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Time for preblossomspraying in the orchard

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IT IS TIME FOR PRE-BLOOM SPRAYING IN THE ORCHARD

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Apple scab	*Venturia inaequalis* – *fungus*	• on the lower surface of the young leaves a velvety, oily-green mould coating develops with an indistinctly defined periphery • on the upper side grey, smooth spots are formed with a dark green coating in the centre • attacked leaves turn yellow, necrotise and fall	• the causal fungus overwinters in fallen leaves; in spring fruiting bodies – pseudothecia – are formed with asci and ascospores, which are discharged during rain • primary infections are caused by ascospores, at the mouse-ear phenophase of the apple and an optimum temperature of 20 degrees

		• spots also develop on leaf, flower and fruit stalks, as a result of which flowers and young fruitlets drop • on the fruits spots with a coating are formed and after the coating falls off, scabs develop in the middle • fruits become deformed, crack and fall	• the spread of the pathogen is carried out by conidiospores, which are formed on leaves and fruits at a temperature of 20–22 degrees and the presence of free water droplets on plant tissues for at least 10 hours • the duration of the incubation period of disease development depends on moisture and temperature

Control:

- Chemical control against scab includes preventive treatments to reduce the source of primary infection and curative treatments.
- Before apple flowering it is important that the trees are thoroughly covered with fungicide by carrying out two treatments.
- **Registered fungicides for control**: Antracol 70 WG – 0.2%, Ardent 50 SC – 0.02%, Ardent 50 SC – 0.02% + Merpan 80 WDG – 0.1%, Bolero 12 EC – 0.06% (*deadline for use of available quantities 25.07.2014*), Delan 700 WDG – 0.05%, Delan 700 WDG – 0.035% + Discus – 0.02%, Dithane M-45 – 0.3%, Captan 50 WP – 0.2% (*up to fruit size "hazelnut"*), Cuproxat FL – 0.3% (*up to mouse-ear stage*), Luna Experience – 20–75 ml/da, Manfil 75 WG – 320 g/da, Merpan 80 WDG – 0.15% (*up to fruit size hazelnut*), Polyram DF – 0.2%, Punch 40 EC – 0.0075%, (*deadline for use of available quantities 18.08.2014*), Sancozeb 80 WP – 0.3%, Syllit 40 SC – 0.16%, Systhane super 24 EC – 0.03%, Score 250 EC – 0.02%, Strobi DF/Discus DF – 0.02%, Strobi DF – 0.02 + Delan 700 WDG – 0.035% (*from mouse-ear stage to the stage when fruits have reached half of their final size*), Thiram 80 WG – 0.3%, Flint max WG – 0.02%, Folpan 80 WDG – 0.15% (*up to hazelnut size*), Chorus 50 WG – 0.03% – preventive, 0.05% – curative (*treatment interval 7–10 days*), Shavit F 71.5 WP – 0.2% (*deadline for use of available quantities 25.07.2014*), Shavit F 72 WDG – 0.2%, Champion WP /Macc 50 WP/Shamp WP – 0.3% (*up to mouse-ear stage*).

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Apple powdery mildew	*Podosphaera leucotricha* – *fungus*	• from infected leaf and flower buds, early in spring, the diffuse form of the disease develops • shoots are weak, with shortened internodes and narrow, boat-shaped curved leaves and deformed, sterile flowers • plant tissues are covered with a powdery coating, which gradually darkens • on the upper leaf surface, at the margins, on petioles and on the shoot tips, the local form of the disease develops as rounded, light	• the causal agent overwinters as mycelium in infected leaf and flower buds • in spring the systemic form of powdery mildew develops • secondary infections and spread are carried out by conidiospores • stronger expression is observed after mild and humid winters • infections are limited by frequent and intensive rains

		green spots with powdery coating on the lower side • on the fruit surface rusty net-like spots develop, which penetrate in depth	

Control:

- Plant resistant and weakly susceptible apple cultivars.
- To remove infected growth and shoots, heavy winter pruning and green pruning in spring are carried out.
- **Registered fungicides for control**: Ardent 50 SC – 0.02%, Bayfidan 250 EC – 0.015%, Bolero 12 EC – 0.06% (*deadline for use of available quantities 25.07.2014*), Kumulus DF – 0.6–0.9%, Luna Experience – 20–75 ml/da, Pol Sulcol 80 WP – 0.9% (*deadline for use of available quantities 25.07.2014*), Punch 40 EC – 0.0075% (*deadline for use of available quantities 18.08.2014*), Score 250 EC – 0.02%, Strobi DF/Discus DF – 0.02%, Topsin M 70 WDG – 0.12%, Flint max 75 WG – 0.02%, Shavit F 71.5 WP – 0.2%, (*deadline for use of available quantities 25.07.2014*), Shavit F 72 WDG – 0.2%.

