

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 6 times independently in the group and usually the truffle species do not have even a superficial resemblance to their nearest agaricoid relatives. Macro-morphological characters, especially colours, can be entirely misleading in this group. My 2014 key to the group, based largely on micro-characters, remains the most reliable way of distinguishing species.

The main purpose of this document is to show those species that can be identified readily based on photos, and more importantly those that cannot. Especially difficult to identify are many of the Tricholomopsidae group with a Gondwana distribution. This group is very diverse in New Zealand and all are quite similar and with overlapping features. 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.

The truffle-like forms, especially with beech, have been collected infrequently and more effort is needed

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 is a relatively large yellow *Lactarius* under beech and 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. It is an important species we need to re-find. *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 appears to occupy an isolated position between *Lactarius* and *Multifurca*

PDD 113266. N. Siegel



Lactarius – Plinthogalus

Lactarius novaezelandiae

Always with beech. Seemingly rare, although there have been several recent records.

PDD 113008 N. Siegel



PDD 106047



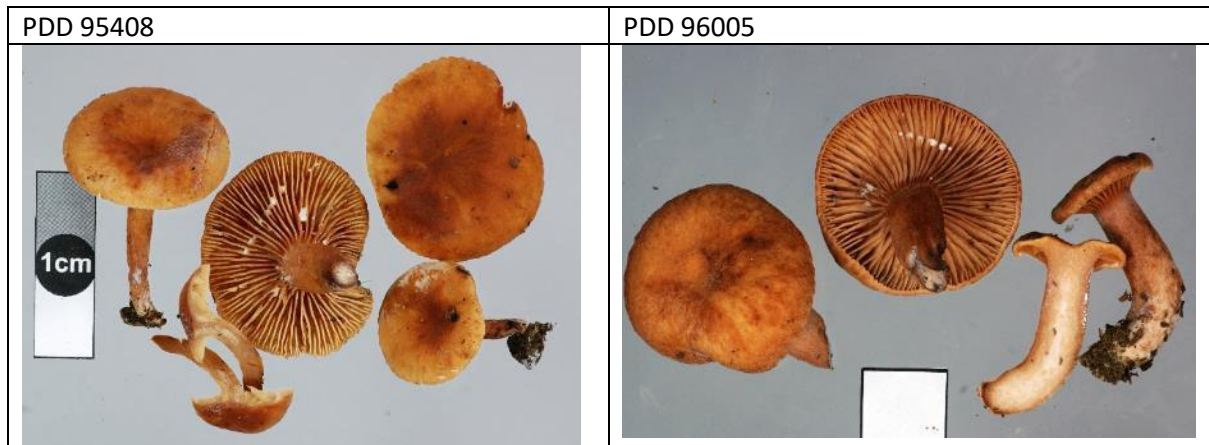
PDD 106047



Lactarius - Lactarius

Lactarius umerensis

Always with beech (so far). Only truly distinguished from *L. sp. 'Hauroko'* by micro-characters (cystidia/spores), although it never has the darker colours of some '*Hauroko*' collections.



Lactarius sp. 'Hauroko'

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



PDD 82833 E. Horak



PDD 113067 P. Leonard



PDD 106563 P. de Lange



PDD 112413 N. Siegel



Lactifluus – Gymnocarpi

Lactifluus aurantioruber

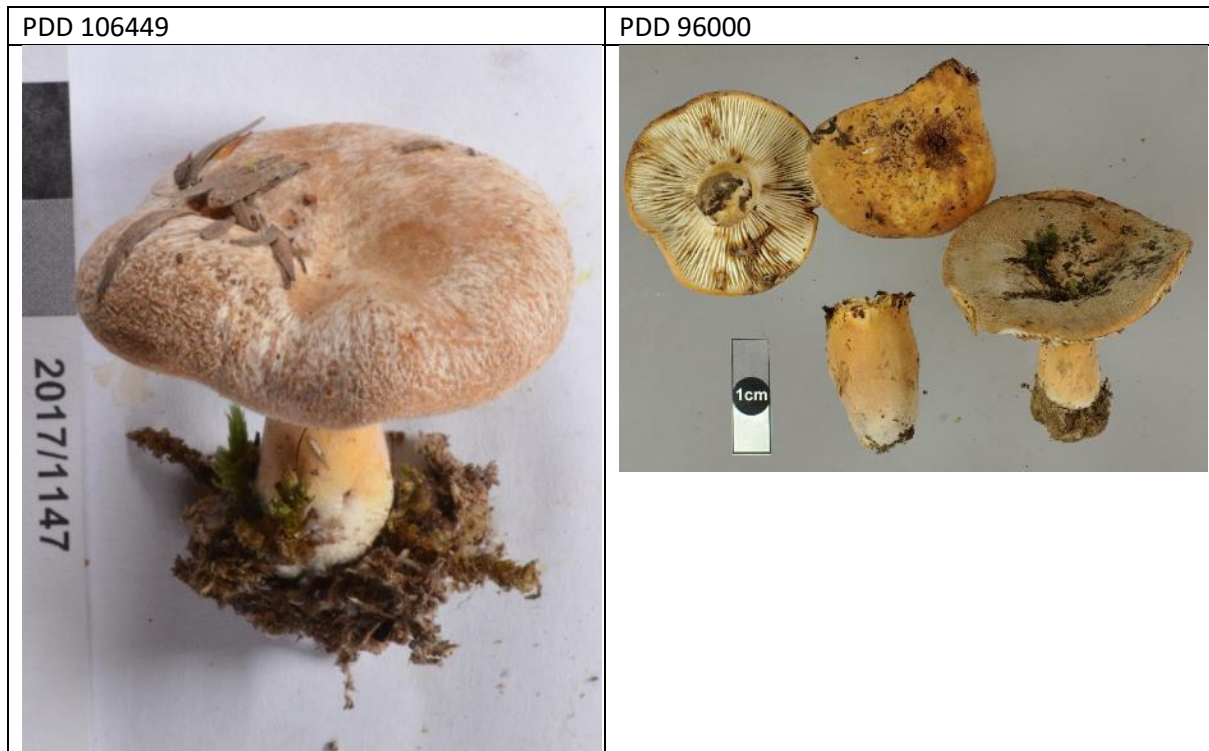
Always with beech. Richer red-orange colours than *Lf. clarkeae*, and less pubescent

PDD 80786



[Lactifluus clarkeae](#)

Always with tea-tree. In Australia with Eucalypts.



[Lactifluus – Lactifluus](#)

[Lactifluus leonardii](#)

With beech (and probably tea-tree). Also present in Australia. There are no sequenced New Zealand collections with photos. The milk and context go vinaceous pink. Note there are currently mislabelled GenBank sequences for this species and *Lf. sepiaceus*.

[Lactifluus sepiaceus](#)

With beech

PDD 96544	PDD 101416 P. Leonard
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PDD 101413 P. Leonard



