Spatio-temporal population trends of the Mediterranean fruit fly in mixed fruit orchards in Central Greece

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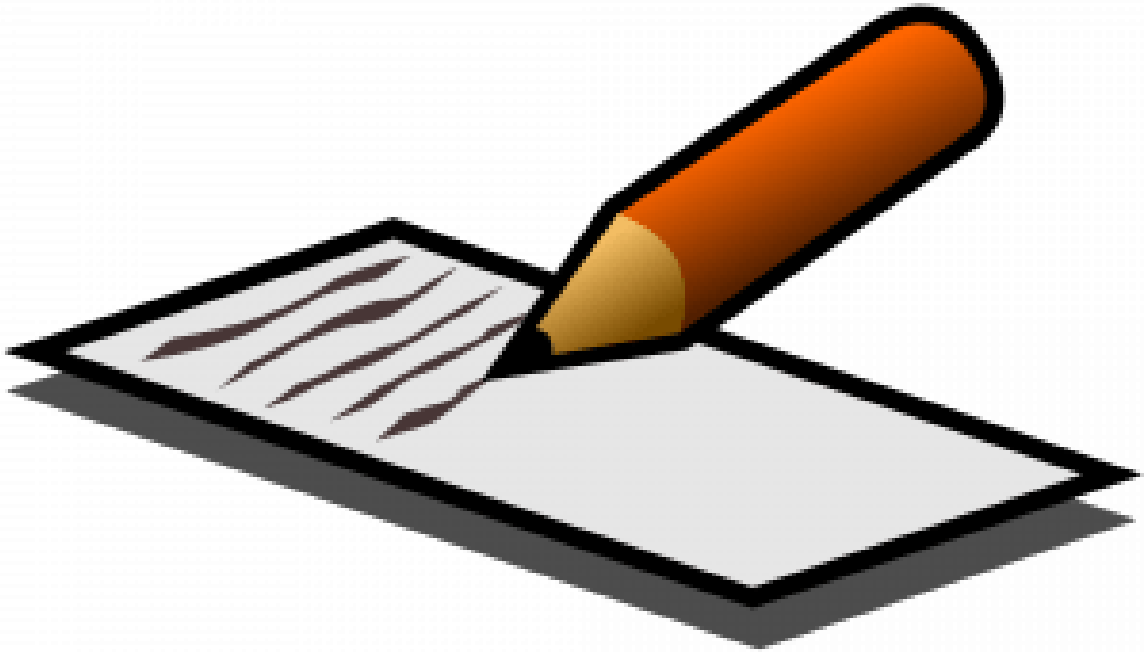
Fruit Flies In-silico Prevention & Management FF•IPM

Introduction



The Mediterranean Fruit Fly (medfly) *Ceratitis capitata*

- Multivoltine pest (3-7 generations/ season in Greece)
- Polyphagous (more than 300 different hosts)
- Invasive, Quarantine Pest
- High biotic potential
- Adaptive and plastic responses to environmental conditions

