Biological Control 184 (2023) 105291

Contents lists available at ScienceDirect

Biological Control

journal homepage: www.elsevier.com/locate/ybcon

Know thy enemy: Investigating genetic contributions from putative parents of invasive *Nymphaea mexicana* hybrids in South Africa as part of efforts to develop biological control

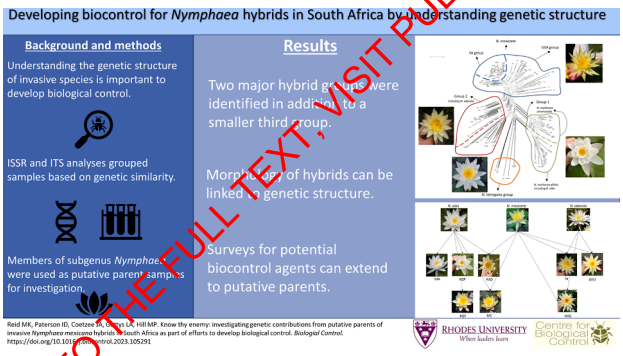
Megan K. Reid [a,*], Iain D. Paterson [a], Julie A. Coetzee [b], Lyn A. Gettys [c], Martin P. Hill [a]

[a] Centre for Biological Control, Department of Zoology and Entomology, Rhodes University, Makhanda, Eastern Cape 6140, South Africa
[b] Centre for Biological Control, Department of Botany, Rhodes University, Makhanda, Eastern Cape 6140, South Africa
[c] University of Florida, Ft. Lauderdale Research and Education Center, 3205 College Avenue, Davie, FL 33314, USA

HIGHLIGHTS

- Two major invasive *Nymphaea mexicana* hybrid groups are present in South Africa.
- These hybrid groups likely share genetic material with *Nymphaea odorata* and *Nymphaea alba*.
- Surveys for potential biocontrol agents can be expanded to include putative parents.
- Understanding the genetic structure of invasives improves efforts to develop biocontrol.

GRAPHICAL ABSTRACT



ARTICLE INFO

Keywords:
Mexican waterlily
Invasive alien plant
Molecular techniques
ISSRs
ITS

ABSTRACT

Hybridisation of alien invasive plants complicates efforts to develop biological control, because variations in the genetic makeup of the target plant can impact the survival of host specific agents that have evolved adaptations specific to the original host. To maximise the likelihood of success in a biological control program, potential agents should therefore be collected from populations in the region of origin that are genetically similar to plants in the invaded range. Molecular markers are useful tools to understand genetic contributions in hybrid populations, especially where morphological differentiation is difficult. *Nymphaea mexicana* Zuccarini (Nymphaeaceae) is an invasive alien plant in South Africa that is being targeted for biological control, but hybrids with intermediate morphological traits are also present at several sites. In this study, ISSR (inter simple sequence repeats) and ITS (internal transcribed spacer) markers were used to determine which *Nymphaea* species are likely to be putative parents of these hybrids, and morphological characters were also investigated to determine if genetic and morphological traits matched. Two major hybrid groups were identified, with one group clustering with *Nymphaea odorata* Aiton and the other clustering with *Nymphaea alba* L. A third, smaller group clustered with *Nymphaea tetragona* Georgi, whereas the remaining samples clustered with pure *N. mexicana* from the native

* Corresponding author at: University of Florida, Ft. Lauderdale Research and Education Center, 3205, College Avenue, Davie, FL 33314, USA.
E-mail addresses: megan.reid@ufl.edu (M.K. Reid), I.Paterson@ru.ac.za (I.D. Paterson), Julie.Coetzee@ru.ac.za (J.A. Coetzee), lgettys@ufl.edu (L.A. Gettys), M.Hill@ru.ac.za (M.P. Hill).

https://doi.org/10.1016/j.biocontrol.2023.105291
Received 5 April 2023; Received in revised form 14 June 2023; Accepted 27 June 2023
Available online 28 June 2023