
OP-13

Implications of farm structure and crop management on fruit infestation and medfly IPM

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The selection of fruit species and the cultivar phenology spectrum are largely determined by seasonal patterns of market demand and fruit prices. Similarly, the spatial arrangement of cultivars tends to be opportunistic, driven by plot availability at the time of planting new fruit trees. And commonly, fruit thinning is used to achieve premium fruit size and quality. The pest control implications of these practices are seldom carefully considered, in particular because in the case of multi-annual systems empirical evaluation of possible options and their implications is not feasible. Therefore, the in-silico approach – a stochastic simulation of medfly behaviour with the PESTonFARM model was used to assess the combined effects of farm structure, fruit phenology and fruit size management on medfly development, dispersal and fruit infestation. The simulations were based on the data collected during the case studies conducted in Italy in 2019-2021 and using model-generated hypothetical scenarios with various farm-landscapes, fruit arrangement, and fruit size management options. The simulations allowed to estimate the pest (medfly) development and fruit infestation patterns under various scenarios, and quantify the effects of the farm structure, the presence and spatial arrangement of early fruit cultivars, the continuity of seasonal fruit chain, and fruit size management practices on IPM costs and effectiveness. The collected information will be of broader relevance to other Mediterranean regions and useful in improving the application of IPM against medfly.