Biological protection of the garden

Let us take the International Organisation for Biological Control's definition: "human use of natural enemies such as predators, parasites or pathogens to control the population of harmful species and keep it below a harmful level."

Some definitions

What is a predator?

A predator is a living organism that captures other living organisms dubbed "prey" to nourish itself or its offspring. Here are some examples:

– **Ladybirds:** the larvae and adults are predators that prefer to eat aphids and the larvae of white flies and mites;

– **Lacewings:** the larvae attack aphids, and the adults feed on pollen and nectar;

- **Seedcorn beetles:** very polyphagous, the larvae and adults feed on a large range of pests: Colorado beetles, slugs, wireworms, chafers;


- **Bedbugs:** predators at all stages, they feed on mites, thrips etc;
- **Syrphid flies:** the larvae eat aphids, and the adults feed on pollen and nectar;
- **Predatory mites:** (Amblyseius, Phytoseiulus) they eat pests at all stages of their life (spider mites, thrips).

What is a parasitoid?

A parasitoid is a living organism that feeds, grows and reproduces on or inside another living organism but, contrary to parasites, inevitably kills its host. The majority of parasitoids are insects. Here are some examples:

- **Micro-hymenoptera** (parasitic wasps): they live on aphids, ringworm, noctuids, houseflies etc;

- **Rove beetles:** they prey on larvae and parasites of soil-inhabiting flies (cabbage fly, carrot fly, seed fly);
- **Nematodes:** they limit the numbers of fungus gnats, otiorhynchid larvae and slugs.

What is an auxiliary?

These are living organisms, predators or parasitoids that control or eliminate the enemies of the plants to be protected. Auxiliaries can be specialist (prey or hosts) or polyphagous (diversified).

Pollinating insects are also considered to be auxiliaries in so much as they pollinate plant species. For example, the large earth bumblebee (Bombus terrestris) pollinates greenhouse tomatoes and seeds.

What is a pathogen?

This term refers to certain agents, bacteria or viruses, which attack insects that are a pest to plants. Mushrooms are equally capable of destroying other mushrooms. For example, Coniothyrium minitans in the fight against Sclerotinia. A number of other animals present in the garden environment are also auxiliaries to plants:

- **Insectivorous birds:** they feed on all insects, but particularly young caterpillars;
- **Birds of prey and cats:** very efficient at limiting the numbers of field mice and voles amongst plants;
- **Dragonflies and spiders:** great consumers of flying insects;
- **Hedgehogs:** they attack slug populations.

Setting up biological protection in the garden

This practice is based on the relationship between species in the environment, and aims more to manage the number of biological pests than to eradicate them. On the one hand, it is necessary to know the pest/auxiliary combinations that are potentially present in the garden; and on the other hand, the bio-control products that are available.

The aim is to protect plants rather than fight their enemies. It is about searching for allies to act with nature and not harm it.

The new concept of gardening

Its spatial organisation may or may not facilitate the connection between the different garden environments and between different gardens. The garden is not isolated, its protection is an integral part of the land on which it is situated. It is absolutely essential to create links from garden to garden with low hedges, for example. Here we are introducing a new concept: **that of the integrated protection of garden plants**, "the setting up by the gardener of a coherent collection of direct and indirect means to minimise the competitors for growth". Here are some example methods:

- **Growth control:** prophylaxis, ways of growing (size, fertilizer), growing techniques;
- **Genetic control:** varieties or rootstocks that are resistant or insensitive to biological pests;
- **Biological fight by conservation:** preserving auxiliaries;
- **Biological fight by increase:** massive releases of auxiliaries to enlarge the population;

- **Biological fight by disruption:** trapping through sexual pheromones;

- **Physical fight:** protecting nets, solarisation, bio-fumigation;
- **Biological fight:** micro-organisms, macro-organisms;
- **Trap plants:** plants that have an attractive or stimulating effect on a pest;

– **Using natural substances:** minerals (anti-slug iron phosphate), plants (vegetable extracts, manure) or animals (dried blood to repel game).

These new gardening methods really show us that we are at the crossroads between “synthetic” chemistry and “natural” chemistry. The latter cannot truly work unless we agree to change our practices and adopt the new ways.

Olivier Guérin
Le Jardin Familial de France no. 501/2017