

Black bird meeting

Background:

The blackbird takes images of hemp leaf punches and uses a nn to quantify downy mildew leaf severity.

Experimental design

1. 64 hemp cultivars for susceptibility to two different isolates of the downy mildew pathogen *Pseudoperonospora cannabina*.
2. Trays may be unbalanced between replications - similar to a prep
3. 2 susceptible checks per tray

BI has been asked to help develop solutions to two major issues in the pipeline:

Issue 1 - validation

One of the biggest issues we currently have is easily connecting the disease severity (the % disease that each leaf disk has when imaged each day) to the image for that day. Because we are seeing more variability than we expect in the disease severity ratings, we need to be able to look at the disk image to determine if the neural network is calling the correct % disease or if it needs additional training. If it would be possible to somehow connect images to cells on a spreadsheet (sorted by date, excel file inherits name, each cell corresponds to a cultivar name) **Allow for visual validation**

Proposed solution:

Develop a Rshiny or Python program to allow the user to click on the nn results and view an image of the leaf disk. AJ will drive up to geneva to better understand the issue

Issue 2 - Managing inter and intra-tray variance.

Trays may be unbalanced, and also missing reps.

Proposed solution

Use asreml for mixed model analysis:

1. Use 2-phase analysis using variance covariance matrix of stage one means in stage 2 to weight entries appropriately in the residual term, similar to a MET
2. Interest was expressed in directly using controls within trays to normalize values → Implement

conditional factors in residual term to leverage controls.