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Blossom blight (early brown rot) of cherry, sour cherry, apricot, peach, plum	*Monilinia laxa* – *fungus*	• necrotic spots on petals and flowers – “blossom blight” of flowers, shoots and leaves, which gradually dry up • fruitlets turn brown, fruits rot, mummify and, at high relative humidity and moderate temperatures, are covered with grey, small, powdery tufts of fungal sporulation • attacked plant parts do not fall, they remain in the tree crown until the following spring • on infected scaffold branches cankers, lesions and gummosis are observed	• it overwinters as mycelium in infected shoots and in mummified fruits on the trees • infections are caused by conidiospores, which are formed in spring under moisture and are dispersed by wind, rain and insects • at high relative air humidity the disease is more severe • fruit cracking as a result of excessive soil moisture, pest damage and mechanical damage from hail are preconditions for mass fruit rot

Control:

- For effective control of the disease it is important to follow the following spraying scheme:
  - Pre-bloom spraying – at flower bud phenophase.
  - Bloom spraying – at the beginning of flowering.
  - Post-bloom spraying – after petal fall.
  - Fourth spraying – in wet and cool weather during the flowering period and high infection pressure – 8–10 days after the third treatment.
- **Registered fungicides for control**: Delan 700 WDG – 0.05%, Luna Experience – 63–75 ml/da, Punch 40 EC – 0.0075% (*deadline for use of available quantities 18.08.2014*), Thiram 80 WG – 0.3%, Topsin M 70 WDG – 0.12%, Folicur 250 EW/Horizont – 0.1%, Chorus 50 WG – 0.045%.

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Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Shot-hole disease of stone fruit species – peach, apricot, sweet cherry, sour cherry, almond	*Stigmina carpophila* – *fungus* *Xanthomonas campestris* – *bacterium* *Bacillus pumilus* – *bacterium*	• small reddish spots develop on leaves, shoots and fruits, which gradually merge into irregular shapes • in the centre of the leaves the tissue necrotises and falls out • on cherry and sour cherry fruits dark spots are formed, which gradually become depressed and adhere to the stone, while on apricot fruits small reddish scabs form around the stalk • on peach and almond, resin exudes at the site of damage	• the fungal form of the causal agent overwinters as mycelium in infected twigs • during dormancy, in mild winters, it multiplies and conidia are formed, which cause infection • the causal bacteria overwinter in affected plant parts as well as in fallen leaves and in the soil • infection by shot-hole disease occurs through wounds, stomata or cuticle • spores and bacteria are spread by rain, wind or insects

Control:

- For good control of the disease three sprayings are necessary:
  - First spraying – at flower bud phenophase.
  - Second spraying – after flowering.
  - Third spraying – 7 days after the second.
- **Registered fungicides for control**: Dithane DG – 0.3%, Dithane M-45 – 0.3%, Thiram 80 WG – 0.3%.

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Peach leaf curl	*Taphrina deformans* – *fungus*	The symptoms are described in issue one of the journal.	The life cycle is described in issue one of the journal.

Control:

- If autumn or winter spraying with 1% Bordeaux mixture has been omitted, up to bud swelling 1–2 treatments can be carried out at 10-day intervals in the period from bud swelling to flower bud phenophase.
- **Registered fungicides for control**: Dithane M-45 – 0.3%, Dithane DG – 0.3%, Sancozeb 80 WP – 0.3%, Score 250 EC – 0.02%, Thiram 80 WG – 0.3%, Shavit F 72 WDG – 0.2%, Champion WP/Macc 50 WP/Shamp WP – 0.3%.

