



GWAS reveals new genes involved in leaf trichome formation in polyploid oilseed rape (*Brassica napus* L.)



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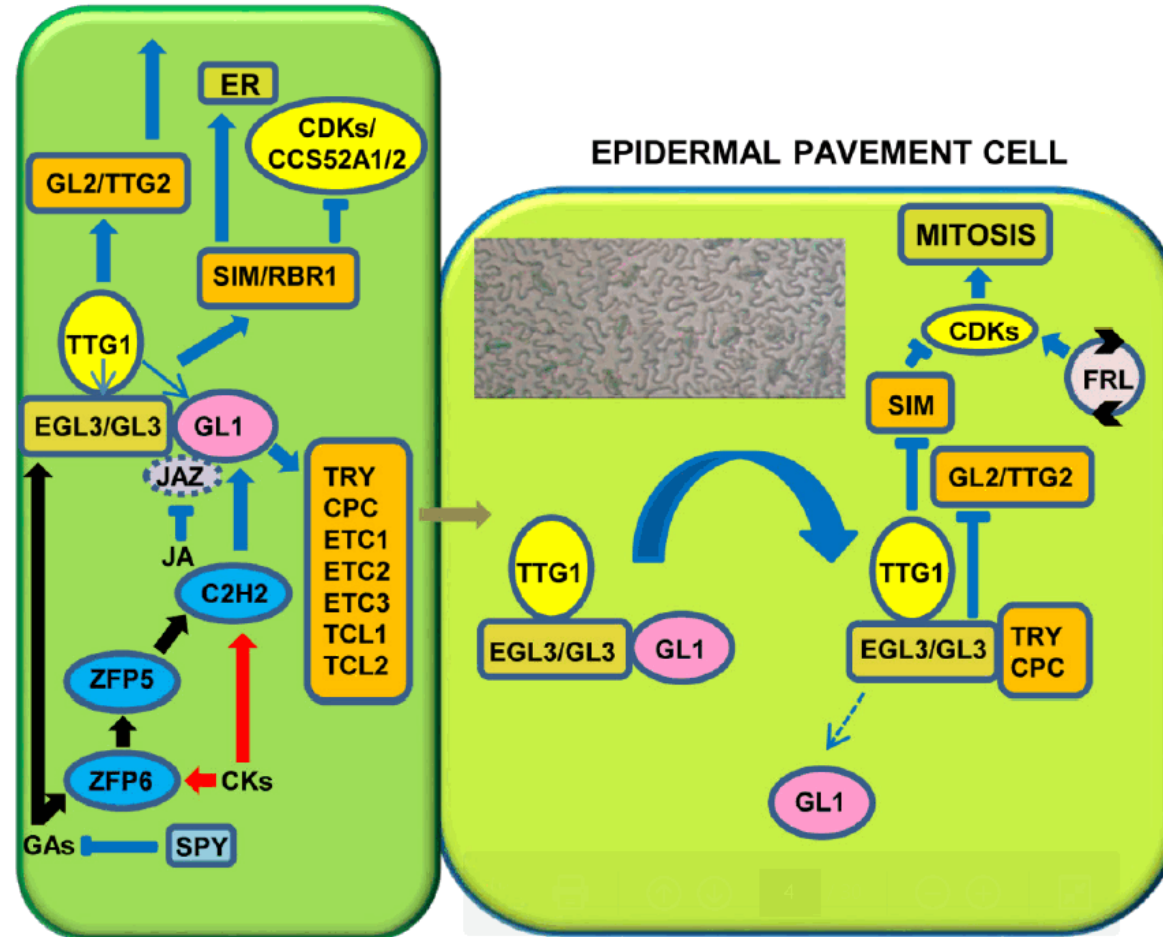
2019.11.09

