

Machine Learning Approach for Predicting Flowering Time in Sorghum

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November 22, 2022

Abstract

Sorghum is an important cereal crop grown across the globe for its grain and biomass value. It can also efficiently use resources such as nitrogen, and multiple varieties that are nitrogen-use and light-capture efficient are constantly being developed. This study focuses on using the spectral signature of sorghum varieties to predict flowering days, which could be used as a proxy for plants' growth/productivity and development trends, thus helping breeders make quick decisions about what varieties to move to the next stage. Multiple sorghum varieties from the sorghum association panel were planted in a replicate-design field experiment with the variable supply of nitrogen. The flowering days were monitored and recorded. The hyperspectral reflectance data were collected and used to build a sorghum flowering days predictive model. Although regression models such as partial least square have been used to predict plants' phenotypes, the non-parametric ensemble machine learning model turned out to perform better on flowering days with an accurate model up to 5 days.

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Random forest

Hyperspectral

Flowering



Acknowledgement: INBRE-NE, NAPPN, and The Charles O. Gardner Professorship
Endowment

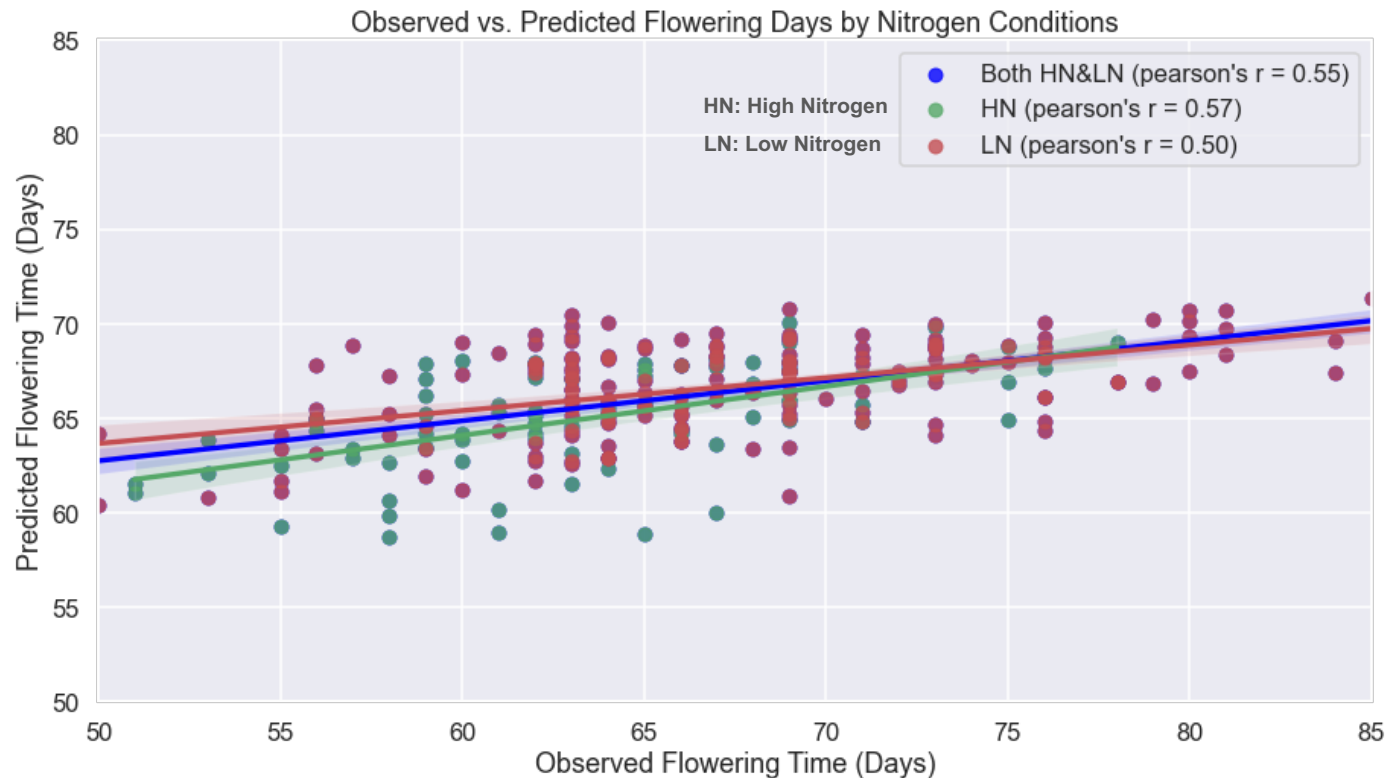
21 days

to score flowering time
in the field.



To 1 day

to score using our
model.



Nishimwe, A., Zwiener, M., Grzybowski, M., Ge, Y., and Schnable, J. C., "Machine learning approach for predicting flowering days in sorghum," *Earth and Space Science Open Archive*, 6 (2021). Retrieved from <https://doi.org/10.1002/essoar.10508812.1>



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