



Site Specific Nitrogen Management in Citrus Orchard to Minimize Nitrogen Pollution



Agricultural Research Organization
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Technology

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Background

Permanent crops agriculture covers 1.2% of the global land area. Such agricultural land requires the addition of the essential nutrients to the soil in order to sustain commercial viability. In the agricultural context, nitrogen is often regarded as the most critical nutrient, and the soil-related growth limiting factor.



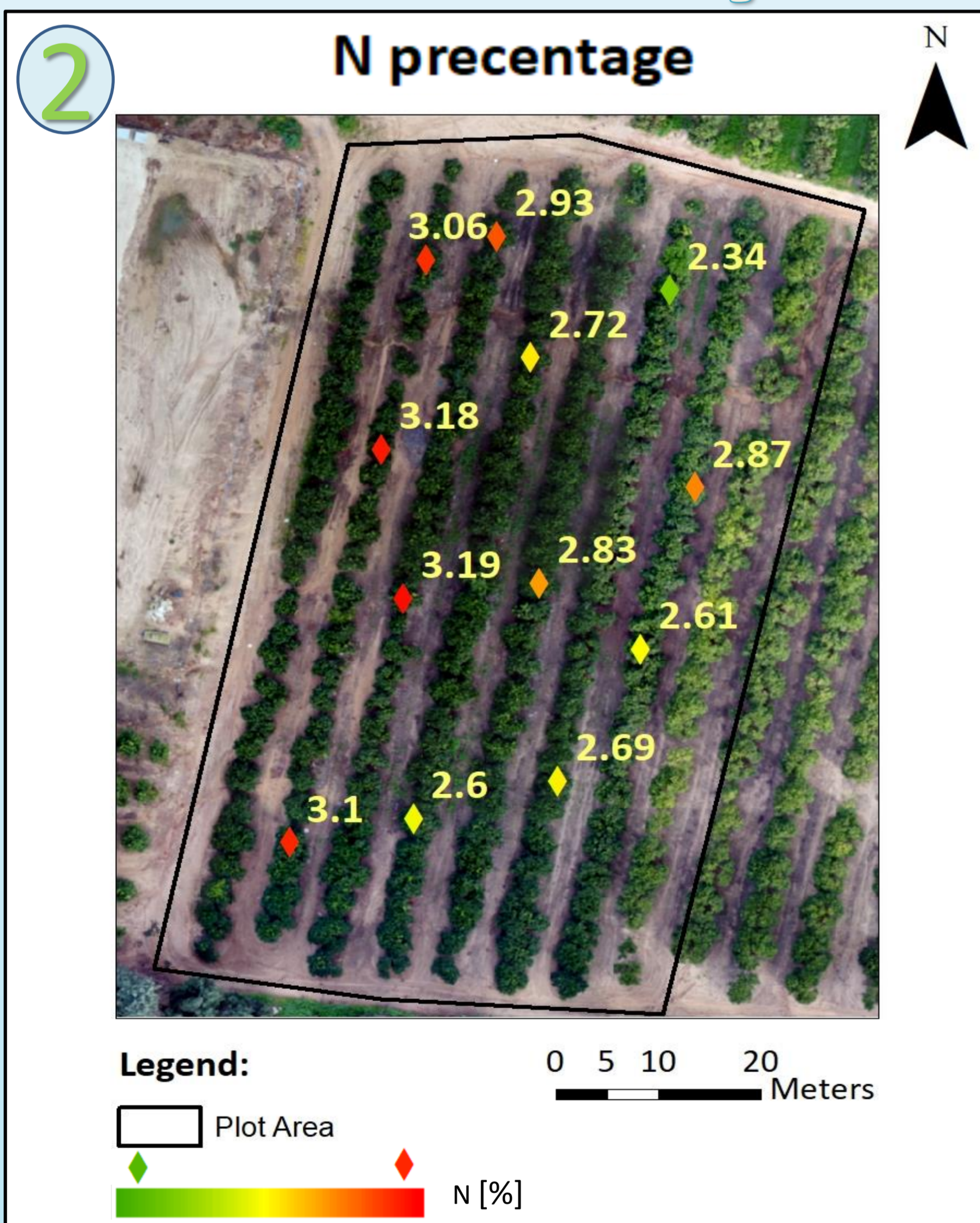
Precision agriculture aims at sustainably optimizing the management of cultivated fields by addressing the spatial variability found in crops and their environment with Site-Specific Management (SSM).