Trichome in Plants

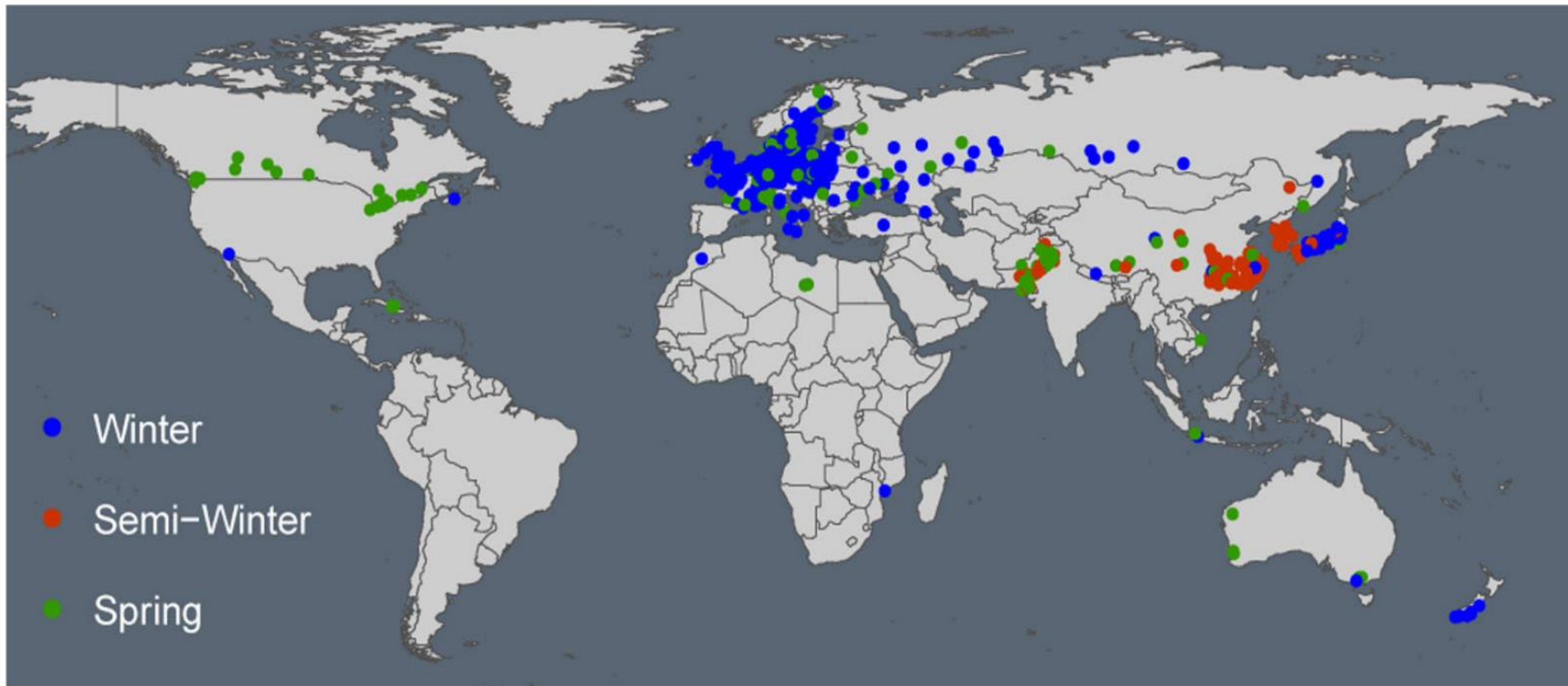


The regulation network of trichome in *Arabidopsis*

TRICHOME DEVELOPMENT



The origin of 991 rapeseed germplasm



Originating from:
39 countries/regions

Germany: 363

China: 131

Canada: 21

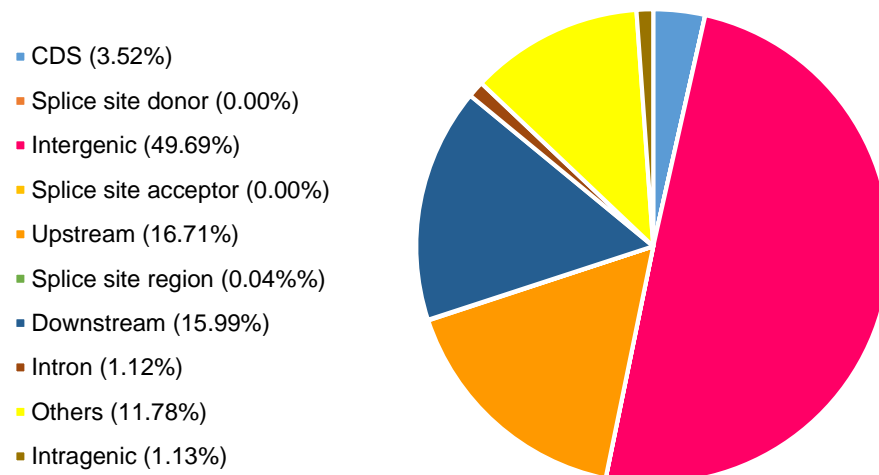
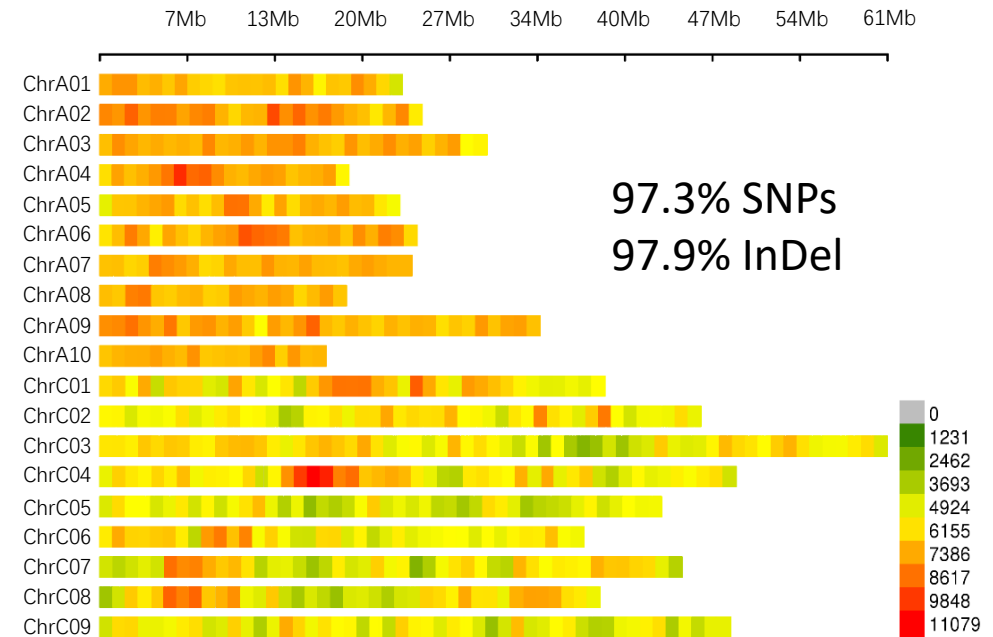
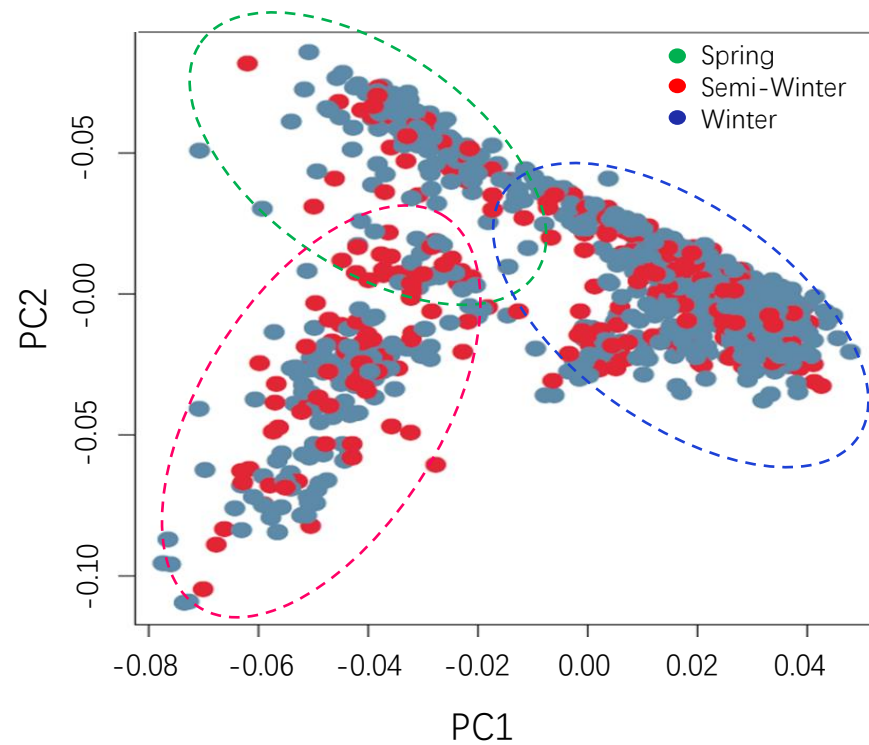
Pakistan: 43

Winter: **658**

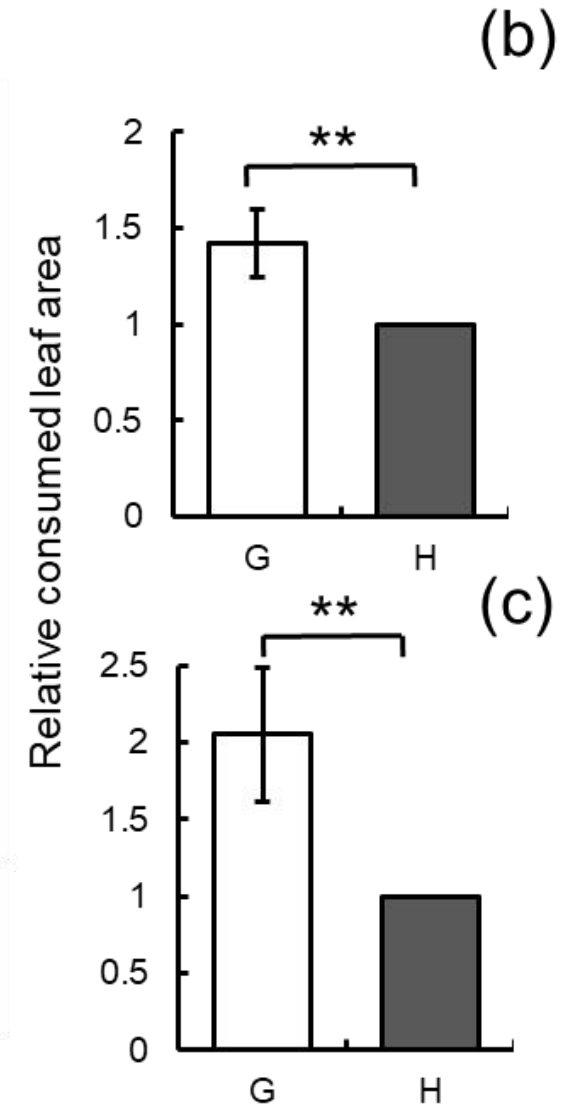
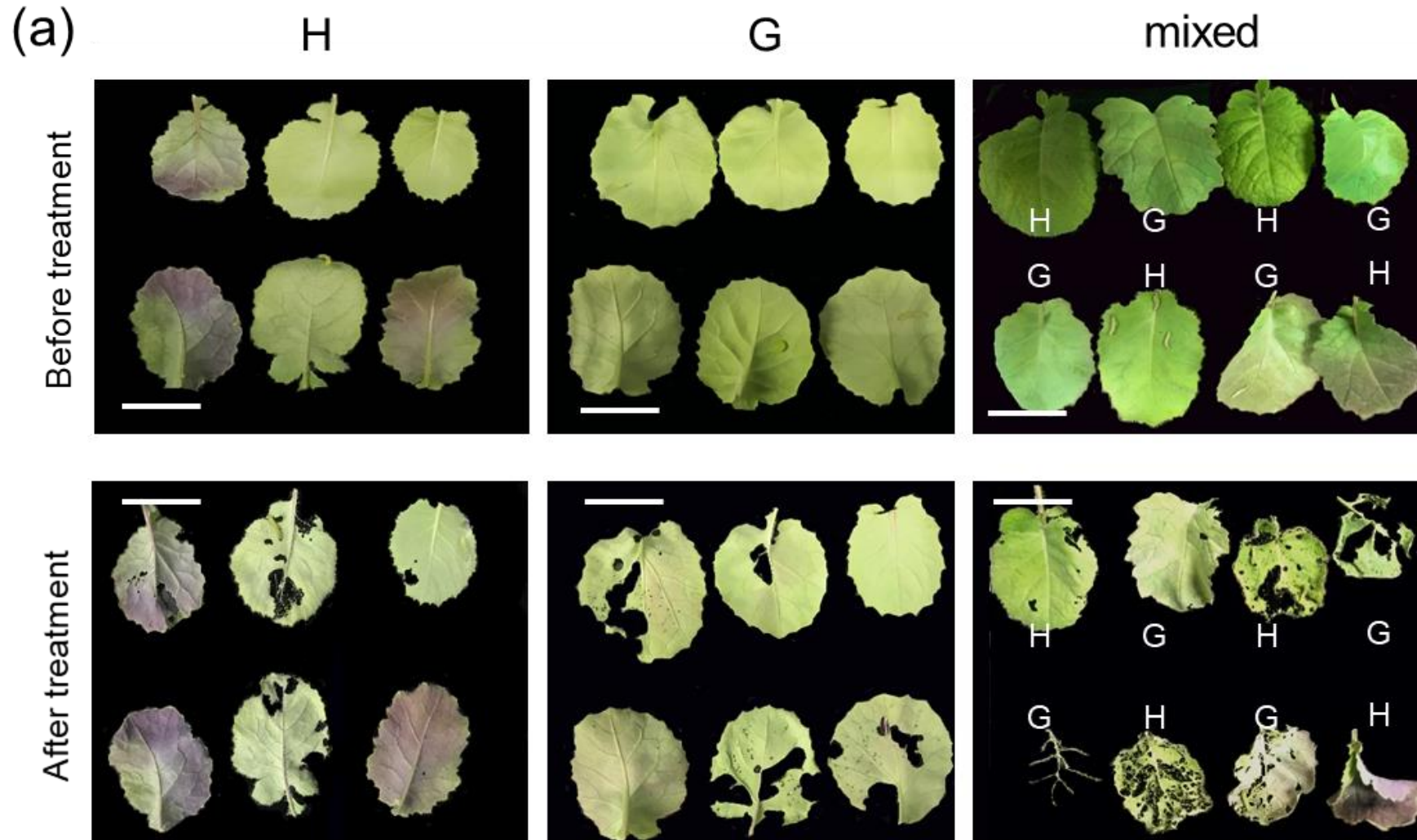
Semi-winter: **145**

