

Project Title: 2021 near-isoline (NIL) Glupro gene pair for grain protein

Objective: To evaluate the yield and quality performance NIL pairs in the presence and absence of high protein (Gpc-b1) gene under rainfed and irrigated environments.

Personnel: J.A. Torrion, Eeusha Nafi, Daniel Porter

Summary:

These trials were planted in rainfed and irrigated environments. A total of 5.5 inches of rain was received from emergence to harvest. In addition, the irrigated environment received 5.5 inches of irrigation during the growing season. Detailed management information is given in Table 1.

This project looks at the yield drag if high protein content is expressed on the line with the presence of the high protein allele. Generally, protein is higher when yield is lower – as in the case of the rainfed compared with the irrigated environment (Figure 1). The yield drag was observed in NIL pairs 061FAFS2, 061FAFS26, and 061FAFS33 that had the allele compared to their corresponding NIL pair without the allele. However, only the 061FAF33 was significant. Most of the yield differences due to the presence of the allele are insignificant. This project is able to identify high grain protein allele that does not cause a significant yield drag regardless of environment. As expected, high flag leaf senescence score was observed in rainfed compared with the irrigated. We also expect that the presence of allele accelerates senescence regardless of environment, but is inconsistent among NIL pairs.

Table 1. Management Information

Seeding date:	4/23/2021	Field Location:	R4
Julian date:	113	Harvest date:	8/14/2021
Seeding rate:	24 plants/ft ²	Julian date:	226
Previous crop:	Faba	Soil type:	Creston Silt Loam
Herbicide:	CleansweepM (6/1/2021)	Tillage:	Conventional
Insecticide:	None	Soil residual nutrient (NO₃-, P, K lb/A):	105-12-212-276(S) (Fall, 2020)
Fungicide:	None	Nutrient fertilizer applied (N, P₂O₅, K₂O lb/A):	125-45-80-10S (Spring, 2021)

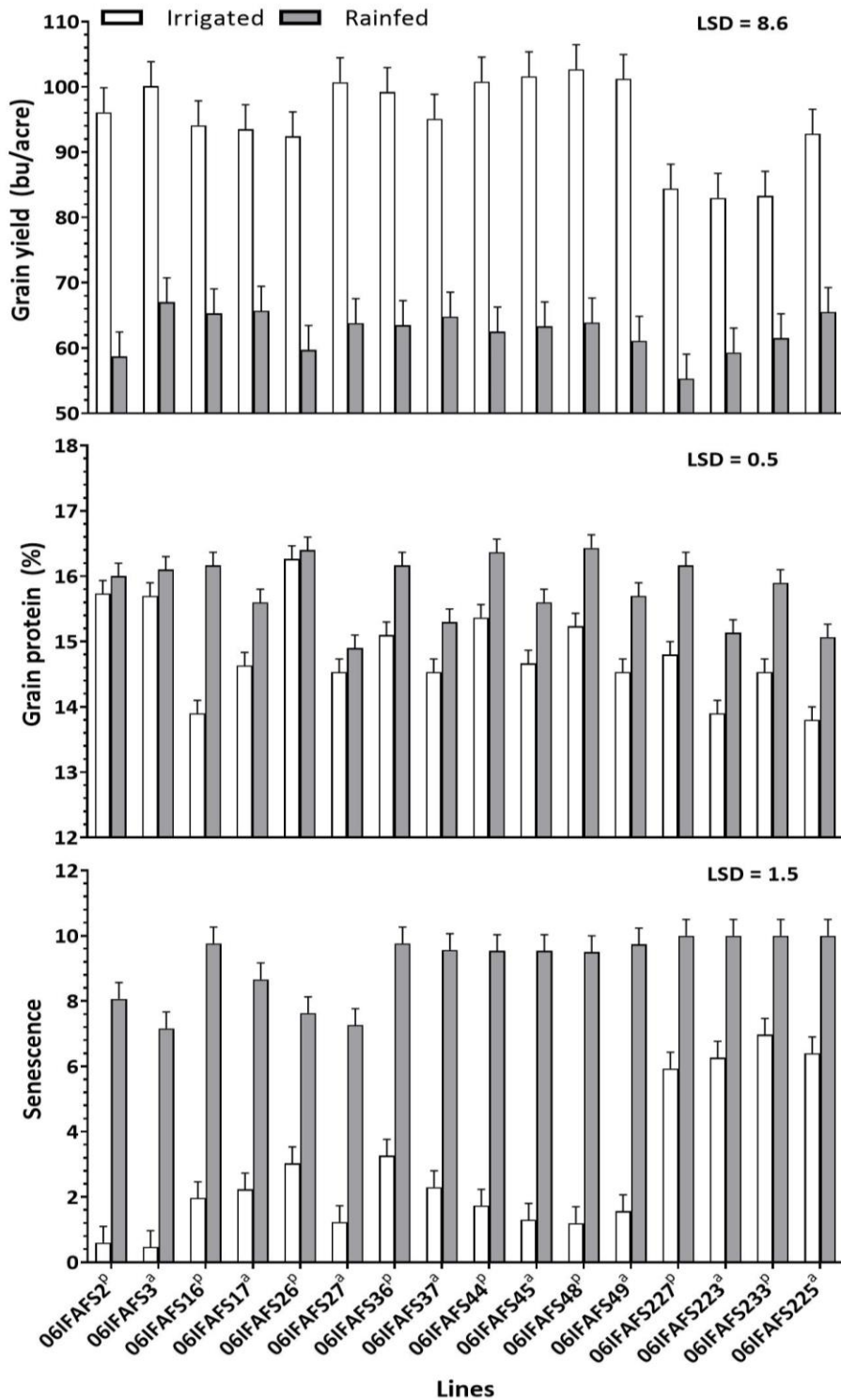


Figure 1. Near-isoline gene pair (superscripts ‘p’ for the presence of the high protein allele, ‘a’ for absence of the allele) interaction with the irrigated and rainfed environment for yield, grain protein, and the flagleaf senescence scored at near soft dough stage (0 being all green and 10 being all brown). LSD is least significant difference.