Objectives

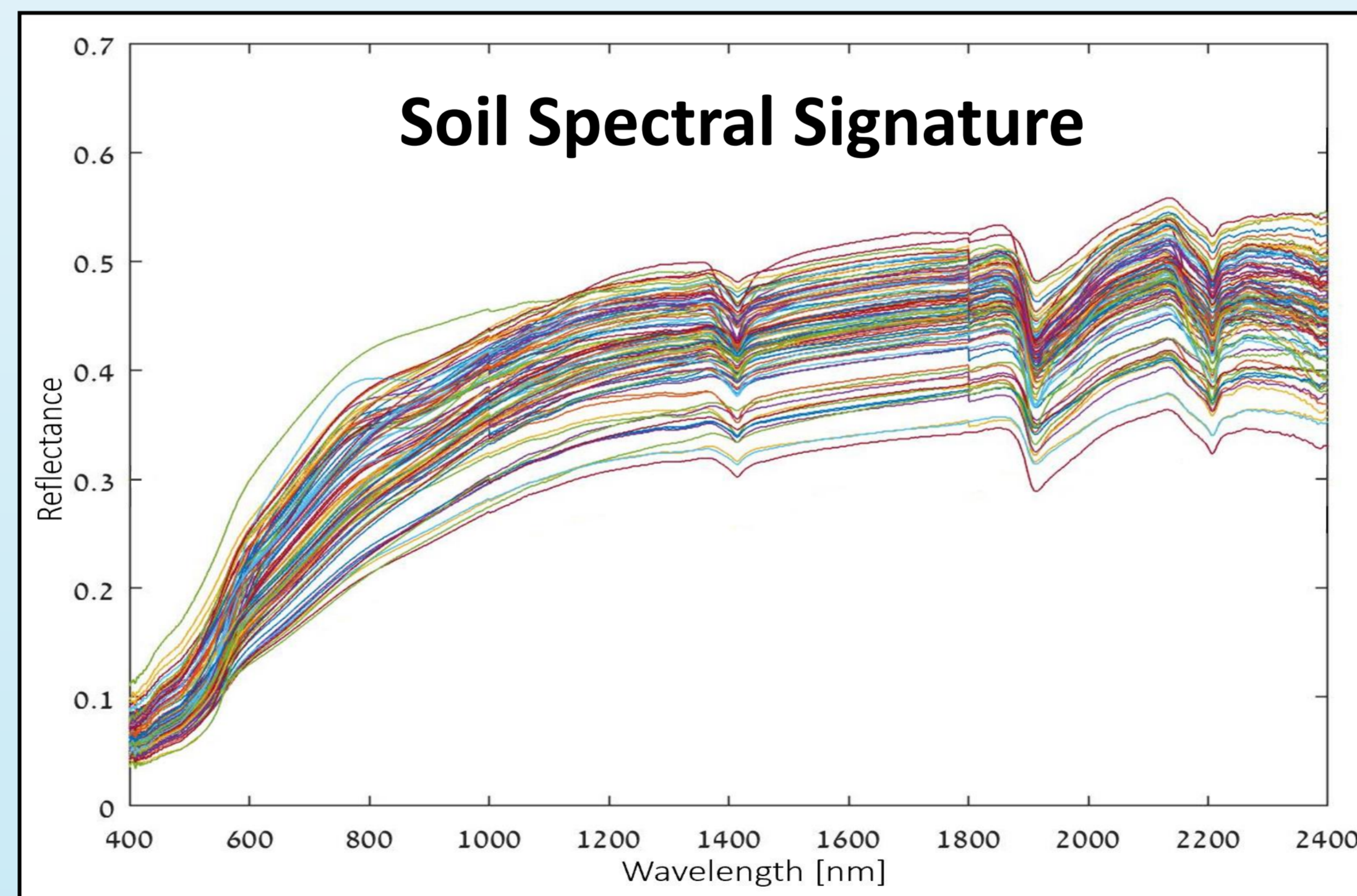
The overall objective is to develop SSM for tree based optimal nitrogen (N) application in citrus orchard.

