Asterophora, the "piggyback mushrooms"

By Sue Lancelle

Mycotrophs are fungi that grow on other fungi, either as saprobes or parasites. Many of these are parasites that you might be familiar with: the various *Hypomyces* that form a crust-like covering on many different mushrooms; *Entoloma arbortivum*, the "aborted entoloma" that parasitizes an *Armillaria*; *Pseudoboletus parasiticus*, parasitizing the earthball *Scleroderma citrinum*, and various "cordyceps" that parasitize truffles. There are many more; see Michael Kuo's "Key to 25 Mushroom Eating Mushrooms and Fungi." However, there is one particularly interesting genus of parasitic mushrooms that we only occasionally run across, and those are species of *Asterophora,* the "piggyback mushrooms."

Currently there are two species of *Asterophora* recognized from North America: *A. lycoperdoides* and *A. parasitica.* These are small (caps typically 1-2 cm when mature) mushrooms that parasitize species of *Russula* and occasionally *Lactarius*. Last summer and fall we were observing more of both of these species than is usual; perhaps it had something to do with the very wet weather we had. What makes these species especially interesting is that they rarely produce basidiospores, the reproductive spores produced by basidia in the gills and pores of Basidiomycetes. Species of *Asterophora* reproduce mainly asexually by the production of chlamydospores, thick-walled cells produced directly by hyphae.

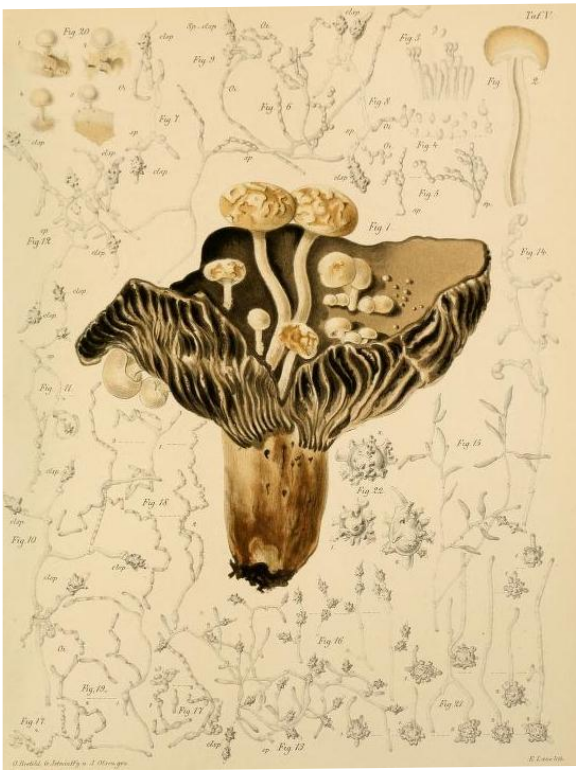

Figure 1. Illustration of *A. lycoperdoides* by Oscar Brefeld. The parasite is growing on *Russula nigricans*. Note the detailed drawings of chlamydospores, especially just under the right side of the *Russula* cap.

Figure 1 shows a detailed illustration of *A. lycoperdoides* made by the German mycologist Oscar Brefeld and published in 1877. The illustration shows the mushroom growing on the cap of *Russula nigricans*. It also contains microscopic details, including the knobby or starburst-like chlamydospores (see also Figure 2). As described in the Australian National Botanical Gardens website on *Asterophora,* Brefeld also repeated and confirmed earlier experiments that showed that mushroom caps parasitized with *Asterophora* broke down more slowly than those that were not parasitized. Presumably, this effect allows the parasite to more efficiently absorb nutrients from its victim.

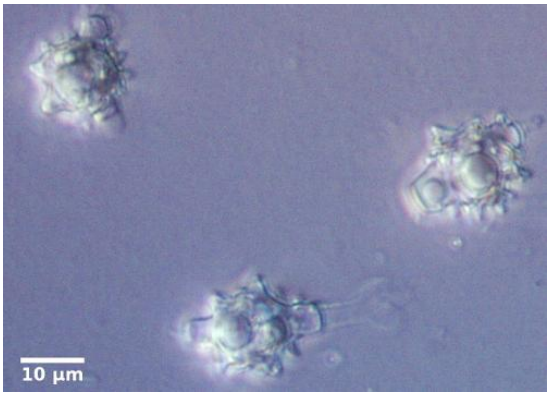

Figure 2. Thick-walled, starburst-shaped chlamydospores of *A. lycoperdoides*, Nomarski optics.

The chlamydospores of *A. lycoperdoides* are formed on the surface of the cap. As they mature, they form a powdery tan cap surface of spores that are then released into the wind, hence the common name "powdery piggyback mushroom." In Figure 3, you can see the change in the cap surface texture from silky smooth when young, to rough and powdery when mature. Figure 4 illustrates another characteristic of *A. lycoperdoides,* the formation of only rudimentary gills. Again, basidiospores form only rarely in this species, so the loss of distinct gills probably reflects this change in reproductive strategy.

Figure 3. *A. lycoperdoides*, showing younger, smooth caps, and mature caps that have become tan and powdery as the chlamydospores mature.


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Figure 4. Flattened, rudimentary gills of *A. lycoperdoides.*

The other species that we encounter, *A. parasitica*, is commonly known as the "silky piggyback mushroom," illustrated by Brefeld in Figure 5. This species also

Figure 5. Illustration of *A. parasitic*a by Oscar Brefeld, showing the more highly developed gills of this species, as well as the development of the smooth chlamydospores (lower right) that occurs within the cap tissue.

reproduces by chlamydospores, but they are not formed on the surface of the cap, which maintains its silky texture through maturity. Rather, the chlamydospores form in the cap tissue itself, and

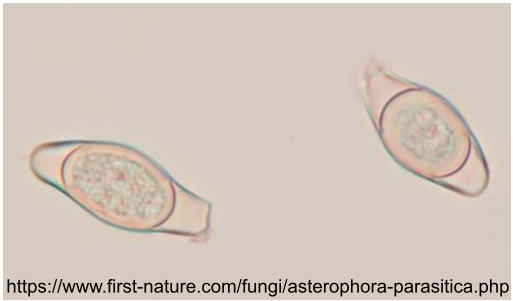
https://www.first-nature.com/fungi/asterophora-parasitica.php

Figure 6. Smooth chlamydospores of A. *parasitica.*

sometimes on the gills, but again, they are formed asexually by hyphae rather than through the normal sexual reproductive process that results in basidiospores. Chlamydospores of *A. parasitica* are smooth (Figures 5 and 6), and easy to distinguish from *A. lycoperdoides.* Gills are often thick and more well developed (Figure 7) than in *A. lycoperdoides,* but as in that species, they rarely produce basidia.


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Figure 7. *A. parasitica*, showing thickened, more well developed gills than typically seen in *A. lycoperdoides*, and smooth, silky cap.

To look for these interesting little mushrooms, it helps to pay attention to what might at first glance just look like a brown or black blob of disintegrating mushroom in late summer to early fall. Poke around a little more closely, and you may be lucky enough to find one of our piggyback mushrooms!

References and Resources

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