LIGHT AVAILABILITY

Flexible competitive strategy

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Credit: Martin Fowler/Alamy Stock Photos

Competition drives natural selection in all living things according to Darwin's theory of evolution. Plants compete for resources such as water, nutrients and light to sustain their growth and reproduction. Meanwhile, resource availability at different spatial and temporal scales also influences the growth of plants and the structure of plant communities. In terms of light competition, multiple mechanisms (including vertical growth, lateral growth and shade tolerance) have been proposed to be key strategies that plants evolve. However, whether plants are able to shift between these strategies according to their environmental conditions has become a pressing question in efforts to understand more about light competition. To resolve this, Michal Gruntman and his colleagues from University of Tübingen, Germany, tested the responses of a clonal plant *Potentilla reptans* when facing different levels of light competition.

Vertical filters of transparent green plastic with different heights and densities were used to mimic the light conditions generated by four different scenarios of neighbouring vegetation: short–sparse, short–dense, tall–sparse and tall–dense. By measuring plant growth parameters such as the number of newly produced leaves, petiole length, height per diameter, specific leaf area, stolon length and internode length, the researchers identified distinct patterns of plant responses to different light conditions. Specifically, the short–dense treatment led to the highest height-per-diameter ratio, suggesting a preference of vertical growth, whereas the tall–dense treatment is more closely associated with increased leaf areas, indicating shade tolerance. Plants with dense neighbours also exhibited more lateral growth compared with those with sparse ones.

This study presents a smart experimental strategy to simplify the real situations that plants face in natural communities and, importantly, demonstrates the ability of plants to employ flexible competitive strategies even when they have the same genetic backgrounds.

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