Can Drone Imagery Replace Visual Stand Density Assessments?

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Introduction

- Bahia is one of the most utilized forages in Florida.
- Previous work demonstrated a highly significant difference between treatments.
- Establishment trails to see whether incorporating browntop millet was advantageous were done in 2020.

Methods

- This was a completely randomized block design with three replications at 30 square meters each.
- These plots were evaluated using human estimation of ground coverage of bahia, utilizing enhanced normalized difference vegetative index (endvi) and thermal images of the plots from the drone.
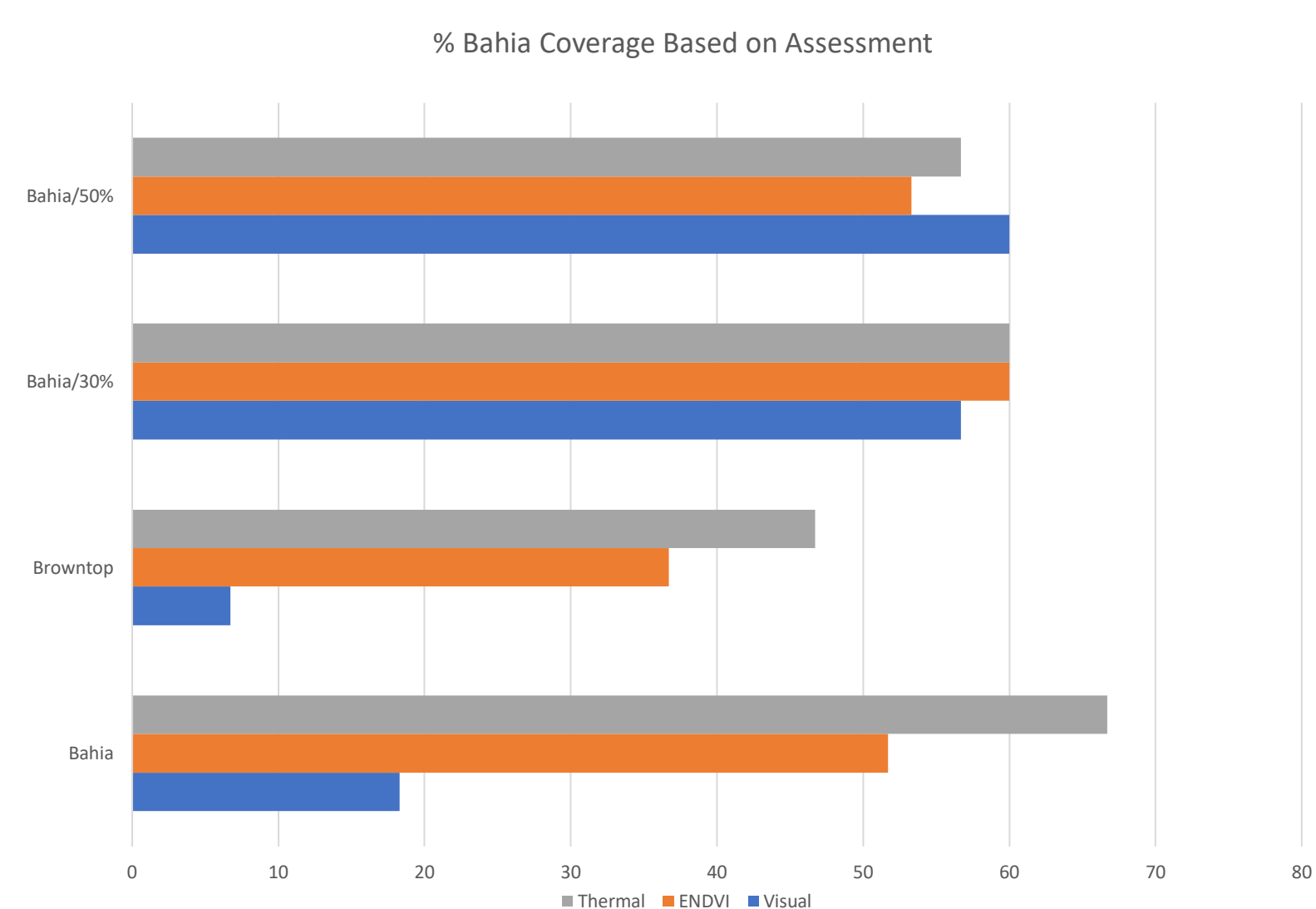
Results

Figure 1: Results of drone imagery and visual assessment.

