Растителна защита
електронно списание за растителна защита
семена, торове и земеделие
ISSN 2815-522X

Plant protection activities in perennial plantations in July

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Date 08.07.2026 | **Issue** 7/2026 | **ISSN** 2815-522X | **Language** EN
www.plant-protection.com/article/2445?lang=en



In July, meteorological conditions will limit the development of a number of fungal diseases, with the exception of powdery mildews on fruit trees and vines.

High temperatures and low atmospheric humidity during most days of the period will be a prerequisite for an increase in the mite population. During the month, the second generation of fruit worms poses a serious threat to fruit crops. In vines, especially in dessert varieties, damage is caused by caterpillars of the second generation of the European grapevine moth.

During the month, if necessary, plant protection sprays should be carried out during the cooler hours of the day.

In fruit nurseries

Apple and peach nurseries and clonal apple rootstocks in mother plantations are sprayed against powdery mildew every 8-10 days until growth stops. For spraying, use a sulfur-based product - Sulfur WG 600 g/ha, Solfo 80 WG – 750 g/ha or one of the products - Sistan 20 EW – 0.03%, Luna Experience – 50-75 ml/ha, Flint Max 75 WG – 0.02%

The fight against cylindrosporiosis continues. Cherry and sour cherry nurseries and seedbeds with mahaleb seedlings are sprayed with Silite 544 SC – 125 ml/ha.



Larvae of Capnodis tenebrionis (L.)

Infested dried-out trees attacked by the flatheaded peach borer should be uprooted and burned.

Capnodis tenebrionis L. – a key pest on stone fruit species

Found nests of the fall webworm should be collected and burned.

Plum nurseries are sprayed with Signum - 45 g/ha against plum rust.

Against aphids and leaf-eating caterpillars, treat with a pyrethroid insecticide – Decis 100 EC (7.5-12.5 ml/ha), Sumicidin 5 EC (0.02%), Afikar 100 EC (15 ml/ha), Efcytmetrin 10 EC (15 ml/ha).

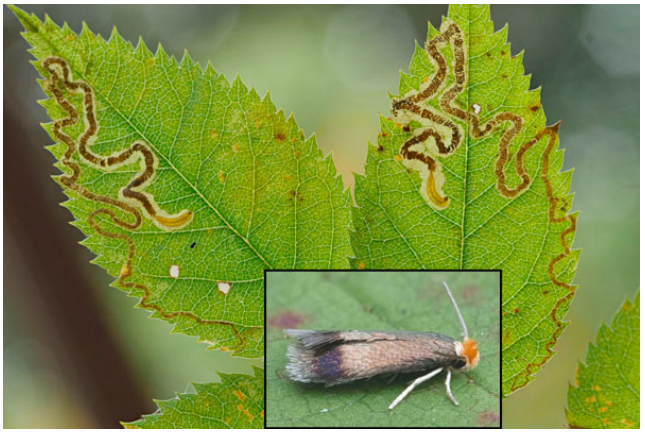
In fruit orchards

Non-toxic trapping bands made of corrugated cardboard are placed to collect caterpillars of the codling moth and plum fruit moth, necessary for monitoring their development next year. Collect 500-1000 caterpillars from each species.

Frames – isolators (under 5 heavily infested trees) are placed to preserve the pupae of the apple leaf miner moth, necessary for monitoring its development next year.

Apple orchards are sprayed with one of the products - Carpovirusine (100 ml/ha), Madex Top (10 ml/ha), Dipel DF (50-150 g/ha), Syneis 480 SC (20-37.5 ml/ha), Delegate 250 WG (30 g/ha), Avant 150 EC (33.3 ml/ha), Deca EC (30 ml/ha), Declain 2.5 EC (30 ml/ha), Lamdex extra (60-100 g/ha) upon a signal from BFSA against the codling moth (second generation) and with a sulfur-based product - Sulfur WG 600 g/ha, Solfo 80 WG – 750 g/ha or one of the products - Sistan 20 EW – 0.03%, Luna Experience – 50-75 ml/ha, Flint Max 75 WG – 0.02% and one of the products - Valmek (60-96 ml/ha), Apollo 50 SC (40 ml/ha), Nissorun 5 EC (0.05%) respectively against powdery mildew and mites.

