

DIDYMO INTERNATIONAL EXPERT TALKS ABOUT THE LATEST SCIENTIFIC FINDINGS

Dr Barry Biggs, a scientist with NIWA and a specialist in stream ecology, is involved in research into didymo in association with Biosecurity New Zealand. In May this year, Dr Biggs was invited to be the keynote speaker at the first international conference on didymo research, held in the USA. We invited Dr Biggs to address a public meeting convened by the Advocates at the Bridge Fishing Lodge on 30 August.



The good news is that scientists are honing in on an answer to the key question: If didymo was to be found in the Tongariro, what would we do?

Science has been on an urgent quest to find a biocide which will kill didymo but allow other aquatic life to survive. New Zealand scientists are at the forefront of didymo research in the world. It's up to us – and the most heartening aspect of Dr Biggs's talk was in the area of his team's biocide control trials.

A number of biocides for possible use from around the world have been reduced to 10 that were acceptable, easily obtainable and cost effective. The cell research data shows a copper sulphate formulation looks a possible and exciting solution to the problem of didymo. But there is a long way to go to find out more about application and long-term control.

Dr Biggs explained, with astounding clarity that gave everyone present an understanding of this often complex scientific information, that while didymo is easy to kill, it is possible that if the wrong process is used, everything else will be killed too.

We heard how scientists' understanding of didymo has come a long way in the last six months to August 2006.

To "nuke" rivers is not a solution as the ecology will never be the same afterwards. In the US, a river was "nuked" using chlorine. All fish and all foods were killed but the didymo returned more vigorous than before. If we used chlorine here to "nuke" the Upper Waiau, it would require 50–280 tonnes of calcium hypochloride for one dose. And more than a single dose would be required, ending up in Lake Manapouri, with dire effects on the lake's ecology.

Didymo is the biggest diatom in the world. There are two particular problems with it. Problem one is the cell, which is small. You have to kill the cell. The second problem is the stalk, which is the part we can see with the naked eye. You have to get rid of the stalk material, which is incredibly resilient.

Didymo grows in clean pure water with little nutrient. To survive, it grows a huge biomass very fast. We know that most algae bloom in polluted water, but the biochemistry of didymo is still a mystery.

Currently, Biosecurity New Zealand is funding seven studies being undertaken by NIWA and the University of Waikato. The studies cover a wide variety of aspects of didymo research, including understanding its distribution and

habitats, developing detection techniques, the genetics of didymo, the way didymo moves from catchment to catchment, conditions for optimum growth, containment, control, decontamination and the effect on the food chain.

What effect does didymo have on the river ecology? Researchers have found that it alters the pH level during the day. A day may start with a pH of 7, and by noon, there is a pH of 9.5. A pH in excess of 8.5 seriously affects young salmonides, causing gill tissue to dissolve, bleeding and death.

Dr Biggs gave a fascinating account of the control study he is involved with and explained the objectives of the study:

1. Develop management tools

While there is a need for urgent eradication, total eradication is never going to happen. It is a micro organism, and all it takes for didymo's survival is for the minutest amount to remain.

There is a need to establish materials other than river rocks on which didymo can be grown. A mat for this has been achieved.

The earlier didymo is found, the easier it is to control, once the control has been found.

2. Look at long-term management

Dr Biggs said that the team is looking at what should be used in the long term. What is used in the first instance may not be best for the next 10 years. Early actions might breed a super didymo or have harmful ecological effects.

3. Undertake impact assessment

Eradication will have side effects, which need to be known, and there must be a cost benefit analysis.

The stages of the exciting biocide control trials are as follows:

- 1. Stage 1 Screening Trial:** Bucket trials of 10-15 days. Looking at the effects in a controlled situation.
- 2. Stage 2 Phase 1:** Looking at effects in running water in a 4-6 week period to assess the best biocide to use.
- 3. Stage 2 Phase 2 Evaluation:** This is the current stage. The team still have further work on formulation and application.

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FROM THE PRESIDENT...

We make no apology for the fact that didymo is again the main subject of this newsletter from the Advocates Committee. The major focus of the Committee's work over past months has been to continue to push for action in a bid to stop the alga spreading to the North Island.

We have pulled out all the stops in our efforts to date, and it is clear from attendance at our public meetings, and from the views expressed, that there is a great deal of concern about the consequences for the Taupo fishery and for the economy, should didymo reach the North Island. There is also some anger (with some exceptions – see response from Biosecurity New Zealand below) about the apparent lack of any concerted and rigorous action from central government.

"It's up to the local communities to take action," is the message from government. Councils in the region have, regrettably, come up with some loose ideas for plans, but no action. The politicians we have approached and lobbied, while verbally supportive, have not been prepared to back their words with action.

