

# Pests and the foundation of integrated pest management

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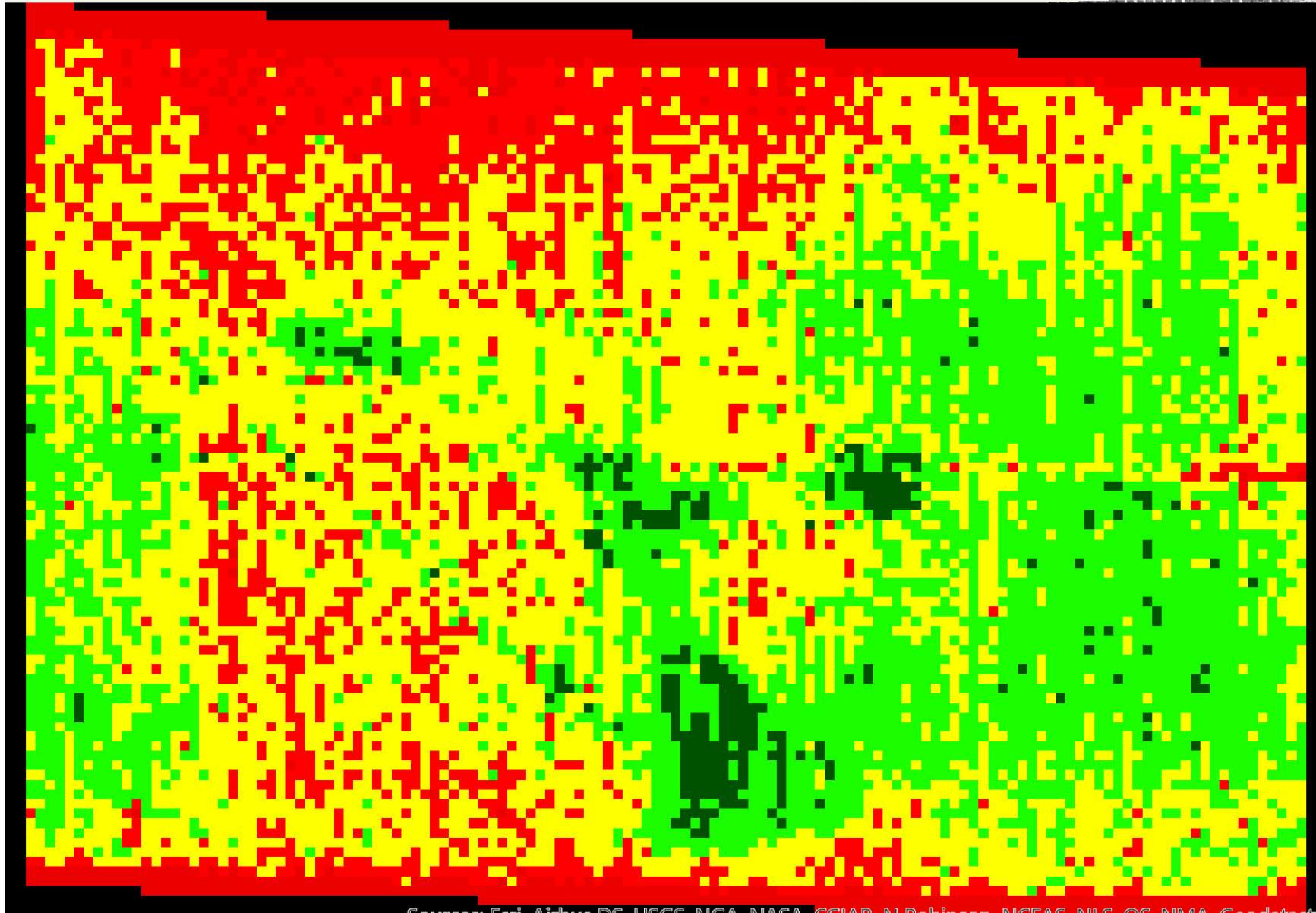


## DJI Matrice 200v2 sUAS/drone



- MicaSense Altum multispectral/thermal camera
  - Captures 6 spectral bands
    - Visible light - Blue, Green and Red bands
    - Non-visible light in the red edge, near infrared and thermal bands

# July 23, 2020

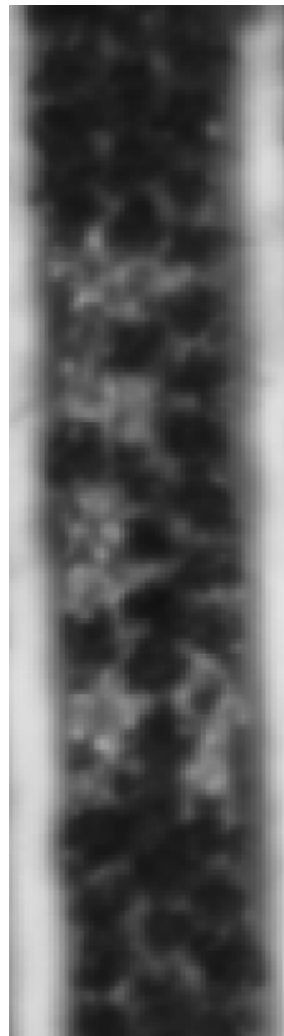


Source: Esri, Airbus DS, USGS, NGA, NASA, CGIAR, N. Robinson, NCEAS, NLS, OS, NMA, GeoData





