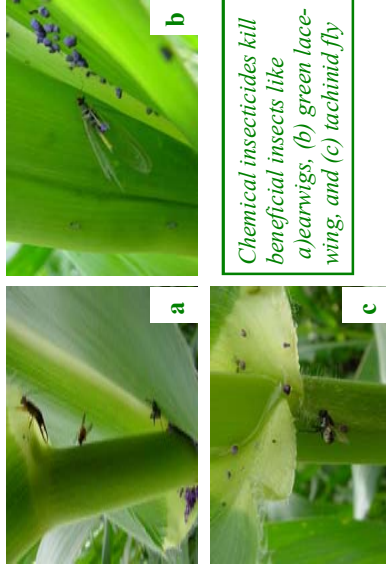


Abundance of natural enemies

Natural enemies like the predatory insects and parasitoids are important because they reduce the population of insect pest species. In corn farms, the adults and larvae of the green lacewing, the brown lacewing, and the coccinellid beetle feed on aphids, eggs and first instar larvae of ACB.

At Villaluna, more brown lacewings and coccinellid beetles were found in Bt corn farms than in non-Bt corn farms. Green lacewings and coccinellid beetles were abundant at the Tigoan site during the tasseling stage, however, no brown lacewings were found. Also, a few number of *Mantispa* sp., another species of lacewing, was found at the Tigoan site. The coccinellid beetles were significantly abundant from late whorl to silking at both sites. In general, there were more natural enemies at tasseling, silking and maturity.



Chemical insecticides kill beneficial insects like a) earwigs, (b) green lacewing, and (c) tachinid fly

Conclusion

Presently, Yieldgard (Bt corn) does not appear to have any harmful effects on insect diversity, guild structure and abundance of natural enemies.

Using the Shannon index to measure species diversity, results showed that in Bt- and non-Bt corn fields insect diversity is generally the same. On the average, Yieldgard showed less infestation of beetles than non-Bt corn hybrids. Different guilds such as phytophagous, neutrals, predators, and parasitoids were also not significantly different among treatments; so does guild structures.

Conclusion (cont'd)

On the average, higher numbers of the predatory beetle and the brown lacewing were recorded on YieldGard than on its isohybrid and the commercial hybrid. The natural enemies of corn were generally significantly higher at tasseling, silking and maturity.

This study shows that Bt corn does not harmfully affect the population of non-target organisms. However, since the study was conducted in one wet season only, long-term studies are needed to further characterize subtle population changes in the field.

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PHILIPPINES Bt corn and insect diversity



Brown lacewing,
Pseudomicromus igrortus (Banks)



Coccinellid beetle,
Micraspis discolor (Fabr.) falling prey to a reduviid bug

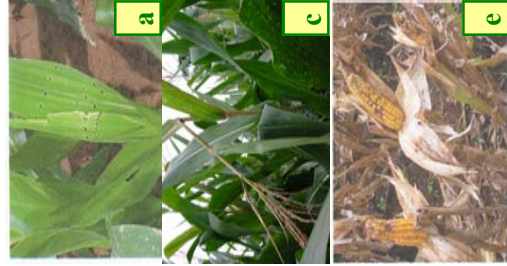


More beneficial insects are found in Bt corn fields than in non-Bt corn fields sprayed with chemical insecticides

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College of Agriculture
University of the Philippines Los Baños

Corn is an important crop in the Philippines for human and animal consumption. White corn is a staple food in southern Philippines while yellow corn is the main ingredient in livestock feed formulation.

Background



Damage caused by ACB

The larvae of ACB cause damages as they feed on corn plant tissues such as (a) leaves, (b) stalks, (c) tassels, and (d-e) ears

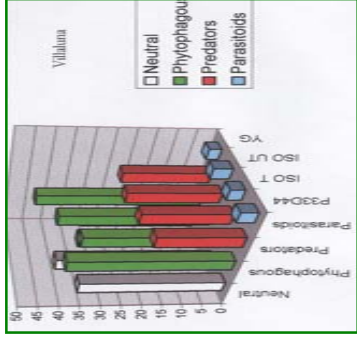
As a major pest of corn, the Asiatic corn borer (ACB) *Ostrinia furnacalis* Guenee can decrease yield from 20-80%. To control the ACB population, a transgenic (*Bt*) corn is used as a new technology. To date, the Philippines Department of Agriculture (DA) approved the commercial propagation of *Bt* corn MON810.

As a new control, it is important to know the effect of *Bt* corn on non-target organisms under local conditions.

