

Association of *Butyriboletus abieticola* with *Abies magnifica* × *A. procera*

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DESCRIPTION

The *Boletus* genus has been undergoing significant phylogenetic revisions recently with identification of multiple new species [1-3]. *Butyriboletus abieticola*, the Mountain Butter Bolete, was originally described as *Boletus abieticola* by Thiers in 1975 and later reassigned to the *Butyriboletus* genus by Arora and Frank [2]. Its association with high altitude fir is what initially separated it from *Boletus appendiculatus* and *B. fechtneri*. It grows above 450 m (about 1500 ft) in the Sierra Nevada of California and the Cascades of Oregon, and possibly Washington state. Most of its biology is gleaned from herbarium specimens and mushroom collectors. Herein, we present a note about the biology of *Butyriboletus abieticola* found at approximately 1,974 m (6,475 ft) in association with the Shasta red fir, now determined to be a hybrid of *Abies magnifica* × *A. procera* [4].

Herein we present the findings of a single field evaluation of a search of the fruiting bodies of *Butyriboletus abieticola*. This was not a systematic search over an entire season.

A single specimen (Figure 1a and 1b) was collected near Crater lake, Oregon, at the base of mature (>0.7 meter diameter) red fir tree in a mature, uncut, subalpine forest of conifers populated with lodgepole pine (*Pinus contorta* var. *latifolia*), mountain hemlock (*Tsuga mertensiana*), Douglas-fir (*Pseudotsuga menziesii* var. *menziesii*), the Shasta red fir (*Abies magnifica* × *A. procera*). It was collected in late June of 2021, a time of higher-than-normal temperatures at this location and altitude. Other specimens were also observed in situ only in association with mature *Abies magnifica* × *A. procera*. The fruiting bodies observed did not fully break through the surface and were located below a divot of forest litter. These observations confirm previous reports and add new altitude records.



Figure 1: Sample specimen of observed *Butyriboletus abieticola*: a) Lateral view. Full diameter is 11 cm; b) Ventral view. Bluish discoloration with bruising is noted.

CONCLUSION

In conclusion, the genus *Boletus* has recently undergone significant phylogenetic revisions, leading to the identification of multiple new species, including *Butyriboletus abieticola*, also known as the Mountain Butter Bolete. Originally described as *Boletus abieticola* and later reclassified under the *Butyriboletus* genus. This mushroom is distinguished by its association with high-altitude fir trees, particularly the Shasta red fir, which has now been determined to be a hybrid of *Abies magnifica* × *A. procera*.

This provides valuable insights into the biology of *Butyriboletus abieticola*. Although based on a single field evaluation and not a systematic search over an entire season, the collection of a specimen near Crater lake, Oregon, at an altitude of approximately 1,974 m (6,475 ft) adds new altitude records to the existing knowledge. The mushroom was found at the base of mature red fir trees in a mature, uncut, subalpine forest populated with various conifer species. Notably, the fruiting bodies were observed in association only with mature *Abies magnifica* × *A. procera* trees and did not fully break through the surface, being located below a divot of forest litter.

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These findings further contribute to the understanding of *Butyriboletus abieticola*'s habitat preferences and behavior, and they corroborate previous reports. However, further research and systematic studies over different seasons will be necessary to gain a comprehensive understanding of this mushroom's ecology and distribution. The ongoing revisions and identification of new species within the *Boletus* genus emphasize the importance of continuous exploration and documentation in the field of mycology to unravel the fascinating diversity and ecological roles of these fungi in our ecosystems.

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CONFLICTS OF INTEREST

There are no relevant potential conflicts of interest to report.

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