

Public hearing on “Planting the Future - a new legal framework for seeds”
27 November 2023 in Brussels

Panel 1: Plant Reproductive Materials

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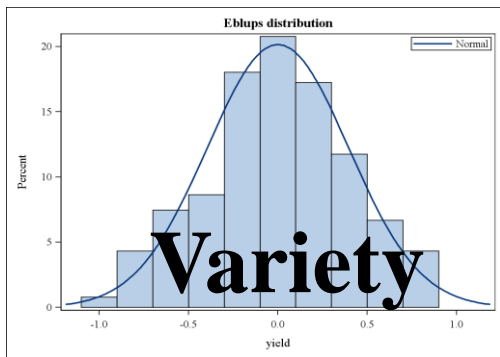
INSTITUTO
SUPERIOR DE
AGRONOMIA



In grapevine

Encouraging the use of polyclonal material

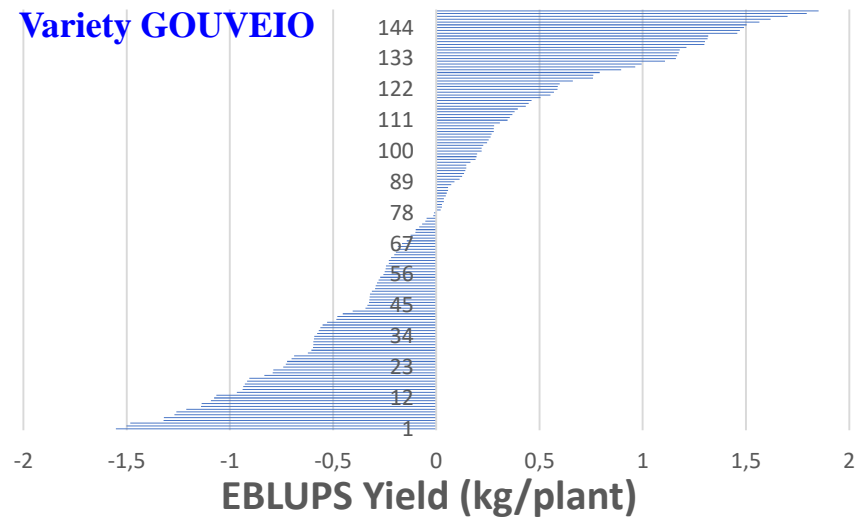
**To secure the sustainable use
of ancient grapevine varieties
for future generations**



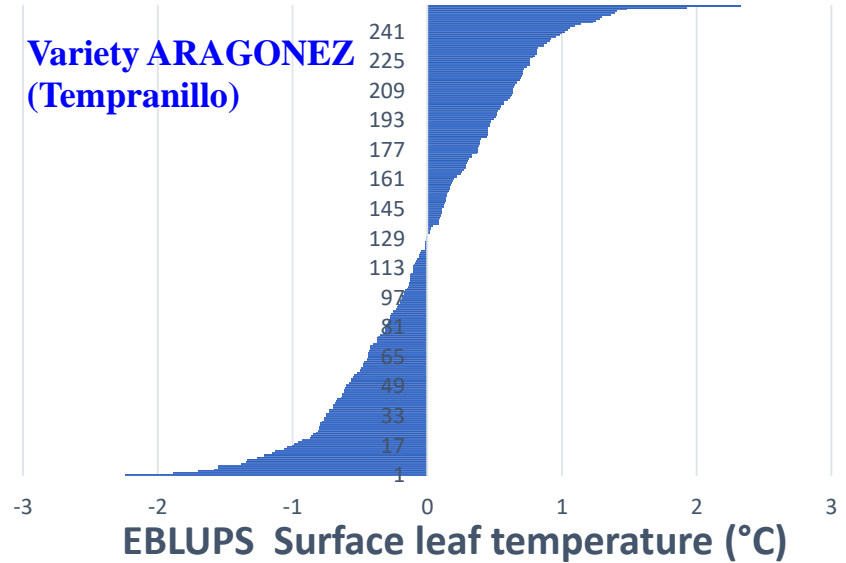
The differences within the ancient variety justify the selection

Empirical Best Linear Unbiased Predictors (EBLUPs) of the genotypic effects (deviations from the mean of the population)

Variety GOUVEIO



Variety ARAGONEZ (Tempranillo)



❑ The use of ancient varieties

**guarantees a strong historical and natural character,
which adds high economic value to viticulture and wine**

**❑ The intra-varietal variability allows to carry out selection within a
variety**

**and adapt it to the most diverse
environmental, agricultural, and market contexts.**

Why do we need polyclonal material?

