= Morchella sextelata =

Morchella sextelata is a species of ascomycete fungus in the family Morchellaceae . Described as new to science in 2012 , it is found in North America (in Washington , Idaho , Montana , Wyoming , New Mexico , and Yukon Territory) . It has also been found in China , although it is not known if this is a result of an accidental introduction or natural dispersion . The fruit bodies have a roughly conical cap up to 7 @.@ 5 cm (3 in) tall and 5 cm (2 in) wide , with a surface of mostly vertically arranged pits . The cap is initially yellowish to brownish , but it darkens to become almost black in maturity . The stipe is white and hollow , measuring 2 ? 5 cm (0 @.@ 8 ? 2 @.@ 0 in) high by 1 ? 2 @.@ 2 cm (0 @.@ 4 ? 0 @.@ 9 in) wide .

Morchella sextelata is one of four species of wildfire @-@ adapted morels in western North America , the others being M. capitata , M. septimelata , and M. tomentosa . M. sextelata cannot be reliably distinguished from M. septimelata without the use of DNA analysis .

= = Taxonomy = =

Morchella sextelata was originally identified as phylogenetic species " Mel @-@ 6 " in the species @-@ rich Elata clade (brown morels) elucidated by microbiologist Kerry O 'Donnell and colleagues in a 2011 publication . The specific epithet sextelata alludes to this preliminary name . Although M. sextelata is not distinguishable from Morchella septimelata on physical or ecological characteristics , they are clearly genetically distinct species , and can be differentiated by comparing DNA sequences or with restriction fragment length polymorphism analysis . Allopatric speciation is thought to have been the driving evolutionary force that caused M. sextelata to diverge from its ancestors roughly 25 million years ago . The original specimens collected were obtained as part of the Morel Data Collection Project , a research effort designed to improve the understanding of North American morels .

= = Description = =

The fruit bodies of Morchella sextelata are 4 ? 10 @.@ 5 cm (1 @.@ 6 ? 4 @.@ 1 in) high with a conical cap that is 2 @.@ 5 ? 7 @.@ 5 cm (1 @.@ 0 ? 3 @.@ 0 in) high and 2 ? 5 cm (0 @.@ 8 ? 2 @.@ 0 in) wide at the widest point . The cap surface features pits and ridges , formed by the intersection of 12 ? 20 primary vertical ridges and frequent shorter , secondary vertical ridges , with occasional sunken , horizontal ridges . The cap is attached to the stipe with a sinus about 2 ? 4 mm deep and 2 ? 4 mm wide . The ridges are smooth or very finely tomentose (covered with densely matted filaments) . They are initially colorless , becoming pale tan , then dark grayish brown in maturity , eventually darkening to nearly black . They are flattened when young but sometimes become sharpened or eroded in maturity . The pits are somewhat elongated vertically . They are smooth , brownish to yellowish tan to pinkish to buff .

The whitish to pale brownish stipe is 2 ? 5 cm (0 @.@ 8 ? 2 @.@ 0 in) long by 1 @.@ 0 ? 2 @.@ 2 cm (0 @.@ 4 ? 0 @.@ 9 in) wide and is roughly equal in width throughout its length , or sometimes slightly club @-@ shaped near the base . Its surface is either smooth or covered with whitish granules . The flesh is whitish , measuring 1 ? 2 mm thick in the hollow cap ; it may become layered and chambered in the base of the stipe . The sterile inner surface of the cap is whitish and pubescent (covered with short , soft " hair ") .

The ascospores of M. sextelata are elliptical and smooth , typically measuring 18 ? 25 by 10 ? 16 µm . Asci (spore @-@ bearing cells) are eight @-@ spored , hyaline (translucent) , cylindrical , and measure 200 ? 325 by 5 ? 25 µm . Paraphyses are cylindrical , septate , and measure 175 ? 300 by 2 ? 15 µm . Their tips are variably shaped , from rounded , to club @-@ shaped , to fuse @-@ shaped . The contents of the paraphyses are hyaline (translucent) to faintly brownish in dilute potassium hydroxide (KOH) . Hyphae on the sterile cap ridges are septate and measure 50 ? 180 by 5 ? 25 µm . The terminal cells are variably shaped (similar to the paraphyses) , and have brownish contents in KOH .

North American Morchella are generally considered choice edibles , but the edibility of M. sextelata was not mentioned in its original description .

= = = Similar species = = =

Morchella sextelata is morphologically indistinguishable from several other morel species in the M. elata clade , including M. septimelata , M. brunnea , M. angusticeps , and M. septentrionalis . M. septimelata can be distinguished from these latter three lookalikes by habitat or distribution : M. brunnea is found in non @-@ burned forests of western North America ; M. angusticeps is found east of the Rocky Mountains ; and M. septentrionalis is restricted to a northern distribution (about 44 ° N northward) in eastern North America . M. septimelata , however , also grows in burn sites and so is both morphologically and ecologically indistinguishable from M. sextelata . Although there are subtle differences in the structure of the sterile ridges between the species , the authors were not confident that enough specimens had been examined to establish that these differences were consistent .

= = Habitat , distribution , and ecology = =

Morchella sextelata may be either saprobic or mycorrhizal at different times in its life cycle . Its fruit bodies grow in partially burned conifer forests , particularly those dominated by Douglas fir (Pseudotsuga menziesii) and ponderosa pine (Pinus ponderosa) . They tend to appear in great numbers the year immediately following fire and appear in decreasing frequency in successive years . Fruiting occurs from April through July , at elevations between 1 @,@ 000 and 1 @,@ 500 m (3 @,@ 300 and 4 @,@ 900 ft) . The distribution includes Washington , Idaho , Montana , Wyoming , and Yukon Territory . M. sextelata has also been found in China , but it remains unclear whether dispersal between these distant locations occurred naturally or through accidental introduction by humans .

Morchella sextelata , identified as phylogenetic species " Mel @-@ 6 " , has been shown to colonize the non @-@ native species Bromus tectorum (cheatgrass) as an endophyte , increasing the overall growth of the grass , as well as the abundance of seeds and their tolerance to extreme heat (60 ? 65 ° C (140 ? 149 ° F)) . This has been hypothesized to be a contributing factor in the success of cheatgrass as an invasive species in western North America .