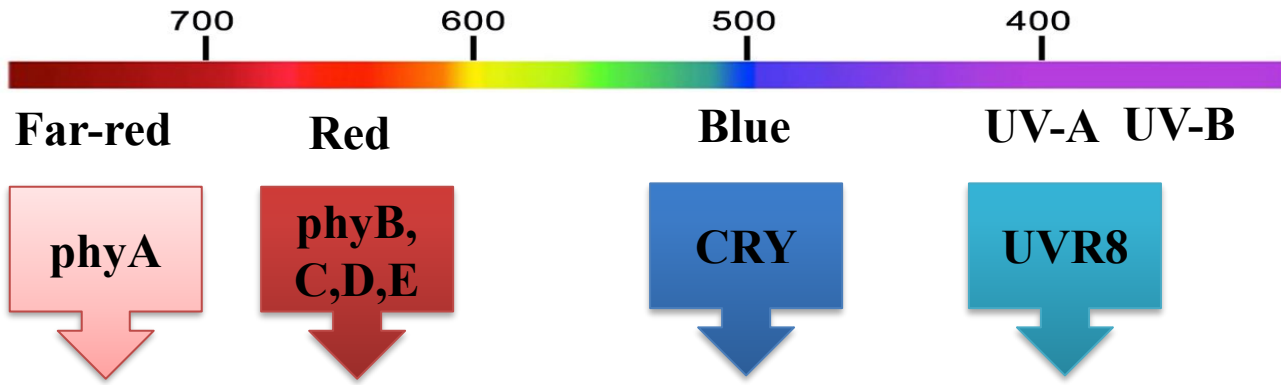




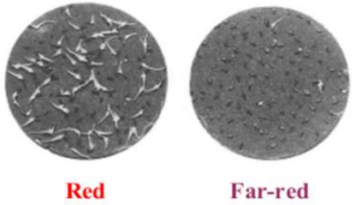
***Cryptochrome 1b represses gibberellin
signaling
to enhance lodging resistance in maize***

Presenter: Linhu Song
Henan Agricultural University
13/03/2026

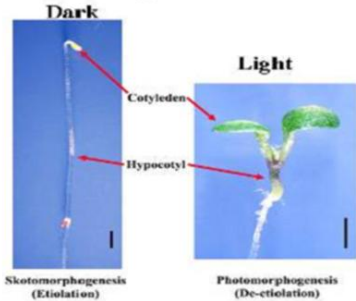
Light signals regulate growth and development of plants



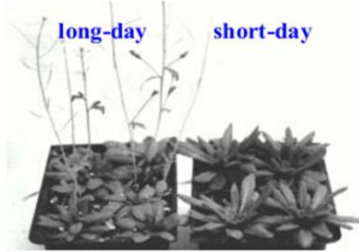
Seed germination



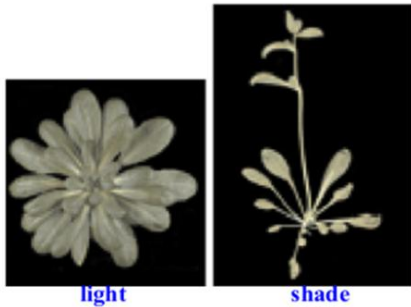
Seedling de-etiolation



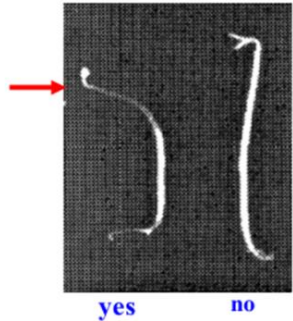
Flowering time



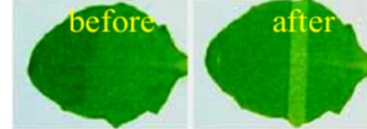
Shade avoidance



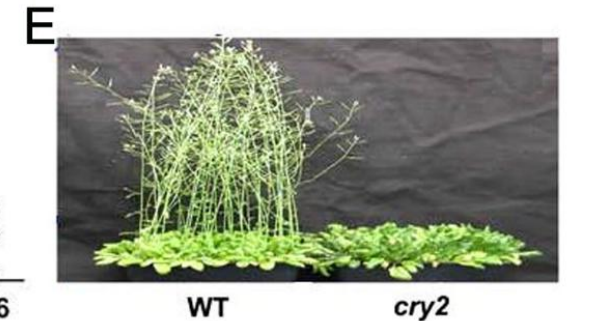
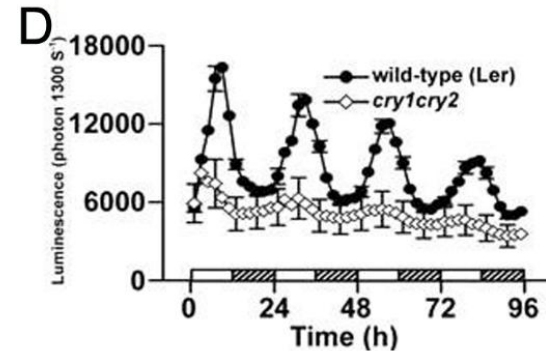
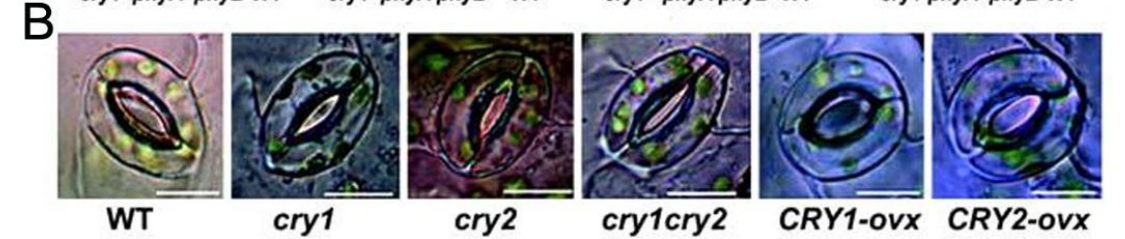
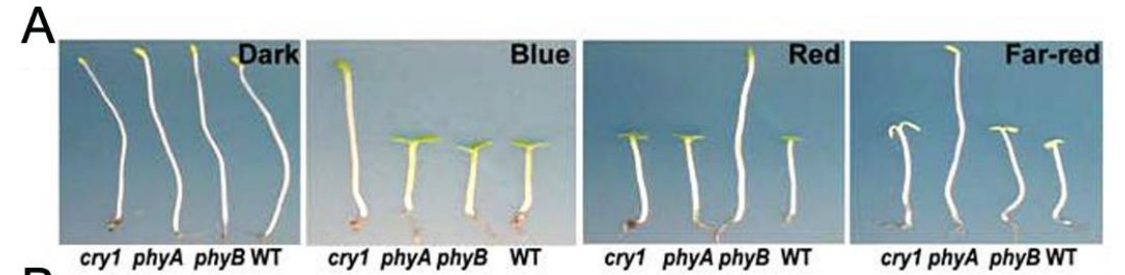
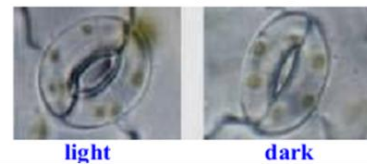
Phototropism