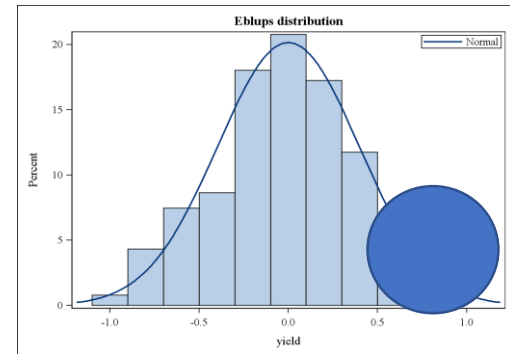
POLYCLONAL SELECTION

It is a combined strategy between conservation and selection

- It is performed in a field trial containing a representative sample of the intra-varietal variability



- Selection of a superior mixture of 7-20 genotypes for target traits



Polyclonal selection methodology:

- has been developed and applied for more than 40 years
- Resolution OIV-VITI 564B-2019: OIV Process for the recovery and conservation of the intra-varietal diversity and the polyclonal selection in grape varieties with wide genetic variability

Polyclonal material

Heterogeneous genetic material

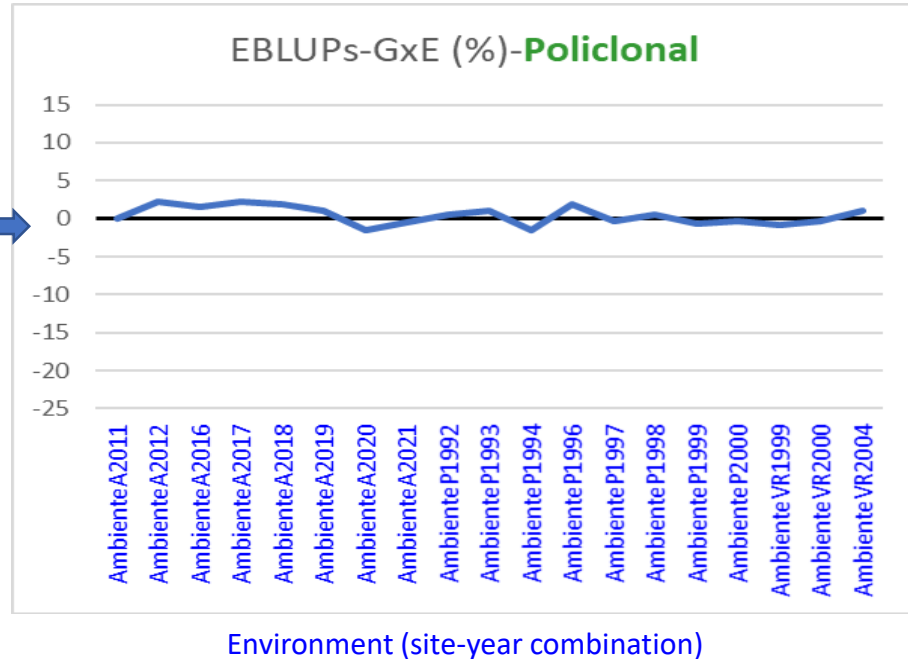
(a balanced mix of 7-20 selected genotypes)

- **Less sensitivity to genotype×environment interaction (higher environmental stability)**
- **Accurate and precise genetic gains of selection**
- **Selection criteria immediately adaptable to new contexts (multiple types of polyclonal material)**

Less sensitivity to G×E interaction

Example: polyclonal material of Viosinho variety studied for yield in 19 environments

EBLUPs of G×E interaction effects close to zero reflect less sensitivity to G×E Interaction



Accurate and precise genetic gains of selection

Variety	Prediction interval (95%) for the genetic gain (%)	Observed gain (%)
Arinto	In Setúbal, [+12,7%; +24,7%]	In Pegões, 12,9%
Bastardo	In Pegões, [+13,8%; +26,3%]	In Alijó, 25,0%
Encruzado	In Alijó, [+12,4%, +24,2%]	In Nelas, 18,7%

By working with intra-varietal variability

**Selection criteria are adaptable to new contexts
(several types of polyclonal material)**

Criteria: yield, quality traits of the must, tolerance to biotic and abiotic stresses, etc.

Example: Bastardo (Trousseau) variety

Type of polyclonal material	Predicted genetics gains
Type I	Yield: +24,0% * (95% of confidence, +19% to +29%)
	Soluble solids: -0,8% n.s.
	Total acidity: +0,9% n.s.
	Anthocyanins: +1,1% n.s.
Type II	Anthocyanins: + 19,5%*
	Soluble solids: +0,6% n.s.
	Total acidity: +1,9 % n.s.
	Yield: + 2,3%*

- * Significantly different from variety average at 0.05 level of significance
- n.s., is not significantly different from the variety average at the 0.05 significance level.

Example of Aragonez (Tempranillo) variety:

3 types of polyclonal selection

Type 1

Predicted genetic gain

- Yield, +21.5%
- Maintain the sugar contents

Type 2

Predicted genetic gain

- Anthocyanins, +8.0%
- Sugar contents, +3.3%
- Yield, -20.4%
- Maintain the acidity

Type 3

Polyclonal selection: *abiotic stress tolerance*

A set of 12 genotypes with lower surface leaf temperature (-3.0°C) and simultaneously with gains in yield and maintaining other important traits.

Predicted genetic gain

- Yield, +14.1%
- Anthocyanins, +0.7%
- Maintain the sugar contents
- Maintain the acidity

Polyclonal material

addresses the challenges of climate change

and the protection of agrobiodiversity

Thank you for your attention