Spring: **188**

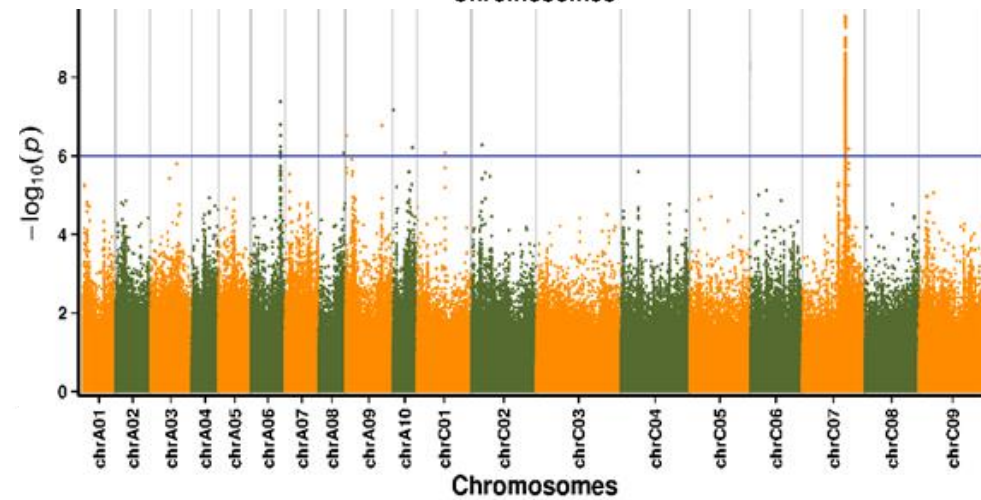
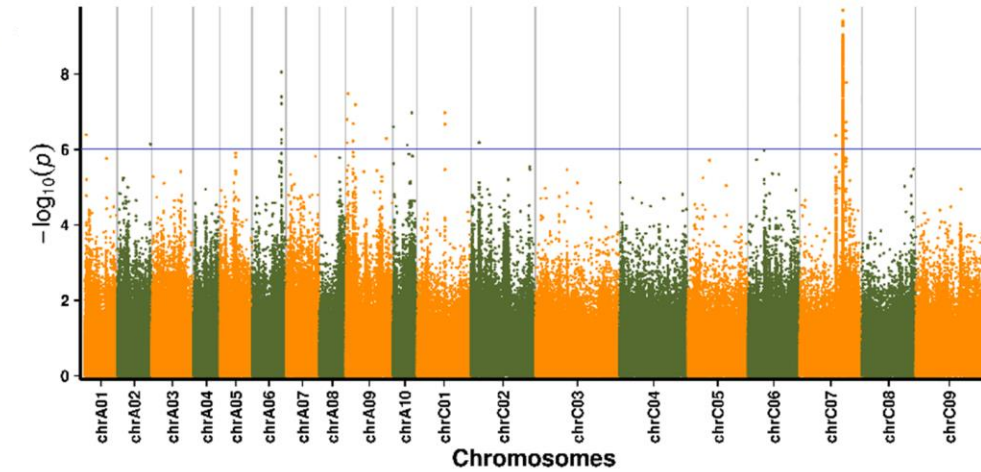
Genetic polymorphism of the core accessions for GWAS