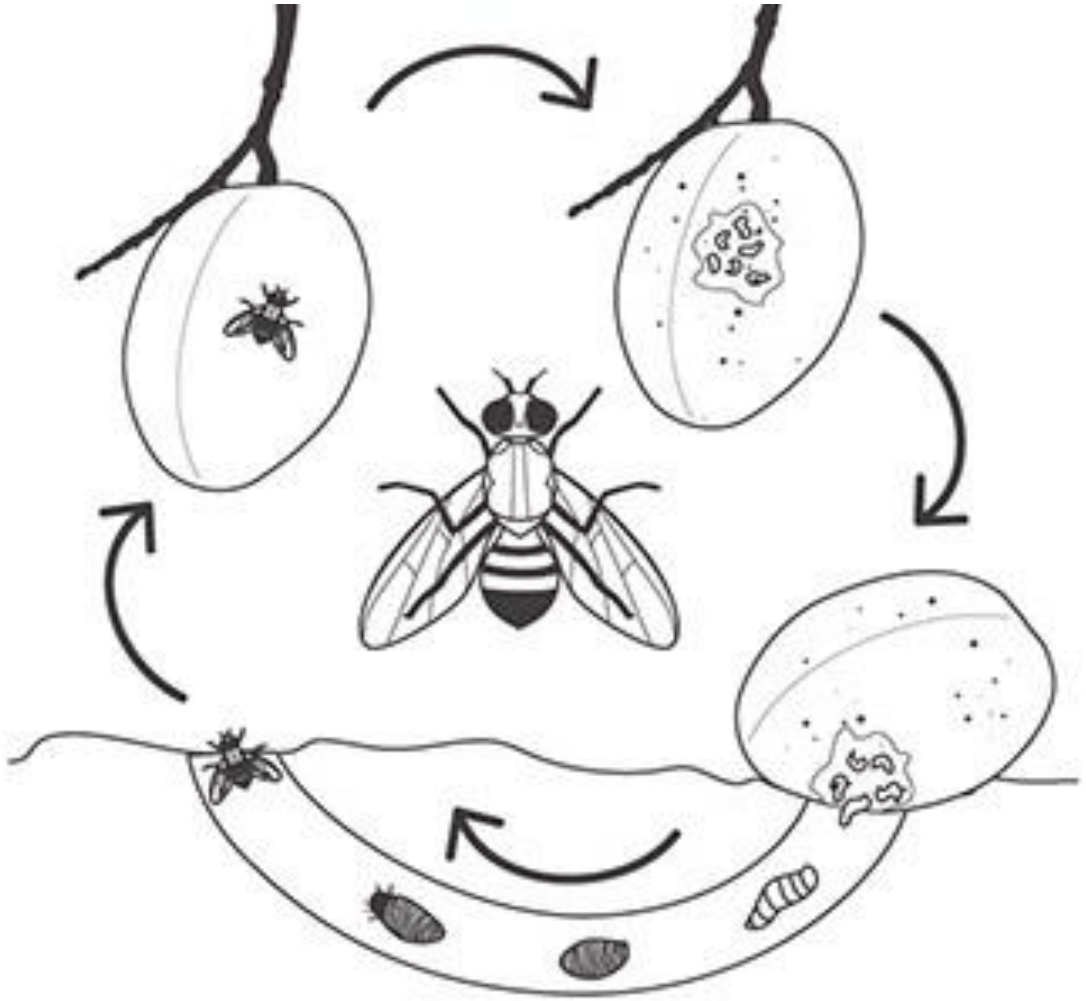
Infestation and fruit damage

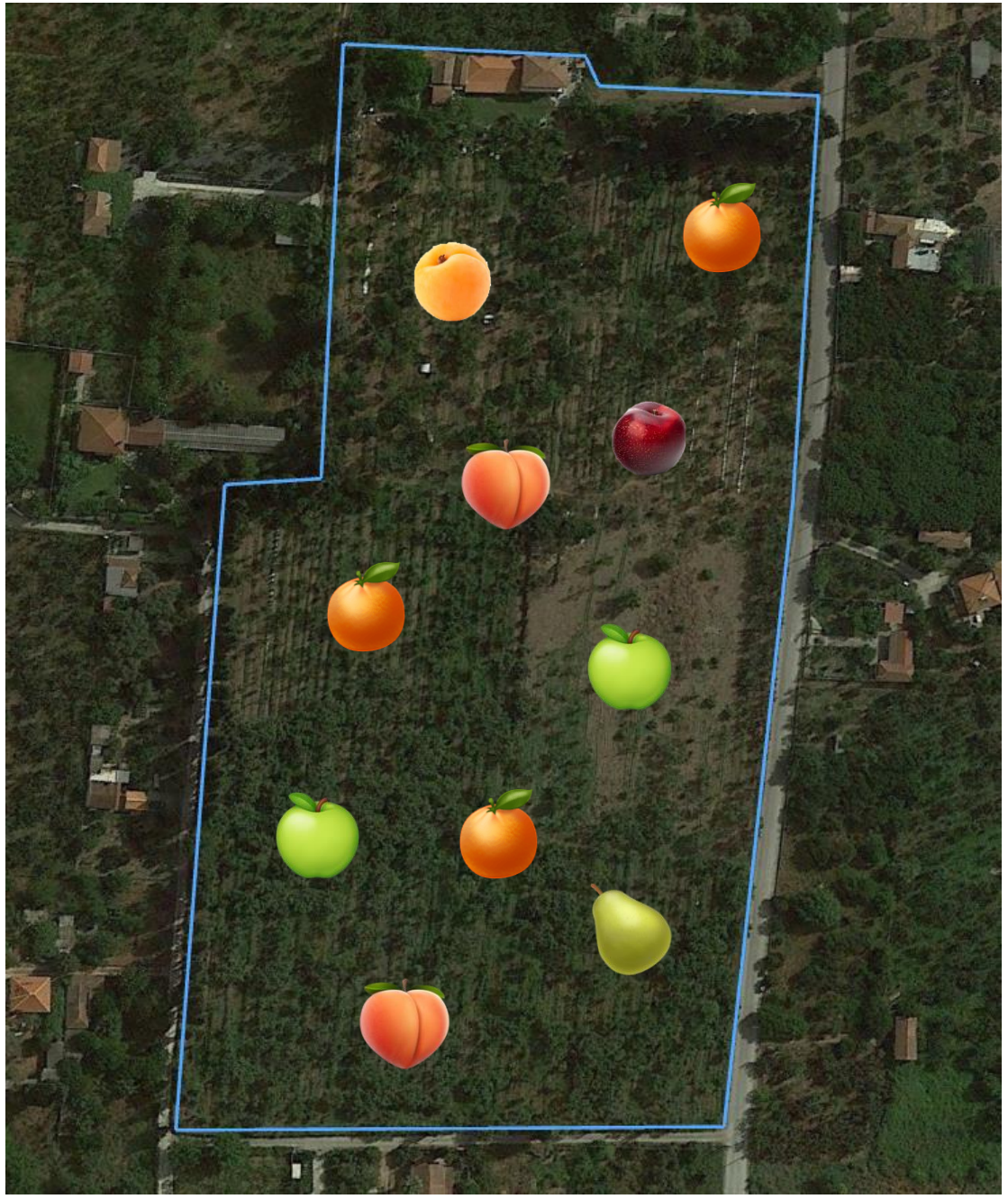
Major pest of fruit crops in Greece (stone, pome and citrus fruits)

Infestation → Larva feeding in the mesocarp → Reduced fruit production, marketability, quality

Infestation → "Hidden" Oviposition sting → Reduced fruit production, marketability, quality

Life cycle in the mixed fruit orchards





Mixed fruit orchards provide optimal conditions for medfly

Mixed Orchard

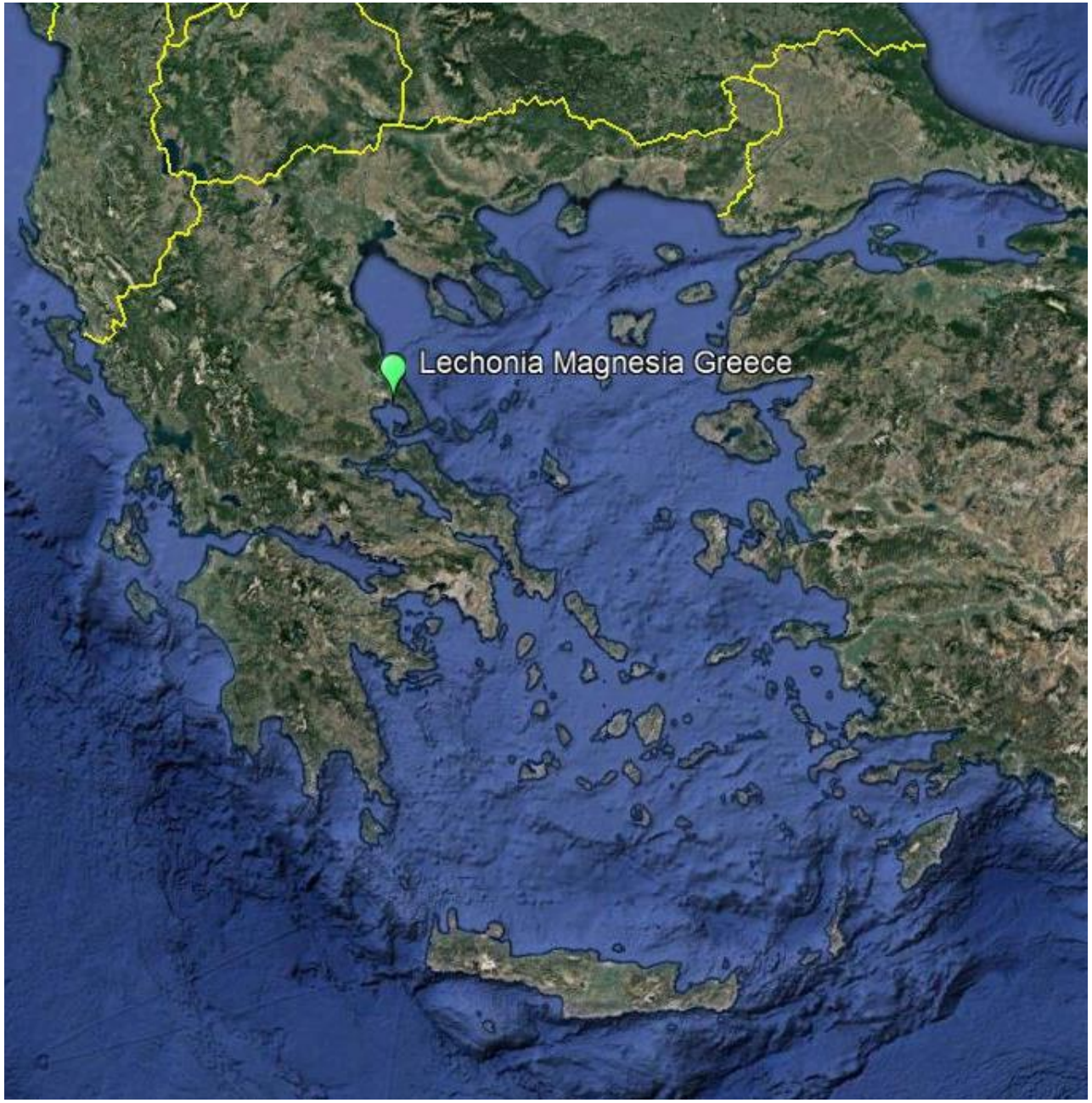
- Stone, pome and citrus fruits
- Available hosts throughout the fruiting season
- Multiple generations
- The same flies can infest more than one crop

