**New Zealand Myrtle Rust Monitoring Form**

**This form has been designed for use by trained myrtle rust observers and can be completed on paper or digitally using a tablet (or another electronic device).**

**The unit of interest is an individual plant or stand of small trees/shrubs or a hedge of the same species with overlapping foliage and cannot be easily distinguished as an individual plant. Any seedlings of these plants should be included in the unit of interest and recorded on the same form as the adult plant or stand. It is extremely valuable to know where, and on which hosts, myrtle rust is present. It is also extremely valuable to know where, and on which hosts, myrtle rust IS NOT PRESENT.   
  
Please complete all relevant fields each time you monitor, regardless of myrtle rust presence or absence.**

**What we define as a myrtle rust positive site:**

**Confirmed host identification by a trained observer, OR expert confirmation of a submitted photo of the host,**

**AND,**

**Confirmed observation of myrtle rust symptoms by a trained observer, OR expert confirmation of a submitted photo of suspect myrtle rust symptoms on a host.**

**How to fill in the form**

**The first time you visit a site complete the site description on page two. You will only need to do this once.**

**Fill in page 3 at least once a year for an annual monitoring.**

**Fill in the rest of the form each you come back to a site to monitor the same plant.**

**Use separate forms to record results for different host species in the same stand or hedge.**

**How to submit photos to confirm the plant species identity and/or myrtle rust infection**

**Please submit photos through the Myrtle Rust Reporter project on** [iNaturalistNZ](https://inaturalist.nz/projects/myrtle-rust-reporter)**:**

<https://inaturalist.nz/projects/myrtle-rust-reporter>

**Completed forms can be submitted**

**Users can either hold their own data or send through the form (directly or scanned) to the following email address:**

[Roanne.Sutherland@scionresarch.com](mailto:Roanne.Sutherland@scionresarch.com)

**Data from any forms sent will be added to a national database when established.**

**SITE DESCRIPTION**

**Date (dd/mm/yyyy):\_\_\_\_\_\_/\_\_\_\_\_/\_\_\_\_\_\_ Observer name(s): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

Contact phone: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and/or email: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Individual plant (or stand/hedge) identifier code \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**(This can be created by using the first 2 letters of the location and plant number e.g. Whakatane plant 2 would be WH02)**

**If this section has been completed previously, please go to the Regular Plant Description section.**

**GPS coordinates: North: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ East: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (NZTM 2000 recommended)**

**Or Lat: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Long: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Or address: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Describe the area where**

**the plant(s) is/are located**

**and how to find the plant(s):  
(double click in the box)**

**Habitat: tick all that apply**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Native forest |  |  | Riparian |  |
| Commercial plantation |  |  | Scrubland |  |
| Urban |  |  | Reserve (park or fields) |  |
| Rural |  |  | Urban street planting |  |
| Wetland |  |  | Garden (home, school, business) |  |
| Coastal |  |  | Farmland |  |
| Botanic garden |  |  | Lake side |  |
| Orchard |  |  | Natural |  |
| Nursery |  |  | Planted |  |
| Roadside |  |  | **other\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** |  |

**Site owner has given permission to add data to the National MR database:**  No  Yes

|  |
| --- |
| **Land ownership (*if known*)** |
| **Māori title land** |  |
| **DOC managed** |  |
| **Territorial authority managed/owned** |  |
| **Private owner** |  |
| **Other** |  |

**PLANT DESCRIPTION**

**Monitored plant(s) identification (See Appendix 1):**

**Common/Māori name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Genus: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Latin species name (if known): \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Confidence level of host species identification: very confident  confident  not confident**

**Marking the Plant(s)**

**If this plant (or plants) will be regularly monitored, ensure that you are able to locate them easily. One way is the use of flagging tape with the individual plant identification number on, or another identifier that can be removed without damaging the plant.**

