

= *Mycena inclinata* =

Mycena inclinata , commonly known as the clustered bonnet or the oak @-@ stump bonnet cap , is a species of mushroom in the family Mycenaceae . The doubtfully edible mushroom has a reddish @-@ brown bell @-@ shaped cap up to 4 @.@ 5 cm (1 @.@ 8 in) in diameter . The thin stem is up to 9 cm (3 @.@ 5 in) tall , whitish to yellow @-@ brown at the top but progressively becoming reddish @-@ brown towards the base in maturity , where they are covered by a yellowish mycelium that can be up to a third of the length of the stem . The gills are pale brown to pinkish , and the spore print is white . It is a widespread saprobic fungus , and has been found in Europe , North Africa , Asia , Australasia , and North America , where it grows in small groups or tufts on fallen logs and stumps , especially of oak . British mycologist E.J.H. Corner has described two varieties of the mushroom from Borneo . Lookalike species with which *M. inclinata* may be confused include *M. galericulata* and *M. maculata* .

= = Taxonomy , phylogeny , and naming = =

First described as *Agaricus inclinatus* by Swedish mycologist Elias Magnus Fries in 1838 , it was assigned its current name in 1872 by Lucien Quélet . *Mycena galericulata* var. *calopus* (named by Karsten in 1879) , and its basionym *Agaricus galericulatus* var. *calopus* (named by Fries in 1873) , are synonyms .

In a molecular study of the large subunit ribosomal DNA sequences of mycorrhizal fungi of the orchid *Gastrodia confusa* , *M. inclinata* was found to be closely related to *M. aurantiomarginata* , *M. crocata* , and *M. leaiana* .

The specific epithet *inclinata* means " bent in " . The mushroom is commonly known as the " clustered bonnet " or the " oak @-@ stump bonnet cap " .

= = Description = =

The cap is light reddish @-@ brown , with a diameter typically ranging from 1 to 4 @.@ 5 cm (0 @.@ 4 to 1 @.@ 8 in) . Initially conic to bell @-@ shaped to convex , it flattens during maturity , developing visible surface grooves corresponding to the gills underneath the cap . The margin of the cap has minute but distinct scallops . The surface is moist and smooth , and hygrophanous . The cap frequently develops splits in the margin , or cracks in the disc (the central part of the cap) . The flesh of the cap is thick in the center but thin elsewhere , grayish to whitish , fragile , and with a slightly mealy odor and taste . The gills have a decurrent attachment to the stem (that is , running down the length of the stem) and are a pale brownish color with tinges of red . They are broad (between 3 and 6 mm) , and have a close to subdistant spacing , with about 26 ? 35 gills reaching the stem . The fragile stem is 3 to 9 cm (1 @.@ 2 to 3 @.@ 5 in) long by 0 @.@ 15 to 0 @.@ 4 cm (0 @.@ 06 to 0 @.@ 16 in) thick and yellow to yellow @-@ brown , becoming reddish @-@ brown to orange @-@ brown in the bottom half in maturity . The lower portion of young stems is covered with white flecks . Roughly equal in thickness at the top and bottom , the base of the stem is covered by a yellowish mycelium that can be up to a third of the length of the stem . The edibility of the mushroom is " doubtful " and consumption " best avoided " .

= = = Microscopic characteristics = = =

The spores are 7 ? 9 by 5 ? 6 @.@ 5 ?m , broadly ellipsoid , smooth , and strongly amyloid (it turns black when treated with Melzer 's reagent) . The basidia (spore @-@ bearing cells) are four @-@ spored . The pleurocystidia (cystidia on the gill face) are not differentiated . The cheilocystidia (cystidia on the gill edge) are embedded in the gill edge and very inconspicuous , club @-@ shaped , 26 ? 36 by 5 ? 10 ?m , and have tips that are covered with contorted projections that can be slender or thick . The flesh of the gills is homogeneous , and pale yellowish to dirty brown when stained in iodine . The flesh of the cap has a distinct pellicle , a well @-@ differentiated

hypoderm (a region of tissue immediately under the pellicle) , and a filamentous tramal body (gill tissue) ; it is pale yellowish to sordid brownish in iodine stain .

= = = Varieties = = =

E.J.H. Corner defined the varieties *M. inclinata* var. *kinabaluensis* and var. *subglobospora* in his 1994 publication on Agaric mushrooms of Malesia , a biogeographical region straddling the boundary of the Indomalaya and Australasia ecozones . The variety *kinabaluensis* (named after its type locality , Kinabalu) has a cap margin that is not scalloped , little or no odor , and cheilocystidia with shorter processes . It was found growing on the dead wood of *Lithocarpus havilandii* , a stone oak tree in the beech family . Variety *subglobospora* , found in Sabah , has spores that are almost spherical .

= = = Similar species = = =

Mycena maculata bears some resemblance to *M. inclinata* , but is only associated with decaying hardwood logs and stumps , and is found in eastern North America , and sometimes on oak on the West Coast . In age , it develops reddish spots on the gills that are not seen in *M. inclinata* . *M. inclinata* is often confused with the edible *M. galericulata* , a common species that is variable in cap color , size and shape . *M. galericulata* typically has a bluntly conical cap that is dull gray @-@ brown , and white to grayish veins that have numerous cross @-@ veins . *M. polygramma* has a ridged stem that is bluish @-@ gray .

= = Habitat and distribution = =

Mycena inclinata is a saprobic fungus , deriving its nutrients from decomposing organic matter found in plant litter such as leaves , twigs , bark and branches . It accomplishes this by producing enzymes capable of breaking down the three major biochemical components of plant cell walls found in litter : cellulose , hemicellulose and lignin .

The fruit bodies of *Mycena inclinata* grow in dense groups or clusters on decaying hardwood logs and stumps (especially oak and chestnut) during the spring and autumn . The fungus forms a white , woolly mycelium on the surface of decomposing oak leaves . Occasionally , it can be found growing on a living tree . In eastern North America , it is abundant in the area bounded by Nova Scotia , Ontario , Manitoba , Missouri , North Carolina , and New York . It has been found in Oregon , but the species appears to be generally rare along the Pacific Coast . The range of the fungus also includes Europe , the Canary Islands , North Africa , East Siberia , Japan , Malesia , Turkey , and New Zealand .

= = Chemistry = =

In a study of the trace metal concentrations of various mushrooms species found in Ordu (Turkey) , *M. inclinata* was found to have comparatively high levels of iron (628 mg per kg) and nickel (21 @.@ 6 mg / kg) , measured on a dry weight basis . Laboratory studies have shown that the fungus is resistant to aluminum . The fungus has been investigated for its ability to decolorize synthetic dyes that are used in the textile , plastics , biomedical and foodstuff industries . The dyes are not readily biodegradable , and when discharged into the environment are persistent and many are toxic .