

Thrips monitoring, movement and environmental preferences in blueberry orchards and the surrounding landscape

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B

Scirtothrips aurantii



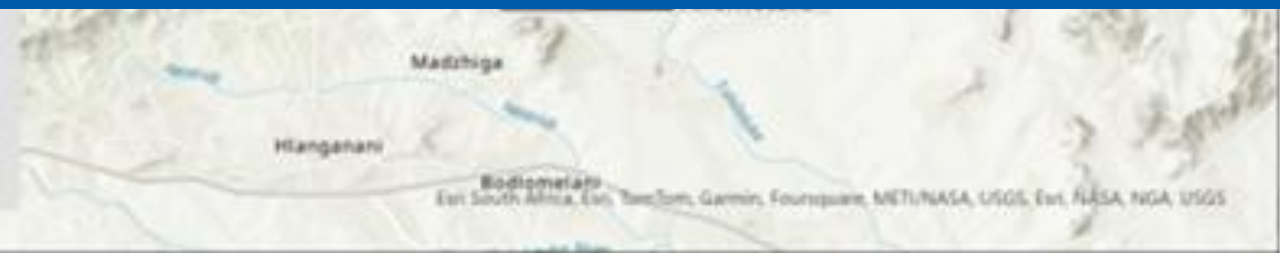
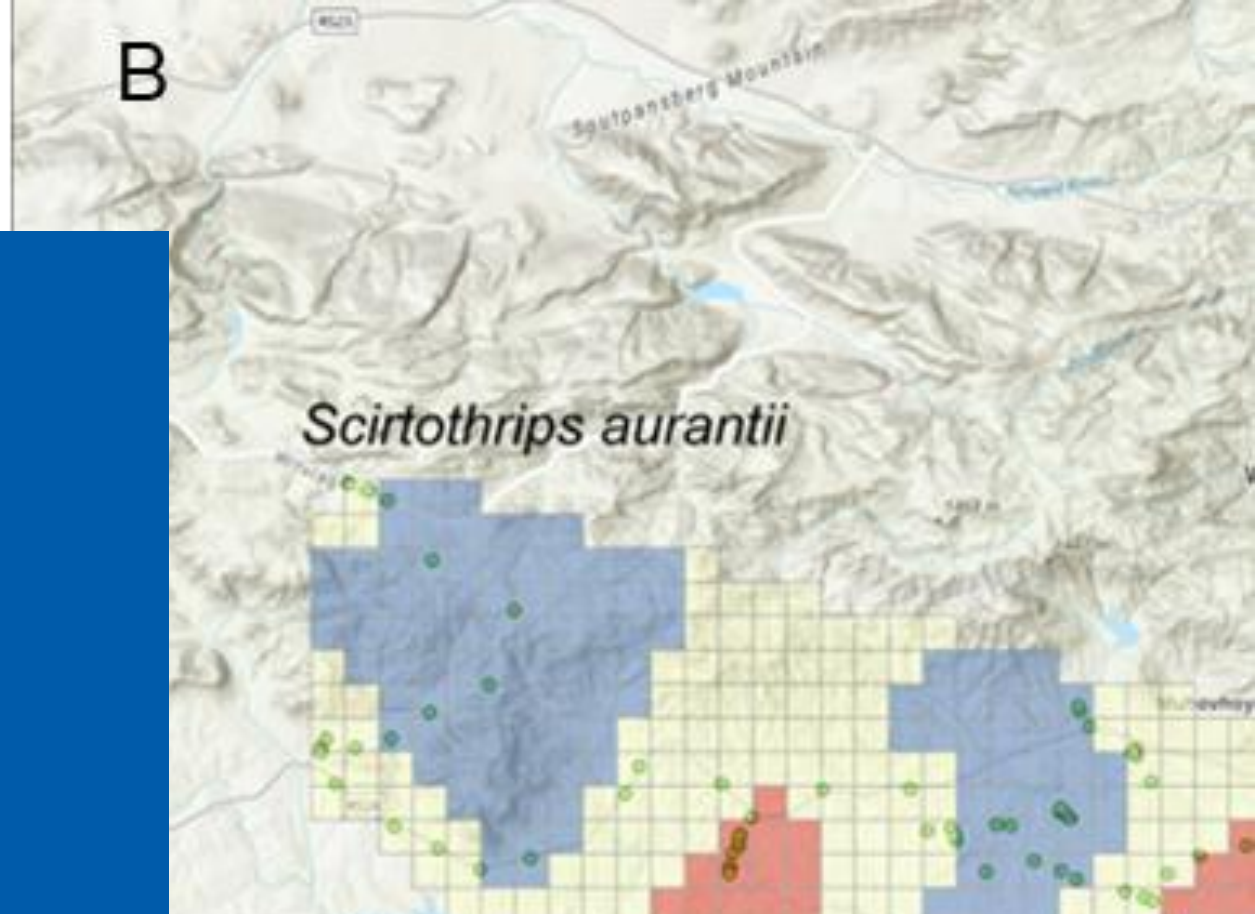
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Thrips pests of blueberries in North America

Frankliniella tritici

Frankliniella bispinosa

Frankliniella occidentalis

Frankliniella fusca

Frankliniella hawaiiensis

Frankliniella vaccinii

Scirtothrips ruthveni

Scirtothrips citri

Scirtothrips dorsalis

Catinathrips vaccinophilus

Catinathrips kainos



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Thrips pests of blueberries in South Africa

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OTHER SPECIES?

