BIBLIOGRAPHY

BINAY-AN, PETER C. APRIL 2008. The Insect Pests of Sweet Corn, Sugar 75 (*Zea maize* Saccharata) at La Trinidad, Benguet. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

The study aims to know the insects and other related pests of sweet corn variety sugar 75, record the degree of injury caused by the insect pests and classify the insets according to economic importance.

In the roots of sweet corn, there were no insects noted damaging based on the results of this research. On the other hand, literature indicates that the insects damaging on roots are white grubs, root webworm, cutworm and wireworm. The insects recorded damaging on the stem of corn were corn borer, variegated cutworm, cluster caterpillar and aphids. The recorded most destructive was corn borer. In the corn leaves, the insects recorded damaging were corn borer, variegated cutworm, cluster caterpillar, semi-looper, armyworm, corn earworm, tussock moth with genus of *Euproctis sp*. and *Dasychira sp*., aphids, jassid, long horned grasshopper, Katydid, snout beetle, cockchafer, leaf beetle, western corn rootworm, northern corn rootworm, snail and slugs. Among the insects recorded, the most destructive were variegated cutworm, cluster caterpillar, armyworm and aphids. On the corn ear, the insects observed damaging were corn earworm, corn borer, and aphids. The most destructive was corn earworm. In the tassel, the insects damaging were corn borer, corn earworm and aphids. Aphids and corn borer were the two most destructive.

The most destructive pest of sweet corn sugar 75 was corn borer. This insect causes damage in corn to as high as 76 to 100%. Corn borer was followed by variegated cutworm, armyworm, cluster caterpillar, corn earworm and aphids with the degree of damage of 26 to 50%. The jassid, snout beetle, cockchafer, leaf beetle, western corn rootworm, northern corn rootworm, long horned grasshopper, katydid, snail and slugs cause damage in corn from 1 to 25%.

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INTRODUCTION

Corn, (*Zea maize* Linnaeus) is a world wide field crop adapted to semi-temperate and tropical climates. It is an annual crop and belongs to the family graminnae. It is rich in nutrient elements and serves many importance to human and industrial uses like in the formulation of feeds for poultry and livestock's. In the Philippines, corn is planted whole year round in the provinces of Pangasinan, Isabela, Cagayan, Ilocos Region, Cebu, and Central Mindanao. In Cebu, corn is the staple food crop of the Cebuano's.

One variety of corn that attracts the attention of most consumers is the development of the hybrid green corn. This variety has high demand in the market as green corn. It is sold in the super market, along the sari-sari store and in public market. Because of the persistent marketing strategies of the companies, the farmers in Benguet have learned the planting of sweet corn. Normally, these are noted by strip cropping at the end of vegetable plots and as for crop rotation. By observation, one of the limiting factors for the production of green corn is the infestation of insect pests.

Literature indicates that the most destructive insects in corn are corn earworm, European corn borer, southern corn rootworm, cutworm, white grub, and wireworm. The underground insect pests normally inhabit the soil while they are injuring the plant. They usually damage the roots or other subterranean parts of the plants. But some insects may feed or injure parts of the plants above the soil. The more important soil insects include cutworm, root aphid, rootworm, white grub, and wireworm. The insect pests on the stalk, leaf and ear of corn are armyworm, chinch bug, earworm, European corn borer, flea

beetle, grass hopper, Japanese beetle, leaf aphid, and south western corn borer according to Thompson and Kelly, (1959).

Identification of the various insect pests and other arthropods attacking corn would be a great guide for future management to boost the production and quality of corn. This means that appropriate control measure could only be provided for the sweet corn sugar 75 should the insect pests be correctly identified.

The study was conducted to know the insects and other related pests feeding on sweet corn variety sugar 75, record the degree of injury caused by these insect pest on sweet corn variety sugar 75 and to classify the insets according to economic importance.

The study was conducted at Benguet State University Balili Experimental Area, La Trinidad, Benguet from December 2007 to February 2008.

REVIEW OF LITERATURE

Importance of Corn

Corn which is classified as corncobs is an important source of furfural, a liquid used in manufacturing nylon fibers and phenol-formaldehyde plastics, refining wood resin, making lubricating oils from petroleum, and purifying butadiene in the production of synthetic rubber. Ground corncobs are used as a soft-grit abrasive. Large whole cobs from a special type of corn are used for pipes for smoking tobacco oil, as cooking and salad oil and as margarine. It is also used in the manufacturing of paints, scups, and linoleum. The search for alternate source of energy has brought attention to corn as a fuel source. Corn is processed to produce alcohol for use with gasoline as gasohol. The dry stalk is potentially important for fuel biomass (Moseman, 2006).

Jugenheimer (1976) cited that corn has many uses; it is used primarily as food for human in most areas of the world, for livestock feeds where about eighty five (85) percent of the crop is fed to livestock, industrial uses which may be divided into four categories; mixed feed manufactures, dry process millers; wet processes, and distilling and fermentation industries.

Cultural Practices of Corn

Jugenheimer (1976) reported that the corn perform well on well-drained, fertile soil and in areas with moderately high summer temperatures, warm nights, and adequate but not excessive rainfall. Similarly, corn prefer-well-aerated deep, warm loams

containing abundance of organic matters, nitrogen's, phosphorous, and potassium. The amount, distribution, and efficiency of rain fall also are importance factors.

Corn plant has an erect and solid stem. It varies widely in height. Some dwarf varieties are more than 60 cm or more. The average height of corn is 2.4 m. The leaves which grow alternately are long and narrow. The main stalk terminates in a staminate (male) inflorescence. The tassel is made up of many small flowers termed spikelets, and each spikelet bears tree small anthers, which produce the pollen grains, or male gametes. The pistellate (female) inflorescence of the ear is a unique structure with up to 1,000 seeds borne on a hard core called the cob. The ear is enclosed in modified leaves called husk. The individual silk fibers that produce from the tip of the ear are the elongated styles, each attached to an individual ovary. Pollen from the tassel is carried by the wind and falls onto the silks, where it germinates and grows down through the silk until it reaches the ovary. Each fertilized ovary grows and developed into a kernel (Moseman, 2006).