Conclusion

- While drone images are useful to identify places of concern in pastures using endvi, it does not yield reliable results for estimating percent forage coverage when compared to a visual assessment.
- Thermal images, likewise do not correlate to the visual assessment.

The plant health algorithms and thermal images were closely aligned to the visual assessments where bahia was mixed with browntop millet. However, there was no correlation between bahia or browntop millet when planted alone. As a tool to measure stand density, drone imagery using plant health algorithms are not a suitable replacement for visual stand assessments.
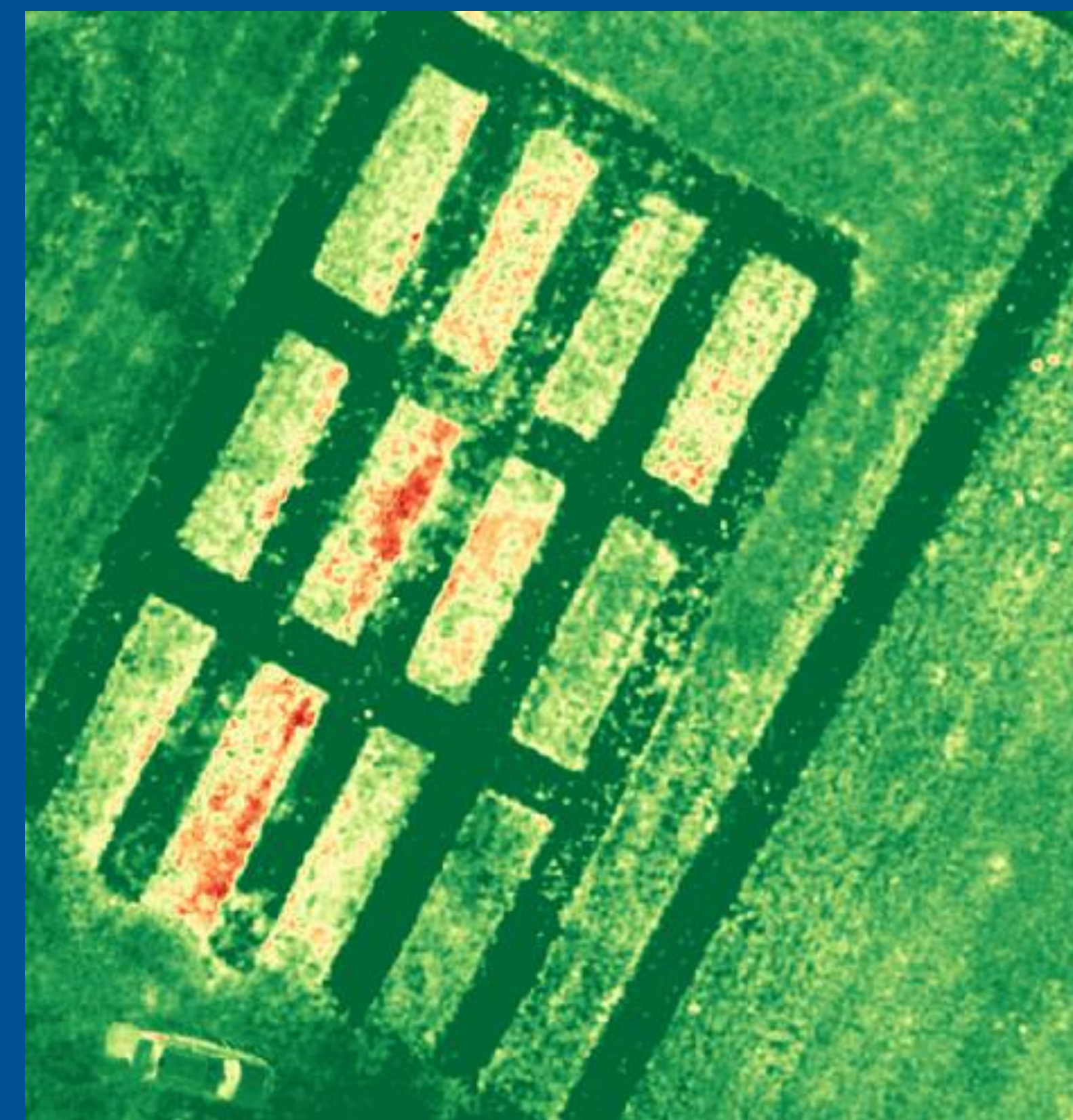
Figure 2: RGB drone image.

