

Reply to Hulme et al.: Cover of non-native species is too low to adversely affect native plant diversity at a national scale

Hulme et al. (1) question the conclusions of our research on the impact of non-native plants on British plant diversity (2). We clearly state that “some non-native species become common in some locations, and thereby alter the local flora, and there may be local implications for conservation” (2), which seems to be Hulme et al.’s (1) main point, but we found “no evidence that non-native species drive such changes at a national scale or that they do so any more than native species” (2). Management may be required to remove non-native plant species from particular localities, as highlighted by Hulme et al. (1). However, our Countryside Survey (CS) analysis shows that increases in cover by native species were nearly an order-of-magnitude greater than cover increases by non-native species: we should take action based on the impacts of species rather than their origins (3), and specifically, we should do so in locations where those impacts are felt. For example, the maintenance of high-conservation value lowland chalk and limestone grasslands in Britain requires the control of native tree and shrub species (e.g., hawthorn, ash, yew) and tussock-forming grasses (e.g., *Brachypodium*), even though

non-native trees also need removing from some localities (e.g., holm oaks from a limited number of mainly coastal sites). The issue is that these species-rich grasslands are human-created plagioclimaxes, which naturally succeed to woodland unless regularly grazed or cut. The driver of change in this case is land management, not foreign species. Nationality-independent tree removal is required if conservationists wish to maintain this cultural vegetation.

Data speak louder than words. We are in agreement with Hulme et al.’s (1) statement that the “CS records only about 10% of the non-native flora of Britain” and that just “four of these [legally listed and threatening] species are recorded in the CS, and they occur in few quadrats.” Our point exactly. Most non-native species, including those that are officially classed as invasive, are far too rare to impinge negatively on plant diversity, averaged across the country. As such, their presence in Britain adds to the nation’s total floral diversity. The CS samples the most widely distributed types of habitat in the countryside, and hence it is relevant to draw national-scale conclusions. We expect that our broad conclusions will also hold (at a

national scale) for most of the specialized habitats that are undersampled by the CS. It would be helpful to repeat our analyses for further datasets to assess whether native species also dominate vegetation change in habitats, such as chalk and limestone grassland, lowland heath, cliffs, and sand dunes, and whether vegetation changes in these locations are also predominantly caused by environmental drivers other than non-native species.

Chris D. Thomas¹ and G. Palmer
*Department of Biology, University of York,
York YO10 5DD, United Kingdom*

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- 1 Hulme PE, et al. (2015) Challenging the view that invasive non-native plants are not a significant threat to the floristic diversity of Great Britain. *Proc Natl Acad Sci USA* 112:E2988–E2989.
 - 2 Thomas CD, Palmer G (2015) Non-native plants add to the British flora without negative consequences for native diversity. *Proc Natl Acad Sci USA* 112(14):4387–4392.
 - 3 Davis MA, et al. (2011) Don’t judge species on their origins. *Nature* 474(7350):153–154.

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The authors declare no conflict of interest.

¹To whom correspondence should be addressed. Email: chris.thomas@york.ac.uk.