

## = Boletus pinophilus =

*Boletus pinophilus* , commonly known as the pine bolete or pinewood king bolete , is a basidiomycete fungus of the genus *Boletus* found throughout Europe . For many years , *Boletus pinophilus* was considered a subspecies or form of the porcini mushroom *B. edulis* . In 2008 , *B. pinophilus* in western North America were reclassified as a new species , *Boletus rex @-@ veris* . *Boletus pinophilus* is edible , and may be preserved and cooked .

The fungus grows predominantly in coniferous forests , forming symbiotic ectomycorrhizal associations with living trees by enveloping the tree 's underground roots with sheaths of fungal tissue . The fungus produces spore @-@ bearing fruit bodies above ground in summer and autumn . The large , edible fruiting bodies known as mushrooms appear under pine trees , generally in summer and autumn . It has a matte brown to maroon @-@ coloured cap and its stem is often large and swollen , and the overall colour may have an orange @-@ red tinge . As with other boletes , the size of the fruiting body is variable .

## = = Taxonomy = =

Italian naturalist Carlo Vittadini was the first to recognise the pine bolete as a distinct taxon . It was raised to species status by Antonio Venturi in 1863 . For many years , *Boletus pinophilus* was considered a variety of *Boletus edulis* , and before that as *Boletus pinicola* . This species , while no longer treated as a variety of *B. edulis* , is classified in *Boletus* section *Boletus* , and hence , as a close relative of *B. edulis* . It gained its current name in 1973 , described by Czech mycologists Albert Pilát and Aurel Dermek . Its specific epithet is a mix of Latin *pinus* " pine " , and Ancient Greek *philus* " loving " . *Boletus pinicola* is a synonym subsequently found to be an invalid name . Common names include the pine bolete , and the pinewood king bolete .

In 2008 , a taxonomic revision of western North American populations of this species was published , formally establishing them as a distinct species , *Boletus rex @-@ veris* . Phylogenetic analysis has shown *B. pinophilus* as a member of a clade , or closely related group , with the North American species *B. subcaerulescens* , *Gastroboletus subalpinus* , *B. regineus* , *B. fibrillosus* , and *B. rex @-@ veris* . Despite the diverse appearances , these taxa are close genetically , leading Feng and colleagues to speculate on combining the first four taxa above as a single species . These four diverged from the lineage that gave rise to *B. fibrillosus* and *B. rex @-@ veris* around 5 million years ago .

## = = Description = =

The fruiting body has a convex @-@ shaped cap , at first small in relation to its stipe , expanding in volume as it matures . The skin of the cap is dry , matte and can be coloured from maroon to chocolate brown with a reddish tint . These characteristics distinguish it visually from relatives such as *Boletus edulis* , *Boletus reticulatus* and *Boletus aereus* . The young , immature cap may have a pale pink colour and a white , powdery flush . Measuring 4 ? 10 cm ( 1 @.@ 6 ? 4 in ) tall by 3 ? 8 ( 1 @.@ 2 ? 2 @.@ 2 ? in ) cm wide , the bulbous stipe is often large , swollen and imposing , bearing a network . The overall colour may have an orange @-@ red tinge which is more obvious in the lowest parts , although this is also common in other species . As with all boletes , the size of the fruiting body can be very variable . The cap diameter can be as much as 30 cm ( 12 in ) and stem height 15 cm ( 6 in ) .

Like other boletes , *Boletus pinophilus* has small pores on the underside of its cap rather than gills . These are coloured white at first , becoming yellow with age and olivaceous @-@ brown at full maturity . The spores are cylindric @-@ ellipsoid , smooth , with oil drops and dimensions 15 @.@ 5 ? 20 by 4 @.@ 5 ? 5 @.@ 5 µm . They produce an olive @-@ brown spore print .

## = = Distribution and habitat = =

In Europe , *Boletus pinophilus* is found in Britain , where it is more common in Scotland , and in France , where it is more common in the south . The bolete is considered vulnerable in the Czech Republic . It is sold commercially in Finland .

*Boletus pinophilus* forms ectomycorrhizal relationships with pine ( *Pinus* ) , fir ( *Abies* ) and spruce ( *Picea* ) . It can therefore be located wherever those trees grow , particularly with Scots pine in Britain , preferring the poor , acidic , and sandy soils associated with coniferous forests . It appears to favour *Pinus* , while the form of the mushroom occurring in association with *Abies* and *Picea* has been labeled *Boletus pinophilus* var. *fuscoruber* . However , it is not confined to coniferous trees and may also be found fruiting in deciduous forests , such as under chestnut trees . Fruiting bodies can occur singly , or in small groups throughout the summer and autumn months , although they are known to appear as early as April in Italy .

= = Edibility = =

The *Boletus pinophilus* is edible , and may be used fresh , preserved , dried and cooked in a manner similar to that of other edible boletes . It is highly regarded and can be quite expensive in central Mexico , and is often sold dried there . The flesh is white , soft in mature specimens and does not change colour upon bruising . The taste and smell is pleasant . People of La Malinche have likened the flavour to pork and pork crackling . It is easily misidentified as the porcini *Boletus edulis* , due to the similar habitat and appearance .

*Boletus pinophilus* is known to be a bioaccumulator of the heavy metals mercury , cadmium and selenium . To reduce exposure , authorities recommend avoiding mushrooms from polluted areas such as those near mines , smelters , roadways , incinerators and disposal sites . Furthermore , pores should be removed as they contain the highest concentrations of pollutants .