Cotton Catchment Communities CRC
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NSW DEPARTMENT OF PRIMARY INDUSTRIES
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COTTON *TALES*

Lower Namoi Valley

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On the lookout for glyphosate resistance

The process of testing a plant population for the presence of herbicide resistant individuals is one that involves growing large numbers of plants in 'ideal' conditions then at particular growth stages applying the herbicide at a full range of rates and observing the responses. Generally, seed is collected from the suspect plants on-farm and is sent for testing. However the dormancy mechanism in barnyard grass seed creates problems with this process. It is difficult to get sufficient quantities of seed to germinate uniformly in short time frames. An alternative sampling method is to collect actual plants out of the field. Plant collections are used successfully in the southern states for wild oat and ryegrass herbicide resistance testing. However this process is limited to seedlings/small plants as large numbers need to be collected and posted. Upon arrival they are potted and once re-established, herbicide treatments are applied. In our current mid-summer conditions, plants are less likely to survive the trip than if collected and sent in early spring. As neither of the available sampling options are able to guarantee a diagnosis, it is recommended to take seed samples from larger plants now and mark these sites to enable seedling collections next spring if they are needed.

Collection of seed for herbicide resistance testing

Collect a minimum is 2000-3000 seeds per sample. This is the equivalent of 1 cup of barnyard grass. Assume that a large seed head will have no more than 100 seeds. To ensure only ripe seed is in your sample, bash the seed heads into a plastic bucket. Place seeds in a paper bag, keeping them dry and out of the sun and heat (ie do not leave shut up in the ute for several days). Store samples at room temperature and post as soon as possible. It is also very useful to collect seed from an area where you don't suspect resistance for use as a comparison. Send the samples to either;

Dr Peter Boutsalis
Plant Science Consulting
22 Linley Avenue,
Prospect SA 5082

OR

John Broster
Charles Sturt University
Herbicide Resistance Testing Service
PO Box 588
Wagga Wagga NSW 2678

Collection of plants for herbicide resistance testing

- Collect 50 plants/field from where you suspect resistance.
- Gently pull out plants and wash roots.
- Wrap in moistened towelling paper.
- Place in waterproof plastic bag.
- Keep in fridge and Express Post on the next Monday to Dr Peter Boutsalis at the address above.

As well as sending the seed or seedlings, providing paddock details such as the herbicide history and crop rotations will aid in interpretation. These are 'user pays' testing services. The cost for glyphosate resistance testing in barnyard grass is $110 plus GST and P&H. Please contact NSW DPI for more information on sampling or for a sample information sheet to accompany your collection.

What should I be looking for?

Resistance begins with the survival of one plant and the seed that it produces. Early in the development of a resistant population, resistant plants are likely to occur only in small patches. This is the critical time to identify the problem. Options are much more limited if resistance is first diagnosed over large areas.

Many of the symptoms of herbicide resistance can also be explained by other causes of spray failure. Before sending samples for testing, evaluate the likelihood of other possible causes of herbicide failure. Start this evaluation by taking the self assessment below.

Self Assessment	**Y / N**
1. Was the rate of herbicide applied appropriate for the growth stage of the target weed?	☐
2. Are you confident you were targeting a single germination of weeds?	☐
3. Were the weeds actively growing at the time of application?	☐
4. Having referred to your spray log book, were weather conditions optimal at the time of spraying so that herbicide efficacy was not compromised?	☐
5. Are you confident the suspect plants haven't emerged soon after the herbicide application?	☐
6. Is the pattern of surviving plants different from what you associate with a spray application problem?	☐
7. Are the weeds that survived in distinct patches in the field?	☐
8. Was the level of control generally good on the other target species that were present?	☐
9. Has this herbicide or herbicides with the same mode of action been used in the field several times before?	☐
10. Have results with the herbicide in question for the control of the suspect plants been disappointing before?	☐

The more questions to which you have confidently answered 'Yes', the more a further investigation of possible resistance is warranted. If you have answered 'Yes' to most of these questions, including questions 8-10 on field history, take action;

- Collect samples and send for testing
- Remove surviving plants from the field to limit the amount of seed going into the soil seed bank.
- Develop a management plan for continued monitoring of the sites and the use of alternative weed control strategies.