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Chemical clues to Paterson's curse invasion

Comparing Paterson's curse plants from Australia with those found in Spain and Portugal has given researchers from the [Graham Centre for Agricultural Innovation](#) new understanding of why the weed is such a successful invader.

The research has been presented at the International Society of Allelopathy 8th World Congress in Marseille France by Charles Sturt University (CSU) PhD student Mr Dominik Skoneczny and research associate Dr Xiaocheng Zhu.

"Paterson's curse is estimated to cost Australian sheep and cattle producers \$250 million a year in lost productivity, control and fibre contamination," Mr Skoneczny said.

"The plant was introduced to Australia in the mid-1800s from the Iberian Peninsula and my research involved traveling to its source to look at chemical clues to better understand how Paterson's curse has evolved in the Australian environment.

"The research collected samples from numerous plant populations from Australia, Portugal and Spain to examine the genetics, ecology and chemistry of Paterson's curse in various locations. In particular I analysed the bioactive secondary compounds produced by the Paterson's curse shoots and roots which play a role in plant defence.

"I found Paterson's curse plants established more densely in Australia and produced up to six fold higher levels of antimicrobial and phytotoxic compounds (naphthoquinones) in their roots."

Mr Skoneczny's research is part of a larger Discovery project funded by the Australian Research Council (ARC) and led by CSU Professors Leslie Weston and Geoff Gurr.

"This research is significant because it's shown that multiple mechanisms, including enhanced genetic diversity, production of root-based defence chemistry, prolific seed dispersal and in some cases a lack of other plant competitors have contributed to the continued spread of this species across 30 million hectares in Australia," Professor Weston said.

"In contrast, in its native range in the Iberian Peninsula, the species is often difficult to locate amongst biodiverse flora and is not considered to be a serious pest."

Other Graham Centre researchers who presented their work at the Congress from Monday 24 to Friday 28 July included Professor Weston, Dr Zhu and PhD student Mr James Mwendwa.

The research team also picked up the International Allelopathy Society's Grodzinsky Award for the best research publication written over the past three years, in a global competition for best publication in the field of allelopathy. Dr Xiaocheng Zhu and Professor Weston accepted the award at the Society's gala dinner at the Old Fort in Marseille on July 27, 2017.

Their paper '[Identification and localization of bioactive naphthoquinones in the roots and rhizosphere of Paterson's curse \(*Echium plantagineum* \), a noxious invader](#)' was published in the *Journal of Experimental Botany* in 2016.

The Graham Centre is a research alliance between Charles Sturt University (CSU) and the NSW Department of Primary Industries (DPI)

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Media Note: To arrange interviews contact Graham Centre communications officer Emily Malone 0439 552 385 or email emalone@csu.edu.au. High resolution photos are available.

Mr Skoneczny was awarded a scholarship from University of Aix Marseille to attend the IAS Congress.

[Identification and localization of bioactive naphthoquinones in the roots and rhizosphere of Paterson's curse \(*Echium plantagineum*\), a noxious invader](#) by Dr Xiaocheng Zhu, Mr James Mwendwa, Dr Paul Weston, Professor Geoff Gurr and Professor Leslie Weston from CSU and Professor Jeffery Weidenhamer, Ashland University and Professor Ragan Callaway University of Montana was published in the *Journal of Experimental Botany*.

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