

INFLUENCE IN YELLOWNESS OF ALLELIC VARIATION IN PSY-1A GENE IN A DURUM WHEAT RECOMBINANT POPULATION

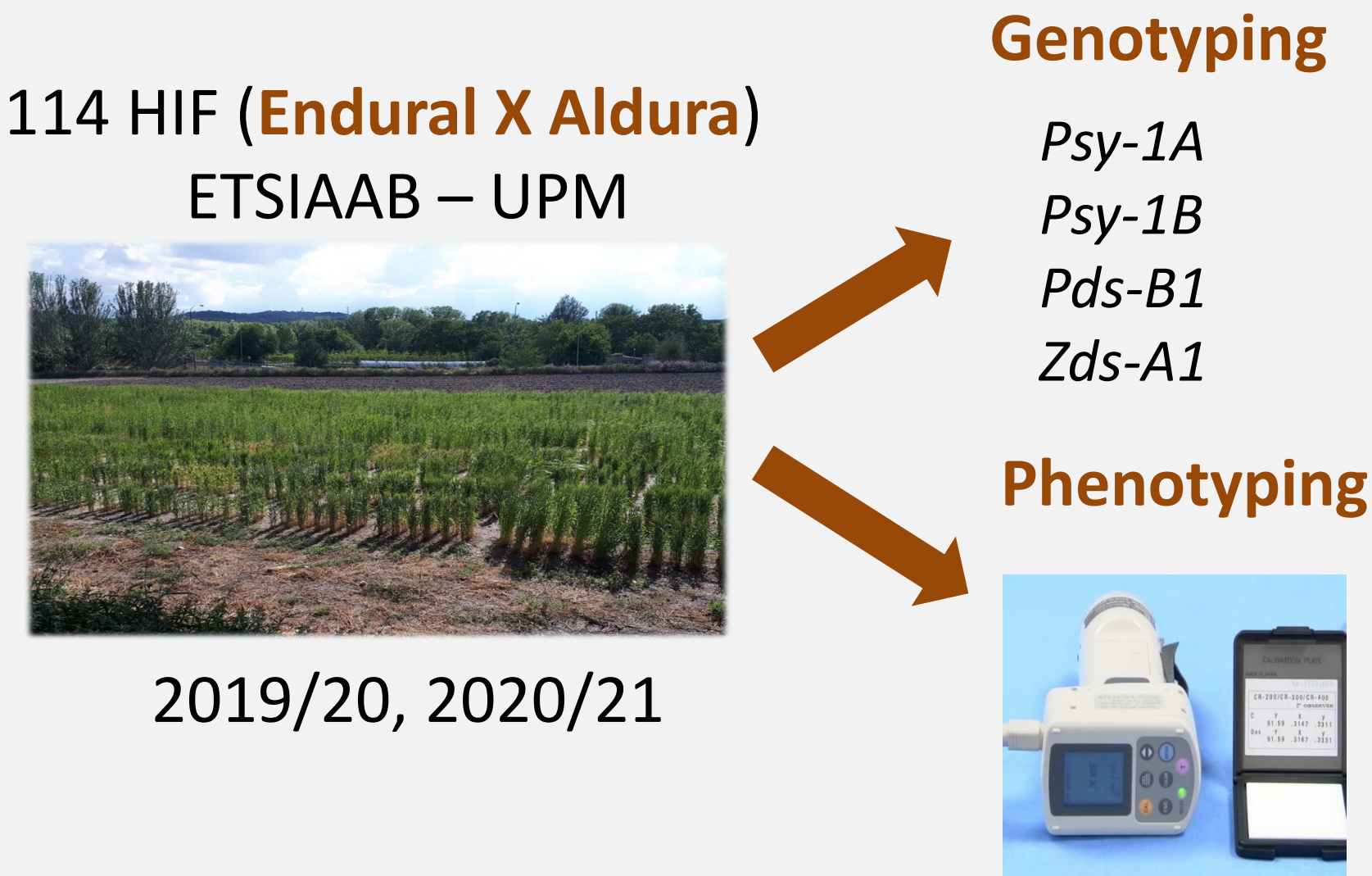
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Most of the breeding conducted in wheat has focused on improving yield. However, during this century, it has arisen an interest in improving wheat quality. Durum wheat quality is a complex mix of traits, from rheological properties, related to end use quality, to nutritional value (1). From those traits, yellow color is related with commercial value, since consumers prefer bright yellow for pasta products, but also with nutritional properties, as the yellow color is conferred by carotenoid pigments, whose nutritional benefits are well known (2). To advance knowledge of quality traits genetic control in durum wheat, we developed a bi-parental HIFs population (114 heterogeneous inbred families) from two durum wheat cultivars (Endural X Aldura) with contrasting phenotypes. Endural presents good rheological properties, while Aldura is not able to form gluten. Besides, they also differ on Semolina color.

