

= *Volvopluteus michiganensis* =

Volvopluteus michiganensis is a species of mushroom in the family Pluteaceae . It was originally described under the name *Pluteus michiganensis* but molecular studies have placed it in the *Volvopluteus* , a genus described in 2011 . The cap of this mushroom is about 7 ? 9 cm (2 @. @ 8 ? 3 @. @ 5 in) in diameter , gray , and has a cracked margin that is sticky when fresh . The gills start out as white but they soon turn pink . The stipe is white and has a volva at the base . Microscopical features and DNA sequence data are of great importance for separating this taxon from related species . *V. michiganensis* is a saprotrophic fungus that was originally described as growing on sawdust . It has only been reported from Michigan (USA) and the Dominican Republic .

= = Taxonomy = =

This species was originally described by American mycologist Alexander H. Smith in 1934 as *Pluteus michiganensis* , based on collections made in Ann Arbor in October 1932 . In the original description there is no mention of a volva at the base of the stipe , one of the morphological characters separating *Pluteus* from *Volvopluteus* . Smith did mention that " the large spores are unusual for the genus *Pluteus* " . The species then disappeared from the mycological literature of the 20th century and Smith did not include his own species when he revised the type collections of North American *Pluteus* . Morphological revision of the type and DNA sequence data (based on Internal transcribed spacer sequences) obtained from the collection confirmed that this taxon belongs in the genus *Volvopluteus* , and that it is a separate species from all the other members of that genus .

The epithet *michiganensis* refers to the state of Michigan , where the fungus was originally described . The original holotype specimens of this species are preserved at the University of Michigan Herbarium .

= = Description = =

= = = Macroscopic characters = = =

The cap of *Volvopluteus michiganensis* is between 7 and 9 cm (2 @. @ 8 and 3 @. @ 5 in) in diameter , more or less ovate or conical when young , then expands to convex or flat . It can have low , broad umbo at center in old specimens ; the surface is markedly viscid in fresh basidiocarps and covered with radially arranged fibrills ; the cap is ash gray , similar to the color of *Tricholoma terreum* . The gills are crowded , free from the stipe , ventricose , up to 1 @. @ 5 cm (0 @. @ 6 in) broad ; white when young turning pink with age . The stipe is 8 ? 11 cm (3 @. @ 1 ? 4 @. @ 3 in) long and 1 ? 1 @. @ 5 cm (0 @. @ 4 ? 0 @. @ 6 in) wide , club @-@ shaped with a bulbous base ; the surface is white , smooth or tomentose . The volva is sac @-@ like , white and has a smooth surface . The context is white in the stipe and cap and it does not change when bruised or exposed to air . The smell was recorded as " earthy , fragrant " ; the taste was not recorded . The spore print color was not recorded , but it is assumed to be pinkish @-@ brown .

= = = Microscopic characters = = =

The basidiospores are 10 @. @ 5 ? 13 @. @ 5 by 6 @. @ 5 ? 8 µm with an ellipsoid shape . The basidia (spore @-@ bearing cells) are 35 ? 55 by 10 ? 15 µm , and four @-@ spored . Pleurocystidia (cystidia on the gill faces) are 70 ? 110 by 25 ? 45 µm , fusiform (spindle @-@ shaped) , utriform (shaped like a leather bottle) or lageniform (flask shaped) ; some have an apical excrescence (outgrowth) . Cheilocystidia (cystidia on the gill edge) are 60 ? 75 by 15 ? 27 µm , commonly fusiform or utriform ; they cover completely the gill edge . The cap cuticle is an ixocutis (parallel hyphae embedded in a gelatinous matrix) . The stipe cuticle is a cutis (parallel

hyphae not embedded in a gelatinous matrix) . Caulocystidia (cystidia on the stipe surface) are sometimes present , and they are 100 ? 360 by 10 ? 20 μ m and mostly cylindrical .

= = = Ecology and distribution = = =

Volvopluteus michiganensis is a saprotrophic mushroom . The type collection was collected on sawdust . The collections from the Dominican Republic were collected on piles of vegetable matter .

This species is only known from the type locality (Ann Arbor) and a second locality in the Dominican Republic . Morphologically , the Dominican collection matches the type collection well , but no molecular comparison has been performed .

= = Similar species = =

Molecular analyses of the internal transcribed spacer region clearly separate the four species currently recognized in *Volvopluteus* but identification can be more difficult due to the sometimes overlapping morphological variation among the species . Size of the fruit bodies , color of the cap , spore size , presence or absence of cystidia and morphology of the cystidia are the most important characters for morphological species delimitation in the genus . *Volvopluteus michiganensis* is distinguished from other species of *Volvopluteus* by its relatively shorter spores , measuring on average less than 12 @. @ 5 μ m long .