An Iconography of the New Zealand Russulaceae

Jerry Cooper, January 2021

This is a compilation of photographs of NZ indigenous Russulaceae that have been sequenced. The taxa are presented in order of phylogenetic placement. Refer to the separate document containing the phylogenetic tree. Many of our species were described by Ross McNabb in the 1970s. It has sometimes proved difficult to unambiguously assign McNabb's names to more recently documented species and our attempts to sequence many of his type collections has failed. However, regardless of correct names, the taxa shown here represent good species. In many cases they display a surprising degree of variability, as shown by very different material with identical sequences (for different loci and not just the Internal Transcribed Spacer (ITS)). It is also worth noting that truffle-like forms have arisen at least 8 times independently in the group and usually the species do not even have a superficial resemblance to their nearest relatives. Morphological characters, especially colours, can be entirely misleading in this group.

The main purpose of this document is to show those species that can be identified readily, and more importantly those that cannot. Especially difficult are many of the Tricholomopsidae group with a Gondwana distribution. This group is very diverse in New Zealand and all quite similar. The taxa *Russula subvinosa, pilocystidiata, griseoviolacea, sp. 'manapouri', sp. 'craigieburn', macrocystidiata, roseostipitata, sp. 'macnabbii' & tawai* are not separated by photos and microscopy is required. Even then it can be difficult.

Several of our species described a long time ago have not been recognised recently and do not have sequences. *Lactarius maruiensis, Russula solitaria, R. pleurogena, R. pudorina, R. vivida*.

L. maruiensis, a relativley large yellow *Lactarius* under beech, has been searched for numerous times in the area around Lake Daniell, but without success. Similarly, the very distinct but small and dark pleurotoid *Russula pleurogena* has been look for in the Waitakare Ranges. *Russula solitaria* may be an immature form of *R. griseostipitata* or not yet re-found. *Russula pudorina* may also be hiding here already somewhere and it seems to share features with *R. aucklandica* and *R. subvinosa*. *Russula vivida* is very likely just a form of *R. kermesina*. *Russula multicystidiata* is probably hiding in the R. *allchroa* species complex.

Numerous people are thanked for their collections and photographs; Pat Leonard, Noah Siegel, Christian Schwarz, Clive Shirley, Peter de Lange, Egon Horak, Teresa Lebel and my colleagues at Landcare Research – Manaaki Whenua.

Lactarius – unplaced

Lactarius tawai

Always with beech. Characteristic zoned orange/brown caps. Phylogenetically this species occupies an isolated position between *Lactarius* and *Multifurca*

PDD 113266. N. Siegel	
	

Lactarius – Plinthogalus

Lactarius novaezelandiae

Always with beech

PDD 113008 N. Siegel	PDD 106047
	
PDD 106047	
	

Lactarius - Lactarius

Lactarius umerensis

Always with beech (so far). Only truly distinguished from *L. sp. 'Hauroko'* by micro-characters

PDD 95408	PDD 96005
	

Lactarius sp. 'Hauroko'

With beech and tea-tree. Much more common than *L. umerensis.* Tends to have richer colours, but not always. Potentially a species complex.

PDD 112415 N. Siegel	PDD 101401 P. Leonard
	
PDD 113066 P. Leonard	PDD 112412 N. Siegel
	
PDD 82833 E. Horak	PDD 113067 P. Leonard

	
PDD 106563 P. de Lange	PDD 112413 N. Siegel
	

Lactifluus – Gymnocarpi

Lactifluus aurantioruber

Always with beech. Richer red-orange colours than *Lf. clarkeae*, and less pubescent

PDD 80786	
	

Lactifluus clarkeae

Always with ta-tree.

PDD 106449	PDD 96000
	

Lactifluus – Lactifluus

Lactifluus leonardii

With beech (and probably tea-tree). No sequenced collections with photos. The milk and context go vinaceous pink. Note there are mislabelled GenBank sequences for this species and *Lf. sepiaceus*.