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Peach twig borer (Anarsia)	*Anarsia lineatella*	• causes damage mainly to peach, apricot and plum • in spring the larvae begin to feed on the contents of the buds, and as the young shoots develop, they bore into them at the base of the petioles	• Anarsia overwinters as a third-generation larva, in the second or first instar, in leaf buds, branch junctions, on the trunk, in mummified fruits • it develops three generations per year, and under favourable conditions even four

		• damaged shoots wilt, their tips droop and gummosis appears at the site of damage • larvae of the first generation damage fruits, leaves and shoots, and larvae of the second generation – mainly fruits, as the shoots have already lignified • a single larva damages 2–3 buds, 5–6 shoots, 1–2 young fruitlets	

Control:
- Immediately before bud burst, the first spraying is carried out after recording 3% damaged buds.
- The second spraying is performed after the end of flowering.
- **Registered insecticides for control**: Vaztak Nov 100 EC – 0.015%, Deka EC – 50–70 ml/da, Decis 100 EC – 8.75–12.25 ml/da, Dursban 4 EC – 0.15%, Nurelle D/Chlorsirin 550 EC/Sanmba – 0.05%, Sineis 480 SC – 20 ml/da, Sumi Alpha 5 EC/Sumicidin 5 EC – 0.02%.

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Cherry weevil (cherry curculio)	*Rhynchites auratus*	• adult beetles cause damage by feeding on swelling buds, flowers and leaves • later they also feed on the surface of young cherry and sour cherry fruits, making deep, irregular gnawings • larvae feed on the inside of the fruits	• the weevil develops one generation per year and overwinters mainly as an adult in the soil • beetles appear at soil temperature of 8–10 degrees

Control:
- Chemical control is directed against adults at a density above 3 beetles/10 branches (by shaking).
  - First spraying – at bud swelling.
  - Second spraying – after flowering.
- **Registered insecticides for control**: Nurelle D/Chlorsirin 550 EC/Sanmba – 0.08%.

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Black plum sawfly	*Hoplocampa minutes*	• adult sawflies fly a few days before flowering of blackthorn and early plum cultivars and lay their eggs in still closed flowers • damage is caused by the false caterpillars (larvae), which feed on the inside of the fruitlets, filling them with black sooty mass with a bedbug-like odour, as a result of which the fruitlets fall	• the sawfly develops one generation per year and overwinters as a false caterpillar in the soil • pupation occurs in spring at a sustained temperature of 8–10 degrees for a period of 8–10 days

		• in order to complete its development, one false caterpillar damages from 2 to 5 fruits	

Control:
- Control is directed against adults at an economic injury level of 2–3 adult sawflies/tree (by shaking).
  - First spraying – at white bud phenophase of plum, before egg laying by the sawfly.
  - Second spraying – after flowering, when 3/4 of the petals have withered but not fallen, against the false caterpillars.
- **Registered insecticides for control**: Deka EC – 30–50 ml/da, Decis 2.5 EC – 0.05%, Sumi Alpha 5 EC/Sumicidin 5 EC – 0.02%.

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Apple sawfly	*Hoplocampa testudinea*	• the larva hatches at the end of flowering and bores under the skin of the fruit, mining it in an arc • one larva damages up to three fruits, which fall • an unpleasant bedbug-like smell can be detected at the site of damage	• it has one generation per year and overwinters as a false caterpillar in the soil • the flight of sawflies begins immediately before apple flowering

Control:
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  - First spraying – up to the beginning of flowering, at an established density of 2–3 sawflies/100 branches.
  - Second spraying – after petal fall, at an established 1–3% damaged fruitlets by false caterpillars.
- **Registered insecticides for control**: Deka EC – 30–50 ml/da, Decis 2.5 EC – 0.03%, Nurelle D/ Chlorsirin 550 EC/Sanmba – 0.04% (against false caterpillars).

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Weevils on apple	*Apple blossom weevil (Anthonomus pomorum)* *Apple golden weevil (Rhynchites bacchus)* *Red-winged fruit weevil (Rhynchites aequatus)*	• adult beetles destroy fruit and leaf buds, and larvae destroy the floral parts of fruit buds, flowers and fruitlets • damaged fruits usually rot and fall	• weevils leave their overwintering sites at an average daily temperature above 8 degrees

Control:
- Spraying is carried out at an established economic injury threshold:
  - Apple blossom weevil – 4–6 pcs/tree.

