Phenocart - Ground based field phenotyping

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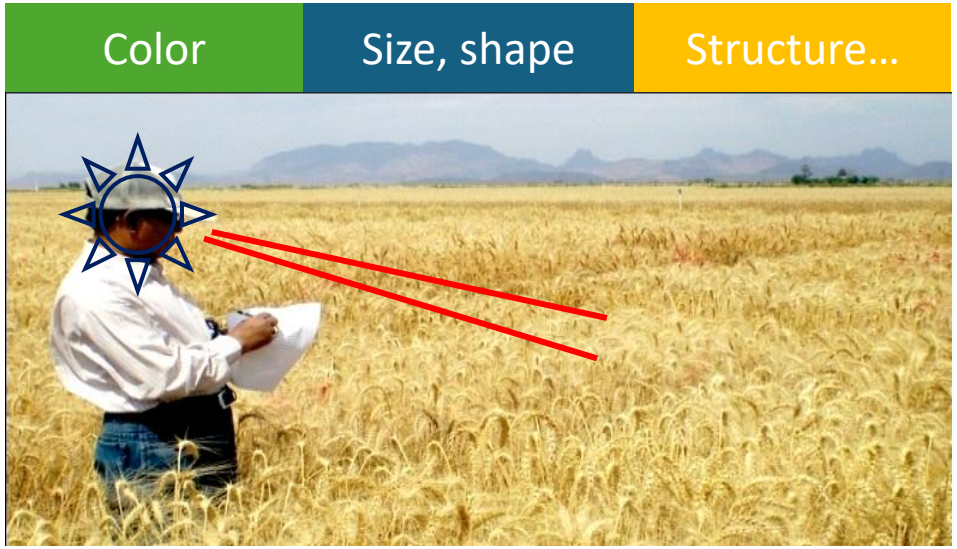
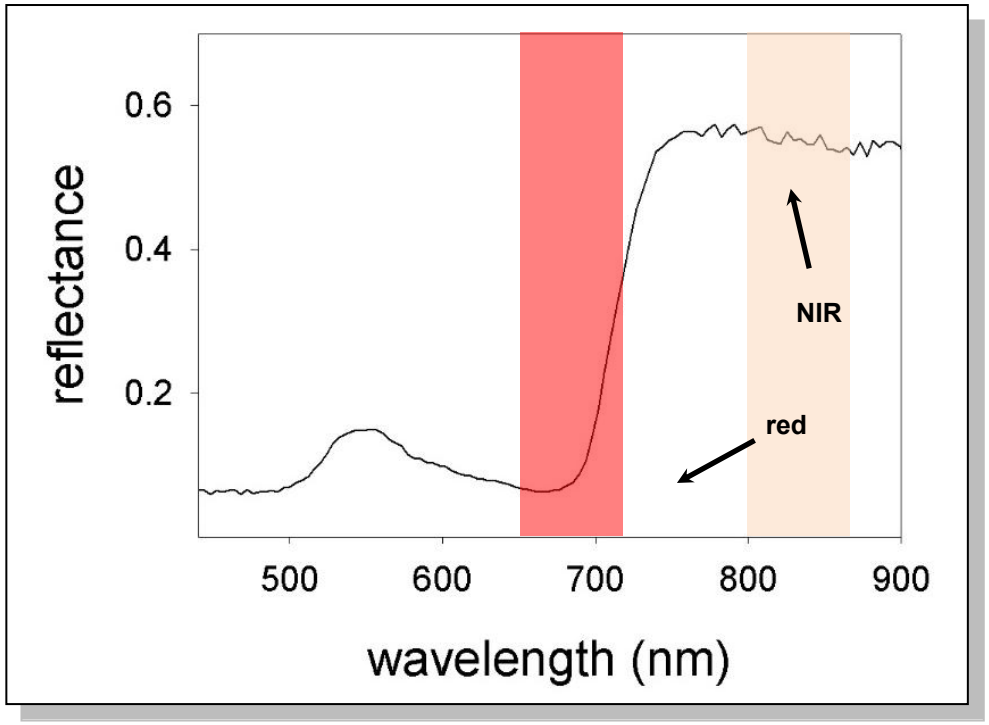
How do you describe the characteristics of your plants in the field?