Lactifluus sepiaceus

With beech

PDD 96544	PDD 101416 P. Leonard

PDD 101413 P. Leonard

PDD 101414 P. Leonard

Russula – archeae

Russula sp. PDD 111493

Poor condition and originally identified as *Lactifluus clarkeae*

Russula – compactae – polyphyllinae

Russula griseobrunnea

Only with beech

PDD 79826	PDD 95682
	
PDD 105468	PDD 105474
	

Russula sp. 'Horopito'

Only with beech. Phylogenetically slightly different from *R. griseobrunnea*. Slightly paler colours, especially to the stem.

PDD 80761	PDD 113142 N. Siegel
	

Russula – compactae – nigricantinae

Russula inquinata

With beech. Blackens.

PDD 86868	PDD 96002
	
PDD 105505	
	

Russula - crassotunicata

Russula littorea

With tea tree and beech A subgenus with few species and this the first southern hemisphere example. Related to the northern hemisphere *R. farinipes*. Hot taste. Uncommon.

PDD 101418 P. Leonard	PDD 105745 P. Leonard

	
PDD 113009 N. Siegel	PDD 113009 N. Siegel
	

Russula – Heterophyllidia - IVa

Russula vinaceocuticulata

Always with tea-tree. Always with purple somewhere on the cap or the extreme stem base. Cap can be variable. Mild taste. The cap covering does not form areolate patches like *R. griseoviridis*.

PDD 87004	PDD 101475 P. Leonard
	
PDD 101474	

Russula novaezelandiae

With tea-tree and beech. Mild taste.

PDD 87005	PDD 87005
	
PDD 105742	PDD 105742
	

Russula acrolamellata

With tea-tree. Hot taste.

PDD 86992	PDD 95562

Russula sp. 'acrolamellata var. nothofagi'

Phylogenetically related to but distinct from *R. acrolamellata* and seemingly restricted to beech. Morphologically identical.

PDD 95308	PDD 95308
	
PDD 113441 N. Siegel	
	

Russula sp. 'Austrofoetida'

Hot taste, smell bleach-like. With beech. Not distinguishable from *R. acrolamellata* on macromorphology

PDD 79881		PDD 96006

PDD 101434 P. Leonard

PDD 105471

Russula sp. 'Riwakaensis'

With beech. Small species with strong smell almond. Mild (to hot?) taste

PDD 101437 P. Leonard

PDD 105459

PDD 105459

PDD 113363 N. Siegel

Russula – Heterophyllidia – IVb

Agaricoid taxa often with a bloom or veil-like patches on the cap.

Russula parvisaxoides

A truffle with tea-tree and beech. Mild taste

PDD 87742	PDD 106003
	

Russula aucklandica

With tea-tree. Mild taste. Northern distribution.

PDD 104168	PDD 104168
	
PDD 106909 P. de Lange	PDD 106909 P. de Lange

	
PDD 106909 P. de Lange	PDD 106909 P. de Lange
	

Russula griseostipitata

With beech. Mild taste. Common. *R. solitaria* may be an immature form. Also misidentified as R. subvinosa.

PDD 80817	PDD 95304

	
PDD 95323	PDD 95323
	
PDD 95382	
	

Russula griseoviridis

With beech and tea-tree. Mild taste. Always with areolate patches on the cap. Confirmed with a type sequence.

PDD 26628 Holotype	PDD 101431 C. Shirley

PDD 101488 P. Leonard

PDD 80297 C. Shirley

Russula griseoviridis aff.

Similar to *R. griseoviridis* but cap bloom not breaking up into patches.

PDD 79832

PDD 79832

Russula albolutescens

Small species with tea-tree. Taste mild. Cap sticky. Closely related to *R. maranginia* from Australia

PDD 101479 C. Shirley	PDD 104179
	
PDD 106209	PDD 106209
	

Russula – Brevipes

Russula sp. 'pirispora'

No photo of collections and material lost. Also present in Australia.

