

Collared Earthstars

Geastrum triplex

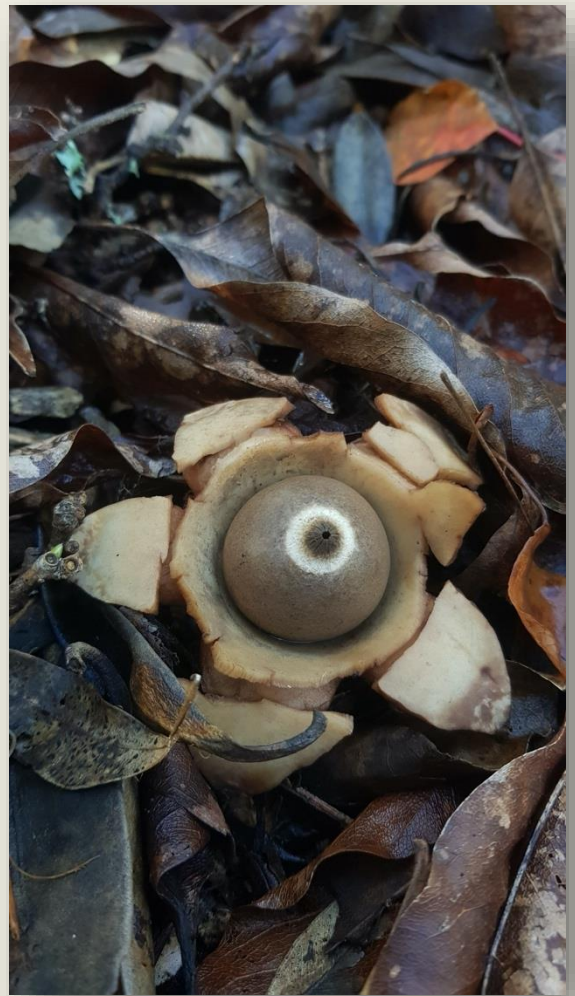
Just one of the many weird and wonderful fungi on campus at present...

Geastrum triplex is in a genus of puffball-like mushrooms in the family Geastraceae. *Geastrum*, comes from *Geo-*, meaning earth, and *astrum*, meaning star. The name is very apt when you spot these fungi amongst decaying organic matter... a spherical ball sitting in a star-shaped saucer!

Geastrum are saprobic fungi that live on rotting wood or soil in leaf litter and mulch where they derive their nutrients from decomposing organic matter. Apart from the visible fruiting bodies, there are masses of underground almost invisible fungal threads (*hyphae*) that collectively are referred to as *mycelium*. These root-like structures secrete enzymes that break down organic matter into smaller components that can then be readily absorbed. Basically, they digest organic matter around them and then absorb it into their bodies. **Merlin Sheldrake** writes in his book, "Entangled Life. How fungi make our worlds, change our minds and shape our futures":

The difference between animals and fungi is simple: animals put food in their bodies, whereas fungi put their bodies in the food.

The immature fruiting bodies are partially or completely buried in the ground. When conditions are suitable, the fruiting bodies mature and pop up amongst the leaf litter. The thickened outer layer, the *exoperidium*, then splits radially and the pointed segments fold back, creating the star-like base,



Geastrum triplex Photo Karen Marais



Geastrum sp. immature fruiting bodies still partially buried
Photo: Sofia Zvolanek

exposing the spherical inner spore sac (*endoperidium*). The bases of the rays usually break around the perimeter of the spore sac, forming the saucer-like platform, that gave rise to the common name “Collared Earthstar” or “Saucered Earthstar”. The spore sac has a pointed beak at the top, called the peristome. The small opening at the top has a jagged edge through which the spores can escape. The wall of the spore sac is thin and flexible, allowing the powdery spores to puff out in a dramatic expulsion when the sac is compressed by raindrops, a falling twig or even a finger! Wind blowing over the jagged opening can also suck out spores.



Cloud of spores being released by pressure on spore sac.
Photo: Karen Marais



Franz Wilhelm Junghuhn,
<https://commons.wikimedia.org/wiki/File:Junghuhn-Licht2.jpg>

Geastrum species vary in size from a few millimetres in diameter to several centimetres. *Geastrum triplex* is the largest species in the genus (immature fruit bodies can get up to 10 cm in diameter). It is widely distributed around the world and has been collected on all continents, except Antarctica. The species was first described by the German botanist, Franz Wilhelm Junghuhn in 1840, while living in Java, Indonesia. He collected the type specimen on Mount Pangerangi. The first documented collections in Australia came from the “Challenger Expedition” in June 1874, when they were collected in Pennant Hills and Parramatta.

Although the fruiting bodies of *Geastrum triplex* are said to be non-poisonous, they are tough and fibrous and not palatable. There are a few references to medicinal and cultural uses. In North America, the Cherokee used the fruiting bodies on the navels of babies after childbirth for



Geastrum sp. Photo: Jenny Medd



Geastrum sp. Photo: Jenny Medd

prophylactic and therapeutic measures. It is also used in traditional Chinese and Indian medicine to reduce swelling and to stop bleeding. In Tanzania, mature fruiting bodies of *Geastrum triplex* and *G. saccatum* have been used to harvest honey, by piercing the spore sac and releasing the spores directly into the

beehives. This is said to anaesthetise the bees for around 30 minutes without harming them and allows for easy honey harvesting.

The fruiting bodies of *Geastrum triplex* have been chemically analysed and shown to contain many bioactive compounds, including *ergosterol*. Most fungi cannot live without *ergosterol* and because ergosterol is present in cell membranes of fungi, yet absent in those of animals, it is a useful target in the development of antifungal drugs.

Fungi are all around us and once you start delving into the fascinating world of fungi, chances are good you will get hooked! Fungi give you a different perspective on life. **Alison Pouliot**, natural historian, photographer and author of multiple books on fungi said it so well: *Fungi alert us to the inherent connectivity of life and help us understand that symbiosis is not some alternative strategy, but how everything survives, including Homo sapiens.*

Atlas of Living Australia: [Geastrum triplex: Collared Earthstars | Atlas of Living Australia \(ala.org.au\)](https://ala.org.au)

Berkeley, M J. 1877. The Fungi of the Challenger Expedition. J. Linn. Soc. Bot. 16: 40

<https://www.biodiversitylibrary.org/item/8368#page/42/mode/1up>

Karun, N C., Sridhar, K R. 2014. Geasters in the Western Ghats and west coast of India. Acta Mycol 49(2):207–219

Powell, R. 2020. [Fungi brings life to dark places. Sydney Morning Herald.](#)

Tibuhwa, D. 2012. Folk taxonomy and use of mushrooms in communities around Ngorongoro and Serengeti National Park, Tanzania. *J Ethnobiology Ethnomedicine* 8, 36.

Wikipedia: https://en.wikipedia.org/wiki/Geastrum_triplex

Wikipedia: <https://en.wikipedia.org/wiki/Mycelium>

Wikipedia: <https://en.wikipedia.org/wiki/Ergosterol>

Karen Marais, Sofia Zvolanek, Alison Downing, Brian Atwell and Kevin Downing
School of Natural Sciences



MACQUARIE
University
SYDNEY · AUSTRALIA