Seed form	Seed color	Pod form	Pod color	Flower color	Flower position	Stem length
 Round	 Yellow	 Inflated	 Green	 Purple	 Axial	 Tall
 Wrinkled	 Green	 Constricted	 Yellow	 White	 Terminal	 Short



https://www.biologycorner.com/bio2/genetics/notes_mendel.html

Sensors and instruments: breaking our physiological limitations

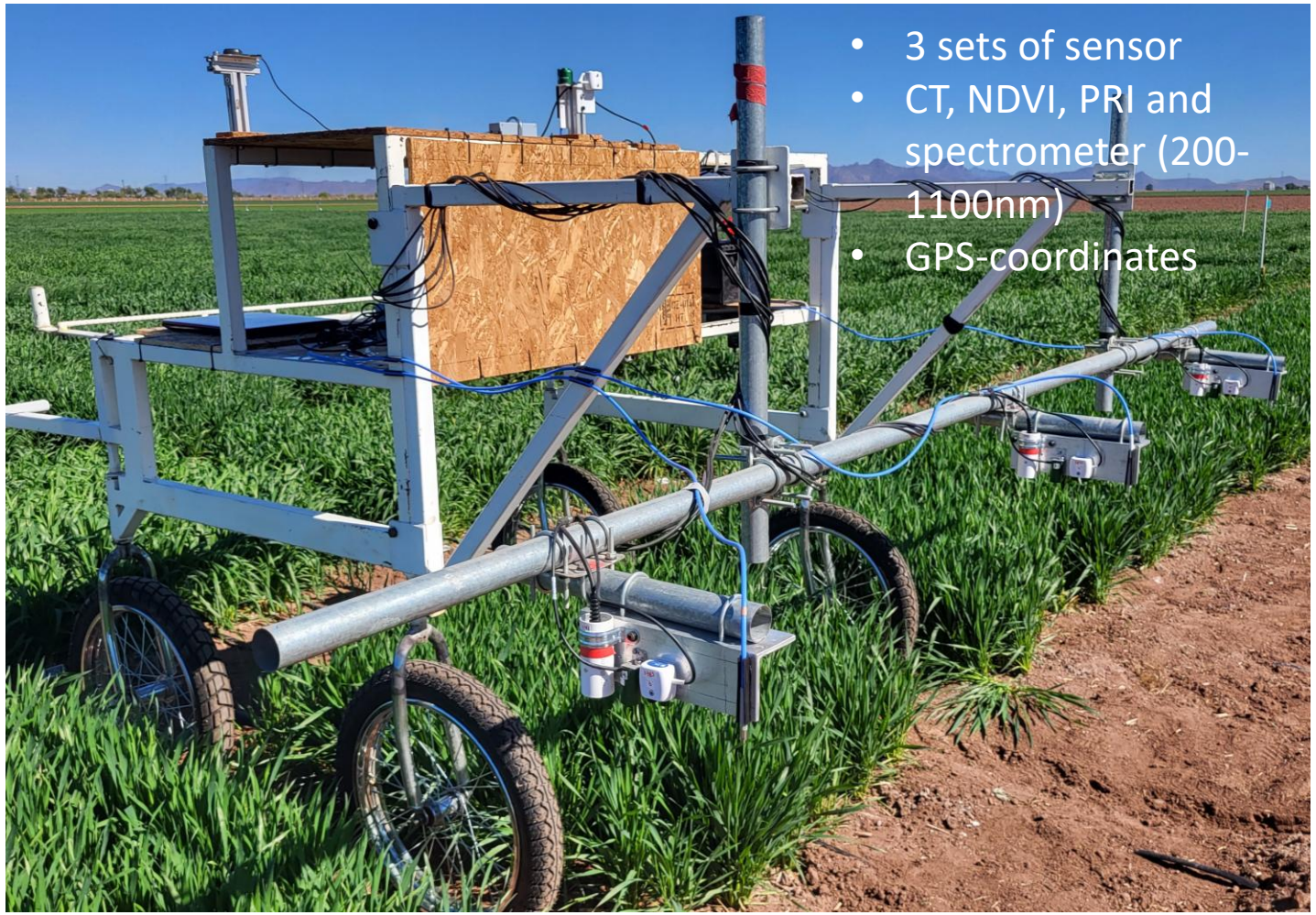


$$NDVI = \frac{R_{NIR} - R_{RED}}{R_{NIR} + R_{RED}}$$

Infrared thermometer

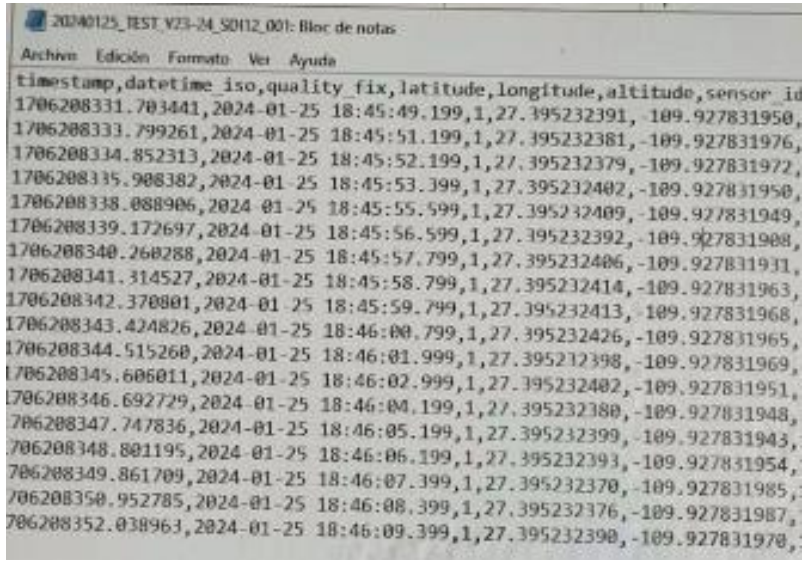
- Canopy temperature
- Strong correlation with root capacity & yield

