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

# Autumn agrotechnical and plant protection measures in wheat and barley

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*Дата:* 18.10.2021 *Брой:* 10/2021

Compliance with the principles of integrated pest management in crop protection against pests guarantees obtaining good yields.

## Appropriate crop rotation

Monoculture cultivation is not advisable. Crop rotation should be observed, as it reduces the population density of soil and plant residue pests – types of foot and root rot, soil-dwelling pests.

## Proper soil tillage

ISSN 2815-522X

It should be adapted to the type of preceding crop in order to ensure quality sowing, uniform emergence and the development of plants that are more resistant to pests. Deep ploughing buries and accelerates the mineralization of plant residues, regulates the density of a number of pests, as well as the degree of infestation with rhizomatous and root-sprouting weeds.

### Variety selection

A single variety should not be grown over large areas on the farm, but at least 2–3 varieties with different resistance to diseases and pests.

### Sowing dates

They are of major importance for the successful control of pests. With very early sowing, combined with a wet and warm autumn, there is a risk of excessive crop growth before the onset of winter and more severe attacks by root rot, rusts, powdery mildew, viral diseases, cereal flies, aphids, leafhoppers, larvae of the wheat leaf beetle, and the common vole. Late-sown crops are weaker and relatively less able to withstand adverse meteorological conditions during the winter period, which increases the likelihood of winterkill, heaving, and poor stand establishment of the sown crops.

### Balanced fertilization

Depending on the soil nutrient status, nitrogen, phosphorus and potassium should be applied in order to ensure the development of healthy plants with higher resistance to diseases. Unbalanced nitrogen fertilization increases the susceptibility of plants to powdery mildew, foot and root rot and other diseases. Fertilizer rates can be determined most accurately after soil analysis.

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*What are the main pathways for transmission of diseases in cereal crops from one season to the next and what are the possibilities to prevent this?*

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### Seed treatment

High-quality seed treatment is a mandatory measure that will reduce the initial amount of pathogens and limit the development of a number of dangerous seed-borne diseases – common and loose smut and Fusarium head blight in wheat, loose smut and stripe disease in barley.

ISSN 2815-522X

**Wheat leaf beetle –** *Zabrus tenebrioides*

*Damage*

In fields with recorded infestation by the pest and higher population densities from previous years, and especially under monoculture wheat cultivation, it is advisable to treat the seed with an insecticide in order to protect the plants in the initial stages of their development.

**Control**

Spraying with registered insecticides

**Common vole** – *Microtus arvalis*

*Damage*

Regular surveys should be carried out to assess the density and condition of vole populations. Particular attention should be paid to roadside strips, ditches, alfalfa fields, meadows and orchards, from where in autumn the vole migrates to the earliest emerged crops. Fields located near alfalfa, stubble and fallow land are potentially at risk of vole infestation.

**Control**

When density exceeds 5 active colonies per decare in stubble fields, deep ploughing must be carried out and these areas should not be sown with autumn-sown crops.

Autumn-sown crops should not be sown in areas bordering heavily infested alfalfa fields and fallow land.

Control of the vole should be carried out by placing poisoned baits when an established ***economic injury threshold of 2 colonies/da*** is reached.

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*Which herbicide should we choose for autumn weed control in wheat and barley?*

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**Weed control**

ISSN 2815-522X

Autumn application of soil herbicides under suitable conditions for the control of grass and broadleaf weeds enables the sown crops to develop in the absence of competition and creates the necessary conditions for the expression of their biological potential.

Fields to be treated with soil herbicides must be very well tilled. Fields located near alfalfa, stubble and fallow land are potentially at risk of vole infestation.

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*How to control early emerging weeds, including volunteer plants from herbicide-tolerant sunflower and oilseed rape in cereal crops already in autumn*

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**Control**

Depending on the type of weed infestation and the preceding crop, registered herbicides can be applied after sowing and before crop emergence.