A mushroom in peril?
The Ash Tree Bolete

By Sue Lancelle

Most people are aware that many fungi form mycorrhizal associations directly with tree roots, a symbiosis that involves about 90% of vascular land plants. But there are several other interesting types of interspecies relationships involving fungi that you may not know about. One of these is the ash tree bolete, *Boletinellus merulioides*.

*B. merulioides* is in the order Boletales and is a member of the Boletinellaceae family. DNA sequencing indicates that *B. merulioides* is a very ancient member of the bolete order, and thus probably most closely resembles the ancestors of this fungal group.

The ash tree bolete occurs singly or in scattered groups near ash trees. The cap is 5-20 cm in diameter and is typically yellowish brown with yellowish flesh that may bruise bluish or brown (figure above). The edges of the cap may become wavy or lobed. The pores are *merulioid*, meaning they are shallow and elongated, developing ridges and crossveins (Fig. 1), and usually bruise bluish to brownish. The stipe is short and eccentric (off center) or even lateral (attached at the edge of the cap), so the fruiting bodies often appear flattened and close to the soil surface (figure above).

As in some other fungi, ash tree boletes form sclerotia – underground knots of hyphal tissue that can lie dormant and then grow when conditions are right; for example, in the ash tree bolete the sclerotia may overwinter and serve as propagules in the spring.

As the common name of this fungus makes clear, it associates with ash trees, so for a long time people assumed that it was a mycorrhizal association. But in 1987, Brundrett and Kendrick described the true nature of the relationship between the fungus and the trees. They discovered that some of the sclerotia were
attached to ash tree roots, and when they examined more closely, they discovered that there were aphids living inside the sclerotia (Fig. 2)! It seems that in exchange for a nice safe place to live while feeding on the ash roots, the native woolly ash aphid, also called the leaf curl ash aphid, *Prociphilus* (or *Meliarhizophagus*) *fraxinifolii*, supplies sugary excretions called honeydew that the fungus can feed on. Thus the aphid/fungus association is mutualistic (both benefit) but together they parasitize the tree, although the fungus does so indirectly. Note that this aphid does not typically do serious harm to the tree.

The ash tree bolete has recently been common in our area. However, its future is uncertain, given the rapid demise of the ash population across the eastern U.S. Just this spring, we discovered in our own woods that about 90% of the ash trees had perished. Ash trees of all species are being attacked by a variety of diseases, introduced insects, and environmental stresses. Sadly, we are in real danger of losing these trees entirely. It is not clear if *Boletinellus merulioides* (and the aphid) will be able to survive the loss of the ash trees. Get out and find these fascinating mushrooms while you still can.

**Citations**


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