

Why are some plant species more threatened than others?

Evidence from the BSBI's Threatened Plants Project

(1) Background

- Around a 1/5th of our flora is threatened but for most species we lack even basic information on the scale and causes of declines as well as their ecological and management requirements.
- Surveys that address these questions need to be unbiased, standardised and repeatable.
- For a volunteer perspective they also need to be simple, rewarding and fun!



Fig. 1. Left: a BSBI recording group surveying Yellow Bird's-nest in North Wales. Right: completed TPP recording form for a population of Sibbaldia in Scotland.

(2) Aims

- Quantify the extent of declines since 1970s.
- Improve our understanding of local abundance, habitats and ecological and management requirements.
- Identify key threats and drivers of change.
- Inform conservation activity and provide a baseline for the future monitoring.

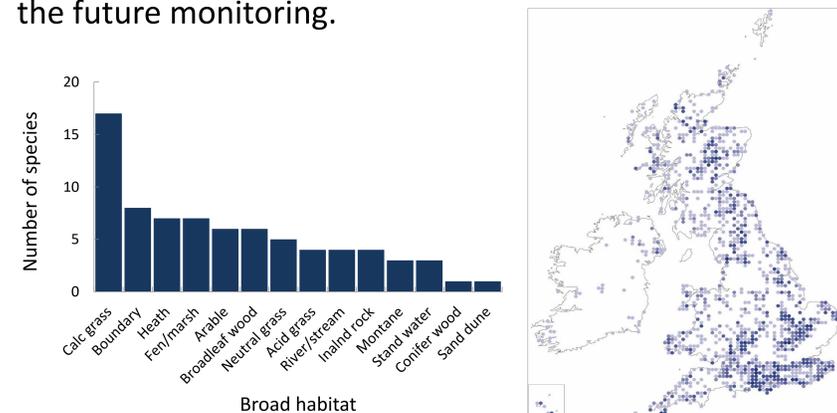


Fig. 2. Left: the number of threatened species recorded in relation to broad habitat. Right: number of pre-selected populations surveyed per hectad (pale blue = one survey, darkest blue = 9+ surveys).

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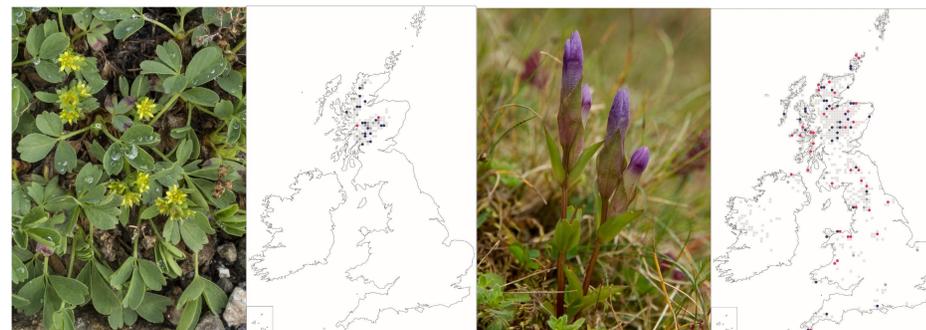


Fig. 3. TPP species exhibiting contrasting results: Sibbaldia (left) and Field Gentian (right). The maps display hectads where populations were refound (blue dots) and not refound (red dots). Grey dots indicate the historic range.

(3) Survey methods

- **Species selection:** 50 threatened plants (GB-Red List) representative of a wide range of semi-natural habitats and geographic area (Figs 1 & 2).
- **Sample sites:** pre-selected (randomly) from post-1970 historic locations.
- **Field survey:** carried out by volunteers over 6 field seasons (2008-2013) using a standardised methodology.
- **Population variables recorded:** population size and extent, regeneration, habitat, management, associates, threats and likely reason(s) for loss where populations not refound.

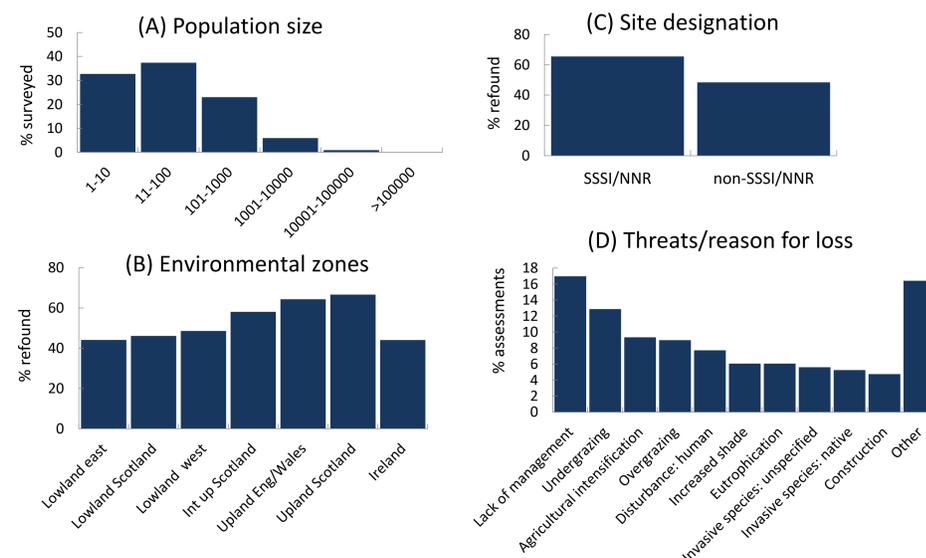


Fig. 4. Summary of overall TPP findings: population sizes (A), refound rates by region (Lowland England/Wales – east and west; Lowland Scotland; Upland England/Wales; Intermediate Upland Scotland, Upland Scotland; Ireland) (B) refound rates by site conservation designation (C) and threats/reason for loss (D).

(4) Main findings

- 1993 pre-selected populations surveyed.
- 51% refound overall; average 53% per species ranging from 18% for Corn Buttercup, to 87% for Sibbaldia (Fig. 3).
- 3/4 populations supported fewer than 100 individuals (Fig. 4A).
- Refound rates significantly higher in the uplands (Fig. 4B) and on protected sites (Fig. 4C).
- Lack of (suitable) management (inc. undergrazing, ↑d shade) most significant threat (36% of all assessments combined) followed by agricultural intensification (inc. overgrazing) (c.20% of all assessments combined).
- Native invasive species 13× more likely to pose a threat than non-native invasives (5.2% v 0.4%).
- Short-lived species with limited dispersal/competitive abilities and short-lived seedbanks the lowest survival rates (e.g. Field Gentian; Fig. 3).
- Long-lived perennials fared better but may face an 'extinction debt' on sites where management is suboptimal.

(5) Implications

- Site protection has worked for some species but no room for complacency, especially in the lowlands, and for species that occur partly or wholly outside of protected sites.
- Reinstatement of low-intensity traditional management will be vital for the future survival of most threatened species.
- Highly interventionist approaches will be required for some species (e.g. periodic disturbance) and could be delivered through well targeted management in wider countryside (e.g. agri-environment schemes).
- Such approaches will require improved communication between data providers, conservation organisations, landowners and the general public.

Acknowledgements and further information: the authors owe an enormous debt of gratitude to the 817 botanists who took part in this survey. Full details of the survey can be found in Walker, K.J., Stroh, P.A. & Ellis, R.W. 2017. *Threatened Plants in Britain and Ireland*. BSBI, Bristol. Please send any queries to Kevin Walker kevin.walker@bsbi.org