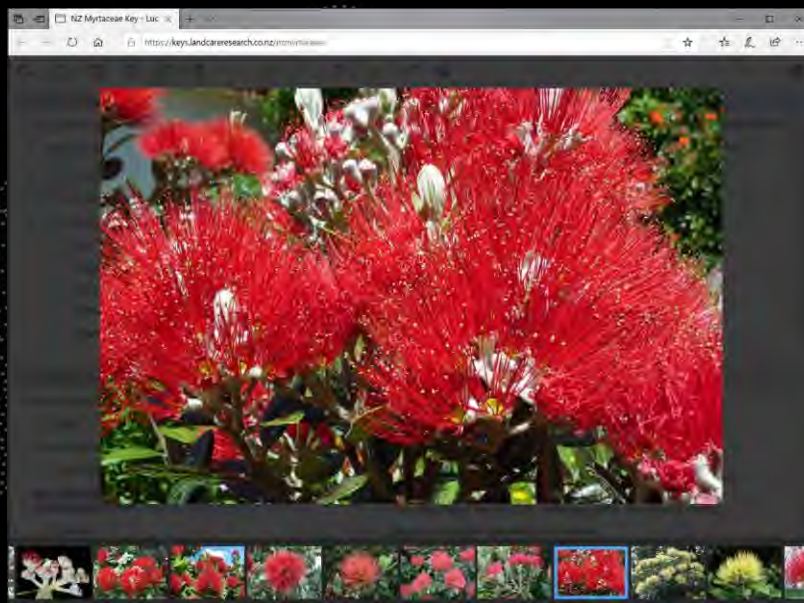


# New app to identify plants at risk from myrtle rust



Murray Dawson et al.



# Background

- Mar-May 2017: Myrtle rust arrived in NZ
- Need for rapid and accurate identification of host spp. to monitor and manage MR
  - Interactive, intuitive, easy-to-use tool
  - Web-based and mobile apps
- Oct 2018: MPI Request For Proposal
  - MWLR, Scion, Unitec collaboration
  - Lucid™ identification key platform
- Work began Feb 2019; completed July 2020
  - Here I'll outline the NZ Myrtaceae key
  - Live demonstration



Images: Robert Beresford  
Plant & Food Research



# Contributors

- Murray Dawson (MWLR)
- Matt Buys, Elizabeth Miller (Scion)
- Peter de Lange (Unitec)
- Chris Ecroyd
- Colin Ogle
- MPI a major contributor
  - Funded by Operational Research Programme
  - Planning, design, scope and feedback (PHEL)



- Jeremy Rolfe (DOC)
- Trevor James (AgResearch)
- iNaturalist NZ community



# Plant identification: Limitations of printed Floras

- Not user friendly
  - Technical language
  - Complex descriptions
  - Lack of illustrations



*METROSIDEROS* Banks ex Gaertn., 1788

2. *M. excelsa* Sol. ex Gaertn. Fruct. 1, 1788, 172, t. 34, f. 8.

*M. tomentosa* A. Rich. Essai Fl. N.Z. 1832, 336, t. 37.

Tree up to 20 m. tall; trunk up to 2 m. diam.; branches spreading; branchlets stout, tomentose. Lvs on short stout petioles; lamina (2.5)-5-10 × 2.5-3-5 cm., elliptic to oblong, acute or obtuse, coriaceous, thick, clad in white tomentum below (young plants occ. glab. below). Infl. of broad compound cymes with ∞ fls; pedicels stout, tomentose. Receptacle obconic; sepals deltoid; petals crimson, oblong. Stamens ∞, crimson, 3-4 cm. long. Ovary adnate to receptacle. Capsules 7-9 mm. long, tomentose, distinctly exserted, loculicidally 3-valved.

DIST.: Three Kings, N. Coastal forest south to Poverty Bay and Urenui. Inland on shores of lakes of Volcanic Plateau.

*Pohutukawa*.

FT. 1-2. FL. 12-1.

