



## Improving pollinators health : A step in food security bio weapons in enhancing food stuff for humans and other creatures

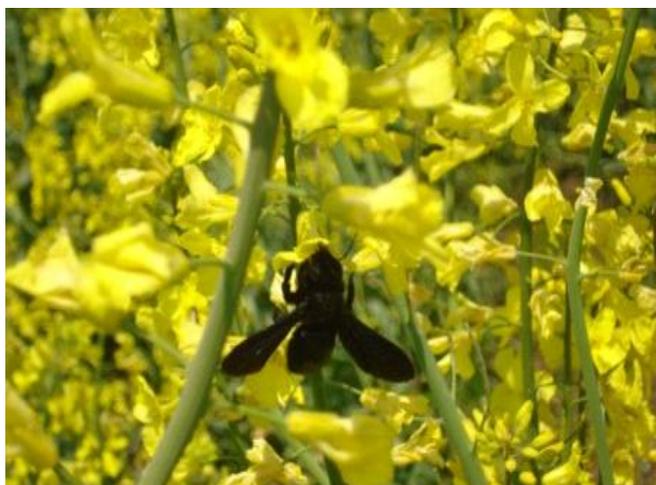
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Jammu and Kashmir is Dependent on Agriculture, Horticulture and Tourism as for its economy is concerned and 75 per cent of its population is dependent directly and in directly on cultivation of fruits and crops. To meet the food and fruit requirement of the ever multiplying population of this country, Agriculture/Horticulture production has to be maximized by using improved resistant varieties, fertilizers, seeds and other latest protection technologies. For further improvement in agricultural production we have to adopt comprehensive strategies. One of such strategies is pollination management that is a very vital process of crop production. Successful pollination is necessary for most plants to produce viable seeds and good fruits. In agriculture, this process is often responsible not only for producing the edible portions of many of our most important crops but also to ensure that seeds are available for the next year's planting. Specifically, pollination refers to the method by which pollen from the male part of a flower (stamen) is transferred to the female part of a flower (stigma) so that fertilization can occur. Pollen can be transferred by way of wind, water, or by animals. Almost 90 per cent of flowering plant species are pollinated by animals like insects. The term pollinator refers to animals that move pollen from one flower to another.

Animals visit flowers to collect and eat nectar and pollen, as a brood site for mating, a place to lay eggs. Bee pollinators of the estimated 30,000 bee species worldwide, about 4,00 are native of J and K, the majority of which do not live in colonies or make honey. Native bees are the primary pollinators for many wild plants and are also important for crop pollination. Studies have demonstrated that when native habitat near agricultural land is conserved, native pollinators are able to provide the majority of pollination services needed for crops. However, where large swaths of land have been converted for intensive agricultural production, native bee populations are not sufficiently large to completely pollinate crops, and therefore must be augmented by managed colonies of the domesticated honey bee (*Apis mellifera* and *Apis cerana*).

Pollinators are essential to the J and K economy. Honey bees, native bees, butterflies and other species contribute substantially to our food production systems, the economic vitality of the agricultural sector and the health of the environment. Honey bee pollination alone adds more than \$15 billion in value to agricultural crops in the United States each year. Pollinators support the success and vigour of flowering plants, making ecosystems



stronger, more resilient and enhancing the environment for human populations. Decades of stressors have severely and adversely altered the health and numbers of pollinator populations. Pollinators have been impacted by the loss, degradation, and fragmentation of habitat, reduction in the number and quality of food sources, reduction in the availability of sites for breeding, nesting and roosting and improper use of pesticides and herbicides. In some case these stressors have made pollinator populations more susceptible to existing disease, predators, and parasites. Seventy-five per cent of all crops grown for human consumption rely on pollinators, predominantly bees, for a successful harvest. However, over the last decade, both native and honey bee populations have been declining at alarming rates, raising concerns about the impact on our global food security. To complicate the situation, many of the factors linked to bee population declines are a direct result of commonly utilized agricultural practices.

