
SOME OBSERVATIONS ON *CRINIPELLIS AUSTRALIS*

Heino Lepp

PO Box 38, Belconnen ACT, 2616 Australia

Abstract

Crinipellis australis has been found at several locations in the city of Canberra, Australian Capital Territory (ACT). The species was previously known only from Sydney and Adelaide. The Canberra finds suggest the species has a preference for *Themeda australis* and is able to exploit irregular rainfall. This paper will supplement the previously published macroscopic description.

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Introduction

Crinipellis australis Grgurinovic was described by Grgurinovic (1997) who listed three herbarium collections, gathered from Sydney and Adelaide at around the time of the First World War. May *et al.* (2004) record no other published finds of this species and note that the only other publication to mention the species is Grgurinovic & Simpson (2001), who classified the taxon as "poorly known". The work leading to this paper started because of curiosity about some small brown agarics growing near the base of a *Themeda* tussock in a remnant native grassland area in suburban Canberra. Later microscopic examination showed them to be *Crinipellis australis* and this find led to a search for the species in other grassy habitats in Canberra. The search proved successful, with many specimens sighted and several collections now deposited at the Australian National Herbarium (acronym CANB) at the Centre for Plant Biodiversity Research in Canberra. A search at CANB turned up one additional collection, from 1991, amongst the unidentified agarics.

Some features of the Canberra specimens

Cleland (1934) gave a macroscopic description, but under the name *Crinipellis*

caulicinalis (Bull.) Rea. Grgurinovic (1997) repeated Cleland's macroscopic description and added descriptions and drawings of microscopic features. The Canberra finds gave an opportunity to record some supplementary information about the macroscopic features (Table 1).

Habit: In Canberra sporocarps grew separately or in small caespitose clusters, on or near grasses. Grgurinovic (1997) noted they were "gregarious on the ground, often attached to buried grass stems".

Microscopic features: The Canberra collections add nothing to the microscopic detail recorded by Grgurinovic (1997). She noted that the basidiospores are "rarely septate" and I saw but one clearly septate spore. She noted that the thick-walled pileal and stipe hairs are only slightly dextrinoid and I fully agree with that finding. The dextrinoid reaction may be very slow in showing and even after a long time is usually still quite weak. There may also be variation within a specimen. For example, in one sporocarp from collection *H Lepp 551* the stipe hairs showed an easily observable, mildly dextrinoid reaction whereas the pileal hairs varied from no observable reaction to at most very weakly dextrinoid.

Table 1.

Macroscopic information given by Grgurinovic (1997)	Supplementary information derived from the Canberra collections
<p>Pileus to 12 mm diam; irregularly convex, covered with intricate appressed fibrils, edge sometimes slightly rugose, pallid brownish drying to a pale greyish brown or dead grass colour</p>	<p>Pilei are up to 15 mm in diameter and covered with short, dense, radially orientated fibrils. The pilei are hemispherical (or slightly flattened-hemispherical) when young but with age become convex to shallowly convex or, occasionally, nearly plane. In the convex specimens there may be a brief, turned out (or even slightly upturned) flange. Sometimes there is a slight central papilla, generally best seen in a pileus beginning to dry out. The pilei show various brownish shades, from greyish orange (near 6B4/6B5 and 6C3/6C4) through greyish brown to reddish brown (near 8D3/8D4). Within any population the younger pilei are darker, some dark brown (9F6 to 9F8). The marginal flange, where present, is paler than the rest of the pileus. In very immature pilei the margins may be white and markedly woolly.</p>
<p>Lamellae apparently adnate or adnexed to an indefinite collar, then seceding, moderately close to concolorous</p>	<p>Colours are greyish red (near 7B3/8B3), various shades of greyish brown to dull red (near 9B3/9C3). The margins may be weakly crenulate. The collar noted by Grgurinovic (1997) varies from indistinct to well-developed.</p>
<p>Stipe up to 25 mm long, slender, usually attenuated downwards, densely pilose, solid, concolorous with the pileus or sometimes browner</p>	<p>Stipes grow to 30 mm long and 1-2 mm diameter and are even or slightly tapered downward. They are pilose, generally densely so but only patchily so in some cases – presumably through loss of hairs by abrasion. The stipes are in shades of brown – from reddish brown, through brown to dark brown (from 7E6/8E6 to high 9F shades) but generally paler towards the apices, at times closely approaching the pileus in colour.</p>

All bracketed colour references are to Korerup & Wanscher (1989).