Russula papakaiensis

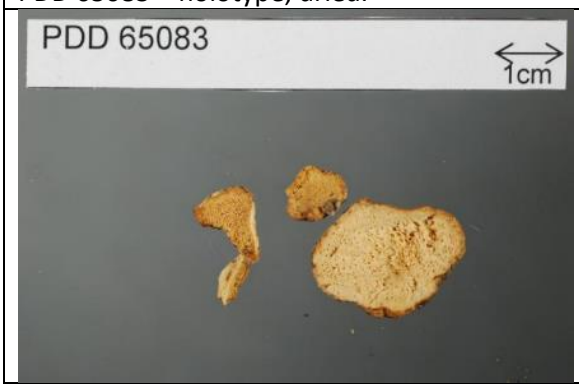
With beech and tea-tree. Taste acrid. Gills always heavily spotted. Many sequences but only one with a poor photo. Also present in Australia and New Caledonia.

PDD 104421 P. Leonard	

Russula korystospora

With beech. Truffle, no taste,

PDD 65083 – holotype, dried.	
	

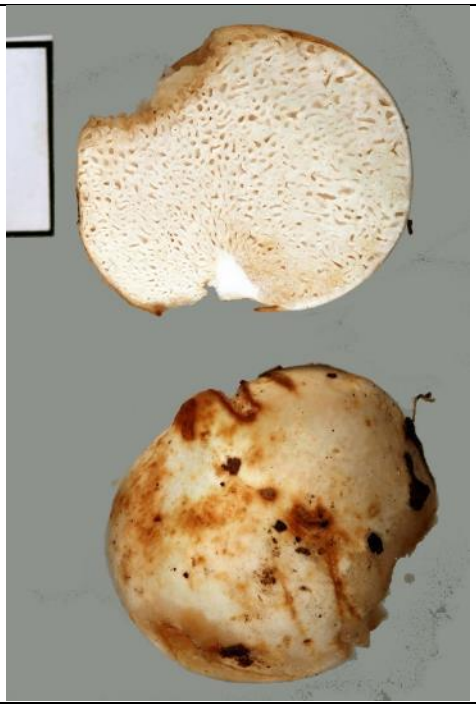
Russula sp. ‘Glentui’

With beech. Truffle

PDD 96042	PDD 70843
	
PDD 70843	

Russula sinuata

With tea-tree. The NZ version of this species described from Australia is very closely related but not quite the same.

PDD 80230	PDD 95311
	
PDD 96340	
	

The Russula allochroa/australis/multicystidiata complex

Russula allochroa and *Russula australis* (if interpreted correctly) seem to form a cluster of closely related species. They are readily recognised from the triangular cross-section and incompressible stems. *R. allochroa* for McNabb was a bitter tasting species with tea-tree, whereas *R. australis* was said to be with both beech and tea-tree and the taste not explicitly noted, although implied mild in his key. There is also *R. multicystidiata* with both beech and tea-tree for which modern collections are few, none sequenced and none with (convincing) photos. *R. multicystidiata* was only marginally differentiated by McNabb from *R. australis*. In addition, McNabb was hesitant about the distinction between *R. australis* and *R. allochroa*. It is likely these three species are represented amongst the 4 phylogenetically distinct but very similar taxa presented here. I have no real idea which names to apply to which taxa or how to distinguish them with any confidence based on morphology. Also note the similarity with *R. cremeoochracea* (subgenus malodora) which does not have a compressible stem, and *R. papakaiensis*, with heavily spotted gills (in age).