**Unit of interest being monitored:**

**1 plant  stand of small trees/shrubs  hedge**

**Monitored plant(s) height (in metres):**

**0-1 m  1-5 m  5-10 m  >10 m**

**Location of the monitored plant(s) within the forest structure):**

|  |  |
| --- | --- |
| **Not in a forest** |  |
| **Seedling** |  |
| **Understory** |  |
| **Canopy** |  |
| **Emergent tree** |  |

**Population size:**

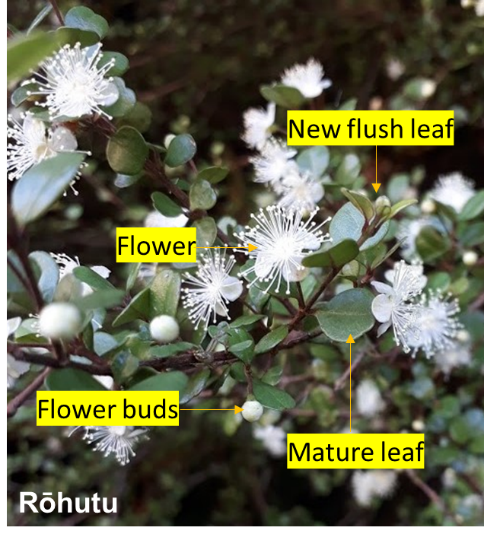
|  |  |  |  |
| --- | --- | --- | --- |
| **Number of mature plants (*i.e.* greater than 30 cm in height) of the same plant species present**  **(within 3 m radius):** | | **Number of seedlings (*i.e.* under 30 cm in height) of the same plant species present**  **(within 3 m radius)** | |
| **0** |  | **0** |  |
| **1-10** |  | **1-10** |  |
| **10-25** |  | **10-25** |  |
| **More than 25** |  | **More than 25** |  |

**Other myrtle species present within 3 m radius: No  Yes  (See Appendix 1):**

**If yes what species­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

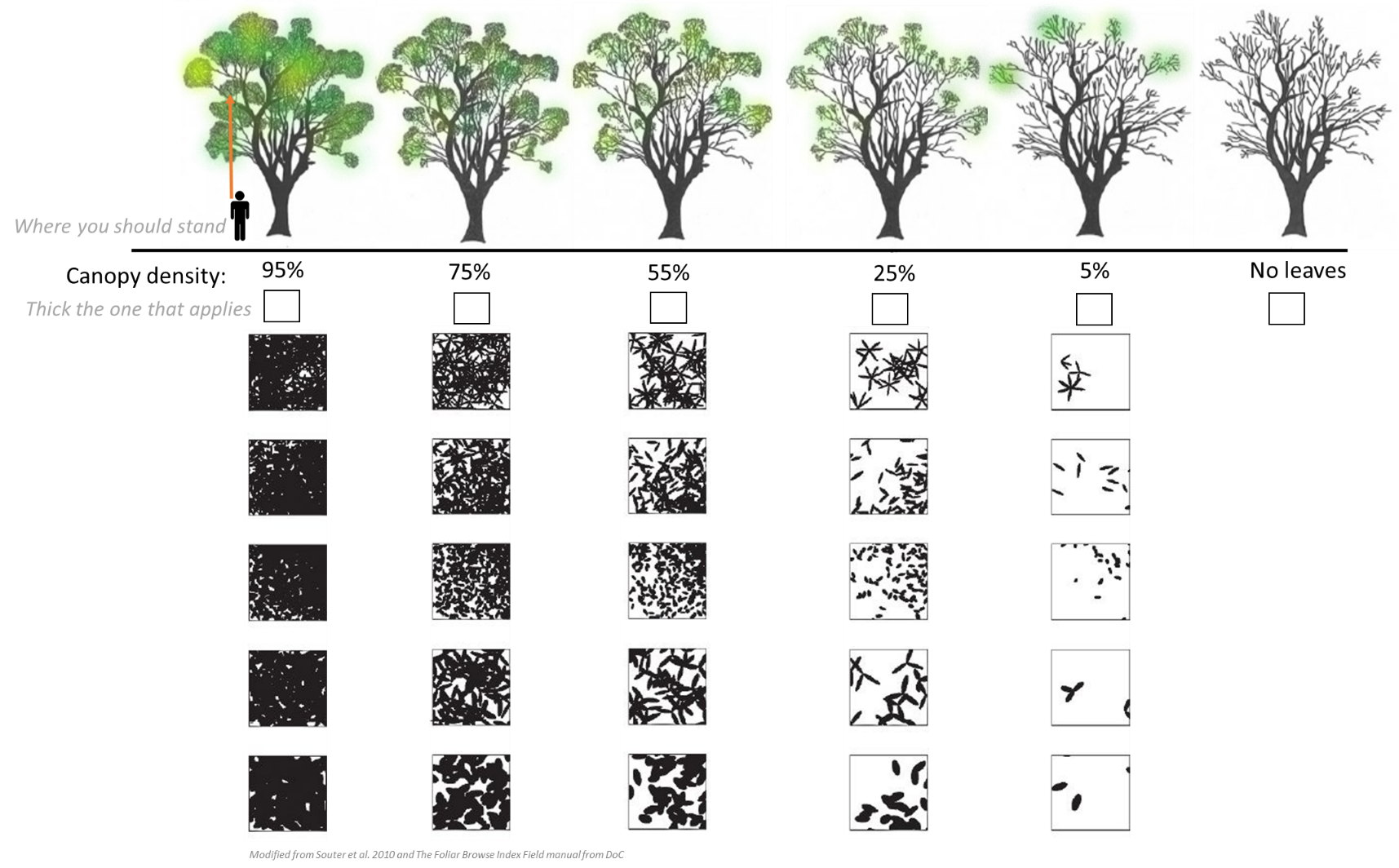
**General comments on the plant(s) (optional)**

