

## South Africa – A global player in the battle against alien plant invasions

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The 4th International Symposium on Weeds and Invasive Plants was held in Montpellier, France, from 19 to 23 May 2014. Hosted by the European Weed Research Society, the symposium was attended by 152 delegates from 33 countries (including South Africa). The Society provided financial support to several delegates (including the author) to facilitate their attendance.

Initiated in 2006 and held every 3 years in a European country, this symposium has in the past highlighted important subjects such as ragweed management and how society deals with invasive species. The 2014 meeting focused mainly on the management of invasive plants and aimed to strengthen global interactions and to facilitate exchanges to bridge the gap between the science (researchers) and the action on the ground (managers and action agencies in the field). For example, an extra session offered during one of the evenings – on the establishment of global biocontrol research centres and the maintenance of effective global collaborations in this field – was aimed at ensuring an unobstructed flow of biocontrol agents between ‘donating’ and ‘receiving’ countries.

### Overview of presentations

The three-and-a-half-day programme of 53 oral and 89 poster presentations, plus a midweek fieldtrip, was well structured and allowed for good international collaborations to be initiated, as the meeting took place at a single venue with no parallel sessions and minimal disturbance. Authors of posters were given an opportunity to present the key messages of their posters to the audience: an opportunity which is rarely afforded at most conferences in which posters are simply left as wall displays with the result that they receive almost no exposure.

The seven sessions were relevant to invasive plant research and management in the 21st century, with important messages being delivered by all the keynote speakers as they introduced each session. The sessions were: (1) Invasive plants in Mediterranean regions, (2) Invasive plants in aquatic and riparian ecosystems, (3) Biology, ecology, evolution and impacts of invasive plants, (4) Invasive plant management: Biological and integrated control, (5) Ragweed – a joint session with COST Action SMARTER (sustainable management of *Ambrosia artemisiifolia* in Europe), (6) Human perceptions of invasions and (7) New tools for weed risk assessment (WRA) and for early detection and rapid responses (EDRR). Each of these sessions had some relevance for South Africa, with the last session having the most relevance for South Africa’s national Invasive Species Programme (ISP) based in the South African National Biodiversity Institute (SANBI).<sup>1</sup> The keynote address during this session, delivered by Dr Dane Panetta<sup>2</sup>, on eradication – a word often misinterpreted by the scientific community – was particularly insightful, as eradication is the ultimate goal of the SANBI ISP. He stressed the importance of establishing the full extent of the problem before commencing an eradication attempt. Hence SANBI ISP, which includes surveillance as part of its mandate, is obviously heading in the right direction. Furthermore, he highlighted two species attributes as important factors to consider for eradication: (1) time to reproduction and (2) propagule persistence. Research conducted by the SANBI ISP should include these two factors wherever possible. It was sad to learn from him that the Australian *Chromolaena odorata* eradication project, which many had considered to be a world leader in this EDRR approach, had been terminated in 2006.

Presentations in this session demonstrated that a few (<10) countries now have at least some kind of prioritisation tool or national screening process for proposed new alien plant introductions, but it seems that the majority of countries are stuck in the ‘damage control’ phase in which established weeds are being continuously contained or maintained, and very few have had the opportunity to try to eradicate newly arrived (‘emerging’) alien species before they have had a chance to become well established. South Africa is one of these fortunate countries, and the poster presentation by Lalla<sup>3</sup> demonstrated the progress that has recently been made towards the eradication of an emerging invasive succulent.

Other similarities to South Africa were challenges in communicating about invasive alien plants, not only to the general public but also to governmental policymakers<sup>4-7</sup>, and the use of modern technology (smartphones, websites, apps, etc.) in enticing the general public to become ‘citizen scientists’<sup>8</sup>. It would have been a good information-sharing opportunity for South African experts on these topics to have attended and shared our experiences. For example, the websites initiated by two metropolitan governments – the eThekweni municipality and the City of Cape Town – differ slightly from their international counterparts, in that they only feature *emerging* invasives, thus inviting locality reports for only this limited number of species for which we have rapid response capacity – with the aim of preventing over-reporting of already widespread, well-established invasives which results in less immediate control actions and eventually in demotivated ‘spotters’.

It was evident from the session on human perceptions, that we as scientists need to realise our weakness as communication or sales experts, and, if resources permit, these aspects of our programmes should be outsourced to the relevant experts in order to get our messages across. In this light, the recently initiated South African project on assigning isiZulu common names to invasive alien plants is novel and is an exciting leap in the right direction – a representative of the multi-stakeholder working group of this project at the conference would have been most beneficial.