Where are thrips coming from?

Wide host range:

- *F. occidentalis* infests 244 plant species from 62 families

Adults can overwinter and breed on non-crop plants

Thrips are mobile and can move to find new plant growth for feeding and reproduction, and long distance movement aided by wind

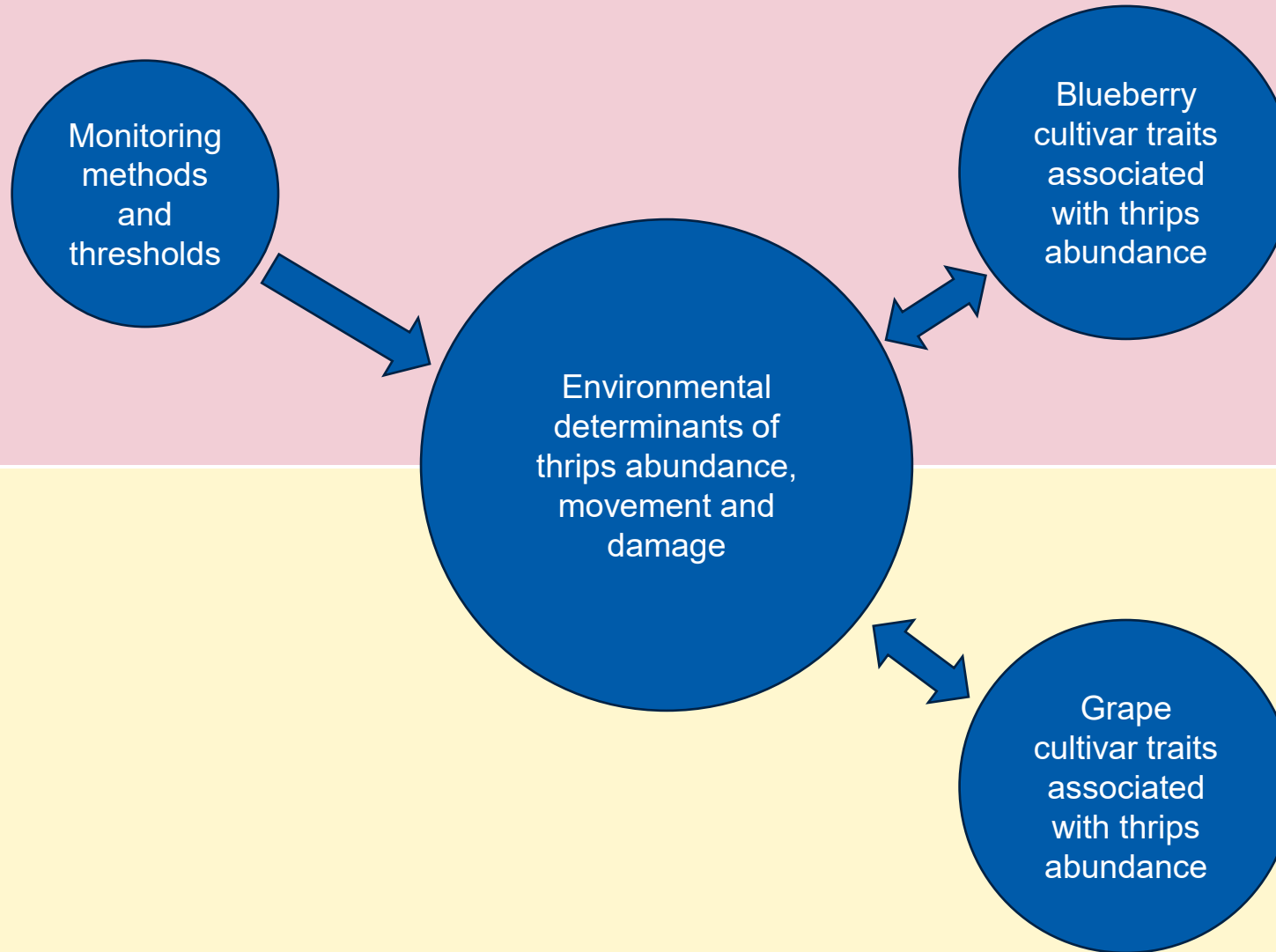
**POTENTIAL FOR NEIGHBOURING
CROPS AS SOURCES**

Aim and objectives

Develop tools to monitor and identify the thrips species damaging blueberries, and guide the targeted use of thrips control tactics by defining the conditions that affect their abundance.

