more brownish, with more prominent longitudinal lines. Eggs ate tibbed, circular and dome-shaped.

The eggs are laid in clusters on the leaves. The larvae which move with a looping action, feed on the leaves, and after defoliating one plant, they move on to another. When disturbed, they drop to the ground with pulsating movements. Pupation occurs in the soil or among the debris on the ground.

The pest is widely distributed in the Caribbean, the United States of America and Latin America.

It also feeds on beans (*Phaseolus* spp., *Phaseolus vulgaris*), woolly pyrol (*Phaseolus mungo*), bonavist bean (*Lablab niger [= Dolichos lablab]*), peanut (*Arachis hypogaea*), sugarcane (*Saccharum officinarum*), wild dolly (*Macroptilium lathyroides*), shame bush (*Mimosa* spp.) and several other cultivated and wild plants.

Indigenous natural enemies include—*Carinodes havanensis* (Cameron) (Ichneumonidae) and *Brachymeria ovata* (Say) (Chalcididae)—Parasites. *Cycloneda sanguinea* (L.) (Coccinellidae); *Chrysopa* sp., *Chrysopa lanata* (Banks) and *Chrysopa limitata* (Navas) (Chtysopidae); and *Polistes barbadensis* (Richards) (Vespidae)—Predators.

The eggs of *A. gemmatalis* are parasitised by an introduced species, *Telenomus remus* (Nixon) (Scelionidae) and the larvae by *Bracon* sp. prob. *hebetor* (Say) (close to *Bracon brevicornis* [Wesmeal]) (Braconidae).

2. A Leaf-tip toller, *Caloptilia* sp. (Lepidoptera:Gracillariidae).

This is a minor pest. A single egg is laid in a slightly curled leaf-tip. On hatching, the larva rolls up the leaf tip further and secures it with a silken thread, thus forming a hollow tube in which to feed. As the larva grows in size, the leaf toll is also enlarged.

Initially the larva lacerates the leaf cells and sucks the exuding sap. At a later stage it feeds on parenchyma. Owing to the small size of the larva, the actual damage to the leaf is negligible, hut the infested leaves, due to lack of photosynthesis, eventually die and fall prematurely. Pupation occurs in the leaf roll.

In Barbados, it is parasitised by *Asympiesella* sp. (Eulophidae).

3. The Sugarcane Root-boter, *Diaprepes abbreviatus* (L.) (Coleoprera:Curculionidae).

Generally this is a minot pest, but during ourbreaks, pigeon-pea is a favorite host plant on which the adults congregate, mate, feed and lay eggs. During such times the plants are heavily defoliated.

Alam (1976) reported on the general behavior, life-cycle, alternate host plants, and discussed various methods of control.

Besides the indigenous and exotic natural enemies reported by Alam (1976), three additional parasite species, viz. *Tetrastichus* sp. prob. *haitiensis* (Gahan) and *Horismenus* sp. prob. *cupreus* (Ashm.) (Eulophidae) and *Ufens* sp. (Trichogrammatidae), attacking the eggs of *Diaprepes famelicus* (Gyll.) on *Citrus* spp., in Montserrat, were introduced into Barbados. As *D. abbreviatus* tends to lay eggs on citrus leaves, these parasites were released in citrus otchards, bur no recoveries were made.

As the adults are attracted in large numbers to pigeon-pea, maize and citrus, these plants may be sprayed with a fast acting, non-residual insecticide(s), such as Malathion, Dibrom (naled), Dimecron, Elecron, Ekalux or Pyrethrins (Fewkes, 1979).

Soil treatment with persistent organochlorine insecticides such as Chlordane, applied at the rate of 1 kg. a.i./ha against first and second instar larvae, 3 kg a.i./ha against third instar larvae and Heptachlor, 7 l/ha of 3E concentrarion (also available as the granular formularion) have been tried and recommended (Alam, 1976). Chemicals should be incorporated into the soil during preparation of the land immediately before or at planting.

4. *Promecops lunatus* (Fhs.) (Coleoptera:Curculionidae).

The adults fray the leaf edges of the crop. A heavy attack causes serious damage. The biology and natural enemies have not been studied.

Chemical control as for *Diaprepes* is applicable for this species.

Sucking Insects

1. The Green Stink-bug, *Nezara viridula* (L.) (Hemiptera: Pentatomidae)

In Barbados this is a minor to negligible pest. The adults and nymphs suck sap from tender leaf-stalks and pods.

