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Autumn plant protection activities in field crops

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Wheat

Proper seedbed preparation, a sowing depth of 5–6 cm, the seeding rate, pre-sowing or at-sowing fertilization, rolling and the required soil moisture are prerequisites for well-established stands. Observance of the sowing time and the seeding rate is also of importance. Wheat and barley seed is treated against loose and covered smut, and barley seed – against stripe disease. In autumn, winter-annual and spring-annual weeds appear: annual grasses (annual meadow grass, mouse barley, wild oat, blackgrass, etc.), annual broadleaf weeds (chamomile, cleavers, field pansy, corn poppy, larkspur, etc.) and perennial rhizomatous and root-suckering weeds (creeping thistle, field bindweed, johnsongrass, etc.).

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Autumn herbicide treatments are applied when annual broadleaf weeds have emerged en masse but have not passed the 3rd–4th leaf stage. Thus, the crops are freed early from their competition. If autumn treatment against weeds is possible, the following conditions must be met: the area is well tilled and rolled after sowing, the sowing depth is 5–6 cm and the species composition of the weeds is known, soil moisture and the temperature at herbicide application are above 5°C, and grass weeds have not passed the 3rd–4th leaf stage. During vegetation, application of graminicide herbicides is carried out when the crop is beyond the 3rd leaf stage, there is soil moisture and the necessary temperature, and the grass weeds have developed three to four leaves.

After crop emergence, it is necessary to survey the stands for pest attacks such as: common vole, wheat ground beetle, cereal flies and aphids, all of which cause serious damage.

Common vole (Microtus arvalis) – widely distributed throughout the country. It damages cereal crops, lucerne, oilseed rape, orchards, etc. It lives in colonies in long burrows with different numbers of holes on the surface. Inhabited colonies are identified by scattered soil heaps, a well-shaped opening and green leaves inserted into it. In a warm and dry winter, the reproductive capacity of the vole is very high. It reproduces year-round and the progeny from a single pair can reach up to 2400 individuals. It feeds on the green parts of the plant. Damage is observed from emergence until harvest. Under heavy infestation the stand becomes bare. After harvest, deep ploughing is recommended to destroy the colonies and to eliminate any emerging weed vegetation on which the vole feeds. When surveying the fields, the density of the vole population is determined, and if 2 active colonies per decare are present, poisoned baits are laid, placed in the (inhabited) openings and tamped with a foot to protect birds and beneficial game.

Wheat ground beetle (Zabrus tenebrioides). This is the most dangerous pest of cereal crops. In dry and warm summers a strong development of the adults is observed. One of the reasons for its mass occurrence in recent years is the monoculture cultivation of cereals. Damage by the adults is insignificant. They appear from June until late autumn. The beetles feed on wheat and barley kernels in the milk stage. They gnaw them and cause shattering. During hot periods they burrow into the soil. After the rains in September they come to the soil surface, mate and lay eggs at a depth of 5 cm under soil clods, in clusters of 20. They prefer to lay in areas infested with couch grass, therefore the damage appears in patches. The larvae dig tunnels up to 40 cm deep, in which they spend the day and emerge to feed at night. They gnaw the sprouts of the plants and, on young plants, chew the leaves, suck the sap and consequently the leaves turn brown, dry up and resemble small

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pieces of tow. Under light infestation the stand thins out, and under mass infestation the entire crop can be destroyed and ploughing up becomes necessary.

The following measures must be observed: proper crop rotation, timely soil tillage and destruction of grass weeds, especially couch grass. This significantly reduces larval density and saves insecticide treatments. Chemical control is carried out at the economic threshold of harmfulness in the emergence and tillering growth stages – wheat – 3 larvae/m^2, barley – 4 larvae/m^2

