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Role of insects and weed in the environment

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There is no reliable study of worldwide damage due to weeds. However, it is widely known that losses caused by weeds have exceeded the losses from any category of agricultural pests such as insects, nematodes, diseases, rodents, etc. The potential crop yield loss without weed control was estimated by 43%, on a global scale. While has reported that of the total annual loss of agricultural produce from various pests, weeds account for 45%, insects 30%, diseases 20% and other pests 5%. Annual worldwide losses to weeds were estimated to comprise approximately 10-15% of attainable production among the principal food sources. Moreover, among insects collected, 50% were harmful either as pests of plants or parasites on useful insects and other animals. These matter collected at different research paper, showed that insects and weed are widely distributed on the earth and play a vital role in the environment.

The insects occur in different ecological niches of environment. Insects, like honeybees are beneficial to man, but several other types of insects occur as pests causing damage to the vegetation. A few others are biting types causing irritation and pain to the human beings. Senthil and Varadharajan (1995) found that maximum number of 83 insects is from vegetation, 17 insects from soil and one from water. Out of 83 insects occurring on vegetation, 52 were from herbs, 23 from trees and 8 from grasses. Their insect collections revealed that 62 insects are harmful while remaining 49 insects were beneficial.

Weeds were considered the most important pest group in a survey of organic vegetable growers. Worldwide consumption of herbicides represents 47.5% of the 2 million tons of pesticide consumed each year. However, the heavy use of herbicides has given rise to serious environmental and public health problems (Sopena and Morillo, 2009).

Important problems of weed control : Weeds are considered the biggest problem facing organic farming, where weed control is more expensive compared to synthetic herbicides whose use is prohibited in clean agriculture has reported that weed management is the most difficult part of organic rice production and it is the major reason for organic rice yields being 50% lower than conventional yields. Lower yields and higher costs for weed control labuor are two of the major reasons that organic cotton must be sold with high price premiums.

Unavailable or limited herbicides candidate in clean farming : Controlling weeds without herbicides takes a lot of time and is very costly for us. All weeding is done by tractors or hand, which is very labor-intensive. Conventional farmers spend only about $50 per one acre on herbicides that knock out every weed in sight. Organic farmers may have to spend upto $1,000 an acre to keep weeds under control.

Various least toxic, natural herbicides have limited efficacy, particularly against noxious perennial weeds. Also, mycoherbicides have some promise, but also pose risks to non-target plants.

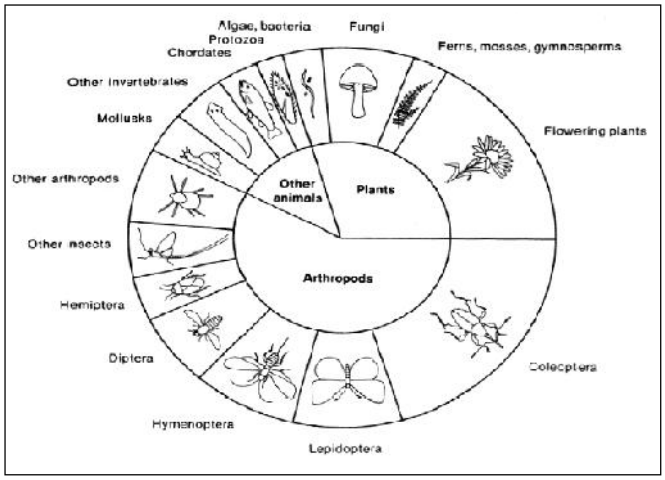
The costs of weed control in organic farming are more expensive : Where synthetic herbicides have their use prohibited compared to herbicides allowed in conventional farming. Growers of organic crops cite weed control as their greatest difficulty in crop production because they are not permitted to use chemical herbicide. They substitute hand weeding and cultivation for herbicides at a greatly increased cost and with reduced effectiveness. Aggregate studies that estimate the value of herbicides assume that growers would substitute a certain amount of hand weeding and tillage if chemicals were not used, which would not be sufficient to prevent yield losses totaling about 20% of the U.S. crop production.

