Information box. Key facts about the roles of light and photoreceptors in response to abiotic and biotic stresses

Excess light stress

- PHOT2 is essential for the chloroplast avoidance movement to reduce the intensity of incident light
- CRY1 is vital for the induction of transcription of excess light responsive genes and anthocyanin biosynthesis acting through COP1 and HY5

Fluctuating light stress

- far-red light has a positive effect on photosynthesis thereby accelerating NPQ relaxation

Photoperiod stress

- the role of photoreceptors is not yet known

UV stress

- phyA, phyB, CRY1, CRY2 and UVR8 regulate the transcription of CPD photolyase genes
- a HY5/COP1/UVR8- or CRY1/CRY2-dependent pathway mediates the production of UV-protective compounds

Cold stress

- phyB represses the CBF pathway in PIF-dependent and -independent ways reducing cold acclimation
- under long day conditions, cold acclimation is repressed in a phyB/PIF4/PIF7-dependent way
- HY5 stimulates the expression of anthocyanin biosynthesis and cold responsive genes independent of COP1

Heat stress

- a light-induced chloroplast-to-nucleus signal primes plants for increased thermotolerance
- light primes HsfA1-mediated induction of *APX2* expression in a phyB-dependent but PIF-independent manner

Drought stress

- CRY1, phototropins and phyB regulate stomatal opening in a COP1-dependent way and phyB, in addition, in a PIF3/PIF4-dependent way
- low R:FR ratios (shade conditions) increase ABA sensitivity and thereby drought tolerance

Biotic stress

- light intensity, quality and duration are of crucial importance for the activation of the full immune response in plant - pathogen interactions
- both photoreceptors and chloroplasts mediate light signals in plant-pathogen defense responses
- phyA, phyB and CRY1 and PHOT2 contribute to systemic acquired resistance