Russula allochroa #1

Taste astringent (after a while). With tea-tree

PDD 80252	PDD 87016
	
PDD 95384	
	

Russula allochroa #2

With tea-tree. No taste, to slightly acrid or retsina-like

PDD 95313	PDD 105582

	
PDD 113424 N. Siegel	
	

Russula allochroa #3

With tea-tree. No notes

PDD 101487 P. Leonard	
	

Russula australis

With beech and tea-tree. Mild taste.

PDD 87581	

Russula – Malodora

Russula cremeoochracea

With beech and tea-tree. Taste mild. Stem not incompressible (the *R. allochroa* complex). The smell of tis species needs to be assessed.

PDD 101493 P Leonard	PDD 104171
	
PDD 104175	
	

Russula pseudoareolata

With beech and tea-tree. Mild taste and fishy smell. Staining yellow/brown when bruised.

PDD 80865	PDD 101422 P. Leonard

	
PDD 113143 N. Siegel	
	

Russula rimulosa

With beech and tea-tree. Mild taste and fishy smell.

PDD 86875	PDD 86875
	
PDD 95680	PDD 101424 C Shirley

	
PDD 105473	PDD 113085 N. Siegel
	

Russula sp. PDD 113291

Under beech. Mild taste, no smell.

PDD 113291 N. Siegel	
	

Russula – Core Clade

Russula roseopileata

With tea-tree and beech. Hot taste. Also present in New Caledonia.

PDD 95679	PDD 92358 C. Shirley

PDD 106054

PDD 113130 N. Siegel

PDD 113233 N. Siegel

Russula – Crown Clade

Russula sp. ‘Hinewaiensis’

With beech. Mild taste. No smell.

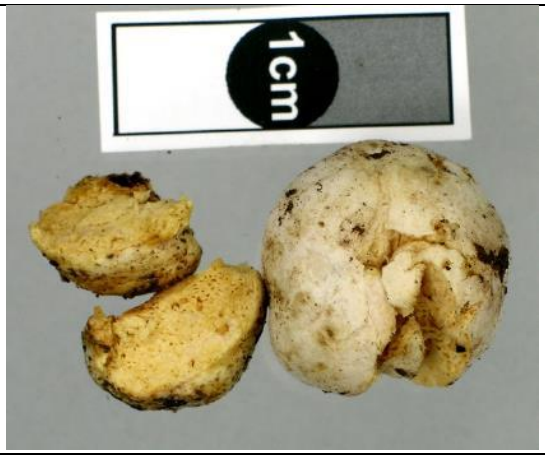
PDD 95309	PDD 95380
	
PDD 95380	PDD 101495
	
PDD 101495 P. Leonard	PDD 101461
	

Russula osphranticarpa

Truffle. No smell. Under tea-tree. Very common

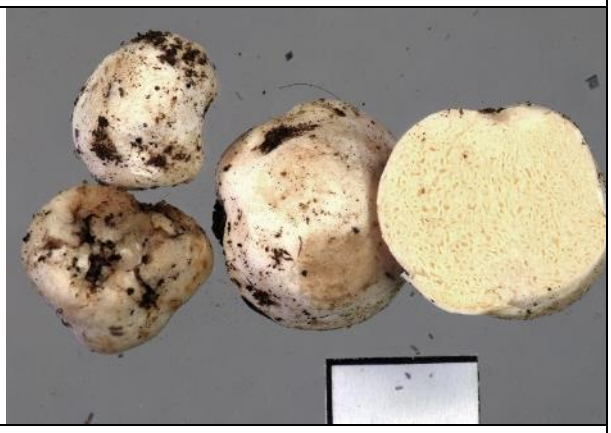
PDD 79811	PDD 86827

PDD 95491



PDD 96529

PDD 96423



PDD 105551

PDD 106004

PDD 106993

	
PDD 106884	
	

Russula atroviridis

With beech and tea-tree. Mild taste. No smell. I'm still hesitant this is the species in the sense of McNabb. Whatever, this species is consistently misidentified as other species in the crown clade (e.g. *R. umerensis* especially). Many of the species in the core and crown clades of subgenus Russula share similar colours, and they are very variable. Making identifications based on colours (which people want to do) will generally lead to mixed identifications. When this species hasn't dried out then it is easily distinguished because the depressed centre of the cap usually has a layer of slime. The slime is not fluorescent, unlike *R. roseostipitata*, with minutely red pruinose stem.