Non-living or abiotic factor :

Living or biotic factors :

The position of insect : The insects are distributed horizontally as well as vertically and live in almost every habitable place of the earth except in the depth of ocean. They are chief consumer of plants and act as natural enemy of crop pest, vector of several diseases, pollinator etc.

Insects in the environment : The insect was originated in the lower devonian period and are considered to be the descent of Symphyta: Myriapoda or Protaptera. In the evolution of insects four steps are involved. The insects may be defined as unique Arthropods (having jointed legs) bearing: the head, the thorax and the abdomen.



Source: http://pulse.pharmacy.arizona.edu/10th_grade/disease_epidemics/science/images/Insect-diversity.gif

Role of insects : The insects work as: Phytophagous, natural enemies of pest, vector of diseases, pollinator, producer of some useful substances, food and medicine.

Natural enemies of pests : The natural enemies were classified into three groups: Predators, Parasitoids and Weed killers.

Predators : These are large insects which capture and devour their pray. They require more than one pray to complete their life cycle (e.g. coccinellids, praying mantis).

Parasitoids : They are smaller insects which feed and live on their host. They require only one host to complete their life cycle (e.g. *Trichograma* wasp etc.).

Weed killers : The insects which feed on weeds and kill them are called weed killers. e.g.

– Parthenium weed killer, *Zygogramma bicolorata* (Chrysomelidae:Coleoptera)

– Water hyacinth weevil *Neochetina eichhorniae* and *N. bruchi*

– AK Grosshopper - *Poecilocerus* pictus (Actididae: Orthoptera)

– Caotropis butterfly - *Danaus chrysippus* (Nymphalidae : Lepidoptera) - feeds on calotropis.

– Aristalochia butterfly, *Papilio aristolochiae* (Papilionidae : Lepidoptera). It feeds on Arista lochia which a weed.

– *Dactylopius tomentosus* cochnieal insect to control prickly pear *Opuntiadillenii*.

Vector of plant diseases : The major vector of plant diseases are aphids, white flies, leafhoppers and plant hoppers, beetles, mealy bugs, psyllids and thrips.

Pollinators: The pollinators are those organisms who involve in the transfer of anther to stigma in flowering plants for sexual reproduction. Pollination is a trade between plants and pollinators. Insect pollination helps in uniform seed set, improvement in quality and increase in crop yield.

Producers of useful substances :

– Some useful substances like honey and wax are produced by Honey bees (*Apis* spp.)

– The silk is produced by silk worm (*Bombyxmori*)

– *The insect Lacciferlacca* produces the lac, which is used as major ingredient in shoe polishes, playing cards and hair dyes etc.

Insects serve as medicine :

– The humans have used various insects as cures for sickness such as leprosy, fever, headaches etc. since the time of beginning.

– Today, many Chinese use insects for everything from tinnitus to dermatitis.

– Some of these cures are documented to be effective.

Insects as scavengers : Insects which feed on dead and decaying matter are called scavengers. They are important for maintaining hygiene in the environment (e.g. carrion bettles, rove beetles, ants etc.).

Soil builder : Insects which live in soil and make tunnels are to much useful in the process of the soil disintegration, and facilitate soil aeration. During these processes subsoil is brought to the surface and soil become fertile. Excreta of insects also enrich the soil (e.g. Beetles, ants, cutworms, larvae of flies, crickets, termites, wasps etc.).

References :

Sopeña, F.M.C. and Morillo, E. (2009). Controlled release formulations of herbicides based on micro-encapsulation, Literature Review. *Cien. Invas. Agr.*, **35** (1) : 27-42.

http://newsletter.dubaitourism.ae/service/FTP/Upload/defaultSpace/3/8/Environment.jpg

http://www.stephsnature.com/images/Websitelifescience/ecology/popcommecovisual.png

Veenakumari, K., Mohanraj, P. and Bandyopadhyay, A.K. (1997). Insects herbivores and their natural enemies in mangals of the Andamans and Nicobars Islands. *J. Natural History*, **31**(7): 1105-1126.

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