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From the start of 2008, *Journal of Ecology* began publishing a new series of papers under the general title Future Directions (see the general invitation to submit suitable manuscripts, and the specifications for papers in this series, on page 7 of issue 1, Volume **96** of *Journal of Ecology*). In one of the first papers to be published in this series, Moles *et al.* (2008) drew attention to the large amount of research that ecologists have undertaken looking for traits that can predict the invasion potential of different species. They also highlighted the conspicuous lack of success in identifying such traits with any real consistency. Moles *et al.* proposed a new approach that would be valid for predicting potentially invasive species of plants and other taxa. It involves the identification of (i) new trait space that becomes available in a habitat following a change in environmental conditions, or a disturbance, and (ii) original trait space that would be vacated by species that suffer local extinction. Identification of trait space that becomes available for invasion, and analysis of differences between the traits of resident species and potential invaders may advance our understanding of the attributes that favour invasions in different situations, and the way in which invasions proceed.

In the latest issue of the *Journal of Ecology*, Küster *et al.* continue the search for characteristics that may account for the success of invasive species. Like Moles *et al.*, they acknowledge the failure of many studies to advance knowledge significantly when the role of individual traits is considered. Instead, they examine the capacity of combinations of traits to explain invasion success. In all, they use data on 40 traits, including aspects of genetics, vegetative morphology, flowering phenology, floral and reproductive biology, life-history, introduction history and habitat range. Data were accumulated on almost 400 naturalised neophyte species (defined as plant species introduced since 1500) in the German flora, and invasion success was measured as the number of grid cells occupied in distribution maps of the species throughout the country. The authors quantified the importance of different trait combinations in explaining invasion success.

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As in previous studies, the explanatory power of individual traits was low. In addition, phylogenetic relatedness contributed little to predicting whether species would become effective invaders. However, multiple trait analysis considerably increased the proportion of variation in invasion success that could be explained, and most of this additional explanation was due to interactions between traits. Success in invasion was dependent on particular combinations of trait attributes, with traits relevant to reproduction and ecological tolerance appearing to be especially important. However, even after inclusion of trait interactions in the model, more than 75% of the variation in invasion success across species remained unexplained. Several other factors are suggested that might have increased the explanatory power of the analyses if information about them had been available. These include the number of introductions of the species, the time since introduction, and within-site heterogeneity in physical factors. Küster *et al.* are also careful to point out that the results they obtained may be specific to the habitats in which their study was undertaken, and that the

strategies they have identified as being associated with high invasion potential may have local rather than general relevance. As is so often the case when addressing seemingly intractable ecological questions, we need more analyses to be confident of conclusions. However, this study makes a major advance in understanding attributes conferring invasion success, and is extremely valuable in pointing the way for others to use the current proliferation of large databases to address similar questions in different ecological situations in order to produce general answers.

Issue 5 of *Journal of Ecology* Volume **96** also carries two other papers on analyses of invasiveness. Firstly, Bradshaw *et al*. interrogate a huge database (almost 9000 species) on the Fabaceae, demonstrating that the traits conferring invasiveness are also associated with a low probability of threat from human-based activities. Secondly, Thompson & McCarthy examine the correlations between success of species in the colonisation of urban habitats and a wide range of potentially explanatory traits. Success in urban environments was associated with similar traits in both native and alien species. The most successful species tended to be robust, and characteristic of fertile, dry, unshaded, base-rich habitats. However, greater success in urban habitats was associated with larger seed mass in native species, whereas it was associated with smaller seed mass in alien species.

The ecology of species invasions is one of the most active fields in plant ecology at present. Understanding the causes of invasion, and control of alien invaders, are among the most pressing of many areas in which research by plant ecologists is making vital contributions. These new studies all advance our general understanding of the syndromes associated with invasiveness, and should be essential reading for all those researching this field, and managing environments in which invasive species are a problem.

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