

## = *Psilocybe makarorae* =

*Psilocybe makarorae* is a species of psilocybin mushroom in the family Strophariaceae . Officially described as new to science in 1995 , it is known only from New Zealand , where it grows on rotting wood and twigs of southern beeches . The fruit body ( mushroom ) has a brownish cap with lighter coloured margins , measuring up to 3 @.@ 5 cm ( 1 @.@ 4 in ) wide . The cap shape is either conical , bell @-@ shaped , or flat depending on the age of the mushroom , and it features a prominent umbo . Although the whitish stem does not form a true ring , it retains remnants of the partial veil that covers and protects the gills of young fruit bodies . *P. makarorae* mushrooms can be distinguished from the similar North American species *Psilocybe caerulipes* by microscopic characteristics such as the presence of cystidia on the gill faces ( pleurocystidia ) , and cheilocystidia ( found on the gill edges ) with more elongated necks . Based on the bluing reaction to injury , *P. makarorae* is presumed to contain the psychedelic compounds psilocybin and psilocin .

## = = Taxonomy = =

The species was first mentioned in the literature in 1981 , when Pierre Margot and Roy Watling described a specimen collected in 1969 by Grace Marie Taylor near the Franz Josef Glacier as an unnamed *Psilocybe* with affinities to the North American species *Psilocybe caerulipes* . It was officially described as new to science in 1995 by mycologists Peter R. Johnston and Peter K. Buchanan . In his 1996 book *Psilocybin Mushrooms of the World* , Paul Stamets noted that the two authors are known to work with law @-@ enforcement officials to assist in prosecuting those who illegally collect psychoactive mushrooms .

The type material was collected in 1990 , near the Haast Pass crossing the Makarora River . The specific epithet *makarorae* refers to the type locality . *P. makarorae* is classified in Gastón Guzmán 's section *Mexicanae* owing to the spore shape and bluing reaction upon injury . It is distinguished from other species in this section by the size of the caps , the presence of pleurocystidia , and the short @-@ necked cheilocystidia .

## = = Description = =

The cap is initially conical to bell shaped , but as the mushroom grows , it expands to become convex with a prominent umbo , and attains a diameter of 15 ? 55 mm ( 0 @.@ 6 ? 2 @.@ 2 in ) . The cap surface is dry to slightly tacky . Its colour is yellow @-@ brown to orange @-@ brown , often paler towards the margin , which has fine striations corresponding to the gills on the underside . The flesh is white . Gills have an adnexed attachment to the stem , and are pale greyish @-@ brown . The whitish stem is 30 ? 60 millimetres ( 1 @.@ 2 ? 2 @.@ 4 in ) long by 2 ? 4 mm wide . It is cylindrical , with a surface of pressed silky fibrils . The base of the stem is often brownish , with white rhizoids present . The veil of young fruit bodies is cortinate ? resembling the cobweb @-@ like partial veil found in *Cortinarius* species . As the mushroom grows , its remnants often remain visible on the stem , but it never forms a complete ring . Both the cap and the stem stain greenish @-@ blue when damaged .

The spore print is dark purplish @-@ brown . Spores typically measure 7 @.@ 5 ? 9 @.@ 5 by 5 @.@ 5 ? 6 @.@ 5 by 4 @.@ 5 ? 5 @.@ 5 ?m , averaging 8 @.@ 7 by 6 @.@ 0 by 5 @.@ 3 ?m . Its shape in face view is ovate ( egg @-@ shaped ) to roughly rhomboid , while viewed from the side it appears elliptical . The spore wall is brown , smooth , about 0 @.@ 8 ? 1 ?m thick , and has a germ pore . The basidia ( spore @-@ bearing cells ) are four @-@ spored and somewhat club @-@ shaped , tapering slightly to the base ; they are clamped , and measure 25 ? 31 by 7 ? 8 @.@ 5 ?m .

The cheilocystidia ( cystidia on the gill edge ) have dimensions of 18 ? 26 by 6 ? 9 ?m , and a shape ranging from ventricose @-@ rostrate ( broad in the middle and tapering to a beaklike neck ) to mucronate ( ending abruptly in a short sharp point ) . They are hyaline ( translucent ) , thin @-@ walled , and clamped , with necks that are 3 ? 5 ?m long . The pleurocystidia ( cystidia on the gill

face ) are similar in shape to cheilocystidia , but narrower ( 4 ? 8 ?m wide ) , and usually have a shorter neck measuring 2 @. @ 5 ? 4 ?m . The cap cuticle is a cutis ( characterised by hyphae that run parallel to the cap surface ) of long @-@ celled , 2 ? 3 ?m diameter , gelatinised hyphae . The hypodermium ( the tissue layer under the cap cuticle ) is filamentous , comprising 4 ? 6 ?m diameter cells with pale brown walls . Clamps are common . The subhymenium ( the tissue layer under the hymenium ) is poorly developed , containing 2 ? 4 ?m diameter cells with pale brown walls . The tissue comprising the hymenophore is made of short cylindric , 3 ? 6 ?m diameter hyaline cells .

*P. makarorae* contains the psychedelic compounds psilocybin and psilocin . Although the potency is not known definitely , Stamets suggests that , based on the degree of the bluing reaction , they are " probably moderately potent " .

= = = Similar species = = =

*Psilocybe makarorae* closely resembles the North American species *P. caerulipes* , but the former can be distinguished microscopically from the latter by the presence of pleurocystidia , and cheilocystidia with longer necks . There are several other psychoactive species of *Psilocybe* found in New Zealand : *P. aucklandii* , *P. cubensis* , *P. semilanceata* , *P. subaeruginosa* , *P. subcubensis* , and *P. tasmaniana* . *P. subaeruginosa* is distinguished from *P. makarorae* by having chocolate brown pleurocystidia . Closely related to *P. subaeruginosa* is the poorly known *P. tasmaniana* ; some have considered the two species synonymous . It has been reported growing on dung and dung @-@ enriched woody debris in open areas of Eucalyptus forests . *P. cubensis* is a common , dung @-@ loving species that can be readily recognized by its larger size ( cap diameter up to 8 cm ( 3 @. @ 1 in ) ) , golden color , and well @-@ formed membranous ring ; *P. subcubensis* is nearly identical , differing only in microscopic characteristics . Known only from the Auckland region , *P. aucklandii* fruits in soil rich in woody debris near *Leptospermum* and *Dacrydium* , and in Monterey Pine ( *Pinus radiata* ) plantations . *P. semilanceata* , one of the most common *Psilocybe* mushrooms , is only found in high @-@ altitude grasslands on the South Island .

= = Habitat and distribution = =

*Psilocybe makarorae* is known only from New Zealand . The reported collection locations have been on both the North and South Islands , including the Bay of Plenty , Westland District , Central Otago , and Dunedin , although Stamets suggests that it is more widely distributed . Like all *Psilocybe* species , it is saprobic , and feeds on decomposing organic matter . Fruit bodies grow scattered or in groups on the fallen , rotting wood of southern beeches ( genus *Nothofagus* ) , and are often encountered near lakes and picnic grounds .