1. Optimise thrips monitoring methods and establish thresholds for economic damage on important blueberry varieties
2. Determine the effects of neighbouring crops on thrips abundance, diversity and damage over two production seasons
3. Quantify dispersal of thrips throughout production landscapes
4. Establish environmental drivers of thrips abundance in the landscape
5. Characterise the traits of susceptible blueberry varieties and their association with thrips abundance

Project conceptual framework



Objective 1. Monitoring methods and threshold

Production region:
Mooinooi/Buffelspoort

Number of varieties: Four (e.g.,
Olivia, Leasa, Julieta, Magica)

Number of replicates: Five orchards

Sampling interval: Monthly

Duration: 12 months

Data:

- Thrips abundance
- Thrips damage (leaves, flowers, fruit)

Sampling methods:

- Beating
- Washing
- Suction
- Sticky traps
- Emergence traps



Objective 2. Effects of neighbouring crops on thrips abundance, diversity and damage

Production regions:

- Mooinooi/Buffelspoort
- Groblersdal/Marble Hall
- Vredendal

Number of replicates: Three circular landscapes (radius 1.5 km) per production region

Number of sites: 15/circular landscape

Sampling interval: Monthly

Duration: 24 months

Sampling method: Beating

Data:

- Thrips abundance
- Damage assessment
- Plant phenology
- Distance from edge
- Distance from neighbouring crop

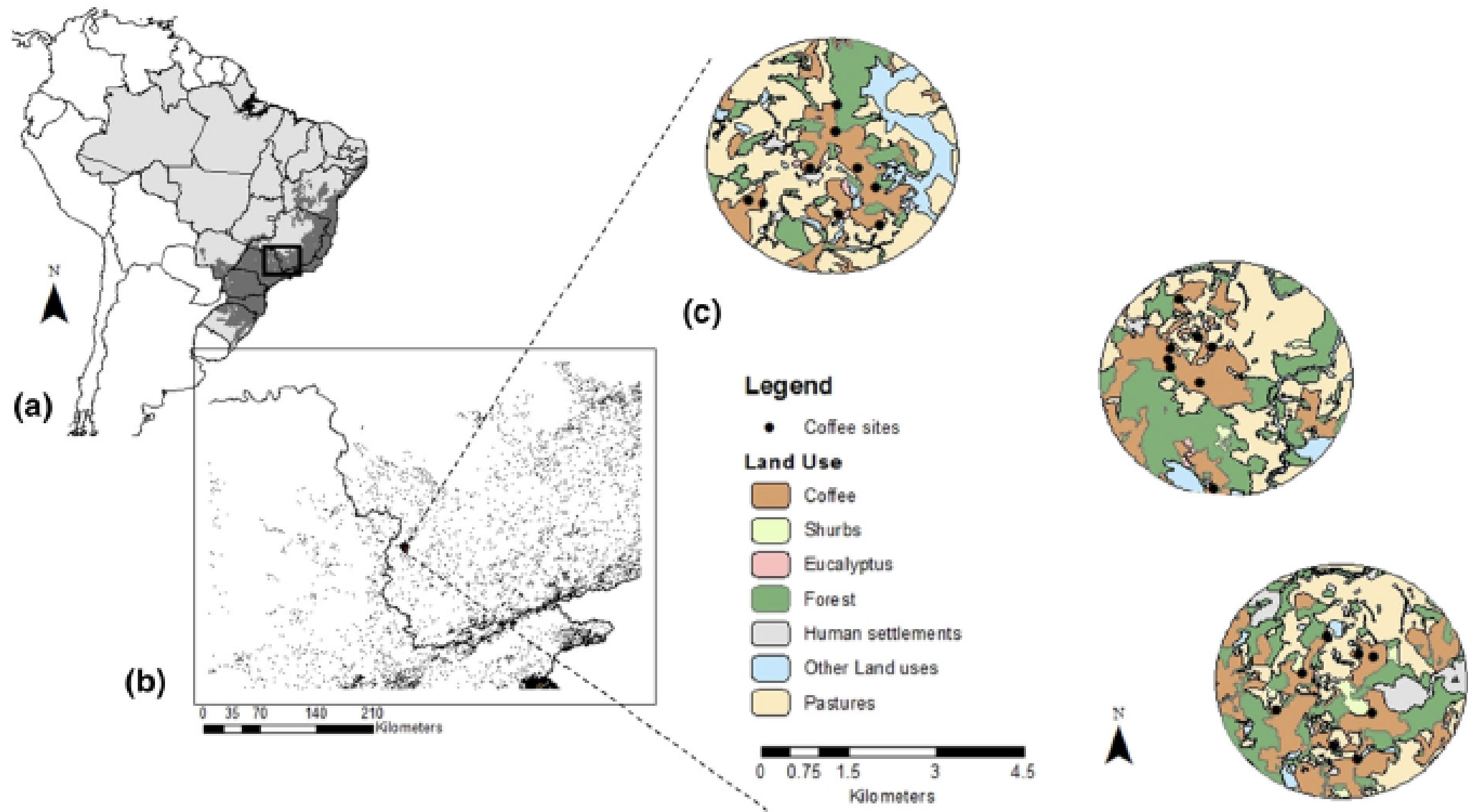


Fig. 1 a Former Atlantic Forest distribution (dark grey) in Brazil, and b a detail of the remaining forest areas around the study sites, at the division of Minas Gerais and São Paulo states. c The three regions of two-kilometre radius classified according to their main land use

Objective 3. Quantify dispersal throughout production landscapes

Production regions:

- Mooinooi/Buffelspoort
- Groblersdal/Marble Hall
- Vredendal

Number of replicates: Three circular landscapes (radius 1.5 km) per production region

