Pest control

Pest control refers to the regulation or management of a species defined as a pest, usually because it is perceived to be detrimental to a person's health, the ecology or the economy.

A crop duster applies low-insecticide bait that is targeted against Western corn rootworms

Pest control is at least as old as agriculture, as there has always been a need to keep crops free from pests. In order to maximize food production, it is advantageous to protect crops from competing species of plants, as well as from herbivores competing with humans.

The conventional approach was probably the first to be employed, since it is comparatively easy to destroy weeds by burning them or plowing them under, and to kill larger competing herbivores, such as crows and other birds eating seeds. Techniques such as crop rotation, companion planting (also known as intercropping or mixed cropping), and the selective breeding of pest-resistant cultivars have a long history.

Many pests have only become a problem because of the direct actions of humans. Modifying these actions can often substantially reduce the pest problem. In the USA, raccoons caused a nuisance by tearing open refuse sacks. Many householders introduced bins with locking lids, which deterred the raccoons from visiting. House flies tend to accumulate wherever there is human activity and is virtually a global phenomenon, especially where food or food waste is exposed. Similarly, seagulls have become pests at many seaside resorts. Tourists would often feed the birds with scraps of fish and chips, and before long, the birds would become dependent on this food source and act aggressively towards humans.

In the UK, following concern about animal welfare, humane pest control and deterrence is gaining ground through the use of animal psychology rather than destruction. For instance, with the urban Red Fox which territorial behaviour is used against the animal, usually in conjunction with non-injurious chemical repellents. In rural areas of Britain, the use of firearms for pest control is quite common. Airguns are particularly popular for control of small pests such as rats, rabbits and grey squirrels, because of their lower power they can be used in more restrictive spaces such as gardens, where using a firearm would be unsafe.

Chemical pesticides date back 4,500 years, when the Sumerians used sulfur compounds as insecticides. The Rig Veda, which is about 4,000 years old, also mentions the use of poisonous plants for pest control. Ancient Chinese and Egyptian cultures are known to have used chemical pest controls. But it was only with the industrialization and mechanization of agriculture in the 18th and 19th century, and the introduction of the insecticides pyrethrum and derris that chemical pest control became widespread. In the 20th century, the discovery of several synthetic insecticides, such as DDT, and herbicides boosted this development. Chemical pest control is still the predominant type of pest control today, although its long-term effects led to a renewed interest in traditional and biological pest control towards the end of the 20th century.

Types of pest control

Biological pest control

Biological pest control is the control of one species through the control and management of natural predators and parasites. For example: mosquitoes are often controlled by putting BTis Bacillus thuringienis ssp. *israelensis*, a bacterium that infects and kills mosquito larvae, in local water sources. The treatment has no known negative consequences on the remaining ecology and is safe for humans to drink. The point of biological pest control, or any natural pest control, is to eliminate a pest with minimal harm to the ecological balance of the environment in its present form.[1]

Elimination of breeding grounds

Proper waste management and drainage of still water, eliminates the breeding ground of many pests.

Sign in Ilfracombe, England designed to help control Seagull presence

Garbage provides food and shelter for many unwanted organisms, as well as an area where still water might collect and be used as a breeding ground by mosquitoes. Communities that have proper garbage collection and disposal, have far less of a problem with rats, cockroaches, mosquitoes, flies and other pests than those that don't.

Open air sewers are ample breeding ground for various pests as well. By building and maintaining a proper sewer system, this problem is eliminated.

Poisoned bait

Poisoned bait is a common method for controlling rat populations, however is not as effective when there are other food sources around, such as garbage. Poisoned meats have been used for centuries for killing off wolves, birds that were seen to threaten crops, and against other creatures.

Field burning

Traditionally, after a sugar cane harvest, the fields are all burned, to kill off any insects or eggs that might be in the fields.

Hunting

Historically, in some European countries, when stray dogs and cats became too numerous, local populations gathered together to round up all animals that did not appear to have an owner and kill them. In some nations, teams of rat catchers work at chasing rats from the field, and killing them with dogs and simple hand tools. Some communities have in the past employed a bounty system, where a town clerk will pay a set fee for every rat head brought in as proof of a rat killing.

Traps

Traps have been used for killing off mice found in houses, for killing wolves, and for capturing raccoons and stray cats and dogs for disposal by town officials.

Poison spray

Spraying poisons by planes, hand held units, or trucks that carry the spraying equipment, is a common method of pest control. Throughout the United States of America, towns often drive a town owned truck around once or twice a week to each street, spraying for mosquitoes. Crop dusters commonly fly over farmland and spray poison to kill off pest that would threaten the crops. Many find spraying poison around their yard, homes, or businesses, far more desirable than allowing insects to thrive there.

