

New interactive plant identification keys

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Have you ever tried to use a Flora key to identify an unknown plant specimen? If so, you may well have encountered difficulties understanding the technical language used and from the lack of illustrations, and problems due to your specimen lacking the critical characters the keys rely upon.

While printed Floras remain invaluable reference works, it is fair to say they are not particularly user-friendly. Traditional keys are an integral part of Floras and have been around for more than 200 years. Most are 'dichotomous', with only one start point and at each step you must choose between two character states or 'couplets'. If you make a wrong choice, you may end up keying out to an incorrect

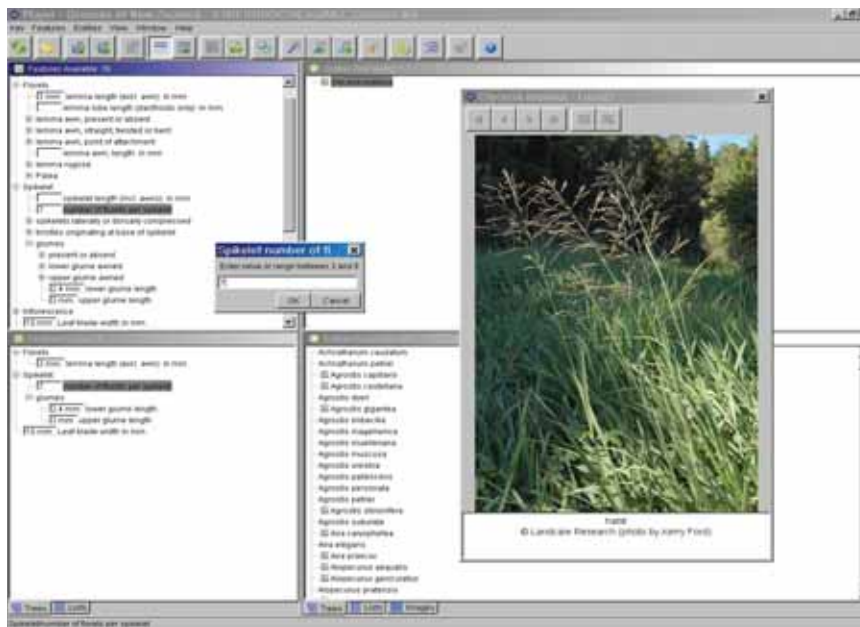


Fig. 1 Screen view of a development version of the new grass key.

species, and you can quickly run into trouble if your specimen is lacking characters such as flowers. Furthermore, illustrations in these Floras are used sparingly, so you often must imagine from the highly technical descriptions what the plants actually look like – not an easy task.

Help is now at hand with computer-based identification keys. Interactive keys represent the cutting edge of identification tools, and have been developed for all kinds of organisms including corals, crustaceans, fish, frogs, fungi, insects, microbes, molluscs, plants, viruses, and wood. These keys are very powerful and can handle information on hundreds or even thousands of species

at a time. Many are also multi-access so you can enter the key at any level and choose the plant characters that you want.

For plant identification, the adage that 'a picture is worth a thousand words' certainly holds true. Because computer-based keys are less constrained than print media, they are able to incorporate many

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more images. This is especially important in representing the full range of features such as growth habit, leaves, flowers, fruit, and any specific diagnostic characters. For the user, they are intuitive, easy and fun to use, and a quick and efficient way to identify plants.

The two main systems used throughout the world are Intkey and Lucid, and both were developed in Australia.

Intkey is part of the DELTA (DEscription Language for TAXonomy) package originally developed at the CSIRO Division of Entomology, Canberra, from 1971 to 2000. The DELTA System is an integrated set of programs that include generation and typesetting of descriptions and conventional keys, and the construction of Intkey packages for interactive identification and information retrieval. The DELTA programs are free for non-commercial use and are under continuous development by Dr Mike Dallwitz and others (<http://delta-intkey.com/>).

DELTA was used to generate the descriptions in the recent book *An Illustrated Guide to New Zealand Hebes* (Bayly and Kellow, 2006), whose authors are using Intkey to develop an associated interactive key for *Hebe*. However, at the present time no widely available interactive key has been completed for New Zealand plants.

Lucid concentrates on interactive keys and utilities such as fact-sheets. Their interactive key has an intuitive interface showing four panes: 1, the complete list of characters; 2, the characters selected; 3, the discarded taxa; 4, possible taxa remaining. Lucid was developed by the Centre for Biological Information Technology in Brisbane (<http://www.lucidcentral.org/>). Landcare Research is currently using Lucid to create the following two interactive keys for plants in New Zealand.

Grass key

This key is for the identification of indigenous and naturalised grasses in New Zealand, and was initiated by Kerry Ford and David Glennly (Landcare Research).

In New Zealand, the grasses constitute the second largest vascular plant family, with a total of 460 species, of which most are naturalised. Grasses are important to New Zealand as they represent a significant component in many ecosystems. Grasslands of indigenous and naturalised species, and mixtures of both, occupy more than 50% of the land area of New Zealand (i.e., about 14 million hectares).

There is high endemism in the indigenous grasses with 83% (157 species) occurring nowhere else. Ten of these species are classified as threatened and three are on the critically endangered list. On the other hand, some of the naturalised grasses are invasive and a threat to both indigenous ecosystems and pastoral lands. About 42 species of naturalised grasses in New Zealand feature on regional biosecurity lists and 17 are listed in the current National Pest Plant Accord (NPPA).

The interactive grass key (Fig. 1) will include many images of species and an illustrated glossary of terms. The key will link to an electronic version of the grass flora (Edgar and Connor, 2000) for further detailed description, habitat and distributional information.

NPPA key

This key is for the identification of plants on the National Pest Plant Accord (NPPA), their close relatives and similar species.

The NPPA list currently includes about 140 specified plant pest species that are banned from propagation, sale, and distribution within New Zealand. The Accord is an agreement between regional councils and government departments with biosecurity responsibilities. The current NPPA list and manual is available from the Biosecurity New Zealand website (www.biosecurity.govt.nz/pests-diseases/plants/accord.htm).

The manual is a useful guide, but does not include species that are closely related to the NPPA species, or those that are similar and commonly mistaken for them. When completed, the new interactive key will include these

additional species, it will have a wide range of associated images, and will use simplified botanical terminology.

This key will link to an electronic version of the naturalised plants Flora (Webb et al., 1988), as well as other resources.

The NPPA key is a cooperative project involving Murray Dawson and Peter Heenan (Landcare Research) in collaboration with Paul Champion (NIWA), Trevor James (AgResearch), Carolyn Lewis (Weedbusters), as well as with staff of Biosecurity New Zealand, the Department of Conservation, and various regional authorities.

Both grass and NPPA keys are two-year projects, scheduled for completion in July 2008 and July 2009 respectively. Once completed, the interactive keys will be available free of charge hosted on the Landcare Research web servers, and also in limited numbers as CD-ROMs.

References

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Murray Dawson and Kerry Ford are botanists at Landcare Research. The two projects they are working on are funded by the Terrestrial and Freshwater Biodiversity Information System (TFBIS) programme. TFBIS is a Government fund to make information on the flora and fauna of New Zealand more accessible, and is administered by the Department of Conservation. They would like to thank everyone who has supplied illustrations or helped in other ways to make these keys possible.