

THE MUSHROOM CULTIVATOR

The Natural History and Cultivation of Huitlacoche Corn Truffles, *Ustilago zae*, the Corn Smut of *Zea mays*

by Ken Litchfield

Huitlacoche is an edible basidiomycete smut fungus, parasitic and pathogenic on maize (corn, *Zea mays* L). It typically looks as though the infected kernels of its corn host have swollen into individual puffball mushrooms, conglomerated along the ear, pearlescent white, and tender when prime for culinary purposes. Upon bursting open, the galls reveal black gooey spores that dry to a black powder with age. These spores will germinate and grow in the soil saprobically, giving rise to the second stage spores in the life cycle. These second stage spores parasitize corn.

Huitlacoche has a long history of culinary and herbal use in the Americas, especially in the Mesoamerican zone of origin for corn, dating to before Aztec times, and in other cultures where corn cultivation has been adopted. It has long been considered a nuisance of corn raised under industrial agricultural methods and is the subject of much research into its life cycle and control. Conversely, some research has been directed at efforts to cultivate it intentionally for the specialty fresh produce market.

In this article we'll explore some of the interesting natural history and biology of this fungus, as well as its relatives and look-alike. I will also discuss the research leading to its control (as a pathogen) as well as how to intentionally cultivate it. With this article you may be able to successfully cultivate it in your own garden or, if unsuccessful, at least have a long season of luscious sweet corn.

Etymology

The name huitlacoche is a Hispanic adaptation, and English adoption, of the original Nahuatl name for this fungus, *cuitlacoche*. Nahuatl is the native language of the Mexica or Aztec culture. A literal translation of this word might be something like "sleeping excrement" from the Nahuatl *cuitlatl* for excrement and *cochtli* for sleeping. Sleeping could refer to the hidden nature of the mushroom, encased or blanketed within the husks that envelope the kernels. But it also could refer to the altered, perhaps otherworldly, state of the mind in sleep, likely alluding to some of the other herbal uses of this mushroom or its look-alike that we'll cover later.

Excrement in our modern, sanitized world is usually a completely repulsive subject. In Aztec culture, periodic purification rituals and preparations were used to cleanse the body of detrimental actions and excesses. This literal and spiritual purgative offering was devoured by one of the fertility goddesses in the Aztec pantheon to redeem and rejuvenate the individual. The contents of dry toilet chamber pots were carried by canoe from all over Tenochtitlan and other cities on the shore of Lake Texcoco in the valley of Mexico to the "floating garden" milpas where the excrement was combined with the watery underworld dredgings of the canals to create some of the most productive raised bed

gardens ever developed. These gardens weren't actually floating but were raised vegetation plots surrounded by aquacultural transport canals where fish, axolotl salamanders, algae and other aquatic organisms were raised. Along with other fruits, vegetables and grains, corn flourished in the extremely rich and well aerated soil kept damp and nourished from the teeming canals. This corn provided the civilization with sacred golden grain and the substrate for its own excrement, the black *cuitlacoche*. The symbiotic relationship of humans and corn were deified by the Aztec lord Xolotl.

Nomenclature and Taxonomy

The proper scientific name for corn smut (according to the rules of taxonomic nomenclature for the last twenty years) is *Ustilago zae*; but the better known scientific name still used in much of the literature is *Ustilago maydis* (Farr et al., 1989). *Ustilago zae* is a parasitic smut fungus belonging to the family Ustilaginaceae in

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Ustilago zae. Photo courtesy of M. Beug.