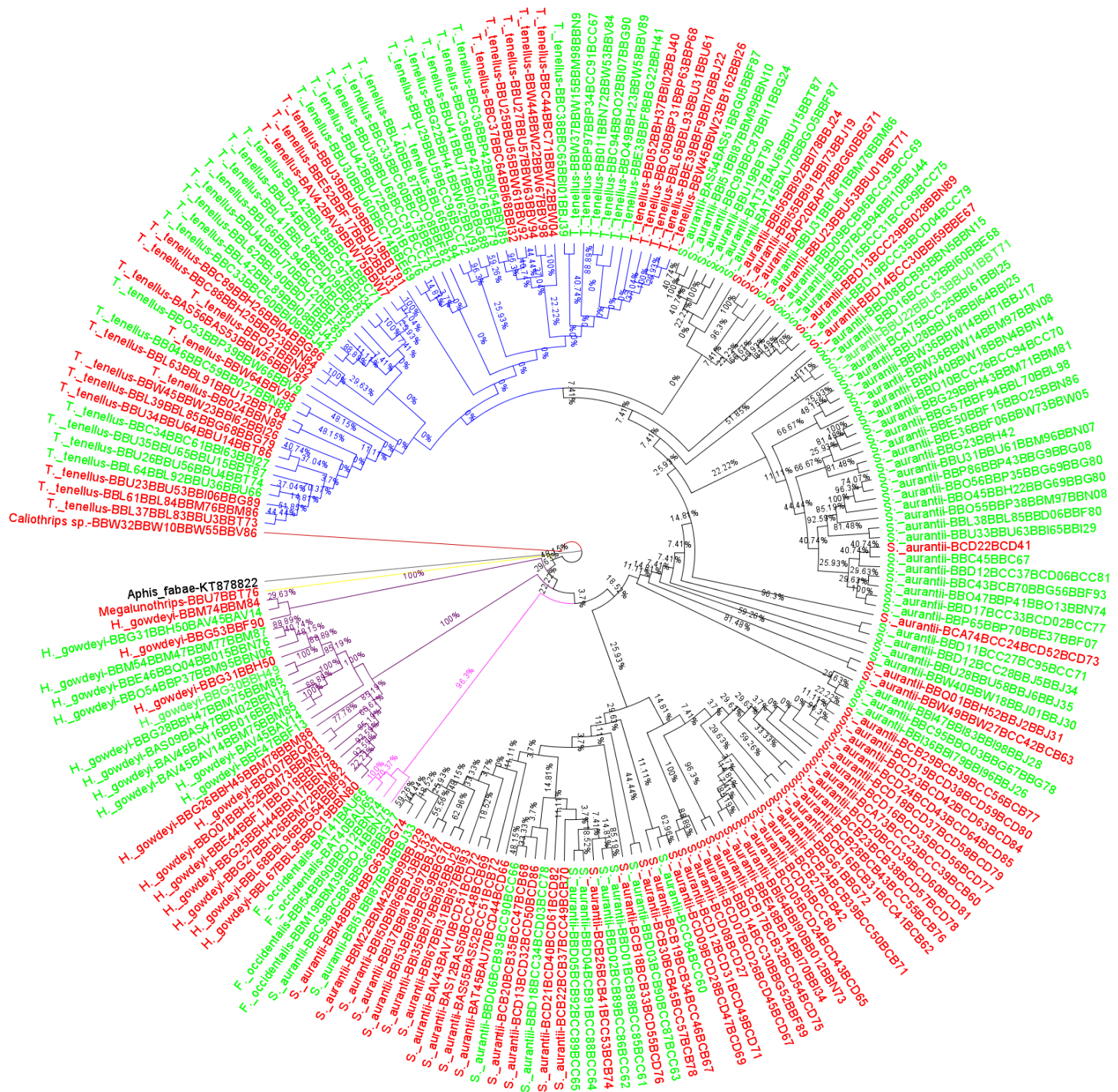
Number of sites: 15/circular landscape

Sampling interval: One snapshot

Number of thrips: 180 (20/landscape)

Part 1. Regional geneflow

- Three gene regions (CO1, ITS1, cytB)
- Confirm species identity and phylogeny
- Generate haplotype networks
- Infer genetic isolation by distance over larger scales



