

10,000 gardens in Africa project

Natural defense strategies



Why to choose natural defense strategies

To defend the garden against adversity (plant diseases, harmful insects, weeds), we can choose methods that do not include synthetic chemicals.

Synthetic chemicals are, in fact, dangerous and harmful to people, to the land and to the economy of the garden:

- They are toxic and dangerous for the people handling and using them in the garden;
- They are to be used in the right doses, and therefore farmers become dependent on aid from experts;
- If used in the wrong doses, they cause serious damage to the soil, water, harvest, as well as to the people who eat the treated vegetables;
- They can kill all the insects living in the garden, both the harmful ones and those that are good and useful for pollination and pest control;
- They are expensive;
- Over time, they reduce the fertility of the soil and create dependency from increasing amounts of synthetic chemicals.

Where synthetic chemistry plays an important role in crop management, the aim will be to accompany communities to reduce and gradually eliminate synthetic chemicals. The ultimate goal, in fact, is greater environmental sustainability of the garden activities.

What can we do?

For every country and/or climate zone, some proposals related to natural defence will need to be drawn up during the training sessions together with the local technicians and communities that take into account: local traditions, the possibility of finding/multiplying seeds, and the suitability of the environment.

We suggest you involve the community in the creation of devices that make it possible to apply control methods and recipes that are simple and easy to apply.

It is essential to **prevent** the attack of insects and diseases in different ways:

- Choose crops that have adapted to the area and climate over the centuries;
- Choose uninfected seeds
- Diversify garden crops;
- Apply crop rotation and intercropping;
- Fertilize the soil in a correct manner;
- Manage irrigation correctly;
- Manage planting times and spaces correctly.

In addition to methods of prevention, constant monitoring in the field is to be carried out in order to identify any pest problems and intervene promptly with defense methods against insects, diseases and weeds.

► Botanical pesticides

Some traditional products – such as tobacco (containing nicotine), neem (containing azadirachtin), chili, garlic, ginger, baobab, nettle extracts, etc. – are extremely effective in controlling harmful insects.

► Pesticides of mineral or other origin

A number of traditional products derive from mineral-bearing sources – such as sulfur, copper, calcium carbonate, etc. – or other components: soap, oil, ash, etc.

► Adversity due to pests (mainly insects)

Attacks from insects are often favored by the lack of equilibrium, for instance water stagnation or excessive fertilizing. It is, therefore, necessary to greatly focus on carrying out the best practices

Here are some common insects



Aphids, known as **plant lice**, are very common pests. There are different species and are among the most important vectors of viruses between plants.

Their presence is often due to excessive fertilization. They attack almost all vegetables and are identified by the presence of the aphids themselves and by populations of ants that feed on their honeydew. They attack the plants by nibbling the leaves and buds, sucking the sap and deforming them. The vegetable plants and fruit trees attacked by aphids suffer a state of general decay.

The most attacked plants are carrots, legumes in general, chicory, radicchio, beans, broad beans, lettuce, tomatoes, parsley, radishes and zucchini.



To defend the crops from being attacked by aphids, it is necessary to clean and remove the parts that have been attacked, manually removing both the ants and aphids.

Secondly, the leaves need to be watered well to dissolve the deposited honeydew which could attract other ants. For washing, you can use a mixture of water and Marseilles soap (100 g per 10 liters / 21 pints of water) or macerated nettles (leave to soak 100 g of leaves and stems in one liter/2 pints of cold water) for at least two weeks

then proceed to filtering). Do not distribute the macerated solution over cabbage, the strong smell will attract the Cabbage White Butterfly; as for tomatoes and cucumbers, limit distribution to the ground. In the more serious cases, pyrethrum or rotenone can be used.

Macerated garlic is also useful: put 300 g of garlic (fresh or dried) in one liter (2 pints) of water and leave to macerate for one or two days, then spray the aphid-attacked leaves with the filtered solution.



Cutworms are caterpillars that attack the area between the stem and root of the plants (collar) and bore into the stem which often ends up breaking. They are active mainly at night. The damage caused by these caterpillars are substantial, and if infestation is massive, the plants affected have to be destroyed.

The most affected plants are beets, carrots, cabbage, cucumber, chicory, beans, lettuce, tomatoes, radishes and spinach

In order to protect the crops from cutworms, the damaged parts can be destroyed, using poisoned baits and resorting to wormwood treatments. In particularly serious cases, pyrethrum or rotenone can be used.



The cabbage white is a very common butterfly that lays its eggs on the undersides of outer leaves. The caterpillars emerging from these eggs are extremely voracious and feed on the leaves, skeletonizing them; the excrement of these caterpillars, especially in warmer areas, can rot the plant. The Cabbage White is a threat not to be underestimated because it can be devastating.

The plants most threatened by the Cabbage White are cabbage, cauliflower and turnips.



Defense can be carried out by manually removing the eggs. When the Cabbage White attacks in a particularly serious manner, it can be suppressed by a natural enemy, the *Bacillus thuringiensis*, a spore-forming bacterium that produces toxins harmful to cabbage whites and other types of parasites. To prevent the attack of cabbage whites, we can treat the plants concerned with tansy or wormwood decoctions.