Description of pōhutukawa  
Flora Vol. 1



# Plant identification: Limitations of printed Floras

- Traditional printed keys
  - Only one start point
  - Only two choices
  - Often rely on floral characters
  - “Written by those who don’t need them for those who can’t use them”

- |   |                  |
|---|------------------|
| 1. Fls white, or flushed with pink  | 2                |
| Fls crimson to scarlet, or yellow   | 5                |
| 2. Lvs 35-90 × 25-50 mm.; filaments ± 3 cm.; receptacle ± 8 mm. long  | 8. albiflora     |
| Lvs not > 25 × 20 mm.; filaments ± 1 cm.; receptacle not > 5 mm. long                                       | 3                |
| 3. Capsule distinctly exserted beyond receptacle-rim  | 7. perforata     |
| Capsule not exceeding receptacle-rim  | 4                |
| 4. Lvs coriaceous, subacute, glab. or nearly so; branchlets glab. or nearly so                              | 10. diffusa      |
| Lvs membr. acuminate, pubescent; branchlets pubescent   | 11. colensoi     |
| 5. Plant a liane  | 6                |
| Plant a shrub or tree   | 7                |
| 6. Lvs 35-75 mm. long, filaments scarlet, capsules 12-20 mm. long, urceolate                                | 6. scandens      |
| Lvs 20-35 mm. long, filaments carmine, capsules 8-9 mm. long, subglobose                                    | 9. carminea      |
| 7. Lvs clad in dense white tomentum below   | 8                |
| Lvs glabrous  | 9                |
| 8. Lvs ± 2-5 cm. long; filaments 1-2 cm. long   | 1. kermadecensis |
| Lvs ± 5-10 cm. long; filaments 3-4 cm. Long   | 2. excelsa       |
| 9. Capsule distinctly exceeding receptacle  | 3. robusta       |
| Capsule not exceeding receptacle  | 10               |
| 10. Lvs of lanceolate order, ± 1-2 cm. wide; capsules 8-9 mm. long; receptacle silky-hairy; us. a tall tree | 4. umbellata     |
| Lvs of ovate order, ± 2-3 cm. wide; capsules 6-7 mm. long; receptacle glab.; us. a straggling shrub         | 5. parkinsonii   |

Traditional dichotomous key for *Metrosideros*  
Flora Vol. 1





# Interactive identification keys

- Multi-access
- Powerful and efficient
- Easy and fun to use
- More reliable than image recognition
- Allow for character misinterpretation
- Numerous taxa, characters, images



*Lophomyrtus bullata*. Images: Jeremy Rolfe, Peter Heenan, Chris Morse



Myrtaceae leaf diversity





Myrtaceae floral diversity





Myrtaceae fruit diversity

# Interactive identification keys

- >10 NZ keys hosted by MWLR
  - Flowering plant genera
  - NZ Weeds Key
  - Grasses etc.
- Free and online
- Lucid™ platform

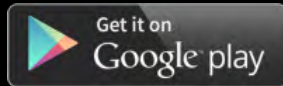


The screenshot displays a web browser window with the URL <https://www.landcareresearch.co.nz/tools-and-resources/identification/#plants>. The page is titled "Identification keys and guides to plants" and features a grid of eight interactive keys, each with a representative image and a brief description.

Image	Key Title	Description
	<b>Key to <i>Coprosma</i> species</b>	David Glenny, Jane Cruickshank, Chris Morse and Jeremy Rolfe The key is illustrated with 500 images of species and the features used to...
	<b>Key to <i>Cotoneaster</i> species</b>	This Lucid 3 interactive key will help you to identify which <i>Cotoneaster</i> you have... of the 26 species currently known to be in New Zealand...
	<b>Key to flowering plant genera of New Zealand</b>	This Lucid 3 interactive key will allow you to identify to genus New Zealand's flowering plants that are wild (native and naturalised) or...
	<b>Key to the grasses</b>	The key includes 442 species and 4 hybrid taxa of indigenous and naturalised grasses of New Zealand.
	<b>Key to the Myrtaceae of New Zealand</b>	A Lucid interactive key for the identification of species within the Myrtaceae family in New Zealand.
	<b>Key to native orchids</b>	This Lucid 3 key is for the identification of more than 120 species and informal entities of New Zealand native orchids. In addition to...
	<b>Key to native plants of schools &amp; marae</b>	Illustrated with more than 2,000 images, this Lucid 3 interactive key will allow you to identify willows that are wild and in cultivation...
	<b>Key to the weed species</b>	A key for the identification of weeds in New Zealand.

