

CHAPTER 3 INSECTS IN AGRICULTURE

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Silvery Tunnel

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Parasitoid

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Alien Invasion

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Insects in Agriculture

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Insects have got both positive and negative impacts in agriculture. Insects become pests when they interfere with our welfare, aesthetics or profits. A reduction or loss in yield and quality of crops is partly due to result of insect-feeding activities and as vector/host to pathogen transmissions. On the other hand, these small creatures serve us a lot as pollinating agents of many important agricultural crops, as biological controlling agents of pests and weeds as well as by producing honey, silk and many other materials essential to us.

Agriculture is a man-made system based mostly on the monoculture of a particular crop/animal in a farm where nature views this as an anomaly and an overpopulation of a plant/animal species. The other creatures, for example an insect species that would rely on this plant

species for food, now have a huge diet of plants to dine on. This insect population will rise in seeking a balance in the environment, not of their choosing but by the power of nature, her niches available, and natural selection. Consequently bird, bats, predators/parasitoids or any insectivores will increase in population, and then the carnivores will increase, and also the diseases of insects and animals.

In crux, the role of the insect ecology is to fill a niche and in turn, support the food pyramid/ food chain, and at the same time to keep the harmonious balance of life on the earth. Any human-made imbalance with respect to agriculture will never be tolerated by nature. In the end, the insect ecology forces us to learn to mimic nature in order to have agriculture to support our species and civilization. Hence, we must have insects around us and we need to learn to work with them for the sake of our existence.

The parasitoids unveil the unique mechanism in the insect food chain which demonstrates how biological control works, and how this phenomenon could be explored for the welfare of mankind. The wasp use their needle-like appendage to penetrate and lay eggs on their victims which is usually an agricultural pest like leaf -eating caterpillar or leaf hopper. As a consequence, the victim might be killed immediately or later once parasitoids have emerged.

Newly-found pest species either accidentally or deliberately introduced into an area where they are not usually found are called Invasive Alien Species (IAS). The Asian citrus psyllid, *Diaphorina citri* Kuwayama and banana scarring beetle, *Basilepta musae* Bryant are among a few IAS species which are huge threats to the Malaysian fruit industry causing millions of ringgit losses.

Looking at other aspects, insects have tremendous influence on human art media. Like plants, insects also

have been explored by man as an interesting object in which artists synthesize an artistic visualization in their presentation, in batik painting for instance. Thus, insects provide inspiration and creativity to humans through uniqueness in diversity of their shapes, colours, characteristics, behaviours and activities. The 'silvery tunnel' created by the citrus leaf miner, a small nocturnal moth, which lays eggs on the young citrus leaf as presented by Norida Mazlan is a wonderful example of a magnificent piece of art presented to us by this insect.

In summary, insects are part and parcel of human life. Moreover, the biological form of scientific materials like insects may be an interesting subject for the artist to bring novelty in their presentation that makes science more meaningful.