



# TRILEPIDEA

NEWSLETTER OF THE NEW ZEALAND PLANT CONSERVATION NETWORK

Please send news items or events to [events@nzpcn.org.nz](mailto:events@nzpcn.org.nz)

Postal address: P.O. Box 16-102, Wellington, New Zealand

E-NEWSLETTER: No 38. JAUARY 2007

Deadline for next issue: Friday 16 February 2007

## Message from the President

It is my pleasure to wish everyone a very successful 2007. I do hope very much that all the good work going into New Zealand plant conservation will continue with as much enthusiasm and dedication as it has in the past. The Network and all its members are making a huge difference to the conservation of our native flora. There is, of course, a sense of urgency not only because of the status of some of our flora but also because of the Global Plant Strategy. As everyone will know, the 16 targets have been set for the year 2010. Not long to go until 2010. The Network has made significant contributions to achieving those targets and that success will continue with the support of all the members.

It is without doubt that the members of the Network Council contribute a huge amount to the activities and success of the Network. The outstanding success of the 2006 Conference was due very much to a few members of Council, in particular Peter De Lange, and Brian Murray who were both key members of the organising team.

The membership of Council has changed with the departure of two people. On behalf of the Council, it is my pleasure to thank both Steve Benham and Peter Buchanan for their sterling work. It is equally my pleasure to welcome both Rebecca Stanley and David Norton on to the Council. I am also delighted to say that Peter Heenan has been confirmed as a Council member (he filled a vacancy during 2006). It is also a pleasure to mention a welcome to Eric Scott who has kindly agreed to be the Administrator for the Network. He will, amongst other tasks, manage the membership database and manage the publication of the monthly Newsletter.

The first Newsletter for 2007 is full of interesting reading. The article 'Dragons in the mist' by Steve Wagstaff will be of particular interest to many readers. There is also a timely reminder about the identification of your (YOUR) most important plant areas. Do please respond to this call for information about what you think should be an important plant area.

The year 2006 was a very successful year for the Network. The many achievements are noted on the web site. Amongst the many achievements is the updated version of the Network's naturalised vascular plant list (Target 1 of the Global Plant Strategy). In particular, there was the outstanding news of the establishment of the seed bank for New Zealand's threatened seed plants (Target 8 of the Global Plant Strategy). It is a pleasure to learn that MWH (engineering and environmental consultants) have sponsored establishment of the the seed bank. It will be established at the Margot Forde Germplasm Centre at AgResearch in Palmerston North. There are many more achievements and successes—have a look at the web site.

*Ian Spellerberg, Lincoln University*

## Plant of the month

Plant of the month for January is *Pseudowintera insperata* (Northland horopito). This tree, up to 7 metres tall, is found in coastal, lowland, and alluvial forest, and on exposed ridge tops. It flowers from December to February. It is endemic to the North Island of New Zealand and formerly on all the northern Whangarei Harbour highpoints from Maungatapere to Bream Head, and also at Logues Bush near Wellsford. It is now known from only three sites in this region. It is not immediately clear what threats there are to the survival of this species but trampling may be one. The species came 8th in the 2006 Vote for Your Favourite Plant competition. The fact sheet for this species may be found at: [www.nzpcn.org.nz/nz\\_threatenedplants/detail.asp?PlantID=2391](http://www.nzpcn.org.nz/nz_threatenedplants/detail.asp?PlantID=2391)



*Pseudowintera insperata*.  
Photo: Jeremy Rolfe.

## New Zealand threatened plant seed bank to be established

Phil Knightbridge, DOC, West Coast Conservancy ([pknightbridge@doc.govt.nz](mailto:pknightbridge@doc.govt.nz))

The establishment of a seed bank for New Zealand's threatened seed plants was announced at the Network's November 2006 conference. Environmental engineering consultants MWH New Zealand are sponsoring the establishment year of the seed bank. The seed bank will be housed at the Margot Forde Germplasm Centre located on AgResearch's Palmerston North campus.



*Epilobium microphyllum* seed capsule soon after dehiscence. Photo: Naomi Lorimer.

