Towards new nursery industry protocols for *Phytophthora* control on supply of stock for restoration and revegetation©

D.J. Hancock[a]

Natural Area Consulting Management Services, 99c Lord Street, Whiteman WA 6068, Australia.

Abstract

The threat to Australian plant life and biodiversity from existing and potential additional forms of *Phytophthora* is real and well documented. Some 50% of Western Australia s endangered flora is susceptible to *Phytophthora* dieback. Whilst there is a range of potential methods of *Phytophthora* pathogen transfer to valuable conservation areas, a very obvious and likely source is transmission via nursery sourced plant stock. The current nursery accreditation standards and compliance, though better than none, are no longer considered adequate to address the current and prospective threat to Australian flora posed by *Phytophthora* from nursery stock. The need for nurseries and buyers of plant stock to know and understand their responsibilities to the environment, the nursery industry and each other, requires broad engagement and consultation with the shared intention of moving forward to a higher level of pathogen management and in particular for those supplying stock to valuable conservation areas. This paper will outline the writer views on achieving improvement to nursery *Phytophthora* protocols for supply to conservation areas.

BACKGROUND

The writer has been involved in the production of plant stock for restoration and revegetation for the last 12 years and founded a Perth native plant nursery and associated environmental contracting and consulting business. His concerns for plant quality and hygiene standards within the industry, led to a presentation on the subject at the Australasian Plant Conservation (APC) Conference in Perth in 2010. The writer has not become aware of any improvement in hygiene standards within the industry or in any particular nurseries supplying stock for restoration /revegetation in the 4 years since.

Plant science has continued to isolate additional species of *Phytophthora*, some of which have the potential to cause significant additional damage to both native flora as well as commonly used exotic flora.

The recently released National *Phytophthora* Threat Abatement Plan contains numerous mentions of the risk of pathogen transmission from nursery stock.

DISCUSSION

The light bulb moment for the Natural Area Nursery, operated by our family company, arose in early 2014 with three significant clients seeking nursery soil samples for *Phytophthora* testing.

Supply of plant stock for restoration — current industry deficiencies

- Stock often sourced from non accredited nurseries.
- Accreditation system compliance inconsistent across nurseries.
- No agreed methodology for soil testing.
- No agreed or documented system for recovery from positive *Phytophthora* testing.
- The need for a higher standard for supply to conservation areas is yet to gain acceptance.

[a]E-mail: david@naturalarea.com.au

Risk sources for nursery infection

- Drainage runoff entry to nursery.
- Nursery ground soil or water supply.
- Contaminated soil from vehicles, boots, tools, and equipment.
- Inadequate sterilisation of recycled plant containers.
- Plant stock from other nurseries or harvested from external sites.
- Soil suppliers.

Risk management

Some of the main issues that arise from requests for *Phytophthora* testing by clients are seen as follows:

1) To accept or refuse.
   i) To accept leaves the nursery very exposed should a positive result be returned. How would a nursery deal with such result? What could the impact be on the business? It can be expected to be anything from significant to devastating. Does the nursery have a plan for recovery after a positive result? Was a control sample retained by the nursery to enable verification of the result?
   ii) To refuse may raise suspicion and a test may still be undertaken by the client when stock is received. If positive, it is likely that payment for the stock would be in dispute. A refusal is likely to lead to the loss of future orders.
   iii) The reality is that testing is likely to become more prevalent in the future and the industry needs to accept that these risks need to be managed and systems established. Dealing with the issue in a proactive way is preferable to retrospective fire fighting. A positive test for *Phytophthora* is likely to have a debilitating effect on any nursery supplying the restoration/revegetation market.
   iv) It has become obvious that the current accreditation standard does not satisfy prominent clients involved in restoration of the conservation estate.
2) To take control.
   i) It is preferable that testing by clients not take place at all as nurseries will not have sufficient control of the process, the outcome, and the impact. The issue is to find a way to satisfy clients relative to hygiene standards and discourage testing.
   ii) The only prospect of achieving this is by undertaking a comprehensive review of hygiene protocols, up-scaling them to a standard above accreditation and implementing testing systems which are controlled by the nursery. The up scaled protocols can be detailed to customers, visitation encouraged and the nurseries policy re testing outlined and acceptance gained.
3) Potential for damage to the industry.
   i) Positive tests of nursery stock could force a curtailment of buying and moves to increase the use of direct seeding for revegetation. There is also the risk of infection transfer between nurseries. All nurseries involved in the supply of revegetation stock could see a substantial impact on their business.
   ii) Furthermore, growing incidences of *Phytophthora* detection in revegetation nurseries may result in increased scrutiny and testing of nurseries focussed on supply of landscape stock.