- Apple golden weevil – 2–3 pcs/tree.
- Red-winged fruit weevil – 2–3 pcs/tree.

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Aphids	*fam. Aphididae*	• aphids suck sap from young apical leaves, which curl, shoots become stunted, honeydew is secreted on which sooty mould fungi develop • the physiological processes of plants are disturbed and, at mass infestation, leaves dry and fall and fruits become small and deformed • moderate temperatures and increased humidity are the most favourable conditions for aphid development • high temperatures depress aphid development and therefore damage is greatest in spring and early summer.	• fruit crops are attacked by various aphid species, which develop a large number of generations • they appear early in spring, with the warming of the weather, already at bud burst of the fruit species

Control:

- It is appropriate to carry out treatment before flowering, when aphids are at lower density and have not yet caused serious damage. The respective economic injury thresholds should be observed:
  - Apple – 10–15 colonies/100 inflorescences or 10–15% infested leaves.
  - Plum – 10 colonies/100 buds.
  - Cherry and sour cherry – 10 colonies/100 leaves/100 buds.
  - Peach – 10–15 colonies/100 flower rosettes.
- **Registered insecticides for control**: Bi-58 – 0.05–0.07 %, Deka EC – 30–50 ml/da, Decis 100 EC – 7.5–17.5 ml/da, Decis 2.5 EC – 0.03%, Dikline 2.5 EC – 0.03%, Calypso 480 SC – 0.02%, Mospilan 20 SG – 25 g/da, Patrol WG – 40–80 g/da.

Disease /Pest	Causal agent	Symptoms/Damage	Life cycle
Defoliating caterpillars	*Leafrollers, Bud moths (grey bud moth – Hedya nubiferana, red bud moth – Spilonota ocellana), Defoliating caterpillars*	• caterpillars of leafrollers and bud moths gnaw leaf and fruit buds, destroy their contents and web them together • damaged buds darken, dry out and crumble • they gnaw young leaves and fruits • defoliating caterpillars and geometer moths feed gregariously, gnawing buds, skeletonising leaves leaving	• defoliating caterpillars multiply massively after drought, at lower summer temperatures and low rainfall

	(lackey moth (Malocosoma neustria), gypsy moth (Lymantria dispar), brown-tail moth (Euproctis chrysorrhoea) Geometer moths	only the main veins, gnawing flowers and fruits and, at high density, completely defoliating trees

Control:

- Maintaining fruit trees in good condition is an important element in the control of these pests, as physiologically weakened trees are more heavily attacked by them. Pre-bloom treatment is necessary at a density higher than the economic injury threshold:
  Leafrollers – 8–10 caterpillars/100 buds or 2–3 caterpillars/1 linear metre.
  - Bud moths – 3–5 caterpillars/2 linear metres.
  - Geometer moths – 4–8 caterpillars/1 m branch or 8–10% damaged inflorescences.
  - Defoliating caterpillars – 8–10 caterpillars/tree (by shaking) or 8–10% damaged buds.
    Chemical control is successful if carried out against caterpillars up to the third instar, at an economic injury threshold of 10–15% damaged leaf area.
- **Registered insecticides for control**: Vaztak Nov 100 EC – 0.015%, Deka EC – 30–50 ml/da, Decis 2.5 EC – 0.03%, Dursban 4 EC – 0.15%, Nurelle D/Chlorsirin 550 EC/Sanmba – 0.05%, Runner 240 SC – 0.04%, Sumi Alpha 5 EC/Sumicidin 5 EC – 0.02%, Teragard 48 EC (*deadline for use of available quantities 21.05.2014*) – 0.1%.

Farmers who apply plant protection products in production are obliged to use only plant protection products authorised for use on the respective crop, against the respective pest and at the respective dose, included in the **"List of plant protection products authorised for placing on the market and use"**, published on the website of the bfsa at the address: **http//www.babh.government.bg/. The hard copy of this list can be purchased from the editorial office of the journal "Plant Protection".**

Plant protection products must be purchased only from traders holding a permit for the activity and included in the **"List of companies authorised to carry out the activities wholesale trade in plant protection products, retail trade in plant protection products in agricultural pharmacies, repackaging of plant protection products and carrying out fumigation and disinfestation of areas, premises and plant production against pests"**, published on the website of BFSA.

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