The proposal for a long term seed storage facility (or seed bank) arose from an *ex situ* conservation workshop and a presentation by Steve Alton from Kew Garden's Millennium Seed Bank Project at the 2005 NZPCN conference. NZPCN member and DOC botanist Phil Knightbridge, who prepared the proposal, reiterated that "conserving native plants in their natural habitats should remain the prime focus of threatened plant conservation".

"However, there are numerous examples of highly threatened native plants that a long term seed storage facility (seed bank) would help to insure against extinction". These include the herb *Atriplex hollowayi* from Northland's beaches, and

a number of native broom (*Carmichaelia*), gentian (*Gentianella*) and cress (*Lepidium*) species. In addition, the seed bank may be able to provide insurance against extinction for naturally uncommon species, particularly those in alpine habitats at risk from climate change.

The establishment of a seed bank for New Zealand's threatened plants helps implement objective 4.1c of the New Zealand Biodiversity Strategy (for seed plants) and Target 8 of the Global Strategy for Plant Conservation. Secondary objectives of a seed bank for New Zealand's threatened plants could be to store seed from good seed years for use in future restoration work and to facilitate research on seed storage behaviour.

The Margot Forde Germplasm Centre, which currently houses a collection of agricultural grassland plants, was chosen as the obvious location for the new seed bank. It has existing seed storage facilities including a collections database and relatively secure long-term FRST funding as one of New Zealand's 'nationally significant databases and collections'. In the words of the Germplasm

Centre's curator Dr Warren Williams, "We could simply extend our resource and already have the expertise on hand."

Once seed has been deposited in the seed bank, it will be able to be used only on the approval of the person(s) and/or organisation that deposited the seed—the seed bank will be acting as the custodian for these seeds. This approval will also be required for access to seed collection location details.

The NZPCN and Margot Forde Germplasm Centre are currently working on finalising a registration process for seed collectors and developing seed collecting guidelines based on Kew's Millennium Seed Bank guidelines. The Germplasm Centre's database will also be updated to accommodate the addition of native seed plants.

Thanks to the funding from MWH New Zealand, the seed bank should be ready to receive threatened native plant collections from February. For 2007, the priority for collection will be acutely threatened species, including those that are taxonomically indeterminate.

## Dragons in the mist—origin and diversification of the austral genus *Dracophyllum* (Ericaceae)

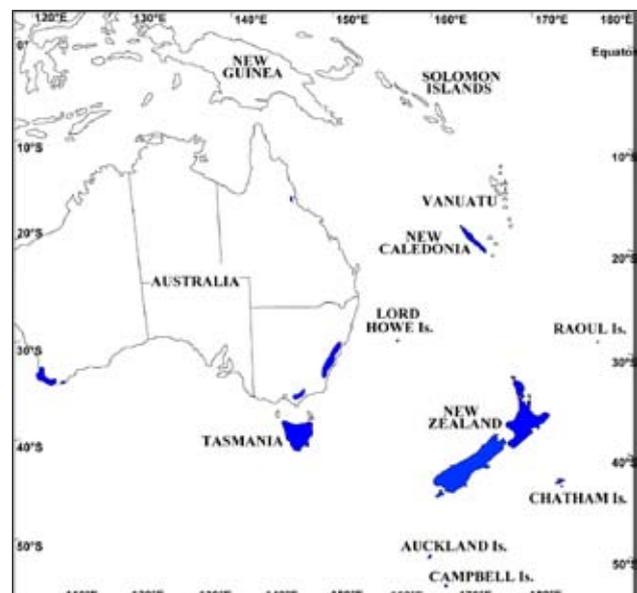
Steve Wagstaff, Allan Herbarium, Landcare Research—[wagstaffs@landcareresearch.co.nz](mailto:wagstaffs@landcareresearch.co.nz)



Members of the genus *Dracophyllum* are commonly known as dragon heath because of their distinctive growth form. They are characteristic shrubs of upland forests and heathlands in mainland Australia, Tasmania, Lord Howe Island, New Caledonia, and New Zealand. Traditionally, about 60 species are recognised in three subgenera. Twenty-nine species are placed in *Dracophyllum* subgenus *Oreothamnus*, and, with the exception of *Dracophyllum minimum* found in Tasmania, all members of this subgenus are endemic to New Zealand. Twenty-one species are

placed in subgenus *Dracophyllum*; of these 7 are found only in New Zealand, 8 are confined to New Caledonia, 4 to Australia, 1 to Tasmania, and 1 to Lord Howe Island. The third subgenus, *Cordophyllum*, includes only a single species, *Dracophyllum involucratum*, which is restricted to New Caledonia. They are morphologically diverse varying in growth form from cushion plants to trees up to 14m tall.