Common Insect Pest Associated with Corn

McCollum and Ware (1980) cited that the principal insects of corn are the corn earworm, the southern corn stalk borer, and the European corn borer. Mendiola (1958) stated that the most common insect pest is corn borer, corn earworm and the corn weevil. Opina et al., (1983) stated that among the serious insect pests of corn, lepidopterous pests are considered the major constraint in corn production. They attack almost all stages of plant development. The corn borer (*Ostrinia furnacalis* Gueene) and corn earworm (*Helicoverpa armigera* Hubner) may severely attack young plants and they usually

persist up to maturity. Vegetative stage of the crop is usually vulnerable to army worm (*Mythimna separata* Walker), cutworm (*Spodoptera litura* Fabr.) and semi-looper (*Chrysodeixes chalcites* Esper).

Other Insects of Corn

Other insects attacking corn are corn leaf aphid (*Aphis maidis*), maize billbug (*Sphenophorus maidis*), corn flea beetle (*Chaetocnema pulicaria*), desert corn flea beetle (*C. ectypa*), larger corn-stalk borer (*Diatraea zeacolella*), rough-headed corn-stalk beetle (*Euetheda rugiceps*), white grub (*Phyllophaga* species), corn-root webworm or budworm (*Crambus caliginosellus*), maize billbug (*Calendra maidis*), seed-corn maggot (*Hylemyia platora*), wireworm, webworm, and the Japanese beetle (Martin *et* al., 1976).

METHODOLOGY

An area of about 200 square meters was prepared at the Benguet State University Balili Experimental Area, La Trinidad, Benguet. The area was cleaned from weeds and cultivated using grab hoe, shovel, bolo, and other materials. After cleaning and cultivating the plots, chicken manure was applied. Planting was done on plots with a dimension of 1x10 meters. All agronomic practices as required by the plants were provided.

The observation on the insects and arthropods associated damaging the crop was done upon the germination of the plants until harvesting. Observation was fixed at weekly interval until harvest. Collected insects and other related pests were brought in the laboratory and were identified. The taxonomic hierarchy: order, family, genus, species, common name was the basis for identification. Entomology related books, internet, and other references were used as reference materials. The insects infesting the roots were evaluated when the ears were harvested. Fifty corn plants were uprooted in the roots were scrutinized for the presence of insects.

Monitoring the degree of injury by the pest insects was determined through percentage by visual estimation of the whole plant. For example, the sample plants were rated by visual observation using the following index:

ORDER/COMMON NAME	RATING INDEX	QUALITATIVE INDEX	DESCRIPTION
	1	No damage	No injury
	3	Slightly damage	1 to 25 % damage on plant
	5	Moderately damage	26 to 50% damage on plant
	7	Severely damage	51 to 75% damage on plant
	9	Very severely damage	76 to 100% damage on plant

Insect's degree of damage of above 51% was considered major pest and minor pest for those insects with a level of injury of below 50%.

Data Gathered:

1. Various insects damaging on sugar 75. The insects and other related pests collected were identified by using entomology related books, internet and other references.

2. Degree of injury. The degree of injury in percent (%) by the insects on sweet corn 75 were assessed.

3. Major and minor pest. The insect pests that has the degree of injury of 51% and above is considered major pests and minor pests for those insects with a degree of injury of 50% and below.

RESULTS AND DISCUSSION

Insects and Related Pest Associated Attacking Sweet Corn 75

The details of the various insect pests and non- insect pests associated damaging on sweet corn sugar 75 are presented in Table 1. The insects are presented according to the parts of corn they damage. Discussion on the insect's nature of damage, the stage of the plant they damage and morphological description of the insects are likewise presented.

Insects' attacking the roots. Literature indicates the existence of white grubs, root webworm, cutworm and wireworm attacking the roots of corn. In these study however, these insect pests were not encountered.

Insects attacking the stem

a. Corn borer. The larva is the destructive stage while the adults are not injurious. The larva upon emergence from the egg, feeds on the leaves by chewing. After few more days or when the larva has reached the 3rd instar, they transfer to the stem and feed by chewing. They are actively feeding at night and at daytime. The larva damages the stem by chewing and as a result the stem is bored. The part of the stem near the developing corn ear is preferred for damaging. As a result of boring, the stem becomes weak and blown down when there are strong winds. The larva is present in the corn damaging during the late vegetative stage until maturity.

Table 1. Destructive stages and time were they active attacking sweet corn 75

PARTS OF PLANT/ COMMON NAME	TIME THEY ATTACK		DESTRUCTIVE STAGE			PARTS OF THE PLANT THEY ATTACK				
	Day	Night	Larva	Nymph	Adult	Roots	Stem	leaves	Ear	Tassel
Roots*										
White grubs	X	X	X			X				
Corn-root webworm	X	X	X			X				
Corn cutworm	X		X			X	X	X		
Wireworm	X	X	X			X				
Stem										
Corn borer	X	X	X				X	X	X	X
Variegated cutworm	X		X			X	X	X		
Cluster caterpillar	X		X				X	X		
Aphids	X			X	X		X	X	X	X
Leaves										
Corn borer	X	X	X				X	X	X	X
Variegated cutworm	X		X			X	X	X		
Semi-looper	X		X					X		
Armyworm	X		X				X	X		
Cluster caterpillar	X		X				X	X		
Tussock moth (*Euproctis sp*. and *Dasychira sp*.)	X		X					X	X	

* Insects of the roots of sweet corn were not observed in this study. The insects presented above were taken from literature.

Table 1. Continued . . .

PARTS OF PLANT/ COMMON NAME	TIME THEY ATTACK		DESTRUCTIVE STAGE			PARTS OF THE PLANT THEY ATTACK				
	Day	Night	Larva	Nymph	Adult	Roots	Stem	leaves	Ear	Tassel
Woolly bear caterpillar	X		X					X	X	
Aphids	X			X	X		X	X	X	X
Jassids	X				X			X		
Katydid	X				X			X		
Long horned grasshopper	X				X			X		
Snout beetle	X				X			X	X	
Cockchafer	X		X		X			X	X	
Leaf beetle	X				X			X	X	
Western corn rootworm	X		X		X	X		X	X	
Northern corn rootworm	X		X		X	X		X	X	
Snail	X				X			X	X	
Slug	X	X	X		X			X		
Ear										
Corn borer	X	X	X				X	X	X	X
Corn earworm	X	X	X				X	X	X	X
Aphids	X			X	X		X	X	X	X
Tassel										
Corn borer	X	X	X				X	X	X	X
Corn earworm	X	X	X				X	X	X	X
Aphids	X			X	X		X	X	X	X

The destructive larva is slender, bluish-green, brown-striped caterpillar up to 19 mm long (Fig. 1). The adults are small, tan, night fliers about ½ inches in length that hold their wings in a delta shape when at rest.

b. Variegated cutworm and cluster caterpillar. The larva or the worm stage damages the stem. The adults are not destructive. The larva cut off the stem of young corn. Normally, they are destructive to the young and growing corn. They are active at night time and hide under debris on the soil surface at day time.

