

BENEFICIAL INSECTS FOR CASSAVA PESTS

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Abstract

Manihot esculenta has characteristics that make it highly attractive to smallholder farmers in isolated areas where soils are poor and rainfall is low or unpredictable. Since it is propagated from stem cuttings, planting material is low-cost and readily available. The plant is highly tolerant to acid soils, and has formed a symbiotic association with soil fungi that help its roots absorb phosphorus and micronutrients. To discourage herbivores, its leaves produce two glycosides which, when digested, produce highly toxic hydrogen cyanide. Since most of the soil nutrients absorbed during growth remain in the above-ground part of the plant, recycling the plant tops helps to maintain soil fertility.

Introduction

Cassava (*Manihot esculenta* Crantz $2n = 2x = 36$) is considered to be one of the most important sources of energy for poor people living in the rural areas where cassava is grown and consumed as a staple food. *Manihot esculenta* is one of some 100 species of trees, shrubs

and herbs of the genus *Manihot*, which is distributed from northern Argentina to the southern United States of America. Cassava has been studied since as early as 1886 when Alphonse de Candolle placed its geographic origin in the lowland tropical Americas. It shares the Brazilian-Paraguayan center of origin with peanuts, cacao, rubber and other crops. Botanically, cassava is a woody perennial shrub, which grows from 1 m to 5 m in height. It is believed to have been cultivated, mainly for its starchy roots, for 9 000 years, making it one of agriculture's oldest crops.

The following are some beneficial insects that are indigenous on your fields and gardens or can be introduced for the control of pests.

Conservation of the beneficial insects

Provide hiding sites and alternative habitats such as mulches and other ground covers.

Plant small flowering plants on borders, hedges, and other perennial habitats as source of food and shelter

No indiscriminate use of synthetic pesticides.

Ground beetle

Host

Slugs, snails, cutworms, cabbage root maggots, grubs and insect pupae, and small caterpillars

Description

Eggs are normally laid singly in the soil.

Larva is elongated and tapered toward the end, worm-like in appearance and have a large head directed forward.

Pupa is brownish black, small and found in the soil.

Adult ground beetles or Carabids are about 2-6cm long, dark shiny brown to

metallic black, blue, green, purple, or multi-colored.

They vary in shapes,- from elongated to heavy-bodied, - tapered head end with threadlike antennae, and have a ringed wing cover.

Their heads are usually smaller than their thorax. Both adults and larvae have strong pincher-like mandibles.

They have prominent long legs, which make them fast moving insects. Most species are nocturnal and they hide during the day in soil crevices, under rocks and stones, decaying logs, leaf litter, or composting materials.

When disturbed or when other vertebrates prey upon them, they emit an odor or gas, as a type of defense mechanism, preventing them from being eaten by other predators. Ground beetles live on or below the ground, hence the name.

Development from the egg to the adult stage takes about a year, although adults may live 2 to 3 years or longer.

Conservation

Practice mulching in some sections of your field to provide a habitat for the ground beetles.

Provide permanent beds and perennial plantings to protect population.

Plant white clover and/or amaranth as ground covers.

Lacewing

Hosts

Aphids, leafminer, mealybugs, thrips, whitefly, armyworms, bollworms, cabbage worm, codling moths, corn borer, cutworm, DBM, fruitworm, leafhopper nymphs and eggs, potato beetle, scale insects, spider mites, and caterpillars of most pest moths. If given

the chance, they can also prey on adult pests.

Description

Eggs are found on slender stalks or on the underside of leaves. Each egg is attached to the top of a hair-like filament. Eggs are pale green in color.

Larvae are known as aphid lions. Newly hatched, they are grayish-brown in color. Upon emerging, larvae immediately look for food.

They grow to about 1 cm in length. They attack their prey by taking them with their large sucking jaws and injecting paralyzing poison, and then sucking out the body fluids of the pest.

A larva can eat 200 or more pests or pest eggs a week. An older larva can consume 30-50 aphids per day. It can consume more than 400 aphids during its development. The larvae resemble alligators with pincers like jaw. However, they become cannibalistic if no other prey is available. They feed for 3 to 4 weeks and molt three times before pupation. They cover their bodies with prey debris. Pupae are cocoons with silken threads. These are found in cracks and crevices. The pupal stage lasts for approximately 5 days. Adults are green to yellowish-green with four, delicate transparent wings that have many veins and cross veins. Adults are about 18 mm long, with long hair-like antennae and red-gold eyes. Each adult female may deposit more than 100 eggs.

