NEXT GENERATION VARIETY TESTING FOR IMPROVED DURUM WHEAT

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In recent years, rapid developments in genomics, phenomics, molecular biology, and digital technologies including data augmentation have opened up a multitude of opportunities for the 'next generation' variety selection. The combination of these technologies will allow increasing our ability to predict variety performances with higher accuracy, timesaving and resource-use effective protocols. This is relevant to allow the breeders to develop and valorise improved varieties with higher agronomic performance and to combat environmental challenges including climate change effects on both abiotic and biotic stresses. Variety evaluation is also crucial for the registration process including both DUS and VCU criteria.



Location of the different VCU trial of Innovar proyect.

The EU H2020 Innovar ('Next-generation variety testing for improved cropping on European farmland') project's objective is to augment varietal registration protocols by linking morpho-physiologic agronomic traits with varietal genomic signatures and the presence of loci of agronomic interest. To develop improved and harmonized selection criteria for VCU in durum wheat, we set up a network of 11 trials in 4 different countries.



Thirty different characters as to crop development, disease resistance, or yield-related traits are being assessed in 170 durum wheat varieties. Innovar core VCU trials included two management regimes (full and minimal) representing more sustainable management practices. Drought- and organic-specific trials will be used to study the adaptation to water shortage and to



organic farming.



On site meteorological stations and soil physical and chemical analysis are being deployed for a detailed trial/sites characterization. Base line inventory of the soil and site conditions has been recorded. Observations has been done according to international protocols (FAO Guidelines for Soil Description (2006). Soil sampling done by genetic soil horizons for laboratory analyses.

soil



Images are being taken at different 10 key stages following the INNOVAR phenomics protocol on VCU trial. RGB portable camera are being used to collect images for each VCU plot



All these data are being incorporated in the Innovar database and will be used for complex modelling and machine learning analysis to facilitate the harmonization of VCU trials across Europe and to optimize a new variety of recommendation system through an Innovar App.

This App will assist growers the informed varietal in choice based on a highperformance low risk (HPLR) that categorisation will indicate the best varieties options while taking into account agroclimatic conditions and disease risk.

* Equal contribution

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