The body of variegated cutworm measures 1 to 1.75 inches in length and commonly curl into a C-shape when disturbed (Fig. 2). The color is greenish brown with several longitudinal stripes. The body of cluster caterpillar measures 1.5 to 2.0 inches long (Fig. 3). The adults or moths are approximately 1 inch long with a wing span of 1.25 to 2 inches and vary widely in coloration. The eggs are somewhat flattened on top, white to dull or off-white in color.

c. Aphids. The nymphs and adults are destructive. Aphids damage by sucking the juice of the corn stem. The insect was noticed damaging the stem only during the early vegetative stage.

Insects attacking the leaves

a. Corn borer. Corn borer was noted damaging on the leaves only when the insects are still small. The larva damage by chewing the leaves. This is soon after emergence from the eggs. But since the larva is small as they just

emerged from egg, the damage they normally create on the leaves is very small to negligible.

b. Variegated cutworm and cluster caterpillar. This worm climbs the stem and damages the leaves. The larva chews and cut off the leaves of young plants. They are active at night time. During the day, they hide under debris on the soil surface. The insect is noticeable in corn only during the early emergence stage of the plant.

c. Semi-looper. The larva is the destructive stage. The adult is free living while the larva feeds on underside of the leaves, making windows between the veins. The leaf area affected is silvery to pale gray in color.

The full grown insect is 25-30 mm long. The body is green with green stripes along the body (Fig. 4).

d. Armyworm. The larva is the destructive stage while the adult is free living. The worm feeds initially on the leaf margins. The larva feeds in colonies and skeletonizes leaves of near vegetative until maturity. The larva feeds singly on leaves during daytime. They are prevalent during the early emergence until early vegetative stage.

The young armyworm is pale green. The mature larva is basically yellowish- or brownish-green with a tan or greenish- brown head mottled with dark brown. The smooth, practically hairless body is marked with three longitudinal dark stripes, one along each side and one down the back. A full grown armyworm is 30 to 35 mm long (Fig. 5). The adult armyworm moth is

grayish-brown forewings, each with a white spot near the center, and grayish-white hind wings. The wingspan averages 38.5 mm.

e. Corn earworm. The early stage larva damages the leaves. The larva damage by chewing the leaves. The insect is prevalent during the late vegetative until the maturity stage. As noticed, damage on the leaves is small to negligible. The presence of the insect on the leaves is temporary as the corn ear is the preferred part for damaging.

The body color of corn earworm is pale green or pinkish to brown. It measures 1.5 to 1.6 inches long (Fig. 6).

f. Tussock moth (*Euproctis sp*. and *Dasychira sp*.) and woolly bear caterpillar. The larva is the destructive stage while the adult are free living. The larva feeds by chewing the side parts of the leaves. Feeding is done at daytime.

The young larva measures 1/8 to ¼ inch (4-7 mm) long. They have fine body hairs which later develop into tufts. Mature larvae measures ¼ inch (3.1 cm) long. They are colorful (Fig. 7 and 8). The body color of woolly bear caterpillar is brownish to black. It measures 2 1/8 inch (55 mm) long (Fig. 9)

g. Aphids. The nymphs and adults are destructive. Aphid's damage by sucking the juice of the corn leaves. The insect were noticed damaging during the early vegetative until maturity stage. However, they are prevalent during the flowering stage.

The body of aphids measures 2.0 mm long (Fig. 10). The color is pale bluish-green with black antennae, legs and cornicles. The head is marked with two longitudinal dark bands and the abdomen with a row of black spots on

each side. The winged form is similar in size. However, the body often seems to have a powdery coating. The insects feed in groups of 5 to over 2000. The leaves fed with aphids usually turned blackish. Molds are normally present.

h. Jassid. The adult is the destructive stage. They damage by chewing the leaves of corn. The adults damage at daytime. They are noticed damaging during the vegetative until the maturity stage of the plant.

The color of the adult is light tan about 1/8-inch long (Fig. 11). Its most distinguishing feature is the presence of two dark spot located between the eyes.

i. Long horned grasshopper and katydid. The nymphs and the adults are destructive. They are prevalent during and after the reproductive stages. The insect feeds by chewing the leaves. They are active at daytime.

Long horned grasshopper measures 22mm, short antennae filiform and threadlike (Fig. 12).

The katydid measures 18mm, wing span is 24mm. The abdomen consists of 7 segments (Fig. 13).

j. Snout beetle, cockchafer, leaf beetle, western corn rootworm, and northern corn rootworm. These pests of corn are attacking the leaves of the plants. The adult is the destructive stage. These pest feed on the leaf by chewing. They are active at day time.

Snout beetle is black, gray, or brown and measures 10 to 16 mm long. They pierce young seedlings near the ground with their "beak," causing stunting, tip dieback, and often death of corn seedlings. Plants which survive

display yellow streaks, suckering, and rows of holes transverse across the blades (Fig. 14).

Cockchafer is robust, oblong, and hard-shelled. The beetle's measures 19 to 25 mm long and reddish brown to black in color (Fig. 15).

The color of the leaf beetle is yellow with black spot it measures ¼-inch long. The wing covers of male is entirely black except for narrow yellow margins and yellow tips (Fig. 16).

The color of the western corn rootworm body is yellow with black spot about ¼-inch long. They feed on the plants above ground, especially the pollen and silks. During heavy infestation, grazing damage to the silks can impair fertilization resulting in fewer kernels on the cob (Fig. 17).

The color of the body of northern corn rootworm is yellowish brown and measures ¼-inch long (Fig. 18). Larva is about 1/2-inch long. Creamy white in color except for the head capsule and a plate on the upper surface of the last body segment.

k. Snail and slugs. These organisms belong to the class Gastropoda. The adult is the destructive stage. They are damaging the vegetative until the maturity stage. They were noticed damaging the leaves early in the morning and late in the afternoon until the middle of the night.

