FERNS AND BRYOPHYTES FROM THE NORTH LUNE LIMESTONE KARST OF SOUTHERN TASMANIA

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INTRODUCTION:

This article, which lists the ferns and bryophytes of the "new" North Lune karst area in southern Tasmania, has been prompted following the recent paper presented by Alison Downing to the recent 4th Karst Studies Seminar at Mole Creek, plus the subsequently published paper by Downing, Selkirk and Oldfield (in *ACKMA Jnl.* **31:** 42-45) and is further inspired by this last journal's front cover revelation of the coming of: "Moses on Limestone".

THE NORTH LUNE KARST AREA:

The North Lune karst area is "new" area of limestone karst in southern Tasmania that has been sporadically explored by speleologists, since 1986 (Clarke, 1990a; 1990b). Located just south of the Hastings dolomite karst, and accessed via the old Mesa Creek logging tramway (*circa* 1900-1915), the North Lune karst area lies adjacent to the existing South-West National Park (World Heritage Area) and encompasses other lands in State Forest including Informal Reserves and areas designated under the "CAR" system of land reservation during the Tasmanian RFA process as areas recommended for extension of the National Park and/ or as Informal Reserve/s (Clarke, 1998b).

The North Lune karst area contains a number of small but varyingly significant caves: un-numbered (NL-X) caves and numbered caves, including "*Spider Den*" (NL-003), "*Mesa Creek Cave*" (NL-006) and "*Top Sink*" (NL-009). Notable from the North Lune karst bio-space (Clarke, 1997b) is *Spider Den*: a small 7-8m deep cave with an extraordinary diverse range of 47 invertebrate species (Clarke, 1997a), including 22 arachnids: 21 spiders and a troglobitic harvestman (Hunt, 1990). The cave contains both epigean (surface dwelling) and hypogean (cave dwelling cavernicoles) with endemic species, rare and endangered species and several "new" undescribed species and at least one species for which *Spider Den* is the type locality (Clarke, 1997a; 1998a). This cave is situated at the slope/ plain juncture in a section of Sassafras dominated rainforest (Figure 1), near a small stream and located immediately down slope from a small bluff of limestone with 2-3m high (fern and bryophyte covered) fluted spires of *rundkarren* limestone (see Figures 3, 4 and 5). The present exposure of this *rundkarren* may be partly due to the loss of skeletal soils by erosion and fires that occurred during or subsequent to logging operations in the early 1900's.

Although still largely covered by a thin layer of skeletal soils supporting rainforest species with mosses, liverworts and ferns growing directly on the limestone, this Ordovician age (460-470m.y.o) limestone has been glaciated and is variously mantled by thin surficial layers and thicker glacial sediments (clay-based moraine till), some of which partially fills many of the North Lune caves, such as *Spider Den* (Clarke, 1990a; 1990b). Glacial sediments and fluvio-glacial deposits extend a considerable distance beyond the mappable limits of the exposed surface limestone outcrop and probably cover or mantle further limestone areas as well as the subterranean drainage that is a feature of soluble rock landscapes such as limestone karst.

HYDROLOGY:

The North Lune karst includes a number of significant swallets and streamsinks including dolines and sinkholes in the streambed of Mesa Creek itself: e.g., *Top Sink* (NL-009) and the impressive fissure entrance swallet beside Mesa Creek, known as *Mesa Creek Cave* (NL-006). In addition there are several efflux springs. Some of this subterranean drainage from Mesa Creek may contribute waters to *Spider Den* (NL-003) and an un-named (numbered) efflux cave (NL-002), as well as possibly being a likely source of waters for the two warm springs beside the Lune River (Clarke, 1990a; 1990b) and the scatter of warm springs in the vicinity of the Hastings Thermal Pool.

VEGETATION:

The vegetation communities in the North Lune karst which contain the ferns and bryophytes are situated within the sassafras and/ or myrtle dominant callidendrous rainforest (Figure 1), bordered by implicate rainforest with Celery Top Pine (as dominant) and the various pockets of thamnic (Native Laurel dominant) rainforest in some karst depressions and deeper, sheltered dolines. Around the perimeter of the karst, there is wet sclerophyll and mixed forest with emergent eucalypts.

In addition to the flowering plants of the rainforest and wet sclerophyll vegetation communities (trees, shrubs and creepers), there are numerous **pteridophytes** (ferns and their allies), plus **bryophytes**: mosses (Musci) and liverworts (Hepaticae), plus other (plant) flora including lichen and several fungi.

Ferns and bryophytes from the North Lune limestone karst:

The presence of ground cover species such as ferns, bryophytes and lichens on the limestone probably all contribute to the ecology of those invertebrates which spend part of their life cycle outside of caves such as *Spider Den*. Jarman and Fuhrer (1995) state that bryophytes (mosses and liverworts) are important for providing shelter and

protection for small invertebrate species, as well as food and moisture. The following listed fern, bryophyte and lichen species that are prefixed with an asterisk ("*") are all species that were collected and/ or identified from the limestone in the section of the North Lune karst, immediately surrounding *Spider Den* (NL-003).

