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Public acceptance of tree health management: Results of a national survey in the UK

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ABSTRACT

Assumptions about public stakeholder attitudes to pest and disease management can influence the decisions of forest managers and NGOs involved in responding to pests and diseases; however, they are rarely assessed directly. Evidence on the social acceptability of tree health management methods is required to inform government led policy and management. A nationally representative survey of 2000 members of the UK public was used to address two research questions: (1) How acceptable are tree health management methods to the public? (2) How do opinions about woodland functions, concern and awareness of tree pests and diseases, and demographics influence acceptance of management methods? We found that public stakeholders are highly supportive of tree health management; however, knowledge about tree pests, diseases, and management options is low. Methods seen as more targeted and 'natural' were preferred, e.g. felling and burning only affected trees and using biological control rather than chemical control. There were demographic differences in attitudes: men and older people are more likely to support management interventions and stronger management methods than females and younger people. Acceptance of management can also differ according to location and local context (e.g. management is less supported when it may impact on wildlife) and values (e.g. those with economic values are more supportive of management). These findings provide evidence to support current government initiatives on tree health and should improve confidence amongst managers tasked with carrying out tree pest and disease management. However, there is a need for in-depth qualitative studies to explain the beliefs which influence demographic variations in acceptance and the influence of concepts such as 'nativeness' and 'naturalness'.

1. Introduction

The introduction of tree pests and diseases into new forest areas is an increasing challenge for environmental policy makers, especially given the growing volume of plant material being moved around the globe (Brasier, 2008; Liebhold et al., 2012; Hantula et al., 2014). Resulting outbreaks often have broad social, environmental and economic impacts (Flint, 2006; Glare, 2009; Mackenzie and Larson, 2010; Moore et al., 2011) and a high public profile (Haack et al., 1997; Tomlinson and Potter, 2010; Nikiforuk, 2011; Heuch, 2014).

There can be significant debate over the character and extent of government-led management responses to tree pest outbreaks (e.g. Tomlinson et al., 2015) and within these the public interest is generally assumed, but rarely assessed directly. These assumptions influence the decisions of the forest managers, governmental and non-governmental organisations involved in responding to pests and diseases. Vice versa, the evolution of a tree pest outbreak and the management actions of government agencies and others are likely to influence public interest and opinion. This can be particularly apparent at local scales as community members experience outbreak management first-hand (e.g. Chang et al., 2009; Porth et al., 2015). Overall, managers and policy makers presume a demand for action focused primarily on protecting forest industries and environmental conservation. On this basis, national governments and other actors implement biosecurity

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protocols, conduct and sponsor scientific research, encourage and support appropriate forest management and, critically, carry out on-the-ground pest and disease management. These actions and initiatives are taken, and considerable resources allocated, on the basis of relatively high-level policy decisions, legal requirements (such as conservation obligations), and specific pest risk analysis (FERA, 2015). Managers and policy makers may, however, be reluctant to adopt or sponsor particular environmental management methods if they perceive them likely to generate opposition amongst local communities or interest groups (e.g. Elston et al., 2014).

There is little direct evidence relating to public support for tree pest and disease management to inform these decisions. Although it is possible that a demand for action may be assumed, by some stakeholders, from occasional public and media controversy, a wider public mandate and levels of support for specific approaches remain unclear and cannot be taken for granted. The social dimensions of tree health management, such as public support, have only recently been recognised by governments as a key area in need of research attention (DEFRA and UK Forestry Commission, 2011; Hall, 2013) and to date detailed research has consisted primarily of outbreak specific analyses at community or regional levels (Flint, 2006; McFarlane et al., 2006; Flint and Luloff, 2007; Müller et al., 2007; Chang et al., 2009; Gamble et al., 2010). Such studies have tended to focus on broad aspects of tree pest and disease management such as attitudes towards natural disturbance, community action and the impacts of outbreaks. They provide useful information identifying some key demographic factors (age, values, location) that can impact in a consistent fashion on support for management and highlight important variations in support at local scales, but to date have focused primarily on North America. Broader syntheses in this area are uncommon (although see Flint et al., 2009 which draws together analysis of some outbreaks already published on). More recently some analyses have emerged of institutional responses to tree pest outbreaks. For example, Porth et al. (2015),Tomlinson and Potter (2010), Heuch (2014), Tomlinson et al. (2015), investigate the varied management responses to tree pests and diseases in the UK, and their consequences. Mackenzie and Larson (2010) conduct a similar analysis focused on landowner experiences of emerald ash borer in Ontario. These studies identify a number of challenges and institutional failures within these responses, relating especially to communication and decision-making.