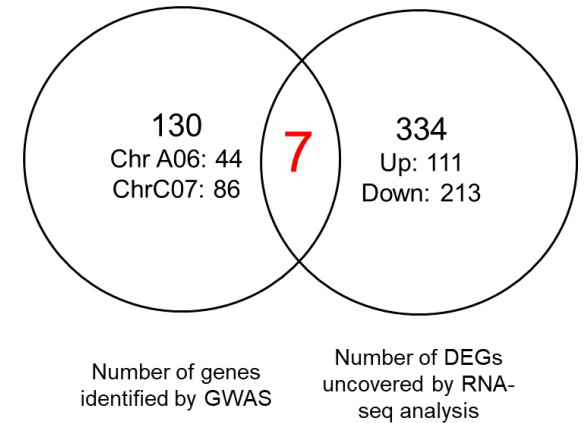
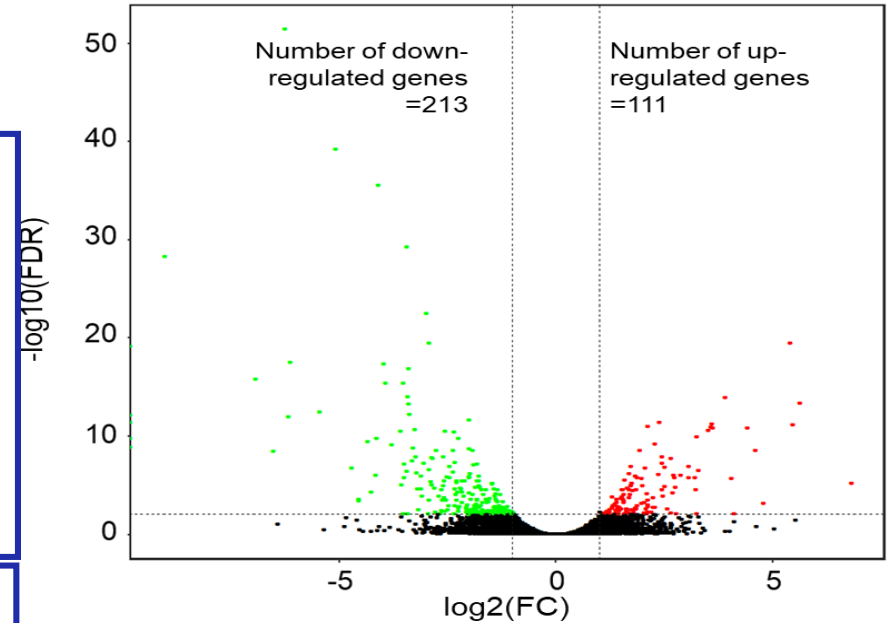
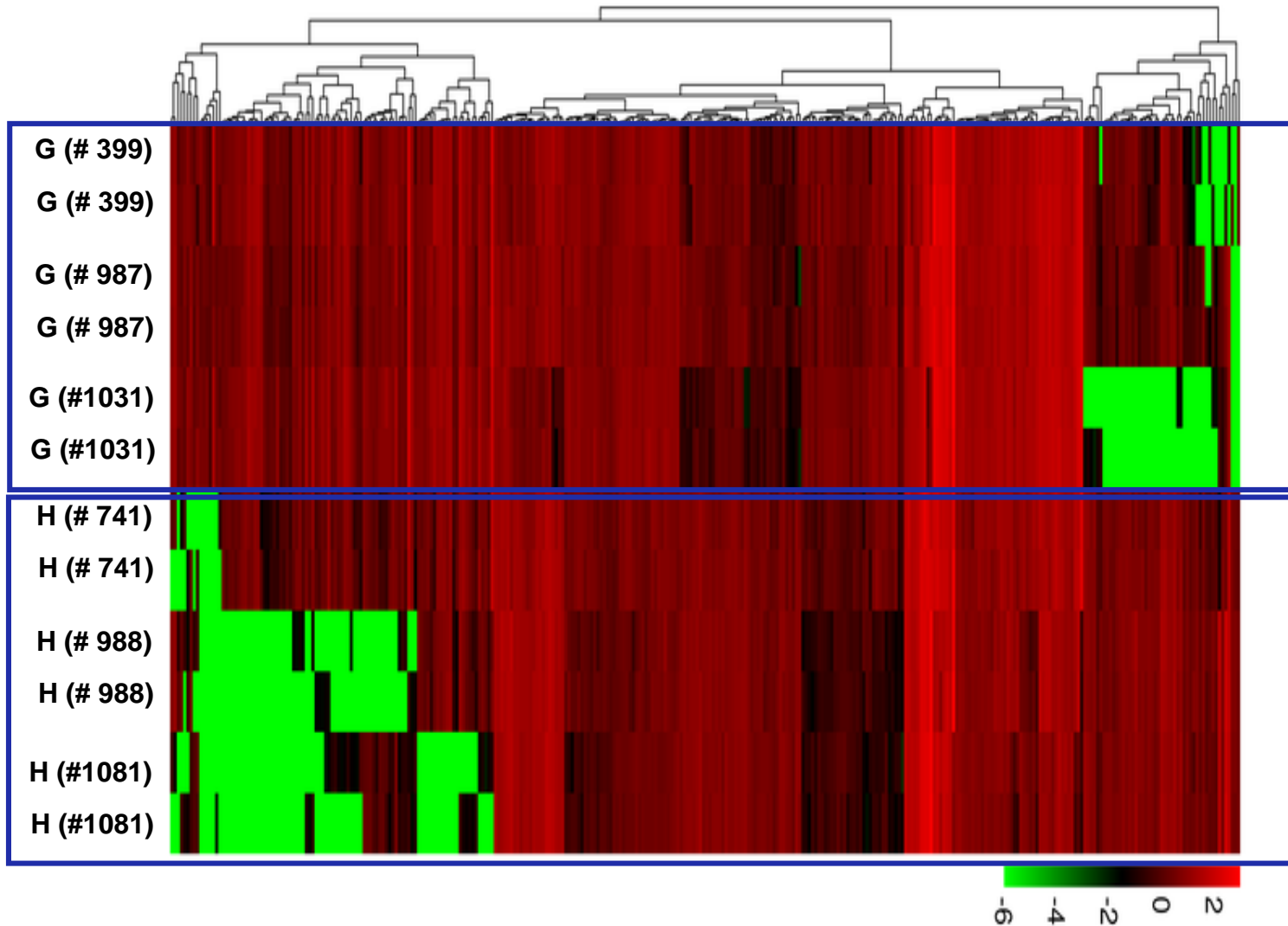
Hairy leaves were less attractive to starving *Plutella xylostella* larvae than glabrous leaves in oilseed rape



GWAS on trichome initiation on leaves of young seedlings



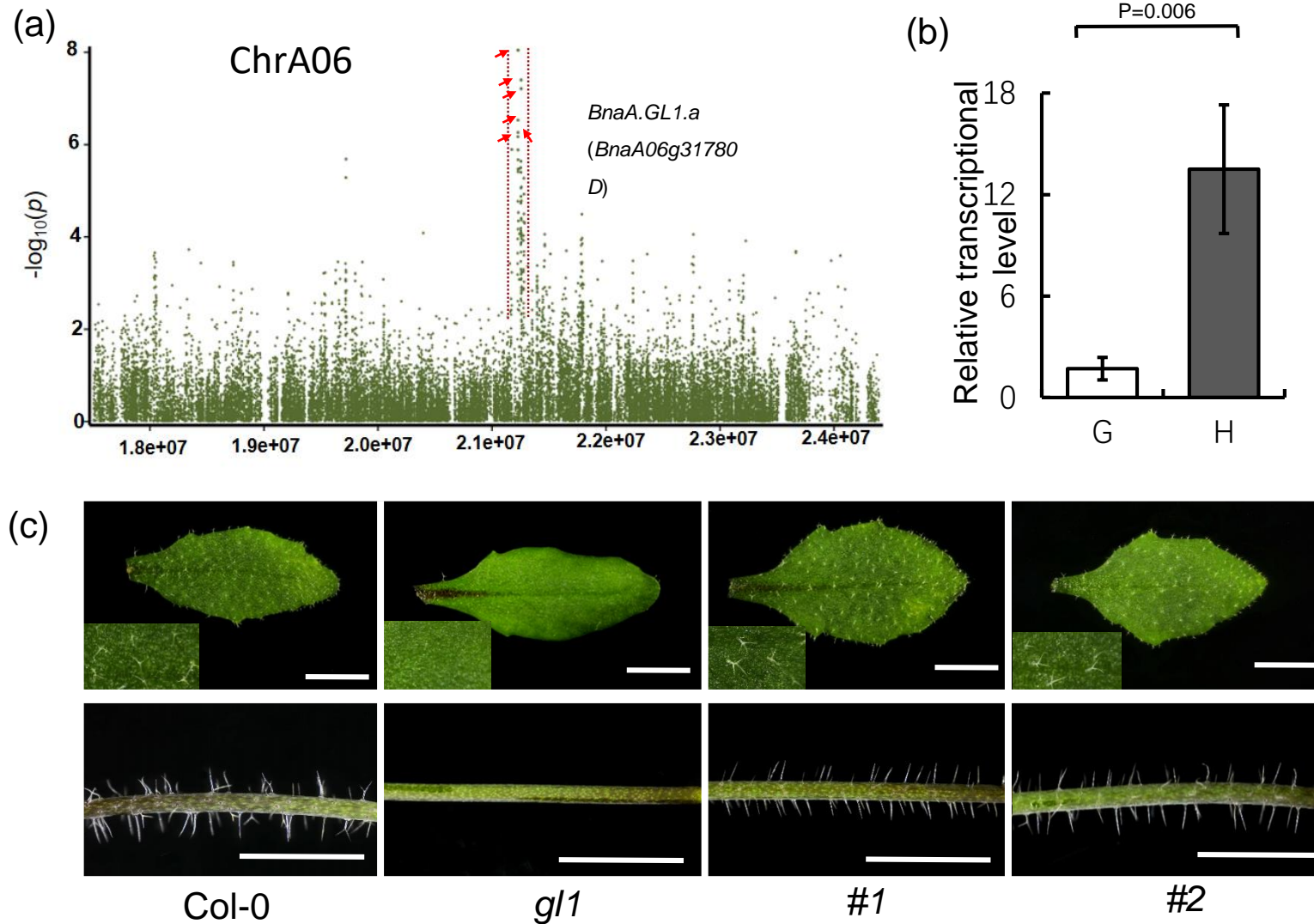
Cluster analysis of the gene expression patterns of H- and G-leaf types