It is pleasing to say that we now have a didymo prevention strategy in action in the the Tongariro area, with wash stations and spray bottles at key venues. Details of this strategy are in the article overleaf entitled: "Didymo – What's is happening locally?"

To get best take-up of the Didymo Prevention Group's initiatives, and especially over holiday times when so many visitors use our rivers, everyone in the area needs to make a habit of asking any river users we see if they know about the drive to keep didymo out, and if they know where the wash stations are.

You will see from various articles in this newsletter that we have had communication with Jim Anderton, the Minister with responsibility for Biosecurity, with Shane Ardern, Opposition spokesperson for Biosecurity, with Clayton Stent, the Mayor of Taupo District Council, with Don Ormsby, Chair of the Turangi Community Board and with Councillors from Environment Waikato.

Biosecurity New Zealand in Wellington have been supportive of our local initiatives. We appreciate their positive response to our request for funding to produce a six-month radio campaign, which has resulted in didymo information being broadcast over Tuwharetoa Radio and the Taupo Radio Network.

We also appreciate Biosecurity New Zealand's willingness to meet the costs associated with enabling us to have Dr Barry Biggs as guest speaker at the public meeting we held in Turangi on 30 August. Dr Biggs, a scientist with NIWA and an inspiring presenter, is at the cutting edge of didymo research internationally. It was indeed a privilege to have him speak to us. His findings, while still in their early stages, provide some degree of hope for controlling didymo, but not for eradicating it – even more reason for zealotry in stopping it from getting into our rivers in the first place. Dr Biggs' address is reported as the lead story in this newsletter.

I wish to express my appreciation to John Wheeler, for taking on the role of Acting President while I was indisposed for three months during the year. His focus never faltered, and the whole Committee appreciate his commitment to the job at hand. My thanks go to him and also to the local Committee members who consistently work to keep the Advocates' voice heard. I look forward to the next few months, as we move towards achieving a Management Plan for the Tongariro and to keeping the North Island Didymo-free.

Heather Macdonald, President

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Product Screening Trials are going on in parallel with the Biocide Control trials.

Part 1: Stalk degradation

Research is being done by Professor Michael Gretz of Michigan Technical University. Stalk material is 15-20 times stronger than anything else, so if killed and left, it still represents a huge problem. Research to date gives hope that a penicillin fungus can be developed as a means of degradation of the stalk. Work is already proceeding in New Zealand to develop a fungus to deal with Lagarosiphon major. There is still a lot of work to do.

Part 2: Cell research

A research facility has been established at Monowai. The first stage was to grow didymo. This has been achieved, for the first time in the world. Didymo must grow on a substrate that could be used in the lab. A special mat that didymo will grow on has been designed for this purpose as noted above.

A range of biocides have been tried. They must achieve better than 95% kill rate. Of course, the ideal is that didymo is killed and fish and other aquatic life survive. Cell research involves research into a toxicity profile i.e. after 15 days, cell viability, the ratio of chlorophyll (greenness) to total organic matter is noted, along with heterotrophic factors, the ratio of live to dead material, and the effect on didymo, invertebrates, fish and other algae.

This excellent talk concluded with some thoughts on where research and action on didymo might go from here. Overall, there is a need to develop a rapid response strategy, as well as short-term and long-term management strategies for application of biocides and control of didymo.

Note:

A question and answer session followed, and from this, we learned the following:

1. Flow rates have no effect on didymo.
2. Other approaches have potential, but this line of research, focusing on copper sulphate, is necessary given its success and the urgency.
3. Spring (October) shows the biomass having a mayhem of growth but no seasonal change in the biomass otherwise.
4. Didymo was the first diatom identified and classified in the early 1800s from the USA.
5. There has been no science elsewhere in the world, probably due to adverse effects on business.
6. Penicillin could be put in the river as a live fungus or in a concentrated enzyme form.

Dr Biggs' presentation was recorded on video. If you wish to borrow the video of this most stimulating presentation, contact Eric Wilson.

NEW WALKING TRACK IS THROUGH

The track that the Advocates and the Trout Centre Committee have been pushing for is now through. Our thanks to DoC.

The track that is now walkable from the Hydro Pool to the Neverfail Pool and up to the Trout Centre will be great for people wanting to walk and to see more of the river and the bush. The Advocates are particularly delighted that people will now be able to walk from the town to the Trout Centre, without having to walk on State Highway 1.

Hopefully, this new piece of track will be promoted in a way that motivates more people to take the walk to the Trout Centre, where both adults and children can enjoy interactive opportunities to learn about trout and their habitat, and see a great display of Tongariro fishing gear over the decades.

We are hopeful that negotiations with property owners may soon result in permission being given to extended access across a piece of private land, which would enable a wonderful 2-4 hour round-trip river walk between the two swing bridges, with a stop off at the Trout Centre.