Figure 3: ENDVI analysis. The green and yellow represent bahia and the red represents goatweed.

Discussion

- The plant health algorithm that best highlighted the bahia was the endvi with spectral reverse.
- There were three predominant plants in each plot (bahia, goatweed and nutsedge). The sedge and bahia blended together.
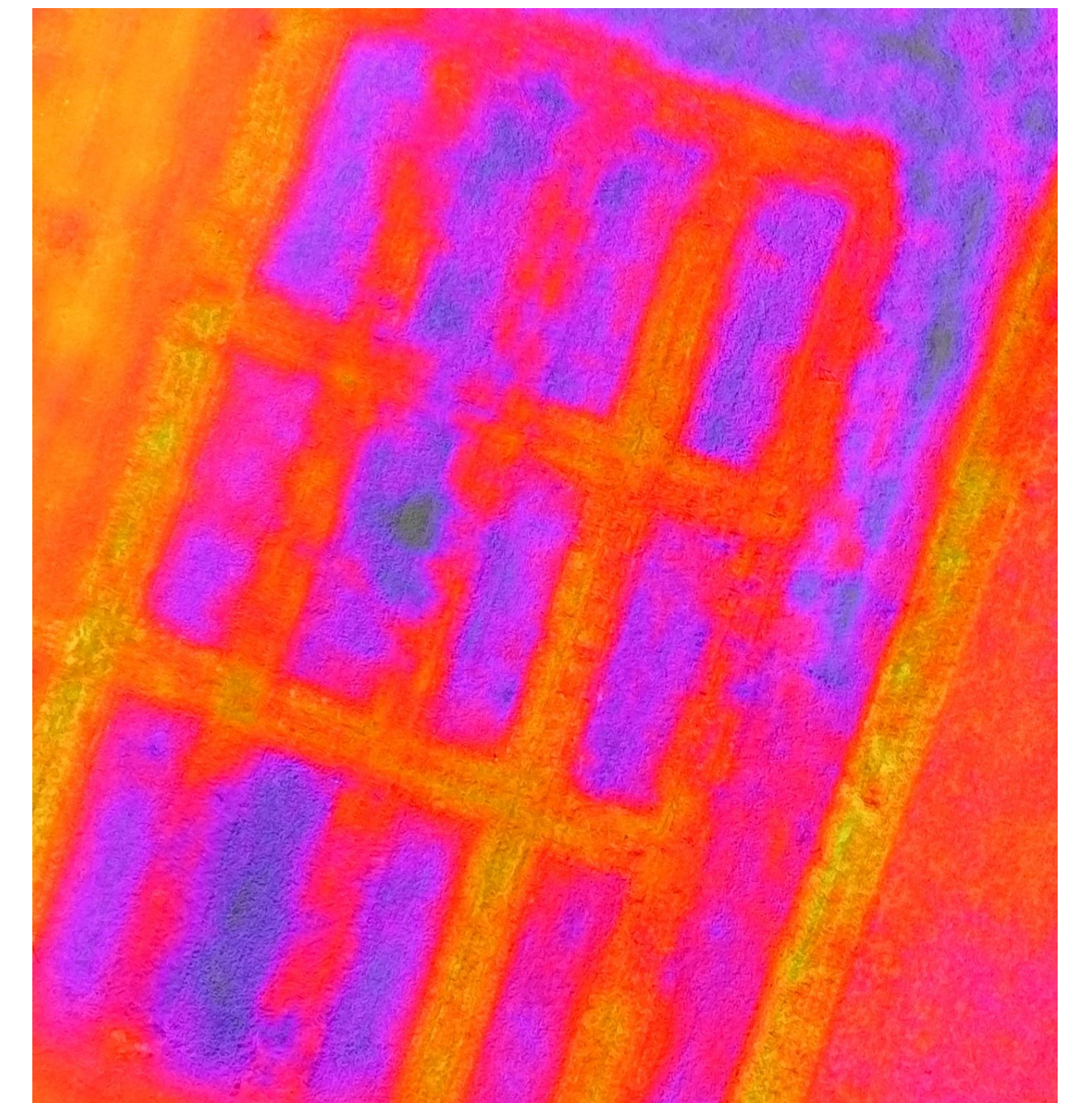

