Assessing pasture dieback with a drone

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Introduction

Pasture dieback causes the premature death of highly productive grass-pastures in coastal areas of Queensland and New South Wales, significantly impacting beef production in these regions. Early symptoms of pasture dieback are leaf discolouration including yellowing and reddening. Currently leaf discolouration is assessed using visual estimations by a team of people, but this produces subjective data and is impractical and time consuming for large areas. This paper investigates the feasibility of using a drone and orthomosaic processing techniques to produce images and indices that can be used for statistical analysis of plant health.

Methods

A DJI Mavic 2 drone was used to capture aerial and orthoimages of pasture dieback research sites. Flights were planned to produce a 70% overlap between orthoimages for subsequent orthomosaic generation. GeoTiff processing was conducted for the Green Leaf Index (GLI; Louhaichi *et al*. 2001).

Results

Imagery produced by the drone has high accuracy with an average resolution of 0.98 cm (Figure 1). Analysis of orthomosaic images has provided indicative imagery (Figure 1) and quantifiable data for GLI as an assessment of plant health.

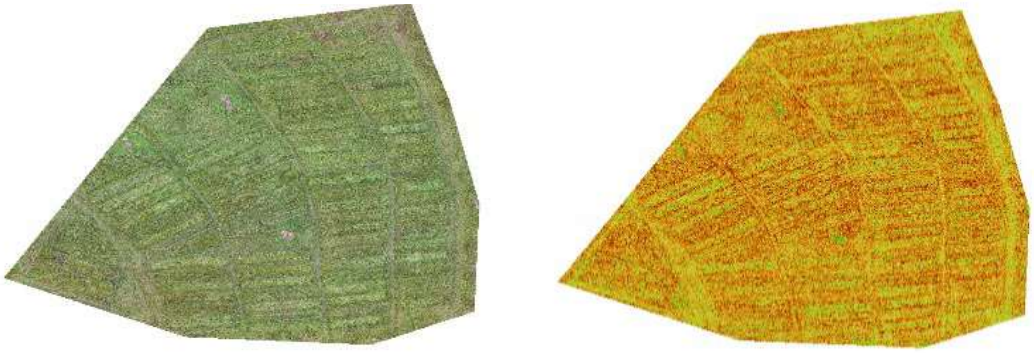

Figure 1. Normal drone image (left) and GLI image (right) of the same pasture dieback trial site

Discussion and conclusion

This process enables rapid identification of pasture dieback affected areas and produces quantitative plant health data that can be statistically analysed. Repeating this process over time will produce multi-temporal comparisons to monitor of the progression of pasture dieback symptoms. While this approach shows promise, certain limitations must be acknowledged, including the need for optimal weather and light conditions for drone flights, and camera calibration and image processing algorithms that may influence the accuracy of data produced. Future research will focus on refining the image processing techniques, exploring the integration of multispectral or hyperspectral data, and developing automated workflows for large-scale assessments.

References

Louhaichi, *et al*. (2001). Geocarto International. 16. 10.1080/10106040108542184.

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