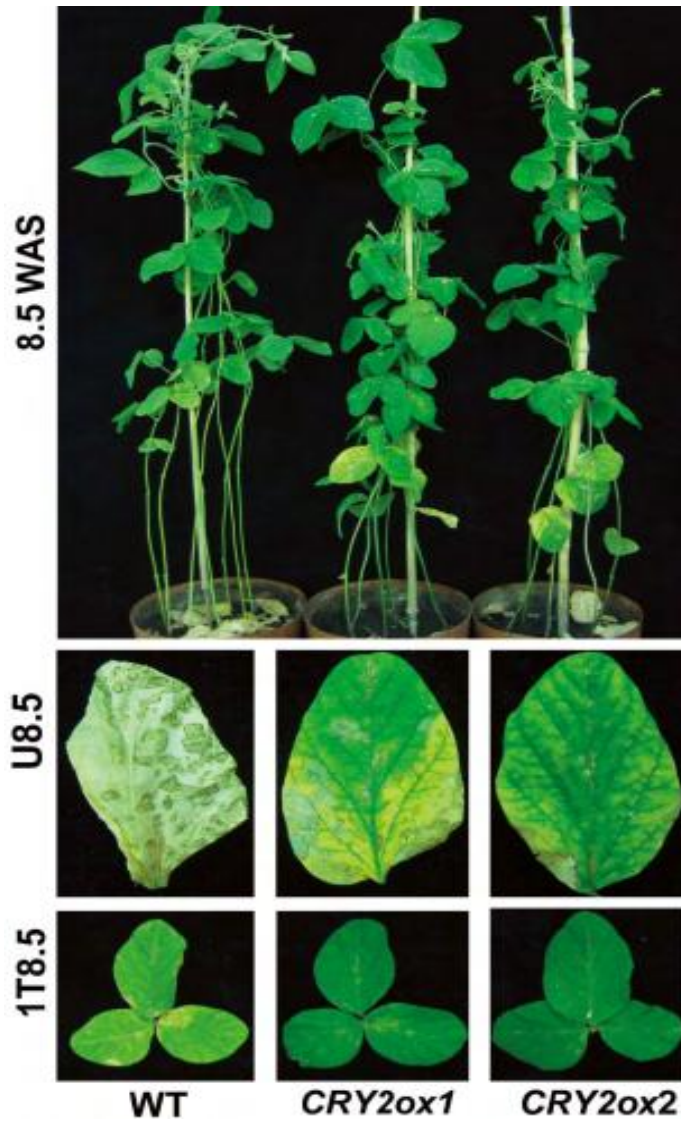
Chloroplast movement



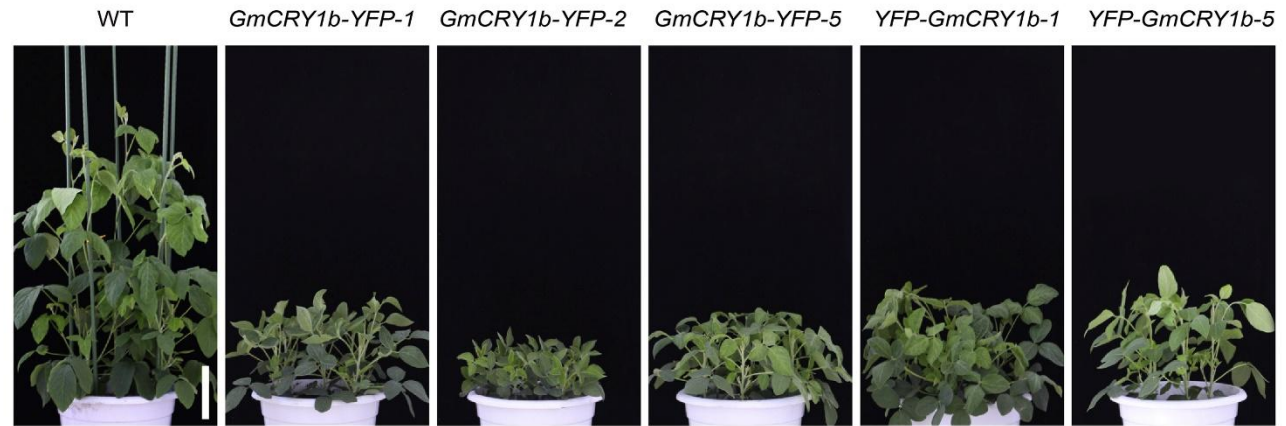
Stomata opening



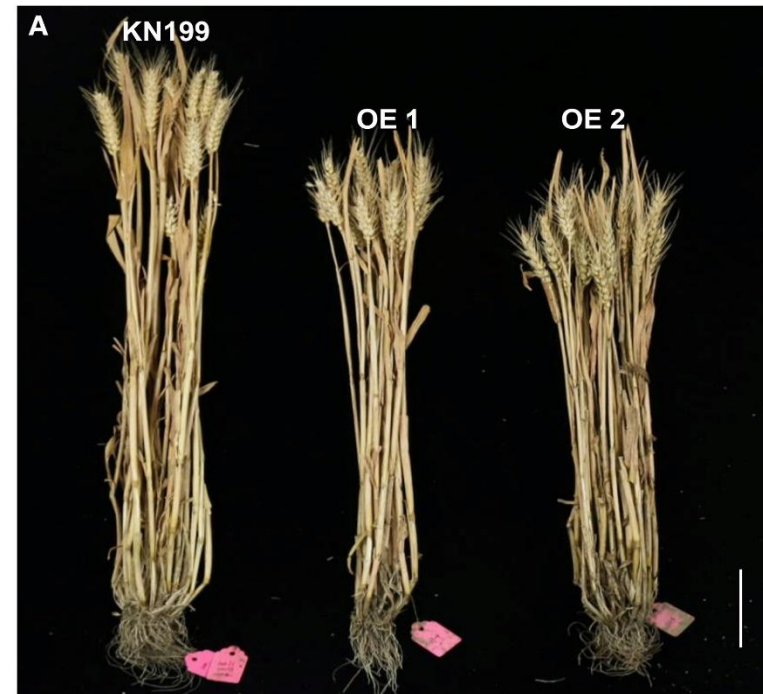
The function of *CRY* in other species



Meng Y, et al. 2013

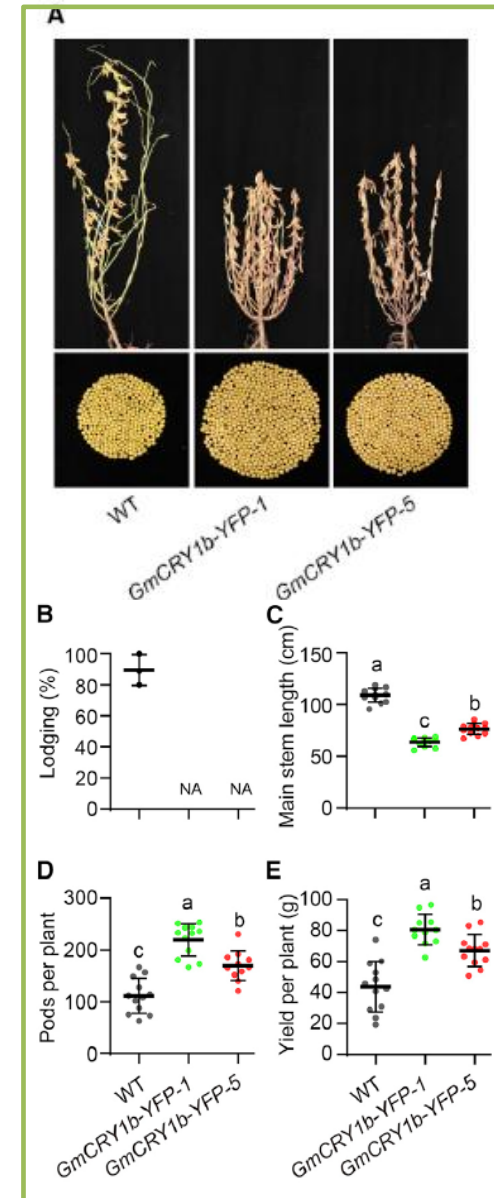


(Yan, et al. 2021)



(Lyu, et al. 2021)

GmCRY1s enhance soybean lodging resistance and increase yield



(Yan, et al. 2021)

The impact of light signals on maize production

intercropping



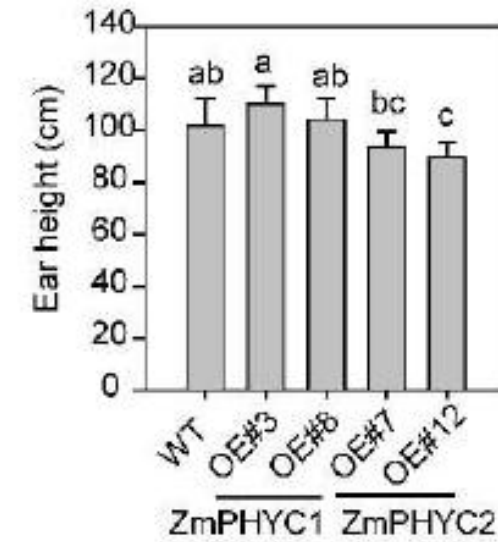
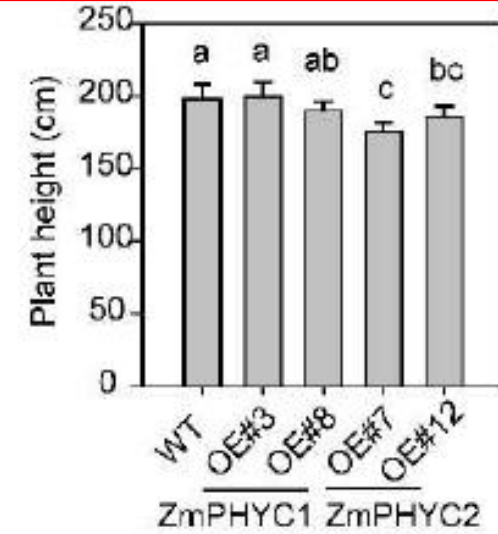
High-density



