

Scope for Managing Crop Pollinators

The Natural Agents

Nature has provided natural pollinating agents that perform crop pollination as part of their search for food from flowering plants. These agents include hundreds of species of insect pollinators; e.g., flies, beetles, moths, butterflies, and bees. The most important among these are the different species of bees such as bumble bees, solitary bees, and honeybees. In a few exceptional cases, insects other than bees are essential crop pollinators, e.g., the two insect species, *Theobroma cacao* and *Elaeis guineensis*, that pollinate the oil palm. But these insects lack body hairs and the necessary behavioural characteristics, and probably only a few of them actually transfer pollen (Free 1993). Furthermore, unlike bees, which forage consistently to obtain sufficient food for their young, most other insects forage to

satisfy their own immediate needs. Hence, it is assumed that they only perform a supplementary role in pollination. Probably, the most important supplementary pollinators are the various *Diptera*, including those belonging to the genera *Eristalis*, *Syrphus*, *Platychirus*, *Calliphora*, *Bibio*, and *Bombylus*.

To be an efficient pollinator, an insect must visit several flowers of the same species in succession, moving frequently from one flower to another, carrying plenty of pollen on its body and brushing against the stigmas of flowers for transference (Free 1993). Some species of *Diptera* carry as much pollen on their bodies as bees, but they do not visit the flowers consistently.

Experience in Management of Pollinators

If emphasis needs to be placed on neglected aspects of crop productivity, e.g., through managed crop pollination, it will be necessary to rear insect pollinators on a large scale for use in crop pollination. These pollinating insects would be using an unharnessed niche, i.e., the pollen and nectar of flowers. While foraging for nectar and pollen, these insects will perform valuable pollination services.

In the developed countries of the West, attention is given to the management of pollinating insects on a commercial scale, even to those other than honeybees, especially bumble bees and solitary bees. These insects are being reared and used for the pollination of alfalfa and crops such as tomatoes and potatoes that are not pollinated as effectively by honeybees. For example, there are 10-15 companies located in western Europe, Israel, New Zealand, the USA, and Canada which are rearing bumble bees. In 1992, these companies sold 300,000 colonies valued between US\$30-60 million (Doorn 1993). Two companies in the Netherlands rear bumble bees on a large scale and market these to farmers as crop pollinating agents. Some companies in Japan are reportedly importing bumble bees and other insects on a commercial scale for use with tomato and potato pollination.

In the developing countries, although both the need and the potential exist, the practice of managing crop pollination using honeybees only is limited. Development and use of other insects in this part of the world will take a long time. In the HKH Region, managed crop pollination using honeybees or other agents is even less prevalent, despite the fact that the productivity of cross-pollinated cash crops is declining and that there is a rich beekeeping tradition; although this is primarily for honey.