Discussion

Outline

1. Introductory paragraph summarising the past chapters
    i) Hybrid breeding as an answer to conventional breeding
    ii) We examined various genetic parameters which are important to program
2. The necessity of stastical methods in hybrid breeding (previous few chapters)
    i) Hybrid breeding requires statistical modelling to evaluate genetic variance and trait architecture (chapter 2) A. Can use this for future selection forecasting
    B. Impact of selection on other traits
    ii) Technologies like genomic prediction can be applied quite simply A. Require smaller training set sizes relative to tetraploids B. You are driving selection of parent development C. Hybrid prediction for coming cycles
    iii) We can evaluate the efficiency of different technologies
    iv) We can evaluate the efficiency of different models and information
3. Statistical genetic topics critical in potato
    i) Dealing with low seedling and tuber-sown genetic correlations A. Touch on seedling versus clonal cropping systems B. Review literature on lack of correlation C. Propose early seedling evaluation and multi-trait prediction models as potential solution
    ii) Evaluating GxE and sensitivity rigorously A. Siezing ploidy. Effective tetraploid mining for diploid breeding B. Address other breeding strategies such as bridge breeding (Corentin Clot)
4. Statistical genetic topics crucial in hybrid breeding
    i) Fertility and seed production in potato inbreds A. Affordable production B. inbreeding depression C. Genetic factors outside *sli*
    ii) Genetic transformation A. The collaborative role of gene-editting in quantitative trait improvement B. The need for regeneration and transformation as traits
        - Necessary for Doubled haploids, genetic transformation, and double monoploid production
        - Genetic variation in response identified in potato
        - Genes found in other crops (Koornneef et al. 1993) C. Building elite inducers (Delzer et al. 2024)
    iii) Pipeline for new traits for new production systems
5. Wrapping up / Conclusions about hybrid breeding in potato
    i) Current status of hybrid breeding research in potato
    ii) This thesis' place in advancing knowledge about hybrid potato

References

Delzer, Brent et al. (Feb. 1, 2024). "Elite, Transformable Haploid Inducers in Maize". In: *The Crop Journal* 12.1, pp. 314–319. ISSN: 2214-5141. DOI: 10.1016/j.cj.2023.10.016. URL: https://www.sciencedirect.com/science/article/pii/S2214514123001757 (visited on 02/25/2025).

Koornneef, Maarten et al. (1993). "Characterization and Mapping of a Gene Controlling Shoot Regeneration in Tomato". In: *The Plant Journal* 3.1, pp. 131–141. ISSN: 1365-313X. DOI: 10.1111/j.1365-313X.1993.tb00016.x. URL: https://onlinelibrary.wiley.com/doi/abs/10.1111/j.1365-313X.1993.tb00016.x (visited on 02/25/2025).