PDD 101414 P. Leonard



Russula – archeae

Russula sp. PDD 111493

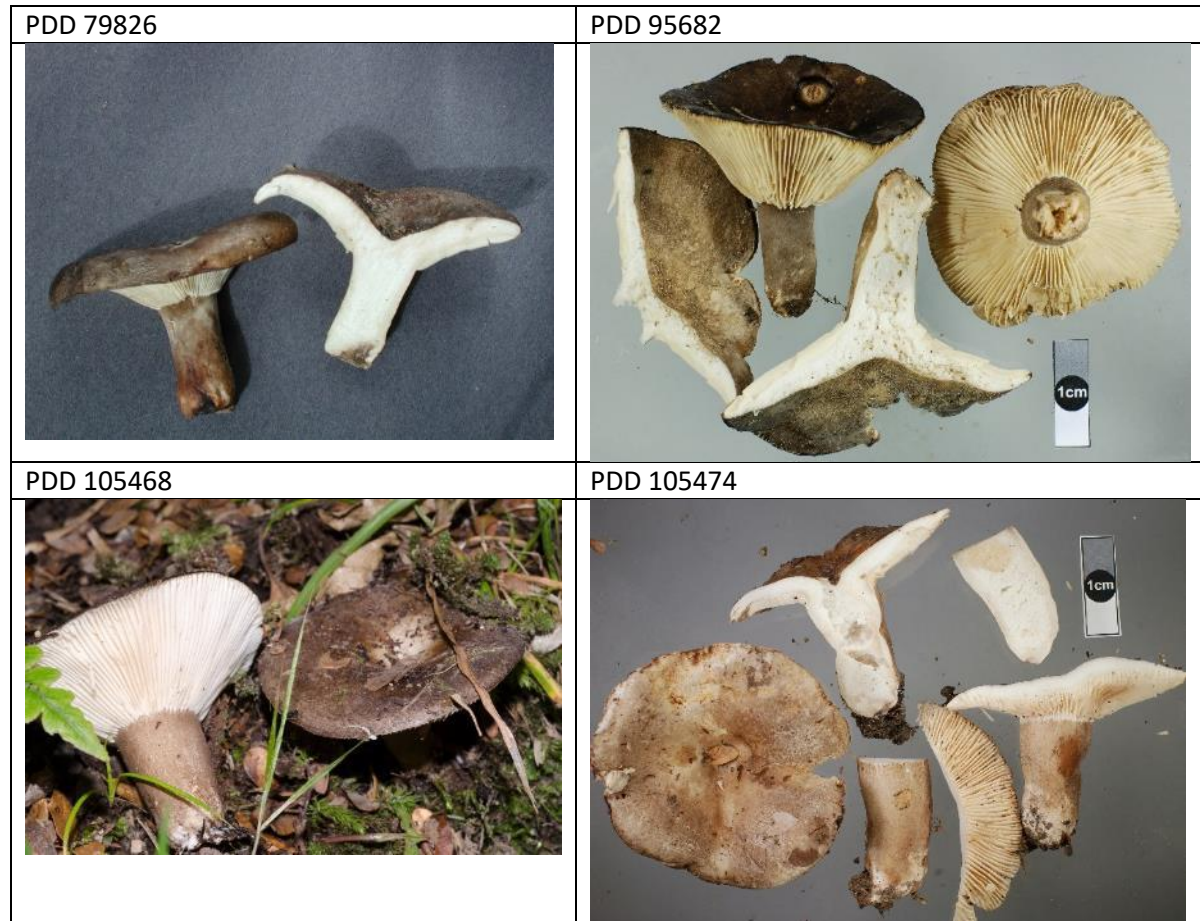
The single collection in poor condition and originally identified as *Lactifluus clarkeae*. More collections are needed.



Russula – compactae – polyphyllinae

Russula griseobrunnea

Only with beech. Not easily distinguished from '*Horopito*' without spore details. The flesh stains brown on cutting.



Russula sp. '*Horopito*'




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



Russula – compactae – nigricantinae

Russula inquinata

With beech. Blackens on handling and cutting.

<p>PDD 86868</p> 	<p>PDD 96002</p> 
<p>PDD 105505</p> 	

Russula - crassotunicata

Russula littorea

With tea tree and beech. In a subgenus with few species and this the first southern hemisphere example. Related to the northern hemisphere *R. farinipes*. Hot taste. Uncommon. The pilocystidia are the best micro-character for distinguishing this from the *allochroa* complex.

<p>PDD 101418 P. Leonard</p>	<p>PDD 105745 P. Leonard</p>
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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 colours can be variable between tan and dark brown. Mild taste. The violaceous cap covering does not form areolate patches like *R. griseoviridis*.

PDD 87004



PDD 101475 P. Leonard

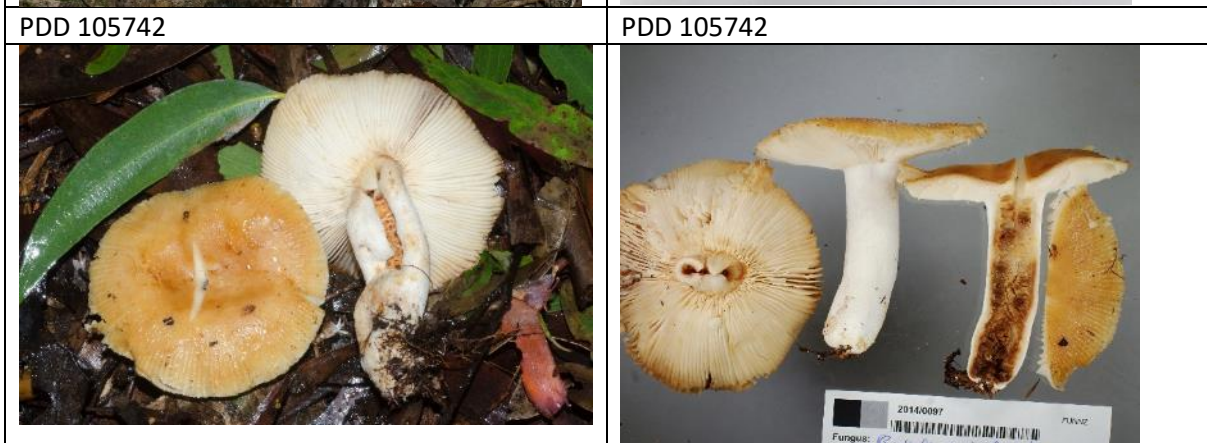
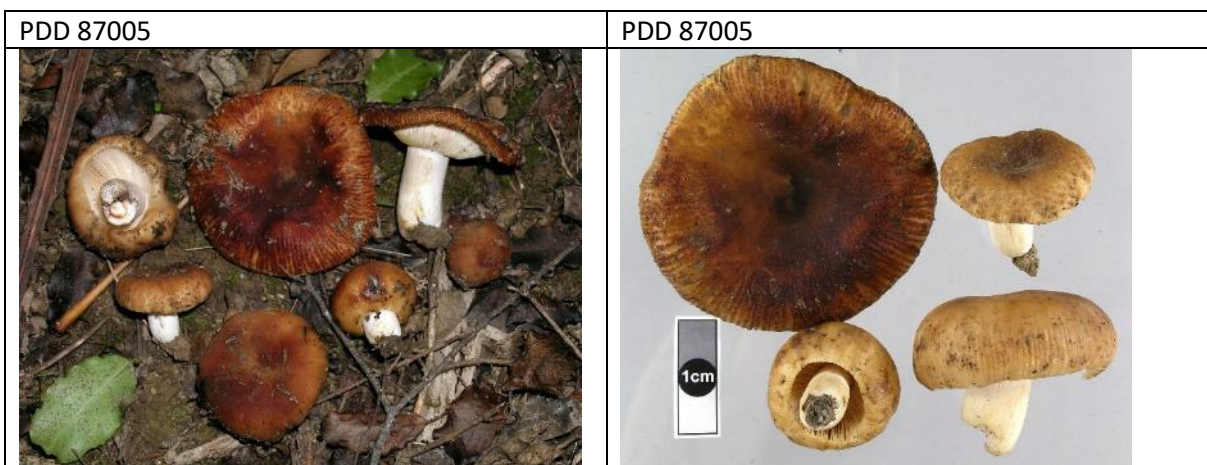


PDD 101474



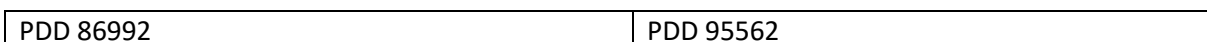
Russula novaezelandiae

With tea-tree and beech. Mild taste. Without violet anywhere.



Russula acrolamellata

With tea-tree. Hot taste. Smell weak to hypochlorite. It is very difficult to distinguish *acrolamellata* form '*austrofoetida*'.





Russula sp. 'acrolamellata var. nothofagi'

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

PDD 95308	PDD 95308
	
PDD 113441 N. Siegel	
	

Russula sp. 'Austrofoetida'

Hot taste, smell strong hypochlorite to bleach. With beech. Not distinguishable from *R. acrolamellata* on micromorphology. Asserted differences in stature, smell and spore morphology aren't supported by sequenced material.

