Environment ‘Himalayan Viagra’ is threatened by fervent Chinese demand and climate change

<span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"="">At the beginning of the Himalayan summer, when the snows start to melt, all the schools close for the season and Nepali parents and children move to the grasslands with enough food for a month-long journey on a quest for a herb more valuable than gold.<span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica;mso-fareast-font-family:" times="" new="" roman";="" mso-bidi-font-family:"times="" roman";mso-font-kerning:0pt;mso-ligatures:none;="" mso-fareast-language:en-gb"=""><span style="font-family: "Helvetica";" helvetica";"="">To find <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"="">, families crawl through muddy fields hoping to spot a yellowish-green mummified caterpillar that resembles a disproportionate unicorn, with a dark-coloured elongated fungus growing out of a larva’s head. <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica; mso-fareast-font-family:" times="" new="" roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">In Chinese, the two-faced creature is called <span style="font-family: "Helvetica";" helvetica";"="">dong chong xia cao<span style="font-family: "Helvetica";" helvetica";"="">, which translates as “winter worm, summer grass”. During the winter, <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> is worm-like, but by the summer, invaded by fungus, it looks more like a plant. Mature <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> resembles nothing so much as a matchstick, thin and slender, projecting two to three centimetres above the ground across the alpine meadows of the Himalayas. <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"="">Himalayan viagra <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: Helvetica;mso-fareast-font-family:" times="" new="" roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">To locals, the hunt is well worth it. Just one kilogram of <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> can <span style="font-family: "Helvetica";" helvetica";"="">fetch up to US$100,000<span style="font-family: "Helvetica";" helvetica";"="">. In rural Nepal, where <span style="font-family: "Helvetica";" helvetica";"="">jobs are limited<span style="font-family: "Helvetica";" helvetica";"="">, the majority of families living at high altitudes as well as those in neighbouring regions earn their living by collecting this herb, making it by far the most <span style="font-family: "Helvetica";"

helvetica";"="">valuable commodity around<span style="font-family: "Helvetica";" helvetica";"="">. <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica; mso-fareast-font-family:" times="" new="" roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">Bu why is it so lucrative? The name is a hint: <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> is also known as “Himalayan Viagra” due to the aphrodisiac medley of caterpillar and fungus. It is believed that cattlemen first discovered the pharmacological benefits of the caterpillar-fungus more than a thousand years ago after noticing their yaks becoming energised from feeding on the herb.<span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica;mso-fareast-font-family:" times="" new="" roman";="" mso-bidi-font-family:"times="" roman";mso-font-kerning:0pt;mso-ligatures:none;="" mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">Starting in the 1960s, people have been making tea and soups out of this mythological little plant-animal, and stuffing the belly of a duck with <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> herbs before roasting. <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica; mso-fareast-font-family:" times="" new="" roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">This magic fungus was widely popularised in the 1990s, when a <span style="font-family: "Helvetica";" helvetica";"="">Chinese runner<span style="font-family: "Helvetica";" helvetica";"=""> who ate it broke <span style="font-family: "Helvetica";" helvetica";"="">two world records<span style="font-family: "Helvetica";" helvetica";"="">. Since then, research on the caterpillar-fungus has intensified.<span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica;mso-fareast-font-family:" times="" new="" roman";="" mso-bidi-font-family:"times="" roman";mso-font-kerning:0pt;mso-ligatures:none;="" mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">The main <a href="https://www.researchgate.net/publication/233417214_Chemical_Constituents_of_Yarsagumba_Ophiocordyce
style="font-family: "Helvetica";" helvetica";"="">chemical constituents<span style="font-family: "Helvetica";" helvetica";"=""> of natural Cordyceps’s 28 saturated and unsaturated fatty acids are palmitic acid, linoleic acid, oleic acid, stearic acid, and ergo sterol. It also includes vitamins and inorganic elements. Chinese medicine now <span style="font-family: "Helvetica";" helvetica";"="">asserts that<span style="font-family: "Helvetica";" helvetica";"=""> that <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> can cure impotence, increase libido, and resolve joint pains, as well as treat cancer and obesity. Some of these claims have been substantiated. According to a <span style="font-family: "Helvetica";" helvetica";"="">2016 paper<span style="font-family: "Helvetica";" helvetica";"=""> in the journal Pharmacognosy Review, the authors found evidence “illustrating that <span style="font-family: "Helvetica";" helvetica";"="">O. sinensis<span style="font-family: "Helvetica";" helvetica";"=""> can enhance libido and sexual performance, and can restore impaired reproductive functions, such as impotency or infertility, in both sexes.” <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"="">Fungus through the looking glass <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica; mso-fareast-font-family:" times="" new=""

roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">As Lewis Carroll writes in his book <span style="font-family: "Helvetica";" helvetica";"="">Through the Looking Glass<span style="font-family: "Helvetica";" helvetica";"="">, “It takes all the running you can do, to stay in the same place”. That seems the perfect metaphor for the <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"="">, a living relationship in which a host and a parasite are involved in a continuous arms race.<span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica;mso-fareast-font-family:" times="" new="" roman";="" mso-bidi-font-family:"times="" roman";mso-font-kerning:0pt;mso-ligatures:none;="" mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">Biologically speaking, this complex chimera consists of ghost moth larvae (the <span style="font-family: "Helvetica";" helvetica";"="">Thitarodes<span style="font-family: "Helvetica";" helvetica";"=""> species in caterpillar stage) infected by the parasitic entomogenous ascomycete, <span style="font-family: "Helvetica";" helvetica";"="">Ophiocordyceps sinensis<span style="font-family: "Helvetica";" helvetica";"="">. <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"="">Ghost moths are relatively large moths known for their reduced adult mouth parts and distinctive subterranean larvae, which are root-feeders of grassland soil, meaning they can feed on any parts of a plant. <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica;mso-fareast-font-family:" times="" new="" roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">The caterpillars spend several years of their lives remaining dormant in winter, and emerge as adults after pupating in early summer. Then, alas, they die; the average adult lifespan of <span style="font-family: "Helvetica";" helvetica";"="">Thitarodes<span style="font-family: "Helvetica";" helvetica";"=""> is two to five days. <span style="font-family: "Helvetica";" helvetica";"="">Thitarodes<span style="font-family: "Helvetica";" helvetica";"=""> are the only hosts to the <span style="font-family: "Helvetica";" helvetica";"="">O. sinensis<span style="font-family: "Helvetica";" helvetica";"=""> parasite, and young caterpillars infected by the fungal spores perish before pupation, a wildly growing mycelium having consumed the body of the larva. After two to four weeks, a slender, sprouting body emerges from behind the head of the larva. It is an eerie death, to be sure. Scientists don’t entirely understand this spectacular co-evolutionary process. Because the fungus is highly host-specific and it is very difficult to rear moths in laboratories, its infection pathway is still under investigation. <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"="">Humans: the final threat <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica;mso-fareast-font-family:" times="" new="" roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">In this biotrophic system in which the parasite must kill its host to survive, humans may be considered a third trophic level: we parasitise this parasitic complex. As the medicinal value of <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> is increasingly hyped, China’s massive consumer market is clamouring for the product, causing its price to rise and spurring a veritable gold rush to Nepal’s Himalayan belt. But collecting these fungi before they mature prevents dispersal of their spores, and the availability of <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> is declining yearly. From a 2009 peak to 2011, the <a href="http://www.nature.com/news/overharvesting-leaves-himalayan-viagra-fungus-feeling-short-

1.12308"><span style="font-family: "Helvetica";" helvetica";"="">trade fell<span style="font-family: "Helvetica";" helvetica";"=""> by half per annum. Due to a lack of proper regulation, over-harvesting is increasingly common. <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica; mso-fareast-font-family:" times="" new="" roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">The fungi are also vulnerable to climate change. As global temperatures rise and <span style="font-family: "Helvetica";" helvetica";"="">snowfall in the Himalayas decreases<span style="font-family: "Helvetica";" helvetica";"="">, their natural habitat suffers, limiting the breeding period.<span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica;mso-fareast-font-family:" times="" new="" roman";="" mso-bidi-font-family:"times="" roman";mso-font-kerning:0pt;mso-ligatures:none;="" mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">There is a darker side to the fungus fad, too. Every year, as families race to the hills for their annual <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> quest, some fungus hunters – both adults and school children – <span style="font-family: "Helvetica";" helvetica";"="">lose their lives<span style="font-family: "Helvetica";" helvetica";"=""> to turf wars and the precipitous, unforgiving mountains. <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica; mso-fareast-font-family:" times="" new="" roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">In June 2009, seven Nepalese men who had climbed up the mountains to pick <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> were attacked with sticks and knives, and their bodies thrown into the deep ravines.<span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family:Helvetica;mso-fareast-font-family:" times="" new="" roman";="" mso-bidi-font-family:"times="" roman";mso-font-kerning:0pt;mso-ligatures:none;="" mso-fareast-language:en-gb""><span style="font-family: "Helvetica";" helvetica";"="">Local Buddhists, especially those of the older generation, believe that to pick <span style="font-family: "Helvetica";" helvetica";"="">yarsagumba<span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"="">is a sin<span style="font-family: "Helvetica";" helvetica";"="">, in keeping with the Buddha’s teaching that this seemingly natural treasure is actually a curse. China’s consumers don’t seem to mind. <span style="font-family: "Helvetica";" helvetica";"=""> <span lang="EN-US" style="font-family:Helvetica; mso-fareast-font-family:" times="" new="" roman";mso-bidi-font-family:"times="" roman";="" mso-font-kerning:0pt;mso-ligatures:none;mso-ansi-language:en-us;mso-fareast-language:="" en-gb""><span style="font-family: "Helvetica";" helvetica";"="">Republished from <span style="font-family: "Helvetica";" helvetica";"="">The Conversation <span style="font-family: "Helvetica";" helvetica";"=""> <span style="font-family: "Helvetica";" helvetica";"=""> <style><span style="font-family: "Helvetica";"><span style="font-family: "Helvetica";"><span style="font-family: "Helvetica";">@font-face {font-family:Helvetica; panose-1:0 0 0 0 0 0 0 0 0 0; mso-font-charset:0; mso-generic-font-family:auto; mso-font-pitch:variable; mso-font-signature:-536870145 1342208091 0 0 415 0;}@font-face {font-family:"Cambria Math"; panose-1:2 4 5 3 5 4 6 3 2 4; mso-font-charset:0; mso-generic-font-family:roman; mso-font-pitch:variable; mso-font-signature:-536870145 1107305727 0 0 415 0;}@font-face {font-family:Calibri; panose-1:2 15 5 2 2 2 4 3 2 4; mso-font-charset:0; mso-generic-font-family:swiss; mso-font-pitch:variable; mso-font-signature:-536859905 -1073697537 9 0 511 0;}p.MsoNormal, li.MsoNormal, div.MsoNormal {mso-style-unhide:no; mso-style-qformat:yes; mso-style-parent:""; margin:0cm; mso-

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