# Interactive identification keys

- >10 NZ keys hosted by MWLR
  - Flowering plant genera
  - NZ Weeds Key
  - Grasses etc.
- Free and online
- Lucid™ platform
- Smartphone derivatives



## NZ Myrtaceae Key







# NZ Myrtaceae Key

- 97 taxa (species, subspecies, varieties, cultivars, hybrids)
  - NZ natives
  - Cultivated
  - Naturalised
- Species profiles
  - Written specifically for key
  - Extensive glossary
- 30 characters / 106 character states
- >1600 images
  - Taxa & diagnostic characters
  - Fully captioned



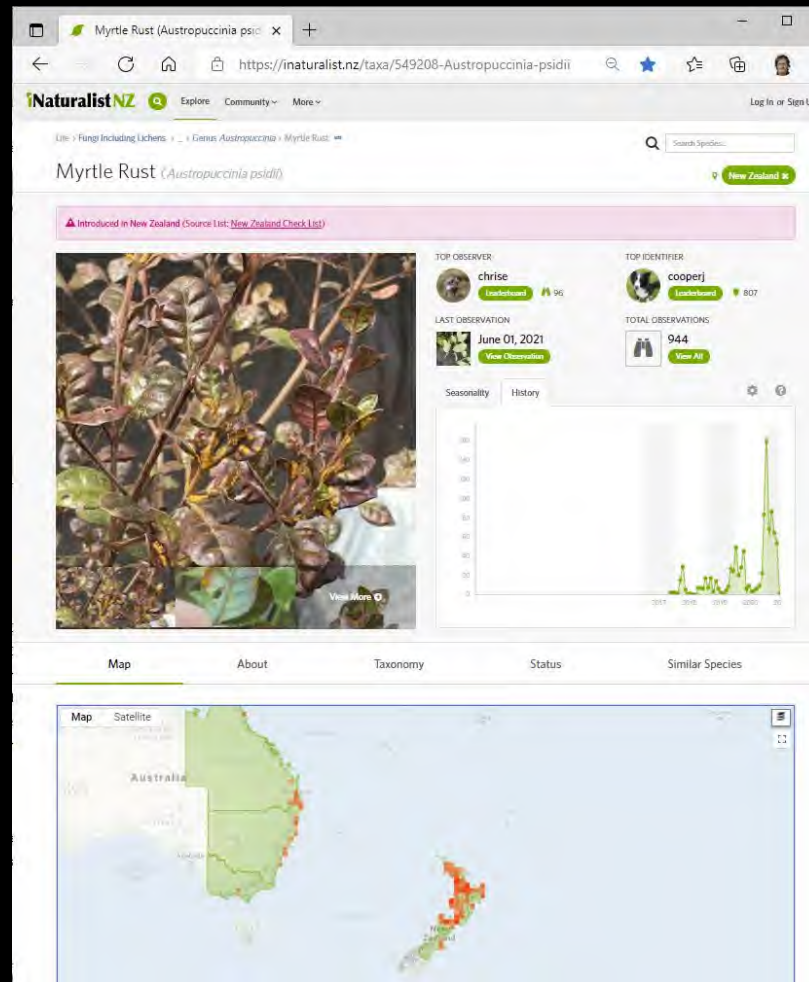
# NZ Myrtaceae Key

- New tool works very well
  - Could be reworked for Australian Myrtaceae
- Challenging to produce
- Useful model for other biosecurity and border management issues?
  - Rapid, user friendly ID
  - Integration of resources



# NZ Myrtaceae Key

- Identification of host species
- Not for reporting MR locations
  - iNaturalist platform
  - <https://inaturalist.nz/>