Adults are green, shield shaped and rather flattened dorsally. The egg is about 1mm high and cylindrical, about 1.3 times as high as wide. It is creamy-yellow at first, changing to orange before hatching. The eggs are laid on the leaf surface in rows forming a hexagonal cluster of about 30 to 100 eggs. The incubation period is about 5 days. The newly hatched nymphs remain clustered for a day near the egg-shells, then gradually disperse and start sucking the cell sap from the leaves. They pass through five moults before reaching the adults stage. The nymphal stage

lasts for 20-43 days. Mating starts one to two days later, and egg-laying beginning in a further two to three days.

The pest is pan tropical and is present in all islands of the Lesser Antilles and all the warmer parts of the Americas. It has also been recorded in cotron (*Gossypium barbadense*), sweet potato (*Ipomoea batatas*), beans (*Phaseolus* spp.), tomato (*Lycopersicon esculentum*), pepper (*Capsicum annuum*), okra (*Hibiscus esculentus*), squash (*Cucurbita* spp.), eggplant (*Solanum melongena*), spider plants (*Cleome spinosa* and *Cleome viscosa*), stinking miss (*Gynandropsis gynandra*) and several other cultivated and wild plants.

In Barbados and the East Caribbean islands, the eggs are parasitised by *Trissolcus* (=*Asolcus*) sp., *Trissolcus* (=*Asolcus*) *basalis* (Wollaston) and *Telenomus* sp. (Scelionidae).

2. The Green and Brown Stink-bug, *Edessa meditabunda* (F.) (Hemiprera:Pentatomidae).

Generally this is a minor pesr. The nymphs and adults suck sap from the stems and pods.

Adults are bright green, somewhat polished. Eggs are about 1mm high, pale green, approximately spherical.

The eggs are laid on the leaves, usually in a cluter of about fourteen, arranged in two rows of seven eggs each. These hatch in about five days. Newly hatched nymphs are orange-yellow, with dark markings, These remain congregated near the empty egg-shells for some time and rhen disperse and start feeding. There are five nymphal instars. The life-cylce occupies abour a month.

The pest has been reported from Trinidad, the Leeward and Windward islands, Haiti and Suriname. Ir also attacks beans (*Phaseolus* spp.), cotton (*G. barbadense*), eggplant (*S. melongena*), Black nightshade (*Solanum nigrum*), wild tomato (*Solanum torvum*), okra (*H. esculentus*), tomato (*L. esculentum*), citrus (*Citrus* spp.), English Clammy cherry (*Cordia alba* and *Cordia obliqua*), white broomweed (*Parthenium hysterophorus*) and several other cultivated and wild plants.

The eggs are parasitised by *Trissolcus* sp. and *Telenomus* sp.

3. The Leaf-hoppers, *Empoasca fabae* (Harris) and *Empoasca fabalis* (DeLong) (Hemiptera:Cicadellidae).

These are important pests. The nymphs and adults suck sap from the leaves and pods. Because of their abundance and role as disease carriers, these pests need special attention.

The adult is about 3mm long, slender and wholly green. The egg are laid into the srems or in the leaf midribs. Incubation period is about ren days. The young nymphs are bright green, feed on the underside of the leaves, and run rapidly if disturbed. Before reaching the adult stage, the insect passes through five instars in 12 to 15 days. Four days after mating, the female srarts laying eggs. An individual female lays two to three eggs at a time, and may live for rhree to four weeks. The insect is capable of transmitting a virus disease of beans (bean yellows).

These species are widely disrributed in the Lesser Antilles and have also been recorded from beans (*Phaseolus* spp., *P. vulgaris*), woolly pyrol (*P. mungo*), bonavist bean (*L. niger* = *D. lablab*), and a number of cultivated and wild plants.

Fennah (1947) reported *Anagrus empoascae* (Doz.) (Mymaridae) as an egg-parasite, in the West Indies. *C. sanguinea* and *Nephus* sp. (Coccinellidae) and *Chrysopa* sp., *C. lanata* and *C. limitata*, feed on nymphs and adults.

4. A Cottony-cushion Scale, *Icerya* sp. prob. *purchasi* (Maskell)(Hemiptera:Margarodidae).

This is generally a minor pest but occasionally large populations occur on ratoon plants. The nymphs and adulrs suck sap from the stems. During heavy infesrations, leaves and stems are covered with characteristic white, fluted, cylindrical insects. Infested leaves turn yellow and many of them drop prematurely. Young, heavily infested shoots die quickly. The scale produces enormous amounts of honeydew, which under dry climatic conditions, look like white globose cyrsrals.

The mature female is 4-8mm in length, and is covered with white wax. The anterior and posreriot filaments are long and thick, the remainder very short, not pointed. A large, white, flured egg sac produced by the female can be two and a half times larger than the scale insect. The large egg sac produces 600-800 reddish eggs, over two to rhree months.

