

**File name:** Supplementary Information

**Description:** Supplementary Figures, Supplementary Tables, Supplementary Note and Supplementary References

**File name:** Supplementary Data 1

**Description:** Differential Gene Expression and GO Enrichment

**File name:** Supplementary Data 2

**Description:** KASP allele specific PCR target polymorphisms and sequences

**File name:** Supplementary Data 3

**Description:** Protein sequences used for Phylogenetic analysis

**File name:** Supplementary Data 4

**Description:** 22 cultivars fully sequenced for VRS3

**File name:** Supplementary Data 5

**Description:** Geolocations and Vrs3 haplotypes of Wild and Landrace Barley accessions

**File name:** Supplementary Data 6

**Description:** *Vrs3* haplotype diversity across the landrace and wild germplasm surveyed

**File name:** Peer Review File