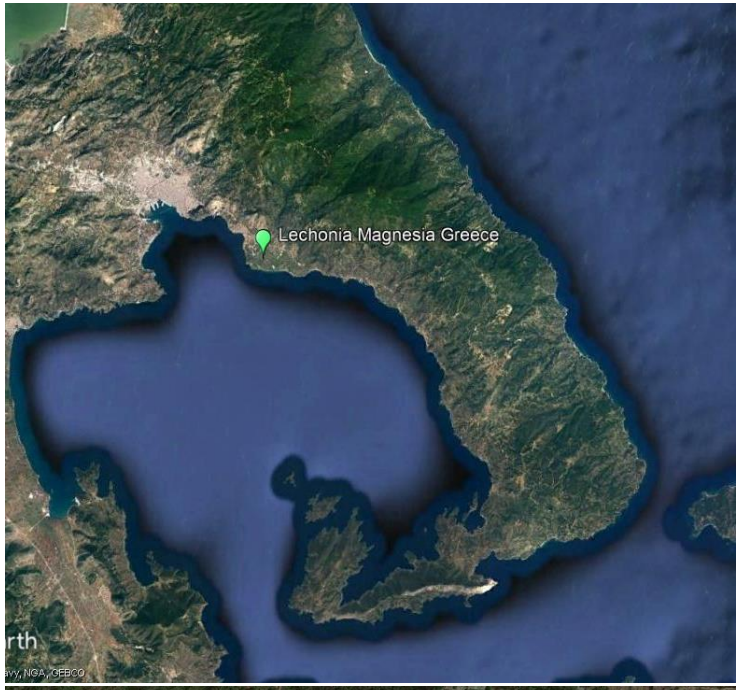
Scope

- Analyze the spatial and temporal dynamics of *C. capitata* in mixed fruit orchards
- Depict effect of altitude on phenology
- Bear new analytical tools to understand population dynamics

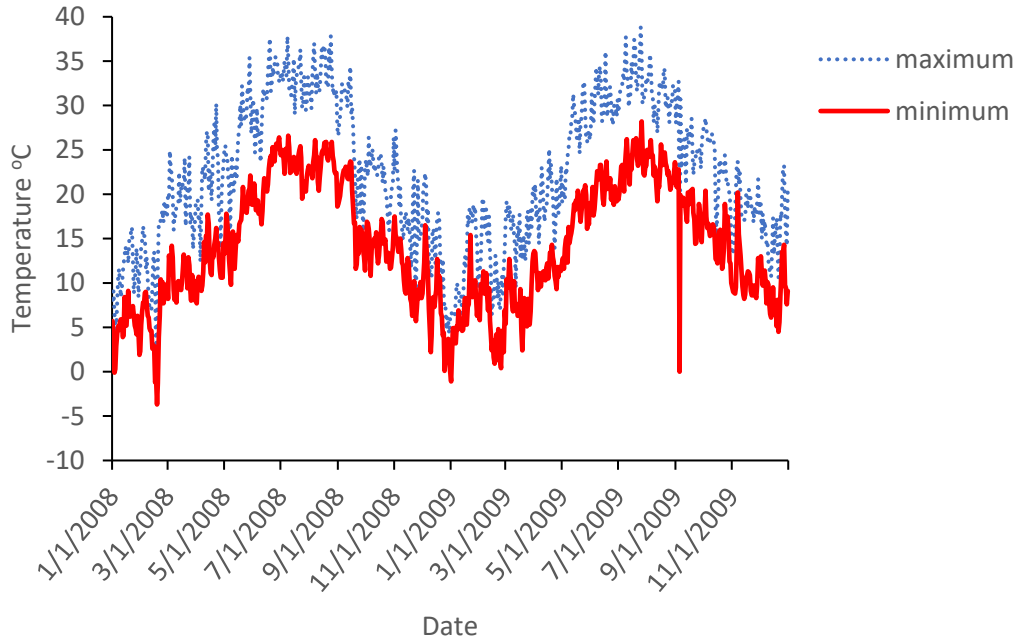
Materials and Methods

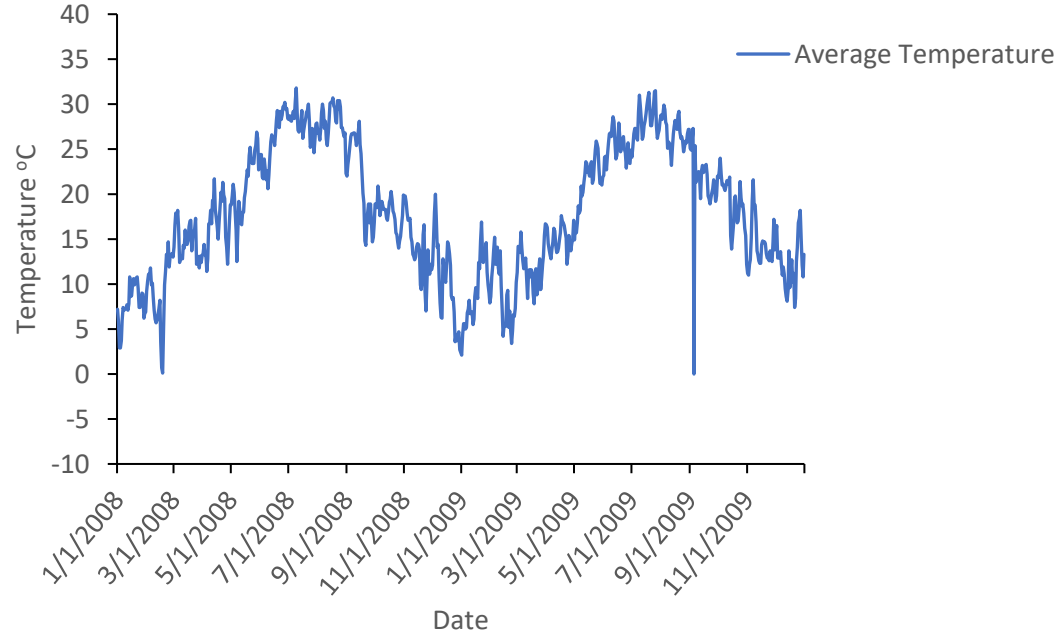
The target area – Volos, Magnesia. Greece

