

"It reaches into every aspect of rural Tibetan life"

Yartsa gunbu: Chances, challenges and prospects – an interview with Daniel Winkler

The explosion in the collection of the medicinal fungus yartsa gunbu (*Cordyceps sinensis*, known in the West as 'caterpillar fungus'[\(1\)](#)) has in recent years generated a massive boost of revenue for Tibetans in rural areas who were otherwise largely left out by official development programmes. TibetInfoNet published an Update on the subject in February 2008[\(2\)](#), mainly drawing on the scientific publications of mountain ecologist Daniel Winkler, an international expert on the subject[\(3\)](#). In the following interview, TibetInfoNet explores with Winkler the conditions, the impact and the possible future of the yartsa gunbu industry in Tibet.

Q: We gather from your scientific publications that you estimate the income that rural Tibetans make out of yartsa gunbu could account for about 40% of rural cash income. This is quite an impressive figure; could you explain how you obtained it?



Yartsa gunbu

Daniel Winkler: *I am aware that the claim of 40% cash income contribution from yartsa gunbu to rural Tibetan incomes seems quite outrageous, but I didn't just make it up by myself. I started by basing my calculations on official annual production figures for the TAR (Tibet Autonomous Region). At first I was very surprised that these figures existed and, of course, there is an issue of reliability. So I crosschecked with figures from other Tibetan prefectures outside the TAR, for example, Kardze, (Chin: Ganzi), Kyegudo/Jyekundo (Chin: Yushu/Jiegu), Golog (Chin: Guoluo) and also county-level production figures I had collected previously. It all tallied pretty well, so the figures seem realistic. Most production figures are compiled on village and district level, then they are reported at county level, then at prefectural and then at regional or provincial level. The collection of data at a very local level reduces the likelihood of substantial miscounting, so to further*

assess reliability, I asked people at a grassroots level. Different responses came to the fore, but as a whole I found that these production figures are pretty realistic.

Q: How do you get from the production figures to the 40% of rural cash income?

Daniel Winkler: *When we were in the field in 2006, [Tibetan researcher] Luorong Zhandui and I took the latest figures available, those of 2005. We looked at the current market prices, and we also tried to find out how much people get when they sell the fungus on the slopes[\(4\)](#), how much they get when they take it to the district or county towns and what are the prices in the provincial or regional towns. The price differences between the county markets and the provincial markets are surprisingly small. We're talking about people adding five or ten per cent in value. If you sell on the slopes, you might lose out about 20%, but people often do that early in the season to get some cash. Then they accumulate the stuff and take it themselves to the county town to optimise. When I worked on these figures, I tried to come up with a realistic value for when it's sold on the slopes. I took that value and multiplied it by the production figures. On this basis, I could calculate the total cash volume of the trade in the TAR. I then took that figure and divided it by the population figures, including the rural population, as well as small-town Tibetans, thus covering 93% of the official TAR population. The result accounted for 25% of the per capita income.*

Q: But you claim it provides 40% of cash income not 25% of income?

Daniel Winkler: *Right, but you have to consider that the [official] rural Tibetan income figures include subsistence production, i.e. the value of what people produce for themselves, even if it is not sold on the market, like butter, meat and barley. Now, I consulted [economist] Andrew Fischer and we concluded that subsistence production accounts for roughly 40% of the Tibetan rural income based on the Tibet Statistical Yearbook, which means that cash income makes up about 60% of the total rural income figure. If yartsa gunbu collection and sale is 25% of total rural income it falls under this 60% cash income, and so 25% of total income equals, after some correction, 40% of total cash income. Note though, that this figure applies to the whole population of the TAR, but yartsa gunbu is not evenly distributed and nor is the income.*

There are regions with no yartsa gunbu habitats; for instance, in the Chang Tang[\(5\)](#) where there are only a handful of people, or regions with very limited resources like Shigatse prefecture. Shigatse has hundreds and thousands of people but just a few yartsa gunbu areas in the Himalayan areas. Otherwise there's no caterpillar fungus in the hills and mountains of northern Shigatse prefecture. In contrast, in other rural areas like Drachen (Chin: Baqing), Driru (Chin: Biru) and Sog counties, in the south-east of Nagchu prefecture, they have the biggest caterpillars and that decides the price.

If you base your figures on official statistics, people probably make 100% or 120% of their annual income from caterpillar fungus there. I would guess there's between 70% and 90% of the annual cash income in these communities coming from it. Now I've got to elaborate a little on how I can claim 100% or 120%. I am convinced that a lot of the income from caterpillar fungus, as with other rural income from medicinal plants, and maybe from other mushrooms like matsutake[\(6\)](#) or morels[\(7\)](#), are only partially accounted for in these income statistics. Fungal income is hard to track and much of it is on the informal market. In addition, subsidies for Tibetan counties are based on income, or the lack of it. If you report a low income, your area could be classified as a poverty area and you could get central government subsidies, but if your income is too high, you are not going to see any of these subsidies. As a result, it is definitely to the administration's advantage to underreport. I think that is the explanation.