**REGULAR PLANT DESCRIPTION**

**Monitored plant growth (see Appendix 2)**

|  |  |
| --- | --- |
| ****Which plant parts can you observe?**** | |
| **New flush leaves** | **No  Yes** |
| **New flush stems** | **No  Yes** |
| **Flower buds** | **No  Yes** |
| **Flower** | **No  Yes** |
| **Immature fruits** | **No  Yes** |
| **Mature fruits** | **No  Yes** |
| **Mature leaves** | **No  Yes** |

|  |  |
| --- | --- |
| **Foliage light exposure of the monitored plant(s):** | |
| **Full light in the open (100% light)** |  |
| **Partial shade (50% light) *e.g. forest margin*** |  |
| **Low light under canopy (less than 10% light)** |  |

**Canopy density of the monitored plant from standing directly underneath the tree. This does not include other plant species that are part of the forest canopy or small trees.**

**Photo:**

**A photo of the plant(s) has been taken. Yes**

**What is the photo file name? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Have you taken a close-up photo of the leaves: No  Yes**

**If yes, what is the photo file name? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**OTHER ENVIRONMENTAL DISTURBANCES**

**From the monitored plant(s), do you see:**

**Evidence of mammalian browsing No  Yes  Don’t know**

**Insect browsing No  Yes  Don’t know**

**Other leaf spots No  Yes  Don’t know**

**Poor drainage / wet feet No  Yes  Don’t know**

**Other ill health: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**If you are in a natural ecosystem, describe the general health around the monitored plant(s) (optional):**

**Evidence of recent site disturbance (i.e new since the last time that you monitored the plant(s)):**

**No new evidence of disturbance No  Yes  Don’t know**

**Fire No  Yes  Don’t know**

**Windfall No  Yes  Don’t know**

**Slips/land slide No  Yes  Don’t know**

**Track maintenance No  Yes  Don’t know**

**Pruning of hosts No  Yes  Don’t know**

**Animal disturbance No  Yes  Don’t know**

**Evidence of animal pest control No  Yes  Don’t know**

**Evidence of weed spray No  Yes  Don’t know**

**Mowing No  Yes  Don’t know**

**Other disturbances \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**MYRTLE RUST DISEASE SEVERITY ASSESSMENT**

**Myrtle rust observer training type: CRI  Territorial authority  DOC  TTW  Iwi**

**AsureQuality/MPI response training  MPI Myrtle rust online learning modules  Not trained  Self-trained  Other, specify: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Weather condition during the observation: Sunny  Overcast  Rainy**