A second spray against the second generation of the codling moth is done 12-14 days after the first with one of the products - Carpovirusine (100 ml/ha), Madex Top (10 ml/ha), Dipel DF (50-150 g/ha), Syneis 480 SC (20-37.5 ml/ha), Delegate 250 WG (30 g/ha), Avant 150 EC (33.3 ml/ha), Deca EC (30 ml/ha), Declain 2.5 EC (30 ml/ha), Lamdex extra (60-100 g/ha) , with a sulfur-based product - Sulfur WG 600 g/ha, Solfo 80 WG – 750 g/ha or one of the products - Sistan 20 EW – 0.03%, Luna Experience – 50-75 ml/ha, Flint Max 75 WG – 0.02% against powdery mildew and with a pyrethroid insecticide – Decis 100 EC (7.5-12.5 ml/ha), Sumicidin 5 EC (0.02%), Afikar 100 EC (15 ml/ha), Efcytmetrin 10 EC (15 ml/ha) against the apple leaf miner moth.



Apple leaf miner – Stigmella malella Stt.

The apple leaf miner – *Stigmella malella* Stt. is found in all fruit-growing regions of the country and sometimes its density is significant. It attacks only apple trees. The adult insect is a small moth, reaching 4-5 mm with wings spread. On the head, between the eyes, it has a tuft of fine, golden-yellow hairs. The legs are light brown. The thorax is grey-brown with a silvery tinge, and the abdomen is silver-grey. The forewings are oblong, black, with a brown tinge and shine. A silvery-white stripe runs transversely through the central part. The hindwings are lanceolate, ash-grey, with long delicate fringes along the entire periphery. Immediately after laying, the egg is transparent with a greenish tinge, and later darkens and black spots appear on the chorion. It is 0.22 mm long. After hatching, the caterpillar is pale green, without thoracic and abdominal legs. The mature caterpillar is yellow-green with 13 segments. It has a small, pointed, brown head. Instead of legs, on the second and third thoracic segments and on the second and eighth abdominal segments, there are weakly developed bud-like outgrowths. It reaches a length of 3.5 mm. The pupa is initially yellow-green, and before imagination it takes on the color of the moth. It is housed in a brown cocoon. The mines are snake-like curved and gradually widen. Their length averages 3.5-4 cm (from 2.7 to 5.1 cm). The excrement is located in the middle and forms one wide or two thin longitudinal threads.

The flight of adults lasts more than a month. The moths are active during the day. In cool weather they are found on the trunk, and when the temperature rises, they move to the leaves. Males and females imaginate sexually mature and immediately begin to copulate.

Eggs are laid on the underside of leaves, near the veins. A single female lays an average of 50 eggs. Embryonic development lasts from 6 to 11-12 days.

The hatched caterpillars pierce the chorion at the point of its attachment to the substrate and enter the leaves without moving over the surface. The entrance hole is covered by the chorion of the egg.



The caterpillars mine the leaves, gnawing snake-like curved tunnels directly under the upper epidermis, which gradually widen. The length of the mines in which the caterpillars have completed their development is from 2.7 to 5 cm. The excrement is located in the middle of the mine, forming one wide or two longitudinal lines.

The feeding of the caterpillars lasts from 12 to 26 days. After completing its development, the caterpillar gnaws a heart-shaped opening in the widened part of the mine, lowers itself on a silk thread and pupates in the soil, at a depth of 5 to 7 cm, in a light brown cocoon. The pupal stage lasts from 6 to 13 days.

Peach orchards are sprayed with a sulfur-based product - Sulfur WG 600 g/ha, Solfo 80 WG – 750 g/ha against powdery mildew.