PDD 79881	PDD 96006
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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

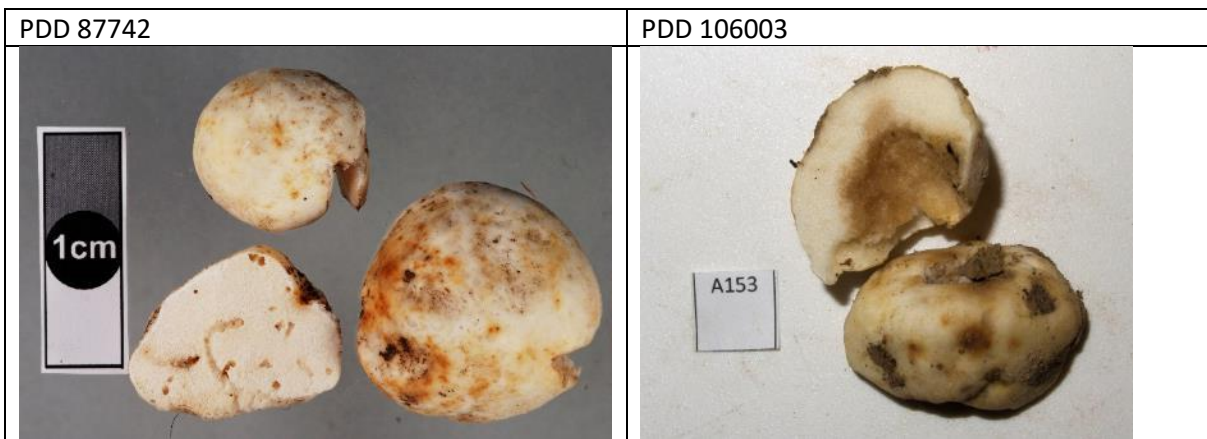


Russula – Heterophyllidia – IVb

The non-truffle taxa often with a bloom or veil-like patches on the cap (as does *R. vinaceocuticulata* above)

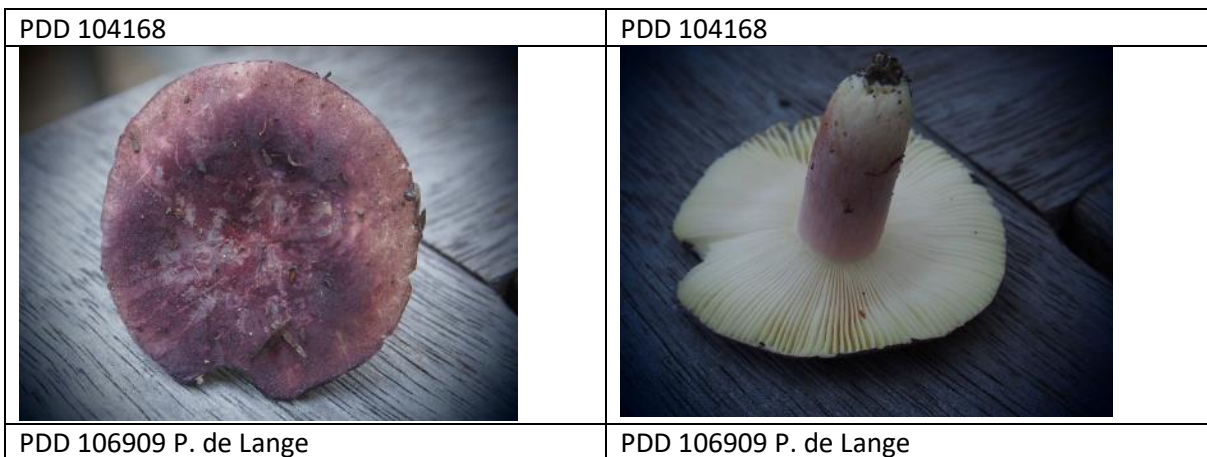
Russula parvisaxoides

A truffle with tea-tree and beech. Mild taste



Russula aucklandica

With tea-tree. Mild taste. Northern distribution with tea-tree and floury-dusting to the cap distinguish this species. The identity of the similar *R. pudorina* remains obscure. It is reported has having a bitter taste.





PDD 106909 P. de Lange



PDD 106909 P. de Lange



Russula griseostipitata

With beech. Mild taste. Common. *R. solitaria* may be an immature paler form. Also misidentified as *R. subvinosa*. The reddish/brown cap and the stipe with grey raised ridges are characteristic.

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 which is a good defining character. One of the few species confirmed with a sequence of the type collection.

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. Potentially '*Russula karera* PL115306 ined. – material not traced)

PDD 79832

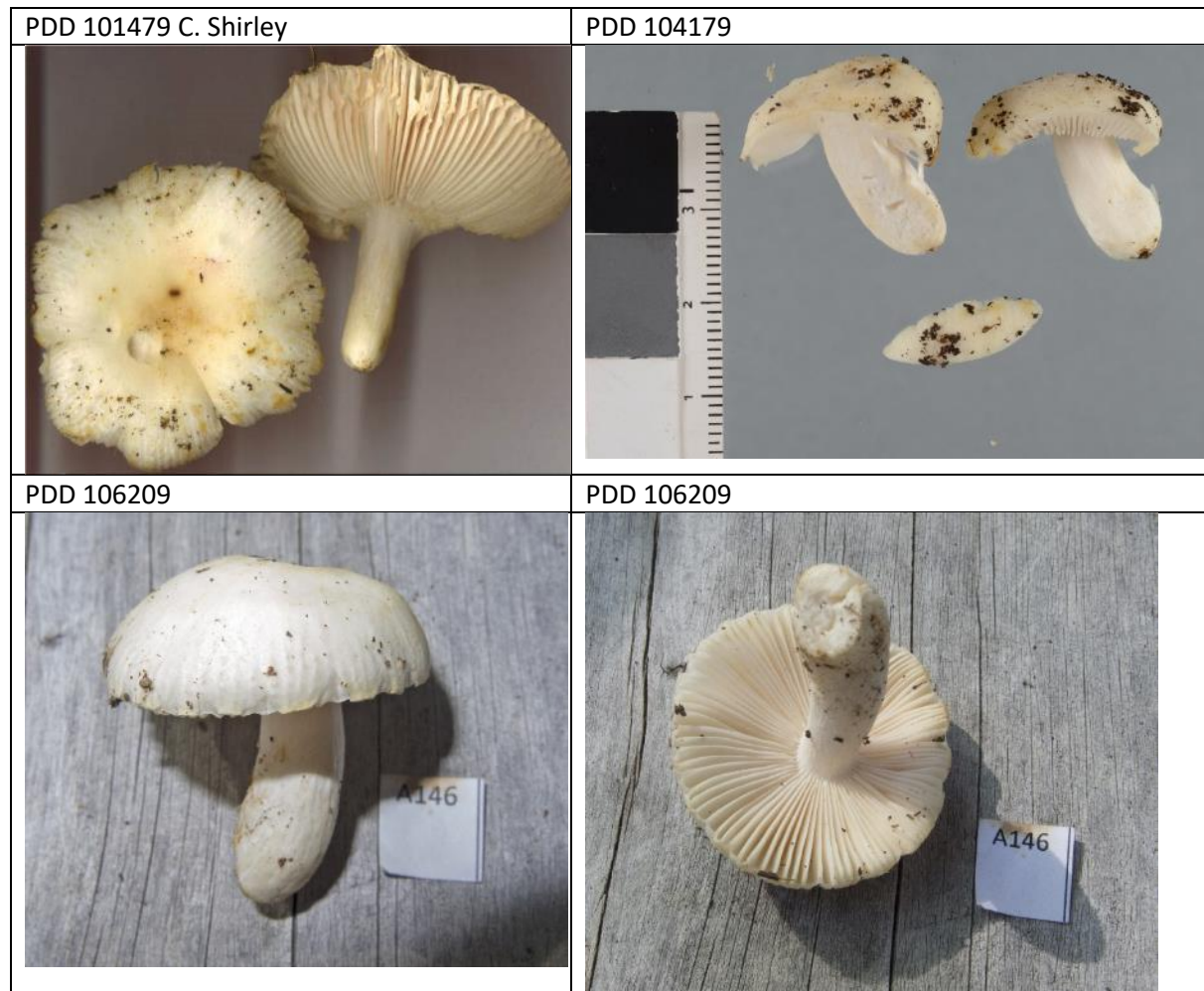


PDD 79832



Russula albolutescens

Small species with tea-tree. Taste mild. Cap sticky. Closely related to *R. maranginia* from Australia. The related *Russula prolifica* described with Eucalyptus in Madagascar will be another Australasian species in this group.