The color of body of snail is brown. It measures 6.7 mm, 0.26 inches (Fig. 19). The slugs are best describes as snail without shell soft body. Generally brownish or grayish with eye stalks. They vary in size from ¼ inch to two

inches or longer. Slugs leave a silvery slime trail that they secrete as they move (Fig 20).

Insects attacking the ear

a. Corn earworm. The larva is the destructive stage. The larva as it emerge from the egg feeds on the leaves, tassel, whorl, and shift to the ears being the preferred sites for damaging during the flowering stage. This worm feeds on the tip kernels of the ear. The larva is active at day and night time. Losses of the high eating quality of sweet corn are results of the damage by the corn earworm.

   The adult corn earworm moth has a wingspan of 25.5 to 38.5 mm. The forewings of the male are usually a light yellowish-olive. Each forewing has a dark spot near the center. The hind wings are white with a broad, dark brown, outer marginal band and, usually, a narrow, brown, intermarginal band.

b. Corn borer. The larva as it bore the stem, the ear of sweet corn 75 is similarly damaged. It is active damaging during the day and night time. They feed and chew the inner portion of the ear.

c. Aphids. The nymphs and adults attack the ear of sweet corn. They damage by sucking the ear portion that causes the discoloration.

Insects attacking the tassel

a. Corn borer. The larva attacks the tassel. They feed on tassel during the day and night time.

b. Corn earworm. The larva attacks the tassel of the corn. The feed by chewing the tassel during the day and night time.

c. Aphids. The nymphs and adults are the destructive stages. They feed by sucking on the tassel of corn. The feeding causes mottling and discoloration of the parts damaged. They are active at day time.

Classification of the pest associated with sweet corn sugar 75

The classification of the insects, snail and slug that are associated in sweet corn variety sugar 75 are shown in Table 2. The details of the classification of the insects are briefly discussed.

The order Lepidoptera. There were four (4) families of Lepidoptera feeding on sweet corn sugar 75. These are the Pyralidae (*Ostrinia furnicalis* Gueene), Noctuidae (*Peridroma saucia* Huner, *Chrysodeixis chalcites* Esper, *Spodoptera fragiperda* Smith, *Spodoptera litura* Fabricius and *Helicoverpa zea* Boddie), Lymantriidae (*Euproctis sp.* and *Dasychira sp*.) and Arctiidae (*Spilosoma sp*.) (Fig. 1-9)

The order Homoptera. There are two (2) families of Homoptera feeding on sweet corn sugar 75. These are the Aphididae (*Phopalosiphum maidis* Fitch) and Cicadellidae (*Dalbulus maidis* DeLong.) (Fig. 10 and 11).

The order Orthoptera. One (1) family of Orhtoptera feeding on sweet corn sugar 75. This is Tettigoniidae (*Atractomorpha viridissima* Bolivar and *Pterophylla camellifolia* Thunberg). (Fig. 12 and 13).

The order Coleoptera. There were three (3) families of Coleoptera feeding on sweet corn sugar 75. These are the Curculionidae (*Gonepterus sp*.), Scarabaeidae (*Melolontha melolontha* Linnaeus) and Chrysomelidae (*Labidomera clivicollis* Kirby, *Diabrotica virgifera* Wilcox, *Diabrotica barberi* Wilcox). (Fig. 14-18)

The phylum Mullosca. There are two species of phylum Mollusca feeding on sweet corn sugar 75. These are the *Helix aspersa* Muller and *Varginulus plebeia* Fischer (Fig. 19 and 20).

Table 2. Classification of the Pest Associated with Sweet Corn Sugar 75

ORDER/FAMILY	SCIENTIFIC NAME	COMMON NAME
Order Lepidoptera		
Pyralidae	*Ostrinia furnicalis* Gueene	Corn borer
Noctuidae	*Peridroma saucia* Hubner	Variegated cutworm
Noctuidae	*Chrysodeixis chalcites* Esper	Semi-looper
Noctuidae	*Spodoptera frugiperda* Smith	Armyworm
Noctuidae	*Spodoptera litura* Fabricius	Cluster caterpillar
Noctuidae	*Helicoverpa zea* Boddie	Corn earworm
Lymantriidae	*Euproctis sp.*	Tussock moth
Lymantriidae	*Dasychira sp.*	Tussock moth
Arctiidae	*Spilosoma sp.*	Wooly bear caterpillar
Order Homoptera		
Aphididae	*Rhopalosiphum maidis* Fitch	Aphids
Cicadellidae	*Dalbulus maidis* DeLong	Jassid
Order Orthoptera		
Tettigoniidae	*Attractomorpha viridissima* Bolivar	Long horned grasshopper
Tettigoniidae	*Pterophylla camellifolia* Thunberg	Katydids
Order Coleoptera		
Curculionidae	*Gonepterus sp.*	Snout beetle
Scarabaeidae	*Melolontha melolontha* Linnaeus	Cockchafer
Chrysomelidae	*Labidomera clivicollis* Kirby	Leaf beetle
Chrysomelidae	*Diabrotica virgifera* Wilcox	Western corn rootworm

Table 2. Continued . . .

ORDER/FAMILY	SCIENTIFIC NAME	COMMON NAME
Chrysomelidae	*Diabrotica barberi* Wilcox	Northern corn rootworm
Phylum Mollusca		
Class		
Gastropoda	*Helix aspersa* Muller	Snail
Gastropoda	*Vaginulus plebeia* Fischer	Slug

Figure 1. Corn Borer
Order: Lepidoptera
Family: Pyralidae
Genus: *Ostrinia*
Species: *furnicalis*

Figure 2. Variegated Cutworm
Order: Lepidoptera
Family: Noctuidae
Genus: *Peridroma*
Species: *saucia*

Figure 3. Cluster Caterpillar
Order: Lepidoptera
Family: Noctuidae
Genus: *Spodoptera*
Species: *litura*

Figure 4. Semi-looper
Order: Lepidoptera
Family: Noctuidae
Genus: *Chrysodeixis*
Species: *chalcites*

Figure 5. Army worm
Order: Lepidoptera
Family: Noctuidae
Genus: *Spodoptera*
Species: *frugiperda*

Figure 6. Corn earworm
Order: Lepidoptera
Family: Noctuidae
Genus: *Helicoverpa*
Species: *zea*