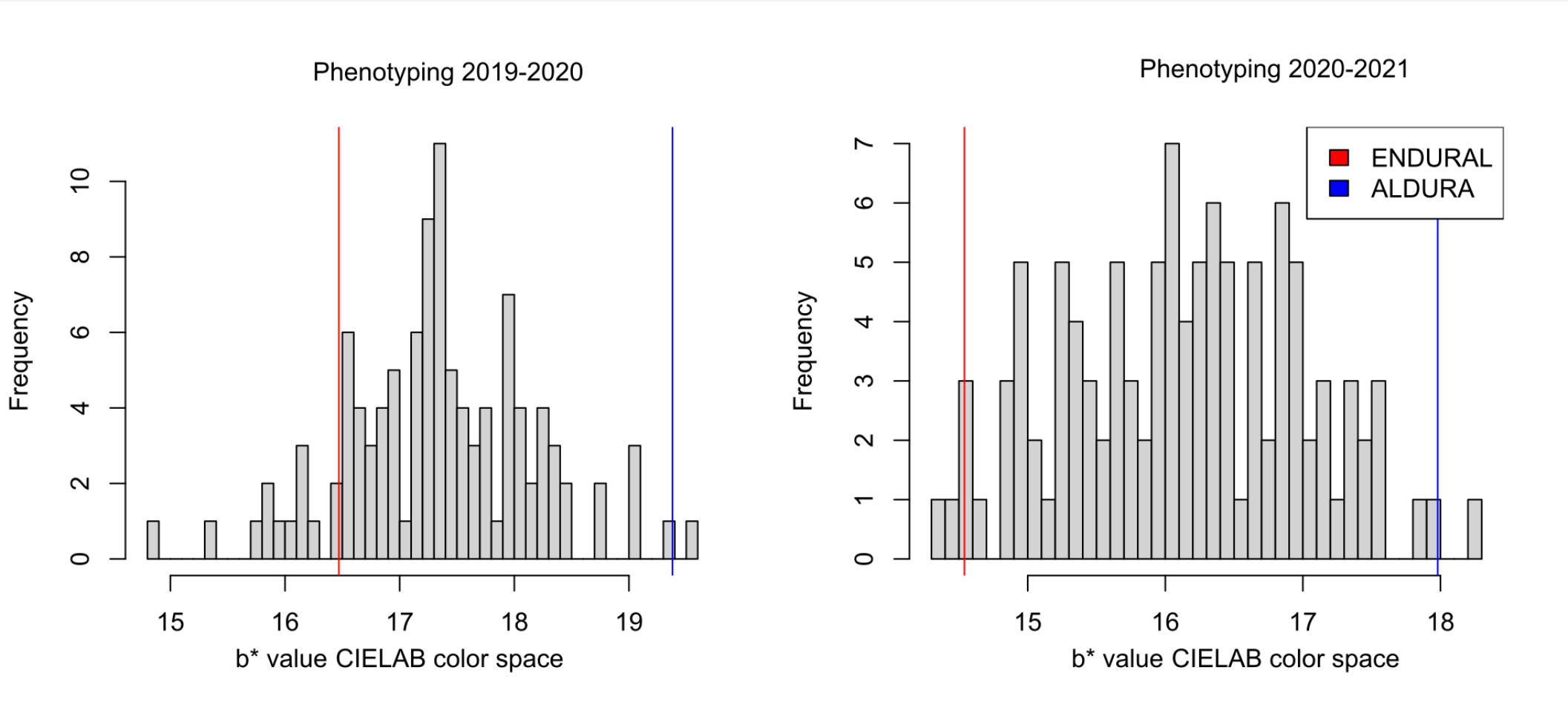
THE AIM OF OUR STUDY WAS TO IDENTIFY THE GENETIC FACTORS RESPONSIBLE OF THE DIFFERENCES BETWEEN ENDURAL AND ALDURA SEMOLINA COLOR AND TO SHED LIGHT IN THE CONTROL OF THIS TRAIT