Moving on from the household income contribution to the contribution to the gross domestic product, I did not use the initial sale value of yartsa gunbu in the mountains, but used the value it has in the markets in Lhasa or Chamdo etc. The price there is maybe 20% higher or so - then we're suddenly at 8.5% of the GDP... When we take the harvest amount and then the value, we suddenly have a figure of 8.5% of the gross domestic product of the TAR coming from caterpillar fungus! But I don't think it's in the statistics, since even the annual rural increment in income still lags behind the annual increase in value of the caterpillar fungus industry. The increase in rural income is mostly attributed to off-farm income, and this is probably the place where we should look for any accounting for caterpillar fungus income, but it is not specified in any way. I find it quite strange that an income of such importance is not clearly on the books. I didn't expect a section in the statistical yearbook of Tibet to be called "Caterpillar Fungus", but "Off Farm Employment" seems a bit odd and its figures don't really match too closely the value of the yartsa gunbu trade.

I think this figure of 40% income in rural areas might also apply to quite a degree in the Tibetan areas outside of TAR; it is probably at least a third [of the income] in most of [the region known to Tibetans as] Kham [(today widely integrated into the Tibetan autonomous prefectures within Sichuan province)], Gansu and Ngaba. It could be true of north-west Yunnan too, but matsutake is much more important there, as there's more forest areas than high altitude pastures. Jyekundo, Golog ... These prefectures in the south of Qinghai have very rich resources too. Looking at [geographer]

Andreas Gruschke's research in Jyekundo, I think we have a very similar situation where most of the rural cash income comes straight from caterpillar fungus.

Q: You said the difference between the prices paid on the slopes and those paid in local markets is not very large, but there is a large difference with the prices paid for yartsa gunbu in Mainland China or other places where it is sold outside Tibet.

Daniel Winkler: Yes, but in comparison with other natural products, I don't think it's much at all. In lowland China, the price is still increasing, even more so than in previous years. I calculated between 1998 and 2005 an increase of about 21% each year. I have the feeling prices rose even faster in the last two or three years. What also happened is a big differentiation in price based on the size of yartsa gunbu. In some areas, like in Kardze (Chin: Ganzhi), I heard people complain that the prices are going up but they don't benefit from that because their caterpillars are smaller, while in other areas, which have big caterpillars, their prices go up at a crazy rate. I would say that the price in Shanghai is sometimes up to double that of Lhasa, but the doubling of a price by retailers (as a minimum) is normal business practice in the West too. When you buy a t-shirt at a store here [in the West], the production price of the t-shirt is maybe 2 or 5% of what the consumer pays. [In Tibet] we have 40%, 50% or maybe even 60% of the value going to the collectors. Even at 40%, I would regard this as a comparatively very lucky situation.

I recall some research in the Himalayas from the early 1990's, where people were collecting medicinal plants and they would get maybe 3% or 5% of the value that they were sold for down in the markets in India. Tibetans are much luckier in the amount they get. I attribute this partially to the communication system in Tibet now, with cell phones etc.

The price difference between, say, Lhasa and the county towns of Sog or Bachen (Chin: Baqing) is still very small and you need a lot of cash to make these deals happen. It involves hundred of thousands, if not millions of yuan and apparently, if you make a margin of 5% or 10% and transport it for a day, it's good enough. It's not like you are going from 100 yuan to 110 yuan, but you are going from 10 million to 11 million, that's a one million net gain in a few days. That's pretty sweet. Overall, I think it's a very lucky situation for rural Tibetans.

We have to keep in mind that most of the economic endeavours in Tibet generate a lot of money that the local population often can't capture. Look at the timber industry [of the past decades]: most of the profits were captured by the government sector. Mining? Maybe a few small communities around the mine might not just get the disadvantages, they might also get some benefits. The same goes for hydroelectricity. You can say that for most of the time local people get the disadvantages and the money goes somewhere else. But now with caterpillar fungus here, and other mushrooms and some medicinal plants, the money really stays with the people and that is just awesome.

Q: Are the distributors who bring down these products from Tibet and sell them in China or abroad themselves Tibetans?

Daniel Winkler: Not in general, there are regional differences. In Qinghai and in Lhasa, there are lots of Chinese Muslims (Hui) in the trade. In the Kham region, there is much more of a Tibetan presence; there are Chinese (Han) who buy up for pharmaceutical companies down in Guangdong or Shanghai but many of them also hire Tibetans for buying. In Lhasa, I think at least two thirds of the trade is controlled by Hui who settled in Lhasa in the last ten - twenty years or so, but they told me that they are losing trade to Khampa dealers, because Tibetans, when given a choice, prefer dealing with Tibetans. In the end though, it's all down to the price. Many collectors like to sell to the same people they trust and where they don't have to haggle over the price for too long - they trust them over the price. There is a relationship between collectors and the dealers who do their rounds. The mobile ones will go out on the slopes and buy. Other people just hold onto their stuff and take it down to town and think: "I can make a couple of thousand yuan more by selling it myself to one layer up in the dealing hierarchy".

