

# Plant protection practices during the dormant period of fruit crops

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To ensure the production of healthy fruit, it is necessary that care for the fruit orchards continues during the winter months as well, when the plants are dormant. With the onset of relative dormancy of fruit species, the harmful activity of pests and disease agents weakens, but most of them remain in the orchards – in the soil, on fallen leaves and fruits.

## **Agrotechnical and mechanical practices**

These measures, carried out during the non-vegetation period of the fruit trees, are an important element of good plant protection practice, as their proper implementation reduces the number of treatments during the

growing season against pests, as well as contributes to obtaining higher-quality fruit free from pesticide residues.

## What are they?

1. Pruning of dead branches, stunted and dried trees, their removal from the orchards and burning, with the aim of destroying the infection **from bark beetles and wood-boring insects, bark beetles, woolly apple aphid, bacterial blight, plum pox virus (sharka), fire blight and other pests**. After each cut, the cutting tools must be disinfected with a 10% solution of bleach or formalin, and they may also be treated with denatured alcohol and water in a ratio of 3:1. Immediately after pruning, it is necessary to coat the cuts with oil-based paint or white latex, to which a copper-containing fungicide should be added, or to use ready-made orchard paste to ensure better callusing and protection against penetration of secondary infections and infestation by diseases and pests.

2. Destruction of caterpillar nests and dried, mummified fruits remaining on the trees, as well as fallen damaged fruits, which are a source of infestation by **defoliating caterpillars, almond seed wasp** and infection by **brown rot, quince fruitlet dieback**, etc.

3. Removal, taking out of the orchards and burning of old and cracked bark from the tree trunks to destroy the overwintering stages beneath it of **codling moths, mites, apple leaf miner, pear psylla, apple bark borer moth** and other pests, as well as the causal agents of **early brown rot on stone fruits, powdery mildew on apple and peach, fire blight on fruit trees**.

4. Whitewashing of the tree trunks and thick scaffold branches to protect them from frost damage and to destroy lichens and mosses on the stems.



5. Wrapping young trees with wrapping paper, corrugated cardboard, polyethylene or other materials to protect them from rodents.

6. Soil cultivation by digging around the tree trunks to a depth of 8–10 cm and ploughing between the rows to a depth of 18–20 cm. In this way, fallen leaves are incorporated into the soil, the process of mineralization is activated, and thus infection by **apple and pear scab**, **white rust on sweet and sour cherry**, **red leaf spot on plum** is reduced. By ploughing the soil, part of the pupae of the **cherry fruit fly**, the false caterpillars of the **slugsawfly of stone fruits**, the **black plum fruit sawfly**, the **cherry weevil**, the **hairy beetle** are destroyed. During soil cultivation, the root system must not be injured, as this leads to infections by **bacterial canker** and agents of **root rot**. The depth of ploughing is determined by the age of the orchard and the type of rootstock.

**7. Fertilization of fruit trees** in autumn provides nutrients to the plants during the period of active root growth and accumulation of reserve substances in the wood, on which to a large extent depend their growth and fruiting in the following years. In bearing orchards, part of the fertilizers is applied in autumn and another part – during the spring-summer period. Phosphorus and potassium fertilizers are applied every 3–4 years or every other year, in the following rates per 1 decare: **60–80 kg double granular superphosphate**, **30–40 kg potassium sulfate** and **3–5 t well-rotted farmyard manure**, which is incorporated at a depth of 35–40 cm. Nitrogen is usually applied several times a year. After fruit harvest in autumn, surface fertilization with 1/4 to 1/3 of the planned rate (15–20 kg per decare) is recommended, with incorporation at 15–18 cm or discing at 6–8 cm.

These rates are indicative and their quantity depends on the age of the trees, the previous crop, whether the orchard has been fertilized every year, whether another crop has been grown between the rows, how ploughing, harrowing and discing have been carried out, whether irrigation has been frequent, etc.

## Chemical activities

The next very important activity during the dormant period is carrying out winter spraying against the overwintering stages of a number of pests on fruit crops. It affects a large number of pests on fruit plants and is particularly useful for older trees, where there is an accumulation of infection from ***brown rot – early and late, scale insects, European red mite, aphids, psyllids, leafrollers, winter moths***.

In pome fruit species, winter spraying limits infection by ***apple and pear scab, fire blight, black rot, codling moth***, etc. In stone fruits, it reduces the incidence of ***shot-hole disease, peach leaf curl, bacterial canker, plum pockets***, etc. In raspberries, it limits ***bud spot*** and ***cane dieback***.

When 70% of the leaves have fallen, stone fruit species should be sprayed with ***copper-containing fungicides***.

Apples and pears are treated with a 5% urea solution. The fallen leaf mass around the trees is also sprayed thoroughly. With urea, in addition to fertilizing the orchard, favourable conditions are created for the development of certain microorganisms that destroy the scab ***infection*** in the leaves.

## Conditions for carrying out winter spraying

To ensure effective spraying, it must be carried out on calm, sunny days with air temperatures above 5 degrees. The sprayer nozzles should have an orifice size of 2 mm in order to achieve optimal coverage of the tree canopy, from the top to the base of the trunk. Between 50 and 120 litres of spray solution per decare should be used, depending on the age of the trees and the shape of the canopy.

## Dangerous diseases in the orchard



## Fire blight in pome fruit species

This is a bacterial disease that affects all above-ground parts of pome fruit species – pear, apple, quince, medlar. Infected trees are recognized by the characteristically hook-shaped, downward-curved and dried young shoots, branches with dried, blackened leaves and fruits that remain on the trees and do not fall. The bacterium causing the disease survives the winter in infected branches, therefore the affected plant parts must be cut 50–70 cm below the boundary between diseased and healthy tissue and must be burned outside the orchard. When infection is detected, it is necessary to:

- Cut the affected parts of the trees 50–70 cm below the boundary between diseased and healthy tissue and burn them outside the orchard;
- Heavily infected trees should be uprooted and also burned;
- After each cut, the cutting tools must be disinfected with a 10% solution of bleach or formalin;
- After completion of pruning, treatment with a *copper-containing fungicide* should be carried out.



### **Peach leaf curl**

The causal agent of the disease is a fungus that overwinters between the bud scales or on the bark of infected shoots. Symptoms are single or numerous, pale green, pale yellow or bright red swellings on the upper side of the leaves, which are sunken on the lower side. The damage may affect the entire leaves, which subsequently necrotize and fall.

For better control of the disease, when 70–80% of the leaf mass has fallen, it is necessary to spray the peach trees with Champion 50 WP – 0.3%, Score 250 EC – 0.02–0.03% (20 ml/da for 100 l spray solution).

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