

= *Amanita nothofagi* =

Amanita nothofagi is a species of fungus in the Amanitaceae family . Endemic to New Zealand , the species was first described by mycologist Greta Stevenson in 1962 . The fruit bodies have dark brown caps that are up to 13 cm (5 @. @ 1 in) in diameter and covered with patches of soft greyish @-@ brown scales or warts . The gills underneath the cap are crowded together , free from attachment to the stem , and white , becoming tinged with yellow in age . The stem of the mushroom is 4 ? 14 cm (1 @. @ 6 ? 5 @. @ 5 in) long by 0 @. @ 5 ? 2 @. @ 5 cm (0 @. @ 2 ? 1 @. @ 0 in) thick , and has a ring . The spore print is white , and individual spores are spherical to ellipsoid , measuring 7 @. @ 5 ? 9 by 7 @. @ 5 ? 9 micrometres . The mushroom may be confused with another New Zealand species , *A. australis* , but can be distinguished by certain characteristics . *Amanita nothofagi* is a mycorrhizal species , and grows in association with native New Zealand trees such as Southern Beech .

= = Taxonomy and classification = =

The species was first described as new to science by New Zealand mycologist Greta Stevenson who collected specimens in the mid @-@ 1950s , in Nelson and Cape Farewell . She published a description of the mushroom in the Royal Botanic Garden 's journal *Kew Bulletin* in 1962 , the second part of a five @-@ part series of articles describing the mushroom flora of the country . The specific epithet *nothofagi* refers to *Nothofagus* , the genus of Southern beeches with which the species is often associated . *Amanita* authority Rodham Tulloss uses the common name " southern beech *Amanita* " , while Geoff Ridley suggests " charcoal flycap " .

Stevenson classified *Amanita nothofagi* in the section *Phalloideae* of the genus *Amanita* , but Ridley considered it better placed in section *Validae* because of its " subglobose basidiospores , a clavate or occasionally abruptly bulbous stipe base , with sparse bands or a rim of volva material . "

= = Description = =

The cap of *A. nothofagi* is initially convex , later becoming flattened with a central depression , with radial grooves on the margin , reaching diameters of 30 ? 130 mm (1 @. @ 2 ? 5 @. @ 1 in) . The colour is variable , ranging from buff to dark grey to greyish @-@ sepia , with radial streaks of dusky brownish grey . The cap surface is sticky when young or wet , but dries out with age . The remnants of the volva form small to large , irregularly shaped , felted patches , that are dull greyish @-@ sepia to sepia , and sometimes scab @-@ like . The gills are crowded closely together , and free from attachment to the stem . They are white to cream @-@ coloured , 6 ? 10 mm (0 @. @ 2 ? 0 @. @ 4 in) wide . The lamellulae (short gills that do not extend fully from the cap edge to the stem) have somewhat truncated ends .

The stem is 40 ? 140 mm (1 @. @ 6 ? 5 @. @ 5 in) high , 5 ? 25 mm (0 @. @ 2 ? 1 @. @ 0 in) thick , and tapers slightly at the top . It is hollow and has a bulbous base measuring 10 ? 30 mm (0 @. @ 4 ? 1 @. @ 2 in) in diameter . The stem surface above the level of the ring is white , sparsely covered with woolly or fuzzy tufts , occasionally breaking into transverse bands ; below the ring the stem surface is smooth or occasionally breaks into bands or fibrillose scales . It is whitish , buff or greyish @-@ sepia streaked with grey . The stem base may or may not have a band or rim of buff to greyish @-@ sepia volval remnants . The ring is membranous , grooved , whitish , buff , and greyish @-@ sepia or lavender @-@ grey . It first hangs freely before later sticking to the stem , often tearing and adhering to the edge of the cap . The flesh of the cap is white or stained mouse @-@ grey under the central part , occasionally with a grey line above the gills ; the stem flesh is white to pale buff .

The spore print is white . The spores are typically 7 @. @ 5 ? 9 by 7 @. @ 5 ? 9 µm , spherical to broadly ellipsoid to ellipsoid , and thin @-@ walled . Under a microscope , the spores appear hyaline (translucent) , and are amyloid ? meaning they will turn bluish @-@ black to black when stained with Melzer 's reagent . The basidia are 30 @. @ 5 ? 57 by 8 ? 16 µm , four @-@ spored ,

and not clamped at the base . The margin cells of the gills are plentiful , spherical , club @-@ shaped or swollen spherically at the tip , hyaline , and measure 13×58 by $8 \times 33 \mu\text{m}$. The cap cuticle consists of a $130 \times 220 \mu\text{m}$ wide , strongly gelatinised suprapellis (upper layer) and a dense , non @-@ gelatinised subpellis (lower layer) . The volval remnants on the cap are made of abundant spherical , elliptic and club @-@ shaped cells that are 21×119 by $14 \times 5 \times 115 \mu\text{m}$, intermixed with hyphae $4 \times 9 \mu\text{m}$ wide and pale umber in colour , and either arranged irregularly , or with a vertical orientation .

== Similar species ==

Amanita nothofagi mushrooms can be confused with *A. australis* if the warts have been washed off and the colour has been bleached . A reliable method to distinguish the two is to check for the presence of clamp connections at the bases of the basidia , which are present in *A. australis* and absent from *A. nothofagi* . Ridley notes that the type collection was made with a dark grey specimen , and later collectors who found browner specimens have had difficulty in correctly identifying the species . Paler specimens resemble *A. excelsa* , which led some to incorrectly believe that the species occurs in New Zealand . *Amanita luteofusca* is also similar in appearance , spore size , amyloid reaction , and lack of clamp connections in the basidia . It is distinguished from *A. nothofagi* largely on the basis of colour ? it is a greyish @-@ brown to yellowish @-@ grey brown that fades to pinkish @-@ buff as it gets older . Tulloss suggests that the resemblance of a number of species from Australasia and Chile which lack brightly coloured fruit bodies and share similar greyish to brownish rings and volvas may indicate that they share Gondwanan ancestors .

== Habitat and distribution ==

The fruit bodies of *Amanita nothofagi* grow solitarily or in scattered groups . Like all *Amanita* mushrooms , it is mycorrhizal , and grows in close association with Southern Beech (genus *Nothofagus*) (including New Zealand Red Beech , Silver beech , New Zealand Black Beech , and Hard Beech) , Manuka , and Kōnuka . Found on both the North and South islands of New Zealand , it is the most common of the country 's endemic *Amanita* species .