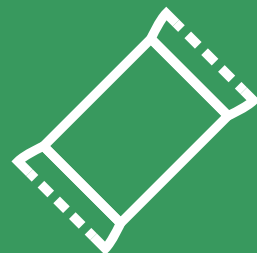


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Determine quality traits in bread wheat grain

Grain protein and microelements concentration and composition

Target: Use Seed-X non-destructive screening to determine quality traits in of bread wheat grain

Grain protein and microelements concentration and composition is an important quality measure which defines nutritional value. EcoBreed and Seed-X collaborated with the goal of improving wheat grain quality using Seed-X unique GeNee™ technology and EcoBreed's proprietary germplasm.

A set of unique landraces representing a wide range of quality parameters (protein and microelements content) was selected: 26 bread wheat lines, 21 unique landraces and 5 commercial varieties. This genetic collection was grown under the same conditions by EcoBreed and characterized for different quality traits, such as protein content and different micro elements, including Mg, Zn, and K.

Using the Seed-X AI seed-level phenotyping platform, the grain images were captured and used to train the system to develop a unique 'fingerprint' for each line. These 'fingerprints' were used to build 10 clusters of similarity groups (see figure and table below). Each cluster is highlighted in a different color. After building the cluster based on the seed's phenotypes, these 10 clusters were correlated to the different quality traits.

Summary of results **Next Page**



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Summary of results

Cluster 1 includes 4 of the commercial varieties present in this study. It can be seen that it presents low quality - low protein 11.9, and low Mg 1026 mic g.

On the other hand, this cluster has large grain size (correlated to high yields).

Cluster 3 includes 5 landraces.

It presents medium quality - protein 14.2, and Mg 1370 mic g and medium grain size.

Cluster 8 and 10 each includes 2 landraces, both clusters present small grain size with a high level of Mg, over 1500 mic g, cluster 8 present high level of protein while cluster 10 the level of protein is medium to high.

Cluster Number	# of lines in the cluster	Mg ug per g	Protein (%DW)	Seed area mm
1	4	1026	11.9	19.3
2	2	1139	13.0	18.8
3	5	1370	14.2	15.2
4	1	1344	14.3	15.9
5	2	1338	16.8	15.4
6	1	1412	21.2	18.6
7	7	1460	15.1	14.0
8	3	1539	16.4	14.3
9	2	1480	16.9	20.3
10	2	1536	15.5	14.4

Table 1: Summary of the different clusters created using the seed images average quality parameters

Dendrogram

Cluster 1:
Protein Low, Mg. Low,
Grain Large

Cluster 3:
Protein Medium, Mg.
Medium, Grain Medium

Cluster 8:
Protein High, Mg.
High, Grain Small

Cluster 10:
Protein Medium, Mg. High,
Grain Small