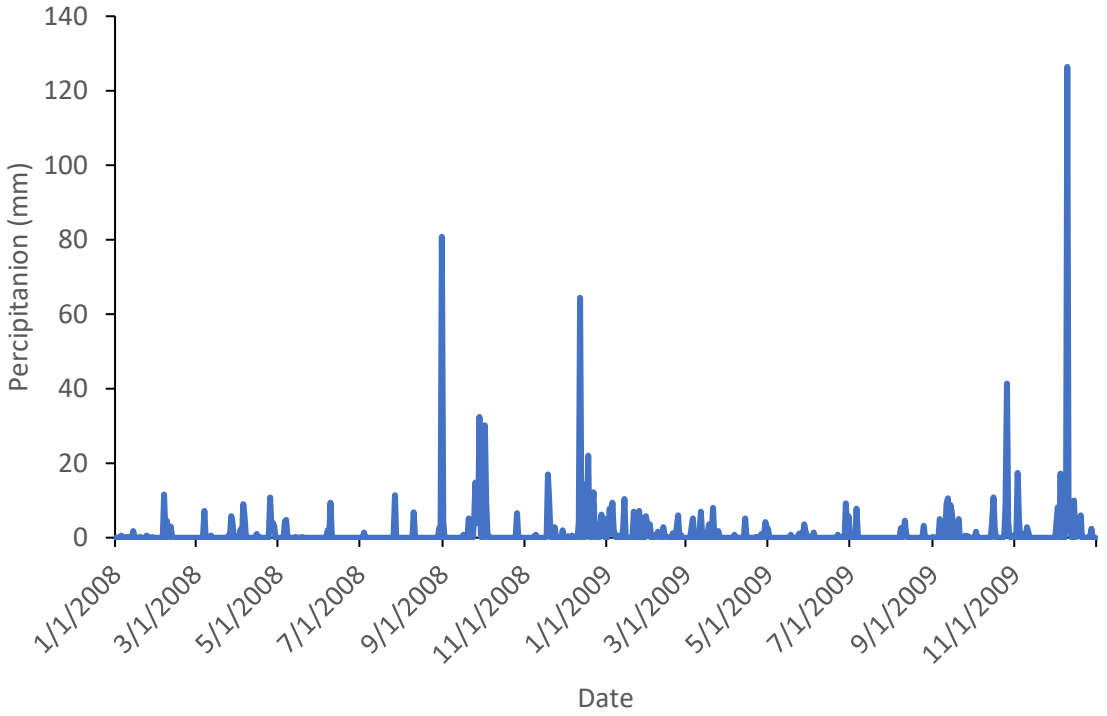




Climatic profile of the experimental area

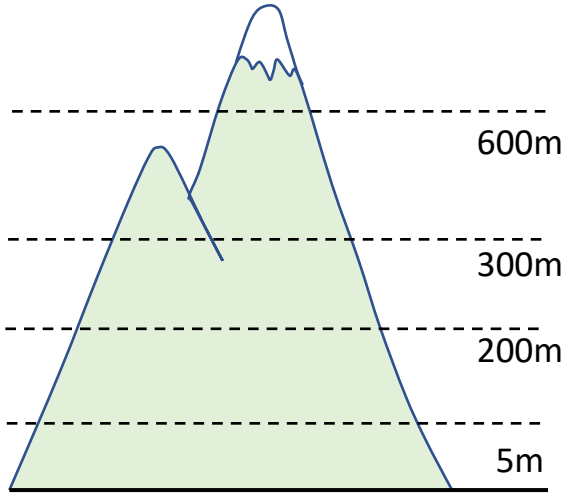




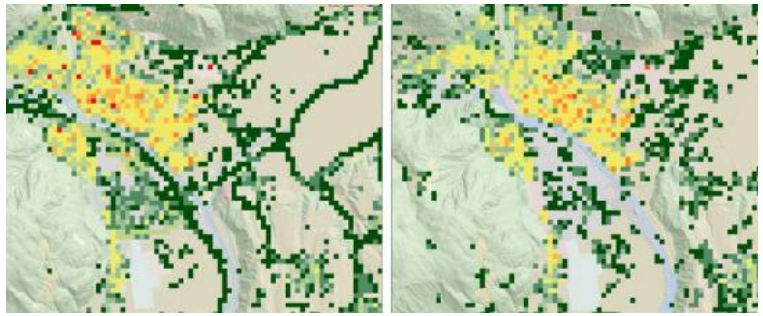


Experimental approaches

- Effect of altitude on phenology
  - Adult trapping at different altitudes



- Spatial and temporal population dynamics
  - Effect of hosts of adult captures (citrus, pome, prunus and others)
  - 2008