Lodging



WT OE#7 OE#12
ZmPHYC2

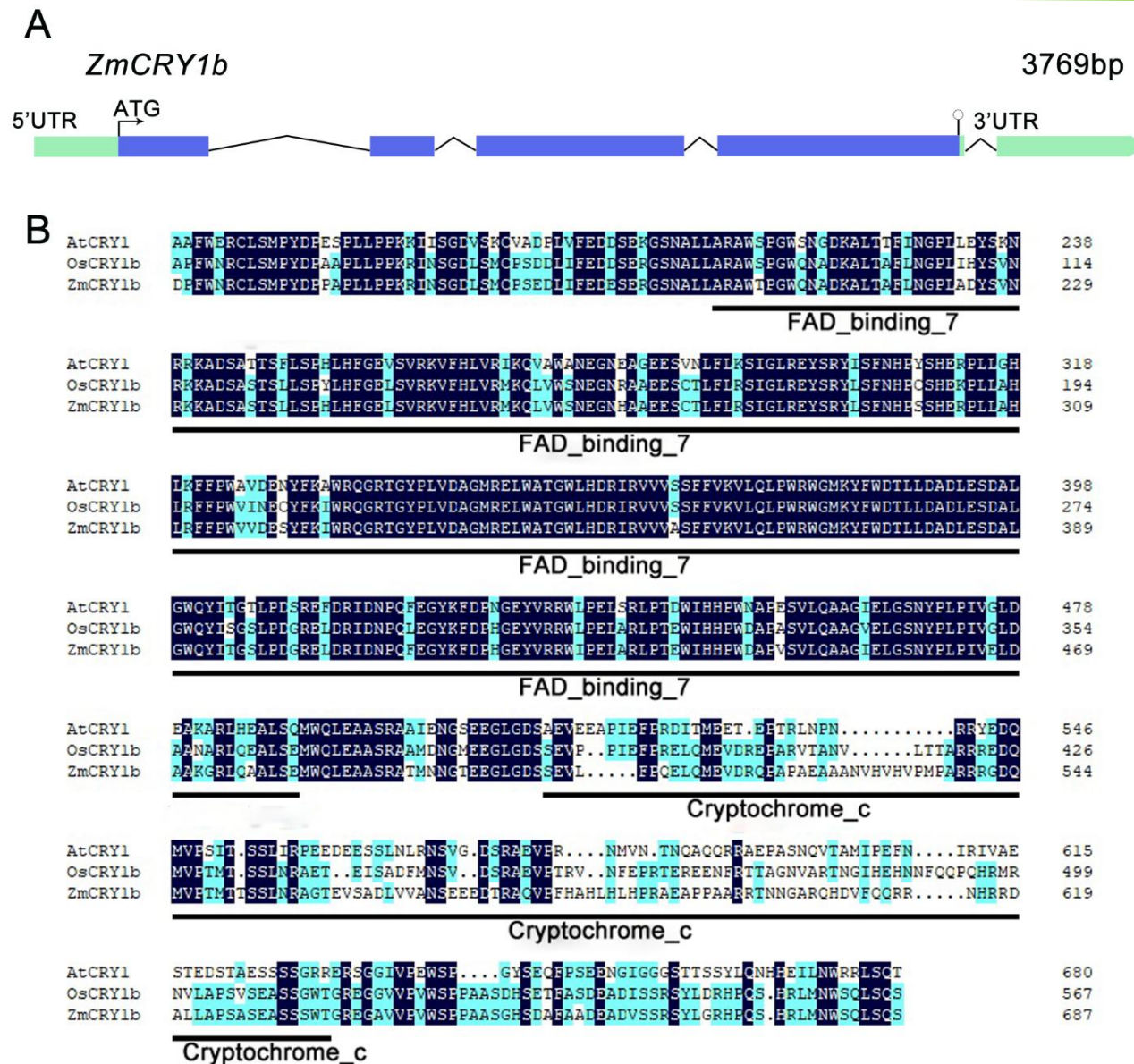
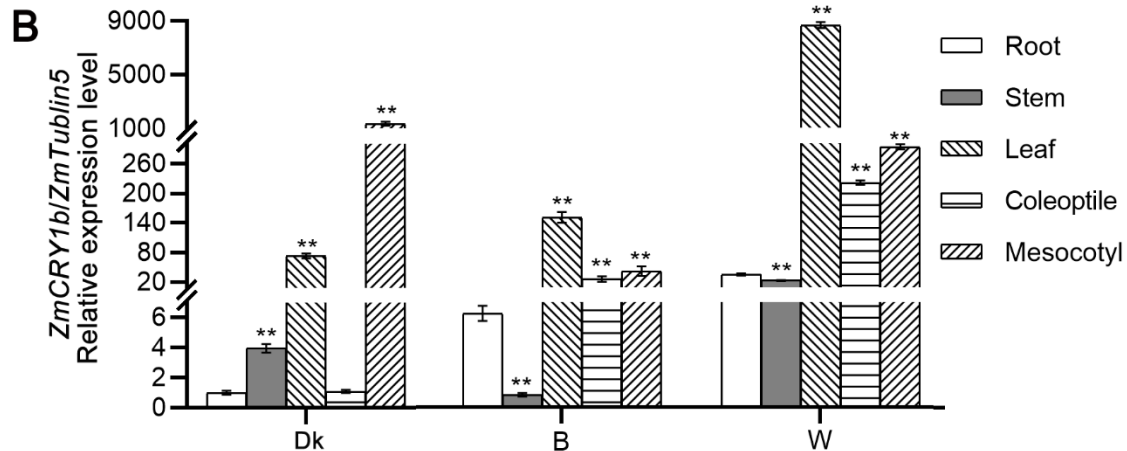
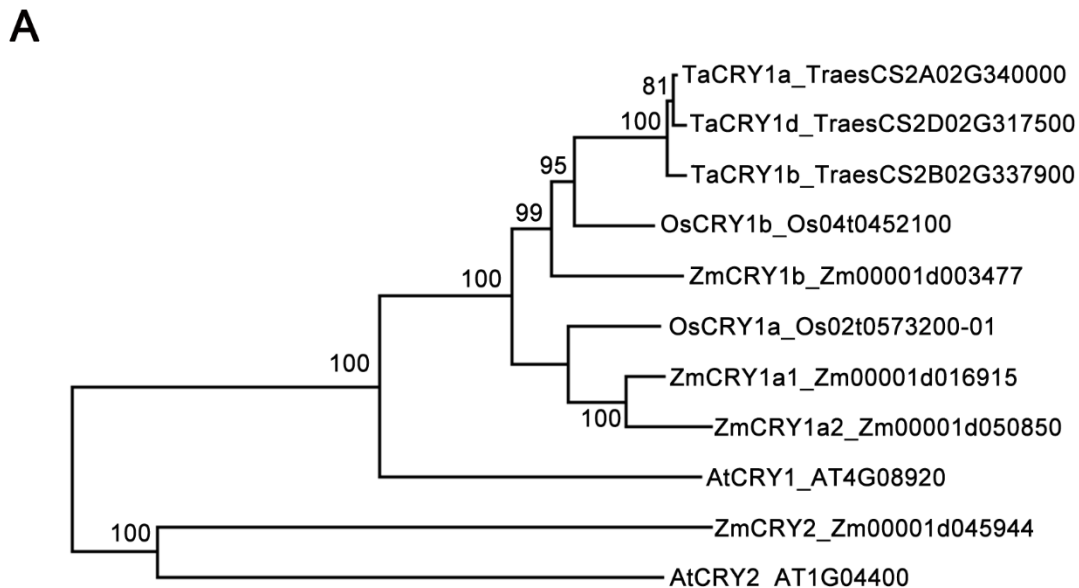


(Li, et al. 2020)