Cereal flies – frit fly (Oscinella frit), Hessian fly (Mayetiola destructor), wheat stem fly (Chorops pumilionis), etc. They are widespread in the fields and cause severe damage to infested stands. Larvae of the autumn generation cause identical damage to the plants. They gnaw the central leaf, which turns yellow and twists, while the other leaves remain green. When the central leaf is pulled, it detaches easily and more than one Hessian fly larva is found at the site. The larvae of the frit fly feed on the succulent and tender tissue in the lower part of young plants, and the tissue decomposes. They also attack the stem – the central leaf twists, turns yellow and is easily pulled out, and at the site of damage a single larva is found. The damage symptoms of the wheat stem fly are the same as those of the frit fly. As a result of the attack, weaker plants die, and the remaining ones produce additional tillers, but this cannot compensate for yield losses in infested crops. Control of the flies is very difficult due to their hidden development. Observance of sowing dates is of great importance; earlier sowing coincides with the mass flight of flies. Balanced and timely fertilization promotes uniform emergence and contributes to faster passage through critical growth stages. To determine the flight, surveys are carried out with an entomological net in calm and sunny weather. When 3 flies/m^2 are present, treatment of the crop is initiated.

Aphids – oat aphid (Macrosiphum avenae), greenbug (Schizaphis graminum). The oat aphid is the most harmful and most common species and attacks cereal crops and a number of grass species. It feeds by sucking sap from the plants. In addition, it is a vector of viruses and causes barley yellow dwarf. This aphid is a non-migrating species and overwinters as eggs on winter cereals and perennial grasses. Thin and earlier sown stands are more heavily attacked. Oat aphid is naturally controlled by ladybirds, hoverflies and lacewing larvae. To reduce aphid infestation levels, volunteers must be destroyed, sowing dates must be observed and fertilization must be balanced, because unilateral nitrogen fertilization weakens the plants and makes them more susceptible to attack. Stands are surveyed in the emergence–tillering growth stages and, when 10 aphids/plant are found, chemical control is initiated.

Oilseed rape

Oilseed rape is sown at the end of August to the beginning of September. It is a demanding crop in terms of soil – it requires soils rich in nutrients with good water regime. The best predecessors are wheat, barley, early potatoes, etc. It is infested by several groups of weeds: winter-annual, early spring and root-suckering weeds. Early destruction of weeds reduces competition with the crop and contributes to uniform stand establishment and rosette development.

The main diseases of oilseed rape in autumn are:

Phoma stem canker (Phoma lingam). The first symptoms – yellow spots appear on the leaves, later speckled with black dots – pycnidia. Plants attacked in autumn die in spring or their stems break. Measures for control of Phoma stem canker include proper crop rotation and destruction of plant residues. Control of the cabbage stem flea beetle, which can contribute to disease spread, is also important.

Phoma leaf spot spreads in foci and very quickly covers the entire field. From the leaves the fungus passes into the petioles and penetrates the crown (root collar). Therefore, regular autumn monitoring is necessary and treatment must be carried out when the first light-yellow spots on the leaves are detected.

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In autumn the following pests are dangerous:

Cabbage stem flea beetle (Psylliodes chrysocephala). It causes damage in autumn by feeding on the leaves, making small holes which, as the leaves grow, turn into perforations. It can be found in the crop as soon as the plants emerge, therefore continuous monitoring is necessary and, when 2 adults/m^2 are recorded at the 3rd–9th leaf growth stage or more leaves, chemical control should be applied.

Turnip sawfly (Athalia colibri). It develops three generations per year, with the larvae of the third generation in autumn causing the greatest damage – they eat the entire leaf blade, leaving only the main vein. Chemical control is carried out at an economic threshold of 2–3 larvae/m^2.

Aphids (Brevicoryne brassicae) and others. Adults and larvae suck sap from the leaves and stems of the crop. The plants weaken and stop growing. Aphids are vectors of many viral diseases.

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According to the Plant Protection Act, farmers are obliged to use only plant protection products authorized for use on the respective crop and pest, and at the appropriate dose.

Plant protection products authorized for marketing are published on the website of the Bulgarian Food Safety Agency at: http://www.babh.government.bg/ or in the "List of plant protection products authorized for placing on the market and use", 2019.

Plant protection products must be purchased only from commercial companies holding an authorization!

Attention! When working with plant protection products, all requirements for occupational safety, protection of bee colonies from poisoning and protection of the environment from pollution must be observed!