Legend

Host plants

- Avocado – Red
- Macadamia – Green

Species

Black nodes - *S. aurantii*

Blue nodes - *T. tenellus*

Purple nodes - *H. gowdeyi*

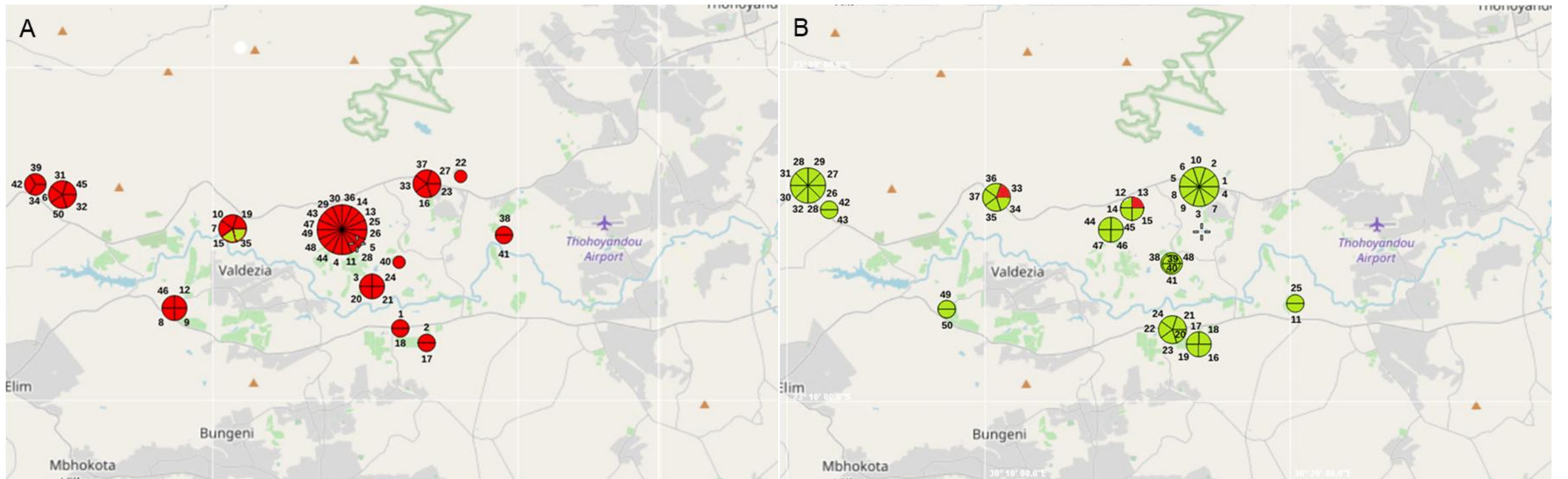
Pink nodes - *F. occidentalis*

Yellow nodes – *Megalurothrips*

Brown node - *Caliothrips* sp.

Grey node - Outgroup

Haplotype maps for *S. aurantii*



Objective 3. Quantify dispersal throughout production landscapes

Production regions:

- Mooinooi/Buffelspoort
- Groblersdal/Marble Hall
- Vredendal

Number of replicates: Three circular landscapes (radius 1.5 km) per production region

Number of sites: 15/circular landscape

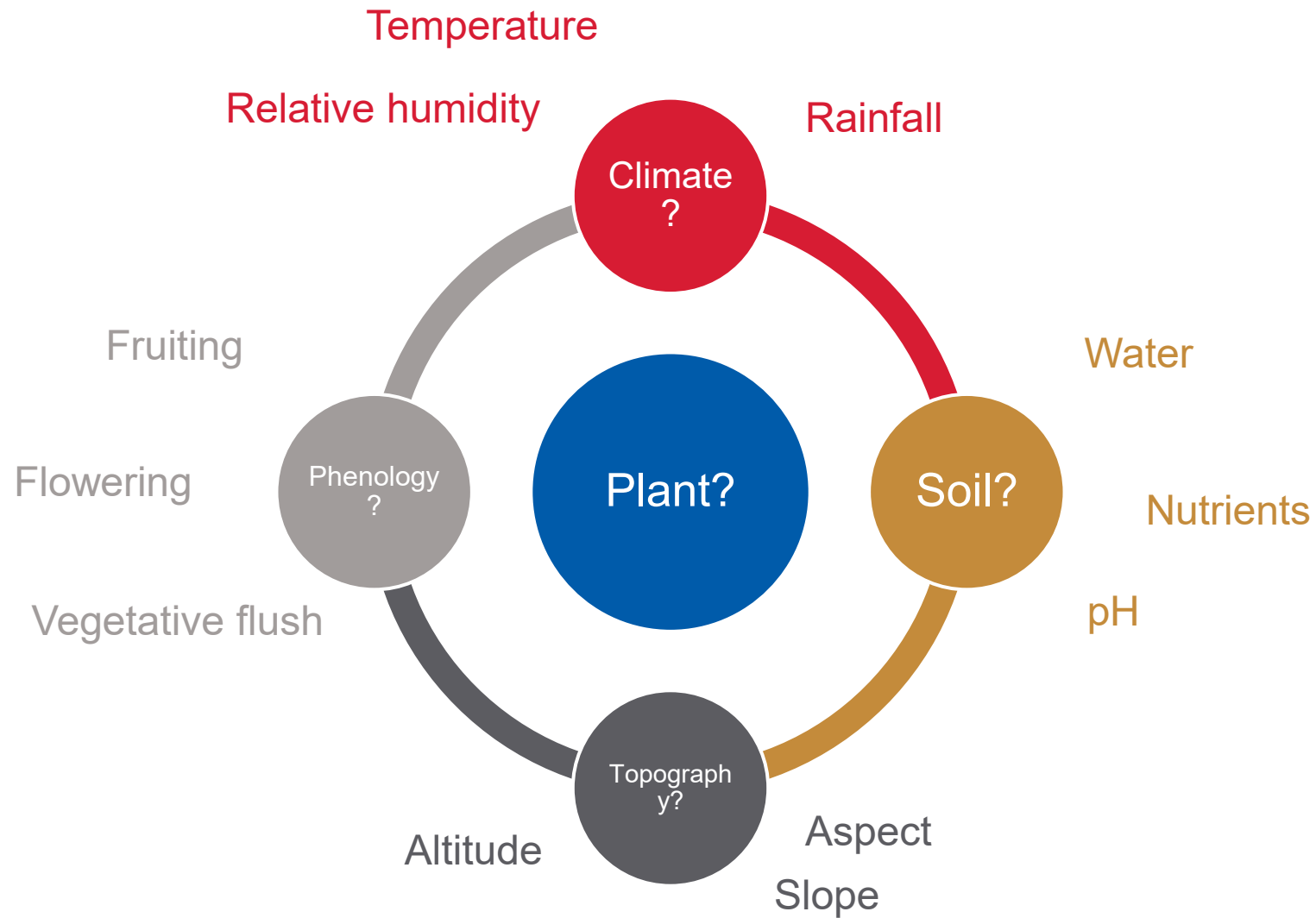
Sampling interval: One snapshot

Number of thrips: 180 (20/landscape)

Part 2. Geneflow between crops

- Microsatellite markers
- Generate haplotype networks
- Population structure within production regions and circular landscapes

Which factors affect thrips abundance?