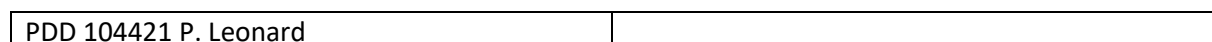
Russula – Brevipes

Russula sp. 'pirispora'

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

Russula papakaiensis

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

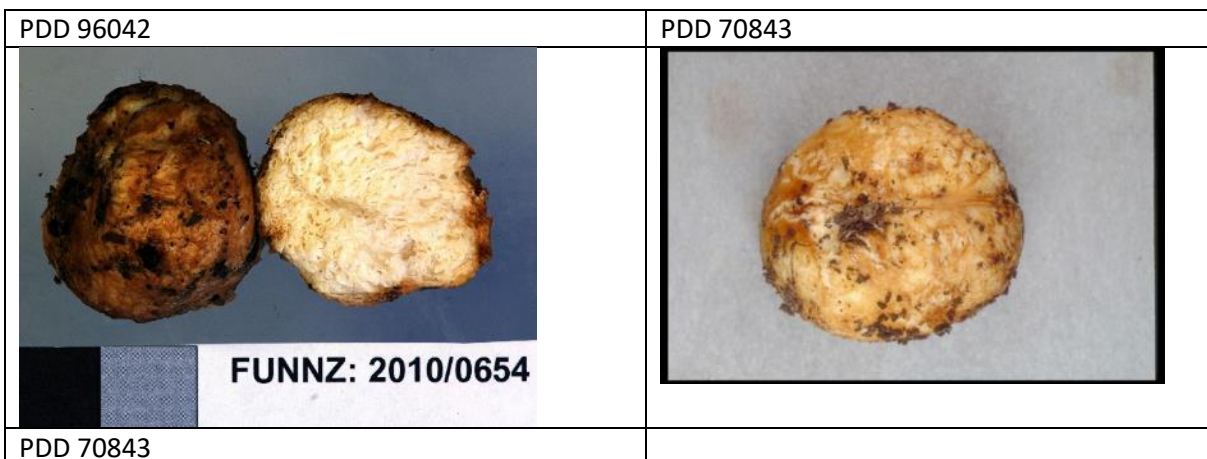


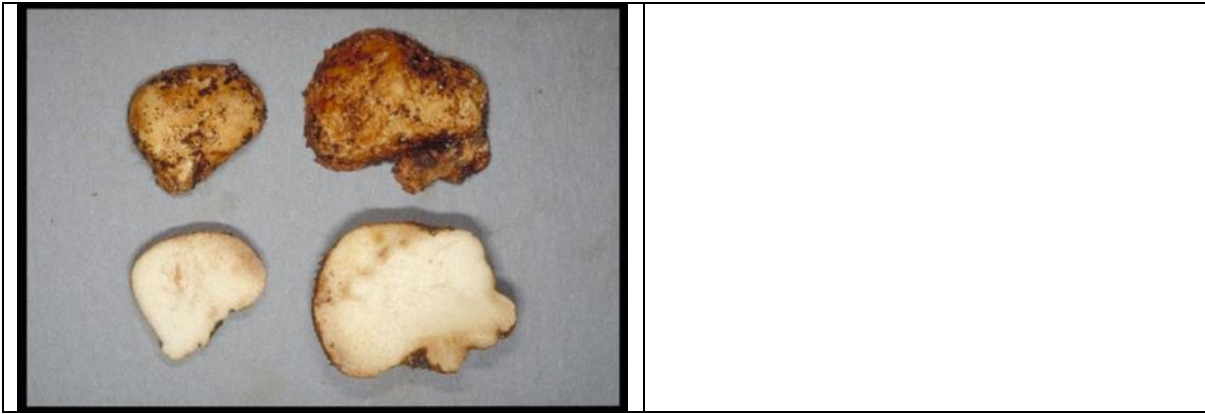


Russula korystospora
With beech. Truffle. No taste.



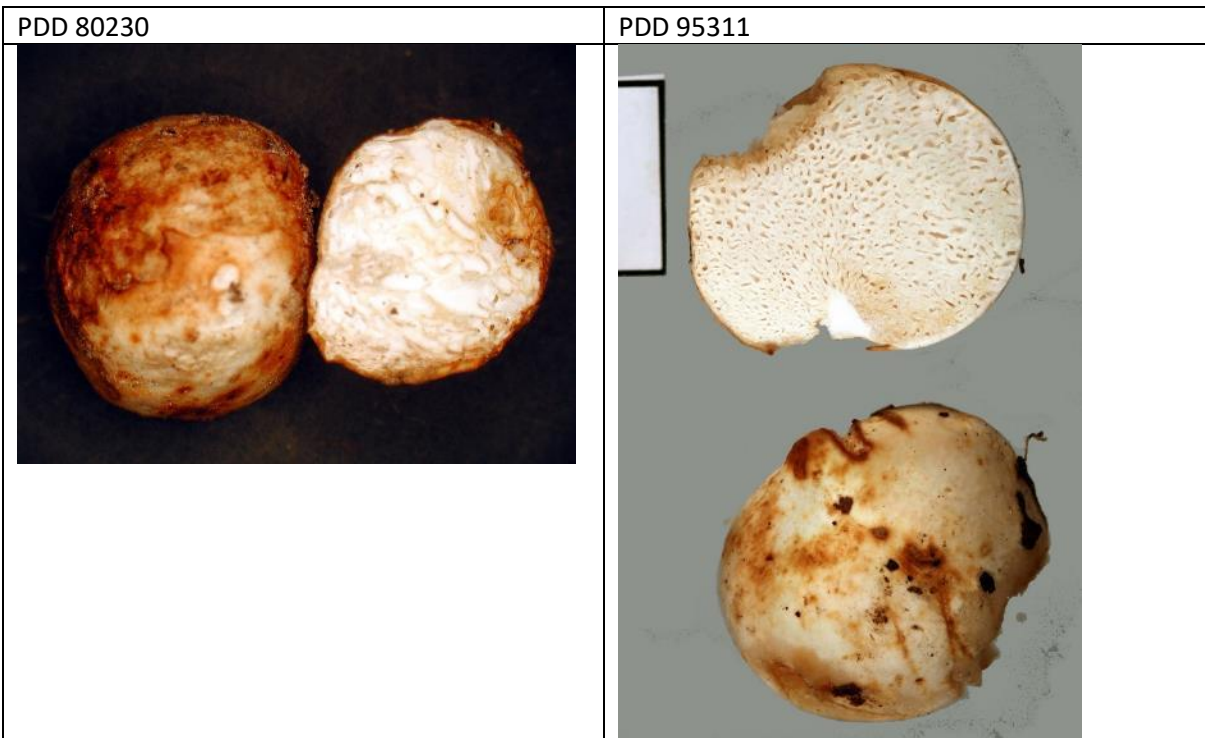
Russula sp. 'Glentui'
With beech. Truffle