**Plant(s) infection status:**

infected  **not detected** suspect myrtle rust to be present

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**STOP HERE IF NO MYRTLE RUST –**

**CONTINUE IF MYRTLE RUST IS PRESENT OR SUSPECTED TO BE PRESENT**

**Which plant parts are showing myrtle rust symptoms?**

|  |  |
| --- | --- |
|  | ****Myrtle rust symptoms**** |
| **New flush leaves** | **No  Yes  suspect** |
| **New flush stems** | **No  Yes  suspect** |
| **Flower buds** | **No  Yes  suspect** |
| **Flowers** | **No  Yes  suspect** |
| **Immature fruits** | **No  Yes  suspect** |
| **Mature fruits** | **No  Yes  suspect** |
| **Mature leaves** | **No  Yes  suspect** |

**Are the same host species within 3 m radius infected: No  Yes  Suspect  Are there other myrtle species within 3 m radius infected: No  Yes  Suspect**

**If yes, what species? (See Appendix 1):**

**MYRTLE RUST DISEASE SEVERITY ASSESSMENT**

**Percent of plant (s) visually observed: 1-25%  25-50%  50-75%  75-100%**

**Percent of plant part with symptoms (see Appendix 2):**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **0** | **1** | **2** | **3** | **4** |
| **Plant parts** | **None are infected (0%)** | **1-10 are infected**  **(1-10%)** | **Up to half are infected**  **(10-50%)** | **More than half are infected (50-80%)** | **Almost all are infected**  **(80-100%)** |
| **New flush leaves** |  |  |  |  |  |
| **New flush stems** |  |  |  |  |  |
| **Flower buds** |  |  |  |  |  |
| **Flowers** |  |  |  |  |  |
| **Immature fruits** |  |  |  |  |  |
| **Mature fruits** |  |  |  |  |  |
| **Mature leaves** |  |  |  |  |  |

**Lesions and spores:**

**Red spots No  Yes**

**Yellow spores (Urediniospores) No  Yes**

**Grey (Old spores) No  Yes**

**\*Dark brown spores (Teliospores) No  Yes  Don’t have a microscope**

**\**can only be confirmed under microscope***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Other Myrtle rust related symptoms:** | Browning and curling leaves or shoots | No |  | Yes |  |
| Defoliation/Leaf loss | No |  | Yes |  |

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Myrtle rust related dieback:** | 0% | 1-10% | 10-50% | 50-80% | 80-100% | Entire plant dead |

**Photo**

**A photo of the myrtle rust infection on the plant has been taken: Yes**

**What is the photo file name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**General comments on the infection (optional)**

**MYRTLE RUST DISEASE SEVERITY ASSESSMENT**

1. **Severity score modified from Pegg *et al.,* 2012:**

**Pick a score for assessing the disease severity according to your previous observations in the form.**

**\**Plant parts refers to stem, leaf, flowers, buds and fruits.***

|  |  |  |
| --- | --- | --- |
| **Score** | | **Symptom Description** |
|  | **0** | **no evidence of myrtle rust symptoms** |
|  | **1** | **minor leaf spots with myrtle rust pustules on <10% of plant parts, only a few pustules per infected plant parts** |
|  | **2** | **myrtle rust pustules present on 10-50% of plant parts, moderate number of pustules per infected plant part** |
|  | **3** | **myrtle rust pustules present on 50-80% of plant parts, multiple pustules per plant part, blighting and distortion (curly)** |
|  | **4** | **myrtle rust present on the majority of plant parts, multiple pustules per infected plant part, foliage dieback, evidence of stem and shoot dieback** |