Trapping systems and attractants

1

♀ ♂

2

♀ ♂

3

♂

Medfly captures

1

♀ ♂

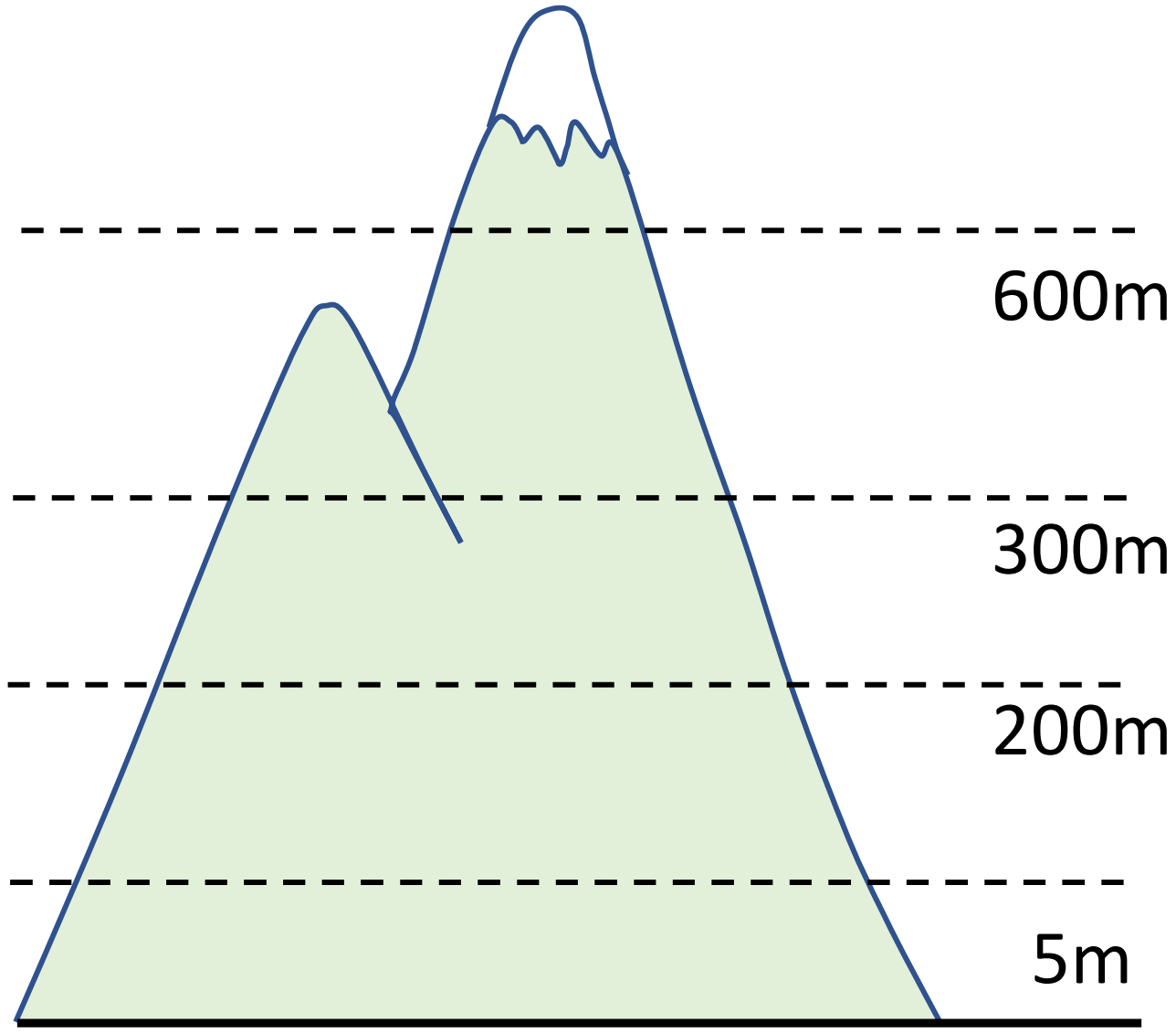
2

♀ ♂

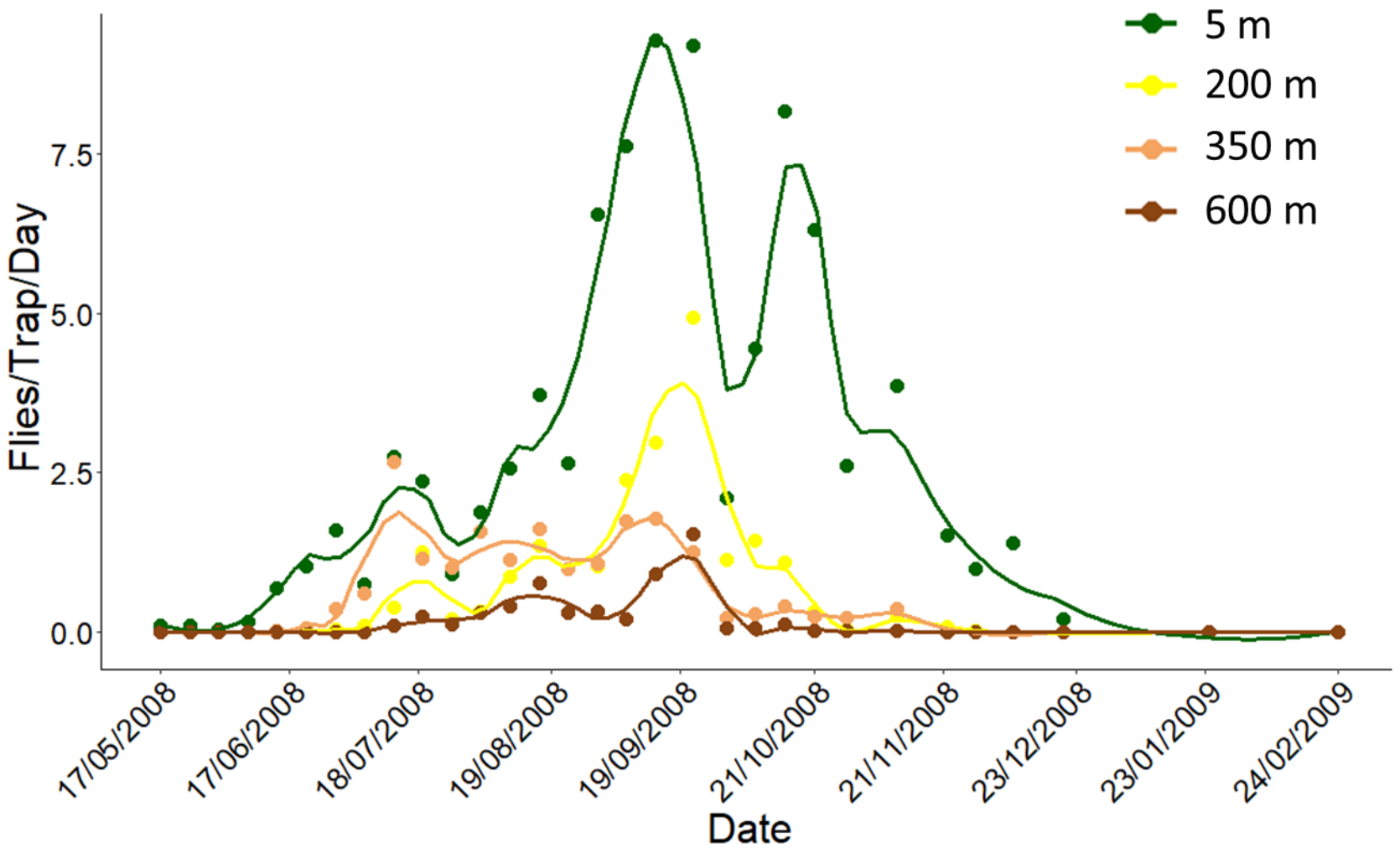
3

♂

Effects of altitude

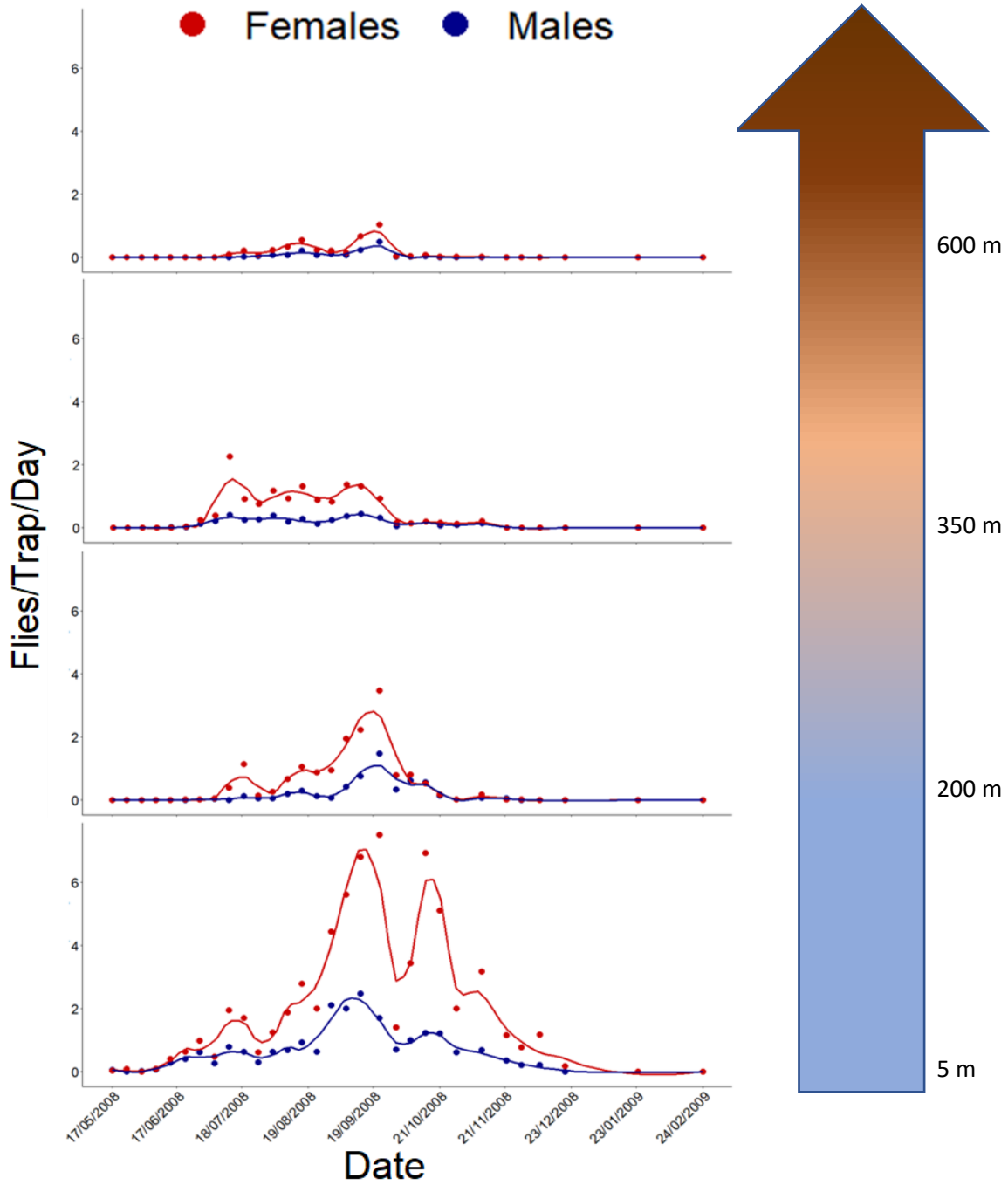


Effect of altitude on seasonal population trends



Factor	Sig.
Altitude	✓
Date	✓
