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The effect of *Helichrysum* shrub encroachment on orchids in a tropical, montane grassland ecosystem, Tanzania

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Abstract

Context

Although shrub encroachment is a common phenomenon in grasslands, which often suppress co-existing herbaceous plants, little is known about how encroaching native shrubs affect endemic and threatened orchid species.

Aims

We assessed the effect of the native dwarf shrub *Helichrysum* species on orchid species in a protected mountainous grassland system in Tanzania.

Methods

We selected five *Helichrysum* shrub-dominated blocks and applied four treatments in each, i.e. no or low encroachment (<20% *Helichrysum* cover; ‘low cover’), high encroachment (>50% *Helichrysum* cover; ‘high cover’), cutting all stems of *Helichrysum* shrubs to ground level (‘stem cut’) and removing both stems and roots of all *Helichrysum* shrubs (‘uprooted’). We then compared orchid species diversity, abundance and functional traits by using a mixed linear model across treatments.

Key results

Orchid species diversity and abundance were significantly lower in ‘high cover’ plots than in other treatments. In ‘high cover’ plots, orchid species such as *Disa robusta*, *Satyrium acutirostrum*, and *S. sphaeranthum* had a significantly lower chlorophyll content than they did in ‘low cover’ plots. The ‘uprooting’ treatment showed significantly higher orchid species diversity in the second field season.

Conclusion

The expansion of *Helichrysum* shrubs adversely affected orchid abundance, diversity, and individual vigour, which in turn affected the regenerative ability of orchids

Implications

We suggest that management should focus on shrub removal, because only ‘cutting’ had a beneficial effect on orchids. Shrub removal should be focused on areas of high shrub cover to promote further orchid species growth in this mountainous grassland of Tanzania.

Keywords: Africa, below- and aboveground competition, cutting, *Helichrysum splendidum*, Kitulo National Park, plant–plant interactions, protected area, uprooting.