- Identify the spatial and temporal variability in N status across the orchard
- Correlate between the temporal (monthly) leaf N status, the “standard” leaf N status and the fruit yield per tree
- Toping fertigation with tree-based application of controlled release N fertilizer to account for tree N status and needs
- Correlate spatial and temporal variation pattern in N status to N leaching and NUE (Nitrogen Use Efficiency) using remote sensing.

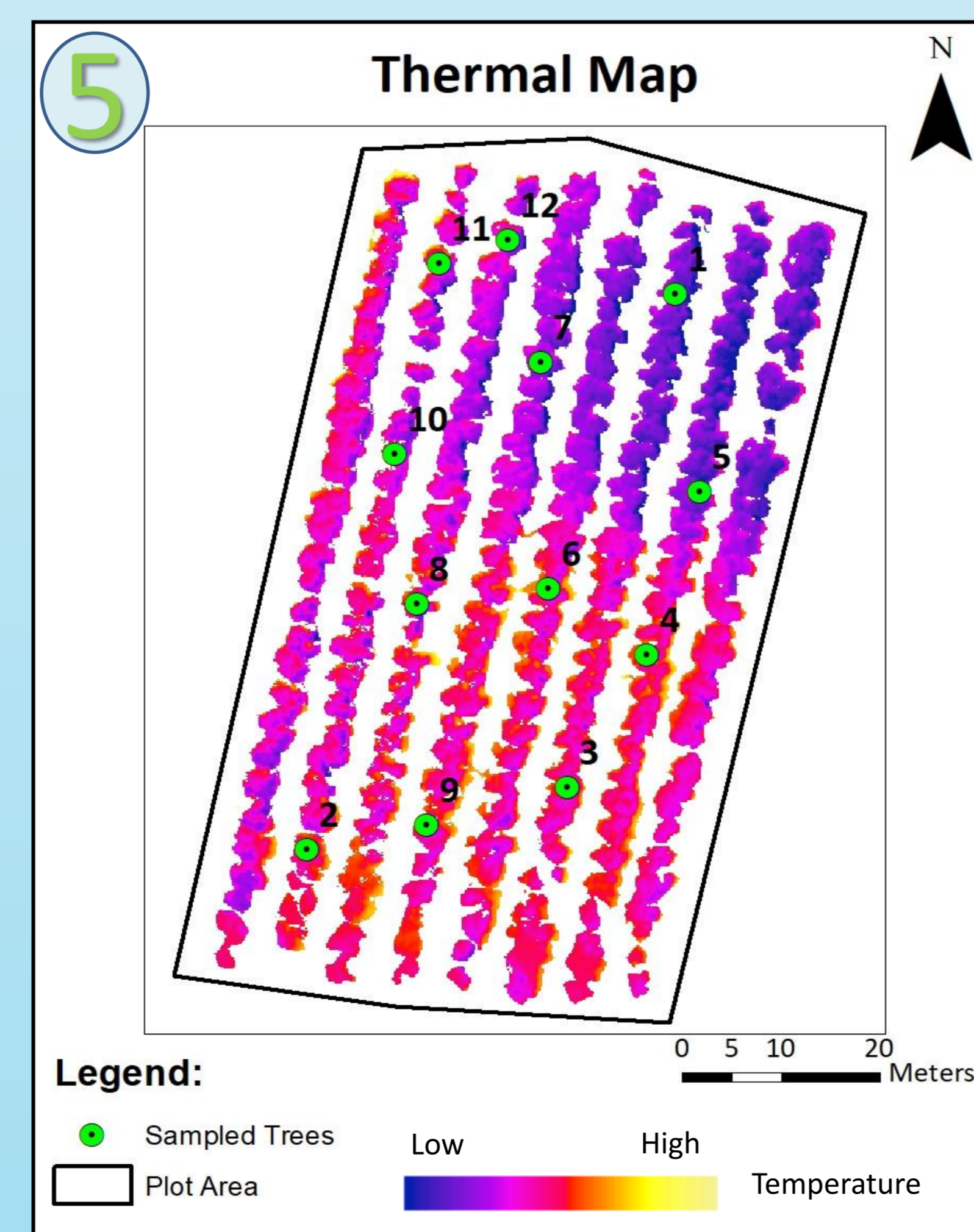
Preliminary Results



The distribution of leaf N status in percentage units is shown in Figure 2



Soils' spectra seen in Figure 3 represent 100 soil samples from the surroundings of the sampled trees