PDD 79824	PDD 95332
	
PDD 95409	PDD 95409

PDD 92357 C. Shirley

PDD 92357 C. Shirley

PDD 96933

PDD 104176

PDD 105744

Russula kermesina

With beech. Mild taste. An easy one.

PDD 95563	PDD 92049
	

Russula purpureotincta

With beech. No taste or smell. Colour very variable ranging white, grey, pale brown, pale green, pink.

PDD 113236 N. Siegel	PDD 92051
	

PDD 101462 P. Leonard	PDD 101462
	

Russula spinispora

Truffle. With tea-tree

PDD 61990	
	

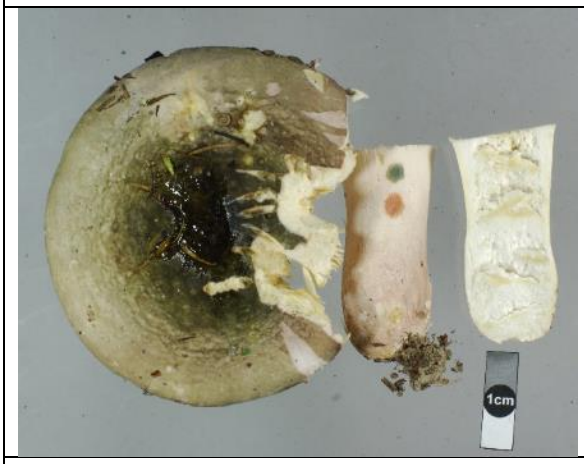
Russula sp. ‘Wilsonii’

With tea-tree. Mild taste. Current tree has two entries – dismiss the second

PDD 87003	PDD 87003
	
PDD 96004	PDD 96004

PDD 96128

PDD 96128



PDD 105506

PDD 106828

PDD 106828

Russula umerensis

With beech. Mid taste. Sometimes confused with *R. atroviridis*. Slime in cap centre not fluorescent.

PDD 86870	PDD 95305
	
PDD 95305	PDD 95381
	
PDD 95385	PDD 95385

	
PDD 101457	PDD 106055
	

Russula – Crown Clade – subsection Tricholomopsidae

This distinct clade has a Gondwana distribution. Many of the NZ species are impossible to distinguish macroscopically, or even microscopically in some cases. In addition, McNabb's concepts sometimes incorporated more than one taxon, with tea-tree associated species often phylogenetically distinct from beech associated species.

Russula leucocarpa

With beech. Totally white peridium.

PDD 69223	
	

Russula tawai

With beech. Taste slightly acrid

PDD 95410	PDD 95999
	
PDD 113240 N. Siegel	PDD 113694 C. Schwarz
	
PDD 101451	PDD 101451
	

Russula sp. JAC13197

With beech

PDD 105464	PDD 105464

Russula sp. ‘Macnabbii’

With tea-tree. Very common and very variable in colour.

PDD 87008	PDD 87008
	
PDD 95565	PDD 95565
	
PDD 95457	PDD 96129

	
PDD 105504	
	

Russula roseostipitata

With beech. Taste first mild then becoming bitter. Often has slime in the cap centre which is fluorescent under UV. See also *R. umerensis* and *R. atroviridis* with slime but without scurfy red/violet stem. *Russula sp. 'Manapouri'* is also brightly fluorescent.

PDD 87579	PDD 95458
	
PDD 95458	PDD 96422

	
PDD 96422	PDD 96422
	
PDD 113455 N. Siegel	
	

Russula roseostipitata aff.

With beech. Taste hot.

