

4th National Cyanobacteria Workshop – 24. 09. 2014

Workshop theme: genetics

Number of participants: 31

Objective: Identify needs for the industry – how can genetics help? Technology available, new technology needed

Industry needs:

- Greater confidence around safe levels for humans and animals with consistency across different toxin types and exposure routes
- Reliable, representative, fast and cheap monitoring tools for toxins, odours and biomass would be of great interest.
- Predictive capacity for occurring blooms
- Presence of genes as well as expression pattern (eg: presence of toxin gene vs active production of the toxin based on RT-PCR results).
- evolution of monitoring standards/guidelines for both drinking and recreational waters (including the issue of ingestion vs skin contact) driven by best science (when can we put the research into practice?)

Discussion points:

- Self-screening by industry vs. outsourcing to commercial labs (comes down to confidence in methods, need for accredited tests for compliance (eg. NATA) or just operational, cost, resourcing and skill requirements etc.)
- Both commercial qPCR kits available currently ongoing in QLD (B. Sendall). Need for inter-laboratory trials in future on other tests?
- Drinking water guidelines only specific for toxins (guideline for Microcystin, health advisories for Saxitoxins and Cylindrospermopsin) – customer issues with taste/odour and operation issues with large biomass to treat.

Genetics for industry – what are the issues, what needs to change/be developed?

- Reliability and accuracy of qPCR – there yet? – see more as a complementary screening tool at this point
- How to relate gene presence to toxin expression – correlation of gene copies to cell counts or more importantly toxin level?
- **Nationally** regulated standards? Accredited standards/probes – currently 2 available commercialised kits
- Sampling design and preservation/storage
- Development of standardised workflow?
- Cyano community database with confirmed species/strain ID linked to genetic sequences – a project for Australia/internationally?
- Where does genetics fit in? There are a number of developing tools and it is hard to understand where they are all aligning to complement or drive particular aspects of management (eg. online sensors, genetics, remote imaging, rapid test kits). Need of an improved communication between all parties: research, operations/industry and health departments.

- Accepted methodologies reflected in guidance documents (not just the NHMRC guidelines but also the industry and agency guidance and frameworks – eg. CRCWQT research report 74, GWRC report updates)

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Where do we go from here?

- Cross-testing methods/kits between different labs. A solution to adopt standardised techniques?
- Use available techniques in routine as a complementary test to microscopy – exchange experiences across labs.
- Reduce overall costs (costs most critical than time per se) – man-hours vs. lab/sequencing expenses.
- Genetics + modelling - Integrate modelling techniques to track blooms – monitor ongoing blooms and follow them – specific water body calibration.
- Is there a demand to monitor other taxa? (green algae, diatoms)
- Can we develop monitoring tools for “active’ monitoring related to growth
- Establish working group to review the current management state (scientists and industry)

Summary:

Industry needs (s.a.)

Limitations of methods

Timeframe