

Pest and disease management in Israeli vineyards

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Vineyards have been cultivated in the land of Israel for more than 3000 yr. To date, the grape wine production area covers 6,000 ha (mostly French varieties), while table grapes are cultivated on 3,000 ha (mostly varieties of local selection). Among the 11 major microbial causing diseases, powdery mildew (*Erysiphe necator*), grapevine downy mildew (*Plasmopara viticola*) and leaf roll virus disease are the most important, whereas black mold (*Aspergillus niger*) and the three fungal pathogens (*Fomitiporia mediterranea*, *Phaeomoniella chlamidospora* and *Phaeoacremonium aleophilum*) causing wood-decay, Esca disease, are also common. Among the 10 major arthropod pests, the most serious damage is caused by grape berry moth (GBM) *Lobesia botrana*, as well as the vine mealybug, *Planococcus ficus* acting as the vector of leaf roll, and leafhoppers' damage, caused by several species belonging to various genera. Two insect species are considered of medium economic importance: the grape carpenter worm (GCW) *Paropta paradoxa* and the vinegar fly *Drosophila melanogaster*. Vineyard management is characterized by dynamic changes in plant protection issues, mainly (1) meteorological and climatic changes; (2) significant changes of management schemes, and (3) genetic changes of few pathogens. The chain of events that lead to berry damage by the complex of rots and the vinegar fly *D. melanogaster* is discussed; as well as the challenge of powdery mildew management on the background of fungicide resistance. Employing decision making systems allowed a steep decrease in the number of treatments against powdery mildew from approximately 10 until 2005, to 3-5 during the last few years. Downy mildew occurring during the spring season was unheard of since 1985. However, since 2015, it has become a major problem. The research in this case focuses on testing new compounds and genetic studies of this fungus-like organism. The phenology and monitoring activity regarding the GBM and the honeydew moth *Cryptoblabes gnidiella*, will be presented. Treatment decisions for the control of GBM are taken during the 2nd generation and early part of the 3rd generation of the moth, with a threshold of 2 eggs/100 bunches (2nd), 1-2 eggs/100 bunches (3rd gen.). During the 3rd and 4th generations, the threshold is lowered to 1 eggs/100 bunches or 0.5 moth/night captured by pheromone traps. Mating disruption of GBM covers approximately half of the vine cultivated area in the country. Until 1995, there were no empirical based recommendations for management of the GCW. During the following 20 years, management of the wood borer was based on control recommendations of the leopard moth, *Zeuzera pyrina*, that consisted of 4-6 treatments during the warm season. Since 2015, one treatment in early spring (February) with teflubenzuron (IGR) was found to be highly effective. Slowing the spread of grapevine leaf-roll disease into new established vineyards is one of the major plant protection challenges in Israeli viticulture. Therefore, we studied the prevention of mealybug crawler movement from adjacent leafroll infested plots to newly established vineyards. We found that 99.9% of the crawler spread did not reach 35-40 m behind the release points and an average of 85% reduction was found in crawlers' arrival in the protected plot using 50 mesh net barriers. The effective control of powdery mildew, plant-hoppers and GBM by a therma-machine (heat treatments) will be presented and discussed.