

An overview of prioritisation of invasive naturalised exotic plants in Queensland

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http://www.epa.qld.gov.au/nature_conservation/plants/queensland_herbarium/

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Summary: Traditionally plant specimens of naturalised flora were held at herbaria as a source of taxonomic and biogeographical data. Currently these plant collections are also used for weed categorisations and as legal evidence that a particular species is causing a problem at a particular location. Analysis of Queensland Herbarium specimen frequency data highlights the dominance of the herbaceous or ground cover species when compared to perceptions of expert panels, which tend to emphasise trees, shrubs and vines.

Discussion: In 2001, at the request of the Southeast Queensland Environmental Weed Working Group, a ranked list of 200 invasive naturalised species was prepared using herbarium specimen data and expert panel assessments (Batianoff and Butler 2002). It is a working document for categorising/ranking environmental weeds for south-east Queensland. This work was followed by an assessment of the impact of the top 66 species on natural systems in south-east Queensland (Batianoff and Butler 2003). The broader Australian context of Queensland's naturalised flora and weed categorisations for natural and agricultural ecosystems has since been published by Groves *et al.* (2003). This national weed categorisation study, based on vouchered specimens held in state, territory and national herbaria, underlines the importance of curated specimen collections, held in herbaria, to the study of naturalised plants.

Exotic plants become naturalised when they spread beyond cultivation and form self sustaining populations. Recognising when a given species has crossed this threshold can be difficult. The Queensland herbarium recognises exotic plant species as naturalised when they have established at least three populations beyond cultivation, or have at least one "wild" population of more than ten individuals. Species that only spread vegetatively are naturalised when they have spread significantly beyond their initial cultivated situation. Species that show signs of spreading but have not met these criteria are classed as "doubtfully naturalised" (currently 280 species in Queensland). This category assists weed management, and is similar to the Victorian Herbarium's "incipiently naturalised" class (Ross, 2000). Ross (2000) in Victorian plant census also recognise some taxa as both native and naturalised in different parts of the state, such species are not dealt with in this presentation.

Australia, Queensland and south-east Queensland had about 2700, 1230 and 1080 naturalised exotic species of vascular plants respectively, in the year 2000 (Groves *et al.* 2003, Batianoff and Butler 2002). These three geographic domains are similar in that about 60% of their naturalised species are relatively frequent and in some areas are regarded as a problem to environmental managers. According to Groves *et al.*

(2003) in Australia serious agricultural weeds represent a smaller proportion of the total exotic flora than environmental weeds (29% vs 60%). The reasons we have more environmental weeds than agricultural weeds might lay in the greater diversity of environments encompassed by natural compared to agricultural ecosystems.

In Queensland and Australia, of the 60% of the naturalised flora which are recorded as “weeds”, about half (or 30% of the total weedy naturalised flora) may present serious problems to environmental managers. In south-east Queensland, we nominated 200 species as serious invasive out of 660 species that were identified by the expert panel as weeds and this figure is also about a third of nominated weedy species. Plant specimen data for Queensland indicates that major concentrations of weeds occur around high-density urban centres, waterways and transport corridors. According to Queensland Herbarium specimen data naturalisations occur at about 12 species per year for Queensland and about nine species per year for south-east Queensland.

When raw frequency data is used, grasses and herbs in the Fabaceae and Asteraceae are the most prominent components of the naturalised flora. Grasses make up about 15% (179 species) and Asteraceae (daisies) about 10% (121 spp.) of Queensland’s naturalised flora. On the other hand, in our initial assessment of invasiveness and impact in south-east Queensland, assessments from the expert panel emphasised large plants (trees, shrubs and vines). In the end we balanced expert opinion with frequency data to produce a final ranking based 90% on expert opinion and 10% on frequency. Resulting in the inclusion of 100 species (50%) belonging to invasive herbs. This issue requires further consideration of weed impacts and management prioritisations, to determine how best to blend ecological understanding with human perceptions and priorities. Ecological understanding is important. For example, with the exception of rainforest and heathlands, the majority of native species richness resides in the understorey. In the long-term, invasive understorey plants such as grasses can completely alter the function of some ecosystems and exclude regeneration of some native woody plants (eg. buffel grass, Butler and Fairfax, 2003), which suggests that understorey weeds should not be underestimated.

We found the national view provided by Groves *et al.* (2003) assisted our understanding of weeds in south-east Queensland by providing context and comparable data. Our next project aims to further develop ecological understanding of weed distribution in Queensland by providing weed categorisations for six super regions in Queensland (amalgamated bioregions: tropical savanna, semi-arid south west, wet tropics, Brigalow north, Brigalow south, south central coast) based once again on specimens and site data combined with input from professionals with local knowledge.

Conclusion: Specimens can provide legal and scientific evidence that particular species are causing problems in particular locations and are therefore invaluable in the development and defence of weed categorisations. However, this point is not sufficiently appreciated by some weed managers. Weed categorisations provide essential context to local weed management. Beyond classification we see a great need for case studies and detailed mapping, survey and monitoring of invasive species.

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