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Travel Grant Report
Special International Workshop on Weeds and Invasive Plants

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Special International Workshop on Weeds and Invasive Plants
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Dr Sonia Graham

Overview of the workshop

The *Special International Workshop on Weeds and Invasive Plants* was held from 24-28 June 2014 in Benasque, Spain. The purpose of the workshop was to discuss then shape the international research agenda for weeds and invasive plants. To achieve this it brought together 35 weeds researchers from 12 countries and encouraged them to exchange ideas, debate contentious issues, identify challenges and goals going forward, facilitate new collaborations, increase the level of interdisciplinary researchers and support early career researchers to take leading roles. I was one of three social scientists in attendance, one of eight researchers from Australia, and one of fourteen early career researchers.

The workshop began with a 'horizon scanning' session. Prior to the workshop all participants had been asked to submit 3-5 research questions that weed ecology should seek to tackle in the next 5-10 years. These submissions included questions such as:

- How will weed management in annual production systems be affected by changes in frequency and intensity of rainfall events predicted by climate-change models?
- Will ecosystems experiencing disruption due to climate change be more invasible?
- How could weed seed predation be promoted and supported in field crops to become a reliable and effective tool for integrated weed management strategies?
- Do particular evolutionary changes lead to greater invasiveness? Which genetic processes (e.g. genetic bottlenecks, admixture) play a role?
- How does competition influence the efficacy of herbicides?
- Can weed ecology and social science theories be used to challenge and inform one another?

During the first session, everyone was required to read all of the questions and then vote for the ones they thought were the most important. Once the scores were tallied, a much smaller number of important questions remained. The participants were then split into groups to determine which of the remaining questions should be the priority questions going forward. The process and results of the horizon scanning exercise are currently being drafted into a paper that will be submitted for publication, with all participants of the workshop as co-authors.

The next main session of the workshop involved presentations and small group discussions on three key topics that had been organised prior to the workshop. These were:

1) Population genetics and adaptation
2) Spatial ecology of weeds and site-specific management
3) Seed banks, bud banks and their management

For each topic, there were three short presentations to explain where research is currently at, and then identify topics for discussion and debate in small groups. These topics did not directly relate to the horizon scanning session and because they were pre-set limited the scope of topics that were covered during the workshop.

The final day of the workshop involved setting aside time to start planning how to take the discussion from the workshop forward through paper writing and research proposals. There were more than a dozen papers being proposed and worked on, as well as a handful of research proposals.

Throughout the workshop there were various activities that were designed to enhance relationship building, and provide opportunities to challenge one another. For example, there was a soap box session where participants were given one minute to have their say on any research topic that had, or had not been raised, during the workshop.

In this session participants expressed wanting to understand the best ways to communicate research findings to practitioners and landholders and making research sure that research is driven by practical problems. I used this session to voice my concerns about the extent to which social science is being involved in weeds research questions and how we may increase interdisciplinary collaboration going forward.
There was widespread support for more interdisciplinary research, including working more closely with social scientists.

Also, each day three hours was set aside for walks in the Pyrenees. These walks were designed to give participants opportunities to continue discussions from the sessions and to talk about future possibilities for collaboration. The walks were highly reinvigorating.

Research related highlights at the workshop

Overall, I found the workshop to be the best international research collaboration that I have ever been to. It was far more stimulating than large conferences; I felt that I was challenged intellectually and I made a whole new network of research contacts that will be beneficial for my future career.

For me, the highlight of the workshop sessions was the horizon scanning exercise. This is because:

- I was able to contribute research questions about the society-weeds interface
- I found the group work process of refining the research priorities to be a highly intellectually stimulating experience
- It was rewarding to see the level of agreement among the different groups on what the future priorities should be

During the workshop there was discussion around the need for greater trans-disciplinary (as distinct from multi- or inter-disciplinary) weeds research, which not only involves greater collaboration among researchers of different disciplines but also facilitates greater interactions between researchers, weed practitioners and civil society. The strong desire for more transdisciplinary research was also evident in the horizon scanning exercise where the two highest rating questions were:

1) How can weed ecologists best engage with civil society, government and private enterprise to organize multi-stakeholder efforts to manage plant invasion problems?
2) How can we work with social scientists to best co-ordinate weed prevention and control efforts amongst multiple land owners, land users and agencies?

A paper is currently being prepared on this topic, to explain why trans-disciplinary research is needed, examples of where it has and hasn't worked to date, and what the principles should be going forward. I am one of three participants who are leading this paper and will notify MLA when they are published. Clearly, the widespread interest in this topic suggests that this is an area where new international collaborations could be forged, bringing together teams with a wide range of skills sets and disciplinary backgrounds.

Response to the social perspective presented

All the participants at the workshop were highly supportive of the need for more transdisciplinary weeds research that includes social science. On a number of occasions I also tried to make the case for more weed research that is purely social in focus; there are many social science theories that could help us to understand the ways that weeds are managed that we have not tapped into yet. There was less widespread support for this.