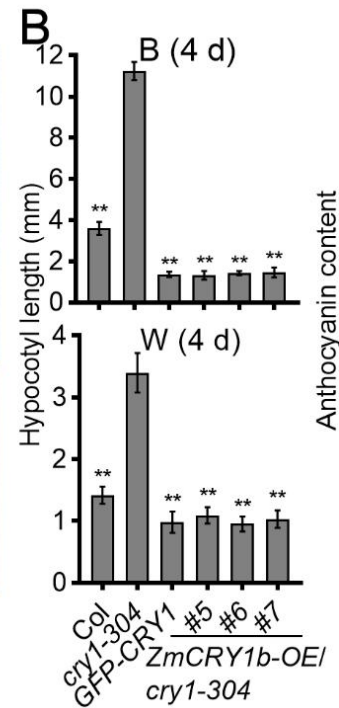
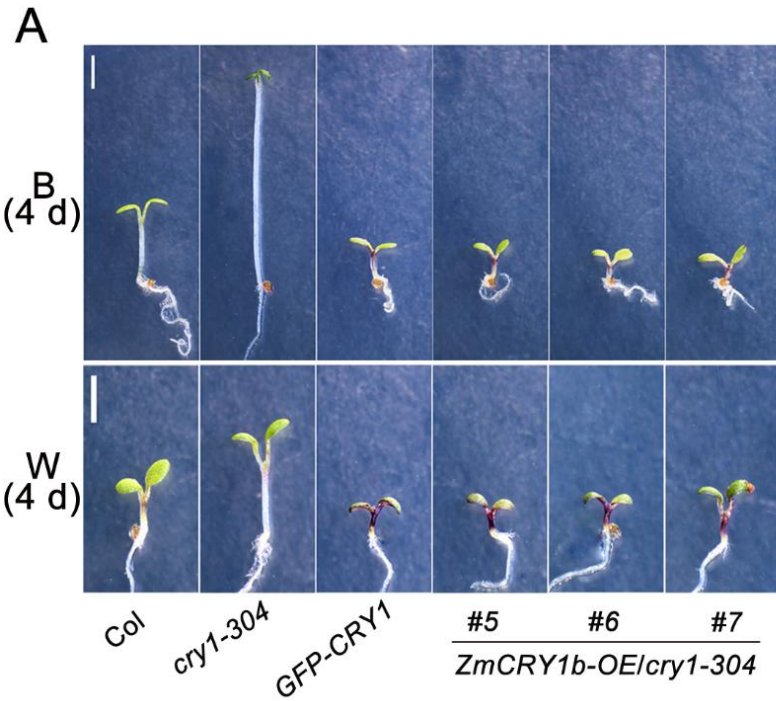
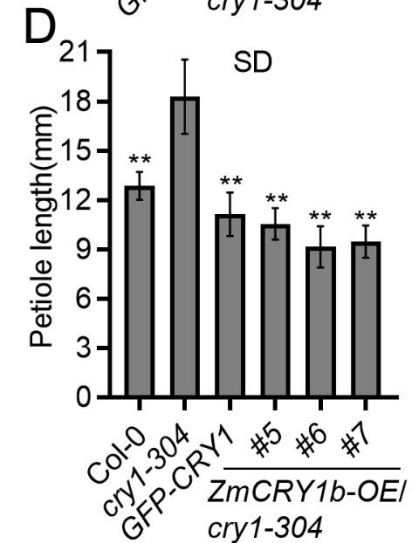
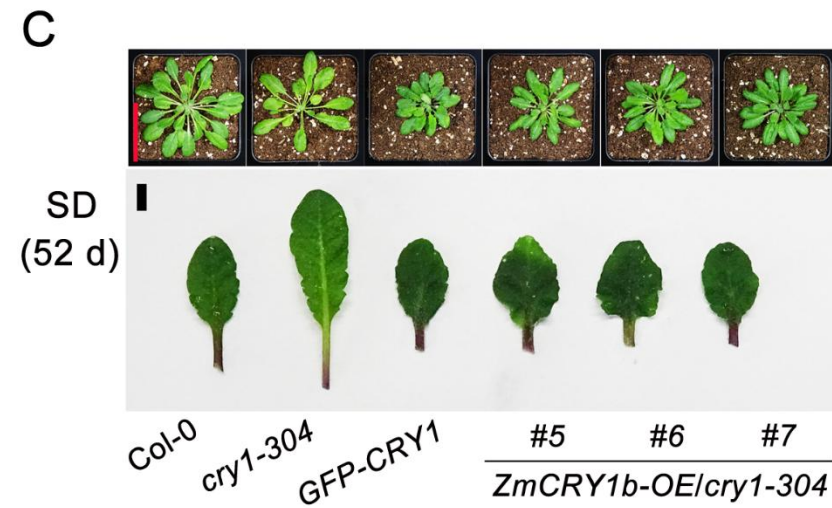
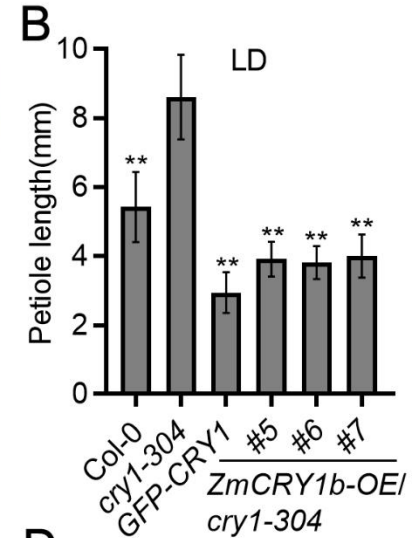
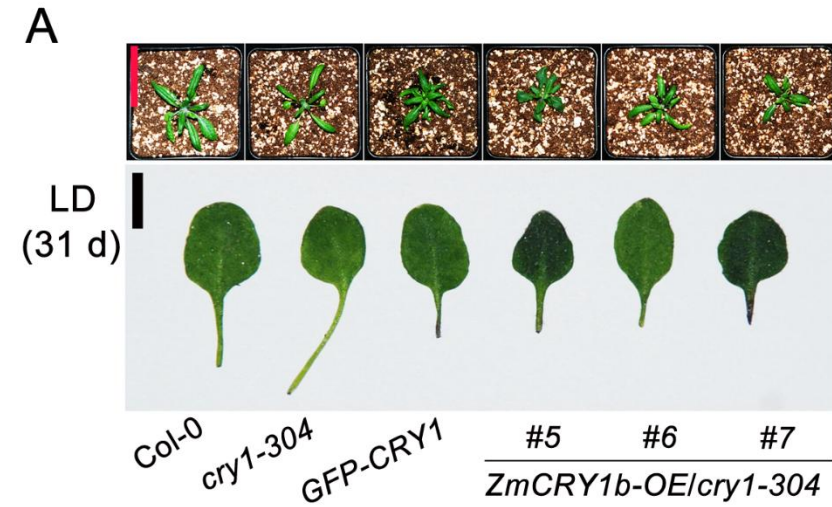
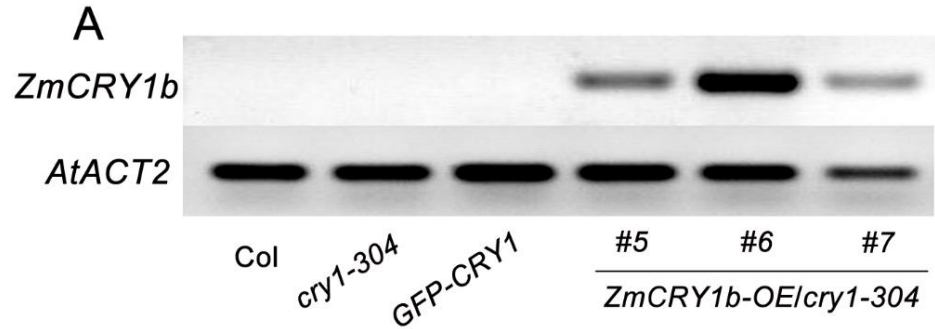
Research background and purpose

- Maize is a globally critical crop, but its yield potential is limited by lodging. High planting density triggers shade avoidance syndrome (SAS), leading to lodging. Cryptochromes (CRYs) are blue-light receptors regulating photomorphogenesis in *Arabidopsis*, but their roles in maize remain unclear.
- We investigated how ZmCRY1b regulates light signaling and gibberellin pathways to improve lodging resistance.

ZmCRY1b phylogenetic tree

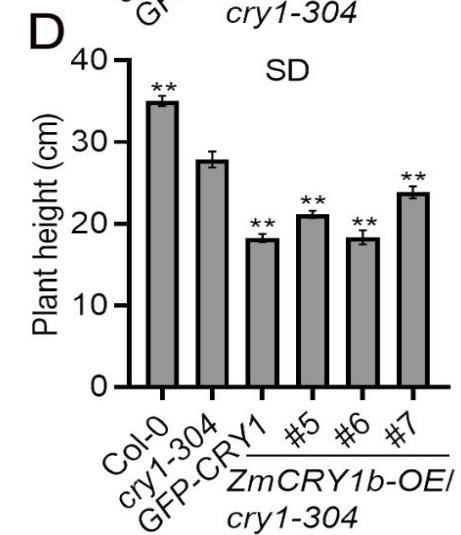
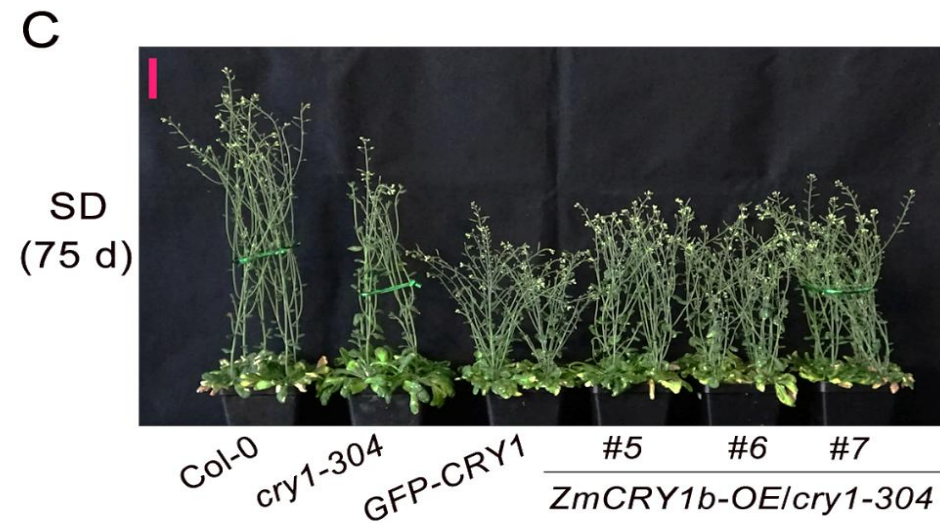
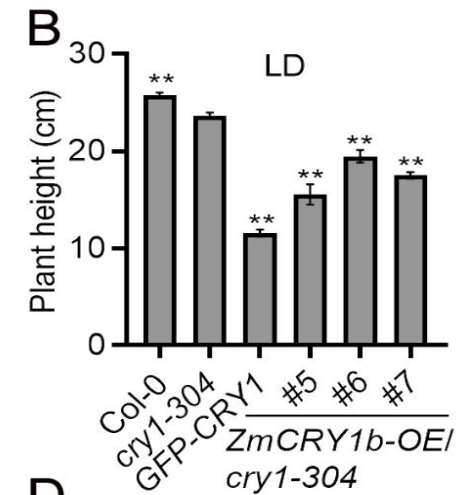