Russula sinuata

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

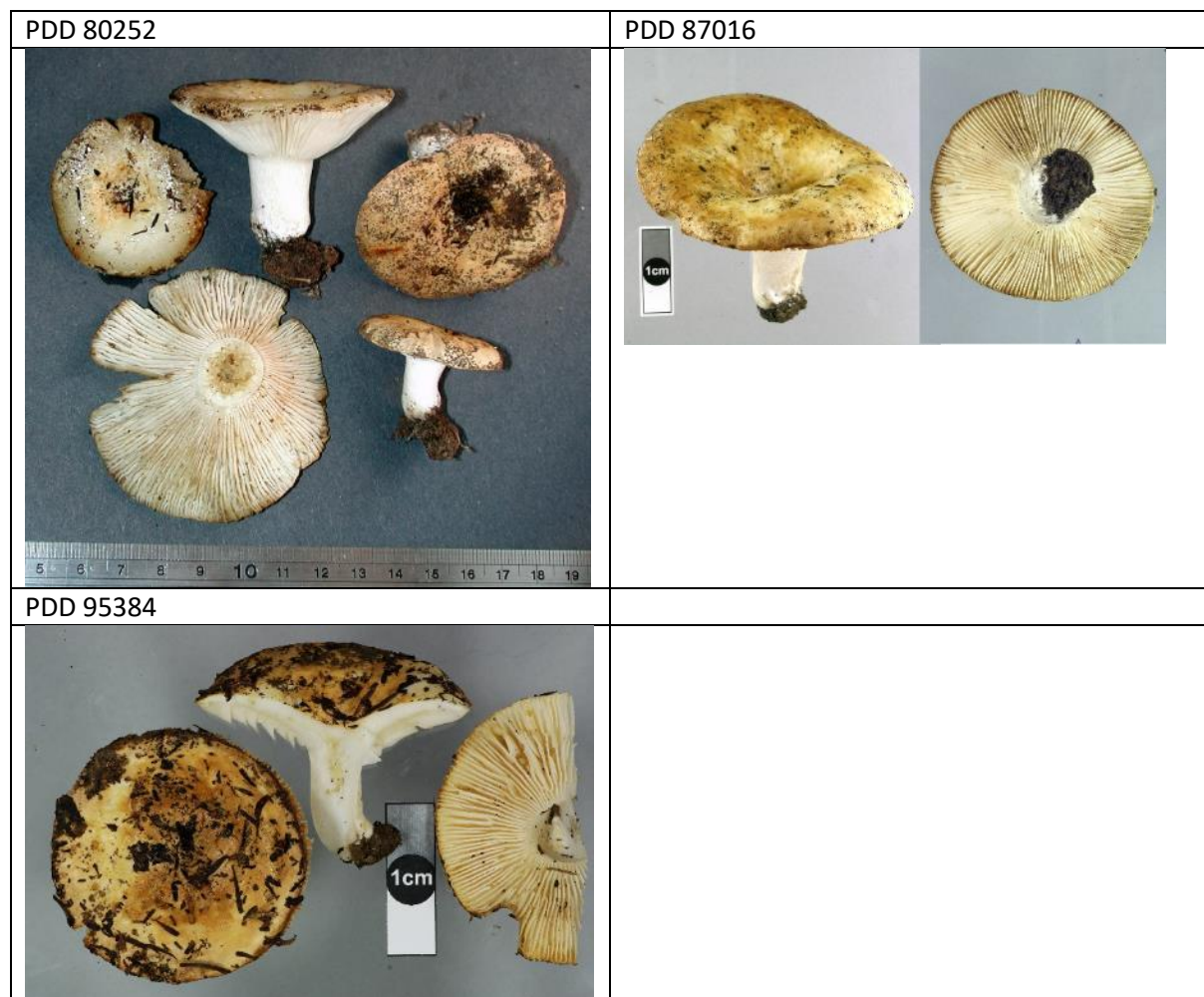


The *Russula allochroa/australis/multicystidiata* complex

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. cremeoohracea* (subgenus *malodora*) and *Russula litorea* (subgenus *crassotunicata*), which do not have a compressible stem, and *R. papakaiensis*, with heavily spotted gills (in age). The Australian *Russula erumpens* is related or the same as one of these taxa.

Russula allochroa #1

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



Russula allochroa #2

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

PDD 95313



PDD 10582



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

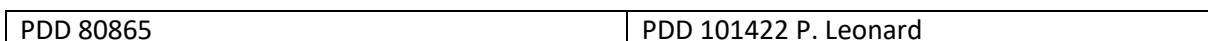
Russula cremeoohracea

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



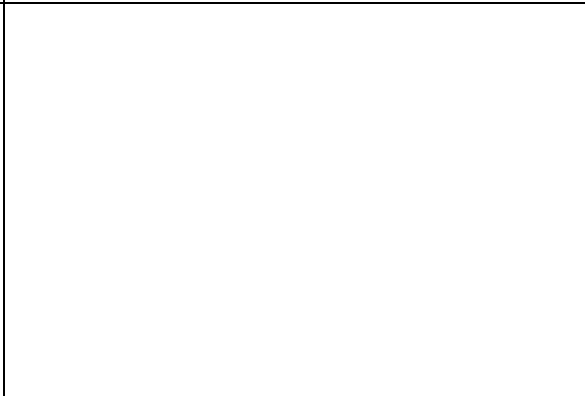
Russula pseudoareolata

With beech and tea-tree. Mild taste and fishy smell. Staining yellow/brown when bruised. The fishy smell of this group is distinct, and the same chemicals make the tissue stain green with iron salts (iron alum crystals) rather than pink in other species (except *R. roseostipitata* which does not have the fishy smell). Note however that most fungi when decaying will smell fishy.





PDD 113143 N. Siegel



Russula rimulosa

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

PDD 86875

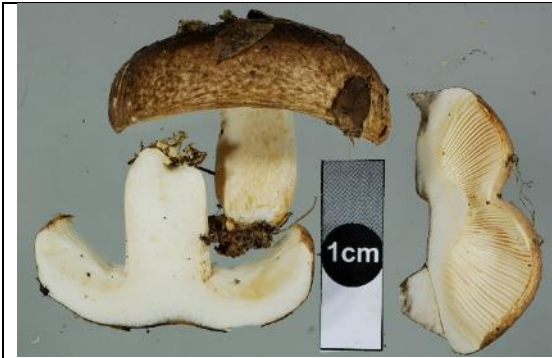


PDD 86875



PDD 95680

PDD 101424 C Shirley



PDD 105473



PDD 113085 N. Siegel



Russula sp. PDD 113291

Under beech. Mild taste, no smell apparently.