Altitude x Date	✓

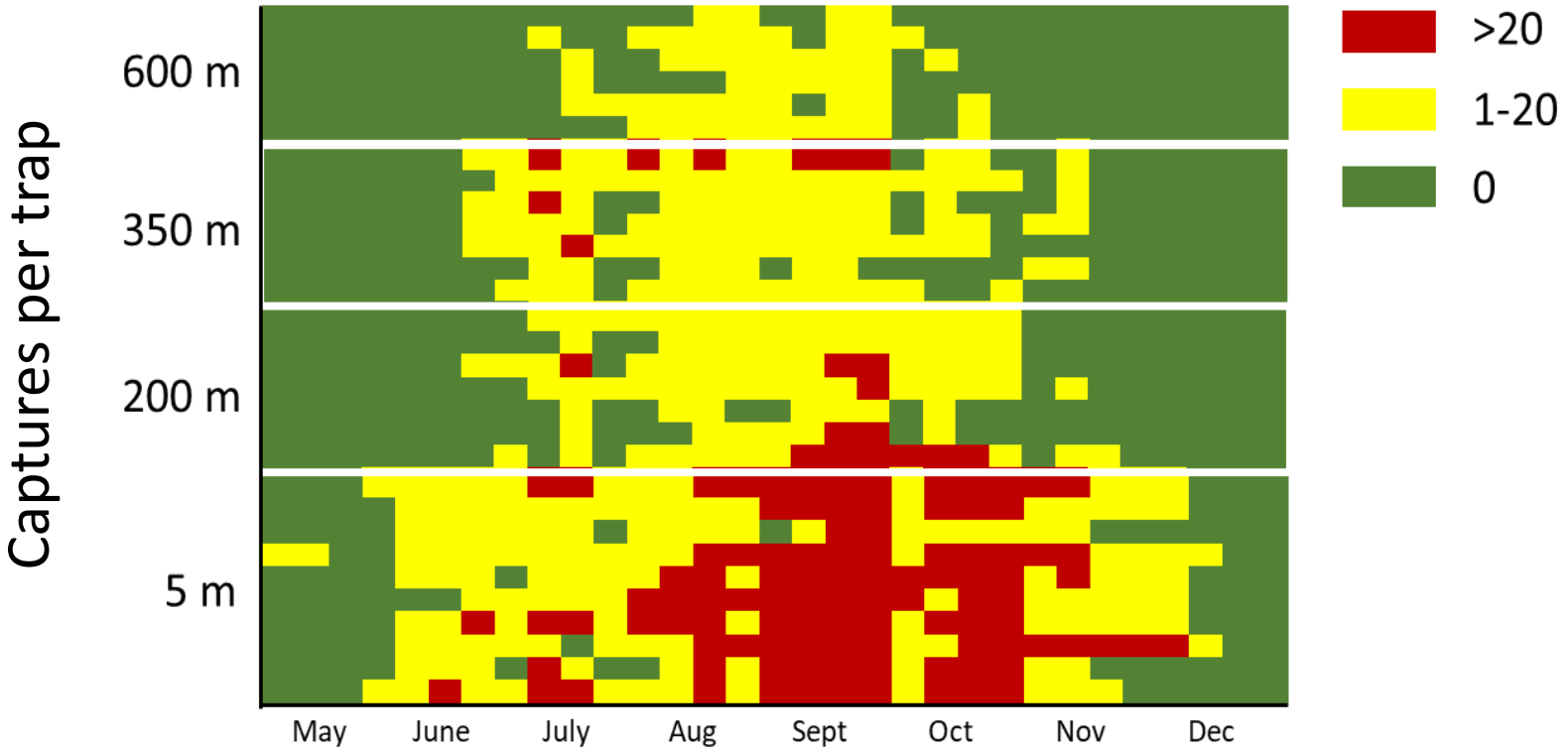
Effects of altitude on male - female captures



Factor	Sig.
Altitude	✓
Sex	✓

- For every 10 meters increase in altitude, the rate of captures is decreasing by about 4.3%.

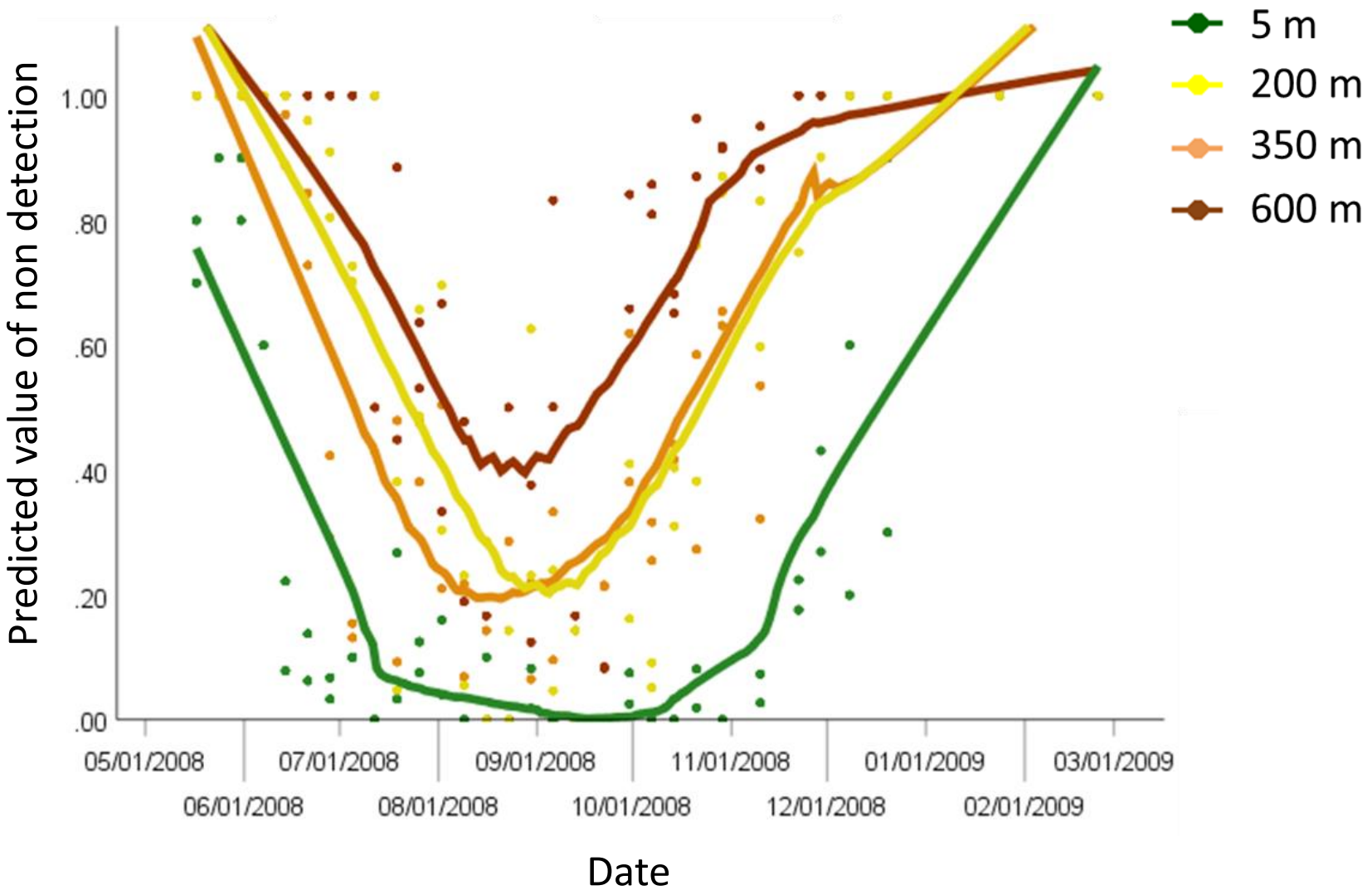
“Event history” graph on seasonal patterns of trap captures