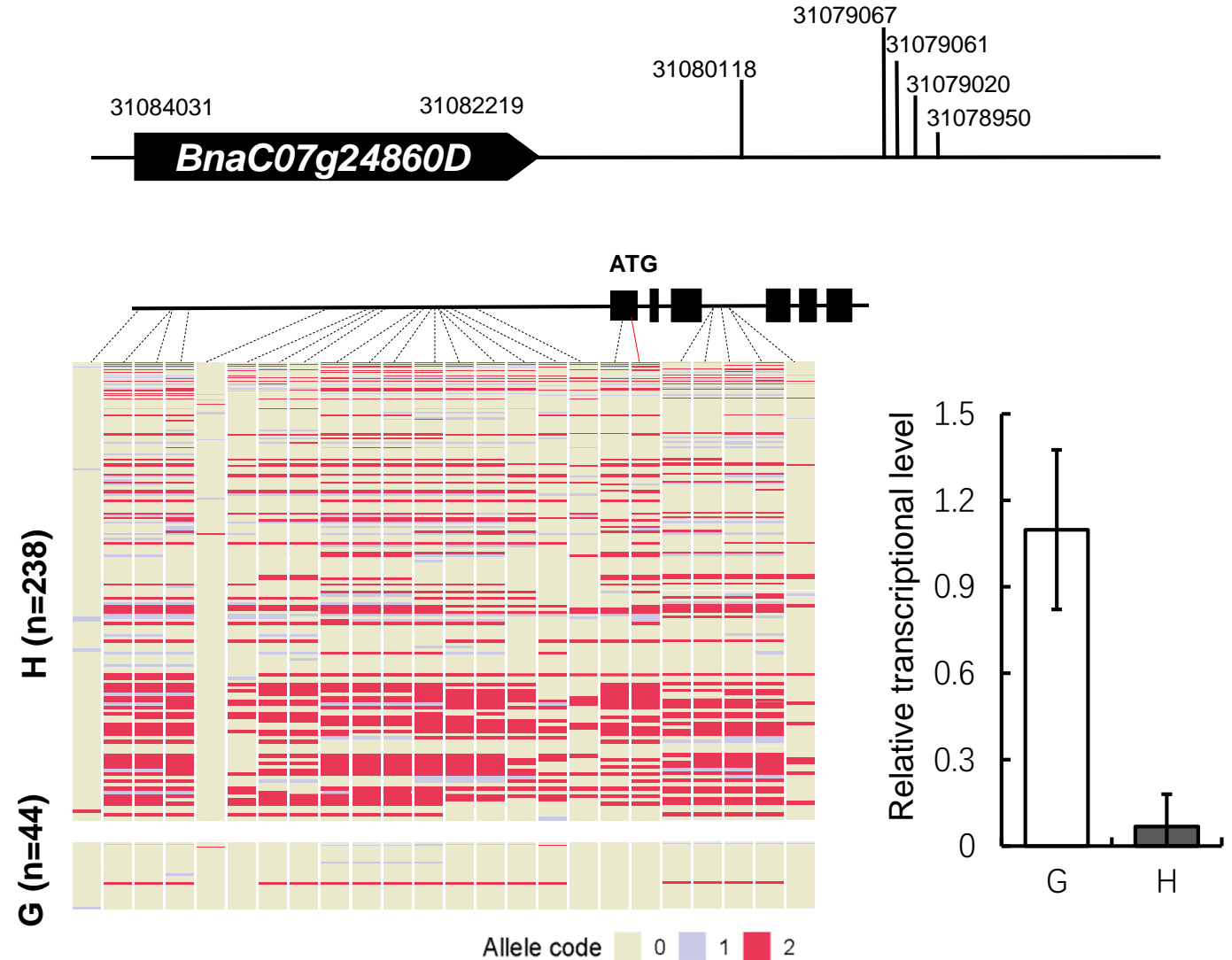
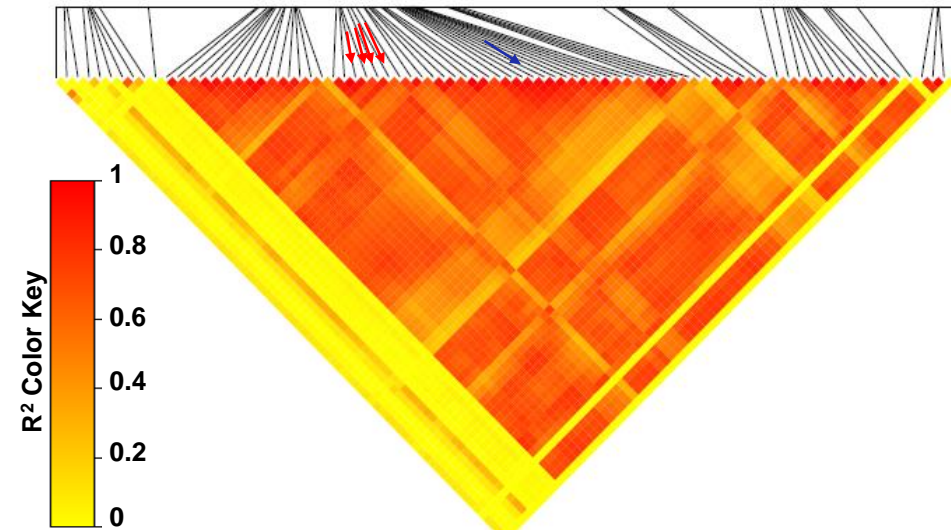
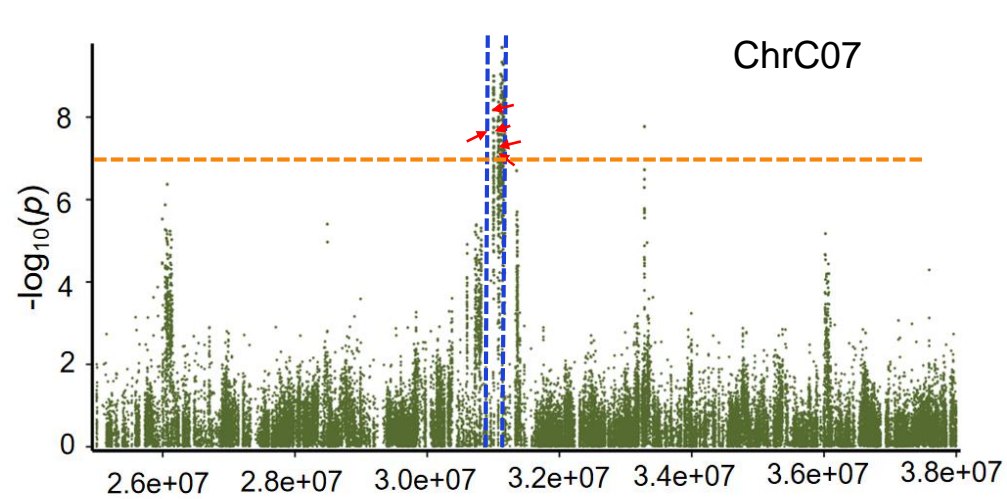
The candidate genes narrowed down by GWAS and RNA-seq