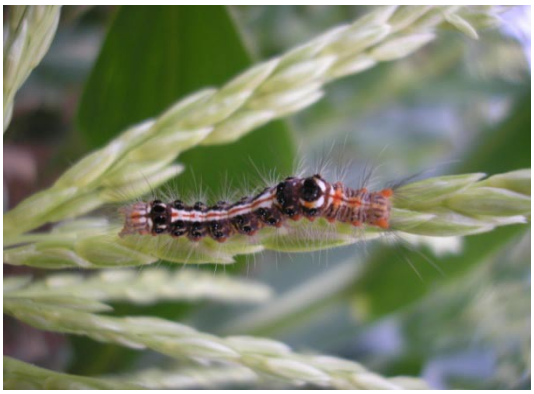

Figure 7. Tussock moth
Order: Lepidoptera
Family: Lymantriidae
Genus: *Euproctis*
Species: *sp.*

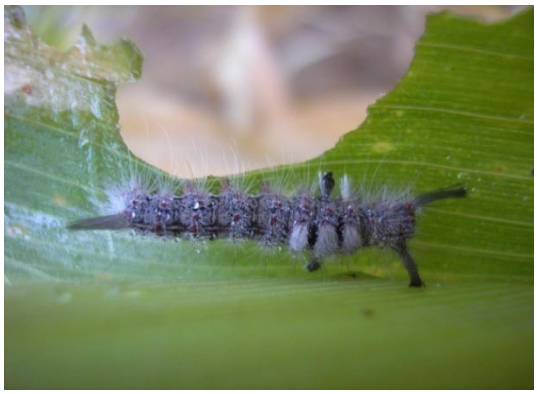

Figure 8. Tussock moth
Order: Lepidoptera
Family: Lymantriidae
Genus: *Dasychira*
Species: *sp.*

Figure 9. Woolly bear caterpillar
Order: Lepidoptera
Family: Arctiidae
Genus: *Spilosoma*
Species: *sp.*

Figure 10. Corn aphids
Order: Homoptera
Family: Aphididae
Genus: *Rhopalosiphum*
Species: *maidis*

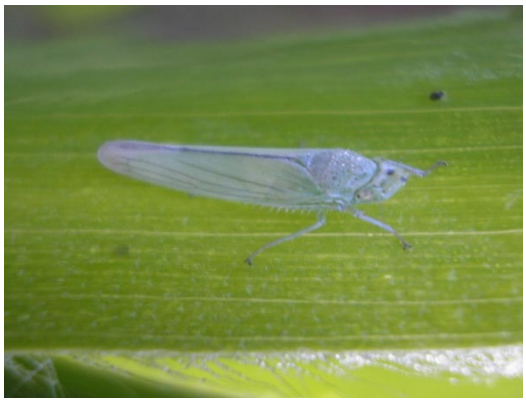

Figure 11. Jassid
Order: Homoptera
Family: Cicadellidae
Genus: *Dabulus*
Species: *Maidis*

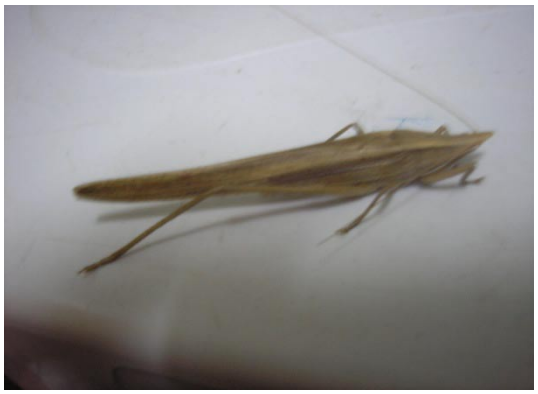

Figure 12. Long horned grasshopper
Order: Orthoptera
Family: Tettigoniidae
Genus: *Atractomorpha*
Species: *viridissima*

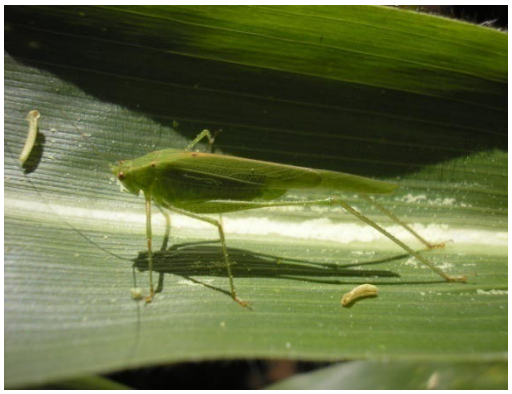

Figure 13. Katydid
Order: Orthoptera
Family: Tettigoniidae
Genus: *Pterophylla*
Species: *camellifolia*

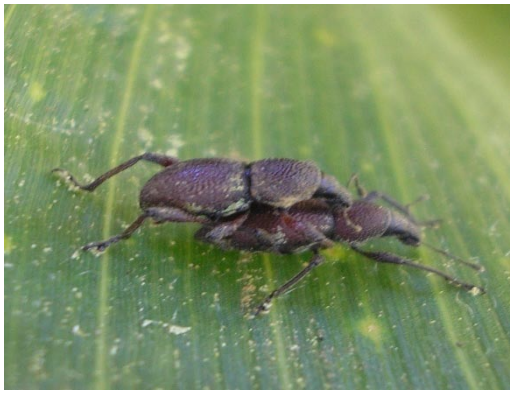

Figure 14. Snout beetle
Order: Coleoptera
Family: Curculionidae
Genus: *Gonepterus*
Species: *sp*.