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

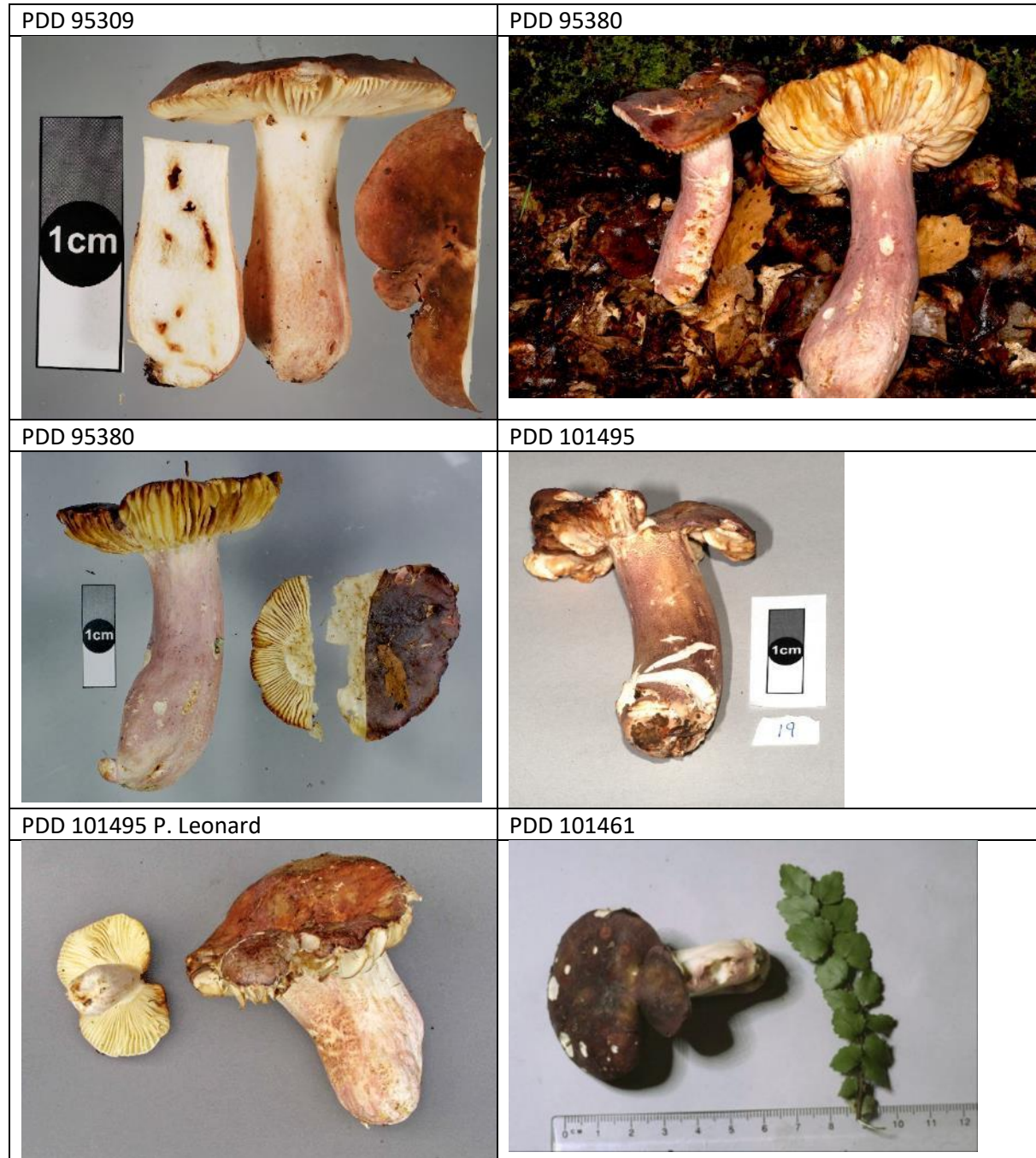


Russula – Crown Clade

From here on it becomes quite difficult to visually separate many species.

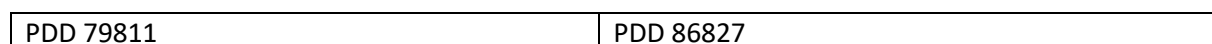
Russula sp. 'Hinewaiensis'

With beech. Mild taste. No smell.



Russula osphranticarpa

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





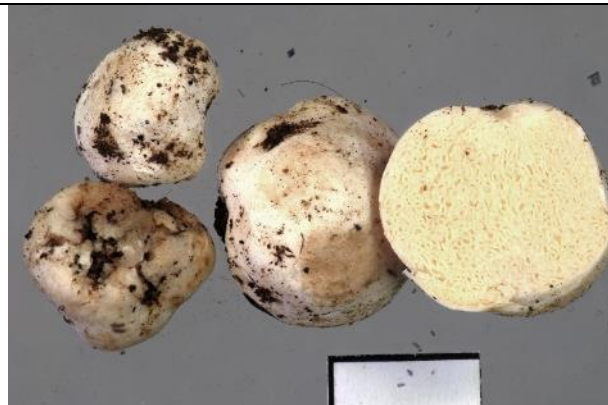
PDD 95491



PDD 96529



PDD 96423



PDD 105551



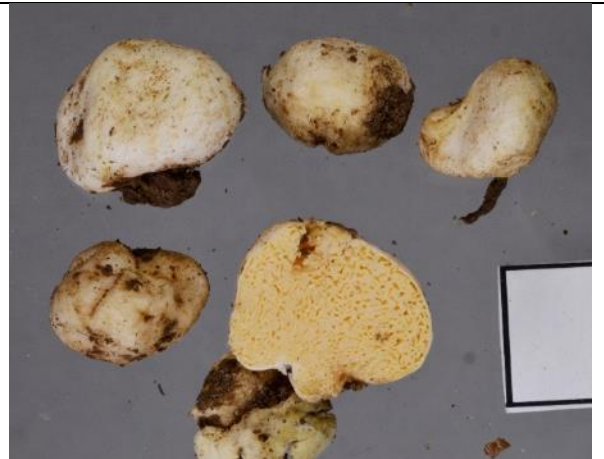
PDD 106004



PDD 106993



PDD 106884



Russula atroviridis

With beech and tea-tree. Mild taste. No smell. I remain hesitant this is *R. atroviridis* 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. Identifications based on colours (which people really want to do) will generally lead to mixed identifications. When *R. atroviridis* hasn't dried out then it can be distinguished because the depressed centre of the cap usually has a layer of slime. The slime is not fluorescent, unlike *R. roseostipitata*, which also generally has slime but it also has a minutely red pruinose/scurfy stem which *R. atroviridis* does not have. *R. atroviridis* often has a 'pointilist' appearance to the cap. McNabb's reported green reaction of the cap with NH₄OH is not supported, for this or any other collection of any species tested.

PDD 79824

PDD 95332



PDD 95409



PDD 95409



PDD 92357 C. Shirley



PDD 92357 C. Shirley



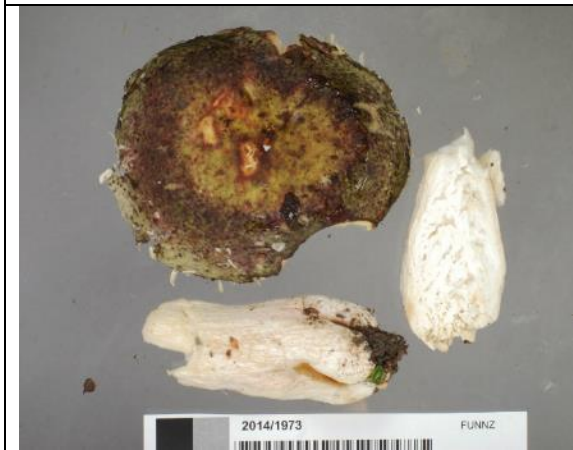
PDD 96933



PDD 104176



PDD 105744



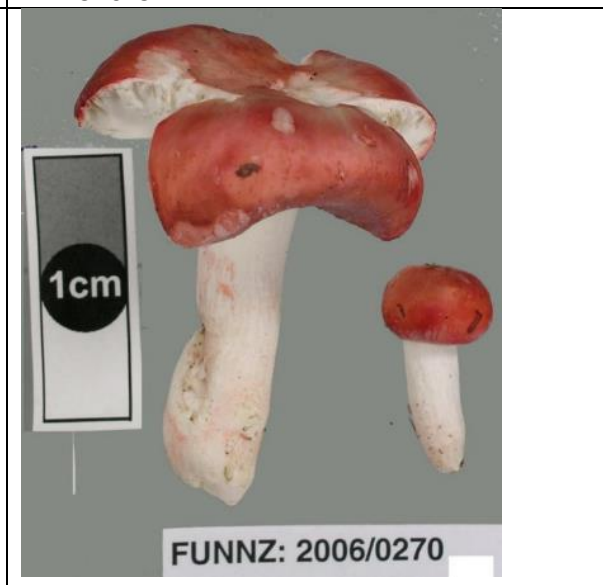
Russula kermesina

With beech. Mild taste. An easy one. *R. vivida* is very likely the same species.

PDD 95563



PDD 92049



Russula purpureotincta

With beech. No taste or smell. Colour very variable ranging white, grey, pale brown, pale green, pink but usually easy to recognise. The pale colours are characteristic.

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. The current phylogenetic tree has two entries which is an error – dismiss the second entry. *R. sp. 'Wilsonii'* is not easily distinguished from other similar species.