Gene ID	Regulation	Pfam_annotation	nt_annotation
<u>BnaC07g24860D</u>	down	Sugar efflux transporter	<i>Brassica rapa</i> sugar transporter SWEET4
<u>BnaC07g24950D</u>	down	EamA-like transporter family	<i>Brassica rapa</i> WAT1-related protein
<u>BnaC07g24960D</u>	down	EamA-like transporter family	<i>Brassica rapa</i> WAT1-related protein
<i>BnaC07g24970D</i>	down	--	<i>Brassica rapa</i> hsp70-binding protein 1
<i>BnaC07g25000D</i>	down	Glycosyltransferase like family 2	<i>Brassica rapa</i> xyloglucan glycosyltransferase 4
<i>BnaC07g49070D</i>	up	--	<i>Brassica rapa</i> uncharacterized LOC103875260
<u>BnaA06g31780D</u>	up	Myb-like DNA-binding domain	Cotton fibre differentiation protein GL1

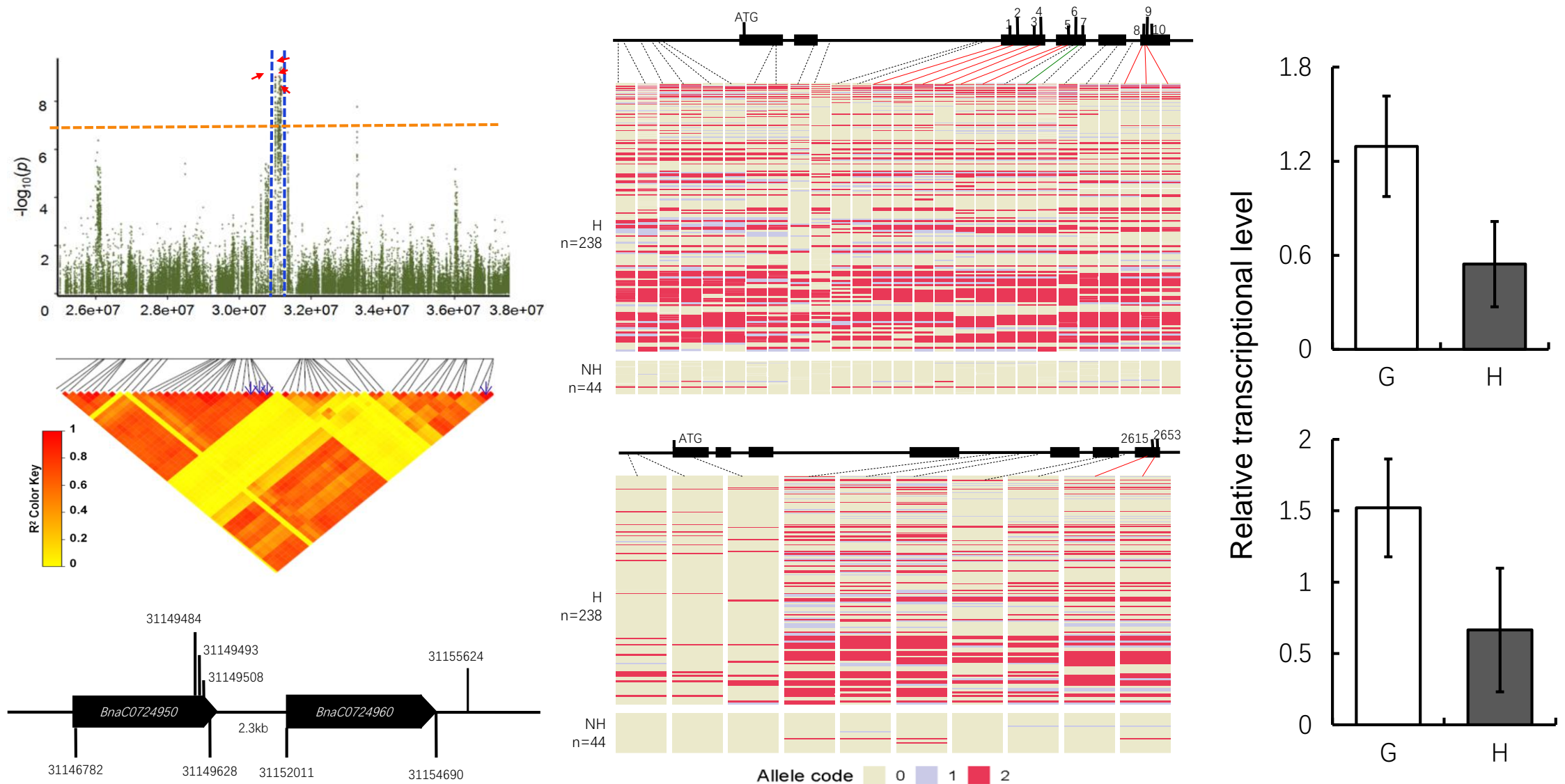
The *gl1* plants harboring the *35S:BnaA06.GL1.a* cassette had trichomes on leaves and stems as WT plants



