Research perspectives

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There are several issues regarding botanical research and the identification and naming of the cultivated flora of New Zealand.

In New Zealand, botanical research is undertaken at universities (University of Auckland, University of Waikato, Massey University, Victoria University of Wellington, University of Canterbury, Lincoln University, University of Otago), Crown Research Institutes (especially the Plant Biosystematics group at Landcare Research, to a lesser extent AgResearch, Plant & Food Research, Scion, and NIWA), other organisations (notably Te Papa and the Department of Conservation, also polytechnics and institutes of technology) and a few private individuals. Significant research contributions on New Zealand plants are also made by overseas institutions.

Most of the botanical research is conducted on native and (to a lesser extent) naturalised plant species. There are currently 2357 native (indigenous and endemic) vascular plant taxa (genus, species, subspecies, variety, cultivar etc.) described for New Zealand (de Lange et al., 2006) and biosystematic research aims at describing new taxa and elucidating taxonomic and evolutionary (phylogenetic) relationships between them. This research contributes to our understanding of New Zealand biodiversity and aids in conservation management.

With 2436 vascular plant taxa naturalised in New Zealand (Howell and Sawyer, 2006), there are now more naturalised than native species in New Zealand. Research on these documents new naturalisations and contributes to weed management.

Although native and naturalised plant groups are represented in cultivation, there are a large number of cultivated species that are neither native nor naturalised. In New Zealand, there may be 25,500 up to 40,000 'cultivated only' plants (cultivars and ornamental species). This group is poorly documented and little studied but may contain future weed escapes 'jumping the fence' in New Zealand or house valuable genotypes now rare or absent from other countries.

The correct application of names to plants cultivated in New Zealand is crucial for biosecurity (both pre- and post-border) and the horticultural and agricultural sectors. It is essential to know exactly what plants are growing in New Zealand and what their correct names are. Having the correct name for a taxon provides, for example, access to other names the plant may be known by (synonyms), its relationships to other species, where it originated from, its biostatus (presence and status in New Zealand – cultivated only, naturalised etc.), and its economic uses.

The application of plant names to the cultivated flora of New Zealand is a research area requiring specialised botanical skills and techniques. To competently and accurately identify plants it is also essential to have access to living material in the field and in cultivation, the relevant botanical and horticultural literature, and herbarium specimens (Heenan, 2008).

Botanical literature is published in New Zealand and international journals and provides the latest treatments for plant groups. Literature includes floras (technical books with detailed plant descriptions and identification keys), revisions (research papers on particular groups of plants), and electronic resources (online databases of names). A herbarium is a reference collection of dried, pressed, and labelled plants and these specimens are crucial to any research on cultivated plants as they are a permanent record of a plant growing at a particular time and place and who collected and identified it. If a plant name changes or an identification is wrong, the identity of the herbarium specimen can be redetermined at a later date. If a plant is only represented on a list as a name, and there is no herbarium voucher, there can be no certainty as to what plant material the person who originally collected and/or identified it was.

There are two main concepts relevant to the application of plant names, *nomenclature* and *taxonomy*.

Nomenclature is a system of names and rules used for the naming of plants (and animals). Botanists use the binomial system of nomenclature developed by Carl Linnaeus in the 18th Century and still in use today. This system combines a genus name with a unique species name to identify an organism. For plants, the International Code of Botanic Nomenclature (ICBN) is followed and there is a more specialised Code for cultivated plants – the International Code of Nomenclature for Cultivated Plants (ICNCP). Nomenclature includes:

1. The correct name and authority
   a. orthography – spelling and usage of names
   b. authority – names of researchers who published the plant names. Their surname and initials are associated with each plant name following a standardised author abbreviation.
2. The correct place and date of publication.
3. Synonyms
   a. homotypic – a synonym created when a taxon gets a new name without being included in another taxon of the same rank or when a new name for a taxon is created without displacing the existing name

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b. heterotypic – a synonym created when a taxon is reduced in status ('reduced to synonymy') and becomes part of a different taxon.

Taxonomy is the science of identifying, describing and classifying plants (and animals). Taxonomic research uses traditional methods and new techniques such as DNA sequence analyses. Taxonomy includes:

1. Taxonomic concepts
   a. taxonomic treatment being followed
   b. application of ranks
   c. species variability.
2. Herbarium voucher specimens
   a. reference for time and place
   b. defines collectors/identifiers application of a name
   c. authenticated presence
   d. available for future research.
3. Biostatus – e.g.,
   a. wild
   b. endemic
   c. indigenous
   d. exotic
   e. naturalised
   f. present in captivity/cultivation/culture.

References

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