The higher the altitude

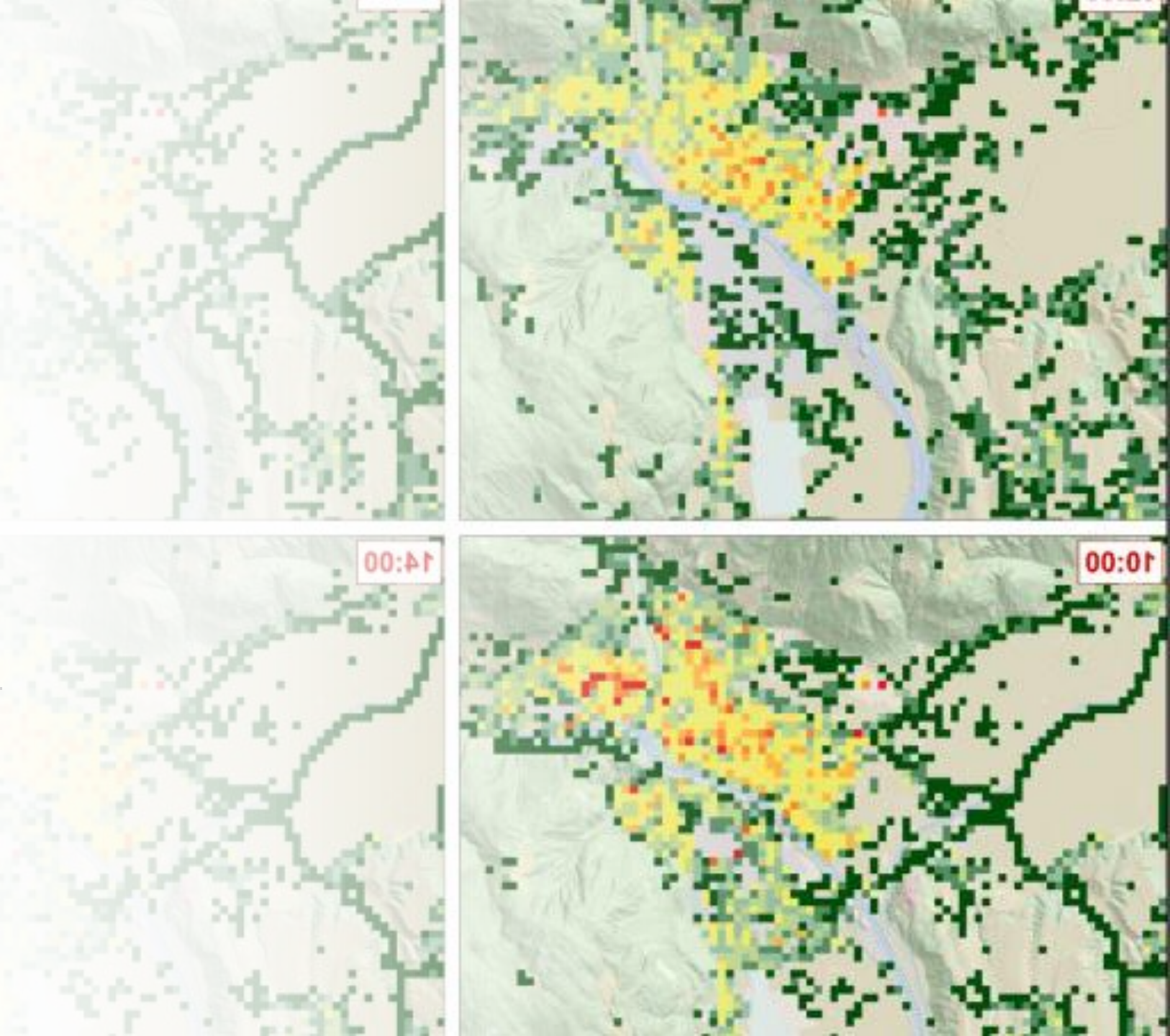
- the shorter the flight period
- the lower the captures
- The more Irregular the trap performance

Effect of altitude on adult detection (traps capturing adults)