Most of the ferns were identified directly either by reference to Garrett (1996) and/ or by confirmation of ID from Gintaras Kantvilas (of the Tasmanian Herbarium). Listed in alphabetical order, by generic botanical name, the identified **pteridophytes** (ferns) include:

* Mother Spleenwort (Aspleniaceae: *Asplenium bulbiferum*) - [see Figure 3];

* Necklace Fern (Aspleniaceae: *Asplenium flabellifolium*);

* Maidenhair Spleenwort (Aspleniaceae: *Asplenium trichomanes*, possibly sub-species: *quadrivalens*);

* Lance Water Fern (Blechnaceae: *Blechnum chambersii*) - [see Figure 2];

Raywater Fern (Blechnaceae: *Blechnum fluviatile*);

Fishbone Water Fern (Blechnaceae: *Blechnum nudum*);

* Hardwater Fern (Blechnaceae: *Blechnum wattsii*) - [see Figure 3];

* Gypsy Fern variety (Grammitidaceae: *Ctenopteris* near *heterophylla*) -[see Figure 4];

* Manfern or Soft Treefern (Dicksoniaceae: *Dicksonia antarctica*);

Pouched Coral Fern (Gleicheniaceae: *Gleichenia dicarpa*);

Scrambling Coral Fern (Gleicheniaceae: *Gleichenia microphylla*);

* Finger Fern (Grammitidaceae: *Grammitis billardierei*) - [see Figure 4];

* Hairy Finger Fern (Grammitidaceae: *Grammitis pseudociliata*);

Bat's Wing Fern (Dennstaedtiaceae: *Histiopteris incisa*);

* Austral Filmy Fern (Hymenophyllaceae: *Hymenophyllum australe*) - [see Figure 4];

* Shiny filmy Fern (Hymenophyllaceae: *Hymenophyllum flabellatum*) - [see Figure 4];

* Narrow Filmy Fern (Hymenophyllaceae: *Hymenophyllum rarum*) - [see Figure 4];

Ruddy Ground Fern (Dennstaedtiaceae: *Hypolepis rugosula*);

Shiny Shield Fern (Dryopteridaceae: *Lastreopsis acumenata*);

Oval Wedge Fern (Lindsaeacae: *Lindsaea trichomanoides*);

Kangaroo Fern (Polypodiaceae: *Phymatosorus pustulatus*);

* Bristle Filmy Fern (Hymenophyllaceae: *Polyphlebium venosum*);

* Mother Shield Fern (Dryopteridaceae: *Polystichum proliferum*) -[see Figures1 & 3];

Bracken Fern (Dennstaedtiaceae: *Pteridium esculentum*);

Leathery Shield Fern (Dryopteridaceae: *Rumohra adiantiformis*);

Silky Fan Fern (Gleicheniaceae: *Sticherus tener* [form "B"]);

Common Fork Fern (Psilotaceae: *Tmesipteris obliqua*).

The identified **bryophytes** (mosses and liverworts) are all species found growing on the limestone in the vicinity of the cave S*pider Den* (NL-003). Most of the bryophyte species were either identified by reference to Jarman and Fuhrer (1995) and/ or confirmed or identified personally by Jean Jarman of the Tasmanian Herbarium. The mosses (MUSCI) from the North Lune karst include:

* Bryaceae: *Bryum billardierei* (?) - [see Figure 5];

* Bryaceae: *Bryum sp.* - [see Figure 5];

* Hookeriaceae: *Achrophyllum dentatum*;

* Hypopterygiaceae: *Cyathophorum bulbosum* - [see Figure 4];

* Ptychomniaceae: *Ptychomnion aciculare*.

Liverworts (HEPATICAE): leafy species from the North Lune karst:

Most of the following leafy liverwort species were collected from the mass of bryophytes shown growing on the limestone *rundkarren* flutes in Figure 4, (along with a single moss: *Cyathophorum bulbosum* and one thallose liverwort: *Riccardia sp.*).

* Acrobolbaceae: *Tylimanthus pseudosaccatus* - [see Figure 4]

* Acrobolbaceae: *Tylimanthus sp.* - [see Figure 4]

* Geocalycaceae: *Chiloscyphus leucophyllus* - [see Figure 4]

* Geocalycaceae: *Heteroscyphus coalitis*

* Geocalycaceae: *Heteroscyphus conjagatus*

* Geocalycaceae: *Heteroscyphus sp.* - [see Figure 4]

* Lepidoziaceae: *Bazzania sp.* - [see Figure 4]

* Lepidoziaceae: *Lepidozia ulothrix* - [see Figure 4]

* Lepidoziaceae: *Telaranea sp.* - [see Figure 4]

* Plagiochilaceae: *Plagiochila sp.* - [see Figure 4]

* Schistochilaceae: *Schistochila sp.* - [see Figure 4]

* Trichocoleaceae: *Trichocolea mollissima*

Liverworts (HEPATICAE): thallose species from the North Lune karst:

* Aneuraceae: *Riccardia cochleata*

* Aneuraceae: *Riccardia sp.* - [see Figure 4]

* Marchantiaceae: *Marchantia sp.*

Further unidentified thallose liverworts are possibly also species of F. Marchantiaceae.

In addition to these ferns and bryophytes, there was one lichen identified by Gintaras Kantvilas (of the Tasmanian Herbarium). Looking like a pale-green, "lettuce-leaf ", this particular lichen was also found growing on limestone rock near *Spider Den*:

* Labariaceae: *Pseudocyphellaria coronata*.

In addition, some attractive fungi located in the surrounding rainforest of the North Lune karst have been identified from field observations or photographs with reference to Fuhrer and Robinson (1992) and Young (1994).

Basidomycetes Fungi:

Agaricaceae: *Hygrocybe procera*

"Carrot-stick" Coral Fungus - Clavariaceae: *Clavulinopsis sp.*

"Bunched" Coral Fungus - Clavariaceae: *Ramaria gracilis*

Puff Balls - Lycoperdales: *Lycoperdon pyriforme*

Ascomycetes Fungi:

Stalked Orange-Peel Fungus - Ascomycotina: Pezizales: *Aleuria rhenana*

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