Apple orchards are sprayed with one of the products - Carpovirusine (100 ml/ha), Madex Top (10 ml/ha), Dipel DF (50-150 g/ha), Syneis 480 SC (20-37.5 ml/ha), Delegate 250 WG (30 g/ha), Avant 150 EC (33.3 ml/ha), Deca EC (30 ml/ha), Declain 2.5 EC (30 ml/ha), Lamdex extra (60-100 g/ha); with a pyrethroid insecticide – Decis 100 EC (7.5-12.5 ml/ha), Sumicidin 5 EC (0.02%), Afikar 100 EC (15 ml/ha), Efcytmetrin 10 EC (15 ml/ha); with a sulfur-based product - Sulfur WG 600 g/ha, Solfo 80 WG – 750 g/ha or one of the products - Sistan 20 EW – 0.03%, Luna Experience – 50-75 ml/ha, Flint Max 75 WG – 0.02%; one of the products - Apollo 50 SC (40 g/ha), Valmek (60-96 ml/ha) or another product based on abamectin, Voliam Targo 063 SC (75 ml/ha), Naturalis (100-150 ml/ha); Closer 120 SC (40 ml/ha) or Meteor (60-90 ml/ha); one of the products - Score 250 EC (0.015-0.02%), Eminent 125 ME (24 ml/ha), Shardif 25 EC (20 ml/ha), Chorus 50 WG (30-50 g/ha); with copper-containing products – 1% Bordeaux solution, Funguran OH 50 WP (150-250 g/ha), Champion WP (0.3%), Cupro Key (180-300 g/ha) respectively against the codling moth (third spray against the second generation), the apple leaf miner moth, powdery mildew, mites, scale insects, scab, fire blight.



European red mite – Panonychus (Tetranychus) ulmi Koch (Paratetranychus pilosus McGregor.)

The European red mite – *Panonychus (Tetranychus) ulmi* Koch (*Paratetranychus pilosus* McGregor.) is the most dangerous of all mite species damaging fruit crops in our country. It is widespread. It attacks apple, pear, peach, plum, etc. It can also multiply massively in vineyards. It is resistant to the most commonly used pyrethroid insecticides, which is why it multiplies significantly in orchards where schemes for total pest control on fruit crops are applied, and the use of this group of products leads to the death of its natural regulators - acarophages.

The female mite has an intensely red, elongated-oval body, with a strongly convex dorsal side. On it there are 7 transverse rows of 26 needle-like setae, arranged according to the formula 2+4+6+4+4+4+2. The setae emerge from whitish warts. The body is 0.35 – 0.5 mm long and 0.2 - 0.25 mm wide. The male mite is yellow-green, with an egg-shaped body, strongly pointed at the end of the abdomen. On its dorsal side there are 28 setae, the body is 0.3 long and 0.16 mm wide. The eggs are spherical, resembling a bulb with one long seta on the upper side. The larvae are reddish, have a shortened body and three pairs of legs. The nymphs resemble adult mites but are smaller. They are reddish in color with four pairs of legs. The posterior part of the body is darker.

The European red mite is a polyvoltine species. On apple it develops 8-9 generations, and on vines - 6-8. After damaging the flowers, the larvae concentrate

mainly on the underside of young leaves and continue feeding. As a result of the damage, the chlorophyll in the leaves decreases and from the upper side they acquire a mosaic appearance - initially small scattered light spots are observed on them, which gradually increase and merge. Gradually, individual areas of the leaves acquire a bronze tinge. In severe infestation, entire leaves become bronze, then turn yellow and fall prematurely. Some of the leaves may dry out completely before falling and acquire a brown coloration. The damage caused worsens the quantity and quality of the production, as well as the feeding of the fruit buds and shoots for the following year.

In a very dry and hot summer, winter eggs begin to be laid as early as August, but the peak is in September-October.



Pear orchards are treated with a deltamethrin-based product – Decis 100 EC (12.5 ml/ha), Meteor (90 ml/ha), Deca EC (50 ml/ha) against pear psyllids (third generation), pear lace bug, pear fruit moth, scale insects; and with one of the products - Apollo 50 SC (40 g/ha), Valmek (60-96 ml/ha) or another product based on abamectin, Voliam Targo 063 SC (75 ml/ha), Naturalis (100-150 ml/ha) against mites.

Against the plum fruit moth (second spray against the second generation), plum orchards are treated with one of the products - Harpoon (100 ml/ha) – against eggs, Delegate 250 WG (30 g/ha), Syneis 480 SC (20-30 ml/ha), Pyregard EC (75 ml/ha), Decis 100 EC (7.5 – 17.5 ml/ha), Coragen 20 SC (16-30 ml/ha) – against caterpillars. For sexual confusion, you can also use combined pheromone dispensers Isomate - OFM TT (40 pcs/ha).