Ectopic expression of ZmCRY1b complements Arabidopsis cry1-304 mutant

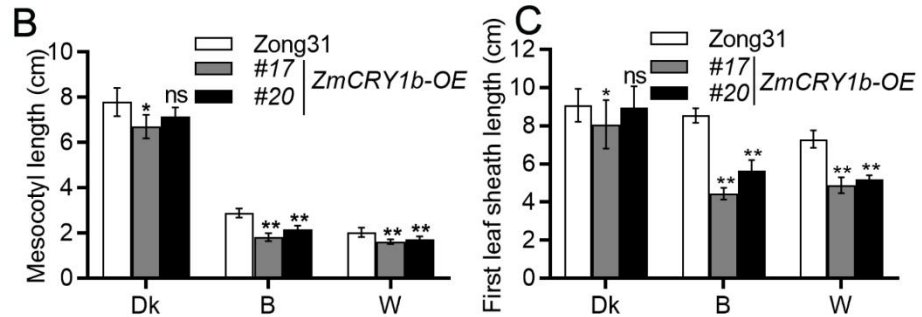
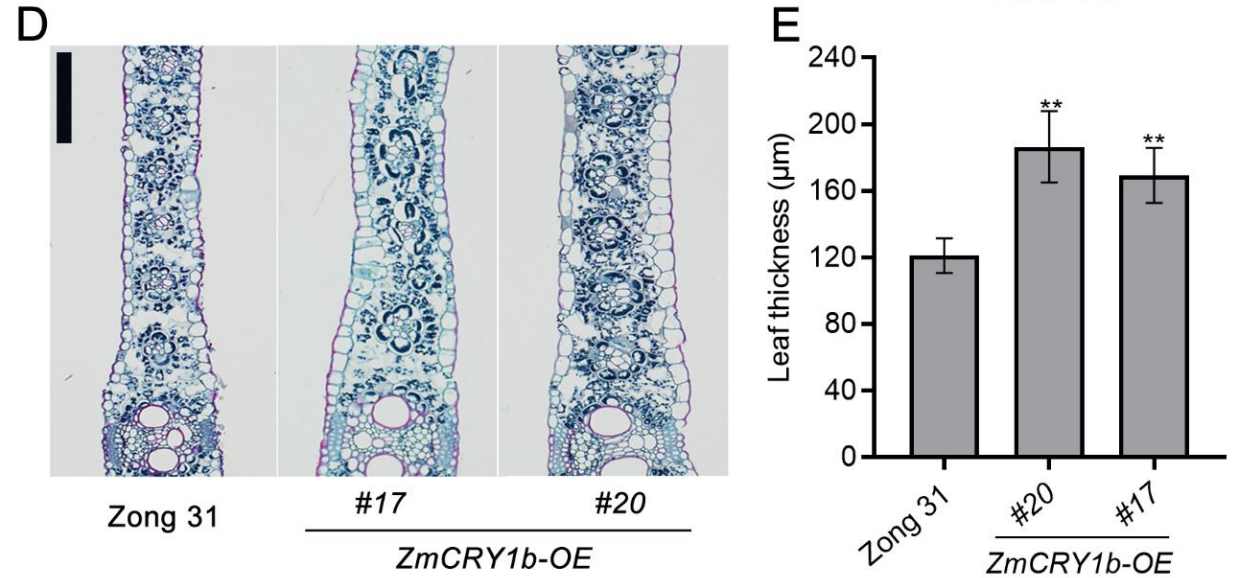
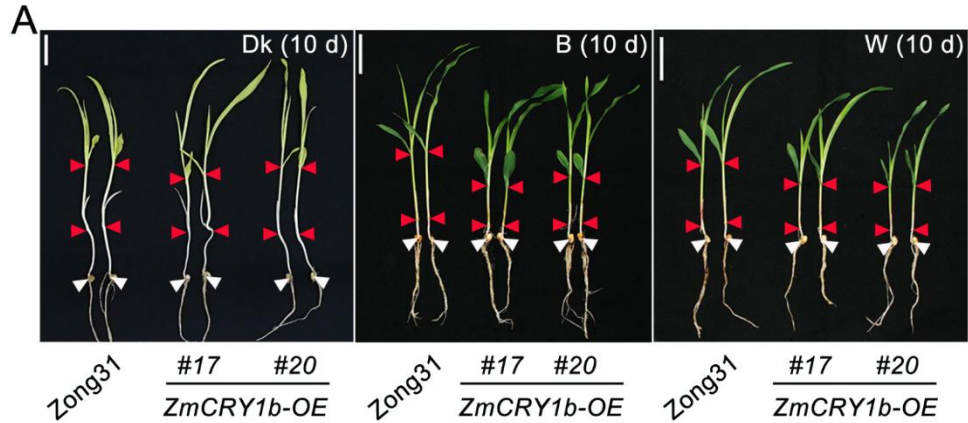
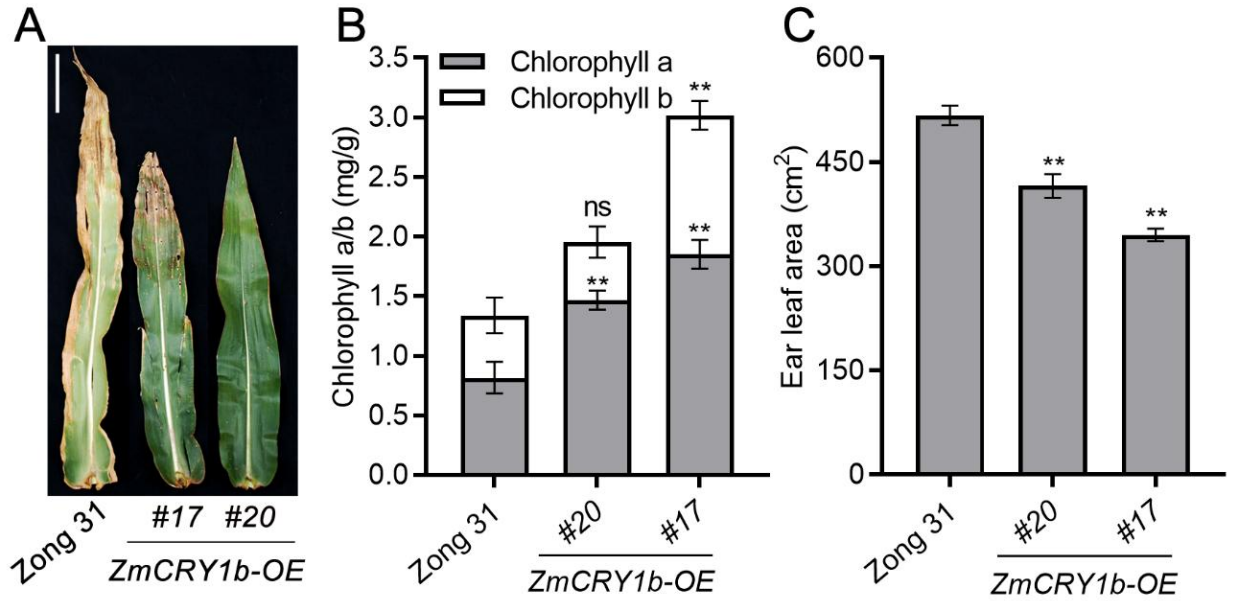
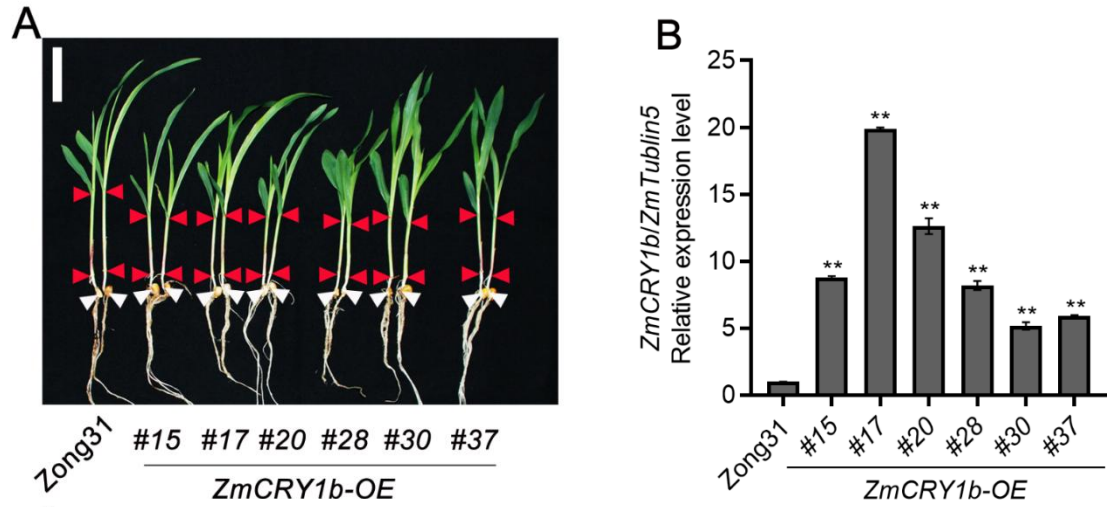


