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HIRSCHFELDIA INCANA AS THE MODEL SPECIES FOR HIGH LIGHT-USE EFFICIENCY IN PHOTOSYNTHESIS

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Not all plants have the same overall efficiency of photosynthesis, the biological process that sustains most life on our planet. *Hirschfeldia incana* is a Brassicaceae species that can maintain much higher photosynthesis rates at high irradiances (>1500 μmol/m^2·s) than many other plants, which translates into high rates of CO_2 assimilation at these high irradiances. Unravelling the genetic basis of the high light-use efficiency at high irradiances of *H. incana* will open a new avenue for understanding high light-use efficiencies in plant photosynthesis, which could be an important resource for crop yield improvement. To achieve this, we use an interdisciplinary approach combining physiology, genetics and bioinformatics.

Here we present the first results arising from whole-genome sequencing, comparative genomics and phenotyping for photosynthesis. We describe the genetic makeup of *H. incana* in the form of its chromosome number, genome size estimate, and the first draft assembly of the *H. incana* genome. In addition we identified copy number variants upon comparison of the draft *H. incana* genome sequence to those of other Brassicaceae species. Some of these appear to be relevant for high photosynthesis efficiency. We will discuss the interpretation of these results and outline a research strategy involving comparative genetics and genomics to further investigate the nature of the exceptional photosynthesis characteristics of *H. incana*. With these results obtained so far, we lay a solid foundation for the use of *H. incana* as a preferred model species for the study of high photosynthesis rates at high irradiance.