

# ECOLOGICAL CONSIDERATIONS FOR THE MANAGEMENT OF NON-NATIVE INVASIVE SPECIES DURING THE MAINTENANCE AND OPERATION OF NATIONAL ROAD SCHEMES IN IRELAND

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During road construction non-native invasive species can be disturbed by machinery and brought into or out of a route corridor, in the form of plant fragments or seed, either within the soil load or on the tyres or tracks of machinery. Cutting of roadside vegetation can also distribute seeds and plant fragments of invasive species, which can then be carried along the road corridor by wind or on tyres of vehicles including cars (see Wace 1977; Wilcox 1989).

Dolan (2004) identified the following invasive species typically found in roadside landscapes in Ireland: Japanese knotweed (*Fallopia japonica*), Winter Heliotrope (*Petasites fragrans*), Giant Rhubarb (*Gunnera tinctoria*), Traveller's Joy (*Clematis vitalba*) and Himalayan Balsam (*Impatiens glandulifera*) (see Reynolds, 2002).

Prevention, early identification and management of non-native invasive species can avoid or reduce the need for long-term maintenance regimes (with associated costs) and impacts on the Irish landscape. While awareness and early detection of invasive species prior to or during construction will provide a means to implement management regimes at an early stage in an invasion event, it is the prevention of an invasion that is likely to be the most environmentally sound approach.

The key areas that determine invasion success are a combination of a habitat's degree of susceptibility to invasion (Pyšek and Prach 1993; Burke and Grime 1996), plus the traits of the invading plant species (Pyšek and Richardson, 2006). Although, susceptibility is easy to categorize, it is the identification of consistent traits which is

proving more difficult (Thompson et al. 2001), as different traits may be more advantageous in different habitats (Alpert et al. 2000). Furthermore, the establishment of non-native invasive species also appears to be determined by the presence of mature native plant communities (Lugo and Gucinski 2000; Lundgren et al. 2004).

Whereas the mature native plant communities within the general Irish landscape may be somewhat resilient to invasion, the removal of vegetation and topsoil provides ideal opportunities for non-native species to invade adjacent ecosystems, alter plant community structure and composition (e.g. Saunders et al. 2002), limiting their ability to perform ecological functions and services (Dolan et al. 2005).

As Ireland is currently undergoing a large extension to its national road network, it is clear that much of Ireland's land area has recently, and will, become more susceptible to non-native invasive species.

To date the management of non-native invasive species on Irish national road schemes is absent, inappropriate (e.g. mechanical flailing) or predominantly herbicide based - the latter appearing to 'control' rather than to eradicate.

Given the amount of disturbance that accompanies road building, this research project (part of SIMBIOSYS: multi-disciplinary research across Trinity College Dublin, University College Cork and University College Dublin) aims to utilize field and simulated environment (cold greenhouse) based research to investigate and identify various environments (and subsequently techniques) e.g. various soil types, nutrient levels pH, soil moisture, degree of light exposure and soil microfauna; which may provide resistance or unfavourable conditions for the establishment of non-native invasive species within Irish roadside landscapes.

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## Biography

Rosalyn Thompson is currently a PhD student at University College Cork (UCC). Part of the SIMBIOSYS group – set up in 2008 to examine the sectoral impacts of transport, bioenergy and aquaculture on biodiversity - her focus is on invasive plant species and invasion resistance. Originally from Caerleon, South Wales (UK), she graduated from Bath Spa University with an honours degree in Environmental Science in 2008.