Plant systematists have long recognised the close relationship between *Dracophyllum* and two morphologically similar Australian genera, *Sphenotoma* and *Richea*, and in recognition of this close relationship place these three genera in tribe Richeae. The genus *Sphenotoma* includes 6 species that are restricted to Western Australia, while *Richea* includes 11 species found in southeastern Australia and Tasmania. Unique morphological and molecular traits shared by all species in Tribe Richeae imply that they once shared a common ancestor whose descendants form a single evolutionary lineage. Though tribe Richeae forms a well defined monophyletic group, the evolutionary relationships among the species of *Dracophyllum*, *Richea* and *Sphenotoma* are less clear.



Although the species of *Dracophyllum* are widely distributed in the southern hemisphere, the greatest level of species diversity is found New Caledonia and New Zealand. I've been working in collaboration with a team of scientists from Australia and New Caledonia to study evolutionary processes that contribute to the differences in species richness. We are using DNA sequence information to retrace the evolutionary history or 'phylogeny' of the group. When we examine an individual's DNA profile, minor errors or mutations are detected. These DNA mutations are passed from one generation to the next and, because the descendants of a common ancestor inherit these unique changes, their presence provides evidence of a close relationship. The accumulation of DNA mutations reflects both a mutation rate and time, but teasing these two aspects of evolution history apart poses a very challenging problem—hence the accumulation of numerous unique DNA mutations can either reflect a rapid mutation rate or a long period of time since two sister species diverged from a shared common ancestor. We rely upon the fossil record to help us reconcile the relationship between the mutation rate and time.

Based upon the fossil evidence, we designated the evolutionary branch leading to *Enkianthus* as the root of the *Dracophyllum* phylogeny and set the age of this branch at 90 million years. This branch is one of the oldest in the Ericaceae, since fossils allied to this *Enkianthus* first appeared during the late Cretaceous. Our initial results are quite encouraging. Given these parameters, the evolutionary branch leading to *Rhododendron* diverged during the early Tertiary about 45.1 million years ago, and this finding appears to be supported by the fossil record. Both fossilised pollen and seeds of *Rhododendron* are reported from that period. Our results also suggest that southern hemisphere epacrids diverged from their northern hemisphere relatives about 44.8 million years ago, and diversification within the epacrids appears to have been rapid with lineages presently recognized as tribes diverging by the mid-Tertiary. Tribe Richeeae, the group we are most interested in, apparently diverged about 38.1 million years ago. Interestingly, fossilized ericaceous pollen was present in New Zealand and Australia by the mid-Eocene, which also lends further support to our hypothesis because the epoch ended about 38 million years ago.

In our phylogenetic analysis, the Western Australian genus *Sphenotoma* forms a distinct evolutionary lineage that diverged during the Miocene (26 million years). *Dracophyllum* and *Richea* together form a second lineage. We recovered two distinct lineages of *Richea* recognized as *Richea* sect. *Cystanthe* and *R.* sect. *Dracophylloides*; these were nested within *Dracophyllum*. It is intriguing that the amount of genetic diversity in *Dracophyllum* is far greater in Australia, whereas the species richness or taxonomic diversity is greater in New Zealand. Furthermore, with the exception of *Dracophyllum secundum*, the Australian species have quite restricted relictual distributions.

The New Zealand and New Caledonian species of *Dracophyllum* trace their origin to Eastern Australia. Diversification in these lineages was rapid and occurred during the Pliocene and Pleistocene (largely within the last 5–7 million years). The early progenitors of these species' radiations undoubtedly arrived by long-distance dispersal long after these lands had separated from Gondwana. There is a correlation between plant distribution and wind patterns in the southern hemisphere, and wind has been proposed as a possible vehicle of long-distance dispersal.