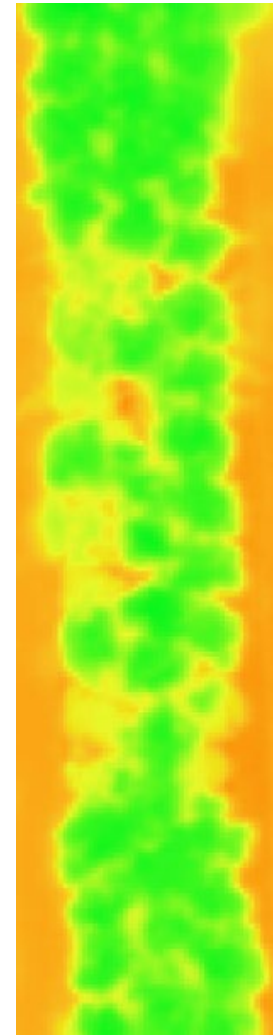
RGB



Red



Near-Infrared



NDVI

Stressed (0.11-0.14)  
Healthy (0.02-0.04)

Stressed (0.33-0.42)  
Healthy (0.55-0.61)

Stressed (0.45-0.55)  
Healthy (0.85-0.91)

$$\text{NDVI} = (\text{NIR} - \text{RED}) / (\text{NIR} + \text{RED})$$



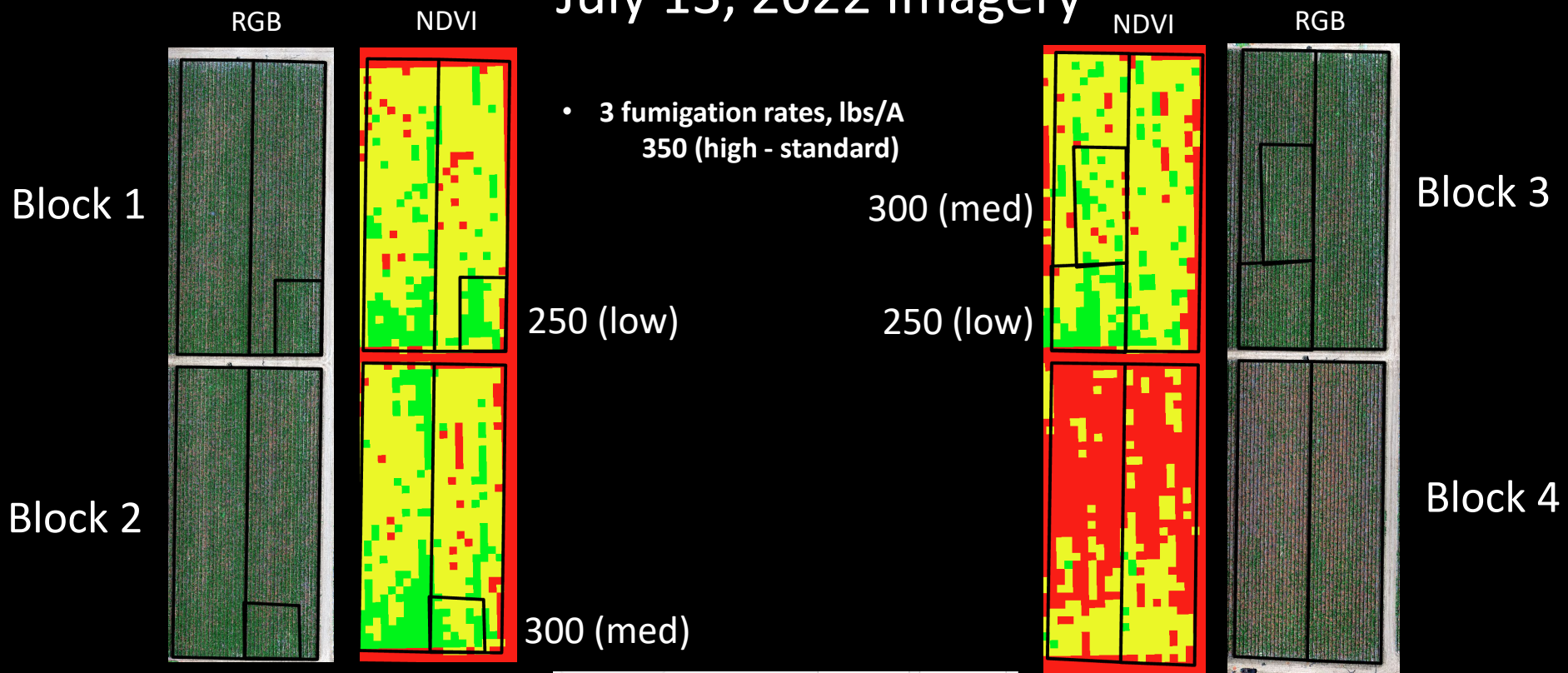




# July 13, 2022 Imagery



# July 13, 2022 Imagery



Color	Upper value	Label
Red	≤ 0.45	0.042 - 0.45
Yellow	≤ 0.6	0.451 - 0.6
Green	≤ 0.860611	0.601 - 0.861