Thermal image in Figure 5 shows the variation of temperature, along with image classification for tree canopy

Experiment Set-Up

- ❖ Citrus orchard in Kefar-Monash (Hefer-Valley) with 12 sampled tree in each of the 4 plots
- ❖ Sprinkler irrigation and fertigation
- ❖ Monthly leaf samples and yearly soil samples (analysis for: NO_2 , NO_3^- , NH_4^+ , TN, TOC, Wet content)
- ❖ Monthly remote sensing from a drone (VIS, NIR, SWIR)

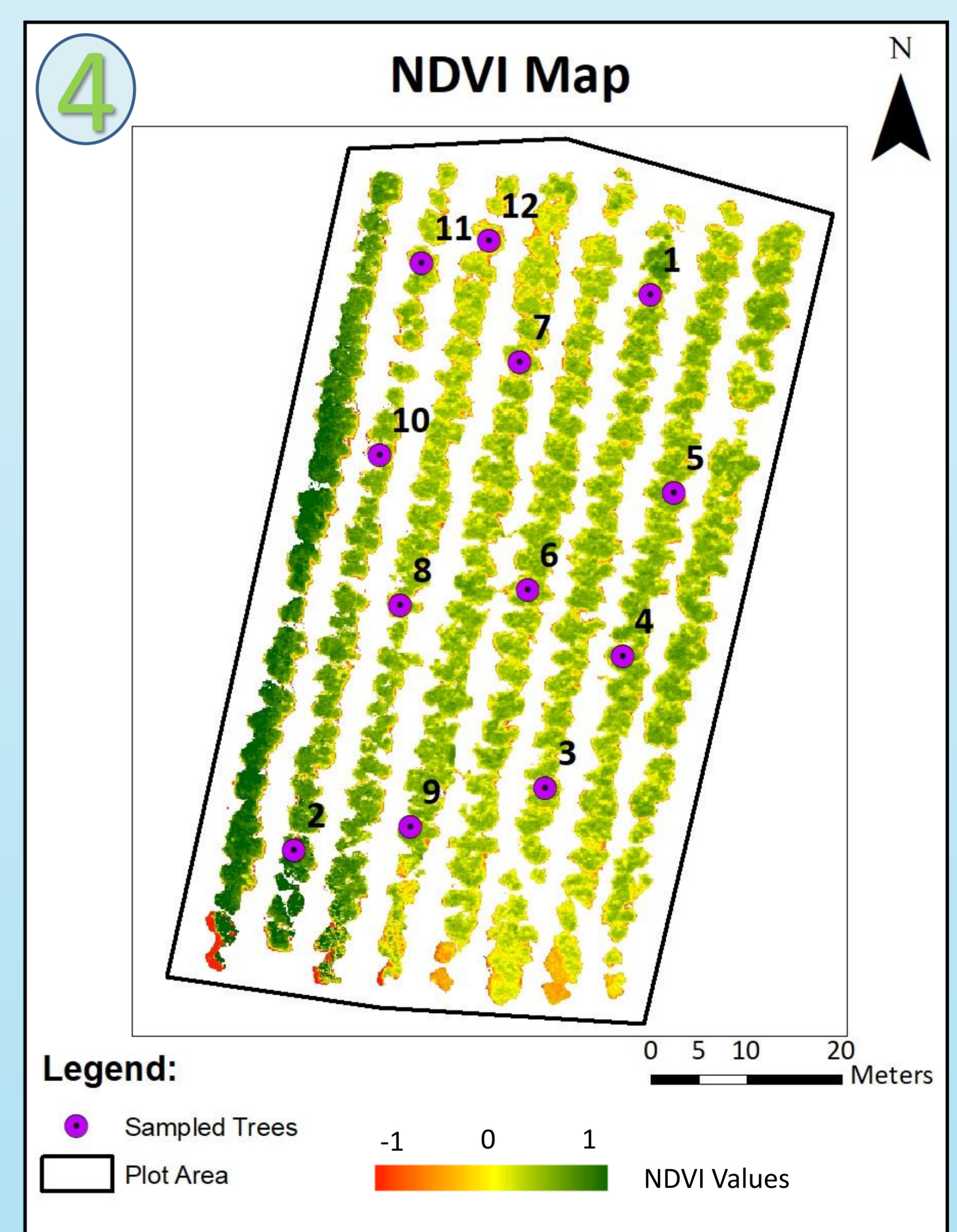
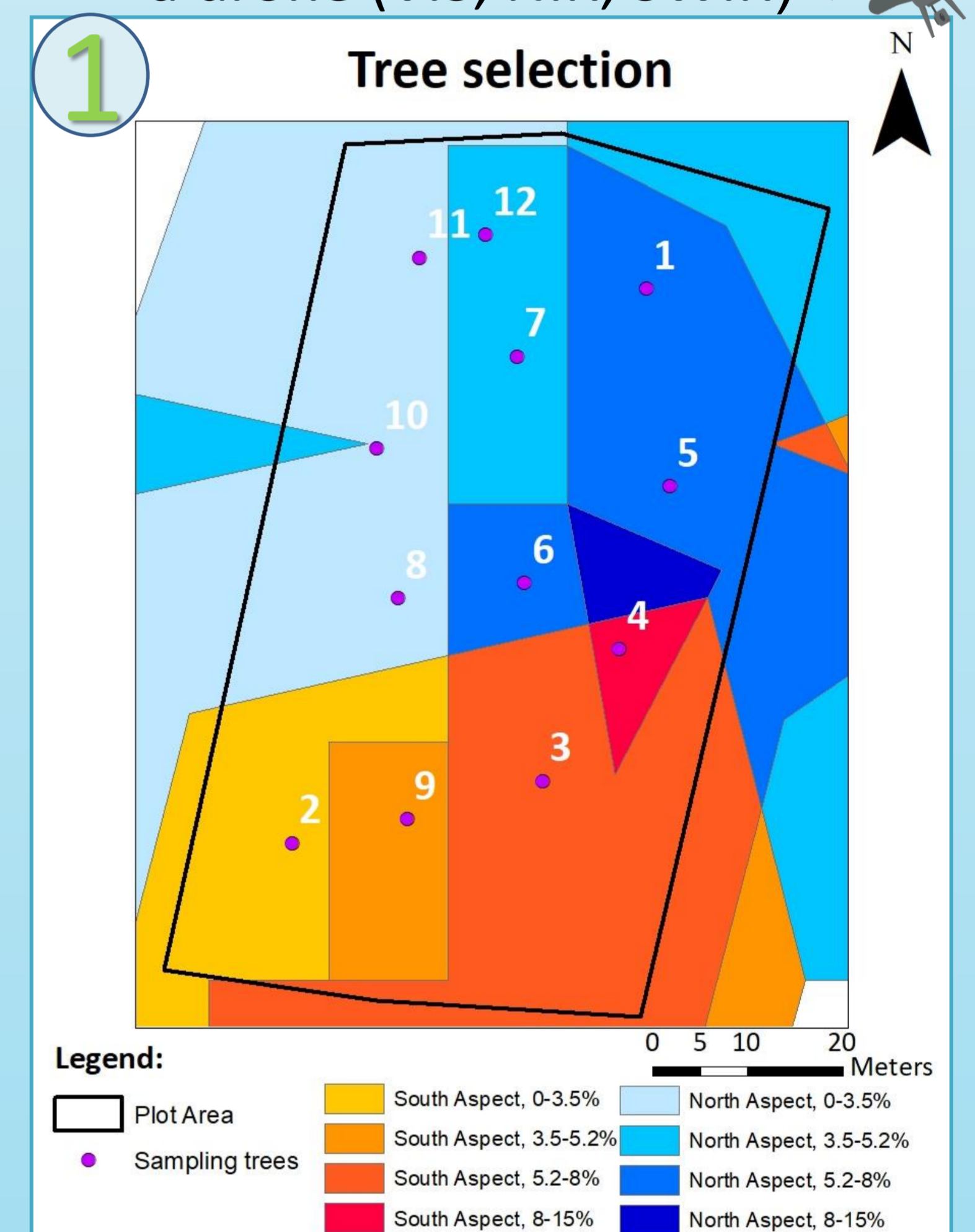


Figure 4 show the normalized difference vegetation index values across the orchard

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