Recommended new nursery protocols for supply to conservation estate areas and for restoration and native species revegetation

- All plant stock to be off the ground at sufficient height to avoid root contact with the ground surface and water splash from ground surface.
- All soil batches to be tested to standards established by Murdoch University, Centre for *Phytophthora* Research. Control sample to be retained by nursery.
- All production to be tracked and matched to individual soil batches to enable recovery action in event of positive test result. Soil batches not to be mixed.

- No exposed ground areas within nursery, i.e. either hard stand or 100-mm aggregate cover.
- No growing medium to be recycled.
- Stock bought in to be from accredited suppliers.
- Recycling of containers to be a dual stage process, any two of chlorine solution inundation, steam sterilisation, commercial grade dishwasher hot wash min 80°C. (Solarisation, pressure cleaning and hand washing are not acceptable).
- Existing accreditation requirements to apply; i.e.
    - All soil and potting mixes to be sourced from accredited suppliers.
    - Soil mix to be housed within a clean and contained storage facility with no potential ground water inflow.
    - Chlorination of all nursery water.
    - Clean down stations and foot baths at nursery entry points.
    - Restricted vehicle entry and designated plant despatch area as a distinct hygiene area.
    - Nursery tools and equipment to be exclusively for nursery use.
    - A distinct quarantine area to be maintained for stock from outside sources

Issues arising from suggested protocol up scale

1. Cost.

The significant cost associated with nursery benches is acknowledged. In some cases it may suit to utilise recycled plastic pallets to maintain stock ground clearance.

A quality Stage 2 *Phytophthora* test will likely cost approx $300 per test. In the Natural Area Nursery situation, the added cost per plant based upon an average year is 0.5¢ per tube. A Stage 1 test results would not normally be available for 2 weeks, hence the need for soil batches not to be mixed and all production tracked relative to each batch. In event of a positive test, this would allow subject stock to be isolated/dealt with.

2. Effectiveness with clients.

Proposed changes may not be acceptable to some clients and business decisions will be made within nursery management in dealing with each. However, it is the firm view at Natural Area that once in place, we do not intend to compromise the new arrangement by acceding to testing in the hands of others.

Once stock has been accepted as in good condition and has left the nursery, the client may then carry out testing but this would not affect the client obligation to pay for the stock. Should testing prove positive in this case, we would argue that we cannot be held responsible for stock out of our control.

Marketing

It is intended that Natural Area actively market the up scaled protocols as a positive initiative to the benefit of clients, the environment and the nursery industry in general.

Industry acceptance

There is no doubt that some, maybe many in the nursery industry will not accept that these proposed changes are necessary or in their interest to implement. However, having seen the impact elsewhere on Phytophthora introduction to a production nursery, the writer has no doubt that the introduction of higher standards is very much a sound risk management exercise.

It is expected that the restoration/revegetation industry sector will establish design, operational and supply standards to projects and these are expected to include demanding standards on suppliers of seed and plant stock. Reference to recent Society for Ecological Restoration Australasia (SERA) and Revegetation Industry Association of Western Australia (RIAWA) conference proceedings will confirm.

Implementation

We are currently road testing the concept with clients in the lead up to 2015 supply and responses are awaited. The Directors of Natural Area Holdings/Natural Area Nursery expect to fully implement the up scaled protocols by end of second quarter 2015.

CONCLUSION

The writer would appreciate constructive criticism and comment on the proposal from those involved in academic, nursery, and revegetation activity in this space.