

WeedWise

Volume 17 Issue 2 May 2016

Newsletter of the Weed Management Society of SA



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From the President,

It has been an exciting time for the WMSSA since our last newsletter. Leah Feuerherdt and her helpers have put together another great issue of WeedWise, which is going from strength to strength.

In this issue we focus on the 5th SA Weeds Conference, held at Waite Campus on May 4th to 5th. The conference was a great success, with an interesting and informative program involving over 130 delegates. It was a privilege to be President of such a dedicated and hard-working Executive Committee – they volunteered tirelessly, often under pressure from their “day job” and family commitments. Well done and thanks committee!!

Thanks go also to the valuable efforts of the presenters, session chairs, PIRSA and SARDI (venue), Schild Wines (presenter's gifts), Aroma caterers and all the other behind-the-scenes helpers. Most of all we thank the audience, both for their attendance and participation.

This conference was a little different from the previous four. We are conscious that in times of tightening budgets it is even more important than ever to make the conference relevant and worthwhile for delegates. To this end we experimented with break-out training sessions, and inclusion of non-weed, allied subject matter that is also of interest to most of our delegates (e.g. myrtle rust, vertebrate pest update). This appears to have been successful, and will hopefully help delegates gain approval to attend future conferences.

The success of the recent conference bodes well for the future of the WMSSA. We are due to hold our next AGM in Oct this year, and I encourage members to consider serving on the committee. My term as President will be up at the AGM, and I intend to stand down to make room for new ideas! Please give nomination for the job some thought. Although I think that Leah Feuerherdt (Vice Pres) would make an excellent President, it is my duty to remind members that Leah accepted the nomination for VP on the strict understanding that there would be no pressure for her to nominate for President.

Happy reading, and please send us your own “weedy stories” to share with our membership!

Best wishes,
John

WEED ARTICLES NEEDED

Would you like to contribute an article, book review or some of your technical expertise battling a weed in your patch? Is there an event you would like to publicise?

We welcome submissions for the next issue of WeedWise
by 30th July 2016

Contact: Leah Feuerherdt
Email: Leah.Feuerherdt@sa.gov.au

5th SA Weeds Conference

4-5th May 2016

Over 130 weed management professionals attended the 5th SA Weeds Conference in early May. The program was varied and full of interesting topics, with plenty of time to network. The plenary session included presentations from two researchers involved with the effects of glyphosate on human health: Ian Musgrave from University of Adelaide who presented on glyphosate, cancer and risk, and Fiona Young from Flinders University who presented the effects of glyphosate and roundup on mammalian cells in vitro. Following these presentations there was an open Q&A session mediated by David Stephenson from PIRSA Rural Chemicals. An interesting learning from this discussion was that the adjuvants used in conjunction with glyphosate may present more of a risk to human health than glyphosate itself.

A huge thanks to the WMSSA Executive Committee for organising the event, as well as the session chairs, presenters and anyone else that helped make the event such a successful one. Thanks also to Schild wines for providing the speaker gifts. Special thanks to those who filled out an evaluation form, we shall collate the results of these to incorporate into planning the next conference in 2018. The abstracts and a selection of full papers are available on the WMSSA website.



Current and past members of the Weed Management Society Committee; Peter Watton (past treasurer), Leah Feuerherdt (VP and Weedwise editor), Nicole McGuiness (website editor), John Heap (President), David Blewett (Executive) Photo credit: Michaela Heinson



It was not all about weeds! Peter Bird (Biosecurity SA) presenting a vertebrate pest update during a breakout session. Photo credit: Michaela Heinson



Aidan Laslett (DEWNR) with Dee Provis, winner of the South East NRM competition to attend the conference. Photo credit: Michaela Heinson



Guest speaker Kate Blood (Vic DEWLP), Michaela Heinson (DEWNR) and Henry Rutherford (DEWNR and WMSSA Secretary).