Objective 4. Environmental drivers of thrips abundance in the landscape

Production regions:

- Mooiooi/Buffelspoort
- Groblersdal/Marble Hall
- Vredendal

Number of replicates: Three circular landscapes (radius 1.5 km) per production region

Number of sites: 15/circular landscape

Sampling interval: Monthly

Duration: 24 months

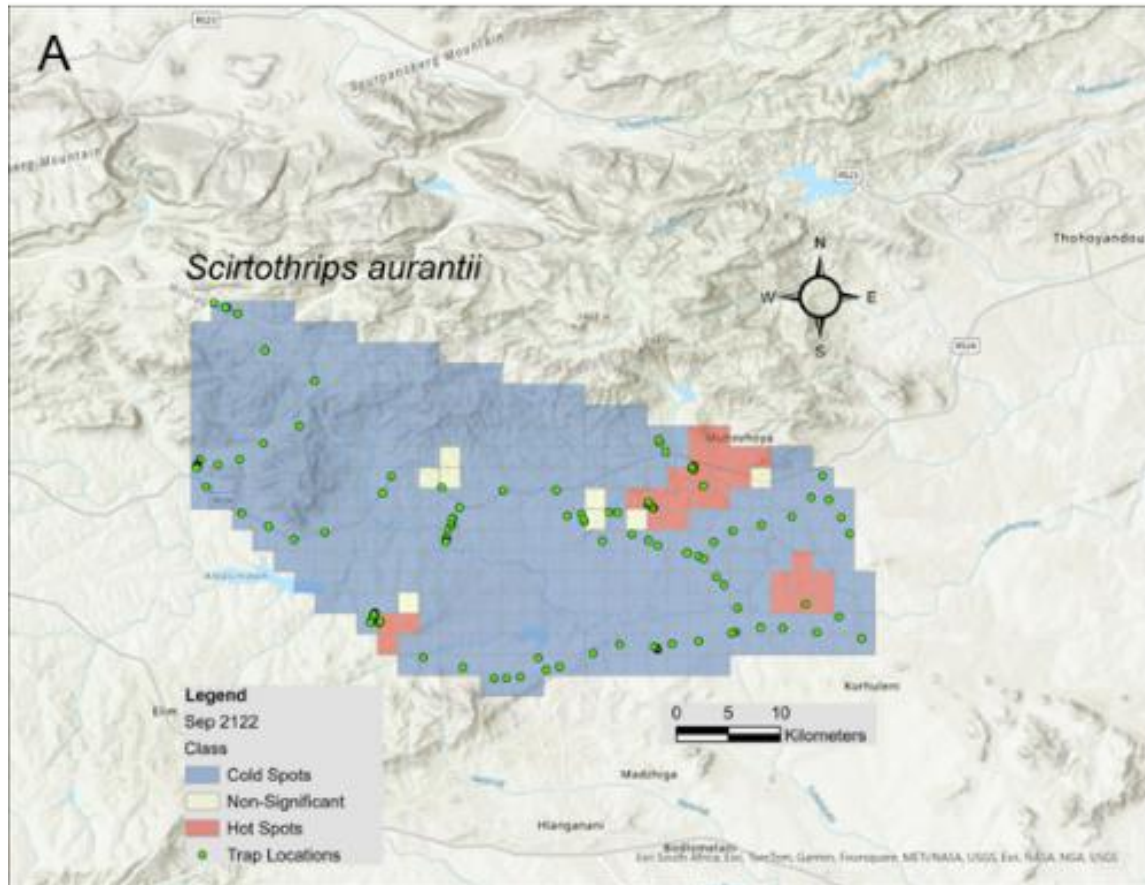
Sampling method: Beating

Data:

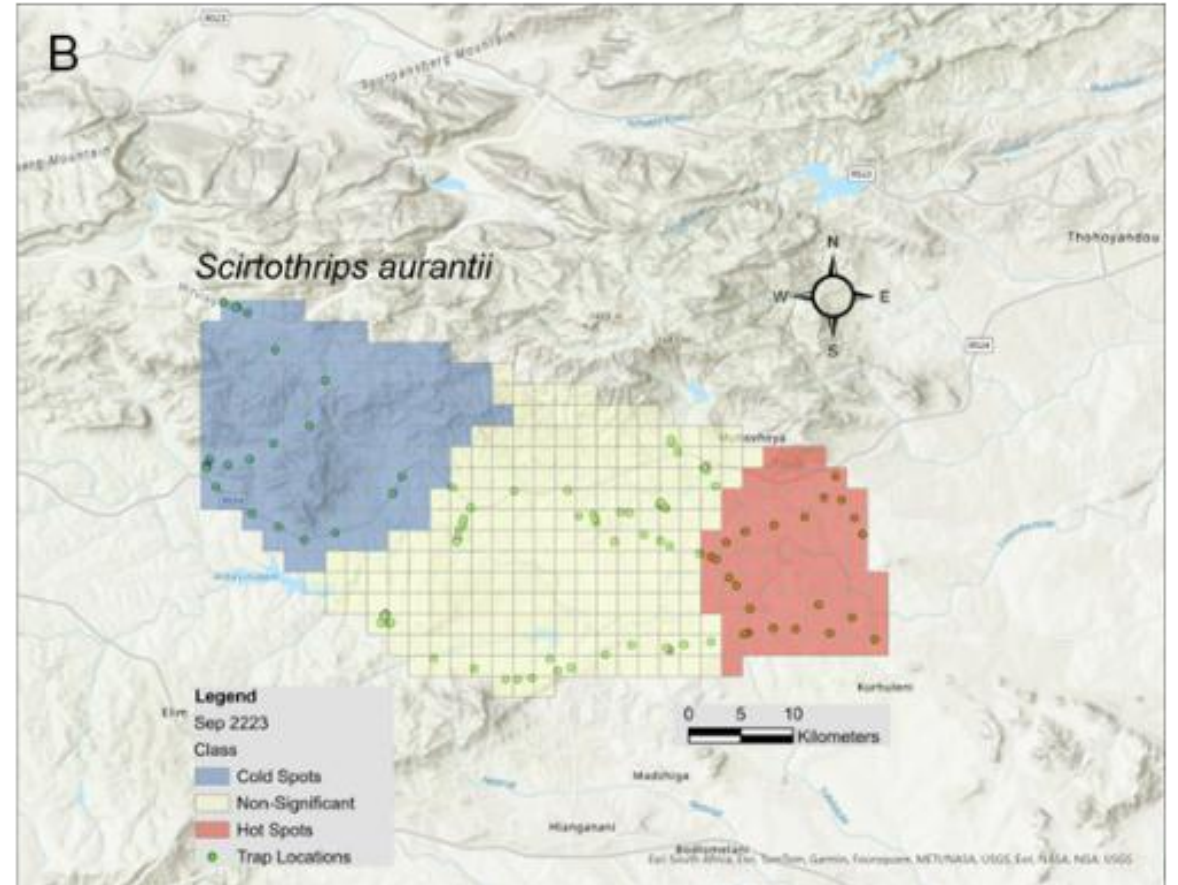
- Thrips abundance
- Plant phenology
- Landuse diversity (neighbouring crop, cropping area)
- Physical environmental data (e.g., altitude, temperature, rainfall, NDVI, NDRE)