Material & Methods



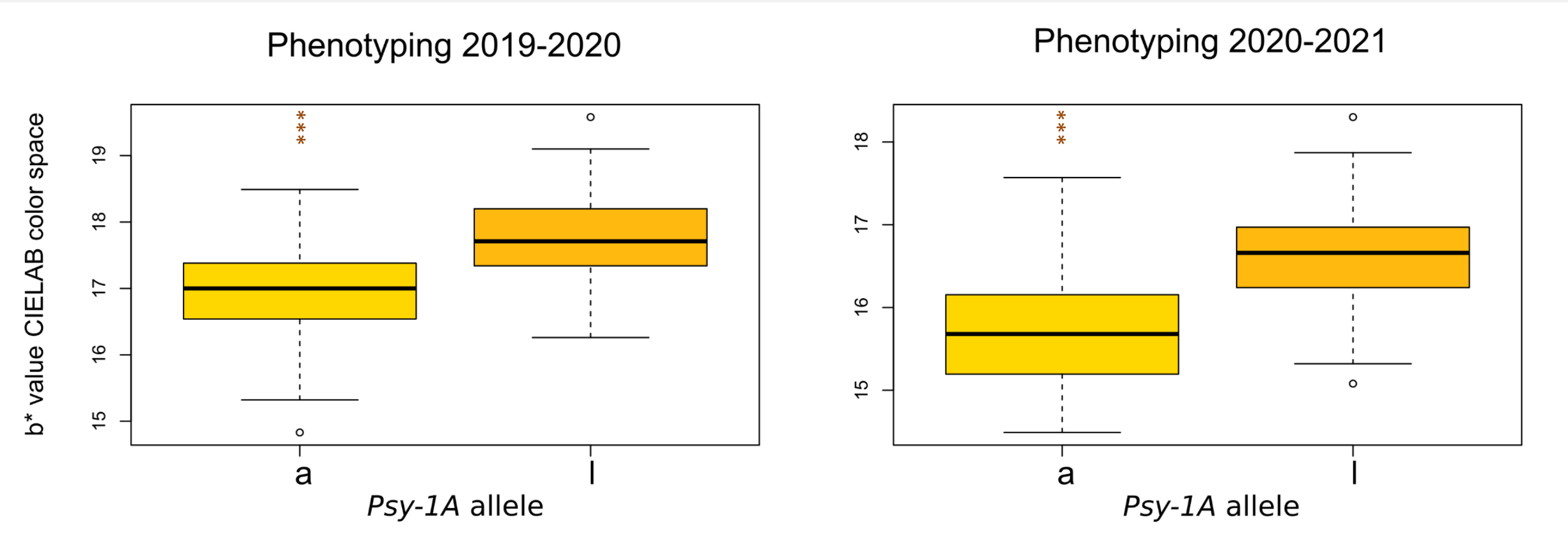
The phenotypic characterization of the Endural x Aldura population was conducted at 2019/20 and 2020/21 seasons, in the experimental fields of the ETSIAAB (UPM, Madrid, Spain). Wheat grains were harvested and milled, semolina color was evaluated by measuring L*, a*, b* (+ve is yellow, –ve is blue) and whiteness index parameters by means of a Minolta CR-300 Chroma Meter (Biolab Australia, Sydney). We screened Endural and Aldura cultivars for polymorphism on key genes related with carotenoids biosynthetic pathway (2). The whole population was genotyped only for the markers polymorphic between the parental lines.

Results & Discussion



- Endural and Aldura differ on Semolina color according to the b* value of the CIELAB color space.
- Endural x Aldura segregating population present variation for semolina yellowness, including some transgressive lines.

- For Phytoene synthase-1A Endural carried the allele *Psy-1Aa* and Aldura *Psy-1A_I*.
- There were no polymorphisms at the *Psy-1B*, *Pds-B1* (Phytoene desaturase) and *Zds-A1* (zeta carotene desaturase).
- The families carrying the allele *Psy-1A_I* had flour significantly more yellow.



OUR POPULATION, POLYMORPHIC ONLY FOR ONE OF THE KEY GENES RELATED WITH CAROTENOID BIOSYNTHETIC PATHWAY, PROVIDES A KEY TOOL TO STUDY THE FUNCTION OF PHYTOENE SYNTHASE (*Psy-1A*)