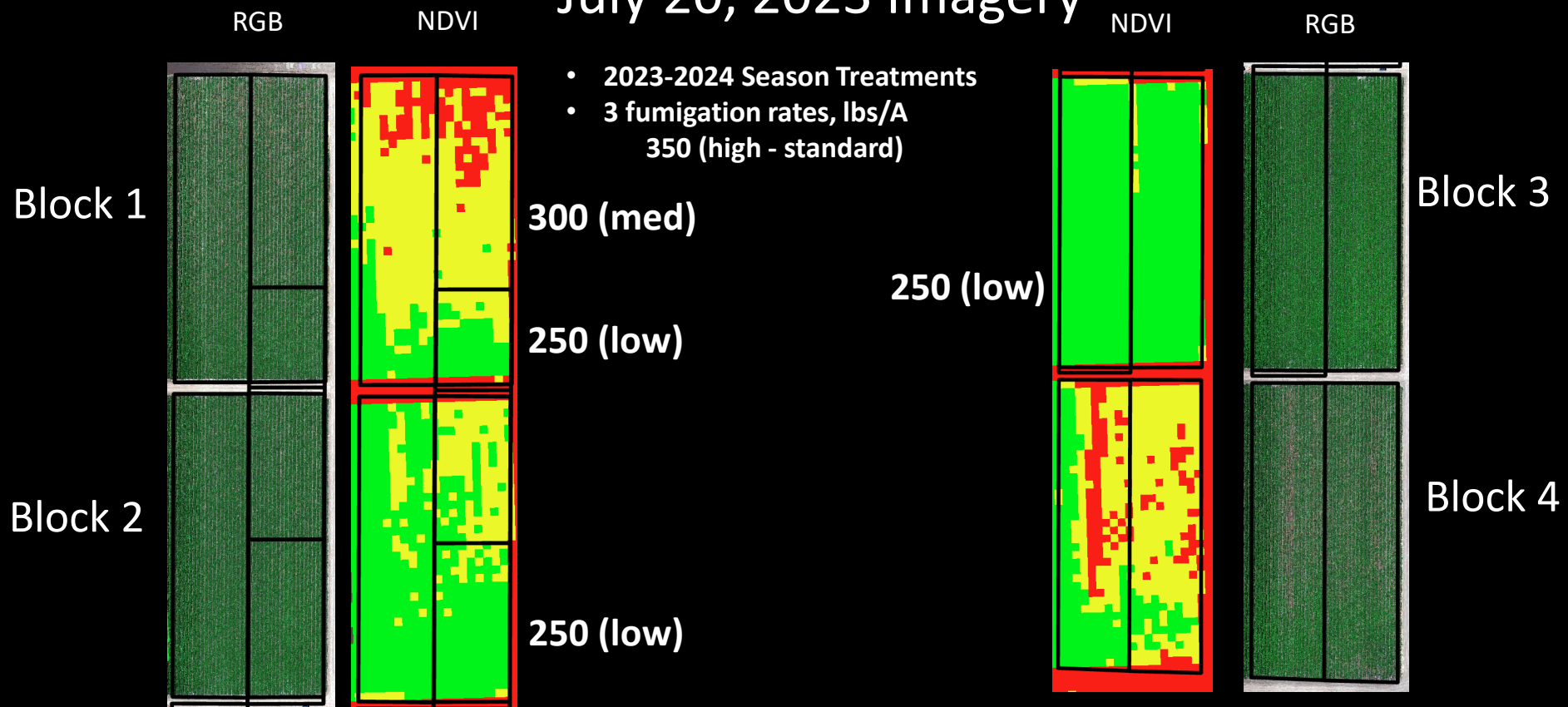
# July 20, 2023 Imagery



- 3 fumigation rates, lbs/A  
350 (high - standard)

Color	Upper value	Label
Red	≤ 0.65	0.089 - 0.65
Yellow	≤ 0.75	0.651 - 0.75
Green	≤ 0.967537	0.751 - 0.968

# July 20, 2023 Imagery



- 2023-2024 Season Treatments
- 3 fumigation rates, lbs/A  
350 (high - standard)

Color	Upper value	Label
Red	≤ 0.65	0.089 - 0.65
Yellow	≤ 0.75	0.651 - 0.75
Green	≤ 0.967537	0.751 - 0.968



# Remote Sensing in Practice

- Improved scouting efficiency for diseases and other pest issues – still need ground validation
- Disease/pest progression in annual or perennial crops with repeated sampling
- Earlier and more accurate disease and pest detection, perhaps even prior to being visible with the naked eye



# Fusarium Wilt (Yellows) of Celery



Stunting often seen  
w/*Foa* race 2



Stunting and death often seen within  
weeks of planting w/*Foa* race 4



# Disease Symptomology



# Disease Symptomology