Weeds at the Early Stage of Invasion

Kate Blood, Vic DEWLP

The Weeds at the Early Stage of Invasion (WESI) project focuses on high risk early invaders that threaten biodiversity. We work with Department of Environment, Land, Water and Planning (DELWP) and Parks Victoria staff looking after public land anywhere in Victoria. By investigating the barriers that prevent action on early invaders, WESI has created a process and tools to assist public land managers. The WESI project's framework leads public land managers through a decision making process, this is supported by a set of detailed guides available at www.delwp.vic.gov.au/early-invaders

These help answer questions such as: I found a new plant in my park, what do I do? Is this early invader in my reserve a high risk? How do I work out how far this early invader has spread? How do I prepare an eradication response plan? The focus of the WESI project is enabling the early intervention and localised eradication of high risk invasive weed species on public land in Victoria at any scale. It aims to support, enable and build the capabilities of DELWP and Parks Victoria staff working on early invaders that threaten biodiversity.

The project team have set up a series of pilot projects to assist adoption of the WESI process and tools by local public land managers. It also provides an opportunity to test and refine the tools out in the field with real life scenarios. WESI is resourced by DELWP's Weeds & Pests on Public Land program and compliments Statewide biosecurity protection of agricultural assets and eradication at a Statewide scale. Contact the project team: Kate Blood: kate.blood@delwp.vic.gov.au Bec James: rebecca.james@delwp.vic.gov.au



A number of steps undertaken when searching for and detecting potential early invaders. Photo courtesy DEWLP

Glyphosate and Cancer Risk

Ian Musgrave, University of Adelaide

After several studies re-evaluating the safety of glyphosate, including the 2015 Federal Institute for Risk Assessment, suggested that glyphosate was neither mutagenic nor carcinogenic, the 2015 report by the International Agency for Research on Cancer (IARC) that classified glyphosate as class 2A, probably carcinogenic to humans, was a surprise to many international regulatory agencies. The subsequent 2015 European Food Safety Authority (EFSA) report that concluded that glyphosate was unlikely to pose a carcinogenic hazard did not end the concern over glyphosate.

Glyphosate targets the shikimic acid pathway. This pathway is essential for the synthesis of a number of metabolites like folic acid and aromatic amino acids in plants, fungi, algae and eubacteria. However this pathway is not present in animals and mechanism based toxicity does not occur. Acute toxicity at high concentrations of glyphosate appears non-specific, and not relevant to cancer. Glyphosate is not an electrophile, so direct chemical toxicity is unlikely. Absorption data for humans is limited, but overall the data suggest there is little absorption.

Glyphosate and Cancer Risk (cont'd)

Ian Musgrave, University of Adelaide

Around 20% of an oral dose of glyphosate is absorbed and around 1% of glyphosate applied to the skin is absorbed (Greim et al., 2015; Neimann et al., 2015, IARC. 2015, EFSA, 2015). As well, glyphosate is rapidly excreted and is considered to have no or minimal bioaccumulation potential.

Studies of exposure to glyphosate in various groups all suggest that exposure is around two orders of magnitude below allowable daily intake (ADI), which has been set at 100 times lower than the no observed adverse effect level. Of relevance to workers involved in weed control, exposure levels have been estimated to be less than 1% of ADI (Neimann et al, 2015; EFSA, 2015). In terms of the cancer studies, relevant exposures associate with positive findings in mice were on the order of 1g glyphosate/kg bodyweight per day, whereas worst case exposures of farm workers are around 0.004 mg/kg/ bodyweight per day. This provides a significant margin of safety, and occupational exposure is unlikely to be a significant health risk.

Key differences between the IARC report and the EFSA report revolve around the breadth of evidence considered by the two groups, the weighting of human epidemiological studies, consideration of physiological plausibility and most importantly, risk assessment. The IARC does not take into account the risk the exposures will be likely to lead to cancer. Basic physiological plausibility for a carcinogenic effect is lacking, DNA damage is only seen at levels of glyphosate that cause non-specific damage. Animal studies are mostly negative, with no consistent, dose dependent carcinogenicity. The IARC conclusion that glyphosate is a probable human carcinogen was arrived at using a narrower base of evidence than that from recent peer-reviewed papers and the EFSA's review. The IARC also does not significantly consider exposure risk, whereas the EFSA considers the risk from typical exposure levels and durations.