OE-ZmCRY1b inhibits Arabidopsis plant height

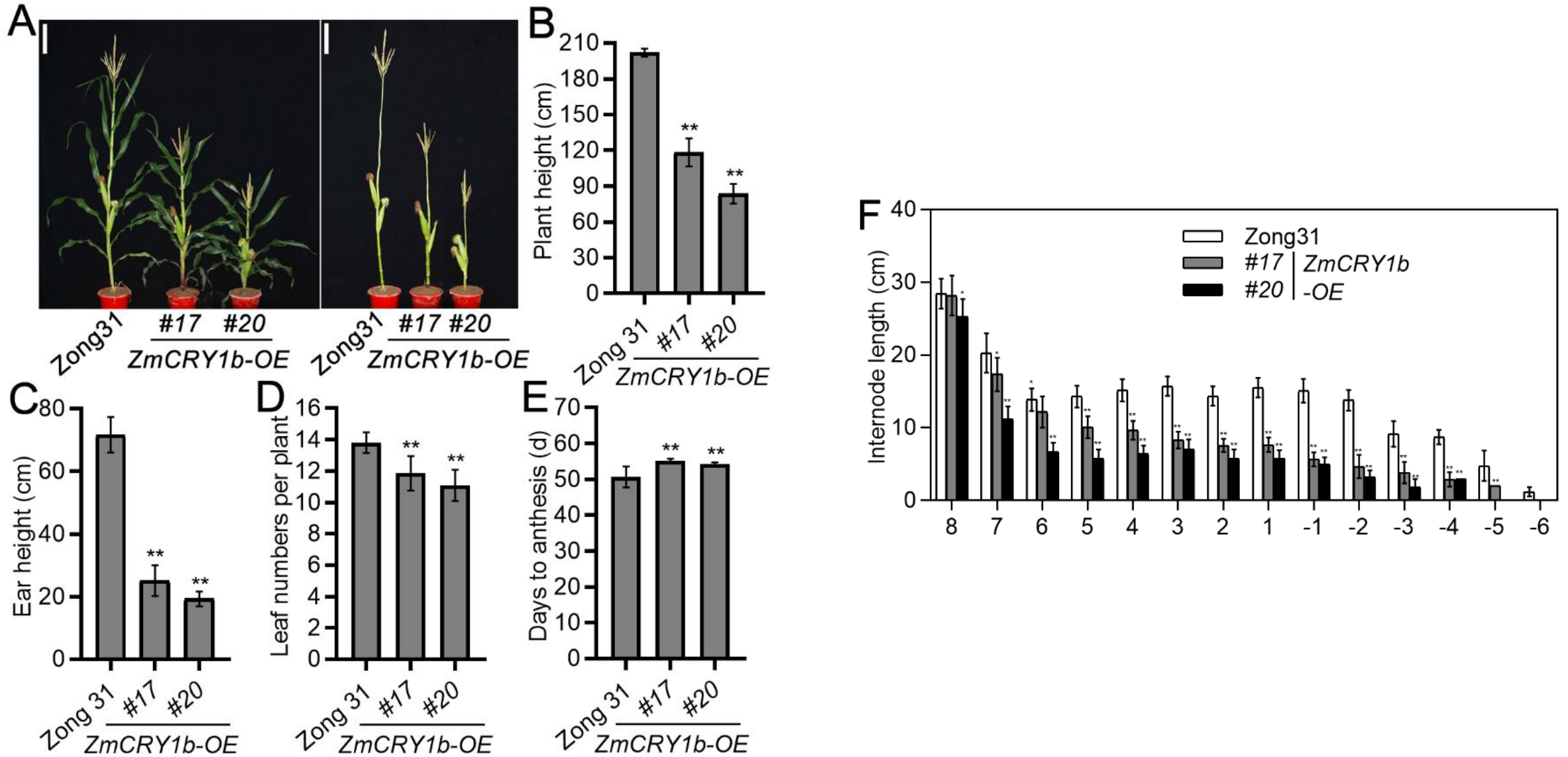
*In Arabidopsis,
ZmCRY1b functions
similarly to AtCRY1,
what about in maize?*



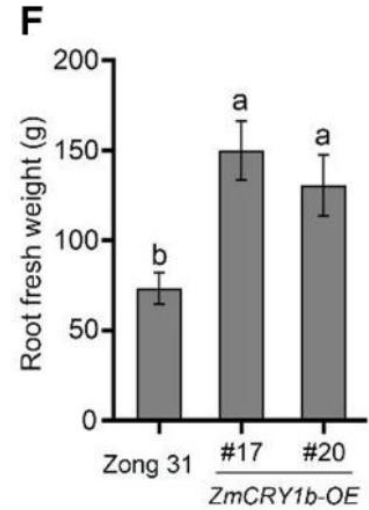
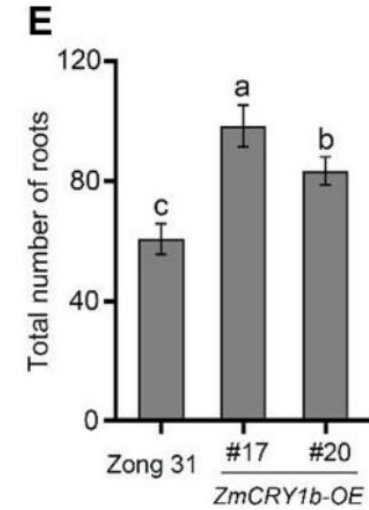
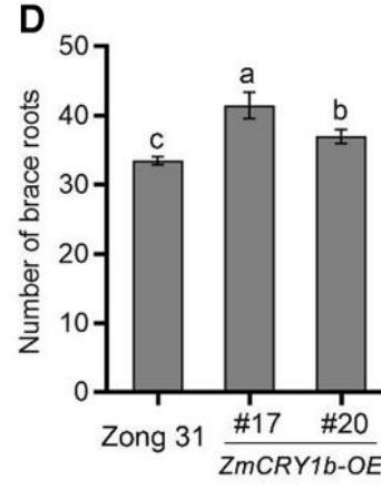
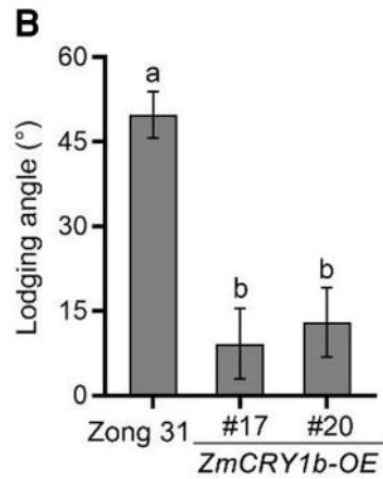
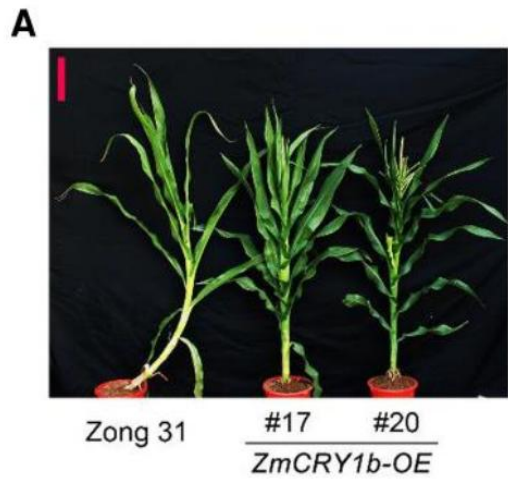
ZmCRY1b overexpression strain reduces maize seedling height



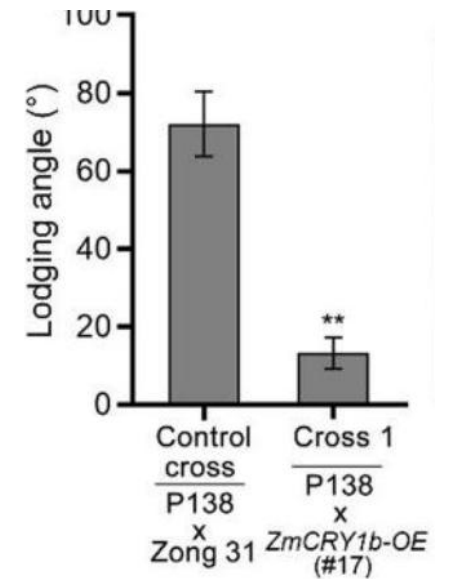
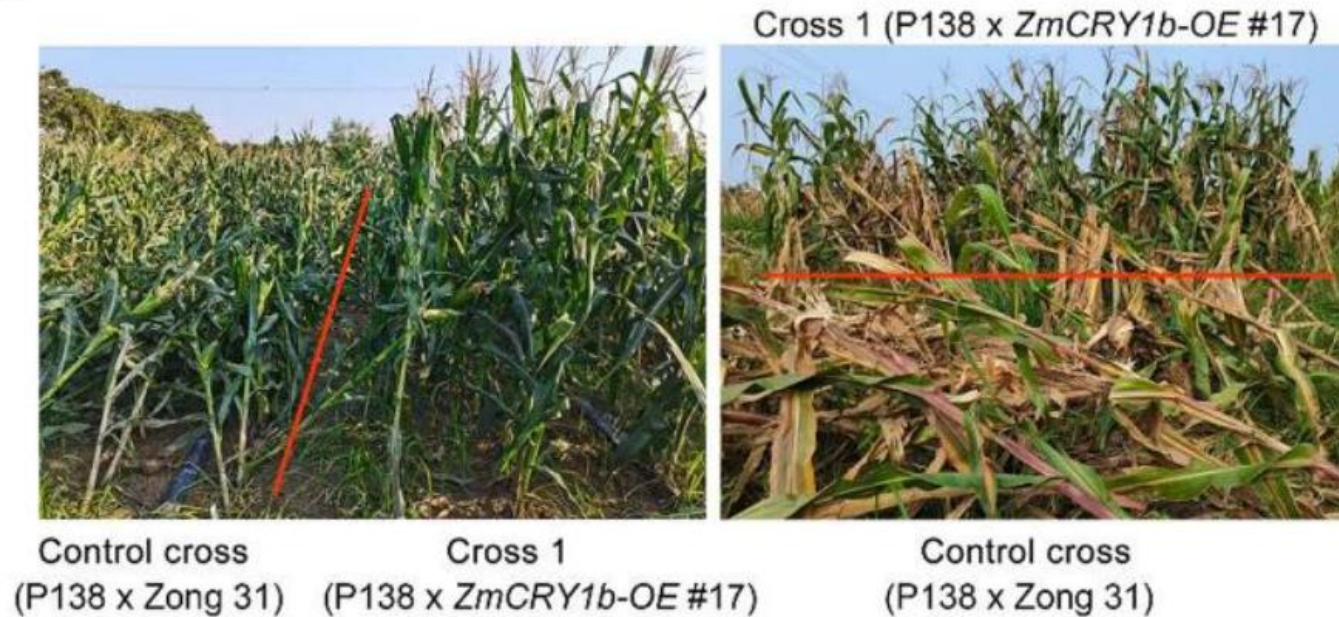
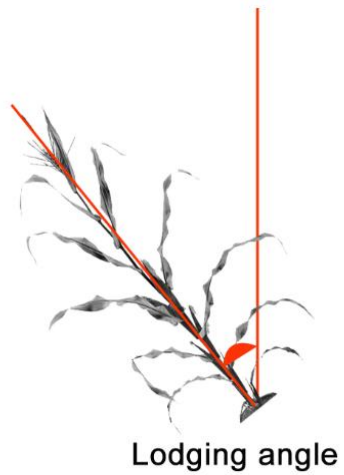
OE-ZmCRY1b Reducing plant height and delaying flowering in the field



