To develop and validate novel OFF-and ON-Season precision IPM strategies for *Ceratitis capitata* management in complex landscapes, three pilot fields (IPM Units) located in Kato Lehonia, Magnesia, Central Greece have been selected. Two of them are organic and one conventional. The 2 organic units consisted of a mixed cultivation of citrus, plums, apples, quinces, peaches, apricots, cherries and pears totaling a 7,2 ha area. The conventional unit was an approx. 7,1 ha farm with citrus, quinces, plums and apricots.

**Pilot site characterization:**

Full characterization of both sites was conducted. Visual detailed inspection was carried out to identify the location of all relevant host plants/cultivars into the farm and orthomaps were provided. Also, all 3 Units were GPS-mapped in late 2020 (trap/host points).

**Seasonal crop phenology:**

To access the seasonal phenological changes of major Cc fruit, a critical input for model development, Cc hosts were inspected every 1-2 weeks during Feb-Aug 2020, Feb-Aug 2021, Sep 2021-Aug 2022 and Sep 2022-Dec 2023 to determine the date of blooming initiation, 50%-100% of blooming, fruit formation and progress of ripening.

**Population monitoring:**

During 2020: A total of 45 traps were established. All traps were set up in the S-SE part of the tree canopy in a 1.8-2m height and dispersed to cover a reasonable number of trees of each cultivated host. Male traps were established approx. 10m far from the female targeted ones. Three types of traps were used: Tephri, Decis and Jackson with the appropriate recommended lures. Jackson and Tephri traps were baited with trimedlure (TML) and biolure (PTA Unipak), respectively, while Decis traps contained their own commercial attractant. Wet traps were filled with a 10% propylene-glycol solution to preserve dead insects.

Three months later, 15 McPhail PTA-baited traps were placed in the 3 units, as a supplementary screening to the 3 other trap types, along with another extra 7 McPhail ones established outside the perimeter of the 3 selected units to create the Buffer Zone, at least 200m far from the closest trap in a unit plot, according to the proposed protocol. These traps were also marked with GPS and mapped.

All established traps summed up a total number of 67, and the total pilot land selected, including the buffer zone, formed an outline polygon of approx. 60 ha in the area. Traps were serviced every 7 (On-season) or 15 (Off-season) days and checked for adult C. capitata captures.

During 2021 (early July): All McPhail (N=15) and Tephri (N=15) traps in units and Buffer zone were removed and buffer zone McPhail traps (N=7) were replaced with Decis traps. So, in total, 22 Decis, and 15 Jackson traps in the 3 pilot units are currently being serviced and checked for adult medfly captures weekly, including the buffer. Traps were serviced every 7 days, both in On- and Off- season periods, and inspected for adult medfly captures.

During 2022-2023: In total, 22 Decis and 15 Jackson traps in the 3 pilot units are currently being serviced and checked for adult medfly captures weekly, including the buffer zone. Traps were serviced every 7 days, both in On- and Off- season periods, and inspected for adult medfly captures.

**Overwintering resources of medfly:**

Systematic fruit sampling was carried out from December 2019 to August 2021 (30 different dates) to access infestation rates of various available hosts. Fruits were collected from the ground of various hosts trees (citrus, loquats, plums, peach, pears) inside the pilot plots and examined in lab-controlled conditions for infestation according to the protocol.

Systematic fruit sampling was carried out from late August 2021 to early August 2022 (20 different dates) to access infestation rates of various available hosts. Fruits were collected from the ground of various hosts trees (citrus, pomes, plums, peach, quince) inside the pilot plots and examined in lab-controlled conditions for infestation according to the protocol.

Systematic fruit sampling was carried out from late August 2022 to January 2024 (25 different dates) to access infestation rates of various available hosts. Fruits were collected from the ground of various hosts trees (citrus, pomes, plums, peach, quince) inside the pilot plots and examined in lab-controlled conditions for infestation according to the protocol.

**Evaluation:**

During 2022-2023, implementation of mass trapping for medfly control with the use of Decis and Magnet traps was conducted.

**Results:**

**Population monitoring:**

During 2020: A total of only 27 flies (21 females, 6 males) were trapped in the off-season period (Jan-May). The first fly was captured on 8.2.2020 in a Tephri trap, while no flies were captured in March-April, while the first male in Jackson traps trapped on 9.5.2020. In May, an increase in the number of individuals captured has been recorded, while monitoring continued weekly from mid-May. Captures gradually started increasing after mid-June. Most of the flies were captured in the McPhail type (N=1982), followed by Decis (N=1119), Tephri (N=583) and lastly Jackson (N=320, only males).

