



Title: 'Alone'

Description: A lone *Mycena* fungus found near Hokitika

Photographer's name: Noelle Bennett

Where and when: Hokitika. West Coast, June 2017.

Sustainability: *Mycena* are a group of small, delicate mushrooms which often have long stipes (stems) and come in a variety of colours. This tiny red one was growing on its own and had a cap size of about 5mm, which suggests it is probably *Mycena ura*.

Mycena tend to grow on dead wood, leaves and twigs or in soil where there is plenty of woody debris. There are over 30 known species of *Mycena* in New Zealand, but it is thought that there are maybe another 25 to 50 species here that are yet to be described. This knowledge gap is called the 'taxonomic impediment' by conservationists, ecologists, biodiversity scientists, lawmakers, and many others rely heavily on taxonomic information to manage, conserve, use, and share our biodiversity. You can't safely conserve plants and animals if you don't know what you've got to work with, and you can't detect whether a species is in trouble unless you can recognise it and count it. So taxonomy is the foundation step in sustaining and restoring ecosystems. The world-wide shortage of taxonomic information, gaps in our taxonomic knowledge, and the shortage of trained taxonomists and curators to fill this need is a particularly extreme impediment to conserving biodiversity in New Zealand. That's partly because we are a small country with relatively few local scientists and funds to help, and because many of the species here are 'endemic' i.e. they are only found in New Zealand and so have not been taxonomically described elsewhere. New Zealand has 40 times less tax take per threatened species (an index of how much public funding might be available for understanding and conserving our biodiversity) than USA.

Fungi are basically essential in all ecosystems, acting as recyclers, helpers of almost all plants and improvers of soil health (you can read more about these roles in the commentaries attached to other photographs of fungi in the *Ecosystem Photography* galleries). Fungi are also key organisms for healing soil after wildfires which are becoming increasingly frequent and more intense because of climate change. When a fire goes through a forest it heats the upper layers of the soil up. When the temperature in that upper layer gets above about 60 degrees Celsius, it effectively sterilises the soil and all active life is killed from it. The first things to regenerate after a forest fire are

fungi. The 'disc fungi' spores germinate almost immediately after fire. Their fine thread-like hyphae bind soil particles together, thereby creating spaces between the particles to allow air and water to penetrate into the soil profile and so for plant roots to reform. This regrowth stabilises the soil and helps reduce erosion. The fungi gradually neutralise the highly alkaline ash, which could have a pH of up to 10, so that it eventually returns to around pH 7. Gradually, the web of life with all its complex communication systems regains momentum, habitats are re-established, insects and other animal life return and natural cycles continue. So life repairs life after disturbance – and in this example, regeneration is largely achieved thanks to the humble fungus.

Photographer's notes: I'll never cease to be amazed by nature. The more I learn, the more fascinated I become and the more I seem to notice. We so need to simply slow down and see.

Photo specs: This image is a composite but is produced from one single image which has been used multiple times with differing effects applied to each iteration. **Technical specs:** The image was taken using a Panasonic DC-G9 camera and a Panasonic Leica DG Macro-Elmarit 45mm f/2.8 macro lens. Exposure details - 1/40sec at f5.6 with an ISO of 400 and a focal length of 45mm (90mm full frame equivalent).

Digital specs: 7362 x 5699 pixels (41.96MP) @ 300dpi

Key words: fungi, fungus, mushroom, Mycena, Mycena ura, saprobe, mycorrhizal, hyphae, endemic, taxonomic impediment, taxonomy, Hokitika, West Coast, fire, regeneration, soil structure, Noelle Bennett, Ecosystems Photography, sustainability.

Price: \$250 (incl. GST) for use of the digital image. Visit www.ecosystemsp photography/sales for details & to order, or to get a quote if you would like a high-quality print.

Donation: The price includes a \$100 donation to a sustainability organisation or project of your choice, or otherwise to *iNaturalist NZ – Mātaki Taiao* – <https://inaturalist.nz>.

We recommend that the donation goes to *iNaturalist NZ* because they are supporting a wide variety of community-led biodiversity monitoring programmes throughout New Zealand, including for the fungi featured in this series of photographs. *iNaturalist* receives species records from citizen scientists, maps the data, and shares the information so that it can be used by scientists, policy makers, and the public. They invite everyone to submit photographs and will find an expert to help by identify the plants and animals in the photographs.

Image ref: NB#019 (please use this reference in all orders and correspondence).

Noelle Bennett
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