

Disease, Pest and Weed Control System in Vineyards

Author(s): проф. д.с.н. Ангел Харизанов; проф. д-р Борис Наков, Аграрен университет Пловдив; проф. Иван Жалнов, Аграрен университет, Пловдив

Date: 14.03.2019 *Issue:* 3/2019



The most dangerous grapevine diseases are downy mildew, powdery mildew, grey mould, excoriose, esca, white and black rot. Control against them is complex, not only chemical:

- Pruning operations on the green parts of the vine – shoot thinning, pinching of shoot tips, lateral shoot removal, etc. By removing the leaves (thinning) around the inflorescence and the bunch, the microclimate in the vine canopy is improved, as light access is ensured and less moisture is retained, all factors that have a negative impact on the development of pathogens and provide better effectiveness of fungicides. In the period 1994–1997, in the grapevine assortment of the Department of Viticulture, experiments were

carried out with leaf removal around the bunch and the influence of this practice on the development of powdery mildew. In most of the variants – different cultivars, the difference in disease incidence on the bunches, with and without leaf removal, varies from 10.5–13.4 to 21.0% (Nakov, Nakova, unpublished data). The literature reports a high effect of leaf removal also on grey mould (English et al., 1993).

- Agrotechnical practices – site selection, fertilisation, irrigation, weed control, soil tillage, provide complex conditions for strengthening the defence reactions to adverse external conditions, including infection by phytopathogens.
- The effect of the use of fungicidal products is better when treatments are carried out in the sensitive phenophases of the plants and are related to the place and manner of survival of the pathogens. For example: the causal agent of powdery mildew overwinters in the vine buds and treatment should be carried out in the phenophase of shoots 2 to 4 cm in length, with chemotherapeutic fungicides; the causal agent of excoriosis survives mainly in the first 2 to 4 internodes, and spraying is carried out as soon as the young shoot appears; the causal agent of anthracnose survives in the buds, and spraying should be carried out at the stage of mass bud swelling.
- In organic production (where only copper- and sulphur-containing products are permitted), it is of particular importance that control is carried out in the critical phenophases of vine development – shoot emergence, inflorescence development and bunch formation, up to the beginning of colour change of individual berries.
- At present, the varietal structure of new vineyards is determined by market demand, but in organic production it is more advisable to give preference to resistant cultivars.

Chemical control of grapevine diseases is carried out with fungicides with different modes of action – contact, with protective action; contact-penetrating, with local action; and chemotherapeutic (curative) fungicides. For 2019, more than 120 products with different modes of action were registered for grapevine in the List of authorised plant protection products.

More than 100 species of insects, mites, nematodes and other animal organisms damage grapevine, attacking roots, buds, leaves, shoots, inflorescences, young berries, ripening and ripe berries, perennial wood and other parts of the vine, and some are vectors of viruses and phytoplasmas causing economically important diseases. Damaged vines grow weakly, bear less fruit, the grapes are of poor quality, and in cases of mass multiplication the entire yield is compromised and the vines may die. The most harmful are grape moths, mites, the grapevine leafroller, grapevine scale, various species of cutworms, leafhoppers – vectors of viruses and phytoplasmas, soil pests, etc. Grape moths prefer cultivars with green and yellow-green berry skin and those with Muscat flavour, while mites prefer cultivars with thicker parenchyma, Muscat flavour and a hairy lower leaf surface. Pests cause

damage from the beginning of the phenological development of the grapevine plant until the onset of its physiological dormancy. Some species and groups of pests cause damage throughout the year. The occurrence, damage and reproduction of pests are related to the phenological development of the vine, since each of them shows a certain preference for specific organs of the plant.

Control of grapevine pests is carried out in accordance with the rules of good plant protection practice in agriculture (2006), with the Principles of Good Plant Protection Practice (2004) and with the basic principles and objectives of integrated production (2008). In general, the requirements of the rules, principles and objectives are expressed in: application of insecticides only when necessary, i.e. when the pest population density has reached or exceeded the so-called economic injury levels (EIL); application only of authorised plant protection products for the respective pest and crop; strict observance of the doses and application rates per decare; protection of workers' health and of biodiversity in agroecosystems (biological control agents and pollinators); use of alternative options in pest control; risk assessment when applying plant protection products; application of plant protection products at periods most effective against pests and safe or minimally hazardous for biological control agents, etc. The basis of all requirements is the EIL (economic injury level).

Weed control in vineyards includes mechanical, biological, preventive and chemical methods. These should be alternated at certain intervals in order to achieve high efficiency. The main method for maintaining the soil in vineyards free from weeds, both in-row and between the rows, is the application of various soil tillage systems. Chemical control includes soil-applied herbicides, which are applied during dormancy, before the beginning of vegetation of the vine and the weeds, foliar herbicides – during the vegetation period of the vine and the weeds, and total herbicides with contact and systemic foliar action – during the vegetation period of the vine and the weeds.

Read more in issue 2/2019 about disease and pest control in line with the critical stages of grapevine development. You will have the opportunity to obtain information on all fungicides, insecticides and herbicides registered in our country. The stages of vine development – diagrams and table – can also be found in issue 2/2019 of the journal.