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**MYRTLE RUST MANAGEMENT**

**Have you managed the infected plant(s) (*e.g.* pruning, spray or plant removal)?**

**No  Yes**

**If yes, please specify: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Are you intending to actively manage the infected plant? No  Yes**

**If yes, what do you intend to do: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

|  |  |  |
| --- | --- | --- |
| Scientific name | Common name | Native /non-native |
| *Acca sellowiana* | feijoa | Non-native |
| *Agonis flexuosa* | willow myrtle | Non-native |
| *Callistemon* sp. | bottlebrush | Non-native |
| *Corymbia* sp. | gums, eucalpyts | Non-native |
| *Eucalyptus globoidea* | stringy bark eucalpyt | Non-native |
| *Eucalyptus* sp. | eucalpyts | Non-native |
| *Kunzea amanthicola* | sand kānuka; rauwiritoa | Native |
| *Kunzea ericoides* | manuoea, titira, atitira, kanuka | Native |
| *Kunzea linearis* | northern kānuka; rauwiri | Native |
| *Kunzea* *robusta* | lowland kānuka; rauwirinui | Native |
| *Kunzea salterae* | Moutohorā kānuka | Native |
| *Kunsea serotina* | upland kānuka ; mākahikātoa | Native |
| *Kunzea sinclairii* | Barrier kānuka | Native |
| *Kunzea tenuicaulis* | geothermal kānuka | Native |
| *Kunzea toelkenii* | Bay of Plenty kānuka | Native |
| *Kunzea triregensis* | Three Kings kānuka | Native |
| *Leptospermum*.*scoparium* | Mānuka | Native |
| *Lophomyrtus bullata* | ramarama, bubble leaf | Native |
| *Lophomyrtus obcordata* | rōhutu | Native |
| *Melaleuca* sp. | bottlebrush | Non-native |
| *Metrosideros albiflora* | kauri rātā vine; akatea | Native |
| *Metrosideros bartlettii* | Bartlett’s rātā; rātā moehau | Native |
| *Metrosideros carminea* | carmine rātā vine | Native |
| *Metrosideros colensoi* | pendant rātā vine | Native |
| *Metrosideros diffusa* | white rātā vine | Native |
| *Metrosideros excelsa* | pōhutukawa | Native |
| *Metrosideros fulgens* | scarlet rātā vine | Native |
| *Metrosideros kermadecensis* | Kermadec pōhutukawa | Native |
| *Metrosideros parkinsonii* | crimson rātā | Native |
| *Metrosideros perforata* | small white rātā vine | Native |
| *Metrosideros robusta* | northern rātā | Native |
| *Metrosideros umbellata* | southern rātā | Native |
| *Myrtus communis* | common myrtle | Non-native |
| *Neomyrtus pedunculata* | rohutu | Native |
| *Syzygium australe* | lilly pilly | Non-native |
| *Syzygium maire* | swamp maire; maire tawake | Native |
| *Thryptomene calycina* | Grampians heath myrtle | Non-native |
| *Ugni molinae* | Chilian guava, NZ cranberry | Non-native |
|  |  |  |

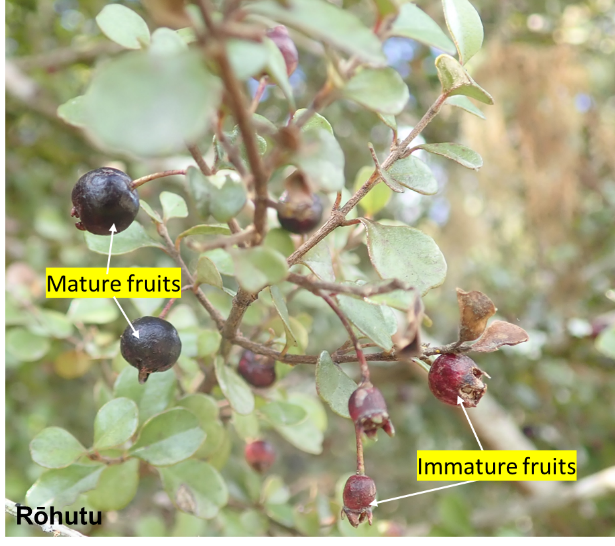
Appendix 2: Plant development stage and myrtle rust symptoms

