

A Case Study : Traditional Methods of Pest Control in Some Villages of Kolhapur District

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Abstract

A pest is an organism whose population often increases above a certain level of economic injury and its existence conflict with welfare, convenience and profit of man. Pest control refers to the regulation or management of a species defined as a pest, usually because it is perceived to be harmful to a person's health, the ecology or the economy. The pest may be classified as crop pest, house hold pest and stored grain pest. It is observed that the use of chemical pesticides is hazardous to human health, so now a day humans are diverted to follow traditional techniques of pest control. Modern farming makes use of more machines and other equipments. New agricultural techniques make use of fertilizers such as super phosphates or ammonia based fertilizers and chemical pesticides. These modern agricultural techniques are beneficial on one hand while on other hand they have serious, long term side effects such as soil erosion, disturbances in mineral uptake by plants, reduced soil fertility and also affect on human health. Traditional methods of pest control are better than modern techniques. A traditional method includes locally available natural things.

KEYWORDS: Traditional methods, Pests, Pesticides, Fertilizers

Introduction: Insects causes enormous damage to agriculture crops, forests as well as stored agricultural commodities. Almost every economically important plant is attacked by a variety of insect pests. Damage is caused either directly by insects as they feed or oviposition or by bacterial, fungal or viral diseases, for which insects serve as vectors. There are various methods by which insects damages the plants like chewing, piercing and sucking, boring, gall making, root eating, egg laying, nest making etc.(Dhaliwal et.al, 2010) Broad-spectrum pesticides often kill a higher proportion of predators and parasites than of the pest species they are applied to control. In addition to immediately killing natural enemies that are present (contact toxicity), many pesticides are persistent materials that leave residues that kill natural enemies, that migrate in after spraying (residual toxicity). Residues often are toxic to natural enemies long after pests are no longer affected. Even if beneficial survive an application, low levels of pesticide residues can interfere with natural enemies' reproduction and their ability to locate and kill pests (Atwal and Dhaliwal,2009).

Biological control's importance often becomes apparent when broad-spectrum, persistent pesticides cause secondary pest outbreaks or pest resurgence. A secondary outbreaks pest of a different species occurs when pesticides applied against a target pest kill natural enemies of other species, causing the formerly innocuous species to become pests. An example is the dramatic increase in spider mite populations that sometimes results after applying a carbamate (e.g. carbaryl or Sevin) or organophosphate

(malathion) to control caterpillars or other pests. Eliminate or reduce the use of broad-spectrum, persistent pesticides whenever possible. Carbamates, organophosphates, and pyrethroids are especially toxic to natural enemies. (Panwar, 2002) When pesticides are used, apply them in a selective manner. Treat only heavily infested spots instead of entire plants. Choose insecticides that are more specific in the types of invertebrates they kill, such as *Bacillus thuringiensis* (Bt) that kills only caterpillars that eat treated foliage. Rely on insecticides with little or no persistence, including insecticidal soap, horticultural or narrow-range oil, and pyrethrins. A less-persistent pesticide can result in longer control of the pest in situations where biological control is important because the softer pesticide will not keep killing natural enemies. One soft pesticide spray plus natural enemies can be effective for longer than the application of one hard spray (Gillot, 2005).

Plants like *Azadirachta indica*, *Vitex nedundo*, *Ricinus communis*, *Gliricidia sepium*, *Euphorbia milli*, *Euphorbia tirucalli* are proved to be the best natural pest control plants. (S.R.Yadav & M.M. Sardesai)

Material and Method: The study was carried out in Mahadevwadi, Yavalewadi, Jakhale and Nigave Village, Kolhapur during June 2013 to March 2014. Interview schedule of some of the village farmers was used to collect information about different traditional methods that are performed to control pest population from farms. Some of the information regarding traditional methods of house hold pest control, especially of storage grains was collected from the women's of those villages. The main objective of study was to find out traditional methods of pest control and to determine the effectiveness of traditional methods.