Phenocart - multi sensor field phenotyping system

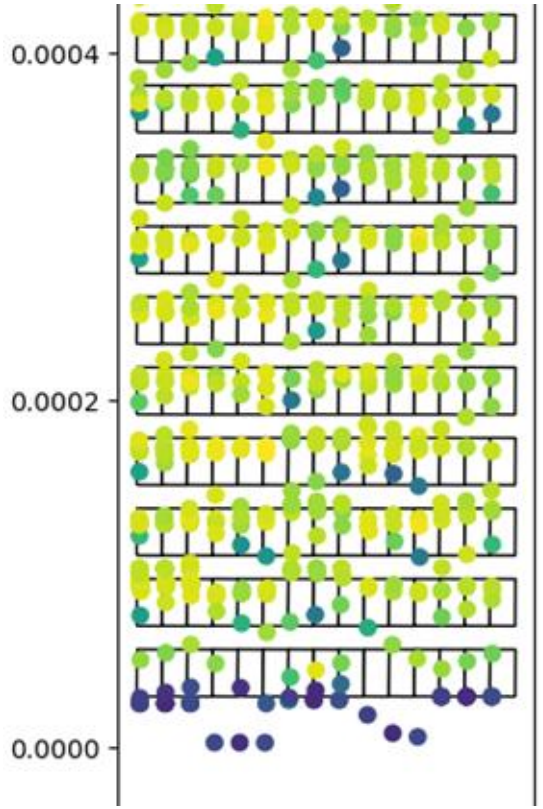


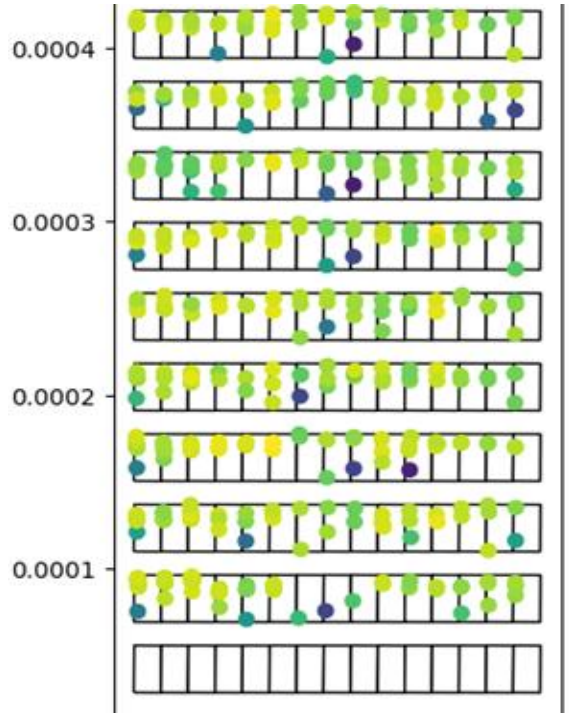
Crain et al., 2016, Crop science

Phenocart - Data process and extraction

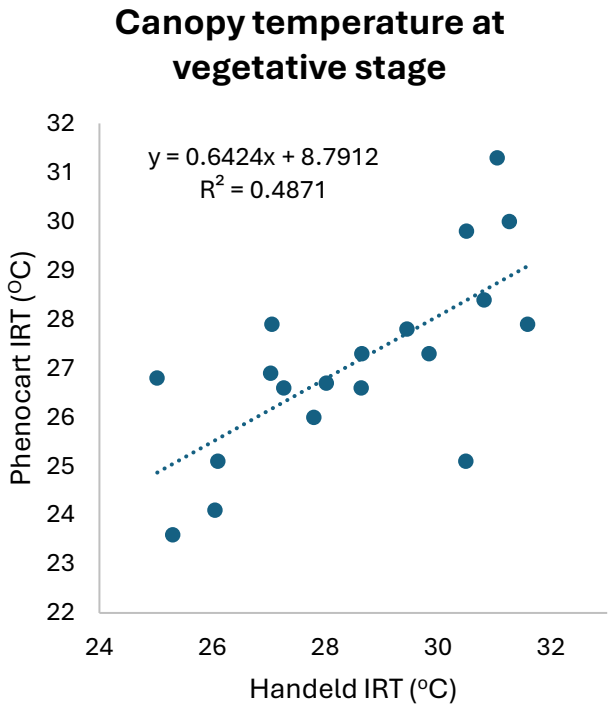


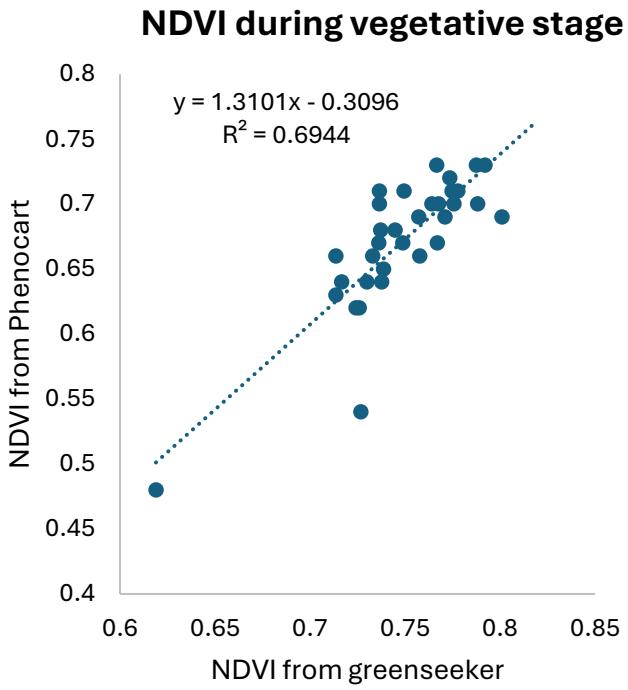

```
# Asumiendo que las columnas se llaman 'longitude' y 'latitude' (ajusta según s
trial_temperatures_shp = gpd.GeoDataFrame(trial_temperatures, geometry=gpd.poin
trial_ndvi_shp = gpd.GeoDataFrame(trial_ndvi, geometry=gpd.points_from_xy(trial
trial_pri_shp = gpd.GeoDataFrame(trial_pri, geometry=gpd.points_from_xy(trial_p
trial_spec_shp = gpd.GeoDataFrame(trial_spec, geometry=gpd.points_from_xy(trial
#trial_spec_shp = gpd.GeoDataFrame(trial_spec, geometry=gpd.points_from_xy(trial

#Crear el gráfico
fig, ax = plt.subplots(1, 3, figsize=(10, 10))
for x in ax:
    trial_shp.plot(ax=x, color='white', edgecolor='black')