During 2020-2021: A total of approx. 38,600 flies were trapped from the beginning of the project. The date illustrating the maximum number of captures in all pilot units in total in 2020 was 16.10.2020 (3408 flies), while low numbers of captured adults (FTD<0.4) appeared after mid-December 2020 until late January 2021. Thereafter, zero captures appeared until mid- April 2021. The first adult detections of 2021 were recorded in late May-early June for Jackson-Decis traps, and 1 month earlier for Buffer zone/other traps. Captures kept increasing by early August, where a substantially decrease was recorded, most probably due to the extremely high temperatures prevailing in the area the previous weeks that may have reduced flies’ mobility and induce high levels of mortality. 2021 season’s peak appeared in early July.

During 2021-2022: A total of approx. 62,000 flies were trapped from the beginning of the project. The maximum number of captures in all pilot units in total in 2021 was recorded in early-mid Oct 2021, while low numbers of captured adults (FTD<1) appeared after mid-December 2021 until early January 2022. Thereafter, zero captures appeared until late-April 2022. The first adult detections of 2022 were recorded in early May in the buffer zone, while in the units, in early June for Decis and early July for Jackson traps. Captures kept increasing after mid-late July, and the summer-expected peak (FTD=10-19) appeared on 22.8.22, especially in Org-1 Decis traps (on oranges) and Buffer-zone Decis traps.

During 2022-2024: A total of approx. 111,000 flies were trapped from the beginning of the project. The maximum number of captures in all pilot units in total in 2022 was recorded in Sep 2022, while low numbers of captured adults (FTD<1) appeared after mid-December 2022 until early January 2023. Thereafter, zero captures appeared until late-April 2023. The first adult detections of 2023 were recorded in late April in the buffer zone, while in the units, in late May for both Decis and Jackson traps. Captures kept increasing after mid-late July, and the season capture peaks appeared in late Oct-mid Nov 2023 and captures vanished after mid-late Jan 2024.

**Infestation:**

During 2019-2021: Infestation rates varied from 4 to 88%. An average of 1-10 pupae/fruit was recorded, suggesting an active larval population of medfly in the area. Peach showed the highest infestation among all hosts, followed by citrus, plums, and figs. The data suggest a year-round development of larvae within fruits with bitter oranges prevailing in the Off-season period, since it is the only active host in late winter-spring in our coastal habitats. Nevertheless, it must be noted, that August 2021 samplings revealed high infestation rates, as expected, although low or zero number of yielded pupae, probably due to extremely high temperatures in early-middle August in the area.

During 2021-2022: Infestation rates varied from 5 to 88%. An average of 1-5 pupae/fruit was recorded, suggesting an active larval population of medfly in the area. Peach showed the highest infestation among all hosts, followed by citrus, plums, and figs. The data suggest a year-round development of larvae within fruits with bitter oranges prevailing in the Off-season period, since it is the only active host in late winter-spring in our coastal habitats. Nevertheless, it must be noted, that Aug-Sep 2021 samplings revealed high infestation rates, as expected, although with low or zero number of yielded pupae, probably due to extremely high temperatures in early-middle August in the area.

During 2022-2024: Infestation rates varied from 0 to 92%. An average of 0-6 pupae/fruit was recorded, suggesting an active larval population of medfly in the area. Local late peach and apple showed the highest infestation among all hosts, followed by citrus, plums, and figs. The data suggest a year-round development of larvae within fruits with bitter oranges prevailing in the Off-season period, since it is the only active host in late winter-spring in our coastal habitats. Nevertheless, it must be noted, that 2022-2023 infestation rates were much lower than those of previous years in the Pilot, even though many fruits were not collected in 2023 as also in 2022, along with fruits not harvested in Pilot marginal hosts. The latter finding was most probably attributed, among others, to the implementation of IPM Scenarios developed in the framework of the off-season in-silico IPM concept (mass trapping, attract-and-kill, nematode soil artificial infestation)

**Phenology:**

Early nectarines were the first host that initiated blooming (mid Feb), followed by nectarines, peaches, and apricots. Afterwards, quinces and apples started blooming, with citrus species coming last.