Observation and Results:

1. **Cow Urine:** Cow urine is used to prepare organic tonics for soil which is prepared from locally available material including cow urine and cow dung. Especially in villages, where cow urine is easily available, it is the main ingredient in preparing organic cultures and pest control solutions. Cow urine works best against white flies. Cow urine sprayed just once in a week, kills or drives away the white flies. These flies are responsible for major damage to cotton plant. This method is usually performed in the areas where cotton is taken in large scale. Cow urine also has molluscicidal effect, hence it is used in rice field where snails and slugs cause heavy damage. Cow urine, ash and soil mixture is useful for the treatment of cabbage plants.
2. **Cow Dung:** It has an amazing and great variety of uses which have been developed over a period of time. Cow dung is mainly used as fertilizer. Composting of cow dung makes it even more powerful. Cow dung along with dried neem leaves is used as smoke producer. It is burnt to keep away mosquitoes. It is also used as floor coating especially in villages. Cow dung is mixed with mud and water and it is used to coat the floor of mud houses. The traditional Indian village practice of wiping the floor daily with mixture of water and fresh cow dung assures that flies will not settle there. Cow dung is also used as seed protector. Seed is covered in cow dung before they are planted. It helps to protect seeds from pests.

3. **Field Burning:** Traditionally, field burning is performed after harvesting sugar-cane. This method is performed to kill any insects or eggs of insects that be present in the field. Sometimes, entire field or all the trees in a particular area is burnt entirely when they are infected with insects. When population of insects increases beyond limit and becomes out of control, entire farm infested with insect pest are burnt to prevent the pest from spreading elsewhere. Field burning improves yield, reduce the requirement of pesticides and fertilizers and control disease. Field burning produces large amount of smoke that leads to pollution. Thus it had adverse impacts on environment and human health. In order to prevent air pollution, some other alternative methods should be taken into practice, which are ecofriendly. This method is commonly observed in Kolhapur area after a sugar-cane harvest.
4. **Traps:** Trapping is an effective method to control some insects and especially rodents like rat and mice. This is the safe and nontoxic method. Mice and rats destroy the grains stored in houses and godowns or warehouses. Here snap traps can be effective. We can easily remove these rodents from houses and godowns with the help of many traps available in the market.
5. **Bird Scarer:** Bird scarer or scarecrow is commonly used in fruit orchards. It is designed to scare the birds that destroy the crops or recently planted crops. This method does not work so well with all species.
6. **Ploughing:** It is the oldest method used as pest control. It includes preparation of soil for cultivating plants. This method is used to cut the roots of weeds which cause them to die. Ploughing has direct impact on the soil inhabiting pests. After ploughing the pest such as worms, arthropods, nematodes and other insect pests are exposed to sun light and other natural predators like birds. Some insects lay their eggs in soil. After ploughing, they are exposed to sun and they desiccate. Birds pick up the exposed worms or insects. Many insects feed on the roots of plants. So after ploughing, insects are exposed to the soil surface. Then they die to harsh sunlight or are engulfed by birds. Summer ploughing is also found to be effective against pest.
7. **Salt or salty water:** Spraying salt or salty water on the plant infected by the pest is the most common method. Salt also works on weeds and check their growth. It is used to keep away the garden pests like snails and slugs. It is also used in deficiency of soil in magnesium and sulphur. Since the salt is toxic to the pests, they will die after consuming it. Salt mixed with water also checks the growth of worms in the soil.
8. ***Azadirachata indica*:** Neem leaves are the most commonly and widely used almost everywhere as pest control method. Neem leaves are especially used in storage of grains in houses and godowns. Neem leaves in powder form are also dusted directly on the crops or in stored grains to protect it from insects. It has an insecticidal property. Dried neem leaves are kept in cupboards to prevent insects eating the cloths. Neem oil is extracted from the seeds of the neem tree and has insecticidal property due to which it has been used for pest control. Neem oil has been found to be effective mosquito repellent creams. Particularly in villages neem leaves are dried and burnt along with cow dung patties to keep away mosquitoes. Neem seed cake (residue of a neem seeds after oil extraction) is also

found to be effective. It is added to the soil to enrich it with organic matter. It also act as nematicides hence it kills nematodes present in the soil. It also kills white ants. Barks and root of neem tree has certain properties that are used to control pest. Overall neem products have antibacterial, antifungal and antiviral properties

