

# Ornamental environmental weeds were marketed earlier and for longer than non-weeds in New Zealand

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**Summary** Many plants now considered invasive weeds were originally introduced intentionally as ornamentals. Increasingly, evidence suggests that attributes of the ornamental market may explain the success of environmental weeds but detailed assessments of this assumption are rare. Here we test the hypotheses that compared to non-weeds, environmental weeds will have entered the ornamental market earlier and have been sold for a longer time. We collected data from dozens of nursery catalogues in New Zealand ranging from 1866 to 1992 for 254 environmental weed species in 188 genera and their congeners. We evaluated the first date of record for each species and the range of catalogues in which it appears. Our catalogues have captured at least half of the environmental weed species thought to have been introduced or sold as ornamentals, and of these the majority (80%) are recorded in a nursery catalogue before they are known to have been naturalized. We found that

environmental weed species were first sold in nurseries up to two decades earlier on average than other species and were sold in more catalogues across a greater number of years. These results suggest that early introduction and sustained propagule pressure through continued marketing and sale increases the likelihood that a species will become an environmental weed. Our results can be used to assess those species currently sold today that have the potential to become environmental weeds as well as species that pose a low risk. As sale of ornamental species can play an important role in driving which species become environmental weeds, this emphasizes the importance of continued engagement with the horticulture industry to minimize the risk of future invasions.

**Keywords** Alien species, Anthropocene, gardens, historical analysis, plant nurseries, plant invasions, non-invasive species, propagule pressure