Specimens studied:

AUSTRALIAN CAPITAL TERRITORY.

Barton: on the dead parts of *Themeda* tussocks; in remnant *Themeda* grassland, with scattered eucalypts; 17 November 2004; *H Lepp* 4605. **Black Mountain Nature Reserve:** on grass roots and shafts; in a grassy clearing beneath powerlines through dry sclerophyll woodland; 9 June 1991; *H Lepp* 551. **Bruce:** on dead grass tussocks; in an exposed grassy slope, with scattered eucalypts; 27 November 2004; *H Lepp* 4620. **Campbell:** on dead grass or on soil; in remnant native grassland; 14 December 2004;

H Lepp 4632. **Cook:** on dead material at bases of *Themeda* tussocks, on totally dead tussocks or from buried vegetable matter (?grass roots); in *Themeda*-dominated grassland with scattered eucalypts; 20 November 2004; *H Lepp* 4612. On dead material at bases of *Themeda* tussocks or from buried vegetable matter (?grass roots); in open grassy area with scattered eucalypts; 13 December 2004; *H Lepp* 4628. **Cook, Canberra Nature Park:** on dead material at bases of *Themeda* tussocks; in *Eucalyptus* woodland, with an understorey of shrubs and grasses; 20 November 2004; *H Lepp* 4613. **Glenloch:** on

dead parts of grass tussocks or from buried vegetable matter (?grass roots); in a patchily grassed grazing paddock (with *Themeda*, *Austrodanthonia* or *Nothodanthonia*, *Vulpia*) and scattered eucalypts; 15 December 2004; *H Lepp* 4635.

Comments about the collection sites

The site altitudes are between 500 and 650 metres above sea level. Apart from the two sites in the suburb of Cook, the sites are at least two kilometres away from each other and all are contained within a circle having a diameter of about 10 kilometres.

Barton: This is a 1.9 hectare area that is registered as site CC04 in ACT Government (2005). Despite its small size it has a high conservation value since it is an area of dry *Themeda* grassland that has been little disturbed by exotic weeds or by human activity. It has been given a Botanical Significance Rating of "very high", the highest used in the previously-cited reference. There are nearby office blocks and the area does attract lunchtime walkers and joggers, but such traffic appears to be always along footpaths around the perimeter.

Black Mountain Nature Reserve: Tall vegetation had been removed from beneath the power lines. The remaining vegetation was mostly grass (native and exotic), with some scattered shrubs and the occasional *Acacia* or *Eucalyptus* - regrowth from stumps or fresh saplings that had grown from seed since the last clearance work under the power lines. The clearance work is done irregularly at intervals of many years.

Bruce: The site is an undeveloped area in the grounds of the University of Canberra. It is on a moderate slope with clay/gravelly soil, mostly grassed but with some eucalypts. It is likely to be mown annually to reduce fire risk, but otherwise would see little human visitation, not being close to any major student facilities.

Campbell: This is site CC02 in ACT Government (2005), where it is mistakenly allocated to the suburb of Reid. It has a "moderate" Botanical Significance Rating and has a high cover of native grass but with a low to moderate level of exotic species and a

moderate level of human disturbance. Along one edge of the area there is a well-worn foot track that is used by people going to or from nearby houses. It is likely that the area is also used by people exercising their dogs.

Cook: This is an area of about 500 by 200 metres, on a moderate slope and largely grassy, with a small number of eucalypts. The grass cover is not homogenous, varying both in density of cover and species composition. There is a small patch of almost pure *Themeda* at the top of the slope, through a mixture of *Themeda*, other native grasses and some exotic species to almost purely exotic species at the lowest point of the slope, with no *Crinipellis* sporocarps found in the lowest section. The area has a bitumen cycle path through it that is used by both commuters and recreational cyclists. The area is also used by people walking their dogs or children occasionally playing ball games and would be mown once or twice a year.