Weeds in the inter-rows of fruit orchards are sprayed with Typhoon SL or another glyphosate-based product – 400-1200 ml/ha.

In strawberry plantations

Strawberry plantations are inspected to establish the cyclamen mite, spray with one of the products - Valmek (60-96 ml/ha), Apollo 50 SC (40 ml/ha), Nissorun 5 EC (0.05%).



Cyclamen mite - Tarsonemus pallidus Banks. (T. fragariae Zimmerman)

The cyclamen mite - *Tarsonemus pallidus* Banks*. (T. fragariae* Zimmerman*)* is distributed in many areas where strawberries are grown. Besides strawberries, it also damages many ornamental plants – cyclamen, chrysanthemum, begonia, petunia, gerbera, geranium, etc. It prefers more humid areas.

The females are glassy, whitish-yellow, elongated-oval, 0.2-0.25 mm long. The fourth pair of legs does not end in claws but in two setae, one of which is significantly longer. The males have an oval-egg-shaped body. They reach 0.15 mm in length. Their last pair of legs is very strongly developed. The eggs are white, oval, relatively large (0.1 – 0.12 mm) for the females that lay them. The larvae are white with three pairs of legs. There are no nymphs.

Plant protection activities in strawberries in July

The pest has a preference for young leaves with a delicate consistency. Sometimes it remains hidden in the rosette of the plants and damages only there. Grown leaves are damaged, but no mites can be found on them, which makes timely identification of the causal agent difficult. The symptoms resemble damage from stem nematodes and some viral diseases.

The fruits obtained are of reduced quality – small and with a low sugar content, and in very severe infestation they may dry out. The reduction in leaf size leads to a decrease in nutrients in the rhizome and to poor bud formation for the following year.

In one year, the pest develops about 7 generations, which overlap, and at harvest time, when the maximum density is reached, all stages – eggs, larvae and adults – can be observed on infested plants. The presence of young leaves with a delicate consistency is of great importance for the reproduction of the pest. At higher temperatures and lower humidity, it enters a depression.

In blackcurrant plantations

After harvesting the fruit, the plantations are sprayed with one of the products - Valmek (60-96 ml/ha), Apollo 50 SC (40 ml/ha), Nissorun 5 EC (0.05%) against mite species.

Weeds in the inter-rows are sprayed with Typhoon SL or another glyphosate-based product – 400-1200 ml/ha. Weed mapping is carried out in all fruit plantations, including blackcurrant ones.

In vineyards

The fight against the causal agents of the economically most important diseases of fruiting vineyards continues – downy mildew and grey mould (if necessary), powdery mildew.



Grapevine leaf infected with zoospores during downy mildew infection

During this period, in addition to the leaves, visible signs of downy mildew infection can also be found on the inflorescences and bunches. The flowers and young fruit sets are covered with a grey-whitish sporulating coating, darken and dry out. In late infection, when the berries have enlarged, another form of the disease appears – brown rot. On the stalk side of the berries, brown necrosis with characteristic double depressions is observed, which gradually grow and lead to drying, mummification and falling. Unsprayed grapevine inflorescences can be infected until softening at the veraison stage of the berries. This requires the last spray to be carried out when the berries reach the size of a pea.

Preventive treatments are recommended before sporulation of the pathogen and before rain. The determination of sprays is carried out based on incubation periods. They are calculated according to the effective temperature, which is equal to the difference between the average daily temperature and 7.9 ^{o}C, which is the biological zero at which the parasite does not develop. One incubation period lasts until the sum of effective temperatures reaches 61 ^{o}C. The calculation of each incubation period begins in the presence of rain or dew, for at least 2 hours. It is recommended to carry out preventive treatments against downy mildew every 4-5 leaves of new growth.

Treat with one of the products - Quadris 25 SC – 0.075 – 0.1%, Ridomil Gold Combi 45 WG – 200 g/ha, Ridomil Gold R WG – 500 g/ha, Ridomil Gold SL – 20 ml/ha. If you wish to treat biologically, for prevention, before or after rain, since the mentioned fungicides are not systemic, you can use a copper product - 1% Bordeaux – 180 - 300 g/ha solution, Funguran OH 50 WP – 150 - 250 g/ha, Champion WP - 0.3%, Cupro Key – 180 - 300 g/ha. Serenade ASO is also an option, but it acts more weakly than the systemic fungicides mentioned.

