= Mycena haematopus =

Mycena haematopus , commonly known as the bleeding fairy helmet , the burgundydrop bonnet , or the bleeding Mycena , is a species of fungus in the Mycenaceae family , of the order Agaricales . It is widespread and common in Europe and North America , and has also been collected in Japan and Venezuela . It is saprotrophic ? meaning that it obtains nutrients by consuming decomposing organic matter ? and the fruit bodies appear in small groups or clusters on the decaying logs , trunks , and stumps of deciduous trees , particularly beech . The fungus , first described scientifically in 1799 , is classified in the section Lactipedes of the genus Mycena , along with other species that produce a milky or colored latex .

The fruit bodies of M. haematopus have caps that are up to 4 cm (1 @.@ 6 in) wide , whitish gills , and a thin , fragile reddish @-@ brown stem with thick coarse hairs at the base . They are characterized by their reddish color , the scalloped cap edges , and the dark red latex they " bleed " when cut or broken . Both the fruit bodies and the mycelia are weakly bioluminescent . M. haematopus produces various alkaloid pigments unique to this species . The edibility of the fruit bodies is not known definitively .

= = Taxonomy and naming = =

The species was initially named Agaricus haematopus by Christian Hendrik Persoon in 1799 , and later sanctioned under this name by Elias Magnus Fries in his 1821 Systema Mycologicum . In the classification of Fries , only a few genera were named , and most agaric mushrooms were grouped in Agaricus , which was organized into a large number of tribes . Mycena haematopus gained its current name in 1871 when the German fungal taxonomist Paul Kummer raised many of Fries ' Agaricus tribes to the level of genus , including Mycena . In 1909 Franklin Sumner Earle placed the species in Galactopus , a genus that is no longer considered separate from Mycena . Mycena haematopus is placed in the section Lactipedes , a grouping of Mycenas characterized by the presence of a milky or colored latex in the stem and flesh of the cap . The specific epithet is derived from Ancient Greek roots meaning " blood " (??????- , haimato-) and " foot " (???? , pous) . It is commonly known as the blood @-@ foot mushroom , the bleeding fairy helmet , the burgundydrop bonnet , or the bleeding Mycena .

In 1914 , Jakob Emanuel Lange described the variety M. haematopus var. marginata , characterized by the reddish color on the edge of the gills ; Mycena specialist Rudolph Arnold Maas Geesteranus considered the coloration of the gill edge too variable to have taxonomical significance . Mycena haematopus var. cuspidata was initially found in Colorado in 1976 , and described as a new variety by American mycologists Duane Mitchel and Alexander H. Smith two years later . The fruit bodies are characterized by a " beak " on the cap that often splits or collapses as the cap matures . It was treated as Mycena sanguinolenta var. cuspidata by Maas Geesteranus in 1988 .

= = Description = =

The fruit bodies of Mycena haematopus are the reproductive structures produced by cellular threads or hyphae which grow in rotting wood . The shape of the cap of the fruit body will vary depending on its maturity . Young caps , or " buttons " , are ovoid (egg @-@ shaped) to conical ; later they are campanulate (bell @-@ shaped) , and as the fruit body matures , the margins (cap edge) lift upward so that the cap becomes somewhat flat with an umbo (a central nipple @-@ shaped bump) . The fully grown cap can reach up to 4 cm (1 @.@ 6 in) in diameter . The surface of the cap initially appears dry and covered with what appears to be a very fine whitish powder , but it soon becomes polished and moist . Mature caps appear somewhat translucent , and develop radial grooves mirroring the position of the gills underneath . The color of the cap is reddish- or pinkish @-@ brown , often tinged with violet , and paler towards the edge . The margin is wavy like the edge of a scallop , and may appear ragged because of lingering remnants of the partial veil .

The mushroom flesh can range from pale to the color of red wine (vinaceous) , and has no

distinctive odor . It oozes a red latex when cut . The gills have an adnate attachment to the stem , meaning they are more or less directly attached to it . They are initially whitish or " grayish vinaceous " in color , and can develop reddish @-@ brown stains . Between 20 and 30 gills reach from the cap edge to the stem , resulting in a gill spacing that is described as " close to subdistant " ? gaps are visible between adjacent gills . There are additional gills , called lamellulae , that do not extend directly from the margin to the stem ; these are arranged in two or three series (tiers) of equal length . The stem is up to 9 cm (3 @.@ 5 in) tall and 0 @.@ 1 to 0 @.@ 2 cm (0 @.@ 04 to 0 @.@ 08 in) thick , hollow and brittle , and a dark reddish @-@ brown color . In young fruit bodies , the upper part of the stem is densely covered with a pale cinnamon @-@ colored powder which wears off with age . The stem has a mass of coarse hairs at the base . Like the cap , the stem also bleeds a red latex when it is cut or broken .

Mycena haematopus can be parasitized by Spinellus fusiger , another fungal species which gives the mushroom a strikingly hairy appearance .