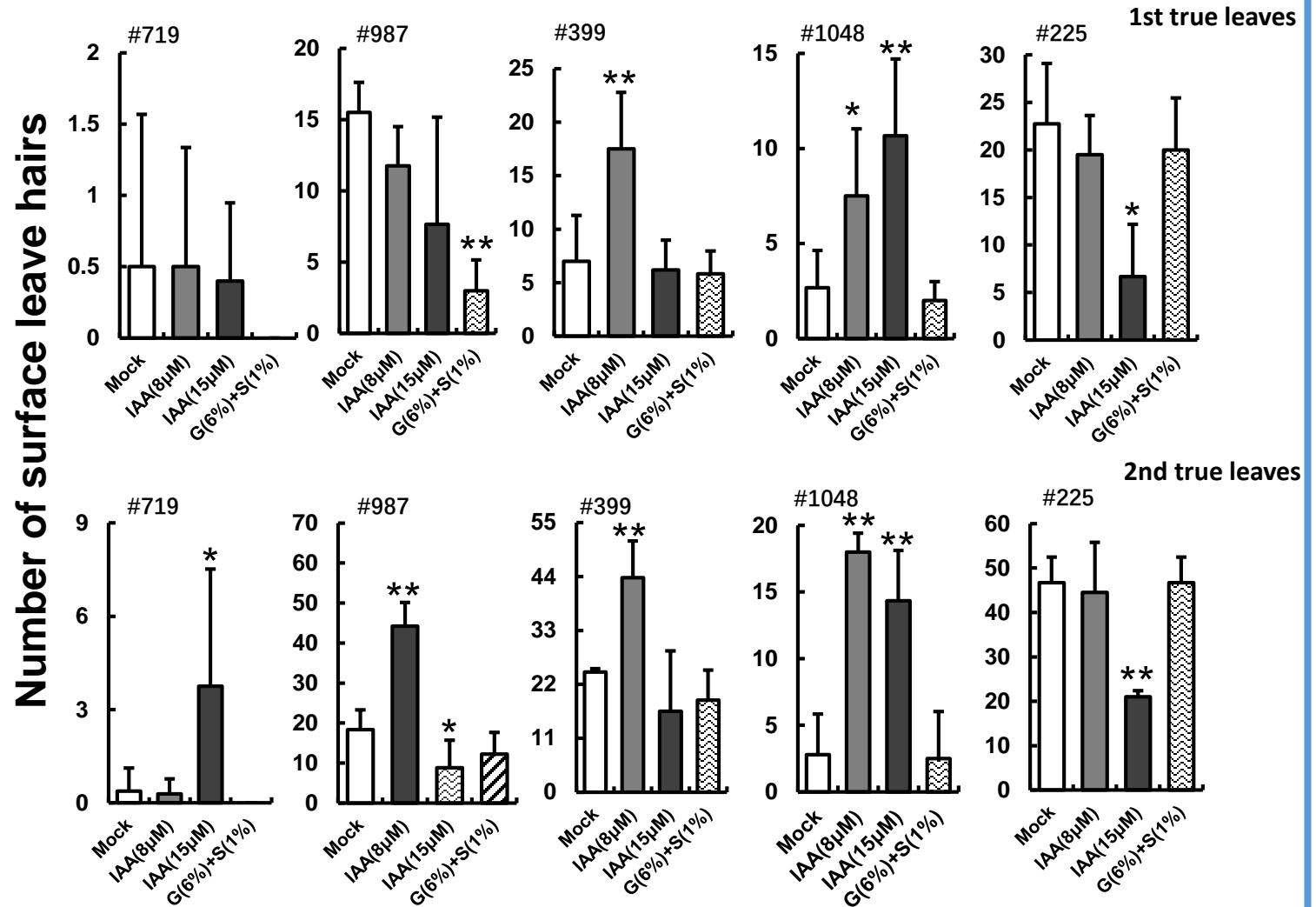
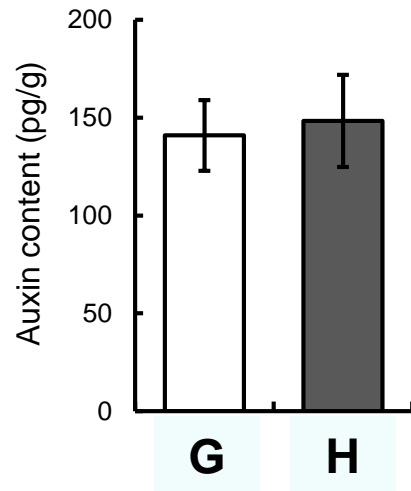
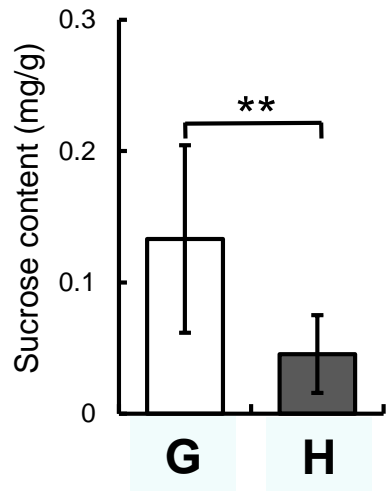
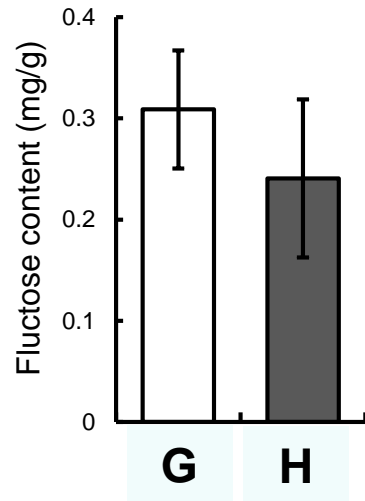
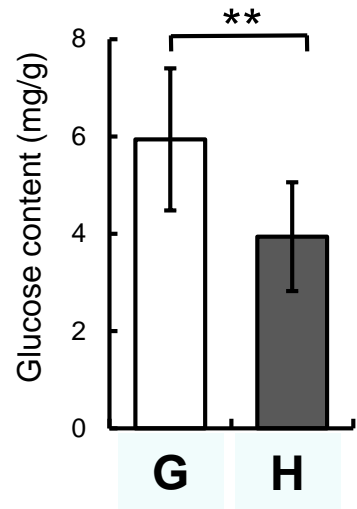
Negative regulation of *BnaC07.SWEET4.a* on leaf-hair initiation



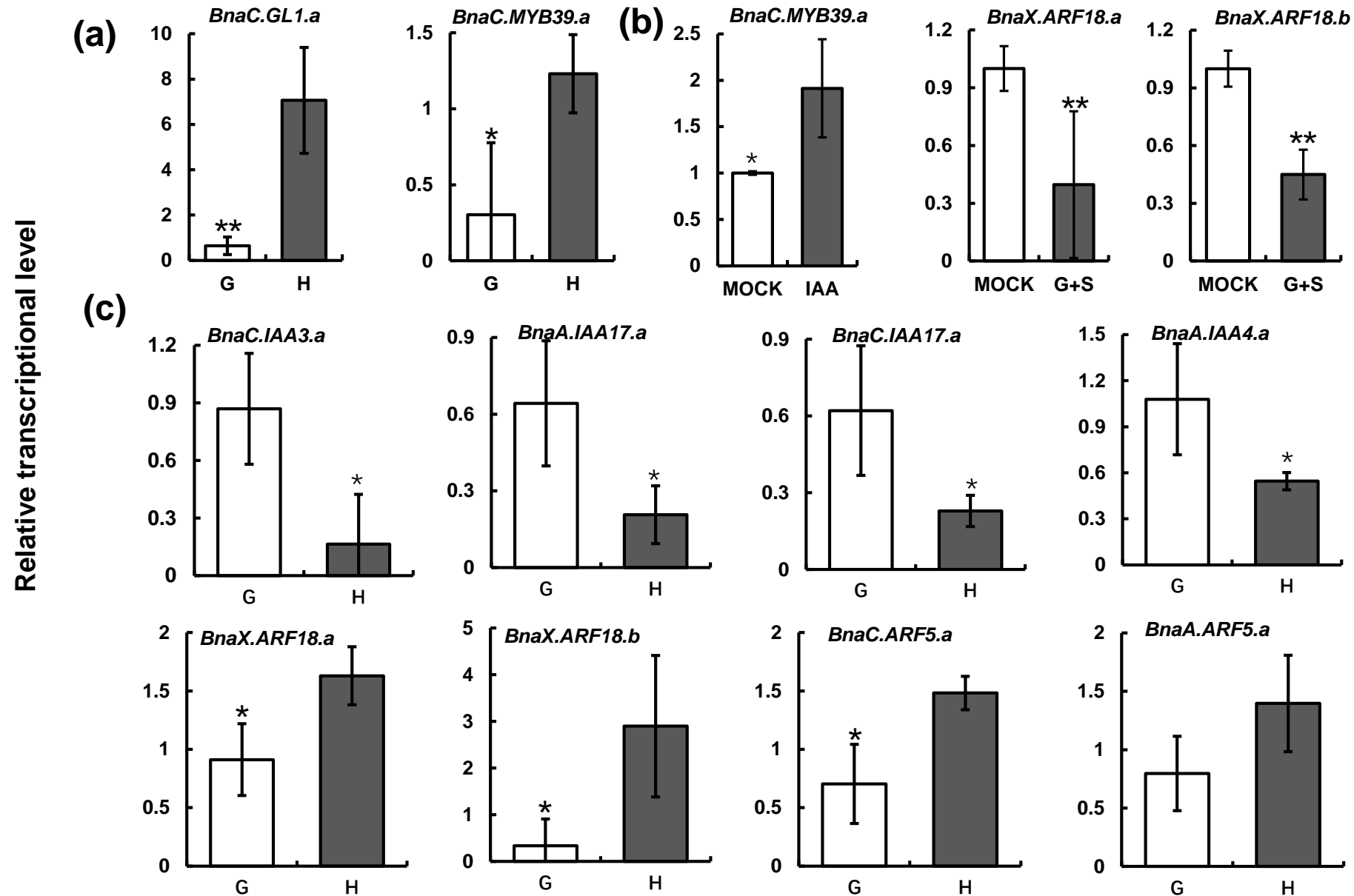
Negative regulation of *BnaC07.WAT1.a* and *BnaC07.WAT1.b* on leaf trichome initiation