Overall, considering the data presented in the peer-reviewed literature, the IARC report and the EFSA report, there is no strong evidence that glyphosate is a significant cancer risk to humans. The recent Australian Pesticides and Veterinary Medicines Authority (APVMA) conclusion that “based on current risk assessment the label instructions on all glyphosate products—when followed—provides adequate protection for users” is warranted based on the available data.

References

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- Niemann L, Sieke C Pfeil R, Solecki R, A critical review of glyphosate findings in human urine samples and comparison with the exposure of operators and consumers. J Verbr Lebensm (2015) 10:3–12



Participants at the 5th SA Weeds Conference listening to a presentation from David Georg about weed training opportunities. Photo credit Michaela Heinson.

The Effect of *Cassytha Pubescens* on *Ulex Europaeus* (Gorse)

Robert Cirocco, University of Adelaide

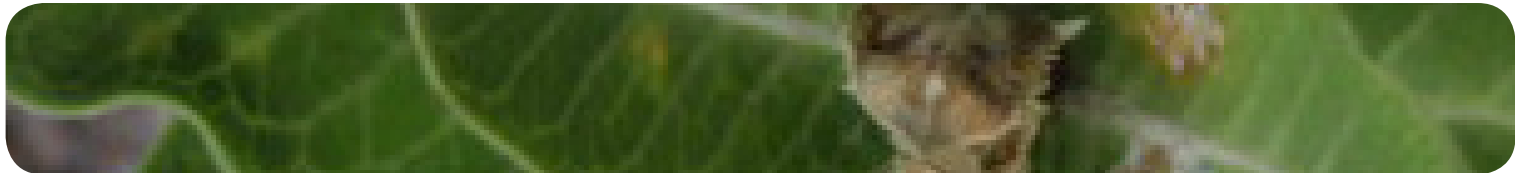


C. pubescens infection front on *U. europaeus* at Crafers. Photo credit Robert Cirocco

Parasitic plants feed off other plants via suckers. *Cassytha pubescens* is a parasitic plant that is native to Australia and attaches to the stems of its hosts. The parasitic vine infects both invasive and native hosts, but invasive hosts seem to suffer much more from infection. Thus *C. pubescens* shows potential as a native bio-control agent against major invasive weeds of Australia. But more research is needed so informed decisions can be made about the true potential of this parasite as an effective management tool in helping control these invasive weeds.

Here, the main aim was to investigate the effect of *C. pubescens* on the physiology of *Ulex europaeus*, a Weed of National Significance (WoNS) in Australia. This assessment was conducted at three field sites in the Mt Lofty Ranges which varied in both slope and aspect. Although the field sites varied in slope and aspect it appears that infection duration was a more important factor that influenced the effect of the parasite in this host. *C. pubescens* negatively affected the physiology of *U. europaeus* mainly at two of the three field sites where plants had been infected the longest.

Infection with *C. pubescens* results in *U. europaeus* becoming water and nitrogen stressed and having lower rates of photosynthesis which would translate to less carbohydrate available for growth. These results revealed that *C. pubescens* can negatively affect the physiology of *U. europaeus* in the field. The data provides further evidence that *C. pubescens* may be successful in helping control major invasive weeds of Australia such as *U. europaeus* which cost millions of dollars annually to eradicate and reduces our native biodiversity.



Olive control-are your methods as effective as they could be?

David Hughes, G. Donovan and V. Clayton

The wild *Olea europaea* ssp. *europaea* is distributed across southern Australia in clusters, mainly around Perth, Adelaide, Melbourne and Sydney, where it was planted as a fruit tree that has now naturalised as an invasive bushland weed. The control of wild olives is difficult and can require large inputs of resources. If you are paying contractors to control wild olives by a method such as drill and fill, or doing it yourself, it may be time to consider a different method. Basal bark treatment of wild olive has been used with great success in the North Para region of SA since 2007. A 2015 trial to compare overall cost for the treatment of mature wild olives using basal bark and drill and fill treatments was conducted. Fourteen mature trees were treated, firstly with basal bark treatment, and a week later a different crew drilled and filled the same trees.