Scale insects are sap-sucking pests. The females damage the plants: they usually live on the stems and undersides of leaves sucking sap. Plants attacked by scale insects undergo discoloration, become chlorotic, have deformed leaves; the presence of scale insects is also due to a delay in the late development of both the leaves and branches.

The plants most affected by the problem are chickpeas, fruit trees and shrubs.



Defense strategies against scale insects vary according to the intensity of the attack. In less difficult cases you can try to remove these bothersome parasites by rubbing the infested areas with a piece of cloth soaked in alcohol or with a bristle brush. If the attack is more threatening, a defensive treatment can be tried with white oil which, however, cannot be used in the event of high external temperatures because you run the risk of damaging the plant by burning it.



Snails and slugs damage garden products by gnawing away at and devouring the sprouts. The damage is not only direct but also indirect, because the plants that have been attacked are more prone to fungal, bacterial and viral diseases. The presence of these pests is greater in wet weather.

The most attacked species are beets and leaf vegetables in general, cabbage, fennel, strawberries, lettuce and spinach.

To defend the crops, in addition to natural removal, the crop boundaries can be sprinkled with ash, which absorbs their mucus/slime and prevents them from reaching the plants. Another curious but efficient alternative remedy is to arrange some beer-baited "traps", small containers containing a couple of inches of beer; slugs love beer and fall into the trap without being able to get out.



The **onion fly** is a harmful insect that lays its eggs near the base of the plant. The larvae born from the eggs devour the bulbs; if the plant is attacked early, these pests can kill it. Onion flies even cause indirect damage, as the plants attacked are more vulnerable to bacterial attacks.

The **plants attacked** are garlic, onion and shallot.



To protect the crops from onion flies, the leaves attacked need to be removed. If the attack is particularly intense, treatments containing rotenone or wood quassia are effective. Infusions of tansy or wormwood are also useful. A good tactic is to associate the cultivation of species that can be attacked by these pests with carrots: the onion fly can't stand the smell of carrot, just as the carrot fly can't stand the smell of onion.



Tortrix moths are small butterflies; their caterpillars attack the plants, devouring the tips and nibbling leaves and petals. Apart from garden products, they also attack fruit trees and petals. Tortrix moths that attack peas are particularly harmful: they lay their eggs inside the pods and when the larvae are born they devour the seeds, emptying them.

The most attacked species are carrots, beans and peas.

To defend the crops from the tortrix moths, they can be removed by hand. If the attacks are particularly serious, pyrethrum can be used. Prevention against tortrix moths is carried out by combining with marigold, mustard and tomato the plants that can be attacked. Some also use an infusion of horsetail to water the plants.

Fungal diseases are difficult to diagnose and to fight. We should try to avoid their formation, by following some efficient strategies: for example, we shouldn't water the leaves if we aren't sure they will dry quickly, we shouldn't touch wet plants, we have to remove and destroy rotting fruits.

Recipes for some preparations

Macerated chili

With chili we can prepare a macerated solution to be used in a preventive manner once a week, spraying it on the ground at the base of the plant. Spray the critical points of the plants two or three times a week, using small quantities and always in the evening. If the pests are already present, use the remedy more frequently. The effectiveness of chili is due to its content of capsaicin, a substance that irritates many insects and pests.

Preparation: put a spoonful of dried (pulverized or crushed) chili in ½ liter (1 pint) of water. Leave the macerated solution in a closed bottle for one week, then filter the liquid and pour into a spray bottle.

Onion infusion

The onion is a natural pesticide. It can be useful to plant rows of onions in the garden, between one clod of soil and another, in order to protect the plants from parasites in a natural way; otherwise, an infusion can be prepared.

Preparation: put 20 g of fresh chopped onions (the outer skin can also be added) in half a liter (1 pint) of water. Bring to boil e let simmer for 15 minutes. Wait for the liquid to cool then filter. Lastly, spray it around the base of the plants; once a week for pest prevention, or more frequently to contrast their presence, always in the evening.

Neem

Neem is a powerful, inexpensive and practically non-toxic pesticide. Its active ingredient is *Azadirachtin*, an organic compound extracted from the seeds of the plant, effective in the fight against hundreds of pests (some even say 500), but in particular against mites, beetles, miners, grasshoppers, nematodes, whiteflies, aphids, cutworms, thrips, Colorado potato beetles, scale insects, moths, red spider mites. It is used successfully against fungus (especially rust fungi and powdery mildew fungi), bacteria and some viruses. It carries out a repellent and antifeedant action (i.e. inhibits the normal feeding behavior) against insects, as well as impeding their growth by blocking the molting process. The positive characteristic of products deriving from the neem tree is that - while extremely significant used against pests - they are not harmful to beneficial insects, pollinators, birds and warm-blooded animals (including humans).

Neem is widely used and every local environment has its recipes. Write yours here.