Cook, Canberra Nature Park: This is a woodland area, on a steeper slope in which there is a fairly dense cover of native grasses and shrubs between the eucalypts. This woodland patch would rarely see any human visitation.

Glenloch: The paddock has a long history of grazing and carries low numbers of cattle from time to time but is not constantly stocked. The area carries native and exotic grasses as well as other exotic weeds.

General comments

Cleland (1934) wrote that the species grew "on the ground, often attached to buried grass stems" and on the evidence of the Canberra specimens this fungus is associated strongly with grasses. Even where twig or leaf litter was abundant such substrates bore no *Crinipellis*. Various other areas were searched, but without success. The other sites included habitats similar to the ones above as well as some in which the dominant (sometimes the only) grasses present were weedy, exotic species. The intention was to see if *Crinipellis australis* grew on non-native grasses. The Canberra evidence suggests that the fungus prefers native grasses and in particular seems partial to *Themeda*. In the sites listed above

other native grasses (most commonly *Austrostipa* or one or other of *Austrodanthonia* and *Nothodanthonia*) were often present, but even when *Themeda* was not the dominant grass *Themeda* tussocks would commonly support the majority of sporocarps. In contrast to the other native grasses the *Themeda* tussocks often contain a sizeable proportion of dead material, which presumably provides a good volume of substrate for the fungus.

The specimens cited by Grgurinovic (1997) were collected in the months of March and April and one of the Canberra collections was made in June. These are the cooler, moister autumn months in which one typically expects to see agarics. The bulk of the Canberra collections were gathered in the early summer of 2004/2005. During this period Canberra experienced significant rainfall. The Bureau of Meteorology (2004, 2005) reported that November and December of 2004 were a little warmer and much wetter than average in the ACT. The mean daily minimum temperatures were 9.3°C (November) and 12.0°C (December). The corresponding mean daily maxima were 23.4°C and 26.6°C. Each of these was no more than one degree above average. At Canberra Airport the November rainfall was 85.6 mm over 10 days (well above the November average of 63.4 mm) with most rain falling in the first half of the month, the heaviest fall, of 34.0 mm, being on the 12th of the month. Rainfall was variable across the ACT. The airport's December rainfall was 72.4 mm over 10 days (the average being 52.5 mm over seven days), with nine thunderstorm days (the greatest number of December thunderstorms since 1971). Most of the rain fell between the 5th and the 14th days of the month, with the last two weeks of the month being rather dry. Heavy rain and thunderstorms were quite widespread and most of the ACT weather stations recorded well above average rainfall.

The November/December sightings of *Crinipellis australis* (and in such profusion) suggest that the species is able quickly to exploit good local rain. Such an ability would be of considerable benefit, especially in areas without dense tree or shrub cover, such as grasslands and open woodlands. In such habitats the ground is exposed to the full force of the drying effects of sun or wind. Another

characteristic that would help *Crinipellis australis* cope with exposed habitats is that the sporocarps are marcescent. Several pilei, either collected dry or allowed to dry naturally after collection, gave copious spore prints after rehydration. The ACT receives variable amounts of rain during the warmer months. Often a short period of cool, rainy days is followed by warm to hot and dry days. It is common to see sporocarps of various agarics or members of the Lycoperdaceae appear, develop a little and then abort during the hot days. It is also not too unusual to see aborted sporocarps in exposed areas during autumn, whenever drying winds are severe. It is likely that similar observations could be made in many other areas of south-eastern Australia. In such cases the resources put into sporocarp development have been wasted. With *Crinipellis australis* marcescence would guard against such a waste of resources and allow the fungus to take advantage of several short rainy periods that are separated by dry periods. The hairy surfaces would presumably help the fungus make the most of any available moisture. They would help trap moisture, for example by acting as condensation points for overnight dew or for fine misting rain. The hairs may also slow down the loss of water from the sporocarp surface. The species therefore seems well-adapted to life in grasslands and open woodlands.