Fortunately, organic farming practices can provide critical solutions that not only decrease risks to pollinators, but actively support the growth and health of our pollinator populations. Some of the most well-studied factors implicated in declining pollinator populations include:

- Low-level exposure to toxic agricultural pesticides including herbicides, insecticides and fungicides.
- Parasites and pathogens
- Malnutrition through reduced diversity in available food sources are often due to intensive conventional mono-cropping.
- Habitat destruction through the conversion of land for anthropogenic use.
- Additive effects and synergistic interactions among multiple factors.

**Maintaining health of pollinators:**

*Day to day care:* – Become familiar with markings and indications that designate the presence of pollinators. For



Packing hive with rice straw and gunny bog



example, flag areas that contain pollinator damage to leaves so that insecticides aren't applied by mistake.

– Adhere to all pesticide label instructions and treat only the target areas. Observe pollinator activity to minimize exposure.

– Avoid applications to flowering plant species since this is when pollinators are actively foraging. Target very early morning or late in the evening applications.

– Use an IPM approach that includes a pollinator protection plan. IPM is a pest management approach that includes biological, cultural, physical and chemical tools in a way that minimizes economic, health and environmental risks. IPM places an emphasis on the reduction of pesticide use and the implementation of preventative and alternative control measures.

– Co-operate and communicate with others. This includes neighboring sites that may be home to sensitive occupants or pollinator habitats, such as beehives.

– Monitor environmental conditions and use equipment that minimizes spray drift to adjacent sites.

– Follow notification requirements if pollinator toxic pesticides (PTPs) are planned for application in close vicinity to

hives or active pollinator activity and become familiar with applicable regulatory agencies to report suspected pollinator pesticide poisonings.

*Disease management of managed pollinators:*—Isolation of the infected colonies and their destruction to avoid infection.

– To maintain strong and vigorous colonies and to ensure surplus honey stores.

– To avoid overcrowding of the bee colonies and exchanging brood from one colony to another.

– To avoid migration of infected colonies.

– To destroy by burning brood and comb when many colonies are not involved.

– Inspection of brood combs at regular intervals.

– No beekeeping appliances to be brought from infected areas.

– Feed Terramycin 0.25 to 0.4 g in 5 lit sugar syrup, if not under organic cultivation/rearing).

– Disinfect bee equipment by soaking in a Formalin @ 150ml/lit of water for 24 hours.

*Avoid winter mortality and chill coma disorders:* Kashmir faces severe chilly winters from December to February so there is great loss of managed bees (*Apis*

*mellifera* and *Apis cerana*) during this period. It has been proved and estimated that winter mortality of honey bee colonies in the Kashmir is upto 12 per cent. Although mortality rates for managed honey bee hives vary from year to year.

**Management of winter mortality by winter hive packing:** Wood shavings, saw dust, rice straw, dry leaves, chopped dry grass are handy packing materials. Thermocol can also be used. The packing can be given in the brood chamber. The packing material is also packed between the inner and top cover. The packing material can be placed in position by gunny bag wrapped over the packing material. Care should be taken that packing material should not be moist since the moisture makes them poor insulators. Proper insulation can reduce colony loss. This winter packing is given at the end of autumn and after the colonies have been properly prepared for winter season. Only strong colonies with number of young bees and enough honey and pollen reserves should be overwintered. Weak colonies will not be able to pull through the winter and should be united with others. The main points need to be taken



care during winter

– Sugar candies approximately 12 cm diameter and 2 cm thick be placed on the top of the combs usually near the bee cluster.

– Entrance hole of the bee hive should be narrowed by mud plaster

– All crevices of the honey bee hive should be closed by mud plaster.

– Keep the hive above ground level on stand during winter to avoid moisture in the hive.

**Conclusion:** Causes of long term decline of honey bees in Kashmir are more most likely due to the loss of beekeepers to the industry and the global spread of pathogens and pests through the trade in bees and bee products. Problems of honey bee health became particularly acute in 2005-06 in Kashmir when colonies across Kashmir experience varroa mite attack this single organism strike fast and industry collapsed. Native bees (Wild bees) face many threats with the result their population decreases. The gap created by these threats can be filled by Improving the health of managed bees for their pollination services in Agroecosystem.

Received : 08.09.2018

Revised : 19.11.2018

Accepted : 27.11.2018