INCREASED VIRAL-RESISTANCE OF YELLOW LUPINE UNDER THE ACTION OF MICROBIAL PREPARATIONS AND PHYSIOLOGICALLY ACTIVE SUBSTANCES

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The influence of microbial preparations and physiologically active substances on the reproduction bean yellow mosaic virus in yellow lupine plants has been investigated. It was established that the action of microbial preparations on the limitation of the viral infection development is explained by the influence of exogenous physiologically active substances, which are contained in preparations and produced by the microorganisms introduced in agrocenosis, on the forming of endogenous phytohormone pool. Therefore, it optimizes a number of physiological processes of the plants and activates their defence reactions.

Key words: *yellow lupine, bean yellow mosaic virus, microbial preparations, physiologically active substances.*

One of the main obstacles to the widespread use of lupine in agricultural manufacture is numerous diseases, namely fungal and viral. Despite of development of highly productive varieties of lupine resistant to fungal diseases, it is not possible to expand areas under yellow lupine fails, namely due to significant affection with viral diseases. The most common and economically important is bean yellow mosaic virus (BYMV) – causative agent of narrow-leaved yellow lupine. Under affection of viral narrow-leaved disease, losses of grain yield of yellow lupine reach 50-90 %. [1-4].

Currently, there are no reliable measures to control viral infections due to the peculiarities of the biology of pathogens, therefore, protection of yellow lupine from viral narrow-leaved disease has mainly a preventive nature [5]. However, there are many data on antiviral properties of metabolic products of different microorganisms [6-10]. This stipulates the importance of finding ways to improve lupine plant resistance to BYMV. Biological methods of phytoimmunity activation and

plant protection are prospective in this direction. Among them, microbial preparations based on active selected strains of bacteria and micromycetes were poorly investigated. Additionally to microorganisms that can optimize processes of plant nutrition, biological preparations contain biologically active substances that can induce plant resistance to infectious diseases upon stimulation of protective responses [11].

In this regard, the aim of our study was to investigate the influence of microbial preparations and physiologically active substances on intensity of reproduction of bean yellow mosaic virus in plants of yellow lupine.

Materials and methods. The influence of biopreparations and different doses of phytohormone (auxins, cytokinins, gibberellins) on the intensity of BYMV reproduction in the plants of yellow lupine of variety Progresyvnyi was performed under conditions of vegetation experiment.

The scheme of the experiment:

1. Control (water-treated seed);
2. Ryzobofit (*Rhizobium lupini* 367a);

3. Ryzohumin (*Rhizobium lupini* 367a and content of phytohormones optimized for plants);
4. Khetomik (*Chaetomium cochliodes* 3250);
- 5-7. Auxin (IAA) (2-20 mg/L);
- 8-10. Cytokinins (BAP) (0.4-4 mg/L);
- 11-13. Gibberellins (GA) (2-20 mg/L).

Lupine seeds were sown in sterile sand using Prianishnikov mixture. Pre-sowing treatment with biopreparations and solutions of phytohormones was performed 2 hours before sowing. Humidity of the substrate during vegetation period was maintained at the level of 60 % from complete moisture-holding capacity. Repeatability of experiment is five-time.

The accumulation of bean yellow mosaic virus was performed using test plants *Vicia faba* that were cultivated under the conditions of vegetation premises at 20-25 °C and photoperiod of 16 hours. Viral plant material was collected 2-3 weeks after contamination (the period of maximum accumulation of the virus). Inoculum from the leaves of affected plants of beans was prepared with the addition of 0.01 M phosphate buffer solution, pH 7.2-7.5. Plant contamination of yellow lupine with BYMV was performed at the phase of 3-5 true leaves by mechanical inoculation with the previous powdering by carborund (500-600 mesh) [12; 13].

Measurement of BYMV concentration in yellow lupine plants was performed in a sandwich version enzyme-linked immunosorbent assay (ELISA) by the standard method [14; 15]; the results were recorded on the reader ELx800 (Biotek, USA) at 492 nm.

The content of phytohormones in plant material was measured using the method of quantitative spectrodensitometric thin-layer chromatography [16].

Statistical calculation of the results was performed using univariate analysis of variance [17].

physiologically active substances contained in preparations and produced in agrocenosis by microorganisms, on the formation of pool of endogenous phytohormones that promotes induction of plant protective responses.

Thus, the influence of microbial preparations on limitation of viral infection is explained by the effect of exogenous