POSTER 64

Understanding the historical spread of naturalised plants in New Zealand

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The naturalisation and subsequent spread of exotic species is a major problem for most regions of the world, including New Zealand. Managing plant invasions requires a greater understanding of why some naturalised species are more widespread than others.

To do this, we compiled a comprehensive list of the seed plant species naturalised in New Zealand, then determined which of 10 New Zealand regions each species has been collected or listed in. We recorded life form (annual, biennial, etc.), native region(s) of origin, year of first record of national discovery, whether the species was accidentally or deliberately introduced to New Zealand (and if deliberately introduced, what it was introduced for) and whether or not the species had a confamilial native, a naturalised congener or a native congener. We examined the effects of these factors on the number of New Zealand regions each naturalised species occupied.

In the year 2000, 28% of more than 2200 naturalised species occupied only 1 region, 18% occupied 2 regions, decreasing incrementally to 2.5 % for 9 regions but with 13.5% occupying all 10 regions. We used a generalised linear model (GLM) with a poisson distribution for species occupying 0-9 regions and a GLM with a binomial distribution to determine the predictors of whether a species occupied 10 regions or not.

As expected, the dominant effect was that species discovered earlier occupied more regions. More surprisingly, although annuals were first recorded on average 40 years earlier than woody species, woody species appear in subsequent regions faster than annuals.