In powdery mildew, affected berries are covered with a grey-white coating that emits a faint smell of rotten fish. Under the coating, small necrotic spots are visible where the growth of the skin has stopped. As a result, the berries crack.

Spray immediately after flowering and 12–14 days after that. Do not allow a massive coating to develop on the berries, because then the fight is very difficult and curing the grapes is almost impossible. You can treat with one of the following products - contact fungicides – Akoidal WG – 0.25%, Azumo 80 WG – 400 g/ha, Kumulus – 0.2-0.5%, Solfo 80 WG – 400 g/ha, systemic – Flint Max 75 WG – 0.016%, Folicur 250 EW – 0.04%, Custodia 320 SC – 75 ml/ha, Dinali 090 DC – 50-65 ml/ha, Domark 10 EC – 25-30 ml/ha, Dynasty 25 EW – 40 ml/ha, Luna Experience – 12-40 ml/ha, Synstar – 70-80 ml/ha.

Chemical control against grey mould is carried out in humid and rainy weather immediately after flowering, after hailstorms, when the berries enlarge, but before the bunches close, at the clarification and veraison stage of the berries with some of the products – Switch 62.5 WG (100 g/ha), Folpan 80 WDG (0.15%)

or another product with the active substance folpet. Of the biofungicides, Polyversum (50-100 g/ha) and Serenade ASO SC (400 ml/ha) are recommended.

Chemical treatments should end 2–3 weeks before harvest, and it is good to rotate products with different biochemical mechanisms of action, as pesticide-resistant races of the pathogen are emerging.

The fight against the second generation of the European grapevine moth continues. Treat twice – when larvae appear on the grapevine inflorescences and 6-8 days later. The ETL for the second generation is 6-7 eggs or caterpillars per 100 inflorescences and bunches for dessert varieties and 10-12 – for wine varieties.

Against the egg stage, products with ovicidal action are applied. The best in this regard are hormonal insecticides – inhibitors of chitin synthesis, juvenoids and others, such as Mimic SC – 90 ml/ha, Coragen 20 SC – 15-27 ml/ha. These products also act on young caterpillars, which makes them a suitable first choice for the next stage – treatment against caterpillars, since at this time there are also many eggs.

Against caterpillars, contact insecticides from all groups are used, such as Afikar 100 EC – 25 ml/ha, Deca EC – 40-60 ml/ha, Decis 100 EC – 12.5-17.5 ml/ha, Lamdex extra – 100 g/ha, Keduc – 40 ml/ha, Coragen 20 SC – 15-27 ml/ha, Meteor - 0.07-0.09%, Voliam – 18-30 ml/ha, Cyperfor 100 EW – 25 ml/ha, Cyclone 100 EW – 25 ml/ha, Sherpa 100 EW 25 ml/ha. The treatment should be carried out in the "black head" stage of the eggs. At higher density, at least two treatments are needed for each generation.

Of the biological means for controlling grape moths, against eggs, parasites of the genus Trichogramma can be used at a rate of 80,000 - 100,000 individuals per decare, colonized 3 times. Against caterpillars - bacterial products based on Bacillus thuringiensis - Dipel DF – 50-100 g/ha, Dipel 2X – 100 g/ha, Forey 48 SC – 250-400 ml/ha, Rapax – 100-200 ml/ha, as well as products obtained from the fermentation of microorganisms Milsach, Spinlai, Tulga 480 SC – 15.8-20 ml/ha, Syneis 480 EC (spinosad) – 4-18 ml/ha.

Against the European red mite, when the economic injury level is exceeded, if eggs and young larvae predominate, hormonal acaricides such as Nissorun 10 WP (75 g/ha) should be preferred. If mobile forms (larvae, nymphs and adults) predominate, contact acaricides can be used – Danitron 5 SC (100 ml/ha), Shirudo (25 g/ha), Limocide (200 ml/ha), Prev-Gold (80-400 ml/ha), Thiovit Jet 80 WG (2000 g/ha).