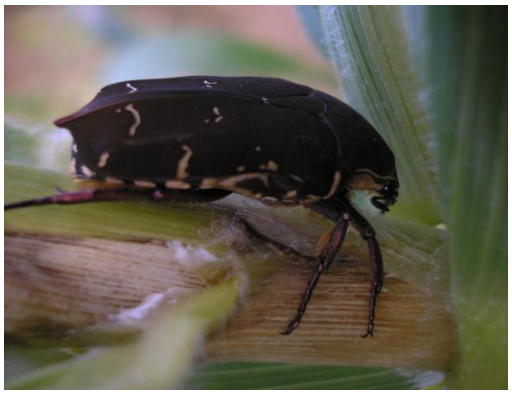

Figure 15. Cockchafer
Order: Coleoptera
Family: Scarabaeidae
Genus: *Melolontha*
Species: *melolontha*

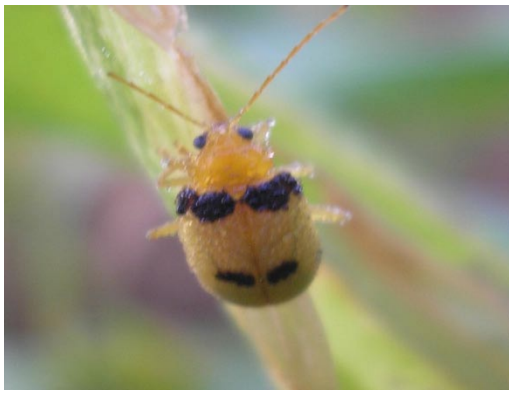

Figure 16. Leaf beetle
Order: Coleoptera
Family: Chrysomelidae
Gernus: *Labidomera*
Species: *clivicollis*

45Figure 17. Western corn rootworm
Order: Coleoptera
Family: Chrysomelidae
Genus: *Diabrotica*
Species: *virgifera*

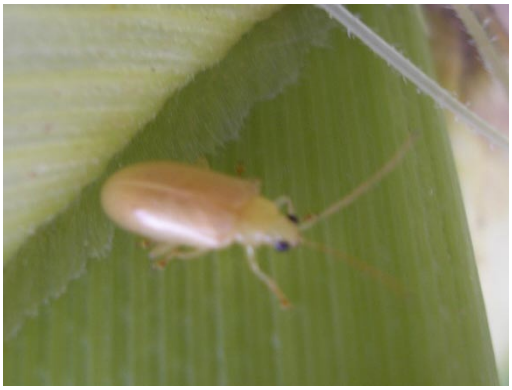

Figure 18. Northern corn rootworm
Order: Coleoptera
Family: Chrysomelidae
Genus: *Diabrotica*
Species: *barberi*

Figure 19. Snail
Phyllum: Mollusca
Class: Gastropoda
Genus: *Helix*
Species: *aspersa*

Figure 20. Slugs
Phyllum: Mollusca
Class: Gastropoda
Gernus: *Vaginulus*
Species: *plebeia*

Degree of Injury

The result of the study showed that the most destructive pest was corn borer. The degree of injury of the insect by the injury rating scale index was 9 which means that the sweet corn plant was very severely damaged (Fig. 21) or with the actual damaged of 76 to 100%. Corn borer was followed by the variegated cutworm, armyworm, cluster caterpillar and corn earworm with an injury rating index of 7. This level of injury rating imply that the corn plants were severely damaged (Fig. 22, 24 25, and 26). The actual damaged was 51 to 75%. The injury index for semi-looper, tussock moth (*Euproctis sp.* and *Dasychira sp*.), wooly bear caterpillar and aphids is 5 implying that the plants were moderately damaged (Fig. 23, 27, 28, 29, and 30) or with the actual damaged of 26 to 50%. The insect jassid, long horned grasshopper, katydid, snout beetle, cockchafer, leaf beetle, western corn rootworm, northern corn rootworm, snail and slug were rated 3 or slightly damaged (Fig. 31, 32, 33, 34, 35, 36, 37, 38, 39 and 40). With the injury rating of 3 it implies that the actual damaged on the plants is 1 to 25% damaged.

Table 3. Degree of injury of the insects, snails and slug associated on sweet corn 75

ORDER/ COMMON NAME	RATING INDEX	QUALITATIVE INDEX	DESCRIPTION
Lepidoptera			
Corn borer	9	Very severely damage	76 to 100%damage on plant
Variegated cutworm	7	Severely damage	51 to 75% damage on plant
Semi-looper	5	Moderately damage	26 to 50% damage on plant
Armyworm	7	Severely damage	51 to 75% damage on plant
Cluster caterpillar	7	Severely damage	51 to 75% damage on plant
Corn earworm	7	Severely damage	51 to 75% damage on plant
Tussock moth (*Euproctis sp.*)	5	Moderately damage	26 to 50% damage on plant
Tussock moth (*Dasychira sp*.)	5	Moderately damage	26 to 50% damage on plant
Woolly bear caterpillar	5	Moderately damage	26 to 50% damage on plant
Homoptera			
Aphids	5	Moderately damage	26 to 50% damage on plant
Jassid	3	Slightly damage	1 to 25% damage on plant
Orthoptera			
Katydid	3	Slightly damage	1 to 25% damage on plant
Long horned grasshopper	3	Slightly damage	1 to 25% damage on plant

Table 3. Continued . . .

ORDER/ COMMON NAME	RATING INDEX	QUALITATIVE INDEX	DESCRIPTION
Coleoptera			
Snout beetle	3	Slightly damage	1 to 25% damage on plant
Cockchafer	3	Slightly damage	1 to 25% damage on plant
Leaf beetle	3	Slightly damage	1 to 25% damage on plant
Western corn rootworm	3	Slightly damage	1 to 25% damage on plant
Northern corn rootworm	3	Slightly damage	1 to 25% damage on plant
Gastropoda			
Snail	3	Slightly damage	1 to 25% damage on plant
Slug	3	Slightly damage	1 to 25% damage on plant

Figure 21.*Ostrinia furnicalis* Gueene damage on the young stage of sweet corn 75

Figure 22. *Peridroma saucia* Hubner damage on the vegetative stage of sweet corn 75

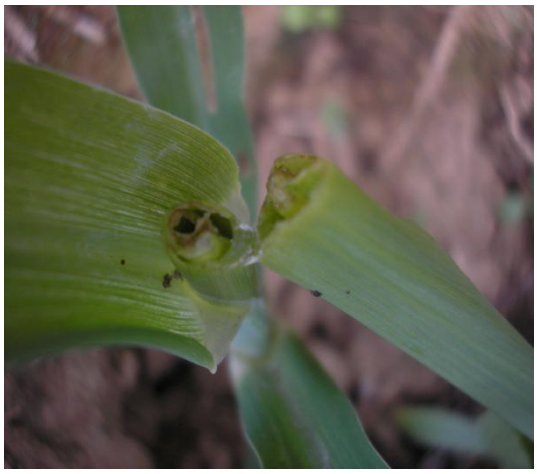

Figure 23. *Spodoptera litura* Fabricius damage on the young stage of sweet corn 75