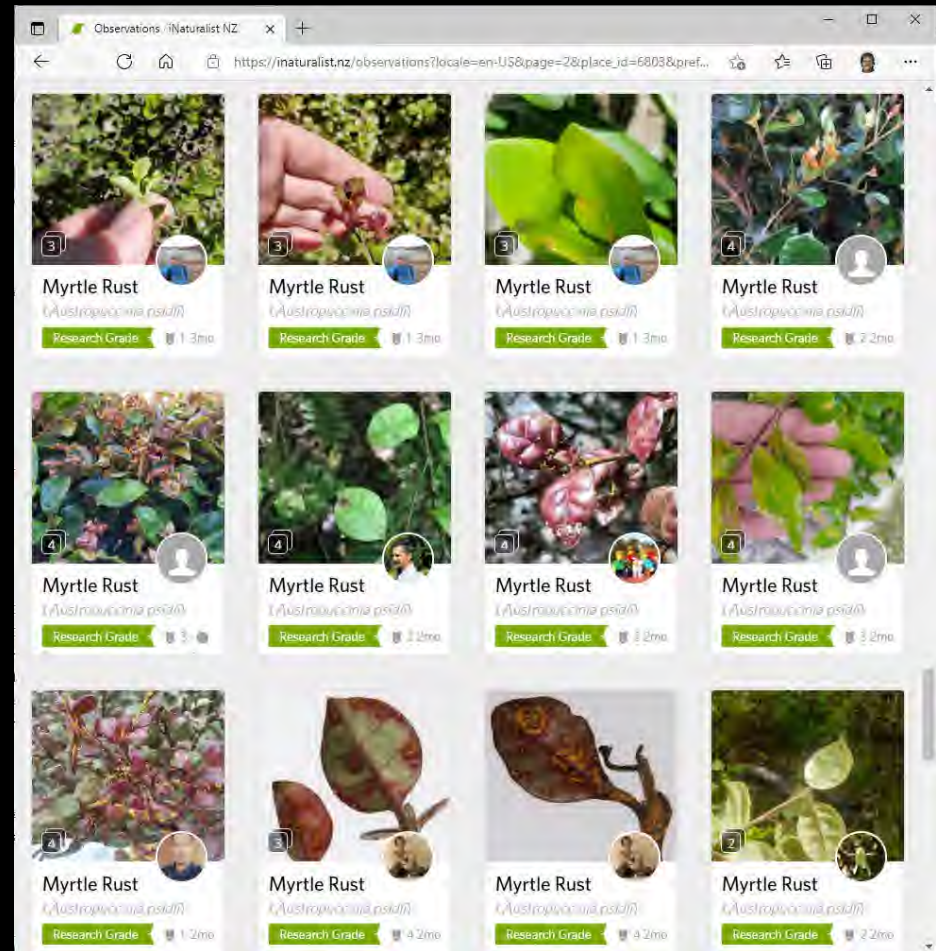


Taxon view



# NZ Myrtaceae Key

- Identification of host species
- Not for reporting MR locations
  - iNaturalist platform
  - <https://inaturalist.nz/>



Group observations

# NZ Myrtaceae Key

- Identification of host species
- Not for reporting MR locations
  - iNaturalist platform
  - <https://inaturalist.nz/>

The screenshot shows an iNaturalist observation page for "Myrtle Rust (*Austropuccinia psidii*)". The observation was made by user "helenmacky" on March 20, 2021. It includes a photograph of a myrtle leaf with orange-brown rust pustules and a map showing the location on Waihi. The "Activity" section shows three suggestions for the identification, all of which are "Myrtle Rust (*Austropuccinia psidii*)". The "Community Taxon" section shows a progress bar for cumulative IDs, with 2/3rd completed. The "Projects (1)" section lists "Myrtle Rust Reporter".

Individual observation

# Live demo

Key to the Myrtaceae of New Zealand

Home / Tools & resources / Identification tools

## Key to the Myrtaceae of New Zealand

This Lucid 3 key is for the identification of Indigenous and exotic species within the Myrtaceae (myrtle) family that grow in New Zealand.

Murray Dawson, Matt Buys, Chris Ecroyd, Elizabeth Miller, Colin Ogle, and Peter de Lange

97 main entries are included in the NZ Myrtaceae Key [mostly species; but also subspecies, hybrids, and cultivars]. Each entry links to a custom profile, created especially for this key.

This key is illustrated with more than 1,600 images and runs using 30 characters and more than 100 character-states.

It was created to assist in reporting myrtle rust occurrences for long-term monitoring and development of management options, but will also be useful to students, researchers, and others in the New Zealand botanical community.

The Ministry for Primary Industries (MPI) Biosecurity New Zealand funded creation of this key during 2019/20.

[Run key](#)

### System Requirements

This key will run on most browsers, including Chrome, Firefox, IE and Microsoft Edge.

Although this key is not optimised for portable devices, it displays OK on tablets.

[Back a level](#)

#### In this section

- Identification tools
- Biological diagnostics
- Diatoms
- eFlora
- Freshwater algae
- Freshwater invertebrates guide
- Fungal guide
- Hair sample identification and factsheets
- Key to Coprosma species
- Key to Cotoneaster species
- Key to flowering plant genera of New Zealand
- Key to the grasses
- Key to Ichneumonidae in New Zealand
- Key to the Myrtaceae of New Zealand**

<https://www.landcareresearch.co.nz/tools-and-resources/identification/key-to-the-myrtaceae-of-new-zealand/>