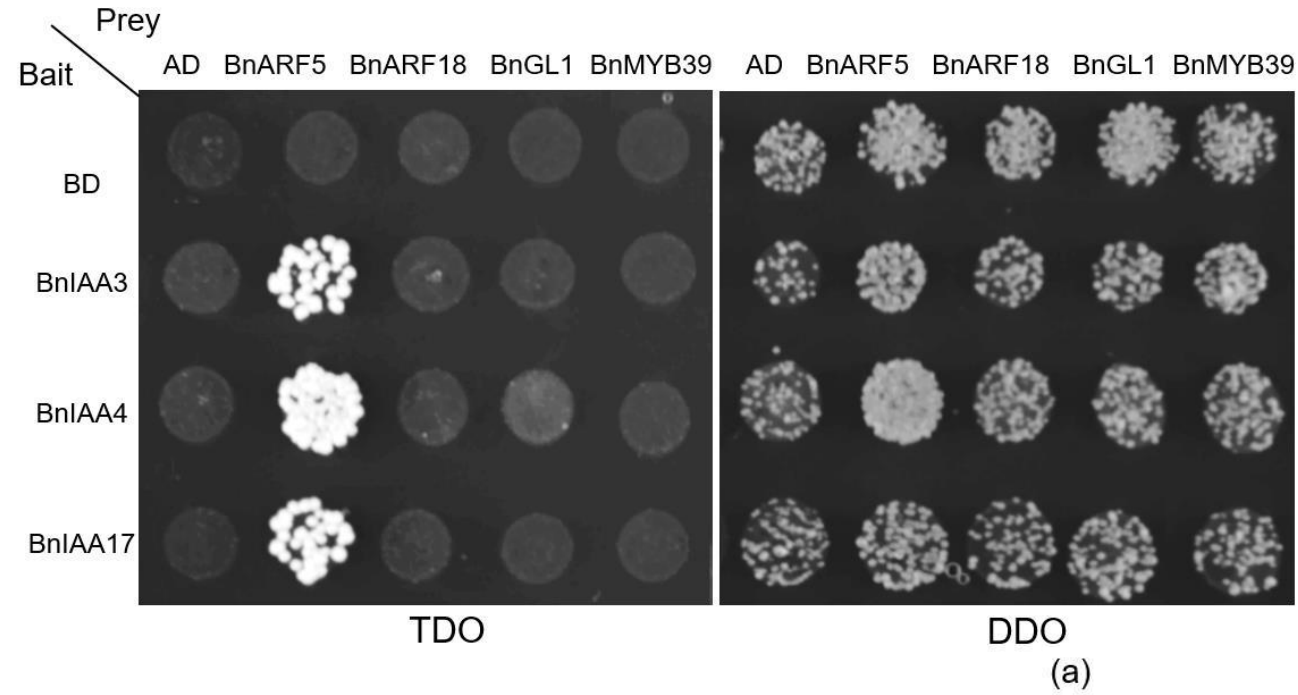
The effect of sugar and auxin on trichome initiation



Comparison of the expression levels of putative genes in the auxin signaling pathway

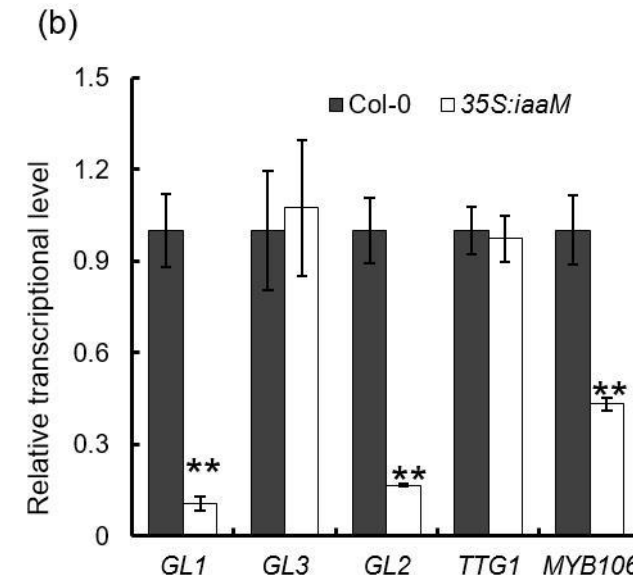


The effects of auxin on trichome initiation

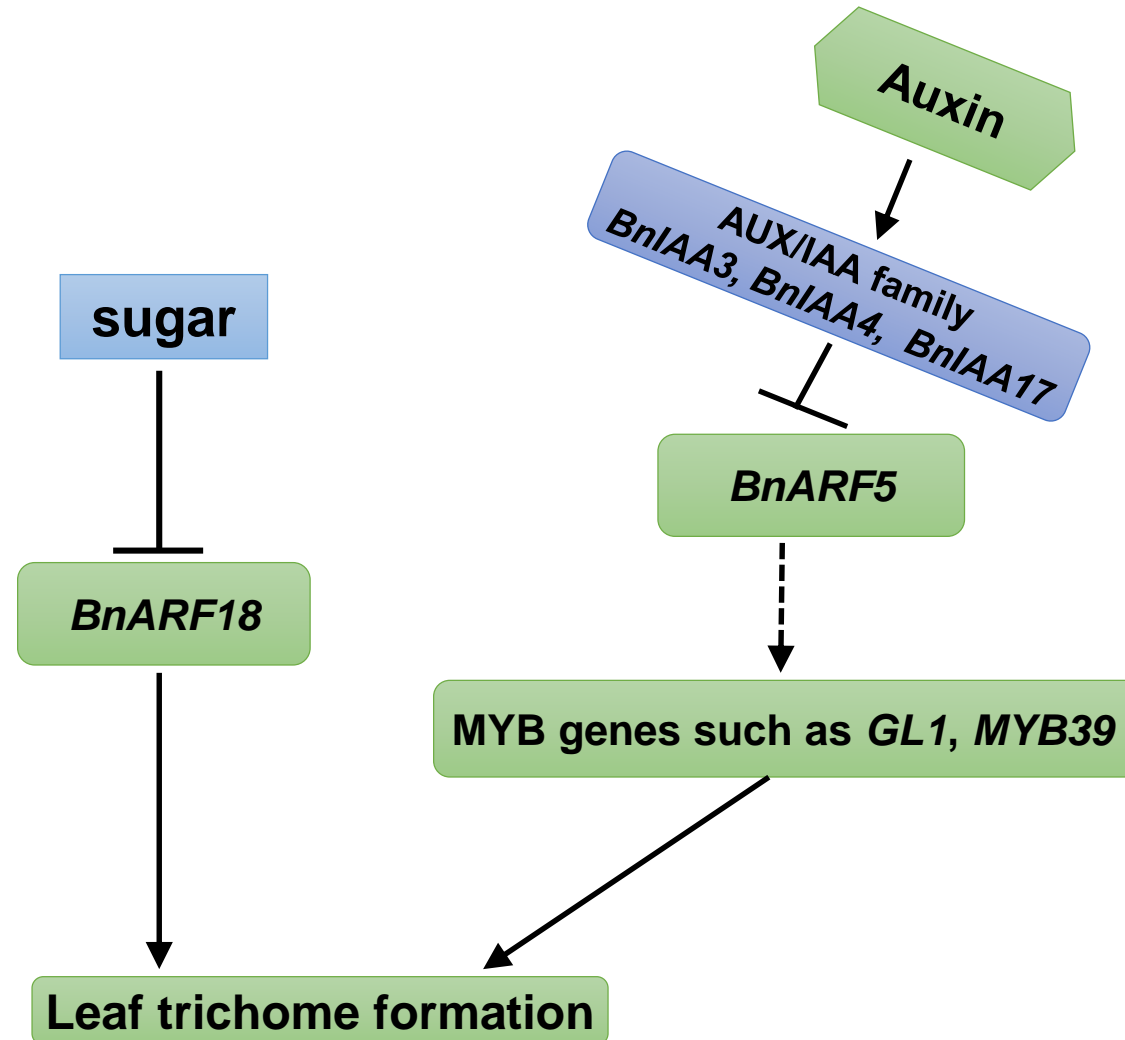


Yeast two-hybrid assay showed the protein interactions between BnaC.IAA3.a, BnaA.IAA4.a, BnaC.IAA17.a and BnaC.ARF5.a

Comparison of trichome (leaf hair) distribution between Col-0 and the transgenic line harboring the *35S:iaaM* construct with elevated auxin synthesis level



A sketch summarizing the probable regulatory factors involving trichome initiation in SAMs of young rapeseed seedlings



Acknowledgement



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