PDD 92050	

Russula macrocystidiata

With beech and tea-tree. Taste mild, sometimes becoming bitter. Another very variable species that gets misidentified – a lot.

PDD 80759	PDD 101456 P. Leonard
	
PDD 101453 P. Leonard	PDD 96545
	

PDD 96545	PDD 101455 P. Leonard
	
PDD 96642	PDD 96886
	
PDD 97018	PDD 97020
	
PDD 104173 (posible photo mix)	PDD 105524

PDD 106053

PDD 112420 N. Siegel

PDD 112420 N. Siegel

PDD 113124 N. Siegel

Russula sp. 'Craigieburn'

With beech. Taste mild, slowly acrid.

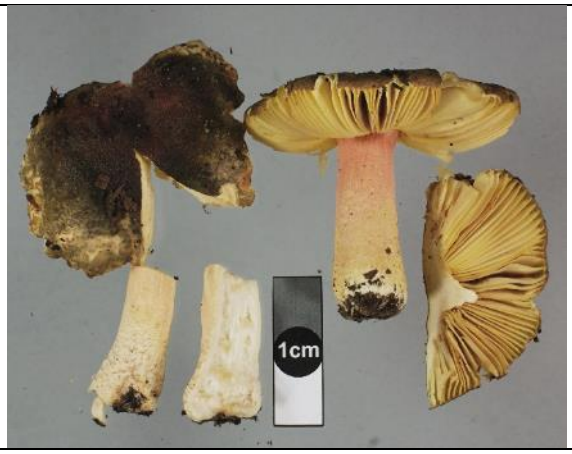
PDD 112992 N. Siegel	PDD 113177 N. Siegel

Rusula sp. ‘Canaaneisis’

Material lost and no photos

Russula tricholomopsis

With beech. Mild taste.

PDD 80780	PDD 96003
	
PDD 112421 N. Siegel	
	

Russula sp. ‘Manapouri’

With beech. Mild taste. Fruitbdoies with various fluorescent colours.

PDD 113176 N. Siegel	PDD 113179 N. Siegel

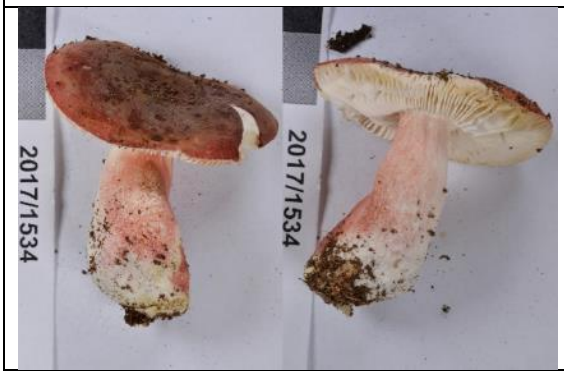
Russula sp. JAC11404

With beech

PDD 95752	
	

Russula miniata

With beech. Tiny.

PDD 106451	
	

Russula griseoviolacea #1

PDD 101447 P. Leonard	

Russula griseoviolacea #2

PDD 87733	PDD 95678
	

Russula griseoviolacea #3

No material or photos

Russula sp. JAC12268

Just dried material.

PDD 89034	
	

Russula pilocystidiata

With beech. Microscopically distinct, otherwise …

PDD 80823	PDD 87775
	
PDD 95322	PDD 95322
	
PDD 96546	PDD 96546
	
PDD 96643	PDD 97021

	
PDD 97021	PDD 112419
	

Russula tapawera

Truffle. Published photo same material as photo of *R. rubrolutea* with colour balance difference?

PDD 83696 Holotype	
	

Russula subvinosa

With tea-tree.

PDD 104172 (possible phot mix – see macrocystidiata – same collectors/day)	PDD 104177

Russula rubrolutea

Truffle. Published photo same material as photo of *R. tapawera* with colour balance difference?

PDD 83697