The basal bark treatment showed clear benefits: no need to clear the ground of debris, lower branches or hazardous objects, saving time and cost; the reach of the spray wand eliminates the need to trim olive branches; work is mainly from an upright standing position, rather than crouched or kneeling; and labour efficiencies of basal bark treatment resulted in a \$356 cost, compared to \$2913 for drill and fill.

Multiple treatments can be required with the basal bark treatment in order to deliver enough chemical mixture to larger trees. Consequently operators do need to be skilled to ensure effective application. However other treatment methods often will require repeat treatment for regrowth.

Effects of glyphosate and roundup on mammalian cells in vitro

Fiona Young, Flinders University

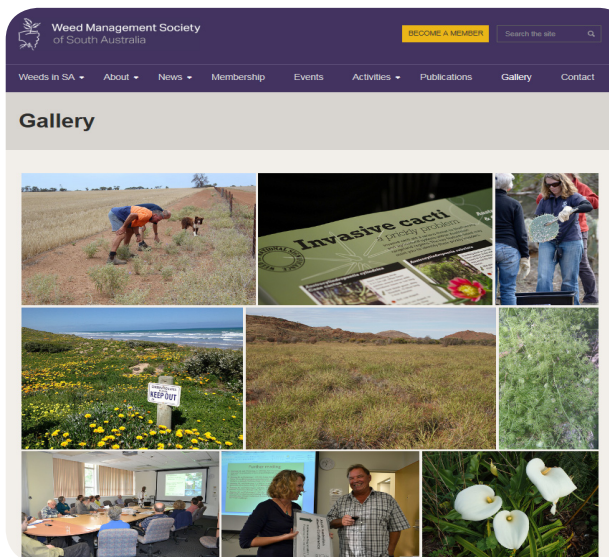
The toxicity of the active molecule in herbicides has been used to determine regulatory guideline concentrations, because other components are considered inert. Glyphosate is the active molecule in the herbicide Roundup, and is soluble in water, but plant cell walls are comprised of hydrophobic molecules, hence Roundup additionally contains surfactant or other detergent-like molecules, which can pass through cell plant walls and effectively increase the herbicidal activity of glyphosate. Glyphosate interferes with a biochemical pathway that is only found in plants and not animals, hence in earlier tests glyphosate alone had little effect on mammalian cells and was judged to be safe.

In this research project, Roundup containing a known concentration of glyphosate was compared with the same concentration of pure glyphosate in mammalian cell culture systems that used human and mouse reproductive cells. Roundup was more toxic than glyphosate alone; when the human cells were cultured with the Roundup or the glyphosate for 24h, half the cells were killed by a 16mM concentration of glyphosate, but when the glyphosate was in the Roundup formulation, a much lower 0.008mM concentration of glyphosate killed half the cells.

The Australian Drinking Water Guideline for glyphosate is 1mg/L (0.006 mM) and is based on the premise that if an adult drank 2L of water containing 0.006mM glyphosate each day, there would be no adverse effects. The in vitro cell culture results cannot be directly extrapolated to in vivo effects, but they support the possibility that this Guideline is indeed safe for glyphosate alone. On the other hand, the cell culture results provide justification for environmental studies to investigate the degradation of Roundup, and animal studies to examine the toxicity and safety of the Roundup formulation.

In conclusion, Roundup was more cytotoxic than the same concentration of glyphosate alone, indicating that the other constituents of the herbicide are not inert. There is a need for in vivo studies to characterise the toxicity of glyphosate in a Roundup formulation, to facilitate re-evaluation of existing public health guidelines.

New WMSSA Website



The Weed Management Society of South Australia has a fully revamped website!! Check it out at wmssa.org.au. As well as explaining what the society does, there are pages for news and events. If you have an event you would like to promote, or some news to share on the website please email wmssa01@hotmail.com.

We are also working on a photo gallery as part of the site. If you have photos of weed species you're comfortable with sharing, please consider uploading them to the website. It is envisaged that the gallery can be a useful resource particularly for weed identification, so watch this space as the page is developed.

