

Image-based production prediction analysis and monitoring of processing tomato vegetative development

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Introduction

The aim is to be able to monitor the development of the industrial tomato crop by means of drone flights or satellite images.

Analyse different index by drone flight to know vegetative development

NDVI

NDRE

GNDVI

Material and Methods

- Extremadura, Spain. (38° 51' 2.534", -6° 40' 14.735")
 - Randomized blocks with 4 replications
 - 108 m² surface per experimental unit
 - Beds 150 cm wide
 - Plant density: 20.000 plants/ha
- 4 treatments of N:
- N0: Null
 - N1: Deficient (-50% N2)
 - N2: Traditional
 - N3: Exceding (+50% N2)



Sampling biomass



Following Greenwood et al., 1990

Drone flight twice a month



DJI mini 3

Mosaic of images



Results

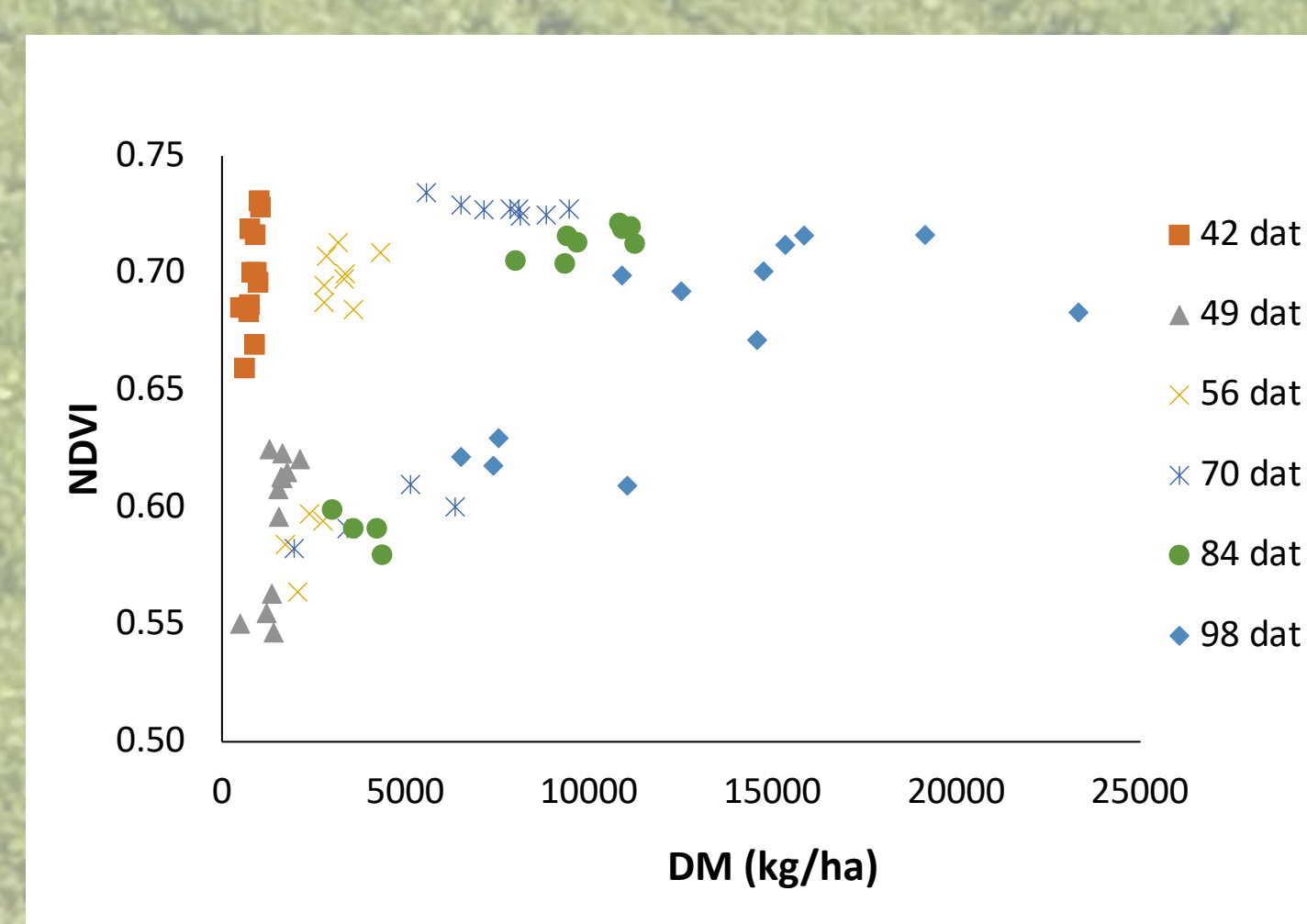


Figure 1: Relationship between NDVI and dry matter (DM) production along the crop cycle

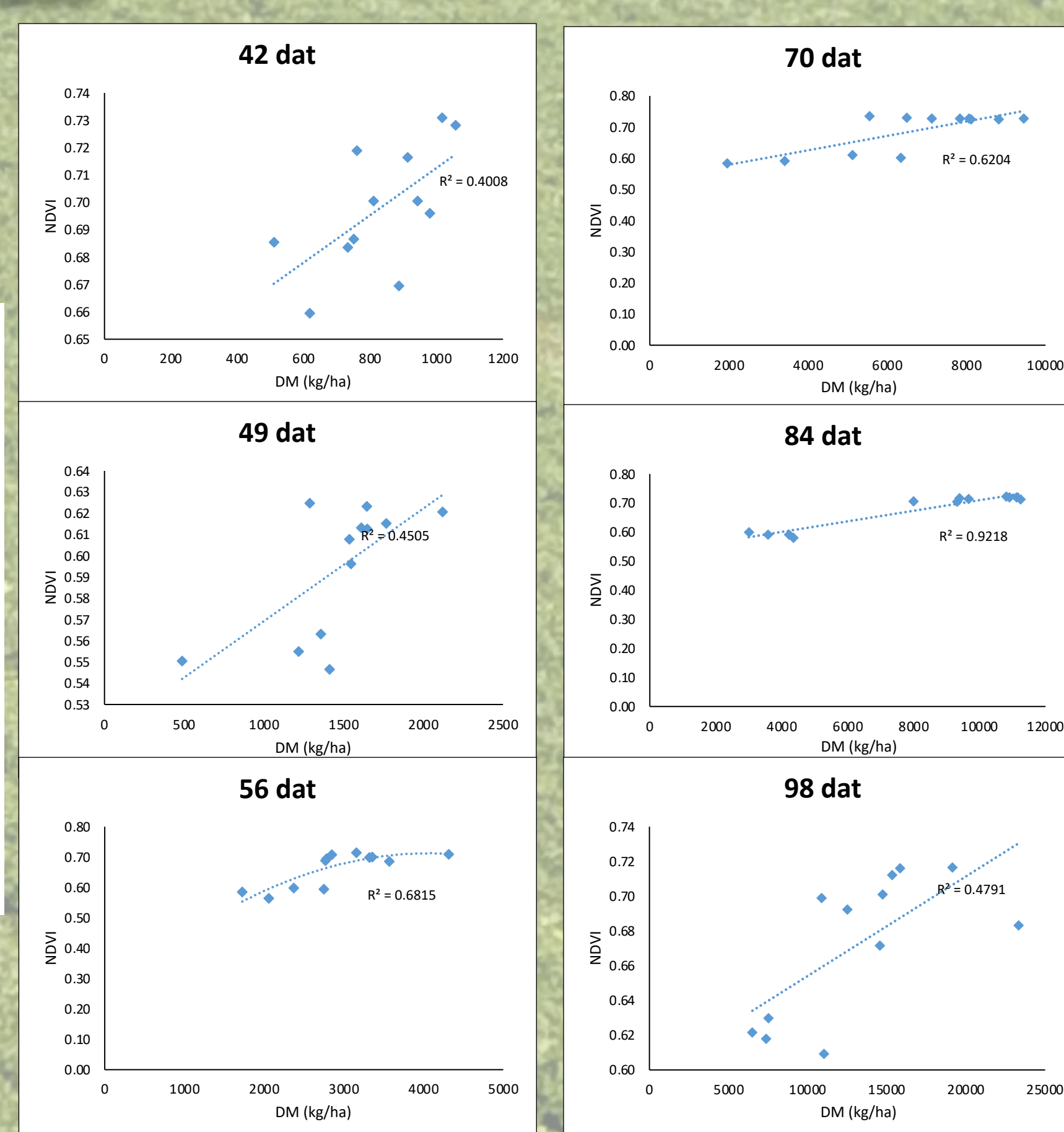


Figure 2: Relationship between NDVI and dry matter (DM) production along the crop cycle