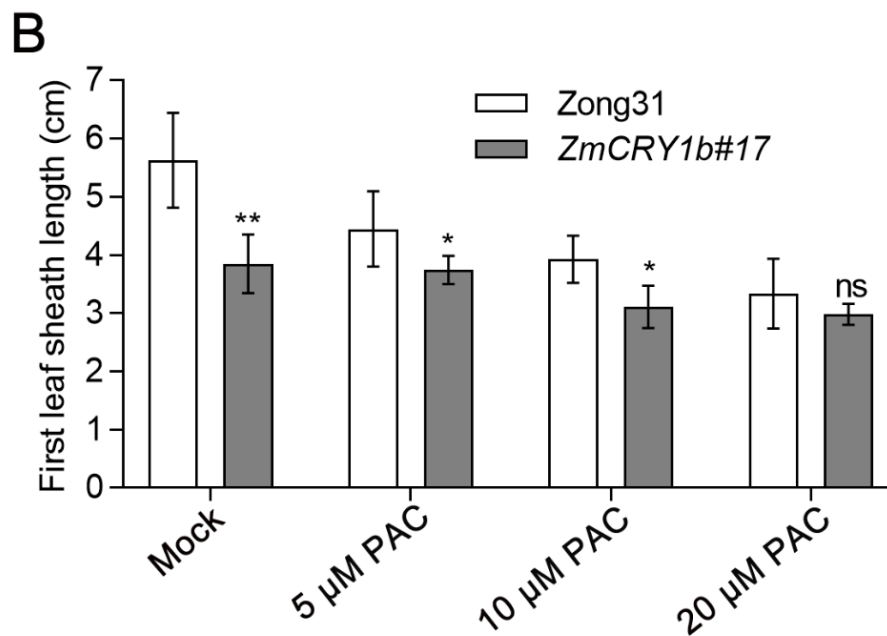
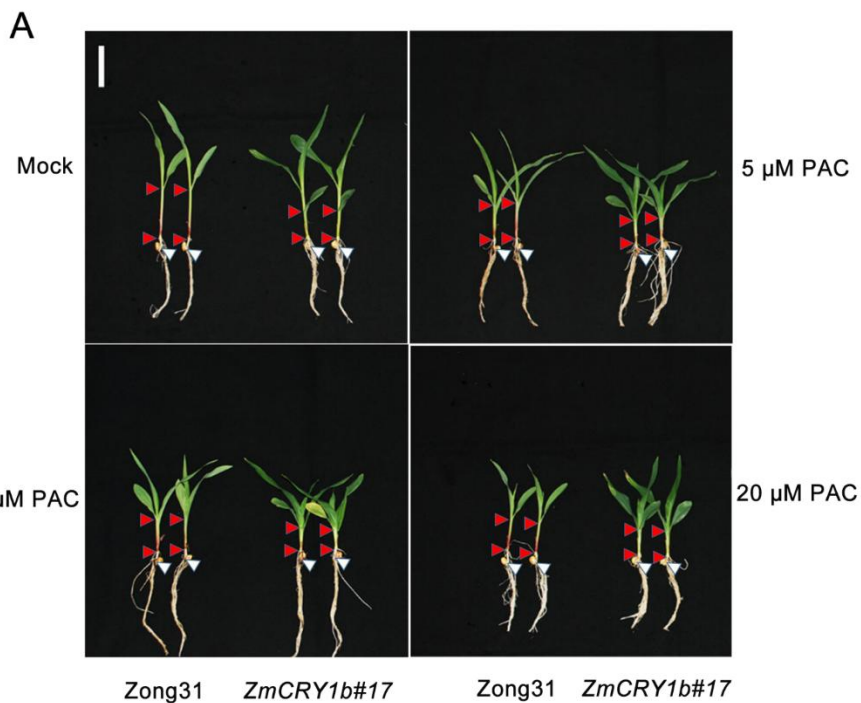
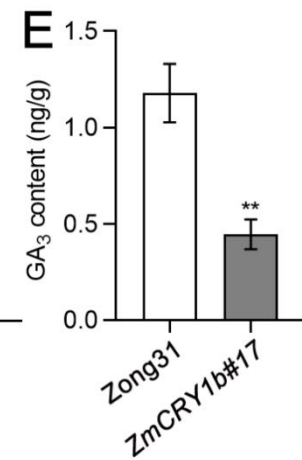
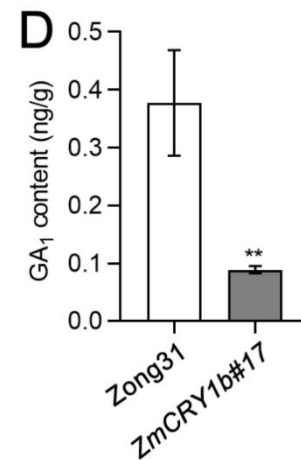
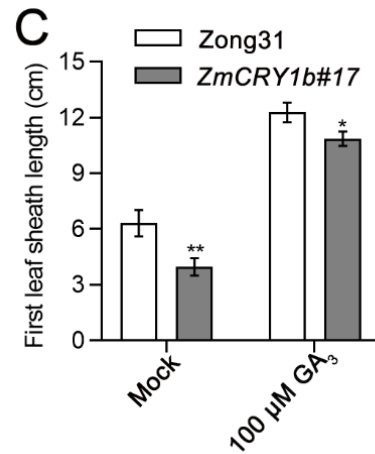
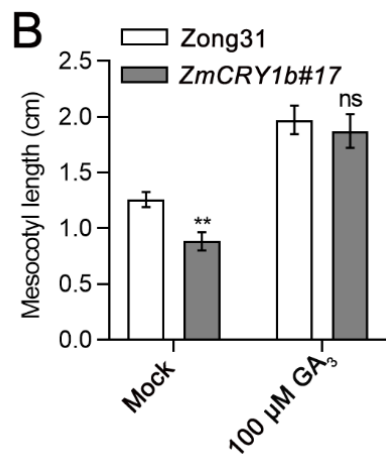
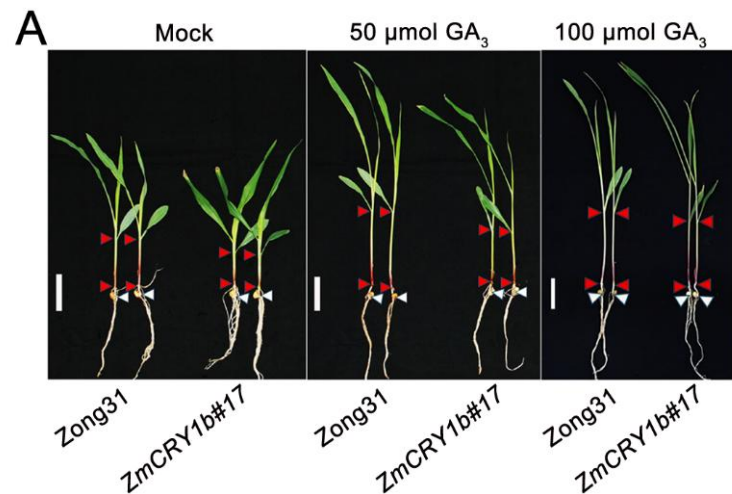
enhance lodging resistance in maize