Figure 24. *Chrysodeixis chalcites* Esper damage on the leaves of sweet corn 75

Figure 25. *Spodoptera frugiperda* Smith damage on vegetative stage of sweet corn 75

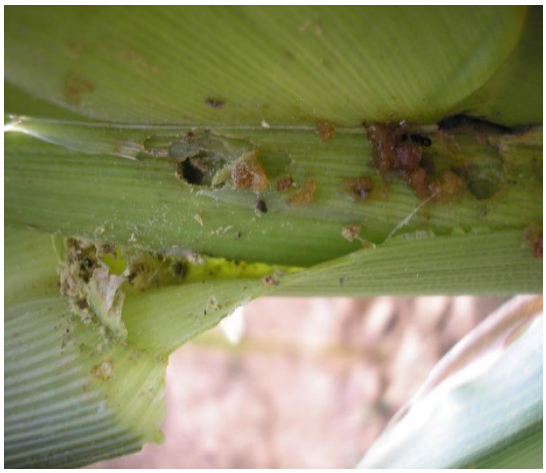

Figure 26. *Helicoverpa zea* Boddie damage on the ear of sweet corn 75

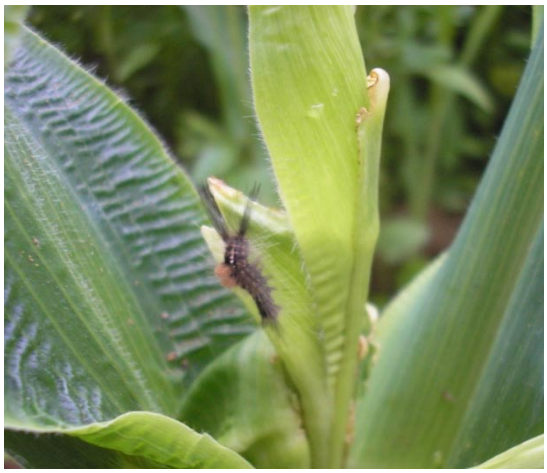

Figure 27. *Euproctis sp*. damage on the vegetative stage of sweet corn 75

Figure 28. *Dasychira sp*. damage on the flowering stage of sweet corn 75

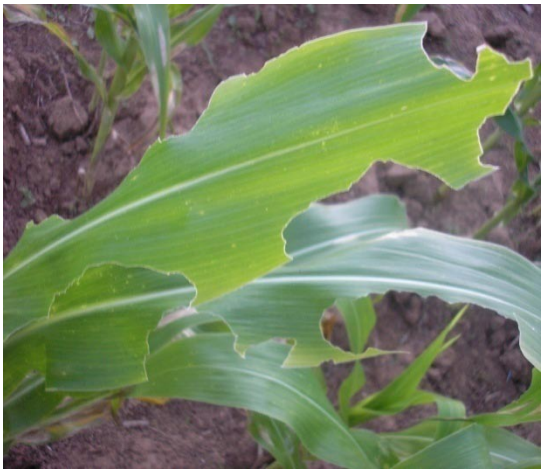

Figure 28. *Spilosoma sp.* damage on the leaves of sweet corn 75

Figure 30. *Rhopalosiphum maidis* Fitch damage on the ear of sweet corn 75

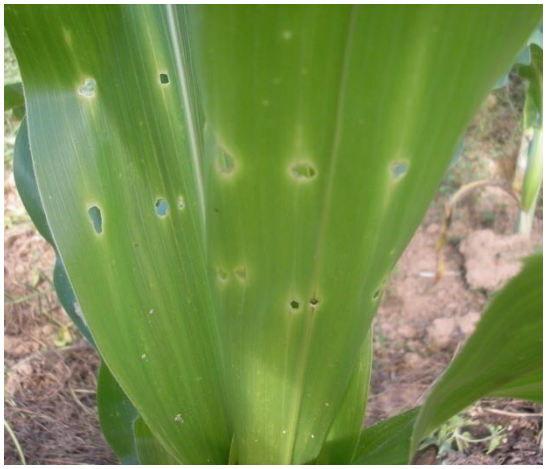

Figure 31. *Dalbulus maidis* DeLong damage on the leaves of sweet corn 75

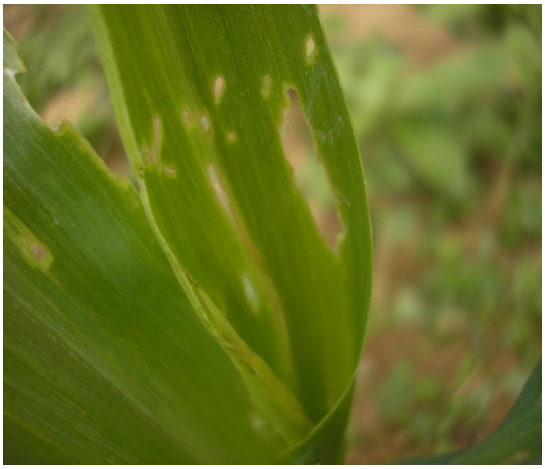

Figure 32. *Altractomorporpha viridissima* Bolivar damage on the leaves of sweet corn 75

Figure 33. *Pterophylla camellifolia* Thunberg damage on the leaves of sweet corn 75

Figure 34. *Gonepterus sp.* damage on the hair of sweet corn 75

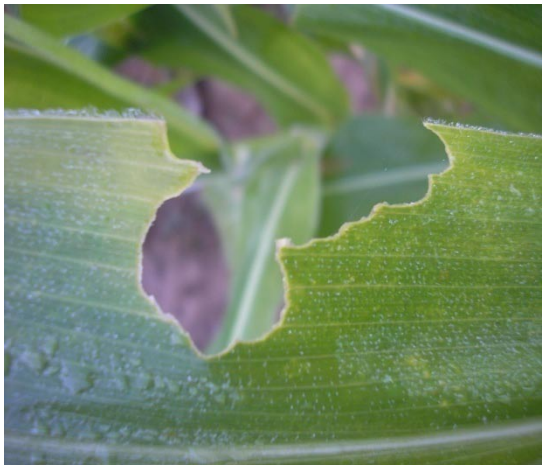

Figure 35. *Melolontha melolontha* Linnaeus damage on the leaves of sweet corn 75