Because of the geographic isolation of New Zealand, the initial *Dracophyllum* founder populations were most likely small, and we propose that inbreeding and strong selection in these small founding populations may have played an important role in the rapid evolution of the genus. The contrast between the amount of morphological and genetic diversity in the group is quite remarkable. All of the New Zealand members of *Dracophyllum* subgenus *Oreothamnus* have virtually identical DNA sequences. With 29 species, it is the largest subgenus in *Dracophyllum*. The species in this subgenus range from alpine cushion herbs such as *D. muscoides* to sizeable trees such as *D. arboreum*. The species of subgenus *Oreothamnus* are especially diverse on the eastern flanks of the Southern Alps, which suggests that diversification in New Zealand coincided with geologic and climatic changes

during the late Tertiary. The uplift of the mountains in New Zealand began during the Pliocene and was accompanied by cooler climates and the expansion of subarid areas in the interior of the South Island. This was a time of severe disturbance; the onset of glaciation and erosion created a variety of new habitats such as extensive scree slopes, alluvial plains, river terraces, and glacial moraine. It seems likely that these changes to the physical environment along with biotic factors such as competition, predation, and symbiosis have also contributed to the rapid diversification of *Dracophyllum* in New Zealand.

Our research is partly funded by the Foundation for Research, Science and Technology and the National Geographic Committee for Research and Exploration. For more information about this research project contact: Steve Wagstaff ([wagstaffs@landcareresearch.co.nz](mailto:wagstaffs@landcareresearch.co.nz)).

### **New Network Council members**

At the Network's AGM held in Auckland in November, 2006, a new national Council was appointed. Several people continued in their same positions including Ian Spellerberg (President), Mike Oates (Treasurer), Peter de Lange (Vice President), John Sawyer (Secretary), Philippa Crisp and Sarah Beadel (Council members). Three new Council members were also elected. They are: Bec Stanley (Auckland Regional Council), David Norton (University of Canterbury) and Peter Heenan (Landcare Research). Retiring Council members—Steve Benham and Peter Buchanan—were thanked at the AGM for the work they did during their time on Council.

### **Website passes another milestone**

Early in January 2007 the Network website reached another milestone by passing through half a million visitors. This has occurred over the 40 months since the site was launched in August 2003 at our inaugural conference. This is an average of 12,500 individual visitors per month over the period (and 370,000 hits per month). However, the visitation rate now exceeds 30,000 visitors per month (800,000 hits/month) so it will not be long before we reach the next major milestone of a million visitors. Please let us know if you find mistakes on the site or have ideas about improvements or additions you would like to see.

### **Identification of your most important plant areas**

The Network is now calling for nominations of Important Plant Areas using the on-line nomination form on the Network website ([www.nzpcn.org.nz](http://www.nzpcn.org.nz))—see NZ Native Flora>NZ Important Plant Areas.

Important Plant Areas (**IPAs**) are the best sites for wild plants and fungi. The purpose of an **IPA** programme is to identify a network of sites within each biogeographic zone that are critical for the long-term viability of naturally occurring wild plant populations. The identification of IPAs in New Zealand and throughout Oceania is valuable so that conservation efforts for wild plant species and their habitats may be appropriately targeted to these sites. Target 5 of the Global Strategy for Plant Conservation is that “protection of 50% of the world's most important areas for plant diversity assured by 2010”. So that New Zealand may achieve this target, the Network is working to identify IPAs and criteria for identification of these areas have now been developed. The Network is now calling for nomination of sites using the form provided. These sites will be examined by an expert panel every few months and if supported will become part of the Network's IPA database. Gradually, the Network will build up a database of the most important areas in New Zealand for plants, which will aid our conservation programme.

