

# Use of *Calvatia gigantea* to Treat Pack Animals in Nepal

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Even the briefest survey of ethnomycology reveals that puffballs are among the most widely used fungi. Puffballs have a surprisingly broad range of uses in cultures scattered from Asia to Central America. Though they are not so desirable nor avidly sought for food as boletes or morels, quite a few are edible, and recipes for cooking them are easy to find (Davidson-Shaddox, 1992).

Besides their use as food, puffballs are often used medicinally in traditional cultures. Peschel (1998) gave one of the most vivid reports of this in explaining how the Chippewa people of North America used the spore mass from puffballs to staunch bleeding from severe wounds like those once suffered in battle. She describes in detail the use of an “icky brown powder” from a puffball to treat a young man with severe injuries from an accident, including loss of a leg. In fact, the spores of both *Lycoperdon* and *Calvatia* species have been used commonly by indigenous people throughout the Americas to stop bleeding and heal wounds (Guzmán, 1994a; 1994b). Likewise, puffballs are used to treat wounds in traditional Chinese medicine (Ying et al., 1987), and a puffball relative, *Geastrum saccatum*, has been used by Maya people of the Yucatán (Guzmán, 1994a; 1994b); in this case, the spore powder is applied to the umbilical cord of newborns to promote healing.

Other minor medicinal uses of puffballs are also often reported. For example, the Maasai people of Tanzania mix pieces of puffballs into milk to be taken as a treatment for stomach ache (Härkönen et al., 2003). Puffballs have been used to treat insect bites in Mexico (Guzmán, 1994b), and, surprisingly, *Geastrum* spores are reputed to be useful for treating asthma (Guzmán, 1994b). In addition, Chinese traditions indicate that certain puffballs have anticancer properties (Ying et al., 1987).

In spite of the widespread medicinal use of puffballs, their effectiveness has not been substantiated in experiments. The best evidence supporting medicinal use of puffballs comes from studies showing that extracts from certain species inhibit bacterial growth. For example, both *Calvatia craniformis* and *Calvatia lilacina* produce an antibiotic called calvatic acid, and extracts containing calvatic acid have rather impressive antibacterial properties. In laboratory tests, a fairly wide range of both gram positive and gram negative bacteria were sharply inhibited by calvatic acid (Calvino et al., 1986; Imtiaj and Lee, 2007; Umezawa et al., 1975).

Reports of medicinal mushrooms being used to treat animals



Giant Nepalese puffballs. Photo by Tika Ram Aryal.

are rare. One example: Härkönen et al. (2003) report that in Tanzania, *Ganoderma* fruiting bodies are used to treat “*ikono*,” an ailment of cattle. The fruiting bodies are cut up and boiled in water for a half hour, after which the sick cow is given the resulting liquid from a bottle to drink.

One of us (Sanjib Shrestha) recently came across another use of mushrooms to treat animals in the Dolpa region of Nepal (Fig. 1). Villages in this region are often accessible only by foot and pack animals are an important means of transport. Pack animals develop sores from the constant rubbing of straps used to tie loads onto their backs. When this happens, the villagers in this region treat the sores with a puffball spore-paste. The paste is made by mixing water with the spore mass from *Calvatia gigantea* and then applied directly to the wound.

The use of puffball spores to treat pack animals appears to be common knowledge among the people of this part of Nepal and dried puffballs are stored for this purpose. In one instance, a fruiting body *C. gigantea* was found stored under the eaves of a house



Figure 1. The terrain surrounding the village of Pahada in the Dolpa region of Nepal. Pahada is shown in the background.

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in the village of Pahada (Figs. 2 and 3). The owner of the house had used about half of the sporocarp and commented that new material would be needed because the remainder had gotten too old to be used. If freshness affects the treatment, the implication is that the spore paste has antibiotic properties that decline over time. Preliminary lab tests using both water and alcohol extracts from this specimen showed no antibacterial activity, but this could have been due to the age of the material. Fresh material needs to be collected to learn whether the spore paste used to treat pack animals in Dolpa has antibacterial properties or serves simply as a dressing for the wounds. It isn't known whether *C. gigantea* is eaten by the people of Pahada, but Christensen et al. (2008) report that it is used as food in some parts of Nepal.

Interestingly, in addition to the puffball, dried rhizomes were also stuffed into the recesses of the same house (Fig. 4). These are also used medicinally, but not with the puffball. The rhizomes



Figure 2. A home in Pahada where puffball spore-paste is used to treat pack animals.



Figure 3. Fruiting body of *Calvatia gigantea* in storage under the eaves of the house shown in Fig. 2.

were from *Acorus calamus*, a plant well known for its medicinal properties. In Pahada, pieces are cut from them and chewed to relieve a cough, and singers also chew pieces of these rhizomes to soothe the throat before performing.

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Figure 4. Rhizomes of *Acorus calamus* are used medicinally to treat a cough or soothe the throats of singers.