Many species of adult lacewings do not prey on pests. They feed on nectar, pollen, and honeydew.

An adult will live for about four to six weeks depending on the climatic conditions.

Conservation

Flowering plants such as dill, cosmos, sunflower, carrots, and dandelions are good source of pollen and nectar for adults. Provide source of water during dry season.

Ladybird beetles

Hosts

Aphids, mealybugs, scale insects, spider mites, whiteflies

Description

Eggs are yellow to orange in color, football-shaped, and are laid in circular clusters of 10 -50 eggs on the underside of leaves or near the aphid colony.

Newly hatched larvae are gray or black and less than 4 mm long. They emerge as dark alligator-like flightless creatures with orange spots. Adult larvae can be gray, black, or blue with bright yellow or orange markings on the body. The larvae are elongate and slightly oblong in shape. They undergo four instars before pupating.

The pupae are usually brightly patterned and can be found attached to the leaves and stems of plants where larvae have fed and developed.

Adults are oval to hemispherical and strongly convex with short legs and antennae. Most species are brightly colored.

Body length ranges from 0.8-16 mm. Their colors tell other predators that they are tasteless and toxic. When disturbed, some of them emit a strong smelling yellow liquid as a protection against other predators.

Their colors vary from red, orange, steel blue, yellow-brown, or yellow elytra, frequently spotted or striped with black.

They feed on pollen, nectar, water, and honeydew but aphids or other prey are necessary for egg production.

They are the best-known predators of aphids and are capable of eating up to 50-60 per day and about 5000 aphids in their lifetime.

Conservation

Lady bird beetles are found in most agricultural and garden habitats.

Their presence indicates that natural biological control is occurring. It is important to maintain habitats planted with several flowering crops.

These give the ladybird beetles varied food sources. When food is not available, they tend to eat each other.

Their beneficial predatory behavior and activities are continuous when there is no indiscriminate use of synthetic pesticides.

Mealybug destroyer

Hosts : Mealybugs

Description

Eggs are yellow and are laid among the cottony egg sack produced by the mother mealybugs. The eggs develop into larvae in about 5 days.

The larva looks like mealybug. It has woolly appendages of wax but is twice as big as the adult mealybug. It grows up to 1.3 cm in length. It undergoes three larval stages, which lasted for about 12-17 days. The larva feeds on mealybug eggs, young crawlers, and the honeydew produced by mealybugs. It can consume up to 250 mealy-bugs.

The pupa is found in sheltered stems. The pupal stage lasts for about 7-10 days.

Adult mealybug destroyer is dark brown or blackish beetle. It has orangish head with reddish abdomen. It is small, about 3-4 mm long. A female can lay up to 10

eggs a day in a mealybug colony or in a group of mealybug eggs. It may live up to 2 months.

Conservation

Mealybug destroyers only thrive when there are mealybugs. They feed on mealybugs, which are necessary for their reproduction. Members of carrot (fennel, dill, angelica, tansy) and sunflower families (goldenrod, coreopsis, sunflower, and yarrow) are good habitats for adult mealybug destroyers.

Spider

Hosts : Moths and caterpillars

Description

Some spiders' eggs are laid in a cluster in silken sacs, while some species lay their egg masses covered with silks within folded leaves. Some of these sacs are attached to the mother spiders or mothers stay nearby to guard their egg sacs. Eggs usually hatch into spider lings within three weeks. The spider lings may remain attached to the mother for several days on some species, but for some species they are left on their own.

Spiders are not insects. They have 8 legs, while insects have 6. They do not have wings whereas Insects do. They have two body sections; a united head and thorax and abdomen, while insects have three; head, thorax, and abdomen.

A female can produce 200-400 eggs but only 60-80 spider lings can hatch from these. Females can survive 2-3 months. In some species, females die after laying eggs.

All spiders are poisonous to insects but only a few species are poisonous to humans, like the Black widow and the Brown recluse.

Conclusion

Mulching along some sections in dikes of rice paddies, in field corners, or a portion of the fields can increase the number of spiders. They can hide in the layer of mulch that serves as their alternate habitat. They can also prey on other small insects inside the mulch.

Remember, that the more food the spiders can eat, the faster their population build-up will become. Cover crops are also important to provide overwintering sites of spiders' sacs.

A spider population depends on the availability of food, the habitat, and the environmental conditions. Avoid use of pesticides as much as possible, for broad-spectrum insecticides can easily kill them.

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