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Study on the Potential Use of Biopesticides in the Management of Blueberry (*Vaccinium corymbosum* L.) Diseases

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Abstract

Blueberry (*Vaccinium corymbosum L.*) fruits are prized for their high nutritional value, and as a result, their production and consumption are steadily increasing worldwide. In most orchards, cultivation relies on management schemes that use synthetic chemical fertilizers and pesticides. Such practices lead to soil depletion, groundwater pollution, disruption of orchard ecosystems, and the production of unhealthy fruits, negatively impacting human health. As a result, the benefits of organic agriculture are gaining greater importance, and both the production and consumption of organic products continue to expand. This study aimed to evaluate the potential of biopesticides for managing blueberry diseases under the conditions of western Georgia, particularly in the Samegrelo region. The research was conducted in 2024–2025 within the framework of a project funded by the Shota Rustaveli National Science Foundation (PHDF-23-827). Field experiments were carried out using standard plant protection methods, with treatments applied according to a pre-developed scheme. Four biopreparations and one copper-containing fungicide permitted in organic production were tested. Results showed that Phytosporin-M demonstrated the highest biological effectiveness against leaf spot (79.7%), followed by copper hydroxide (61.49%). For fruit rot, Phytosporin-M reached 66.5% effectiveness, while copper hydroxide achieved 63.8%. The other biopesticides tested (Agrocatena, Botrybell, Plastoff *L*) were less effective, with results not exceeding 50% against either disease. In terms of agricultural effectiveness, Phytosporin-M again ranked highest, producing yields 30.6% greater than the control. Overall, the study highlights environmentally sustainable approaches to plant protection, supporting both agricultural productivity and ecosystem health.

Keywords: Blueberry; Biopesticide; Biocontrol; Fungal pathogens; Sustainability;