Phenotyping individual progenies of barley lines for yield and homeostasis at the whole plant level

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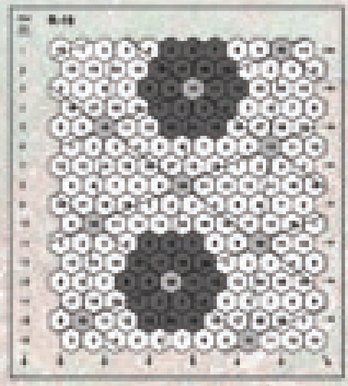
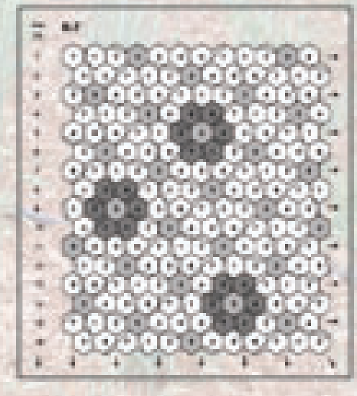
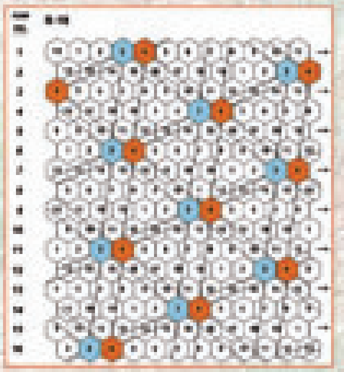




Accurate and precision phenotyping is a prerequisite for dissecting the molecular nature of polygenic traits and increasing the efficiency of breeding programs. The effectiveness of phenotyping methods, particularly for traits like yield and stability of performance, is reflected in their ability to reliably differentiate among very similar genotypes under real field conditions.

The documented negative correlation between yielding and competitive ability (Euphytica 50:57-62; 1990), if not properly considered, represents a major obstacle towards the goal of accurate field phenotyping. Another important decision concerns the use of appropriate selection designs. The honeycomb selection designs (PBR 13:87-139; 1995; FCR 75:191-209, 2002) are designs specifically conceived for evaluating single plants in the absence of the masking effects of intra-plant competition, providing for reliable estimation of agronomical parameters through multiple replicates (>>30) and unique layout properties that effectively eliminate the effects of soil heterogeneity.

Data will be presented of two years of phenotyping individual progenies of local barley lines for yield and homeostasis at the whole plant level, which led to the isolation of genotypes that differ with respect to quantitative traits, representing a series of valuable genetic material for dissecting agronomical traits at the molecular level.



Literature:

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Table 1: Ranking of selected progeny lines within the local barley cultivar 'Athenaida' in terms of the three components of crop yield potential after a [illegible] cycle of divergent honeycomb selection. [illegible]

Line Code	Yield Potential per plant		Stability of performance		Responsiveness to inputs		Response to selection	
	x̄	%	[illegible]	%	[illegible]	%	[illegible]	%
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
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Table 2: Correlation coefficients among the three components of crop yield potential of cv. Athenaida, signifying they are controlled by different groups of genes. 1= yield potential per plant, 2= stability of performance, 3= responsiveness to inputs.

*Significant at the 0.05 level

	1	2	3
1		0.50*	-0.28
2	0.50*		-0.19
3	-0.28	-0.19