9. ***Vitex negundo***: It is commonly known as the five leaved chaste tree or Indian pivot tree. The leaves of this plant are effective against stored grain pest, especially of garlic. The dried leaves of this plant are powdered and are spread on the pest infected plants or in stored grains. It kills the larvae of insects i.e. it has larvicidal property. Leaf extract of *Vitex negundo* is very effective in the storage of grains in warehouses. The powdered form is commonly used in houses to protect stored grains from pest.
10. ***Ricinus communis***: Oil extracted from the plant *Ricinus communis* is called castor oil. It is extracted from the castor beans. This oil is used as natural insect repellent. Castor oil is mixed in stored grains to protect it from insects. Castor oil mixed with cinnamon oil, eucalyptus oil and citronella oil also act as mosquito repellent. The Indian traditional system of burning the castor plant along with cow-dung patties during the festival of Holy has a medicinal sense behind it. It helps to repel many insect pests.
11. ***Gliricidia sepium***: This tree is used as rat poison. Particularly its flowers are used as rat repellent, thus it has rodenticidal Property. It is also used for its insect repellent properties. The leaf extract obtained from this plant is used to remove external parasites. The foliage of this plant is also useful in preventing the problems associated with soil-borne nematodes and other micro organisms. It also has fungicidal, antimicrobial properties.
12. ***Euphorbia milli***: The latex obtained from this plant is used as insect pest control. The latex also acts as most powerful molluscicidal agent. The leaf juice has mosquito repellent property. It also controls aphids, white flies, mites, spiders and other flower pests. A small twig of plant is hanged to the roof of the houses so that the insects stick to the latex. The latex of this plant is harmful when it comes in contact with eyes and skin.
13. ***Euphorbia tirucalli***: It is commonly known as “pencil tree”. The latex obtained from this plant has antibacterial and antifungal property. It has larvicidal property against the larvae of mosquito. Thus it is used as mosquito and ant repellent. It is also used as fly and termite repellent. A small twig of plant is hanged to the roof of the houses so that the insects stick to the latex. Latex is harmful when it comes in contact with eyes and skin.

Conclusion:

We have studied various traditional methods of pest control in village areas. Though these methods work slowly but they are found to be more effective than the modern pest control methods such as use of pesticides and chemical fertilizers. This research work shows that majority of methods to control pest population are still traditional. Priority should be given to the traditional methods rather than modern techniques.

It is concluded that the traditional methods should be preferred rather than the use of chemical fertilizers and pesticides which has long term health hazards to soil and humans. Moreover traditional methods are easy to perform and are cheaper. Most of raw materials for traditional method are available locally without any cost. Traditional methods are preventive rather than curative and they depend on long range planning.

Modern chemical methods of pest control have hazardous impacts on human health and environment. They are responsible for environmental pollution. A method such as fumigation is responsible for large scale air pollution. Pesticides and fertilizers spread on crop plants and soil respectively find their way into nearby water bodies along with surface rain water and thus responsible for water pollution. It is also responsible for various deadly diseases in man. In order to prevent these hazardous impacts, use of various above mentioned traditional methods should be undertaken by large number of farmers.

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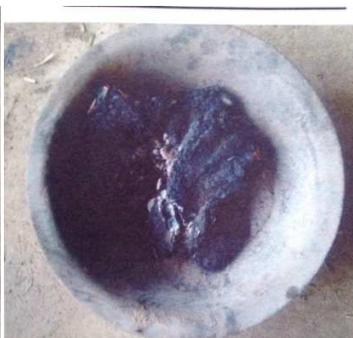
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Cow Urine



Cow Patties



Cow Dung



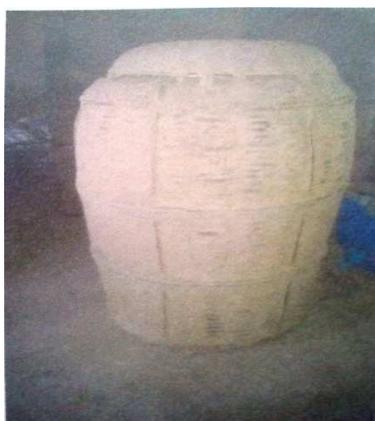
Field Burning



Bird Scarer



Ploughing



Bamboo Container Closed



Bamboo Container Open with neem leaves

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