## **Technical Support Officer, Plant Ecology, Whangarei, TS1 (CA2/IA), Department of Conservation, Northland Conservancy**

### **Vacancy 61/065**

Would you like to play a key role and make a real difference to the protection of threatened flora and ecosystem conservation in Northland? Northland Conservancy is seeking someone to join the Conservancy's biodiversity team to do just that. This exciting role will focus on providing strategic and technical advice on threatened flora and habitat management throughout the Conservancy. You will have a key role in the management of biological data within the Conservancy and will work closely with the Conservancy's vegetation monitoring team. You will seek opportunities for innovation, improvement and development within the conservancy and provide advice on 'best practice'.

To be successful in this role you will have a strong applied technical competence in threatened species management, a high level of botanical knowledge, demonstrated experience in finding solutions to complex biodiversity problems, an ability to develop strategies, an inclusive style and be team player. You will have excellent analytical skills and a good understanding of database systems and the ability to develop and sustain organisational systems and processes. You will have excellent written and oral communication skills including experience with MS Word and Excel. A relevant tertiary qualification will be an advantage. The position is a full time permanent position in the Northland Conservancy Office, Whangarei.

**For an application pack, contact [rsatherley@doc.govt.nz](mailto:rsatherley@doc.govt.nz), or Northland Conservancy, telephone (09) 430 2470, quoting Vacancy 61/065.**

**Applications close in the Northland Conservancy Office at noon Monday, 29 January 2007.**

### **Upcoming events**

If you have important events or news that you would like publicised via this newsletter please email the Network ([events@nzpcn.org.nz](mailto:events@nzpcn.org.nz)):

### **Waikato Botanical Society, Saturday 20 – Sunday 21 January, North Taranaki**

**Saturday: Mt Messenger /Whitecliffs Walkway** Ascend Mt Messenger to the trig at 310 m asl from the tunnel on SH3 through typical North Taranaki coastal forest, *Myosotis petiolata* var. *pansa* and *Rorippa divaricata* have been recorded in this area. We follow the hard beech ridgeline to the Waipingau trig (245 m), then connect with the Whitecliffs Walkway near Parininihi. Heading south, we drop down to the Waipingau Stream, checking on the pingao (*Desmoschoenus spiralis*) stand at the stream mouth. The walk is finished off along the Pukearuhe beach from where we can study this section of the Whitecliffs and their formation. This is a full day excursion. Please note that a reasonable standard of fitness is required as this is a long day (approx 10 km), finishing with a 2 km walk along a black sand beach.

**Sunday: Tauwhare Scenic Reserve on the Mokau River.** See if we can score more than 272 vascular species in this reserve. It is a geographically and botanically interesting area with historical significance. Botanise the ridges or down into the wetlands and the tidal margins of the Mokau River. This area has been well studied by Barry Hartley, New Plymouth naturalist, and he will be available to join us again this year.

**Accommodation:** Lovells farm cottage in the Hutuwai Valley about 2.5 km from the Tongapurutu Bridge on SH3. The cottage sleeps 8 and can pitch tents as well. Approx \$10/pp, depending on numbers. Cooking facilities available. Bring own sleeping bag, pillow. Cottage available from Friday 19 January. **Maps:** Q18 and R18 are the two Topo maps for the areas. **Contact:** RSVP Jane Hart ph 06 752 3688 or [jane.hart@xtra.co.nz](mailto:jane.hart@xtra.co.nz)

## **Explore North Shore Discovery Walks, 20 January – 19 February**

Explore the North Shore reserves with a guide on Saturday mornings or a different set of reserves on Monday evenings. Contact Margi Keys, 09 443 6919, or [discoverywalks@ix.net.nz](mailto:discoverywalks@ix.net.nz).

## **Auckland Botanical Society Anniversary Weekend Trip**

This year's trip over 26–29 January is to Te Kauri Park Scenic Reserve. It will be led by Peter de Lange and will involve different parts from the 2000 trip to the same area. Enquiries and bookings should be made through Maureen Young, phone 09 425 7162, email [youngmaureen@xtra.co.nz](mailto:youngmaureen@xtra.co.nz).