PDD 87003

PDD 87003



PDD 96004



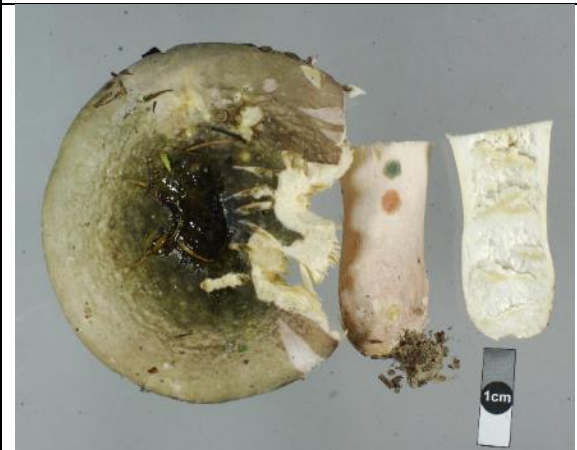
PDD 96004



PDD 96128



PDD 96128



PDD 105506



PDD 106828



PDD 106828



Russula umerensis

With beech. Mild taste. Very variable in colouration. Sometimes confused with *R. atroviridis*. The slime in cap centre not fluorescent. Note that a 'pointilist' colouring of the cap is characteristic of *R. atroviridis* and not *R. umerensis*. The undescribed '*Russula mavorea* ined.' is the same.

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 (e.g. *Russula sp. 'macnabbii'*).

Russula leucocarpa

With beech. Totally white peridium.

PDD 69223



Russula tawai

With beech. Taste slightly acrid. *Russula tawai*, like nearly all species in this group, often has dark coloured gill edges, gills that vary between white and yellow, and stems with flushes of various colours. None of these characters is diagnostic for any of the species. McNabb's record of a green reaction of the cap in NH₄OH is not supported (like *R. atroviridis* or any other NZ *Russula* tested so far)

<p>PDD 95410</p>	<p>PDD 95999</p>
<p>PDD 113240 N. Siegel</p>	<p>PDD 113694 C. Schwarz</p>
<p>PDD 101451</p>	<p>PDD 101451</p>



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 (often as *R. griseoviolacea*).

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 (possible photo mix)



PDD 105524



PDD 106053



PDD 112420 N. Siegel



PDD 112420 N. Siegel

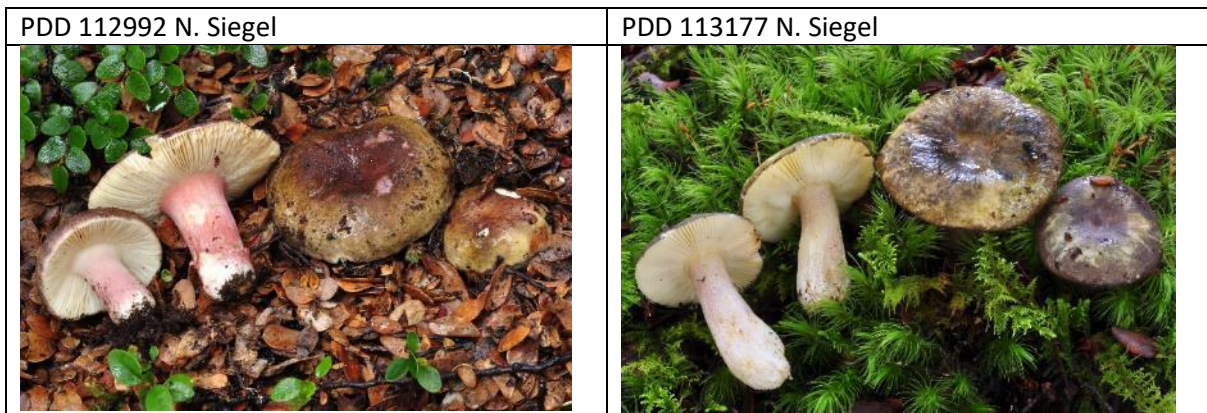


PDD 113124 N. Siegel



Russula sp. 'Craigieburn'

With beech. Taste mild, slowly acrid.

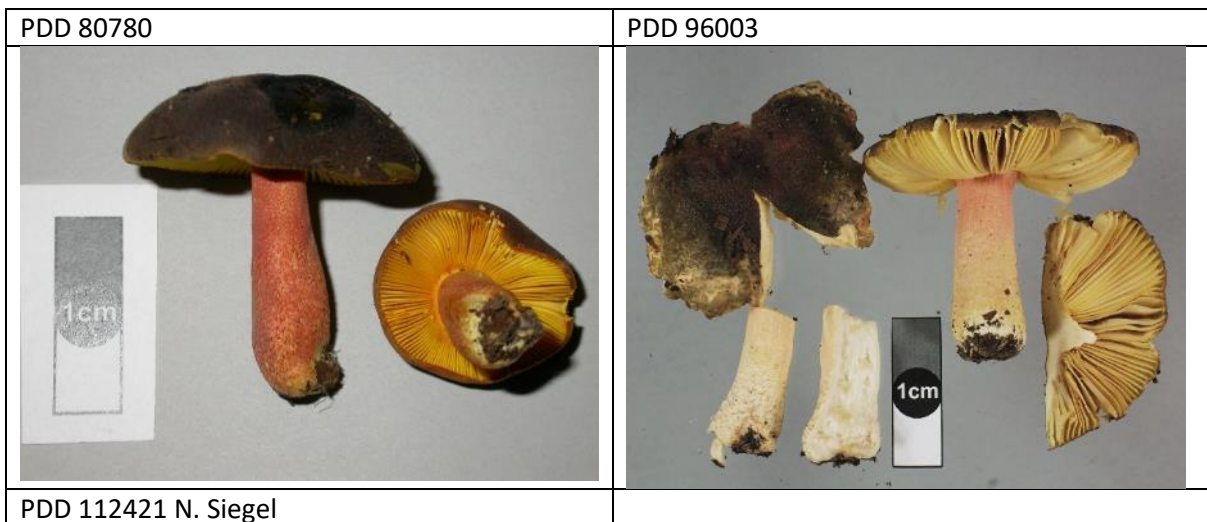


Rusula sp. 'Canaaneisis'

Material lost and no photos. PL73302 = PDD 76409 is most definitely *Lactarius umerensis*. The photo also does not conform to Pat's description. The sequenced 'PDD 101760' cannot be traced. A photo identify as this species is almost certainly *Russula atroviridis*.

Russula tricholomopsis

With beech. Mild taste. The very rich pink/orange colouration of the stem and gills are characteristic. Microscopically it is easily distinguished by the long brown cap hairs.





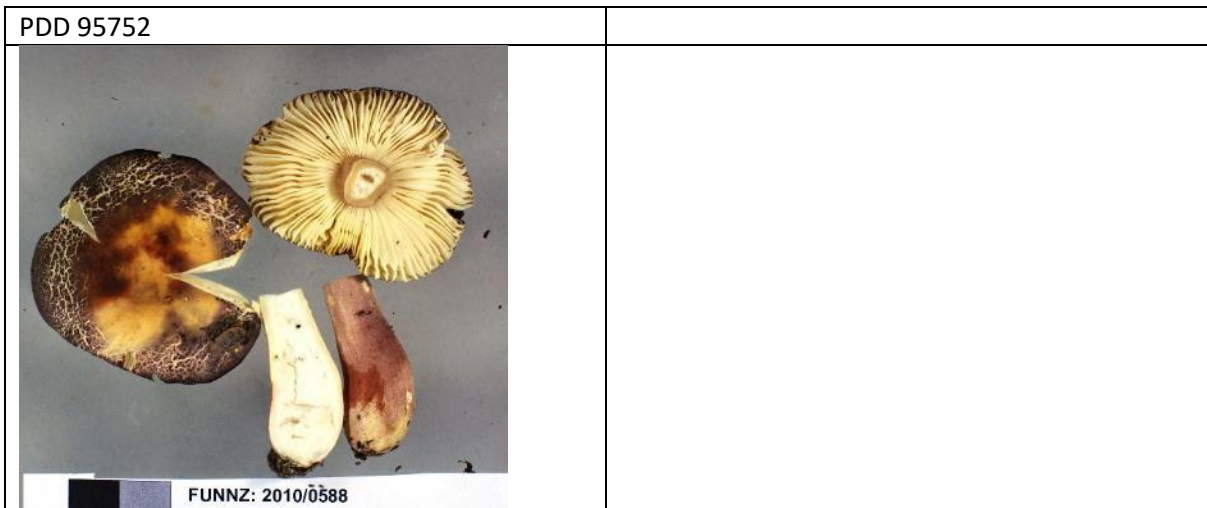
Russula sp. 'Manapouri'

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



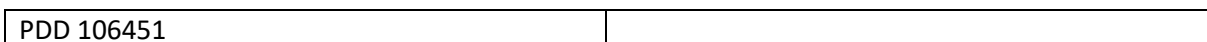
Russula sp. JAC11404

With beech



Russula miniata

With beech. Tiny.