Presented here are results of a study that investigated the impact of *Bt* corn MON810-Yieldgard corn hybrid, DK818YG on the variety and community of insects. The field experiments were conducted in farmers' farms in Villaluna, Cauayan, Isabela, and Panagan, Tigaon, Camarines Sur during the 2001-2002 wet cropping season. Each site was planted with *Bt* corn, its isohybrid - DK818 (the same hybrid but non-*Bt*), and another hybrid - P30D44 as a reference hybrid.

Insect diversity

There were as many kinds of insects in fields planted with *Bt* corn and non-*Bt* corn. The phytophagous, or those insects feeding on the different parts of the corn plant had the most number. This group included ACB, cutworms, earworms, corn silk beetles, mired bugs, locusts, aphids, leafhoppers and planthoppers. Corn silk beetles (*Monolepta bifasciata* Burm.) were very abundant at the Tigaon site during silking (flowering), while the migratory locusts were numerous at the Villaluna site. The *Bt* cornfields were least infested with corn silk beetles.

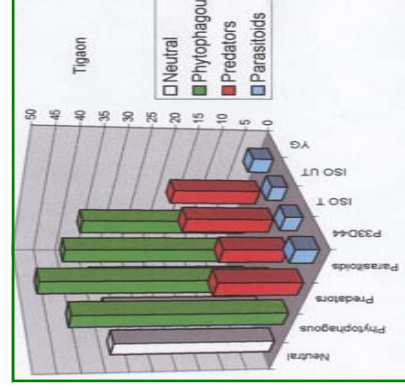


The next abundant group were the neutrals followed by the predatory and parasitoid species. The neutral species included midges, *Sarcophaga* sp., mosquitoes such as *Culex* sp. and *Aedes* sp., *Musca domestica* L. and other dipterans whose larvae are mainly detritivores.

The predatory insects found were the green lacewing (*Chrysopa* sp.), the brown lacewing (*Pseudomicromus igorotus* Banks), and the coccinellid beetles (*Micraspis discolor* Fabr.)

Parasitoids are insects that "eat" or parasitize the eggs of other insects for their nourishment. The dominant species of egg parasitoid was *Trichogramma evanescens* Westwood in Isabela.

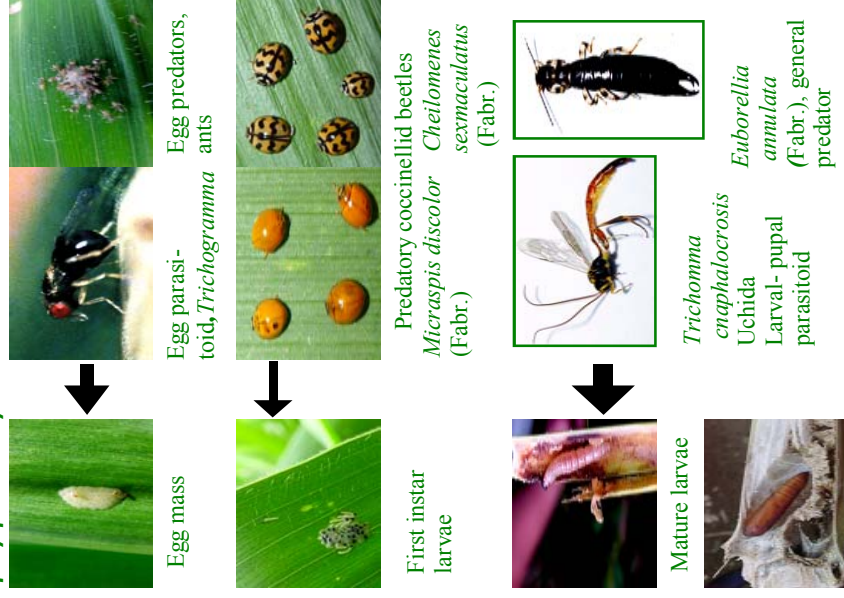
The population of the different guilds or groups of insects such as phytophagous, neutrals, predators and parasitoids were not significantly different between *Bt* and non-*Bt* corn fields.



Insect community structure: host-parasitoid/prey-predator system

A corn field is a dynamic community where different groups of insects live together. Some insects feed on other insects for their growth and survival. For the ACB, nature provides a number of predators and parasitoids from its early life form to its mature stage. These were found both in *Bt* and non-*Bt* corn fields.

Insect community structure(partial): host-parasitoid/prey-predator systems



Egg masses of ACB are attacked by beneficial insects like the *Trichogramma* sp. and ants. As the larva matures, it is being preyed on by earwigs, coccinellid beetles and other insects. When the ACB becomes a moth, it does not inflict damage to corn tissues anymore.



Adult ACB