Figure 4: Thermal images of established forage. Red represents a warmer temperature (less forage) and blue represents cooler temperature (more forage).
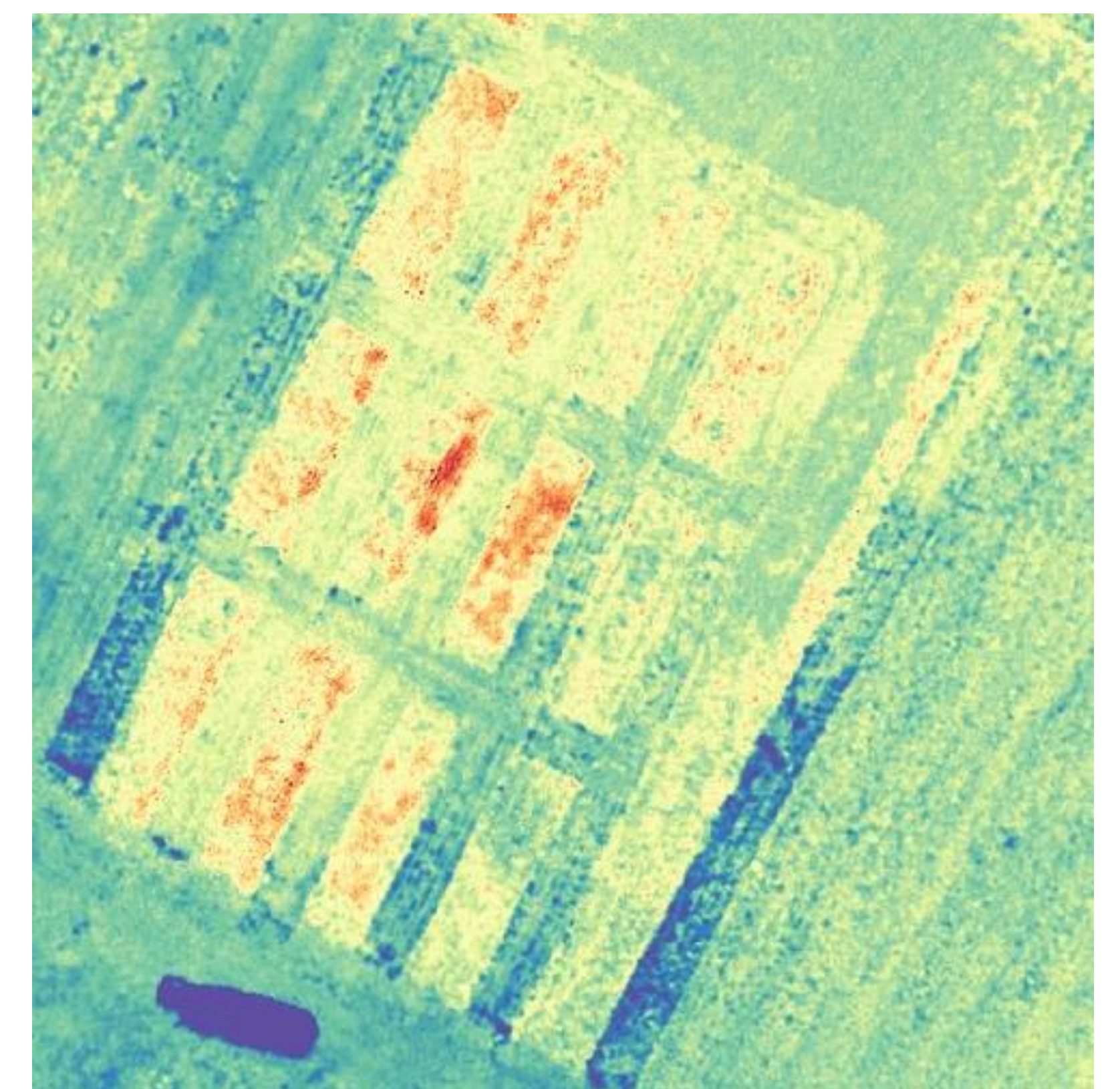

Figure 4: Additional algorithms were used, but none were an adequate substitute for visual assessment.