trial_temperatures_shp.plot(ax=ax[0], column='target_temp_C')
trial_ndvi_shp.plot(ax=ax[1], column='index_value')
trial_pri_shp.plot(ax=ax[2], column='index_value')
trial_spec_shp.plot(ax=ax[2], column='ndvi')

# Agregar títulos a cada subgráfico
ax[0].set_title("Canopy temperature", fontsize=12)
ax[1].set_title("NDVI index", fontsize=12)
ax[2].set_title("spec NDVI", fontsize=12)

# Ajustar el diseño para evitar superposición
plt.tight_layout()

# Mostrar la figura
```

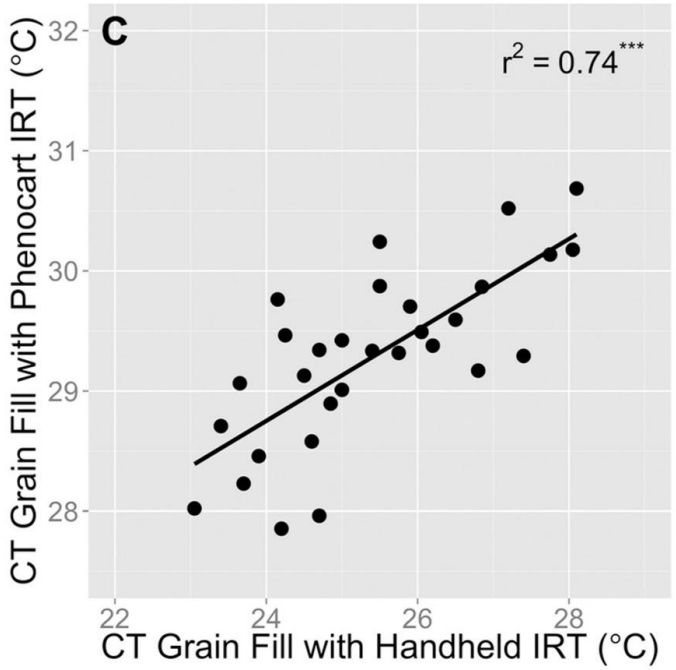




Phenocart - Data validation







Crain et al., 2016, Crop science

The way to breeder-ready field phenotyping platform

A few key points for discussion

- Possible adoption by NARS
- Standardization and automation
- More sets of sensors

An option of portable, affordable and reliable ground-based HTP platform

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Thank you for your interest!

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