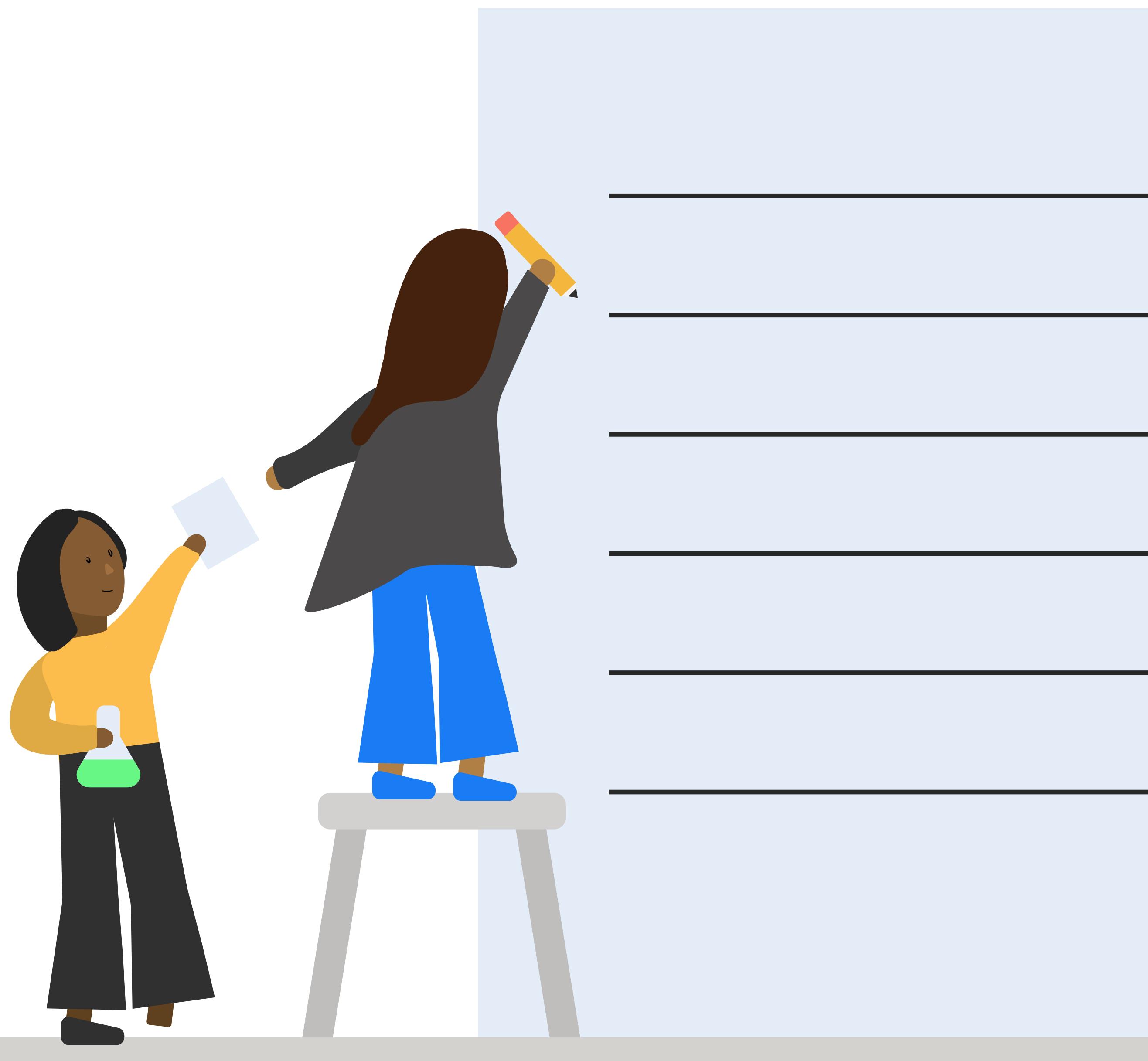


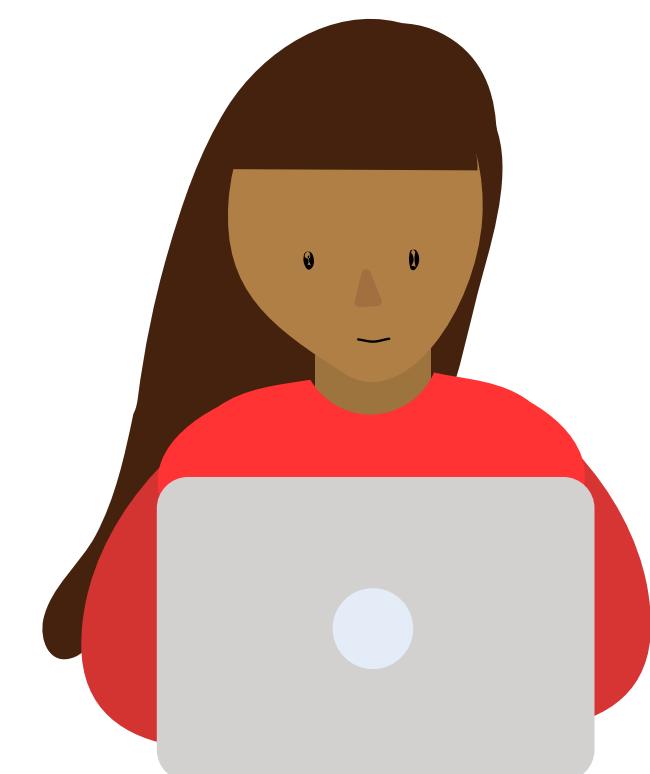
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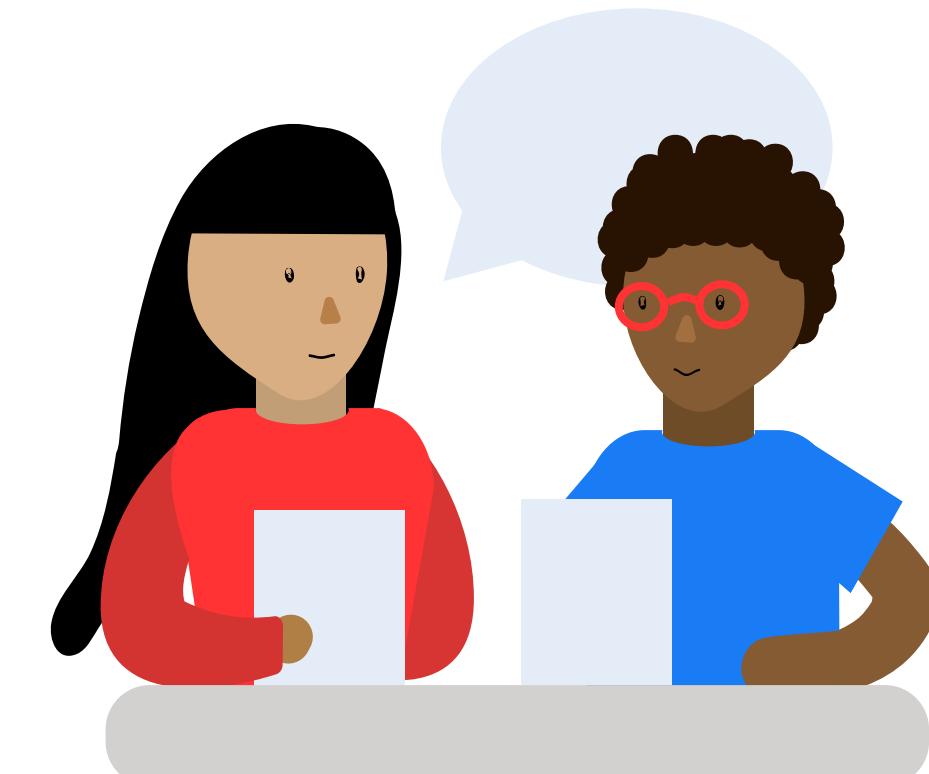
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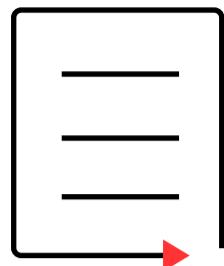
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**Title**

Subdivision of light signalling networks contributes to cellular partitioning of C₄ photosynthesis in maize.

Authors

Ross-W. Hendron and Steven Kelly

Affiliations

Department of Plant Sciences, University of Oxford, South Parks Road, Oxford, OX1 3RB, UK

Corresponding Author

Email: steven.kelly@plants.ox.ac.uk; Telephone: +44 (0)1865 275123

Abstract

Plants coordinate the expression of genes required to conduct photosynthesis in response to growth and environmental changes. In species that conduct two-cell C₄ photosynthesis, the expression of photosynthesis genes is partitioned such that leaf mesophyll and vascular sheath cells accumulate different components of the photosynthetic pathway. The identity of the regulatory networks that