Oryx

From the Himalayas to the web: investigating online trade of the world's most valuable parasite

By Reshu Bashyal, 29th February 2024

The word 'parasite' tends to conjure up all sorts of unpleasant images and feelings, and it's not one generally associated with thoughts of a valuable resource. But did you know that some parasites are literally worth their weight in gold? *Ophiocordyceps sinensis*, known as the caterpillar fungus, or locally as *yartsa gunbu*—meaning 'winter worm, summer grass'—is the world's most highly prized parasite. It is found mainly in the remote, high-altitude pastures of the Tibetan Plateau and the Himalayan regions of Bhutan, India and Nepal, and is one of the most important contributors to household economy in the region. The fungus has a rather gory survival tactic: it parasitizes ghost moth caterpillars that burrow underground during winter, killing and mummifying its victim and then sprouting a fruiting body out of the larva's head. These short, brownish stalks protruding from the soil have long been sought-after as a folk medicine, but they are incredibly difficult to find amongst the grasses and shrubs of the high-altitude meadows. To harvest the fungus, collectors—crawling for hours on their hands and knees—meticulously scour the mountain slopes in spring, hoping to spot the small tendrils, which are typically no longer than a matchstick, emerging from the grass. Once a fungal fruiting body has been spotted, it must be carefully dug up from the ground, complete with its caterpillar host. Collectors take utmost care when extracting and handling their precious finds, as traders pay premium prices for intact fungi attached to whole caterpillars.

This unusual fungus is traded globally, mostly for use in traditional medicines and cosmetics, but also as a dietary supplement and social status symbol. In recent years, increasing demand has led to a dramatic rise in the market price of the caterpillar fungus, but little is known about its trade, and its often illegal and unsustainable harvest remains poorly understood.

Ghost moth larvae parasitized by caterpillar fungus *Ophiocordyceps sinensis*. Photo: Manassanant/Adobe Stock.

My initial encounter with caterpillar fungus traders occurred in 2013 at a tea shop along a trekking route in Nepal. During my conversation with local people at the shop, I was astonished to learn just how important the caterpillar fungus is to the local economy. Some harvesters receive household items from local grocery stores throughout the year, paying these back only after the pre-monsoon season, once they have collected and sold the annual fungus haul. In the Himalayas of Nepal, many people rely heavily on this and other non-timber forest products, including different types of plants and fungi, which can contribute up to 90% of some household incomes. This dependency has persisted for a long time without substantial change, but in recent years the trade has become more organized and has spread from local markets to online platforms. In our study we investigate the escalating trade in this popular wildlife commodity, question the sustainability of this practice and highlight the need for enhanced monitoring of the online wildlife trade.

To uncover patterns and trends in this lucrative trade, we reviewed e-commerce platforms in search of posts advertising caterpillar fungus for sale. The recent increase in online trading has probably received an additional boost during the Covid-19 pandemic; travel bans and border closures implemented during the lockdowns have popularized online trading platforms, and reports of an alleged link between Covid-19 and wet wildlife markets have heightened public curiosity about the profitable—and often illegal—activity of wildlife trade. In the summer of 2020, at the peak of the pandemic and in an attempt to limit the spread of the Covid-19 disease, Nepal imposed a ban on the collection of caterpillar fungus. This, however, proved ineffective, as many harvesters living in remote villages proceeded with the harvest regardless, and online platforms provided a viable way of trading the fungus despite the restrictions on physical gatherings imposed during the pandemic.

Left: *Ophiocordyceps sinensis* or *yartsa gunbu* after being pulled from the ground. The caterpillar's body is covered in dirt, and the fungus that has grown up to the surface of the soil can be seen protruding from its head, between the collector's fingers. Right: Caterpillar and attached fungus after cleaning. Photos: Global Lives Project/Flickr (left) and Devesh Rai/Wikimedia Commons (right).

As part of our survey we explored whether online caterpillar fungus sellers indicated how products had been sourced, and if their trade was legal and sustainable. A few sellers mentioned that their products were 'sustainably sourced' but did not provide any further details, such as the process used to obtain the fungus. Most of the advertisements, however, did not mention sustainability practices at all and even for those that did, there was a distinct lack of third-party verification on how it was labelled sustainable. Given the importance of ensuring sustainability in sourcing wildlife for trade—especially in the Himalayas, which face intense pressure from exploitative and destructive harvesting—this was a concerning finding. Online platforms not only facilitate access to global markets, they also offer a degree of anonymity for traders. This, combined with a lack of transparency in online adverts, adds to the challenges faced by wildlife enforcement officers trying to monitor the trade to ensure its legality and sustainability.

Left: Three grades of caterpillar fungus (each with different prices) in a traditional herbal shop in Kathmandu. Right: *Ophiocordyceps sinensis* for consumption. Photos: Reshu Bashyal/Greenhood Nepal (left) and Игор Чусь/Adobe Stock (right).

There is general consensus within the caterpillar fungus trade that there are varying grades of the end product, with characteristics such as size, colour and intactness of the caterpillar and fungal fruiting body determining the perceived quality and thus the price customers are willing to pay. We found this grading reflected in the online market, but there appear to be no established norms or standard practice with respect to describing the grade, origin or type of the fungus. In this emerging and immature market, sellers are experimenting with different terms to find the ones most attractive to buyers. Some descriptions of grades that we found in online adverts denote the intended use of the caterpillar fungus—in food, medicine or cosmetics—whereas others referred to how or where it was sourced, using words such as ‘wild’ or ‘Himalaya’, or to purported quality with terms including ‘pure’, ‘top’, ‘premium’ or ‘A+’. These assigned grades have a significant impact on price. For example, caterpillar fungus originating from the Himalayas tends to be the most expensive because harvesting in its harsh, high altitude habitat is particularly difficult, and there is a misconception that it is more effective for medicinal purposes. We noticed, however, that online adverts described with the grading ‘Himalayan’ did not always correspond with a Himalayan country of origin, and adverts rarely provided evidence that the grading had been in any way verified.

An advert for caterpillar fungus, found during the authors' online search.

By exploring e-commerce platforms through a systematic review, our research sheds light on the booming online trade of wildlife commodities, including high-value plants and fungi. With limited conservation attention and little capacity to track such activities, this burgeoning trade is a threat not only to the survival of the caterpillar fungus, but also to the sustainability of local livelihoods and the communities whose economic well-being largely or solely depends on the harvest of non-timber forest products. Ongoing monitoring and timely interventions are crucial to curb the potential escalation of illegal and unsustainable online trade of the caterpillar fungus and other wildlife products.

The article 'A systematic survey of online trade in the caterpillar fungus *Ophiocordyceps sinensis*' is available open access in *Oryx-The International Journal of Conservation.*

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