Experiment showed that the hairs of the stipe create a very effective capillary system. Dried specimens, their stipes embedded in a plasticine-like adhesive, were placed in a shallow dish and enough water added to reach those parts of the stipe just above the adhesive surface. Within a few seconds the entire stipe surfaces were wet. That was not the case with some smooth stipes from another species that had been similarly placed. While the *Crinipellis* stipes rehydrated readily in these experiments, the pilei failed to do so, even when left for an hour or more. It appears that the pilei need aerial moisture to rehydrate and cannot make use of a thin, watery film on the soil surface.

Crinipellis australis has been collected from the widely separated Adelaide, Canberra and Sydney areas. In Canberra it has been found in abundance in a variety of grassy habitats

during the summer of 2004/2005. Since that summer I have seen only a small number of *Crinipellis australis* sporocarps in some of the sites listed above. It seems likely that sporocarps could appear at any time of the year, in small numbers after "ordinary" rain but in great abundance after substantial rain spread over a week or so. It is also possible that the species is widespread in (at least) south-eastern mainland Australia and to be found in many grassland and woodland habitats. However the grassland and grassy-woodland habitats of south-eastern mainland Australia are subject to various threats. Many such habitats are in areas ideal for pastoral use or housing development and most have already disappeared or been greatly modified since European settlement. Therefore *Crinipellis australis* may well be widespread but with a very patchy distribution.

A statistician would call the Canberra specimens a biased sample from the *Crinipellis australis* population, for two reasons. First, most of the specimens are the result of a deliberate search for the species during a very short period, in unusual climatic conditions and over a very small area. Second, I ordinarily pay little attention to small, brown agarics, so the fact there was only one previous collection of the species in CANB permits no inference about either the rarity or the spread of the species in the Canberra area. In the absence of further information, there are no grounds for changing the "poorly known" status given to this species by Grgurinovic & Simpson (2001) and the above speculations about the species' distribution and phenology are simply plausible suggestions.

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References

- ACT Government. (2005). *A Vision Splendid of the Grassy Plains Extended. ACT Lowland Native Grassland Conservation Strategy*. Action Plan No. 28. Arts, Heritage and Environment, Canberra. (Accessed online, March 16, 2006 at <http://www.environment.act.gov.au/nativeplantsandanimals/threatspec/grasslandconservationstrategy>).
- Bureau of Meteorology. (2004). *Monthly Climate Summary - ACT. A warm and wet November in the ACT*. (Media release, accessed 15 March 2006 at: http://www.bom.gov.au/announcements/media_releases/act/20041201.shtml).
- Bureau of Meteorology. (2005). *Monthly Climate Summary - ACT. December was warmer and wetter than normal in the ACT*. (Media release, accessed 15 March 2006 at: http://www.bom.gov.au/announcements/media_releases/act/20050103.shtml).
- Cleland, J.B. (1934). *Toadstools and Mushrooms and Other Larger Fungi of South Australia*. Part 1. Harrison Weir, Government Printer, Adelaide.
- Grgurinovic, C.A. (1997). *Larger Fungi of South Australia*. The Botanic Gardens of Adelaide and State Herbarium and The Flora and Fauna of South Australia Handbooks Committee, Adelaide.
- Grgurinovic, C.A. & Simpson, J.A. (2001). Conservation status of the known Agaricales, Boletales, Cantharellales, Lycoperdales, Phallales and Russulales of South Australia. *Fungal Diversity* **8**, 97-127.
- Kornerup, A. & Wanscher, J.H. (1989). *Methuen Handbook of Colour (3rd. ed., reprint)*. Methuen, London.
- May, T.W., Milne, J., Wood, A.E., Shingles, S., Jones, R.H. & Neish, P. (2004). Interactive Catalogue of Australian Fungi. Version 2.0. Australian Biological Resources Study, Canberra / Royal Botanic Gardens Melbourne. http://www.rbg.vic.gov.au/research_and_conservation/fungi/cat [accessed 7 June 2007].