facilitate this partitioning are unknown. Here we show that differences in light perception between mesophyll and bundle sheath cells facilitate differential regulation and accumulation of photosynthesis genes in the C₄ crop *Zea mays* (maize). We show that transcripts encoding photoreceptors differentially accumulate in mesophyll and bundle sheath cells in a manner that is consistent with biophysical light filtration. We further show the blue light (but not red) is necessary and sufficient to activate photosystem II assembly in etiolated maize mesophyll cells, while both red and blue produce the same effect in C₃ *Hordeum vulgare* (barley). Finally, we

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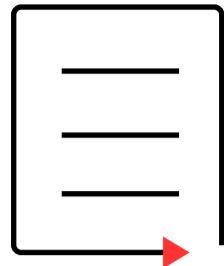
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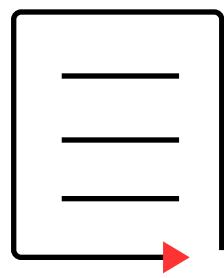
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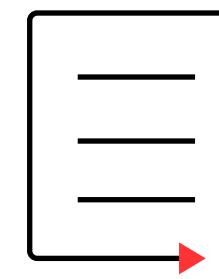
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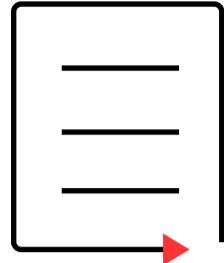
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