Hot- and coldspots for *Scirtothrips aurantii*

September 2021/2022

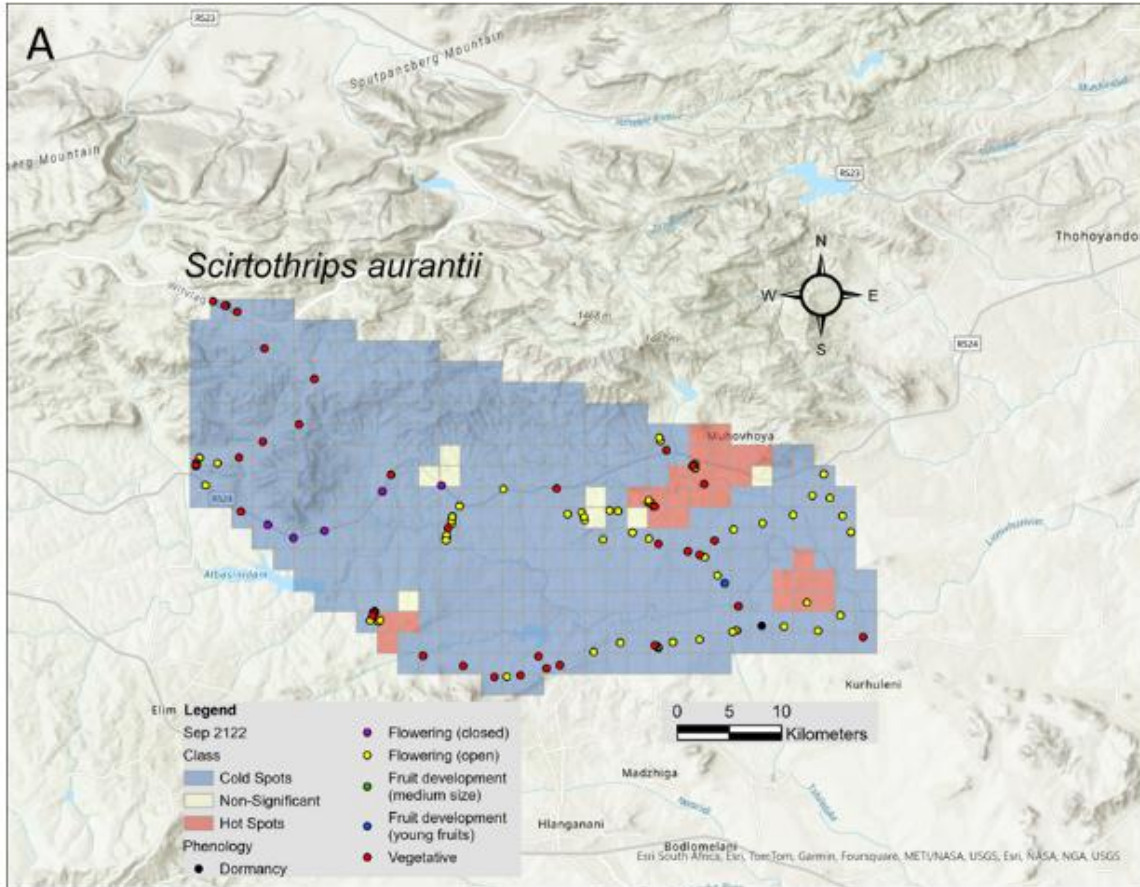


September 2022/2023

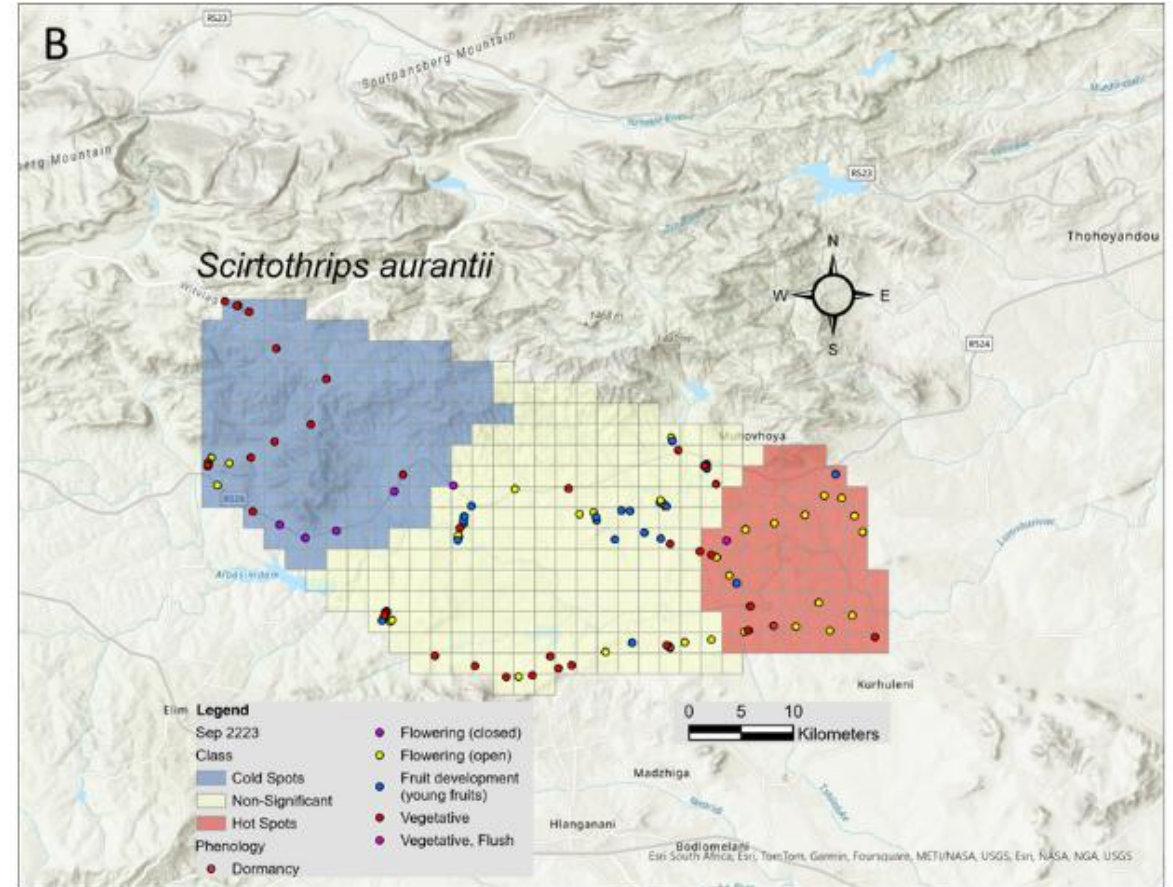


Flowers, young fruit and flush predict higher *S. aurantii* abundance

September 2021/2022



September 2022/2023



Objective 5. Traits of blueberry varieties susceptible to thrips

Production region:
Mooinooi/Buffelspoort

Number of varieties: Four (e.g., Olivia, Leasa, Julieta, Magica)

Number of replicates: Two samples from each of five orchards

Sampling:

- Vegetative bud break
- Flowers at full bloom
- Fruit at the green stage

Duration: 24 months

Thrips sampling method: Beating

Data:

- Thrips abundance
- Thrips damage
- Volatile organic chemical profile
- Protein and amino acid content
- Leaf sap nutrients (late January)

Impact to industry

Efficient thrips monitoring methods

Economic injury levels and economic thresholds

Thrips dispersal distance – potential buffer zones

Areas and times of year with high thrips abundance – targeted control

Plant traits associated with high thrips abundance and damage – plant-based attractants and fertilizer regimes

Reduce risk of thrips damage



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Questions?



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