Recent editions of Weedwise, and all future editions will also be available on the website. Thanks very much to former committee member Deb Agnew, and current committee member Nicole McGuinness who have been responsible for updating the website content and working with the web developer.

Cactus Species Survey: call for participants

The Global Working Group on the management of cactus species seeks to increase collaboration among countries with the same problems for which the solutions could be shared.

The online survey on "Management of cactus species" is part of a new research project that aims to collect knowledge on the management of cactus invasions. Project outputs will include a long list of available management practices, barriers for management and future research projects needed regarding the management of cactus invasions all over the world. We will publish and make the data available for use and further research. We invite people working with, affected by or interested in cactus invasions to fill in the survey by visiting: <http://academic.sun.ac.za/cib/projects/cactuswg/survey.asp>

20th Australasian Weeds Conference 11-15 September 2016, Perth WA

In 2016, the Council of Australasian Weed Societies (CAWS), along with local hosts, the Weed Society of Western Australia, are celebrating the 20th Australasian Weeds Conference. The biennial conference is being held in Perth, and over 300 delegates are expected from across Australasia. The conference will cover a variety of topics including:

- Herbicide Resistance
- Weeds of National Significance
- Agricultural Weeds
- Environmental Weeds
- Biological control of weeds
- Modelling and new technologies to manage weeds
- Legislation, regulation and policy to manage weeds

The CAWS Oration will be delivered by Professor Steve Powles, Director of the Australian Herbicide Resistance Initiative. www.20awc.org.au

Weed Management Society of SA Membership Form

The Weed Management Society of SA Inc. was formed on 15th October 1999, bringing together people actively involved in managing weeds and researchers with interests in protecting our agricultural and natural environment. The Society is a forum to share knowledge, debate issues and generate ideas, drawing on practical weed control experience and the latest research.

New members are always welcome, or simply come along as a visitor to public meetings. The Society's newsletter *WeedWise* is distributed by mail to all financial members.

Please tick relevant boxes, fill in your contact details and send to the address below (Note: GST is not charged by the Society)

Annual Membership:

- \$30 standard, \$15 Concession/Student, free for community groups

I want to become a member of the WMSSA and would like to receive the society's newsletter *WeedWise* by: ☐ **mail** ☐ **email**

☐ I enclose a cheque for \$ _____ (payable to Weed Management Society of South Australia)

☐ I have made an electronic payment of \$ _____ to the WMSSA Account.

Account Name: Weed Management Society of SA

Institution: Peoples Choice Credit Union

BSB: 805-050 **Number:** 2378 7221 **Reference:** Your surname
Payments by electronic transfer from accounts with People's Choice Credit Union will need to use: **Account number:** 2349916,
First three letters of account name: "wee".

Name: Mr/Mrs/Miss/Ms/Dr

Address:

Telephone Work:

Mobile:

Facsimile Work:

Home:

Email:

Forward with payment to:

Secretary, WMSSA c/- Henry Rutherford, PO Box 517, Torrens Park, SA, 5062

Upcoming Events

Willunga Creek Planting Event
Sunday 19 June 10-3 pm
Register at info@urbanforest.on.net

Adelaide Mount Lofty Ranges NRM
Board Meeting
23 June 2016. Time and Location
TBA

Coastal Revegetation at Parham
and Light Beach
Friday 3 and Sunday 5 June
Contact Warrick Barnes 8520 3392

Weed Society of Victoria
6th Biennial Weed Conference
7-9 June 2016
<http://wsvic.org.au>

Canadian Weed Science Society
Workshop
Applying Transdisciplinary and
Systems Approaches for
Sustainable Weed Management
6-10 June 2016, Alberta, Canada

7th International Weed Science
Congress
19-25th June 2016, Prague, Czech
Republic
<http://www.iwsc2016.org/>

20th Australasian Weeds
Conference
September 2016, Perth, Western
Australia
<http://www.wswa.org.au/20awc>

www.wmssa.org.au

President: John Heap - john.heap@sa.gov.au

Secretary: Henry Rutherford - wmssa01@hotmail.com

WeedWise Editor: Leah Feuerherdt - leah.feuerherdt@sa.gov.au