Biocontrol was highlighted as important in the sustainable management of invasive plants, and a recent shift of people’s perceptions to accepting this method has now begun. Particularly fascinating, was Dr Dick Shaw’s talk on the success obtained by simply substituting the word ‘biocontrol’ with ‘natural control’ in engagement with the media.<sup>9</sup> The excellent work of some South African biocontrol researchers was mentioned on several occasions,

but unfortunately none of them were in attendance. Dr Asad Shabbir's research on the effects of climate change on biocontrol agents was insightful,<sup>10</sup> and indicates the need to realise potential consequences of climate change for the efficacy of the many established biocontrol agents in South Africa.

Dr Joe Caffrey's keynote address<sup>11</sup> in which he highlighted the success of controlling an aquatic weed of South African origin (*Lagarosiphon major*) in Ireland, using natural fibre called 'jute'<sup>12</sup>, could possibly benefit South African management of the emerging alien aquatic *Hydrocleys nymphoides*, only known to occur in one dam from the KwaZulu-Natal midlands in which chemical control is not an option.

The use of the genus name *Reynoutria* (instead of *Fallopia*) at this conference may need to be reflected in the national list of invasive species soon to be published under the South African *National Environmental Management: Biodiversity Act* (NEMBA, 2004). There were a number of presentations on invasive alien species in this genus,<sup>13-15</sup> and links have been established with these authors to assist South African weed taxonomists with their identification queries.

Insights gained from the dedicated session on ragweeds (*Ambrosia* spp.) could help South Africa as we embark on a national battle against a related invasive alien plant species: *Parthenium hysterophorus*. The fact that the *Ambrosia* species and *P. hysterophorus* both give rise to serious human health problems as a result of their highly allergenic properties, provides the South African authorities with some useful precedents as to how best to develop their awareness campaigns, among other considerations.

Knowledge of what are currently the most globally important weeds will benefit South Africa as these species will be put onto a watch list of potential invaders for the country if they do not already feature on such lists. In addition, international collaborations with those scientists researching species that are already a problem in South Africa could benefit South African invasive alien plant management. Some of these species are: *Acacia* sp.<sup>16</sup>, *Ailanthus altissima*<sup>17</sup>, *Ambrosia* sp.<sup>18-22</sup>, *Carduus nutans*<sup>23,24</sup> and *Cytisus scoparius*<sup>24</sup>, *Fallopia* (= *Reynoutria*) sp.<sup>13,25</sup>, *Genista monspessulana*<sup>24</sup>, *Hypericum* sp.<sup>24</sup>, *Ludwigia* sp.<sup>26</sup>, *Lythrum* sp.<sup>23</sup>, *Melaleuca quinquenervia*<sup>27</sup>, *Oenothera glazioviana*<sup>28</sup>, *Parthenium hysterophorus*<sup>29,30</sup>, *Pueraria* sp.<sup>31,32</sup>, *Rubus* sp.<sup>33</sup> and *Verbascum thapsus*<sup>34</sup>.

It is envisaged that abstracts and presentations will be uploaded onto the conference website (<http://invasive.weeds.montpellier.ewrs.org/default.asp>) in the near future. Authors also have the opportunity to submit papers for a special issue (or section) of the *Weed Research* journal. This will be very beneficial in global information sharing, and to initiate or build on current interactions between invasion scientists who share particular interests.

## Conclusions

South African invasion experts, such as Dave Richardson, Ian Macdonald, John Wilson, Julie Coetzee, Martin Hill, Terry Olckers and others, are well known in the international invasion biology scene. People rate South African expertise in the field of biocontrol very highly; the high-calibre invasion biology research of the Centre for Invasion Biology, headquartered in Stellenbosch University, is also making us a world player. Several delegates recalled with considerable pleasure their participation in the International Weed Science Congress held in Durban in 2004, and the International Symposium on Biological Control of Weeds held at Kruger National Park in Mpumalanga earlier this year.

South African attendance and participation at international conferences is expensive, but the benefits obtained often outweigh the costs. The value of face-to-face interactions among people of similar interests cannot be overstated, nor can the opportunity to showcase South African research to the world. South African scientists need to realise their worth on the global front in invasion biology and should view participation at such international conferences as an investment, rather than simply as a cost.

