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Cereal Improvement through Variety choice and understanding Yield Limitations

Description of Work

Crop development models are being produced to determine the yield potential of winter wheat and spring barley in Ireland. Despite some of the highest yielding cereals globally, estimations of yield potential for Irish cereals have indicated that up to 100% increases in yield may still be possible. These estimations are typically based on crude calculations using average national weather data. Using detailed crop growth and development data collected in recent years from wheat and barley monitor crops located across the island of Ireland, we are able to construct yield potential estimation models that are parameterised by the typical development of crops in Irish conditions. Furthermore, using GIS technology we propose to create surface maps of the country that will allow of the spatial analysis of cereal yield potential. There may also be an opportunity to integrate the models with short-term weather prediction models to estimate the yield potential of crops approaching harvest.

International Context

Currently this work is very much set in an Irish context, as the model design is based on the typical growth and development of Irish crops. Internationally an array of highly detailed wheat growth models have been established and are used as tools for research crop physiology, however the mobility of these models is low due to their high requirement for input information. In addition, research models estimating yield potential also exist in other countries, however to the knowledge of the authors none has been created to operate with the detail in relation to crop growth and development. Therefore this work is relatively novel to the area internationally.

Opportunities

Initially, the outputs of the project will assist in the identification of the potential factors which limit wheat and barley yield in Ireland. This may provide new information on areas of the country that may be suited to these crops that are not currently considered, or detail the contrasting limitations that affect crops spatially across the country and therefore husbandry recommendations may change for farmers depending on location. Furthermore, the prediction of crop yield potential presents many opportunities for tools to optimise crop husbandry during the growing season in order to maximise yield production from the predicted climatic conditions.

Contact *John Spink* Email: *John.Spink@teagasc.ie*