Measurement exercise

Methods of Scientific Working for Crop Science (3502-440)

Prof. Dr. Karl Schmid

October 28, 2024

1 Phenotyping severity of infection

Phenotyping by visual inspection is frequently used in many field trials of crop plants, e.g., in plant breeding.

Frequently a so-called grade-scale is used in which quantitative phenotypea are translated into grades. The scoring card in Figure 1 is an example for this type of phenotyping. The disease severity is measured the the proportion of leaf area affected by the disease.

In this exercise, we create a dataset by phenotyping the leaves in Figure 2 using the phenotyping card in figure 1.

The leaves were inoculated under controlled conditions with the downy mildew pathogen *Peronospora variabilis* Colque-Little et al. (2021).

Please individually record the following data:

- Your matriculation number
- The plant number
- The leaf number
- The degree of severity of each leaf based on the scale in Figure 1

We will collect all data and discuss the results with respect to intersubject variability and other factors in the next class.

References

Colque-Little C, Abondano MC, Lund OS, Amby DB, Piepho HP, Andreasen C, Schmöckel S, Schmid K (2021) Genetic variation for tolerance to the downy mildew pathogen Peronospora variabilis in genetic resources of quinoa (Chenopodium quinoa). BMC Plant Biology 21(1):41, DOI 10.1186/s12870-020-02804-7, URL https://doi.org/10.1186/s12870-020-02804-7

Stanschewski CS, Rey E, Fiene G, Craine EB, Wellman G, Melino VJ, S R Patiranage D, Johansen K, Schmöckel SM, Bertero D, Oakey H, Colque-Little C, Afzal I, Raubach S, Miller N, Streich J, Amby DB, Emrani N, Warmington M, Mousa MAA, Wu D, Jacobson D, Andreasen C, Jung C, Murphy K, Bazile D, Tester M, on behalf of the Quinoa Phenotyping Consortium (2021) Quinoa Phenotyping Methodologies: An International Consensus. Plants 10(9):1759, DOI 10.3390/plants10091759, URL https://www.mdpi.com/2223-7747/10/9/1759, number: 9 Publisher: Multidisciplinary Digital Publishing Institute

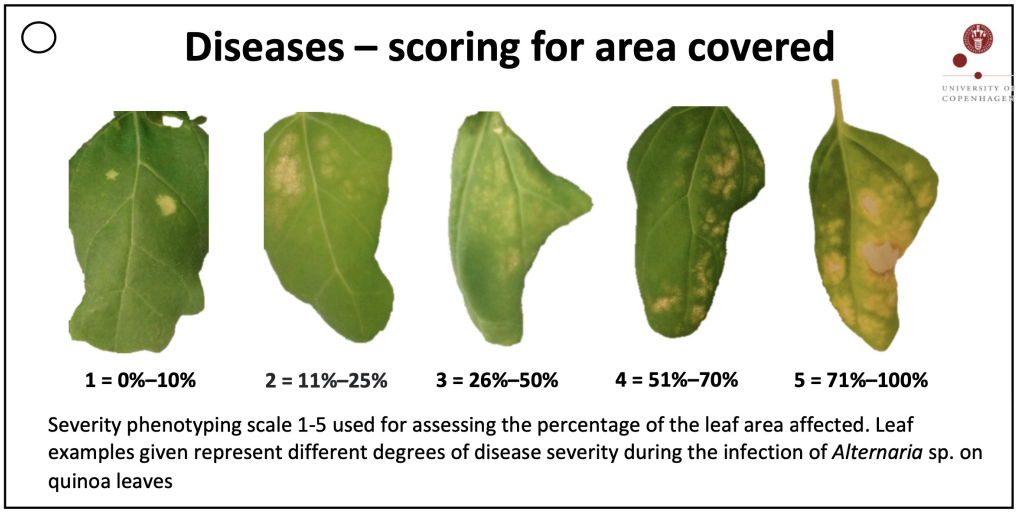

Figure 1: Scoring card for disease phenotyping. Source: Stanschewski et al. (2021)

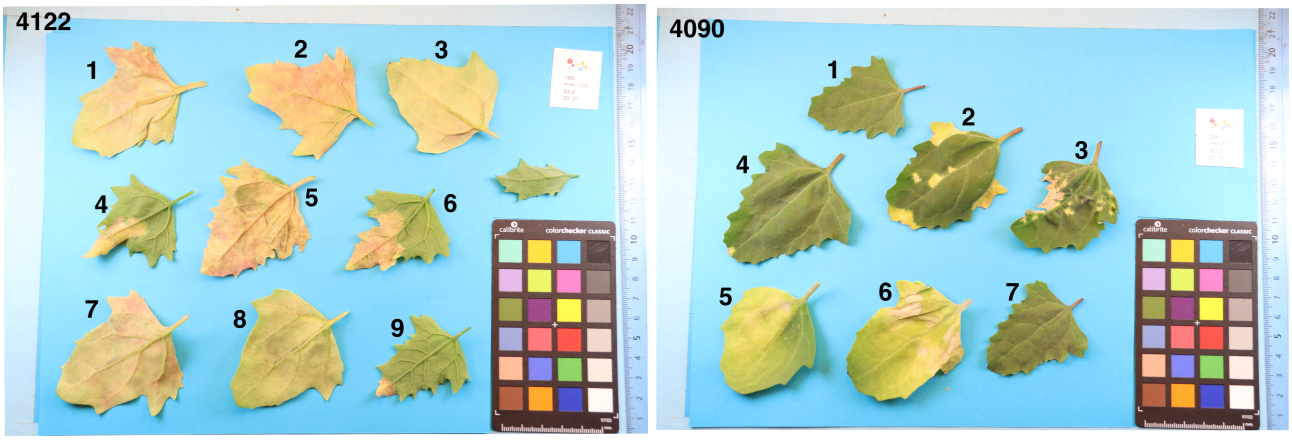

Figure 2: Leaves of two different quinoa plants that were inoculated with the fungal pathogen *Peronospora variabilis*. Source: Carla Colque-Little, University of Copenhagen