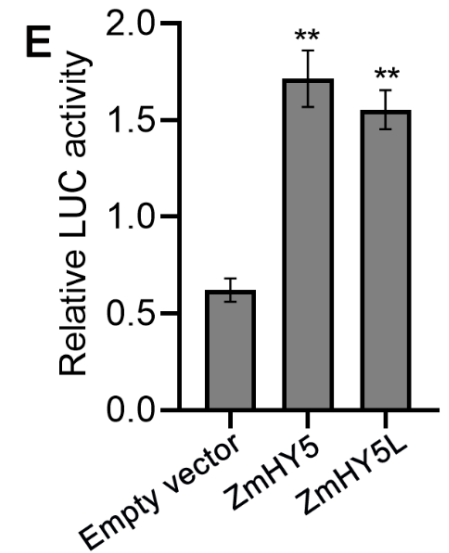
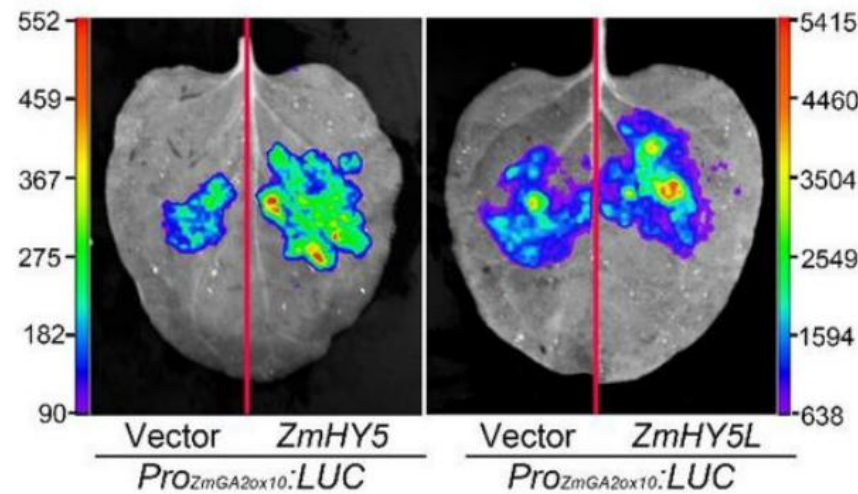
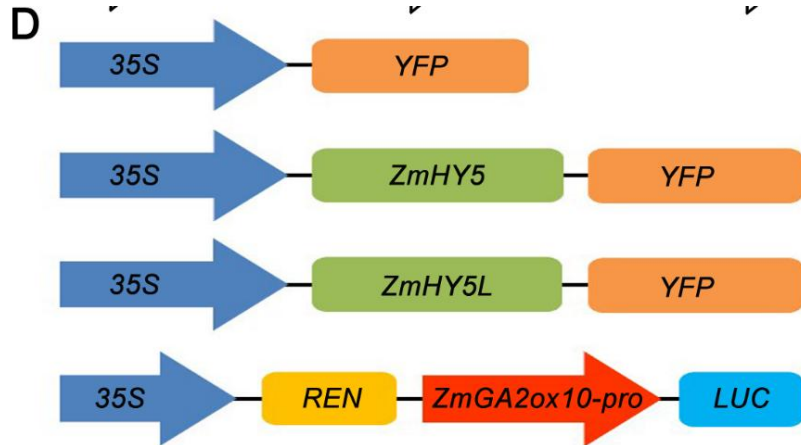
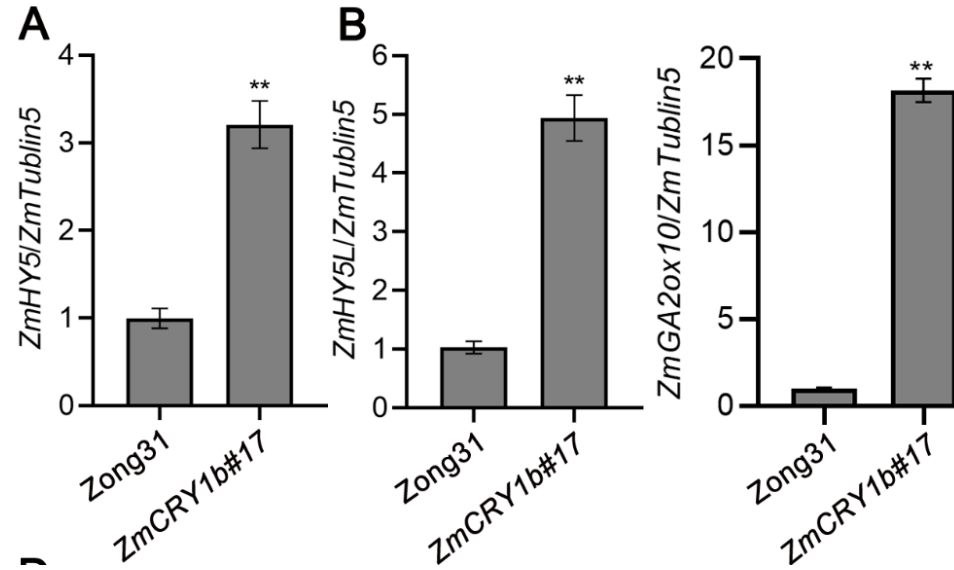
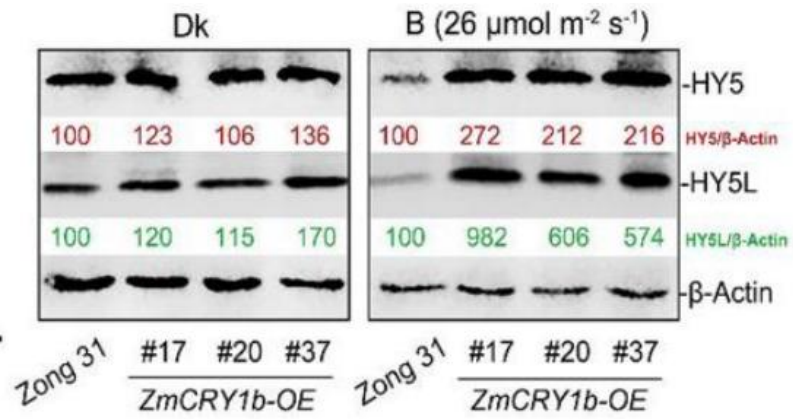
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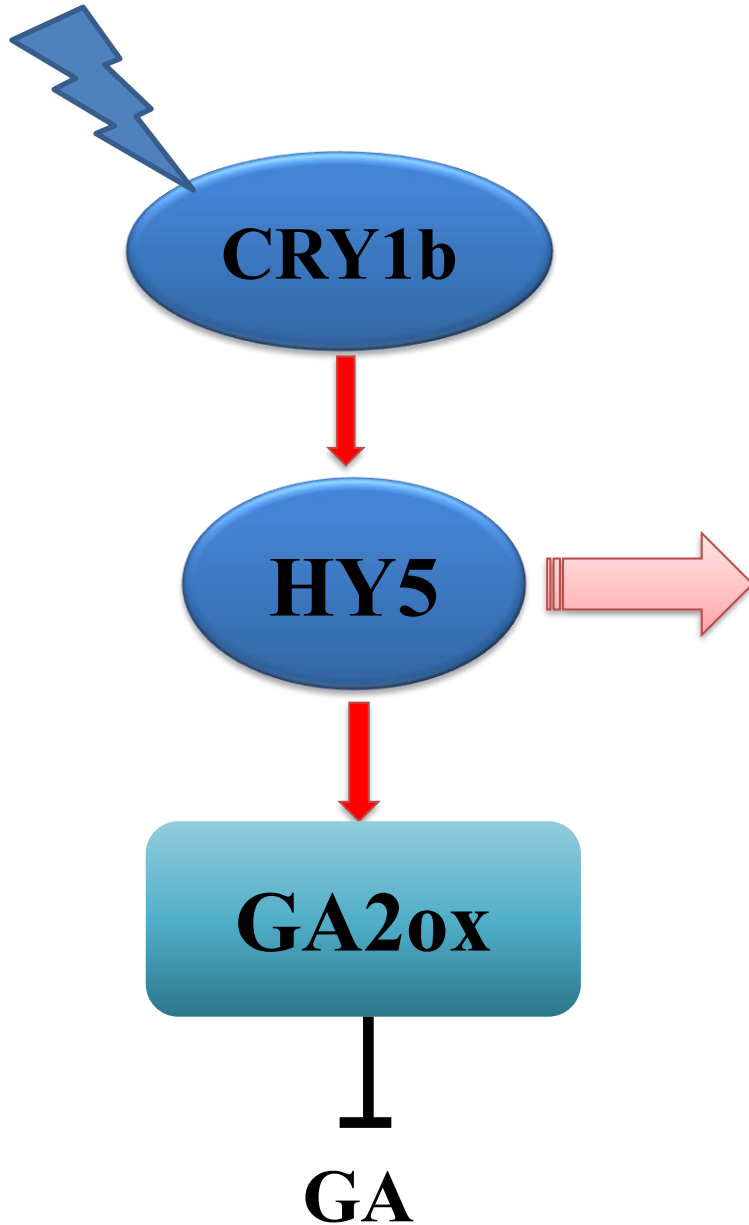
CRY Reduce plant height by regulating gibberellins



ZmHY5 regulates the expression of *ZmGA2ox10*



Light



Control cross
(P138 x Zong 31)



Cross 1 (P138 x *ZmCRY1b*-OE #17)

Cross 1
(P138 x *ZmCRY1b*-OE #17)

Control cross
(P138 x Zong 31)

Thank you for your attention !