**Plant development stages**

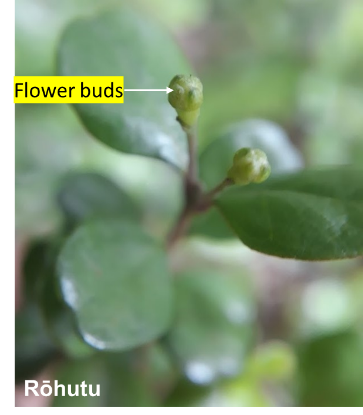
**New flush leaves or stem: new young growth, soft to touch, lighter in color, leaf size ranges from small to same size as fully developed leaves.**



**Mature fruit: fully developed fruit or mature seed capsules.**



**Flower buds: developing flowers surrounded by sepals.**



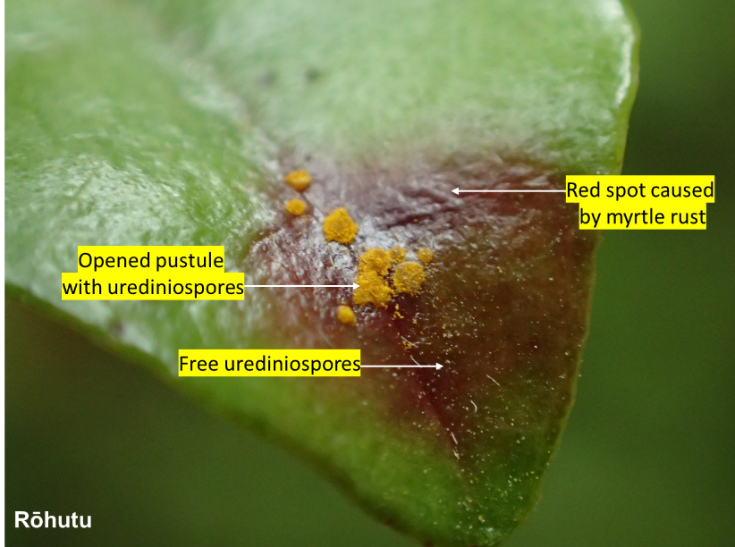
**Immature fruit: early stage development of fruits, when the flower part is no longer present (stamen, petals, pistil).**

**Mature leaves.** fully developed leaves that are darker in colour and firmer to touch than the new flush leaves.

**Myrtle rust symptoms**

**Red spot: red-purple lesion, general plant reaction to biotic stress (*e.g.* insect, pathogen), this can be the first sign of myrtle rust infection.**

**Yellow spores (Urediniospores): yellow myrtle rust spores present inside a pustule. Spores disperse widely when the pustule erupts.**







**Grey (Old spores): old yellow myrtle rust spores that have lost their pigments.**

**Dark brown spores (Teliospores):** next stageof myrtle rust spore cycle, brown coloured, may also occur with yellow myrtle rust spores.

**Additional resources on myrtle rust identification can be found on** [https://www.myrtlerust.org.nz/](https://www.myrtlerust.org.nz/myrtle-rust-online-learning-modules/)

**CREDITS**

**This form was designed as part of the Ministry for Primary Industries commissioned research project MPI18607. The content of the form was developed by Roanne Sutherland, Julia Soewarto, Karyn Froud and Rebecca Ganley with the contribution of mana whenua, Department of Conservation, regional and district councils, industry representatives, private land owners, public and staff from research organisations who have assisted in the development and testing of the form.**

Ko Tatou - This Is Us Biosecurity 2025 Logo 