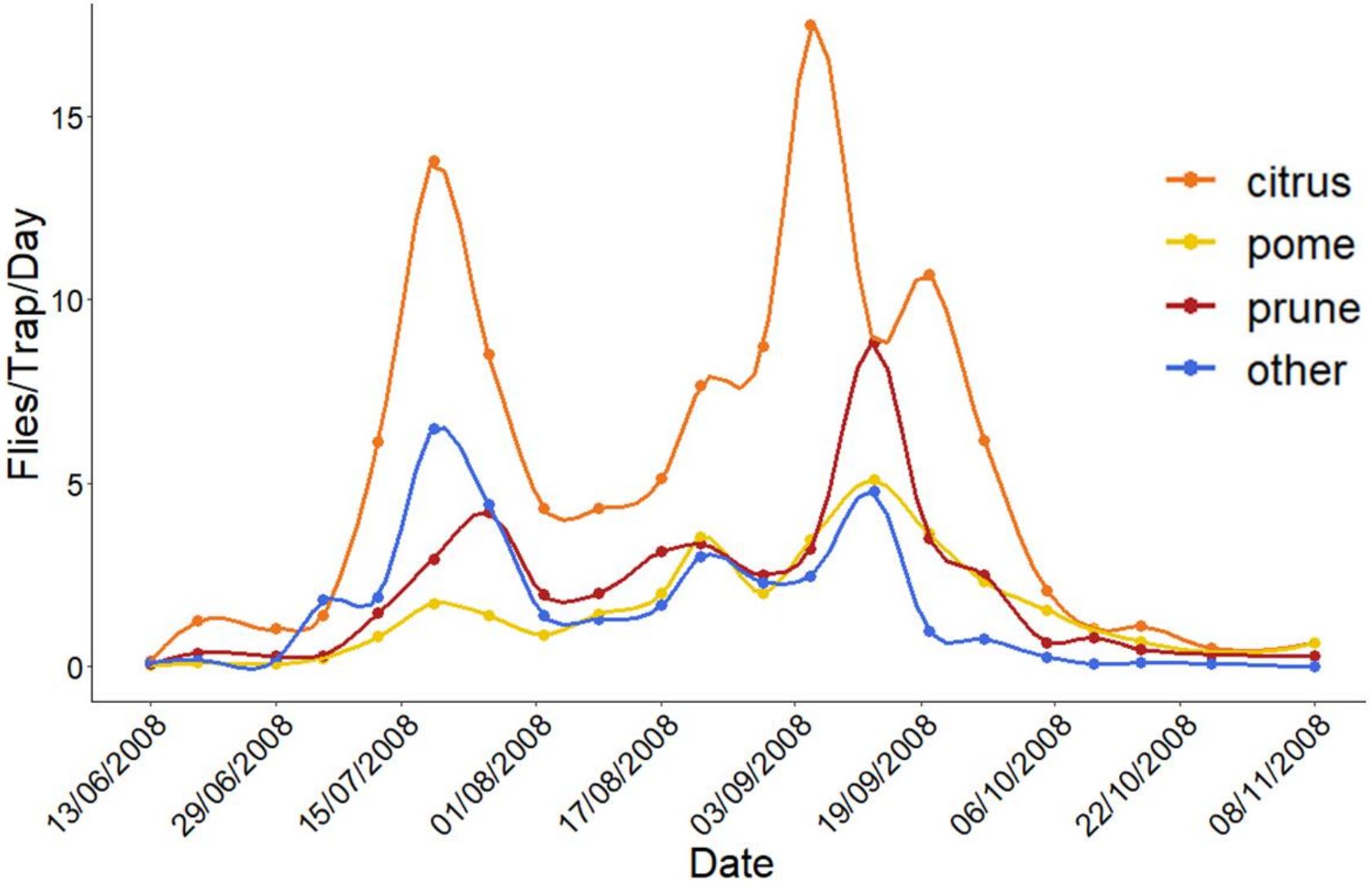


Factor	Sig.
Altitude	✓
Date	✓
Date x Altitude	✓

Seasonal and temporal phenological patterns

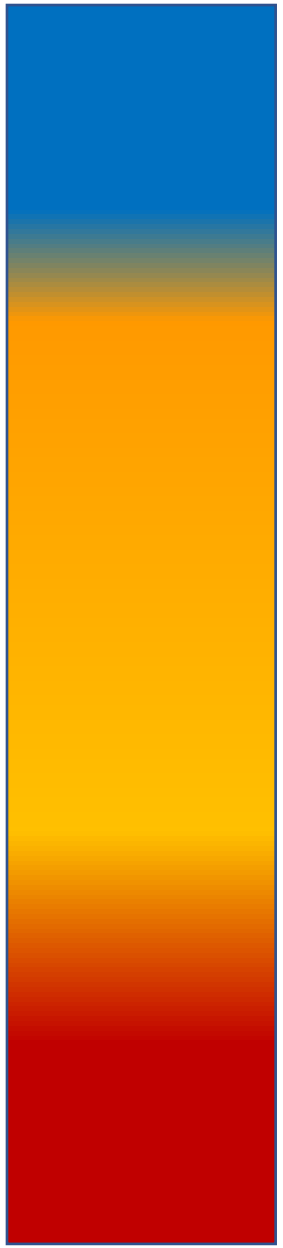


Effect of host on seasonal population trends (2008)



Factor	Sig.
Host	✓
Date	✓
Host x Date	✓

Effect of host trap type on captures



other

citrus

pome

prune

Jackson

Tephri

Females

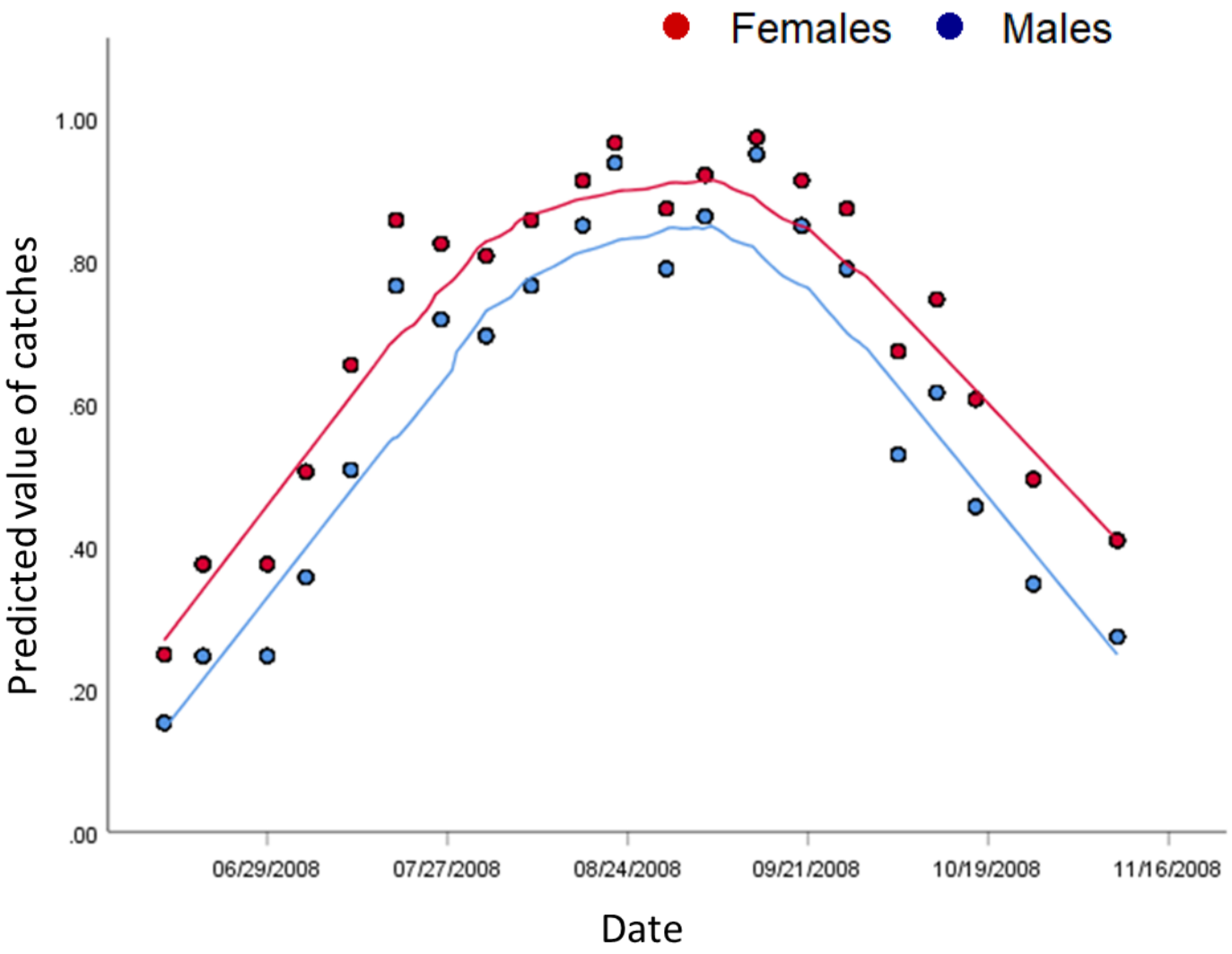
Males

Flies/Trap/Day

Date

13/06/2008
29/06/2008
15/07/2008
01/08/2008
17/08/2008
03/09/2008
19/09/2008
06/10/2008
22/10/2008
08/11/2008

Effect of season on detection of males and females



Factor	Sig.
Sex	✓
Date	✓

Conclusion

- Altitude strongly affect
  - Population density
  - Seasonal phenology
  - Adult detection
- The host plant strongly affect
  - trap captures and should be considered when designing surveillance activities
- Both Jackson and McPhail type traps (i.e. IPMT, Teprhi) provide sound tools for medfly population monitoring
- Management of the Mediterranean fruit flies in mixed fruit orchards is challenging since population densities is high throughout the fruiting season
- ”Demographic” concepts in the analysis of trap capture data provide new insights in the phenology of medfly

Thank you for your attention

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