This study asks how acceptable tree health management methods are to the public in a general sense and in relation to five specific management objectives. It also assesses the extent to which a respondent's values, levels of concern and awareness, and demographic variables (gender, age and location) influence acceptance of tree health management methods. The paper presents the results of a nationally representative survey of public attitudes towards tree health management in the UK. We reveal strong support for management action to address tree pests and diseases, despite limited public knowledge of the particular threats and the related management methods.

2. Method

2.1. Survey

The public survey explored acceptability of seven tree health management methods in a 'general' sense, where no definition of location or impact were presented, and within five different settings. These five settings were categorised as: (i) woodlands managed for economic income, (ii) woodlands managed for recreation, (iii) woodlands managed for wildlife, (iv) woodlands managed as a valued part of the landscape, (v) trees in a respondent's own garden. The survey also asked questions about concern and awareness of tree pests and diseases and the importance of maintaining 10 woodland functions. The respondents chose from answers placed on an ordinal scale, apart from questions concerning the acceptability of different management methods, where 'Don't know' was also provided as a choice.

The survey was conducted by a specialist panel survey company (http://eu.tolunagroup.com/), using an online survey tool. The questions were drafted by the research team at Forest Research and subsequently refined for online use. The target sample size was 2000 individuals over the age of 18 and nationally representative of the UK. Respondent quotas were predetermined in accordance with 2011 UK Census statistics (Office for National Statistics, 2011), to gain a representative sample by gender, age group and region. The sample was elicited from Toluna's panel of registered respondents over a two-week period in March 2014. Although surveys can be vulnerable to bias, our sampling strategy and method was chosen to minimise this risk significantly. The issue of respondent self-selection is common to all forms of survey given that potential respondents always have an opt-out, non-completion choice. Online surveys have been criticised for excluding sectors of society with limited access to computers (e.g. older respondents) and panel surveys – as other forms of survey such as face-to-face – commonly offer small rewards for completion which may encourage superficial engagement with the survey materials by some respondents. In this study, however, the nationally representative quota sampling, high number of responses and use of a large monitored respondent panel guarded against these biases to as great an extent as possible. The approach likely ensured a more efficient capture of a representative response than other forms of survey (e.g. avoiding the common gender imbalance suffered by telephone surveys). A 'public' sample was achieved by screening out respondents who had a livelihood link to forestry or arboriculture.

2.2. Demographic groups

Informed by the literature, demographic variables used in the analyses were gender, age group and urbanity (the percentage of urban area in a respondent's postcode). Urbanity was assigned using each respondent's postcode in combination with appropriate urban–rural classification data (Office for National Statistics, 2014; Scottish Government, 2012; NISRA, 2005). Using ArcToolbox in the GIS program ArcMap v10, the urban–rural data were mapped onto UK postcode data and the classification for each postcode extracted from the attribute table. The percentage of urban area within a postcode was calculated to provide a measure of urbanity for use as a continuous variable in the analyses (27 records were excluded due to missing information).

2.3. Statistical analyses

2.3.1. Value of woodland functions

The value placed on woodland functions was analysed using factor analysis for dimension reduction, carried out with varimax rotation and Kaiser normalisation. The regression scores for each factor were tested for differences between gender using Kruskal-Wallis tests followed by pairwise comparisons with adjusted p-values. Correlations of regression scores with age group and % urbanity were tested using Spearmans rank correlation.

2.3.2. Concern and awareness about tree pests and diseases

The quota sampling method ensured a representative sample of the UK population and is suitable for reporting descriptive percentage responses. However, as quota sampling is a non-random form of sampling it results in stratification, clustering and