RIVERBANK PLANTING

During May and June, the Advocates initiated a river bank clearing and planting project that stretched from Poto Street to Taupahi Reserve. Funding came from a grant from the Waikato Catchment Ecology and Environment Trust.

We are grateful to Jen Shieff for her planning, Eric Wilson for finding a sponsor, Dave Lumley and his team at DoC for their expertise and supervision, the willing help from the community and all the hard working and helpful prison inmates who joined in.

Initially, DoC produced a planting plan that specified which plants were to go where, and we were able to purchase the plants at very good rates from the Taupo Native Plant Nursery.

It was a useful exercise, with inroads made towards eradicating blackberry and noxious weeds. Our planting will help stabilise the riverbank, create cover for fish and attract birds.

We plan to undertake another planting project



next year, and as part of the planning for that, we will talk with DoC to get a fit between the Advocates' views of what needs to be done next and DoC's long-term priorities for planting the river area. DoC will then produce another landscape plan. Meantime, please let the Committee know of any spot that you think we should be considering for clearing and planting.

Feral pine trees

The project of working towards the eradication of feral or wilding pines in the Tongariro River basin, which was outlined by John Toogood at the Advocates AGM in March, is in its initial stage of wider consultation. So far, there has been positive support for the initiative from DoC, Environment Waikato and others. We plan to proceed slowly with this extensive exercise, in conjunction with other groups and organisations who have an interest in halting the encroachment of the feral pines, which are displacing the natural manuka and kanuka scrubland of the area. Please let us know if you wish to contribute to this project in any way.

Tree an expression of grief for the river

The weeping cheery tree alongside the Major Jones Pool has, for forty years, been a feature of the Taupahi Reserve river walk. That the tree has survived the various drives by DoC to eradicate exotics from the river reserve is, we are told, thanks to the protestations of local residents over the years.

Now DoC has also come to appreciate the tree and its history. Dave Lumley of DoC and Heather Macdonald of

the Advocates agreed that it would be good to find out the story behind the planting of the tree and to mark it in some way to ensure it continues to survive and be appreciated. After some research, the background to the tree was revealed, so you will now see a plaque beside the tree, carrying the following inscription:

This weeping cherry tree was planted by a resident "to cry for the river that will never be the same again" when the Tongariro Hydro Scheme was implemented in 1965.

Advocates for the Tongariro River 2006

DIDYMO WHAT IS HAPPENING LOCALLY?

The presence of didymo in New Zealand was made known with its discovery in the waters of the Waiau in Southland.

It is now spreading to waters all over the South Island, with the current count being some 16 rivers from Southland to Nelson. A year ago, the list was seven rivers. Updated information can be found on Biosecurity New Zealand's website, www.biosecurity.govt.nz. Put "didymo" into the search box.

Public meeting in May

The Advocates organised a public meeting on didymo on 11 May. About a hundred people attended the meeting, which we held with support from Genesis and the Tongariro Lodge. Staff from Biosecurity New Zealand, Wellington also attended. Our intention in convening the meeting was to bring together the community, business people, local politicians, DoC and Biosecurity New Zealand in a bid to stimulate action aimed at spreading awareness, improving border controls to contain didymo and making cleaning solutions readily available close to rivers. A sense of urgency and frustration at lack of action was apparent as people spoke.

Central North Island Didymo Action Group

Since didymo began to spread in the South Island, the Advocates have been actively campaigning to keep the North Island didymo-free. Of course, the waters of the Lake Taupo region, particularly the rivers running into the lake, are the focus of our efforts.

At the meeting on 11 May, DoC announced that a Central North Island Didymo Action Group had been formed. This group picked up the issues raised at the meeting and incorporated them into a didymo awareness and prevention strategy for the local area.

Launch of didymo prevention strategy

The Didymo Action Group, led by Nic Etheridge of DoC, includes Glenn McLean of DoC Fishery, Bubs Smith of the Tuwharetoa Trust Board, Steve Smith, Eastern Region Manager of Fish and Game, Jared Bowler, Environment Manager of Genesis Energy and Mike Birch of the NZ Recreational Canoeing Association. It officially launched its didymo prevention strategy on 11 October.

Didymo wash stations (wheely bins containing 5% dishwashing solution), 10 thousand spray bottles, and laminated Biosecurity posters have now been distributed by DoC to fishing stores in Turangi and Taupo and to accommodation venues in the area. Some signage has gone up and large banners will be put up on main arterial routes into the central North Island at holiday times. It is great that we finally have this kind of action on the ground here.

Lobbying nationally

Wellington-based Advocates members Richard Kemp, Sylvia Smith and Bob MacDonnell met with Shane Ardern MP, Opposition spokesperson for biosecurity. Shane Ardern, while sympathetic, says the Opposition can not get didymo into headlines, or force the House to consider it, and that the power to do that is with people at local level.