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Bachelor thesis/Master thesis on ordinal scores in oilseed rape breeding

Many agronomic traits are visually assessed on an ordinal rating scale. For example, susceptibility to the disease *Phoma lingam* in oilseed rape may be assessed on a rating scale from 1 (no symptoms) to 9 (very susceptible). Such data are often analysed by analysis-of-variance (ANOVA) procedures, which make strong distributional assumptions, such as homogeneity of variance and normality of errors. These assumptions are certainly violated by ordinal rating scale data, but almost invariably such data are analysed using ANOVA procedures.

In this thesis you will be analysing rating scale data assessed in an oilseed rape breeding program by NPZ Innovation GmbH (Hohennlieth, Schleswig Holstein, Germany). You will critically assess the distributional assumptions underlying ANOVA and compare ANOVA results to analyses using methods specifically tailored for ordinal data. Specifically, you will be using the so-called threshold model, which is a special kind of generalized linear model proposed for ordinal data. You will use this model to compute estimates of line effects and of heritability for the trials at hand.

The single-location and multiple-location data provided by NPZ Innovation comprise scores at the level of individual plants per plot. You will investigate the question how many ordinal scores per plot are needed to produce reliable results with the threshold model.

Your results will be discussed and shared with the breeding company.

If you are interested, please get in touch (piepho@uni-hohenheim.de).

Prof. Dr. Hans-Peter Piepho