Developments and prospects for biological control of *Prosopis* (Leguminosae) in South Africa

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South Africa was the first country to deploy biological control (biocontrol) against invasive *Prosopis* populations. Developments in this regard have been ongoing, and have been reviewed, at approximately 10-year intervals, since 1991. This review spans the period 2011-2020, a timespan globally characterised by increased awareness of the impacts of invasive *Prosopis* populations, and recognition of the need for improved management. Concerted international collaboration has resulted in enhanced clarity on phylogenetic relationships within the Leguminosae and the phylogenetic placement of *Prosopis*. These advances have improved the framework for interpreting the host range of potential agents and for evaluating risk. At the outset of the biocontrol programme, in the 1980s, only agents that consumed mature seeds were considered. The intention was to reduce the invasiveness of *Prosopis* while simultaneously retaining it as a usable resource. The programme was subsequently expanded to investigate agents that prevent pod set or maturation of seed. More recently, potential agents that damage the vegetative growth of the plants have been included in response to recognition in South Africa, that there is no other route to successful management of *Prosopis*. There is a wealth of largely unexplored potential in this regard.

Key words: *Algarobius prosopis, Coelocephalapion candolfoi, Asphondylia prosopidis, Oncideres rhodosticta, Evippe sp.*

INTRODUCTION

This review summarises developments, and prospects for expansion of efforts, directed towards biological control (biocontrol) of invasive *Prosopis* (Leguminosae) in South Africa. It follows two such earlier reviews (Zimmermann 1991; Impson *et al.* 1999) and the most recent review on the subject by Zachariades *et al.* (2011). The current review spans a period which has been characterised by a surge in *Prosopis* related research both globally and nationally. These initiatives have improved general understanding of the impacts, rates of expansion, costs versus benefits and stakeholder perceptions of *Prosopis*, as reviewed from a global and national perspective by van Klinken *et al.* (2009) and Shackleton *et al.* (2014). Notable developments include remote sensing studies that provide historical evidence of the profound rates of spread and patterns of invasion displayed by invasive *Prosopis* populations (e.g., van den Berg *et al.* 2013; Mbaabu *et al.* 2019; Shiferaw *et al.* 2019). In addition, techniques have been developed that enable remote discrimination between invasive *Prosopis* populations and indigenous vegetation with similar spectral properties (Robinson *et al.* 2016; Adam *et al.* 2017).

It is broadly recognised that management of invasive *Prosopis* populations demands concerted, co-ordinated strategies encompassed within national or regional management plans. Further, that these plans should adopt an integrated approach that incorporates utilisation where feasible and mechanical, chemical and, possibly, biocontrol options (Shackleton *et al.* 2014). Shackleton *et al.* (2014) reported, that except for Australia and Ascension Island, detailed management plans remain largely absent.

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