Space fumigation

A project that involves a structure be covered or sealed airtight followed by the introduction of a penetrating, deadly gas at a killing concentration a long period of time (24-72hrs.). Although expensive, space fumigation targets all life stages of pests.[2]

Space treatment

A long term project involving fogging or misting type applicators. Liquid insecticide is dispersed in the atmosphere within a structure. Treatments do not require the evacuation or airtight sealing of a building, allowing most work within the building to continue but at the cost of the penetrating effects. Contact insecticides are generally used, minimizing the long lasting residual effects. On August 10, 1973, the Federal Register printed the definition of Space treatment as defined by the U.S. Environmental Protection Agency (EPA)[2] :

> the dispersal of insecticides into the air by foggers, misters, aerosol devices or vapor dispensers for control of flying insects and exposed crawling insects

Sterilization

Laboratory studies conducted with U-5897 (3-chloro-1,2-propanediol) where attempted in the early 1970s although these proved unsuccessful.[3] Research into sterilization bait is ongoing.

Another effective method of soil sterilization is soil steaming. Pest is killed through hot steam which is induced into the soil.

Destruction of infected plants

Forest services sometimes destroy all the trees in an area where some are infected with insects, if seen as necessary to prevent the insect species from spreading. Farms infested with certain insects, have been burned entirely, to prevent the pest from spreading elsewhere.

Natural rodent control

Several wildlife rehabilitation organizations encourage natural form of rodent control through exclusion and predator support and preventing secondary poisoning altogether.[4]

The United States Environmental Protection Agency agrees, noting in its Proposed Risk Mitigation Decision for Nine Rodenticides that “without habitat modification to make areas less attractive to commensal rodents, even eradication will not prevent new populations from recolonizing the habitat.”[5]

Eliminate Food Sources: Keep bulk food, seed, and dry pet food in metal cans with secure lids. Pick up fallen fruit. Take birdfeeders inside at night.

Remove potential rodent homes like yard debris, trash, construction waste, etc.

Exclude rodents from your home. Seal openings 1/2 inch or larger around the outside of your house with metal, concrete, or Copper Mesh Wool, which can be found online or at hardware stores.

Include natural rodent predators in your solution. A family of five owls can consume up to 3000 rodents in breeding season. Placing a nest box to encourage a family of owls to make your property home can be a great alternative to commercial pest control methods.[6]

Repellents

- Balsam fir oil from the tree *Abies balsamea* is an EPA approved non-toxic rodent repellent. [7]
- *Acacia polyacantha subsp. campylacantha* root emits chemical compounds that repel animals including crocodiles, snakes and rats.[8] [9]

See also

- Association of Natural Biocontrol Producers
- Crop rotation
- Disease control
- Insect repellent
- International Organization for Biological Control
- Sterile insect technique
- Insectary plants
- Invasive species
- List of common household pests
- List of politically endorsed exterminations of animals
- Mosquito control
- Pesticide application
- Pesticide control
- Poison shyness
- Radio wave pest control
- Rat-catcher
- Rat trap
- Rat baiting
- Varmint hunting
- Weed control
- Wildlife management

External links

- Australian Environmental Pest Manageres Association [10]
- National Pest Management Association [11]
- Pest control tactics [12]
- Pesticide application network [13]
- Association of Natural Biocontrol Producers [14] - trade association of the biological control industry
- Pest management information from Preservation Department of Stanford University Libraries [15]
- National Pest Technicians Association,England U.K [16]
- UF/IFAS Pest Alert Web site [17] - arthropods, nematodes and plant diseases affecting humans, livestock/pets, agricultural and ornamental plants

References

[1] "Bacillus thuringienis Factsheet" (http://www.ext.colostate.edu/pubs/insect/05556.html). Colorado State University. . Retrieved 2010-06-02.

[2] Baur, Fred. *Insect Management for Food Storage and Processing*. American Ass. of Cereal Chemists. pp. 133. ISBN 0913250384.

[3] (http://www.jstor.org/pss/3799765)

[4] WildcareBayArea.org (http://www.wildcarebayarea.org/site/PageServer?pagename=TakeAction_Rodenticide)

[5] http://www.epa.gov/opp00001/reregistration/rodenticides/

[6] Hungryowl.org (http://www.hungryowl.org/)

[7] http://www.epa.gov/opp00001/biopesticides/ingredients/factsheets/factsheet_129035.htm

[8] PlantzAfrica (http://www.plantzafrica.com/plantab/acaciapoly.htm)

[9] World AgroForestry Centre (http://www.worldagroforestrycentre.org/sea/Products/AFDbases/af/asp/SpeciesInfo.asp?SpID=99)

[10] http://www.aepma.com.au/

[11] http://www.pestworld.org

[12] http://www.cals.ncsu.edu/course/ent425/text19/tactics1.html

[13] http://www.dropdata.net

[14] http://www.anbp.org

[15] http://palimpsest.stanford.edu/bytopic/pest/

[16] http://www.npta.org.uk

[17] http://entomology.ifas.ufl.edu/pestalert/

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