Q: Statistics may be more or less reliable, but the impact on the local population, particularly the social impact should be visible. If you generate a lot of cash, it generally shows on how big your house is, your status symbols, even the way you behave. What are the effects from the yartsa gunbu business that you have observed among rural Tibetan communities?

Daniel Winkler: As I pointed out, so far, the cash income is a real blessing for Tibetan communities. We have this rural population that has an extremely hard time keeping up, or dealing with the modern world pushing into their lives. They see all these things out there; they also see how their traditional farming or herding activities are not really geared in a way to generate cash, at least not based on the traditional management approach. Rural Tibetans have a hard time just switching over to meat production. They are reluctant to sell animals for cash, they will do it if necessary, but it's not how it used to be done. Things do change, but slowly.

We now have this cash influx there and Tibetans can invest it in home improvements. You see that in matsutake areas. Originally, you used to have a little village all in earth colours and suddenly there are pink [painted] houses and blue houses, yellow houses, and then there are these satellite dishes on the rooftops, and motorcycles. In the nomadic areas, to be a male of some recognition you need to have a motorcycle; horses are out. It's motorcycles now. Everybody has these 125cc Chinese-made motorcycles. So big changes; capital is there for business; for schools - you can pay the fees to send your kids to school, and easily afford the books and the boarding, with the caterpillar fungus money. Visits to the doctors - all those kinds of things become possible. And if you want to invest in a little tractor for agriculture, you see how many tractors there are - the walking tractors - all these things become affordable for Tibetans who spend four weeks a year collecting caterpillar fungus and bring home five thousand, ten thousand or twenty thousand yuan. But I think there are disadvantages too.



Q: This sounded pretty good so far, what could be the disadvantages?

Daniel Winkler: The disadvantage is that their access to 'easy money' takes away the necessity for young Tibetans to learn a trade, to start a business, to participate actively in their local economy. You go out there, collect for four weeks, you have enough cash for the year and you are set. Who needs to learn masonry, carpentry or plumbing? Also, if you can make your money this way, you keep your subsistence economy going on the side and produce some meat, some grain or whatever and your cash needs are met. So I see a bit of a danger here. The easy caterpillar fungus cash prevents people from entering professions they can rely on in a transforming society. That's happening all around them. With the new cash, people build houses, and often they hire Chinese crews to do the work. People say: "We don't have to do that [construction work]. Come on, what do we earn here? It would take months to earn what we make in two days collecting caterpillar fungus, and without somebody else telling me what to do".

So, I think this is the [main] disadvantage of the cash, [it removes the] necessity of participating in a new economy that is establishing itself very strongly in the Tibetan areas. Through the new cash, people just don't need to get involved in a way beyond collecting caterpillar fungus. There are stories from Nagchu prefecture how the local farmers in Drachen don't even do their farm work themselves anymore, they hire people from Shigatse with caterpillar fungus money. They have the cash, they don't have very expensive habits here and so what do they do with cash? Well, there's someone else [there to] do the agriculture work and Shigatse people don't have the access to caterpillar fungus, they are the migrant collectors and workers all over TAR.

Q: From a Tibetan perspective, one might argue that this keeps traditional Tibetan attitudes and practices alive. Working in the fields is part of their culture, but they will not do other manual work unless they have no other choice, as you mentioned. So they might not be integrated into the economic system, but integration into the economic system might not be what they actually want.

Daniel Winkler: *They integrate themselves into economic life through the cash they bring and through the shops they support, the goods they buy. They are definitely integrated, but as their cash source is mainly caterpillar fungus, what do we do if the resource suddenly collapses? That would be a disaster. The caterpillar fungus is a really unique resource - I can't think of another region in the world where rural people have a comparably valuable product they can harvest each year. This fungus is apparently quite resilient to collection and each year produces a crop. Yes, some years are better, other years are worse, depending mostly on rain and temperature but it simply grows there. The question is just how long it will be there. We don't have any reliable research about whether the current rate of collection is sustainable. What I know is that it's been collected for centuries; we have reports from people travelling to Lighthang [for collecting] from one or two hundred years ago. There are production figures in Chinese documents showing that fifty million specimens were collected in the mid 19th century, but now collection happens at a level of many hundreds of millions.*

Q: Could this change in scale be dangerous?

