PROJECT DELIVERABLE REPORT

Deliverable D6.3: Description of pilot sites in-silico generated IPM scenarios

Project Title:

In-silico boosted, pest prevention and off-season focused IPM against new and emerging fruit flies ('OFF-Season' FF-IPM)

SFS-2018-2

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D6.3

1   Summary

This deliverable (D6.3) documents the achievement of the mid-term milestone (M13) and represents a major step in the development of novel paradigm for OFF- and ON-Season management of the Mediterranean fruit fly (medfly), which constitutes Objectives No 1 and 2 of the FF-IPM project:

1.   To create a fundamental paradigm shift in FF IPM towards "OFF-Season" management of emerging pests.
2.   To enhance the capacity for "ON-Season" FF management through innovative in-silico boosting the existing IPM toolbox, and the development of novel tools and services.

The deliverable contains in silico generated Integrated Pest Management (IPM) scenarios for locally adapted OFF- and ON-Season IPM management of medfly for the farms located in Italy and Greece. The scenarios were developed by inSilico-IPM using the PESTonFARM simulation model. The simulations were based on detailed empirical information collected by UNIMOL, UTH, and BPI about the background and traits of the experimental IPM Units (farms), such as topography of the local terrain; composition, spatial distribution and phenology of the fruit grown on each farm; and historical weather patterns typical for each site. Each of the developed scenarios contains a defined combination of recommended IPM treatments and fruit phenology-based timing and plots for their application.

The most promising scenarios, with the best combination of: (1) the impact on pest mitigation, (2) reduction in the pesticide use and (3) cost/benefit ratio, were presented to the immediate stakeholders - owners of the experimental farms and, when relevant, of adjacent properties. The technical aspects of the scenarios and the expected results such as the yield and its commercial value, the cost of the proposed IPM and the expected impact on the pest population density, reduction in the use of pesticides or their residues in fruit, prospects of conversion into low- or pesticide-free production system etc. were discussed. The risks associated with changing the IPM practice were also explained. The scenarios that were accepted by the stakeholders are being implemented in the respective farms during the growing season of 2022. At the end of the year, these scenarios will be analyzed and refined, and implemented again in 2023.

The project operates in six Experimental Sites located in Italy (Campomarino and Paliano), Greece (Kato Lehonia and Corinthos) and Spain (Carlet and La Pobla del Duc). Unexpected COVID pandemics have severely impeded the empirical work and farm information gathering process necessary to develop IPM scenarios. Nevertheless, teams in Italy and Greece were able to gather sufficient information on the farms located at four Sites, which enabled the generation of IPM scenarios (reported herein). For the Sites located in Spain, a complementary data collection plan has been implemented to enable the development of IPM scenarios for 2023 season.

Finally, it should be emphasized that this delivery summarizes a long and complex development process. It builds upon interactions with multiple project partners and was contingent on the specific inputs and deliverables generated by the different Work Packages. The basic PESTonFARM model has been significantly expanded, adapted to the research needs of the FF-IPM project and provided with supporting databases, as documented in D6.2. Extensive empirical information was gathered by the WP6 team to comprehensively characterize various aspects of the target farms. Pre-existing gaps in knowledge about the biology and behaviour of medfly were elucidated by WP2 (D2.2-3). The WP4 verified the effectiveness of key "tools" for biology-based medfly IPM (entomopathogenic fungi and nematodes, ground-dwelling predators, and specialized baits and traps) and confirmed their suitability for early season use in medfly management (D4.1-5). All this information had to be absorbed and built into the PESTonFARM model before any simulations of the IPM scenarios could be performed. The disruptions and delays experienced by the various project partners due to COVID cumulatively affected the completion date of this delivery as well.