

GANODERMA IN QUEENSLAND - TRIAL KEY AND NOTES

Background

The taxonomy of the genus *Ganoderma* has been described as chaotic. Worldwide there are 214 described species, but very few good descriptions exist which might allow accurate recording of these fungi in the field. The only readily available reference to the genus in Queensland is Hood's (2003) Introduction to Fungi on Wood which lists 11 species. The critical work by Ryvar den & Moncalvo (1997) was published by Fungiflora in Oslo and is not readily available. But, papers by Smith and Sivasithamparam (2000) and 2003 examined Australian species in considerable detail and concluded that only 6 species were present and only 5 of these were found in Queensland. But none of these publications allow reliable identification of Queensland *Ganodermas* to species level.

Ganodermas in Queensland

We see *Ganoderma* species on almost every QMS foray and frequently have rather inconclusive discussions about their identity. As Smith and Sivasithamparam point out the morphological differences between *Ganoderma* species are small and indistinct and neither pore density nor spore size provide reliable ways of separating species. It is therefore not surprising that they did not include a key in their 2003 paper. Some of their results are summarised in the table 1 below.

Table 1. *Ganoderma* species in Australia

Species	Surface	Pores/mm	Spore sizes	Records in Queensland
<i>G. australe</i>	Matt	3.0-4.5	9.1-11.8 × 5.5-9.1	25
<i>G. incrassatum</i>	Matt	3.6-5.9	6.8-10 × 5-6-8	1
<i>G. steyaertanum</i>	Laccate	3.4-5.6	7.3-12.7 × 5-9.5	13
<i>G. cupreum</i>	Laccate	3.4-5.6	8.2-11.8 × 5.5-10	8
<i>G. boninense</i>	Laccate	3.2-5.0	8.2-13.5 × 5-8.6	0
<i>G. weberianum</i>	Laccate	2.7-5.9	6-10.9 × 4.5-7.3	2

Host and habitat information seems to be particularly poor in the published literature. Differences in distribution, cap texture and spore morphology may nevertheless provide just enough to allow the production of a trial key.. The aim of this article is to provide a trial key and notes to try to improve our recording.

Trial Key

1. Cap matt 2
1. Cap laccate 3

2. Cap sessile, 50 - 500 mm diameter, with a white or pale edge and spores distinctly truncate ***Ganoderma australe***
2. Cap stipitate, spathulate or occasionally sessile, < 40 mm diameter, margin concolourous and spores indistinctly truncate ***Ganoderma incrassatum***

3. Spores Q > 1.7 on average ***Ganoderma boninense***
3. Spores Q < 1.6 on average 4

4. Cap large, 50 - 500 mm diameter, red brown or black, in rainforests or vine forests ***Ganoderma steyaertanum***
4. Cap small to medium, 30 - 90 mm diameter, in sclerophyl forests 5.

5. Spores truncate, smooth, $8.2-13.5 \times 5 - 8.6 \mu\text{m}$ ***Ganoderma cupreum***
5. Spores ovate, finely echinulate, $6-10.9 \times 4.5 - 7.3 \mu\text{m}$ ***Ganoderma weberianum***

Notes on species

Ganoderma australe

This is the most frequently seen matt species in South-east Queensland. It forms large, 50 to 500 mm diameter, shelf like brackets growing on *Eucalyptus* and other hardwood trees in wet and dry sclerophyl forests. The surface often uneven and shows growth bands and is a pale matt brown. The edge is often paler or even white. The flesh is brown and very hard and wood like. The lower surface is poroid, white or ochraceous in living specimens and stains dark brown when scratched. There are usually 3 – 4.5 pores per millimetre.

The spores are produced in very large quantities and can often be seen coating both the surface of the bracket and the surrounding area, they are pale brown. They are ovoid-ellipsoid with an ornamentation of small dark warts, a thick septate wall and a clearly truncated end.