## **Wellington Botanical Society Field Trip Saturday 4 – Sunday 5 February**

Day 1 botanise Clive Paton's covenant in the Wairarapa. Meet: 9 00 a.m. at Dorset Square Native Reserve, cnr SH2 and Moore St, Featherston. Leader: Tony Silbery, 06 372 5620 (h), 06 375 8004 (w). Check website for final details ([www.wellingtonbotsoc.wellington.net.nz](http://www.wellingtonbotsoc.wellington.net.nz)). Day 2 in Aorangi Forest Park—see uncommon plants of Wellington Conservancy. Leader: Pat Enright, ph 06 308 8278 (h), 495 0786 (w). Wellington contact for both trips: Sunita Singh 04 387 9955

## **Wellington Botanical Society Field Trip Sunday 12 February**

**Dench garden weeding**—NOTE NOT SATURDAY Co-Leaders: Arnold and Ruth Dench, 37 Lyndfield Lane, Newlands, Ph: 477 4490. Help with maintenance of this nationally important garden containing many threatened indigenous plant species established by Arnold and Ruth Dench. Bring food; hot drinks provided.

## **International Association for Vegetation Science 49th Annual Conference**

*New Zealand: New home; new habitat! New ideas?*

This is being held in Palmerston North, 12–16 February 2007. As well as the week of the conference activities, there are associated tours. For information, contact G. Rapson, Massey University ( email: [G.Rapson@massey.ac.nz](mailto:G.Rapson@massey.ac.nz)).

## **Dune Restoration Trust of New Zealand—Inaugural Conference, “Sharing the Knowledge”, Tauranga, 13–16 February**

The programme includes invited speakers such as Richard Warrick of the Global Environmental Change Institute and field trips to various local shore areas and Mayor Island. For registrations please contact: [heidi@envbop.govt.nz](mailto:heidi@envbop.govt.nz).

## **Auckland Botanical Society Field Trip 17 February 2007**

To Tamahunga, near Leigh.

Leader, Maureen Young, phone 09 425 7162, email: [youngmaureen@xtra.co.nz](mailto:youngmaureen@xtra.co.nz).

## **Waikato Botanical Society Field Trip Saturday 17 – Sunday 18 February**

Pureora Forest Park (combined trip with Rotorua Botanical Society) including the Waipa Mire and the Bog Pine Reserve near Pureora Village. Visit one of the largest mires in the Waipapa Ecological Area. The Waipa Mire is mostly surrounded by podocarp forest with exotic forestry bordering one edge. The mire contains some threatened species including stout water milfoil (*Myriophyllum robustum*), the swamp leek orchid (*Prasophyllum hectorii*) and the threatened native daphne *Pimelea tomentosa*, in the adjacent shrubland. As well as the mire, the mire/podocarp ecotone vegetation also provides interesting habitat to explore and botanise. Sunday: A number

of interesting sites can be visited from the Pureora village base, including the where there are *Pittosporum turneri* and *Dactyланthus taylorii* records and, nearby, a population of *Melicytus flexuosus* can be seen. There are *Ileostylus micranthus* mistletoes on the roadside in the close by Waimanoa block. *Dactyланthus taylorii* and *Pimelea tomentosa* may also be found lurking around in the village scrub, not to mention the fantastic birdlife and podocarp forest here.

**Meet:** Friday evening or 9.00 a.m. Sat and Sun, at Cabin 1, Pureora Village or contact [abrandon@doc.govt.nz](mailto:abrandon@doc.govt.nz) to carpool from Hamilton. **Contact:** Early RSVP essential for accommodation to: Andrea Brandon [abrandon@doc.govt.nz](mailto:abrandon@doc.govt.nz) ph 07 858 1018 (wk).

### **Wellington Botanical Society Monthly Meeting 7.30 p.m. 20 February**

A talk on 'Project Crimson' by Bridget Abernethy, Executive Director of Project Crimson. For more details see the website ([www.wellingtonbotsoc.wellington.net.nz](http://www.wellingtonbotsoc.wellington.net.nz)).

### **Botanical Society of Otago Monthly Meeting 5.20 p.m. 21 February**

A talk on 'Radical environmental change on Whangapoua Estuary, Great Barrier Island in 3500 years' given by Dr Yanbin Deng, Otago Archaeological Research Cluster, Dept of Anthropology, University of Otago. Contact [Kevin Gould](mailto:Kevin.Gould@otago.ac.nz), phone: (03) 479 9061.