The eggs hatch in a few days. The newly hatched nymphs are reddish-brown in color and pass through three instars before reaching the adult stage. The young crawlers settle on leaves and twigs with some initial yellowish wax formation, and soon acquire a reddish-brown color. The full-grown insects settle, often in large numbers, on the branches, twigs and young shoots. Sexual differentiation takes place during rhe second instar. Males are rare.

The pest is distributed in the Caribbean, and has been reported from Puerto Rico, the Lesser Antilles and Trinidad.

It has also been recorded on cirtus (*Citrus* spp.), guava (*Psidium guajava*), Spanish oak (*Inga laurina*), saman (*Samanaea saman*), shrubs (*Acacia* spp., and *Acacia farnesiana*), Locust berry tree (*Byrsonima coriacea* var. *spicata*), Barbados evergreen (*Ficus retusa* var. *nitida*), an erect herb (*Acalypha poiretii*), and several other cultivated wild plants.

The predators recorded in Barbados are *Chilocorus cacti* (L.), *Diomus* sp. and *Rodolia cardinalis* (Muls.) (Coccinellidae), which prey upon nymphs and adult females.

5. Black scale, *Saissetia oleae* (Bernard) (Hemiptera: Lecaniidae).

This pest is believed to be of African origin and has spread throughout the world. The females and nymphs suck sap from rhe stems of pigeon-pea. The female is about 4mm long and 2.5mm high, dark-brown or black in color.

A female lays about 1,000-4,000 eggs under its body. Freshly laid eggs are white in color, changing to orange or brown in color later. The young nymphs are flat, elongate-oval and pinkish-brown in color. The crawlers begin feeding a few hours after emergence. Whereas the adults usually occur on shoots and twigs, the crawlers prefer to settle on the underside of the leaves and on shoot tips. The males, which are rare, pass through a pupal stage. Ordinarily, reproduction occurs without fertilization.

It has been reported from the Greater and Lesser Antilles and Trinidad.

The pest has also been recorded on cotton (*G. barbadense* and *Gossypium hirsutum*), guava (*P. guajava*), citrus (*Citrus* spp.), hog plum (*Spondias mombin*), oleander (*Nerium oleander*), avocado (*Persea americana*), small red trubba (*Solanum ficifolium*), Barbados or Indian almond (*Terminalia catappa*), henna (*Lawsonia inermis*), black-eyed susan (*Thunbergia alata* and *Thunbergia fragrans*).

In Barbados, it was parasitised by *Lecaniobius cockerellii* Ahmead (Eulophidae).

6. A number of minor leaf sucking pests recorded were: *Saissetia coffeae* (Walker), *Saissetia hemispherica* (Targioni-Tozzetti), *Asterolecanium cajanus* and *Asterolecanium pustulans* (Cockerell) (Asterolecaniidae), *Howardia biclavis* (Comstock) (Diaspididae), *Megalotomus rufipes* (Westwood) (Coreidae), *Aphis* sp. (saphididae), *Liriomyza* sp. (Agromyzidae), and *Tetranychus* sp. (Tetranychidae).

SUMMARY

Amongst the defoliators, the velvet bean caterpillar, *Anticarsia gemmatalis* (Hub.), the sugarcane root-borer, *Diaprepes abbreviatus* (L.) and *Promecops lunatus* (Fhs.), occasionally appear in large numbers causing serious damage to the crop.

The eggs of *A. gemmatalis* are parasitised by *Telenomus remus* (Nixon) and the larvae by *Bracon* sp. prob. *hebetor* (Say) (close to *Bracon brevicornis* [Wesmeal]).

During outbreaks, the adults of the sugarcane root-borer, *D. abbreviatus* are attracted in large numbers to pigeon-peas, maize and citrus; these plants may be sprayed with fast acting, non-residual pesticides, like Malathion, Dibrom (naled), Dimecron, Elecron, Ekalux or Pyrethrins.

For the control of grubs in the soil, more persistent organo-chlorines such as Chlordane and Heptachlor should be incorporated into the soil during land preparation before or at planting.

Amongst the sucking insect pests, the Green Stink bug, *Nezara viridula* (L.) and the Green and Brown Stink bug, *Edessa meditabunda* (F.) cause some damage to the crop; while the leaf-hoppers, *Empoasca fabae* (Harris) and *Empoasca fabalis* (DeLong), are the vectors of "Bean Yellows" virus and need special attention.

The cottony-cushion scale, *Icerya* sp. prob. *purchasi* (Maskell), black scale, *Saissetia oleae* (Bernard) and other pests, appear mostly on ratoon crops. Pest populations should not be allowed to develop to serious levels, and infested plants should be sprayed or destroyed.

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