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RESEARCH ON THE INVASIVE IMPACT OF HARMFUL INSECT COMPLEXES ASSOCIATED WITH PARASITIC NEMATODES AND PATHOGENIC VIRUS VECTORS IN PRODUCTIVE PLUM ORCHARDS

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The cultivation of plum is a centuries-old tradition, surpassed only by apple, and the production of plum fruits obtained in the Republic of Moldova is over 35%, with an important share in exports, about 30%. Plum is such an appreciated crop due to the high productivity of the trees, the special qualities of the fruits and the numerous valuable varieties with diverse fruiting time. The current plum orchards are capital investments, which can be exploited for 20-25 years, and the efficiency of their use depends on the correctness of the establishment of orchards and care techniques in the first 4-5 years after planting.

One of the priorities in the cultivation of plums is the study of the evolution of the parasitic vectorial impact of microbial infections of complexes of harmful organisms, such as associations of harmful insects and invasive nematode complexes in the soil, which also act as vectors of pathogenic viruses, triggering viral infections, which usually occur in pathosystems, triggered by the development of perennial monoculture of plum plantations in time and space. According to the research programs developed based on the project – State Program 2020-2023, we started addressing these strategic objectives in the development of the horticultural sector in the Republic of Moldova, where research on the phytosanitary biological control of invasive and vector insect and nematode communities is conducted annually, to establish the parasitic, functional impact and the structure of associated populations in young and productive plum orchards, breeding nurseries, including other related species such as peach, apricot, cherry etc.

The intensive plum orchards, nurseries for reproducing the planting material from 6 administrative districts, on areas of over 500 hectares, in the North zone (Briceni, Soroca), the Center zone (Criuleni, Nisporeni), the South-East zone (Căușeni, Ștefan-Vodă) of R. Moldova were investigated. More than 300 samples of soil, young trees, young shoots, young seedlings attacked by viruses were taken from various systems of orchards and breeding nurseries. The soil samples were taken at a depth of 30-60 cm, at intervals of 15-20 days, covering the main phenological stages throughout the growing season. To establish the entomo-helminthiotic and virotic parasitic impact, we performed visual and optical observations to identify local and extensive damage, with symptoms of specific viral infections on trees. The results of the analyzes are interpreted by the values of abundance and frequency of the species (insects on average per 100 leaves, 100 fruits analyzed; nematodes – individuals / 100 cm^3 soil), classified by ecological-trophic specialization depending on the age of plantations, environmental conditions, variety, soil, maintenance systems.

As a result of the phytosanitary records carried out during the growing season, in 2020-2022, on the entomo-parasitic impact of the range of invasive insects, a very strong attack was periodically detected, which caused significant losses in fruit production and quality. Their presence in plum orchards is quite difficult to detect, they are often detected too late and spraying insecticides is no longer effective. The damage is usually very extensive; in severe cases the entire plum production is compromised. The most dangerous species detected on plum trees in new type productive orchards are: *Cydia funebrana* – plum fruit moth, *Cydia molesta* – oriental fruit moth, *Hyalopterus pruni* – mealy plum aphid, *Hoplocampa minuta* – black plum sawfly, *Eurytoma schreinerei* – plum seed wasp, species of ectoparasitic aphids and vectors of pathogenic viruses of the genus *Aphis sp., Myzus sp.,* some species of cicadas, mites etc. For this reason, farmers should pay particular attention to spraying insecticides.

The concomitant nematological surveys are also very important, because they also occur as invasive forms and vectors of pathogenic viruses, detected in plantations of various fruit species, including plum. This includes nematode species established as specialized complexes on plum trees, where the most common species that form associations and belong to the orders *Tylenchida* and *Dorylaimida*, the genera: *Pratylenchus, Pratylechus, Tylenchus, Helicotylenchus, Ditylenchus, Xiphinema spp., Longidorus, Trichodorus*, with endo-ectoparasitic specialization and specialized vectors of various forms of pathogenic viruses, which can trigger specific viral infections in fruit plantations. According to the bibliographic review and the results obtained by us, currently the presence of 15 species of nematodes with invasive impact and vectors of pathogenic viruses specific to plums have been identified. They are represented by associations of the order *Dorylaimida*, the genera *Xiphinema* and *Longidorus,* the species*: Xiphinema index, X. vuitennezi, X. riversi, X. brevicolle, X. diversicaudatum, Longidorus elongatus*, responsible for the transmission of 20 species of pathogenic viruses and viral infections in plum orchards, detected in practically all areas and sectors investigated.

The investigations carried out in the intensive plum orchards have also highlighted the more advanced etiological composition of 3 viral diseases (ring pattern virus, fan-leaf virus, plum pox virus), detected immediately after the formation of vegetative organs (first growing season), infested and through the numerous insect species with sting-sucking buccal apparatus, such as: aphids, cicadas, mites, wasps, which are associated with complexes of vector nematodes in the soil, especially in the sectors that were previously planted with classic orchards, frequently detected in all zones and growing seasons.

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