Integrated Pest Management

The guiding principle of IPM is to combine preventive, agronomic, physical, biological, and other agro-ecological measures to minimize the occurrence of pests and thus the use of synthetic pesticides, in order to protect human and animal health and the environment. Ideally, as in organic farming, chemical plant protection should be dispensed with altogether..

Central elements of IPM

The most effective and lasting way to manage pests is by using a combination of methods that work better together than separately. Central for the design of an IPM concept are the following elements:
IPM should provide farmers with information and tools to proactively implement measures to reduce pest infestation, thereby improving the health of their crops and the surrounding landscape and reducing vulnerability to pests.

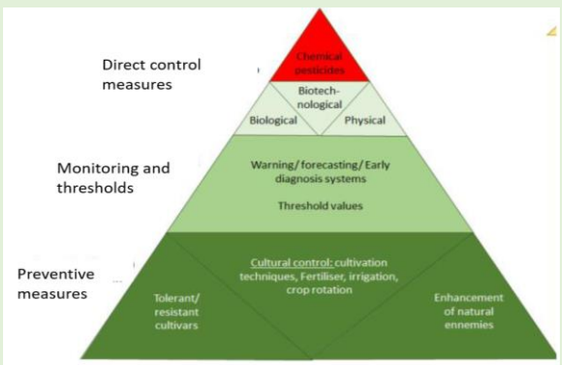


Figure 1: Pyramid of central IPM elements (Based on Boller et al 2004)

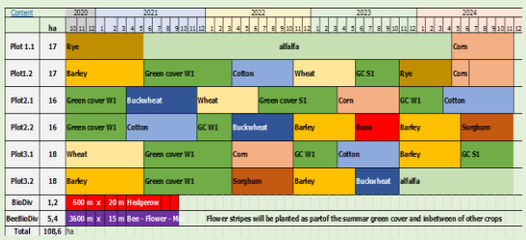
The Food and Agricultural Organisations (FAO) definition of IPM

"Integrated Pest Management (IPM) means the careful consideration of all available pest control techniques and subsequent integration of appropriate measures that discourage the development of pest populations and keep pesticides and other interventions to levels that are economically justified and reduce or minimize risks to human and animal health and the environment. IPM emphasizes the growth of a healthy crop with the least possible disruption to agro-ecosystems and encourages natural pest control mechanisms."

FAO/WHO (2014): The International Code of Conduct on Pesticide Management

Prevention measures

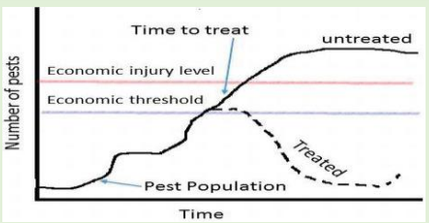
Cultural methods are practices that reduce pest establishment, reproduction, dispersal, and survival. For example, crop rotation can decrease soilborne diseases by avoiding accumulation of crop specific diseases.
Use of resistant varieties and locally adopted varieties results in the plants being less damaged than a susceptible plant.



Source: Crop rotation plan of Kurdamir pilot sites, ECOserve GIZ, 2019

Monitoring and assessing pest numbers use of treatment thresholds

Correct pest identification, monitoring the severity of infestation and the use of treatment thresholds are important to decide whether and which pest management is needed. *Economic-injury* level is the lowest population density that will cause economic damage. *Economic threshold* is the density at which control measures should be determined to prevent an increasing pest population from reaching the economic-injury level.



Source: https://www.intechopen.com/chapters/64227

Direct control measures

Biological control is the use of natural enemies—predators, parasites, pathogens, and competitors—to control pests and their damage.. Mechanical and physical control measures kill a pest directly, block pests out, or make the environment unsuitable for it.

Source: Ladybug eating aphids
https://www.hirerush.com/blog/10-easy-garden-pest-control-tips?_utm_source=1-2-2

Monitoring for pests and diseases

Not all pests and diseases in a crop make a treatment necessary. Many pests and diseases are kept on a level, where they do not cause serious damage or economic loss, by e.g., their natural enemies, by the crop plants being tolerant or resistant to the pests or by crops outgrowing the pest.
Monitoring and considering information about the pest, its biology, and environmental factors, will help to decide, whether the pest can be tolerated, or control measures should be taken. If control is needed, this information also helps to select the most effective management methods and the best time to use them.
For pest monitoring it is needed to identify the pest, to know what to sample (e.g. specific areas of the plant, percent injury, numbers of insects, an assessment of weed population, etc.), when to sample, how frequently to sample and what constitutes a sample.

Monitoring patterns

Monitoring patterns and methods can vary from pathogen to pathogen. Edge sampling can be appropriate for pests like spider mites that commonly invade into the field from the field borders.

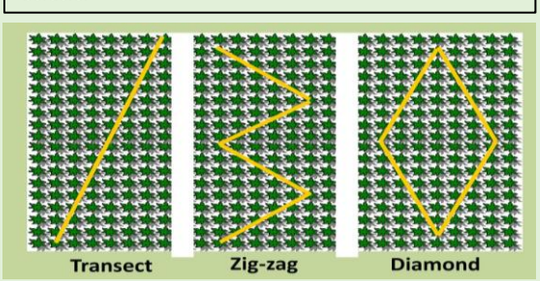


Figure 2 Monitoring patterns
Source: Scouting fields one

Sampling with a sweep net in alfalfa

Sampling with a sweep net is commonly used to monitor alfalfa pests when alfalfa plants are at least 15-25 cm tall (for shorter alfalfa, do not rely on sweep net sampling to determine pest numbers; instead estimate plant damage visually). Sweep net sampling is also used for estimating numbers of lady beetles. A 35 cm diameter sweep net is the standard sampling tool used in alfalfa.

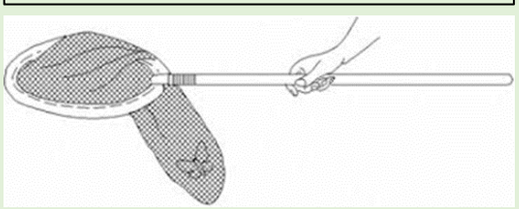


Figure 3: Sweep net sampling
Source: bugwood.org

Monitoring with traps

Several kinds of traps can be used to monitor pests, such as light traps, sticky traps, pheromone trap or dispensers and plastic pitfall traps.

Figure 4: Sticky traps © Gunel Qubanova 2021

Reference: The poster was developed based on Integrated Pest Management Concept for the ECOserve Pilot sites elaborated by Dr. Gisela Feikl and Gunel Gurbanova (PhD)

Preparad by
Sevinj Sarukhanova, GİZ ECOserve Advisor
Samir Abbasov, GİZ ECOserve Advisor

Environment, Climate, Opportunities for people and nature