= = = Microscopic characteristics = = =

The spore print is white . The spores are elliptical , smooth , with dimensions of 8 ? 11 by 5 ? 7 µm . They are amyloid , meaning they will absorb iodine when stained with Melzer 's reagent . The spore @-@ bearing cells (basidia) are 4 @-@ spored . Sterile cells called cystidia are numerous on the edges on the gills ; they measure 33 ? 60 µm (sometimes up to 80) by 9 ? 12 µm . Cystidia that are present on the stipe (caulocystidia) appear in clusters , and clublike to irregular in shape , measuring 20 ? 55 by 3 @.@ 5 ? 12 @.@ 5 µm . The gill tissue contains numerous lactifers , cells that produce the latex that is secreted when it is cut .

The surface mycelium of M. haematopus is whitish and fluffy . Swelling at the terminal tips of hyphae (diameter up to 12 µm) is present , but not very abundant , and moniliform hyphae are very rare . Bioluminescence is present , but weak . Extracellular oxidase enzymes are present , consistent with its ecological role as a saprobe .

= = = Edibility = = =

Although some sources claim that M. haematopus is edible , it is " hardly worth collecting because of its small size . " Other sources consider the species inedible , or recommend avoiding consumption , " since most of them have not yet been tested for toxins . " The taste of the mushroom is mild to slightly bitter .

= = = Similar species = = =

Another Mycena that produces a reddish latex is Mycena sanguinolenta , the " terrestrial bleeding Mycena " . It may be distinguished from M. haematopus in several ways : it is smaller , with cap diameters between 0 @.@ 3 to 1 cm (0 @.@ 1 to 0 @.@ 4 in) wide ; grows in groups rather than clusters ; is found on leaves , dead branches , moss beds and pine needle beds rather than decaying wood ; and the edges of its gills are consistently dark brownish @-@ red . Furthermore , range of cap color in M. sanguinolenta is different than in M. haematopus , varying from reddish @-@ to orange @-@ brown , and it lacks a band of partial veil remnants hanging from the margin .

= = Ecology , distribution and habitat = =

Mycena haematopus obtains nutrients from decomposing organic matter (saprobic) and the fruit bodies can typically be found growing on stumps and well @-@ decayed logs , usually in groups that are joined together by a common base . The decomposition of woody debris on the forest floor is the result of the combined activity of a community of fungal species . In the sequential succession of mushrooms species , M. haematopus is a " late colonizer " fungus : its fruit bodies appear after the wood has first been decayed by white rot species . The initial stage of wood decay by white rot

fungi involves the breakdown of " acid @-@ unhydrolyzable residue " and holocellulose (a mixture of cellulose and hemicellulose) .

In North America , Mycena haematopus is known to be distributed from Alaska southward . According to Mycena specialist Alexander H. Smith , it is " the commonest and the most easily recognized one in the genus . " The species is common in Europe , and it has also been collected from Japan , and Mérida , Venezuela , as the variety M. haematopus var. marginata . In the Netherlands , M. haematopus is one of many mushrooms that can regularly be found fruiting on ancient timber wharves . The fruit bodies can be found year @-@ round in mild weather .

= = Bioluminescence = =

Both the mycelia and the fruit bodies of M. haematopus (both young and mature specimens) are reported to be bioluminescent . However , the luminescence is quite weak , and not visible to the dark @-@ adapted eye ; in one study , light emission was detectable only after 20 hours of exposure to X @-@ ray film . Although the biochemical basis of bioluminescence in M. haematopus has not been scientifically investigated , in general , bioluminescence is caused by the action of luciferases , enzymes that produce light by the oxidation of a luciferin (a pigment) . The biological purpose of bioluminescence in fungi is not definitively known , although several hypotheses have been suggested : it may help attract insects to help with spore dispersal , it may be a by @-@ product of other biochemical functions , or it may help deter heterotrophs that might consume the fungus .

= = Natural products = =

Several unique chemicals are produced by Mycena haematopus . The primary pigment is haematopodin B , which is so chemically sensitive (breaking down upon exposure to air and light) that its more stable breakdown product , haematopodin , was known before its eventual discovery and characterization in 2008 . A chemical synthesis for haematopodin was reported in 1996 . Haematopodins are the first pyrroloquinoline alkaloids discovered in fungi ; pyrroloquinolines combine the structures of pyrrole and quinoline , both heterocyclic aromatic organic compounds . Compounds of this type also occur in marine sponges and are attracting research interest due to various biological properties , such as cytotoxicity against tumor cell lines , and both antifungal and antimicrobial activities . Additional alkaloid compounds in M. haematopus include the red pigments mycenarubins D , E and F. Prior to the discovery of these compounds , pyrroloquinoline alkaloids were considered to be rare in terrestrial sources .

= = = Books cited = = =

Smith AH . (1947) . North American species of Mycena . Ann Arbor : University of Michigan Press .