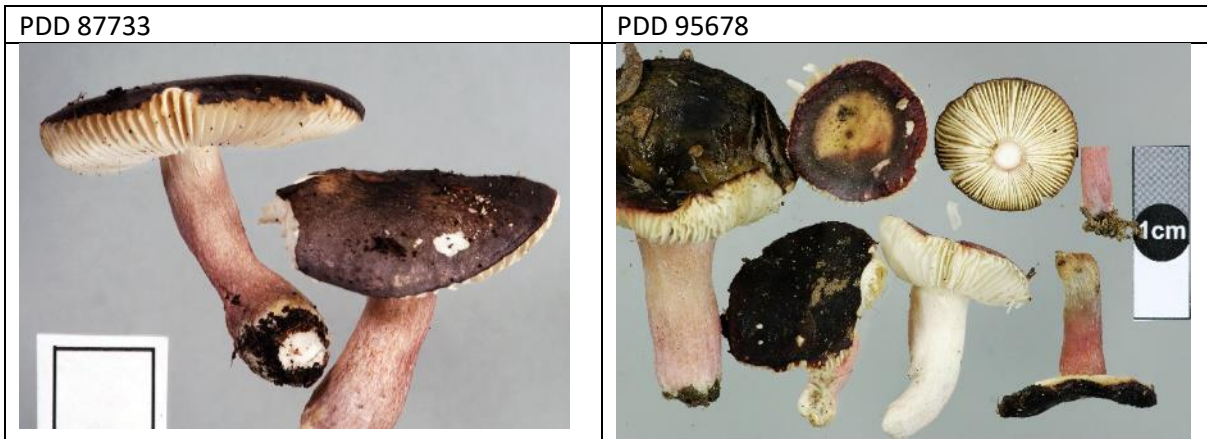




Russula griseoviolacea #1



Russula griseoviolacea #2

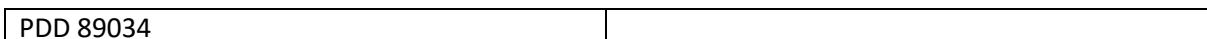


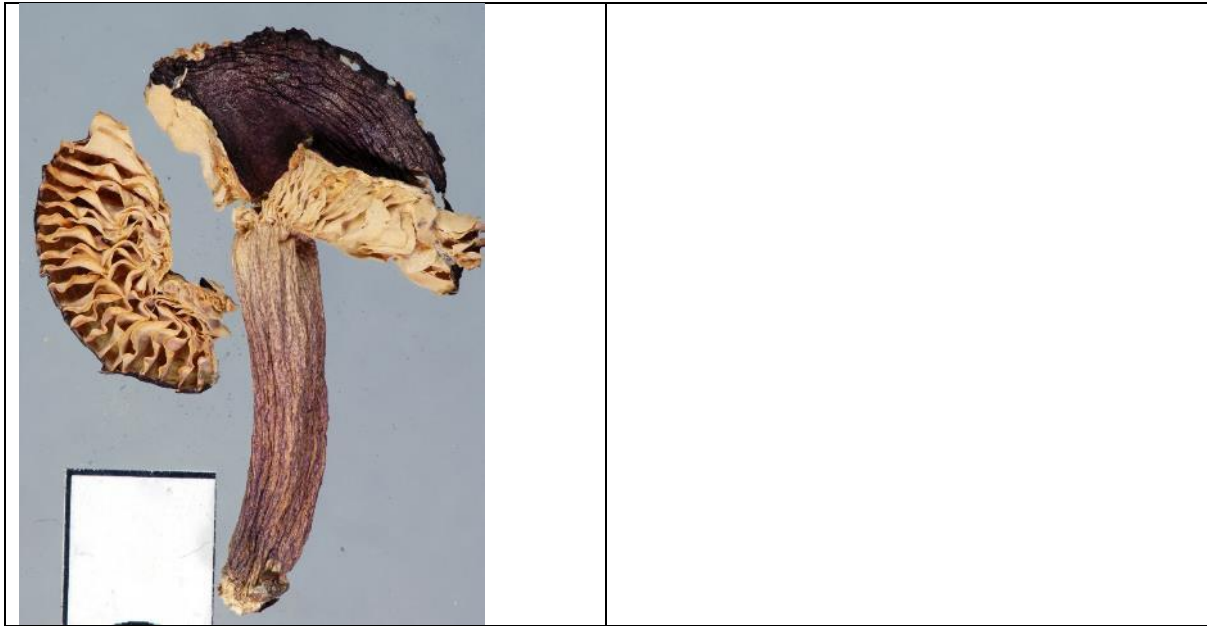
Russula griseoviolacea #3

No material or photos

Russula sp. JAC12268

Just dried material.





Russula pilocystidiata

With beech. Microscopically distinct, otherwise ... just another macroscopically indistinguishable member of the group.





PDD 96643



PDD 97021



PDD 97021



PDD 112419



Russula tapawera

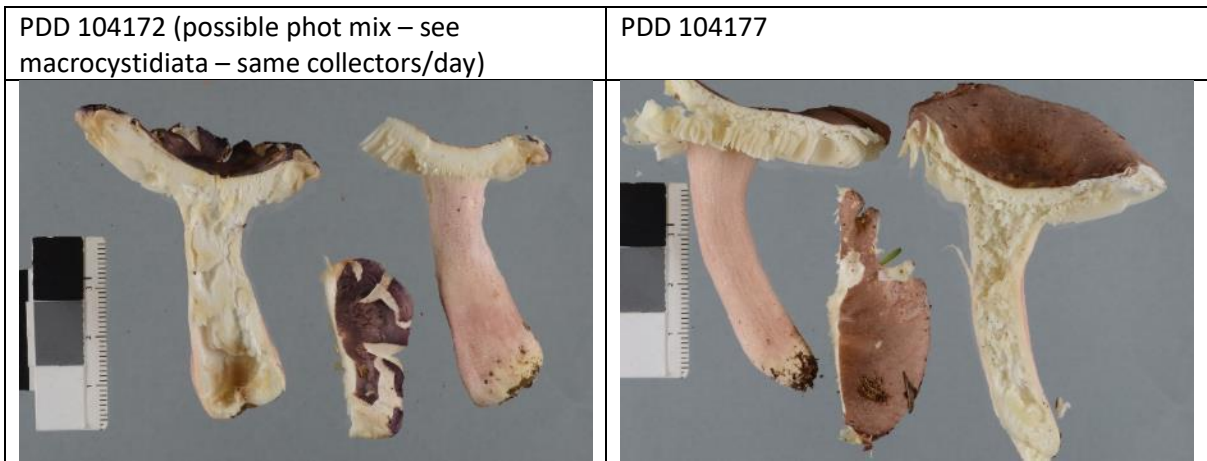
A truffle. The published photo is the same material as photo of *R. rubrolutea* but with colour balance difference – or at least the top left fragment is identical. One or the other appears might be incorrectly labelled.

PDD 83696 Holotype	
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Russula subvinosa

With tea-tree. Poorly known.



Russula rubrolutea

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