Ganoderma incrassatum

There are several records, but only one collection of this species. It appears to have a northerly distribution and to favour rainforest habitats. The fruiting bodies are small, up to about 40 mm diameter and generally stipitate or spathulate. They are dark brown to almost black in colour and matt. The surface is wrinkled and shows concentric zoning. The margin is concolourous as the crust overhangs the pores. The flesh is dark brown, hard and quite thin, 2 – 3 mm. The pores are yellowish brown and there are 3.5 – 6 per mm. It is readily distinguished from *G. australe* where the specimens are small and stipitate or spathulate. Where specimens are sessile, examination of the spores is a good guide with this species having warty spores with a thick septate wall, but unlike *G. australe* they are ellipsoid and indistinctly truncate.



Ganoderma steyaertanum

This laccate species can be readily distinguished in its large, 50 -500 mm diameter, fruit body. The attachment is sessile or can be broadly stipitate. The cap surface is uneven, with concentric zones and dark brown (Chestnut) to almost black cap. Margin yellowish white. The pores are pale yellow to greyish orange and there are 3.5 – 5.5 per mm. The spores are brown, ovoid ellipsoid with an average Q below 1.6. They are echinulate, thick walled and usually truncate. This species appears to favour rainforest habitats. Specimens that are red brown and stipitate, can occur and are more difficult to distinguish from the three species listed below.



Ganoderma boninense

Basidiocarp stipitate, substipitate or sessile, kidney shaped. Typically 30 – 90 mm across. Surface in concentric zones, violet brown to black, laccate shiny, with a paler margin. Flesh greyish to brownish orange. Pores pale yellow, 3 – 6 per mm. The distinguishing feature appears to be its elongated ellipsoid spores with a Q-value (Length /width) of 1.7 or greater.

This laccate species has not so far been reliably recorded in Queensland. It has however been found in New South Wales.



Ganoderma cupreum

Basidiocarp stipitate, substipitate or sessile, kidney shaped. Typically 30 – 90 mm across. Cap highly laccate when fresh, from bright red brown to almost black, with concentric zones which can be in contrasting colours. Margin pale. Flesh hard, pale reddish brown. Pores very pale yellow, 3.5 – 5.5 per mm. Spores brown, thick walled with septa in the wall, more or less smooth, truncate, $8.2-13.5 \times 5 - 8.6 \mu\text{m}$. Small to medium laccate species which are distinctly stipitate and have smooth truncate spores are most likely to be *G. cupreum*.





Ganoderma weberianum

Basidiocarp laccate and stipitate or spathulate up to 50 mm wide. Violet brown to dark brown to black. Radially and concentrically wrinkled, with a pale yellowish margin. Stipe short, 10 – 15 mm and dorsally attached. Flesh greyish orange, hard. Pores pale yellow, 3 – 6 per mm. Spores ovoid, thick walled, echinulate, 6 – 10.9 × 4.5 – 7.3µm.

Small to medium laccate species which are distinctly stipitate and have finely echinulate and smaller spores are most likely to be *G. weberianum*. This is the species illustrated in Fuhrer under the name of *Ganoderma resinaceum*.

Conclusions

Recently published work has not eliminated all the difficulties in identifying species of *Ganoderma*, but it has made it considerably easier, moving the problem from the impossible category to difficult. Better recording of host and habitat information may in time give additional clues to the identity of these common forest fungi.

References

1. Hood, I. A. (2003) An introduction to Fungi on Wood in Queensland. University of New England Press.
2. Moncalvo, J.M. and Ryvarden, L (1997). A nomenclatural study of the Ganodermataceae Donk. Fungiflora. Oslo.
3. Smith, B. J. and Sivasithamparam, K. (2000). Internal transcribed spacer ribosomal DNA sequence analysis for 5 species of *Ganoderma* from Australia. Mycological Research 104: 943-951.
4. Smith, B. J. and Sivasithamparam, K. (2003) Morphological studies of *ganoderma* (Ganodermataceae) from the Australian and Pacific regions. Australian Systematic Botany, 16, 487-503.
5. Steyaert R.L. (1972) Species of *Ganoderma* and related genera of the Bogor and Leiden Herbaria. Persoonia 7, 55 – 118.

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