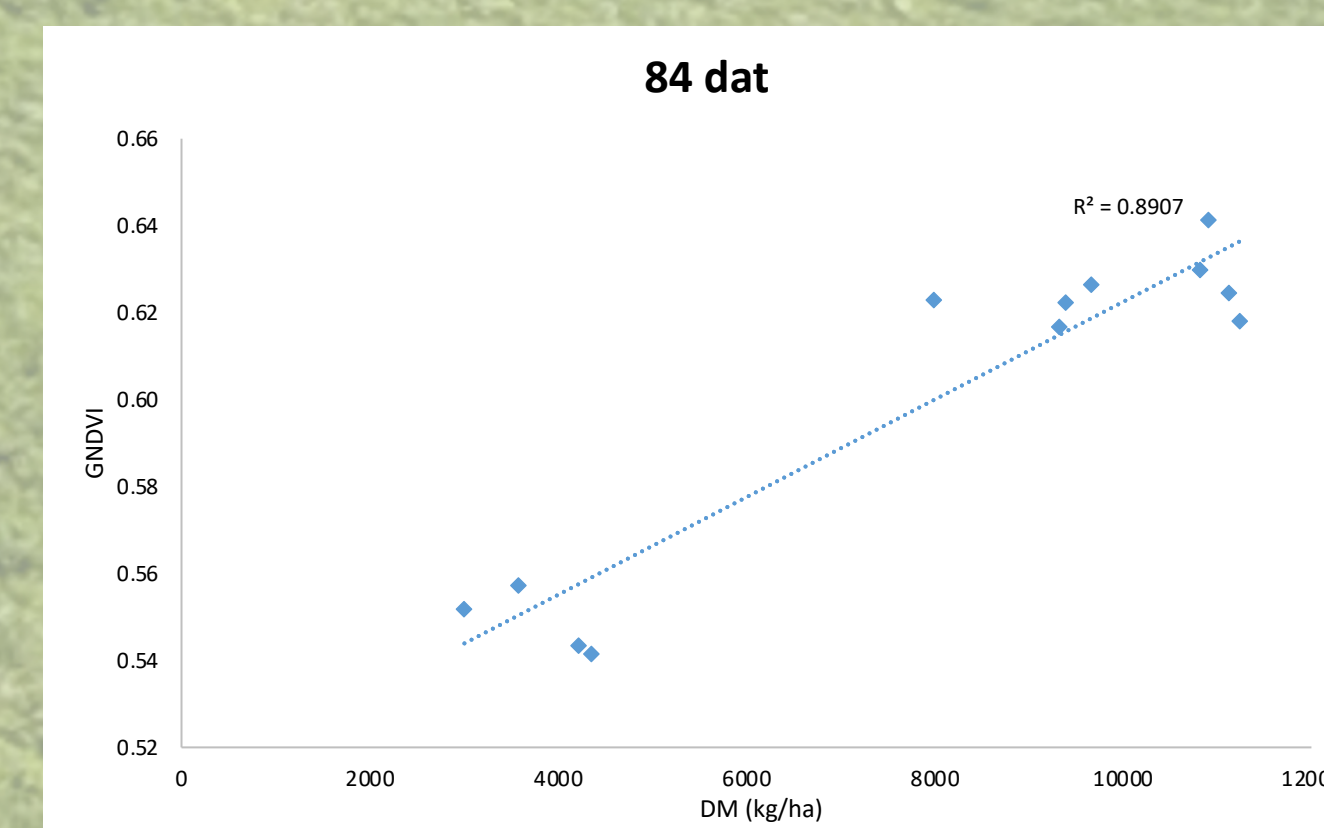


Figure 3: Relationship between GNDVI and dry matter (DM) production in 84 dat

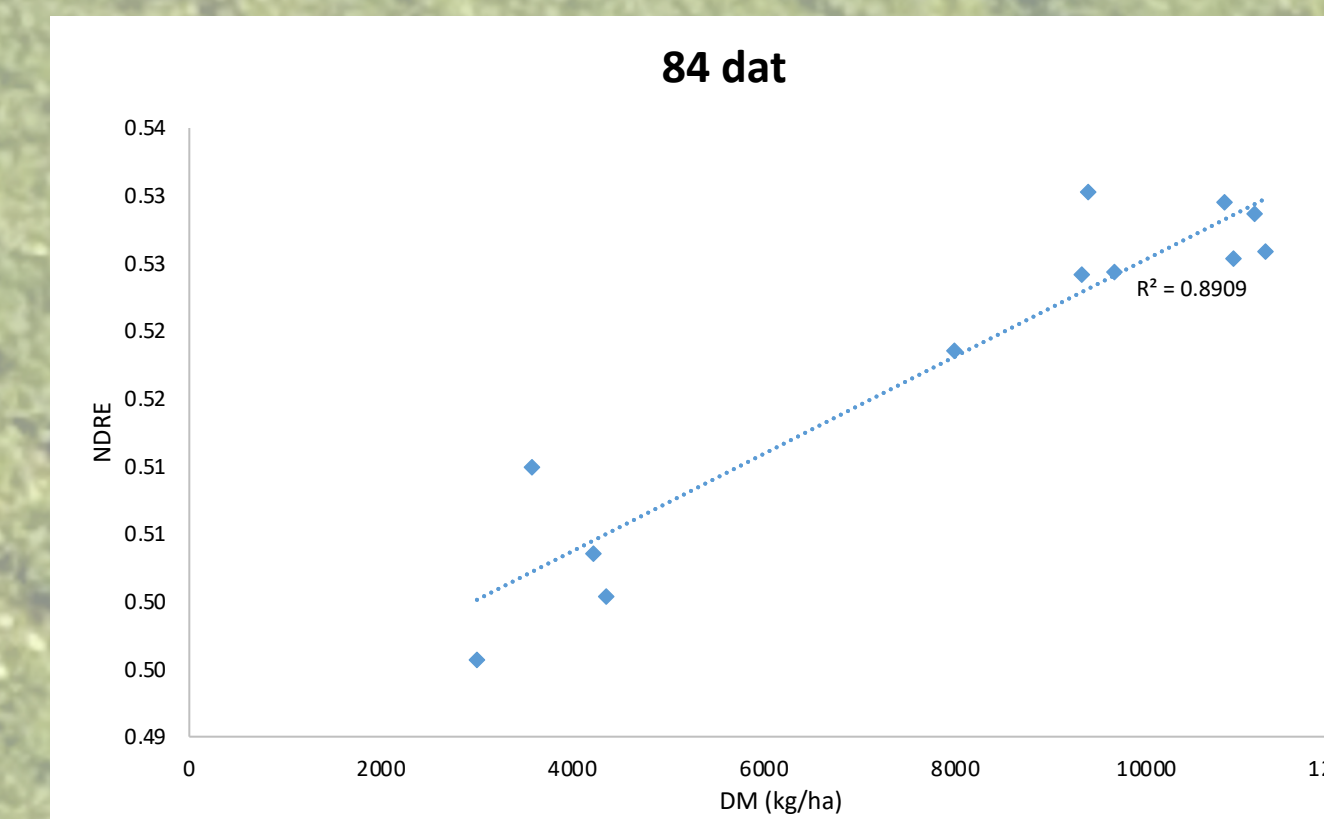


Figure 4: Relationship between NDRE and dry matter (DM) production in 84 dat

Conclusions

- The methodology followed is a successful option to obtain the dry matter generated by the crop in real time and in a non-destructive way.
- Best date to correlate different index with dry matter is around 84 dat.
- In this study NDVI is the best index ahead of NDRE and GNDVI.

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