Figure 36. *Labidomera clivicollis* Kirby damage on the leaves of sweet corn 75

Figure 37. *Diabrotica virgifera* Wilcox damage on the leaves of sweet corn 75

Figure 38. *Diabrotica barberi* Wilcox damage on the leaves of sweet corn 75

Figure 39. *Helix aspersa* Muller damage on the leaves of sweet corn 75

Figure 40. *Vaginulus plebeia* Fischer damage on the leaves of sweet corn 75

Major and Minor Pest Associated with Sweet Corn Sugar 75

The classification of the insect either it is a major or minor pest was based on the degree of damage. The insect is classified major pest if the level of damaged on sweet corn is 50% and above and minor pest if the level of damage is 50% and below. The result of evaluation is as follows:

Major pest. The major pest of sweet corn variety sugar 75 encountered were the corn borer, variegated cutworm, army worm, cluster caterpillar, and corn earworm. These insect pest feed on almost all part of the sweet corn sugar 75. The insects enumerated above were classified in the order Lepidoptera.

Minor pests. The minor pests of sweet corn variety sugar 75 encountered were aphids, jassid under, long horned grasshopper, katydid, snout beetle, cockchafer, leaf beetle, western corn rootworm, northern corn rootworm, snail and slug.

Aphids and jassid were classified in the order Homoptera while the long horned grasshopper and katydid were classified in the order Orthoptera. Snout beetle, cockchafer, leaf beetle, western corn borer and northern corn rootworm were classified in the order Coleoptera. The snail and slugs were classified in the class Gastropoda.

Table 4. Identified major and minor pests associated with sweet corn sugar 75

ORDER/SCIENTIFIC NAME	COMMON NAME	MAJOR PEST	MINOR PEST
Order Lepidoptera			
Ostrinia furnicalis Gueene	Corn borer	X	
Peridroma saucia Hubner	Variegated cutworm	X	
Chrysodeeixis chalcites Esper	Semi-looper		X
Spodoptera frugiperda Smith	Armyworm	X	
Spodoptera litura Fabricius	Cluster caterpillar	X	
Helicoverpa zea Boddie	earworm	X	
Euproctis sp.	Tussock moth		X
Dasychira sp.	Tussock moth		X
Spilosoma sp.	Woolly bear caterpillar		X
Order *Homoptera*			
Rhopalosiphum maidis Fitch	Aphids		X
Dalbulus maidis DeLong	Jassid		X
Order Orthoptera			
Altratomorpha viridissima Bolivar	Long horned grasshopper		X
Pterophylla camellifolia Thunberg	Katydid		X
Order Coleoptera			
Gonepterus sp.	Snout beetle		X

Table 4. Continued . . .

ORDER/SCIENTIFIC NAME	COMMON NAME	MAJOR PEST	MINOR PEST
Melolontha melolontha Linnaeus	Cockchafer		X
Labidomera clivicollis Kirby	Leaf beetle		X
Diabrotica virgifera Wilcox	Western corn rootworm		X
Diabrotica barberi Wilcox	Northern corn rootworm		X
Class Gastropoda			
Hilex aspersa Muller	Snail		X
Varginulus plebeia Fischer	Slug		X

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary

The study was conducted at Benguet State University Balili Experimental Area, La Trinidad Benguet from December to February 2008. The study was conducted to know the insects and other related pests feeding on sweet corn variety sugar 75, record the degree of injury caused by the insect pests on sweet corn variety sugar 75 and classify the insets according to economic importance.

In the roots of sweet corn, there were no insects noted damaging based on the results of this research. On the other hand, literature indicates that the insects damaging on roots are white grubs, root webworm, cutworm and wireworm. The insects recorded damaging on the stem of corn were corn borer, variegated cutworm, cluster caterpillar and aphids. The recorded most destructive was corn borer. In the corn leaves, the insects recorded damaging were corn borer, variegated cutworm, cluster caterpillar, semi-looper, armyworm, corn earworm, tussock moth with genus of *Euproctis sp*. and *Dasychira sp*., aphids, jassid, long horned grasshopper, katydid, snout beetle, cockchafer, leaf beetle, western corn rootworm, northern corn rootworm, snail and slugs. Among the insects recorded, the most destructive were variegated cutworm, cluster caterpillar armyworm and aphids. On the corn ear, the insects observed damaging were corn earworm, corn borer, and aphids. The most destructive was corn earworm. In the tassel, the insects damaging were corn borer, corn earworm and aphids with aphids and corn borer as the two most destructive.

The corn borer, variegated cutworm, semi-looper, armyworm, cluster caterpillar, corn earworm, tussock moth (*Euproctis sp. and Dasychira sp.*) and woolly bear caterpillar) are feeding on the leaves, stem, and almost all part of the sweet corn sugar 75 at day and night. The aphids were feeding on leaves, stalk, flower and ear of the corn during daytime. The jassid feed on the leaves of the corn at daytime. Long horned grasshopper and katydid are feeding on the leaves of corn at daytime. The snout beetle, cockchafer, leaf beetle, western corn rootworm and northern corn rootworm are feeding on the leaves of the corn plants at daytime. The snail and slugs are feeding on the leaves of sweet corn sugar 75 both at the day and night.

The most destructive pest of sweet corn sugar 75 was corn borer. This insect causes damage in corn to as high as 76 to 100%. Corn borer was followed by variegated cutworm, armyworm, cluster caterpillar, corn earworm and aphids with the degree of damage of 26 to 50%. The jassid, snout beetle, cockchafer, leaf beetle, western corn rootworm, northern corn rootworm, long horned grasshopper, katydid, snail and slugs cause damage in corn of 1 to 25%.

Conclusion

Sweet corn sugar 75 is like other ordinary corn, is attractive for the infestation by many kinds of pest insects and other related pest. These include corn borer, variegated cutworm, armyworm, cluster caterpillar, and corn earworm as the major pest while the minor pests are tussock moth (*Euproctis sp. and Dasychira spp.*), woolly bear caterpillar, aphid's, jassid, long horned grasshopper katydid, snout beetle, cockchafer, leaf beetle, western corn rootworm, northern corn rootworm, snail and slugs.

Recommendation

Should there is a wide cultivation of sweet corn especially if it is intended for commercial scale production, the insect pest as cited above must be given especial attention for control.

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