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## References

1. Wilson JRU, Ivey P, Manyama P, Nanni I. A new national unit for invasive species detection, assessment and eradication planning. *S Afr J Sci.* 2013;109(5/6), Art. #0111, 13 pages. <http://dx.doi.org/10.1590/sajs.2013/20120111>
2. Panetta D. Weed eradication: Feasibility and programme evaluation. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
3. Lalla R. Progress towards eradication of an emerging invasive succulent in South Africa. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
4. Brunel S. How to communicate on pests and invasive alien plants? The experience from the European and Mediterranean Plant Protection Organization. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
5. Guérin M, Mandon-Dalger I, Provendier D. How to define invasive plant for different sectors? The way to a consensus. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
6. Poortvliet M, Schut M. Human perception and institutional aspects of ragweed control. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
7. Sheppard A. Prioritization in invasive alien plant management. How do you link the science to policy. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
8. Gamela A, Moraik M, Marchante E, Marchante H. Reaching for allies: Communicating on invasive species in Portugal. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
9. Shaw RH. Japanese knotweed versus the general public: The battle royale. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
10. Shabbir A, Dhileepan K, Adkins SW. The response of an invasive weed and its biological control agent under a changing climate of CO<sub>2</sub> enrichment: Management challenges for the future. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
11. Caffrey JM, Millane M, Evers S, Moran H, Butler M. A novel approach to aquatic weed control and habitat restoration using biodegradable jute matting. *Aquat Invasions.* 2010;5(2):123–129. <http://dx.doi.org/10.3391/ai.2010.5.2.01>
12. Caffrey JM. Invasive plants in Irish freshwaters: Impacts, control and management. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
13. Lamberti-Raverot B. Achene morphology affects water dispersal of the terrestrial invasive *Fallopia x bohemica*. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
14. Bzdęga K, Janiak A, Książczyk T, Pawliczek A, Sliwińska E, Tokarska-Guzik B. Genetic diversity and hybridization in the invasive *Fallopia* complex in its introduced and native range. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
15. Shaw RH. *Ludwigia* – A prime target for biocontrol in Europe. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.

16. Birnbaum C. Do soil microbes matter in plant invasions? A case study from Australia on five acacias and their associated soil microbial communities across non-native and native range populations. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
17. Uludag A, Pehlivan M, Dogru B. A new weed in fruit orchards: Tree of heaven (*Ailanthus altissima* (Mill.) Swingle). Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
18. Chauvel B, Martinez Q, Barbaz C. Growth and development of *Ambrosia artemisiifolia* L. under different trophic conditions. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
19. Kazinczi G, Mate S. Efficacy of single and combined herbicide treatments on common ragweed at different phenological stage. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
20. Muller-Scharer H, the SMARTER team. EU-COST Action on sustainable management of *Ambrosia artemisiifolia* L. in Europe (SMARTER): A template for future weed science initiatives. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
21. Skálová H, Moravcova L, Wild J, Pysek P. Seedling growth and distribution of *Ambrosia artemisiifolia* L. in the Czech Republic. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
22. Yair Y, Siboni M, Goldberg A, Shachar E, Yaacoby T, Rubin B, et al. Biology and invasion paths of *Ambrosia confertiflora* DC. and *Ambrosia tenuifolia* Spreng. in Israel. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
23. Grant J, Lambdin P. Invasive European plant species in the Southern Appalachians, USA: Potential targets for collaboration and cooperation in a new beneficial insects quarantine laboratory. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
24. Smith L, Pitcairn M, Moran P, Bruckart W, Cristofaro M. Status of biological control projects in California on terrestrial invasive alien weeds. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
25. Gaskin J, Schwarzlander M, Grevstad F, Haverhals F, Bourchier R, Miller T. Extreme differences in population structure and genetic diversity for three invasive congeners: Knotweeds in western North America. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
26. Haury J, Coudreuse J, Bozec M, Barloy D. Biology, ecology and fertility of water primroses (*Ludwigia grandiflora* subsp. *hexapetala* and *Ludwigia peploides* subsp. *montevicensis*): Variability and consequences for management in Western France. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
27. Purcell M, Pratt P, Makinson J, Brown B, Davies K, Taylor G, et al. The role of gall formers as biological control agents of the broadleaved paperbark tree *Melaleuca quinquenervia* in Florida (USA). Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
28. Aragón CF, Castro-Diez P. Impact of invasive *Oenothera glaziovana* Micheli on the composition and structure of a coastal dune native plant community. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
29. Shabbir A, Dhileepan K, Adkins SW. The combined effects of defoliation by a biological control insect and a suppressive fodder plant upon the growth reproductive potential of invasive parthenium weed. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
30. Yaacoby T, Rubin B. *Parthenium hysterophorus* L., a spreading invasive weed in Israel. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
31. Morisoli R, Bertossa M, Conedera M, Schoenenberger N, Sonognini L, Rossinelli M. Targeted chemical control of *Pueraria lobata* (Will.) Ohwi depending on age and expansion of the plants. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
32. Schoenenberger N, Conedera M, Morisoli R, Pron S, Rossinelli M, Soldati V, et al. Growth rate and seed production of *Pueraria lobata* (Will.) Ohwi in southern Switzerland. Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
33. Scott J, Yeoh PB. Ecology and biological control of Blackberry: An unexpected result from south western Australia. Paper presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.
34. Endriss SB, Alba C, Bowers DM, Hufbauer RA, Norton APO, Pysek P. Are differences between populations of *Verbascum thapsus* L. explained by a shift from specialist to generalist herbivores? Poster presented at the 4th International Symposium on Environmental Weeds and Invasive Plants; 2014 May 19–23; Montpellier, France.

