Traditional knowledge of Iranian farmers on biological pest management

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Traditional knowledge of Iranian farmers on biological pest management has been discussed. Methods of controlling the insect pest population of a certain species by exposing it to its natural enemies have been enumerated.

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Many farmers throughout the world rely on traditional knowledge and practice to maintain healthy crops and animals. Traditional knowledge and practice provide valuable alternatives and complement formal knowledge to protect plants and control diseases. Local people have an intimate knowledge of many aspects of their surroundings and their daily lives. Over the centuries farmers have learned how to grow food and to protect it in a difficult environment. They know what varieties of crops to plant, when to sow and weed, which plants are poisonous and which can be used for medicine; how to cure, how to protect, and how to maintain their environment in a state of equilibrium. All this knowledge and experience could be called, Ethno-plant protection and has specific value in developing countries, where expensive chemical and biological technologies are often beyond the reach of remote and resource-poor farmers.

Since 1995, a series of joint activities have been started to conserve valuable indigenous knowledge in the field of agriculture, and apply it in the process of agricultural development in Iran. The aim of this effort, which is supported by the Rural Research Centre (RRC) and the Department of Extension and Farming System (DEFS) in the Ministry of Jihad for Agriculture, is to make use of the benefits of indigenous knowledge. Researchers have compiled a book regarding traditional knowledge of Iranian farmers on plant protection1. The paper overviews traditional knowledge of Iranian farmers on biological pest management.

Enumeration

Biological control means controlling the population of a certain species by exposing it to its natural enemies. This can include the use of predator pests and also microorganisms such as bacteria. In traditional farming, biological control occurs naturally but is supported by cultivation practices, which involve attracting and facilitating the access of predator insects to pests, not destroying predator insects and actively raising predator species.

Orchardists of the northern Garmsãr Plain remove the gum from tree trunks with a scythe to facilitate the access of ants to the larva of woodborer beetles; the ants enter the trunk through vents and feed on the larvae. In Qazvin and Kãshãn, farmers take water from a local spring called Ab-Malakh (literally, water of the grasshopper; it is located near the village of Ab-Malakh to the North of Mount Denã along the Samirom river) to their wheat fields to attract starlings, a predator of grasshoppers, a wheat pest. Starlings are attracted by the water, which apparently refreshes them and gives them an appetite to continue hunting. There is a theory that the bills of the starlings become sticky when hunting and they need water to clean their bills and enable them to continue hunting. Water with such properties is present in several regions of the country. The best known of these is the water of a spring located in the Samirom region of Isfahãn province. Historical records testify that such

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waters have been used many years ago for the same purpose. During the Qajar dynasty in Iran, this water was used to attract starlings in order to control grasshoppers. The starlings attacked the grasshoppers and preyed on them. In the early 19th century (during the rule of Fath-Ali Shajeh), the entire territory from Kashan to Kazzaz and from Komreh (Khomein) to the borders of Borujerd was under attack by grasshoppers and the same practice was used then to control grasshoppers.

Some rural people try to attract birds to their fields during the growth period of pests by providing shade, water and food for them. They maintain that such areas attract birds for the food, water and shelter they provide and prevent them from attacking the crops in the field. In many villages it is common to keep insectivorous poultry, such as domestic fowl, to directly control the insects and/or destroy the habitats of vector insects. In some villages domestic poultry, such as fowl and turkey are used to control weeds. Turkey has recently been recognised as one of the best kinds of grazing poultry in rangelands and pastures where there is a diversity of plant species. Another practice common to rural areas since long ago and still common today, is the keeping of cats. Cats hunt and therefore directly control mice and certain insects. They also control some pests indirectly by eating leftover foods, and destroying areas where pests congregate. Releasing livestock into fields and orchards to graze on weeds is common in most rural regions. Bringing sheep to graze on fields is a simple method used by farmers to control the alfalfa weevil (Hypera postica). The sheep feed on alfalfa, as well as moving around the field, both of which cause damage to pests. Some alfalfa farmers believe that control of the alfalfa snout beetle is more effective when sheep graze in their fields in the late autumn. One reason suggested for this is that the mature insects have laid their eggs by that time and the eggs are thus destroyed (Fig. 1).

Some farmers use camels to control weeds and thorns in fields and pastures because they feed on plants and weeds that are unappetising and toxic for sheep. As a result, the camels leave the most suitable plants and weeds for the sheep. Cultivating rice and fish in combination is common in certain parts of northern Iran. Research shows that carp feed off insects, worms, and insect-larvae and the amoureux fish feed on plants such as azolla and duckweed growing between rice stems. These fish have not only contributed to the biological control of weeds and insects, but also decrease rice pests such as the stem borer.

**Conclusion and recommendations**

Although indigenous knowledge is a rich source for knowing how to control pests, diseases, and weeds, this implies neither a full rejection of new technologies nor a return to the past. Furthermore, not all indigenous knowledge is necessarily accurate. For instance, in the Sisakht regions of Denam municipality in Kohgiluyeh-va-Boyerahmad province, some orchardists claim that the grape moth (Polychrosis botrana Schiff) has emerged due to a weakening of religious belief among people and reduction trust and social relations between them. In their opinion, God created this and other pests and calamities to punish his wrongdoing servants. However, it should not always be assumed that traditional methods used to control pests and diseases are based on superstition. First, even if indigenous knowledge is assumed to be a set of superstitions, new knowledge has been formed and developed on the basis of similar superstitions. And second, many indigenous methods, deemed simple and superstitious over the years, have proven effective today. Studies indicate that indigenous knowledge would appear superstitious when it has not been precisely perceived. However, when assessed scientifically as well as discovering the roots, the positive effects on crops would have been revealed.

Greater interaction between plant protection scientists and indigenous farmers would contribute enormously to achieving more sustainable natural pesticides and also methods to diffuse them more.
effectively. Therefore, various means should be used to facilitate greater interaction between these two groups. This could be achieved, for example, by compiling a dictionary of indigenous terminologies including topics such as colours, climates, plants, animals, insects, plant diseases and pests, weeds, etc. This would be of great influence in deepening the communication between plant protection specialists and farmers. Furthermore, joint meetings could be held and managed by both experts and farmers at international, regional, national, and local levels.

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References