

## DEVELOPING WELL ADAPTED HYBRIDS IN EUROPE BY USING A G\*E APPROACH

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### ABSTRACT

The expression of sunflower yield is determined by biotic and abiotic factors. Breeding work allows, most of the time, to find efficient answers for pests or diseases damages, but the interaction between varieties and environmental criteria is more difficult to analyze and therefore to select. First studies carried out in France by INRA and TERRES INOVIA demonstrated the possibility to structure the Genotype \*Environment interaction using pedo-climatic parameters, at different stages of the sunflower cycle, and highlighted differences of behavior between hybrids. On that basis, we developed our own research program using data collected for the last 10 years on our European sunflower testing network, in order to find original agro-climatic indicators that explain the Genotype \*Environment interaction. Using strong statistical methods and computer tools, we were able to identify a limited number of different “climates” that summarize most frequent agro-climatic conditions present in the European sunflower area (10 different countries), and to find specific combinations of indicators for each “climate”. Moreover, a statistical model established with these indicators significantly explains part of the Genotype \* Environment interaction and highlights the capacity of some varieties to obtain stable and high enough yield in all the identified “climates”. The model is a powerful tool for the breeding or the marketing teams to characterize *a posteriori* testing locations and better analyze how relevant their network is. The use of that method in the breeding process will also be helpful in creating new hybrids broadly adapted to abiotic stresses.

**Key Words :** abiotic stress, Europe, G\*E interactions