Many of the calls for social research by the biophysical scientists involved wanting to understand why land managers do or do not adopt a particular practice, and understanding the 'barriers' to adoption of scientific information. While I believe that greater research of this kind is needed; I know that there is much social research, particularly within rural sociology, that has identified a suite of reasons why land managers do and do not adopt a range of agricultural practices and that much of the findings of this research would be applicable to weed practices. I therefore do not believe that looking at the motivations and reasons why individual landholders do or do not adopt particular weed management practices to be pushing the frontiers of knowledge within the social sciences.

Instead, I believe that social weeds research could significantly advance knowledge if it considers land managers within the broader social context in which they operate. For example, one way to look at weeds is as collective action problems. This means that we are unlikely to understand the behaviour of individual landholders unless we know what they think of their neighbours (including both private and public landholders), whether they think their neighbours are likely to do their weed control, and the extent to which they are influenced by a sense of social conformity. Understanding these social relationships is central to understanding weed management more broadly.

I believe there are two reasons why the participants at the workshop focused on the first type of social research, rather than the second. First, there were three social scientists in attendance, i.e. less than 10% of all participants. This meant that most of the conversations were still about the biophysical nature of the problem. While there was some talk about the need for transdisciplinary research, this was quite superficial. I believe that having a larger representation of social scientists, from a range of disciplines, would help to broaden and balance the discussion. Second, all three of the main topics of the conference were focused on gaps in the biophysical weeds research. There was little scope to talk about how social science might fit because of the way the topics were selected and framed. A greater balance in the topics under discussion might also have provided opportunities for a richer discussion of transdisciplinary as well as social weeds research.

Relevant industry issues

Three key themes that emerged during the workshop were particularly relevant to MLA.

First, make weeds research more holistic. The case was made for weeds research that is less narrowly focussed on specific issues, such as herbicide resistance or the effectiveness of particular site management practices. Instead, research is needed that seeks to understand weed management at larger spatial scales (e.g. landscape) and longer temporal scales (e.g. multiple years and decades) so that broad principles can be developed and applied to a variety of situations. In addition, to be more holistic, weed research needs to consider interdependencies between various weeds issues and between weeds and other land management issues, such as invasive animals or other priority outcomes for grazing businesses.

Second, invest in weed management research that investigates seed banks, and not just above ground plants. I found this to be a fascinating idea and wonder how it might be possible to encourage land management practices that consider seed banks, which are not visible to the naked eye, given the pre- existing challenges with getting widespread weed management. Considering seed banks also requires a longer-term perspective. It's not just about spraying individual plants, it's about addressing the existing seed bank and considering how to minimise additional seeding now and into the future.

Third, take into account in research and extension broader social and environmental changes taking place and the extent to which this will affect weed dynamics and the effectiveness of management practices. For example, climate change will not only affect the spread of weeds,

but it will have effects on a whole range of farming practices and the social system. Being aware of and planning for the inter- related changes that will be associated with climatic change, and other major changes, will be a major future challenge for weeds research.

Recommendations for further action from MLA

I believe that MLA is in a great position to take up many of the challenges discussed during the workshop.

Particularly:

- Challenge the traditional approaches to weed research and management);
- Encourage greater consideration in research and extension of the broader agro-ecosystem in which weed management occurs;

- Foster collective action on weed research and action.

To achieve this, MLA could:

1) Host a similar workshop, or series of annual workshops, in Australia, with the aim of establishing a community of practice around interdisciplinary and holistic weeds research and action. This could involve:

   - A range of participants, such as:
     - Weed scientists
     - Plant ecologists
     - Animal advisory/extension officers
     - Social scientists (working on weeds and other inter-related issues)
     - Agronomists (working on weeds and other inter-related issues)
     - Weed practitioners (local government; national parks; state forests)

   - Limiting the number of participants to 35 (any more than this and it becomes difficult to establish working relationships)
   - A qualified facilitator to run the workshop
   - A knowledge broker to help translate the workshop discussions into actions
   - A horizon scanning exercise to develop shared goals
   - Selection of topics for discussion that represent each of the broad range of interests/disciplines represented at the workshop, with an emphasis on topics that occur at the interface of interests/disciplines
   - An aim of achieving actionable outcomes. For example, in Spain a transdisciplinary initiative exists called AESAVE, which stands for the Spanish Association of Plant Health. This association involves a range of researchers (albeit all biophysical) and stakeholders involved in plant health. The association acts as a lobby group to shape national and regional crop protection directs. It also identifies areas for research and develops best practice management strategies.

2) Support future Andina workshops to continue to build Australia's international network and collaborations on weed-related issues

3) Support research projects that investigate holistic weed management from a transdisciplinary perspective

4) Provide top-up scholarships to PhD students to encourage them to study weeds from an transdisciplinary perspective