



Can local use assist in controlling invasive alien species in tropical forests? The case of *Lantana camara* in southern India

Ramesh Kannan^{a,b}, Charlie M. Shackleton^{a,*}, Smitha Krishnan^c, R. Uma Shaanker^{b,d}

^a Department of Environmental Science, Rhodes University, Grahamstown 6140, South Africa

^b Ashoka Trust for Research in Ecology & the Environment, Royal Enclave, Srirampura, Jakkur Post, Bangalore 560064, India

^c Institute of Terrestrial Ecosystems, Department of Environmental Systems Science, ETH Zürich, 8092 Zurich, Switzerland

^d Department of Crop Physiology and School of Ecology & Conservation, University of Agricultural Sciences, GKVK Campus, Bangalore 560065, India

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ABSTRACT

Many invasive alien species (IAS) are used by local communities for a variety of subsistence and income generating purposes. This frequently poses a conflict of interest for their removal due to forest conservation and biodiversity concerns. However, if local use can simultaneously check or control specific IAS, the conflict can be avoided and both development and forest conservation perspectives accommodated in the short to medium term. We examined the local use for *Lantana camara* invasion in southern India through assessment of the demand for and impacts of harvesting on this globally problematic IAS. We interviewed local artisans regarding their knowledge and quantities of *Lantana* used, along with forest surveys to estimate *Lantana* densities and size classes in harvested and unharvested sites, and lastly we undertook controlled cutting in moist and dry evergreen forests in both the wet and dry seasons to examine rate of regrowth and mortality. Over the entire study area the abundance of *Lantana* far outweighed local demand, but at small scales around villages, density and size classes were significantly reduced through harvesting. The controlled cutting experiment showed marked seasonal differences, with the most severe cutting intensity resulting in significant mortality when *Lantana* plants were cut in the wet season, but with limited effect when cut in the dry season. We conclude that promoting local use of IAS may be a feasible approach in controlling them and thereby limiting their impacts in forests.

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1. Introduction

Lantana camara L. (hereafter *Lantana*) was introduced as an ornamental plant into India in 1807 in the East India Company Botanical Garden in Calcutta (Kannan et al., 2013). Since then the plant has spread throughout much of the country, making it one of the most widespread invasive alien species (IAS) in India (Shaanker et al., 2010; Dobhal et al., 2011; Khuroo et al., 2012), and still expanding (Kannan et al., 2013). In a comparative analysis of stem density of plants between 2000 and 2010 in the BRT Sanctuary in South India, Sundaram et al. (2012) found a 33% increase in *Lantana* stems over the ten year period. Ecological niche modeling studies indicate that the species is likely to spread and invade large parts of the country, including biodiversity hot spots such as the Western Ghats and Eastern Himalayas (Taylor et al., 2012; Kannan et al., 2013). *Lantana* has spread in over 60 countries (GISD, 2015) and has been rated as a serious IAS in many other

countries such as South Africa (Robertson et al., 2003), Australia (Downey et al., 2010) and Polynesia (Meyer, 2004).

Attempts to control *Lantana* in India have been limited, uncoordinated and largely futile. The uncoordinated and limited physical, chemical and biological approaches to control the spread have been largely ineffective (Love et al., 2009; Shaanker et al., 2010; Bhagwat et al., 2012; Sundaram et al., 2012). Thus, like many IAS, *Lantana* is currently deemed uncontrollable in India and is expected to overwhelm many Indian landscapes, including forests, agricultural land, wastelands and protected areas (Ramaswami and Sukumar, 2011; Prasad, 2012).

In tropical human dominated landscapes, including India, *Lantana* has usurped native biota, many of which have been and are still crucial in providing livelihoods and safety nets to the rural poor (Ticktin et al., 2012; Jevon and Shackleton, 2015). For example, several communities in southern India still derive more than half their annual cash income from sourcing non-timber forest products (NTFPs) including bamboo and rattans (Shaanker et al., 2004a) and the spread of *Lantana* has either completely usurped some of these resources or thinned them substantially (Rist et al.,

* Corresponding author.

E-mail address: c.shackleton@ru.ac.za (C.M. Shackleton).