

Genome-wide association mapping for seedling vigor in oat at tropical/sub-tropical temperature

Chien-Cheng, Hung ¹, Kathy Esvelt Klos², Yung-Fen Huang^{1,*}

¹Department of Agronomy, National Taiwan University, Taiwan;

²Small Grains and Potato Germplasm Research Unit, United States Department of Agriculture, Agricultural Research Service, Aberdeen, ID, USA.

Forage crop planting in Taiwan is dominated by plant species suitable for tropical/sub-tropical growth, such as *Pennisetum* spp. and *Digitaria decumbens* St. Therefore, forage production is higher during the spring-summer than fall-winter seasons, leading to a significant imbalance in the supply of domestically produced forage. As Oat (*Avena sativa* L.) is grown during the winter in Taiwan it could fill the winter forage gap. We are re-initiating oat breeding in Taiwan and one of our goals is to enable selection at early developmental stages for efficient breeding. Therefore it is important to understand the relationship between seedling vigor and biomass production. The goal of this study is to investigate the genetic architecture of oat seedling vigor-related traits. We evaluated 105 oat lines from the Collaborative Oat Research Enterprise (CORE) and six check varieties, in a pot experiment at 25°C in a growth chamber to the 3-leaf stage (28 days). Plant height, emergence rate, percentage of emergence, and seedling growth rate were measured. Phenotypic data collected in this study and genotypic data collected in previous studies are used for genome-wide association to identify genomic regions contributing to variation in seedling vigor-related traits.