Daniel Winkler: *Yes, the scale has changed; I would guess by a factor of maybe five to ten times, at least from the figures I have, which do not cover the whole Tibetan plateau. But a factor of five – five times the amount collected [in the past]. They have discovered new areas where people never bothered to collect before and yartsa gunbu are so tiny, they are very difficult to find, but there are always more; you can't find them all. I think it is quite a resilient species and sustainability is much better guaranteed than with many other medicinal plants that are collected to such a degree, but questions remain about how long it can continue at this level. We need more research and so far we don't have any published results of any multi-year studies and I have been trying to work on that. I know some other people who are trying to get similar research off the ground but we don't have any figures to date.*

The caterpillar is dead anyway, so it doesn't matter if you collect the caterpillar or not; it has already been digested by the fungus. The fungus just needs to produce some spores. Many caterpillar fungi are collected before they produce spores but, at the end of the season, most of them have produced spores and people give up collecting because the caterpillar goes soft and nothing is left inside. It has no value anymore.

Each year we might still have enough spores around from reservoir populations to keep Cordyceps going well, but who knows? It's such a strange life cycle and is so very complex that there are no clear answers yet. All we can say is it hasn't crashed so far. It's been collected for centuries and hopefully we can find management approaches that suit Tibetan needs and the fungus' need to reproduce and re-infect larvae. I could imagine that it could be collected at an intense level without wiping out the population, but this has not been proven in any way. As part of my research co-operation with Beijing's China Tibet Research Institute, Luorong Zhandui wrote a policy advisory document for the TAR government, parts of which were turned into law

So now they officially monitor the production and they want to map out the collection areas. They talk a lot about management of the collection camps and the ecological impact of these camps in high altitude pastures: garbage, people burning all kinds of woody vegetation where there is not much left, and all these sorts of things. They want to have collection licenses, collection fees. Basically, they already have a licensing system all over TAR, but it's very different from county to county, so they talk about harmonising it but, for example, in north-west Yunnan, you don't need a license as a local and outsiders are just kicked out. There are some things in the works and there is awareness about its importance, but I think we still really need to speed up our research and data collection.

Q: Who delivers these licenses?

Daniel Winkler: *County governments require their people to have a license. If you collect in your home district you might pay twenty, fifty or a hundred yuan, which you can pay off these days with between one and five caterpillar fungi. It's a small fee; it's cash but it's a small fee compared to what you gain from collection. If you collect in your own county [but] in a different district, you can easily get charged a thousand yuan and, if you go into neighbouring counties, it can run into many thousands. It's an especially big problem in Qinghai province; there are a lot of non-local Muslims and Han pushing in. In some areas, already in the 1990s, it was documented that there were more people coming in to collect than there were people actually living there. The county government made a lot of money with permits and this would then have to be used in the community. In the case [Tibet researcher] Melvyn Goldstein has written about, [they] supposedly used it all for schools and roads and whatever; everybody was happy at that point. With the increasing value, most areas now shut out outsiders and there are roadblocks and buses don't go through anymore. Each year a few people get killed over it when outsiders are caught poaching and don't back off after being told: "Hey, this is our pasture, what are you doing here?"*



Digging out yartsa gunbu

There are fights but when you talk about the money that's involved, that's probably still quite harmless for the scope of the industry. I have to say that the situation is very different in different provinces. In Qinghai, the situation is different to TAR or Sichuan or Yunnan. In Qinghai, sometimes the collection rights are separated from the land usage rights. People who have a pasture are not necessarily entitled to collect there; or they are entitled to collect, and other people are not allowed to step on their territory, but they can sell their rights [exclusively] to others. It is a very complex picture. You can't generalise what practices exist. It's quite different all over the plateau.

Q: Do these collected fees remain in the counties or districts?

Daniel Winkler: *From what I have heard, they always stay with the counties. It is not that the TAR government has told the counties to collect fees. The counties realised that they had to step in and regulate the situation and that there was a lot of money to be made, so they wanted a slice of the cake. There is no taxation so far, while there is on matsutake mushrooms. The counties claim to use the money for cleaning up the collectors' camps. I've never verified that, I have just seen places where camps were taken down and there is definitely a problem here. The garbage is an issue because people don't come up with just a bag of tsampa nowadays. The cash is there, so they buy instant noodles, beers and sodas and so on from shops. When the collectors leave, there are bottles, plastic containers, etc. So there's a garbage problem up there above the tree line.*

Q: But if the county authorities levy these fees and take higher fees from outsiders, wouldn't it be in their interest to have more outsiders collecting? As far as I can see, there is no popular control by the local population...

Daniel Winkler: *Yes, that's [the kind of] conflict that received international media attention in Zatoe (Chin: Zaduo, Jyekundo / Yushu prefecture) in*

May 2005. Some people got killed and there was a confrontation between the local people and their own administration. Initially, when this conflict erupted the county governor supposedly said: "I don't need police here, I can deal with the people". He apparently underestimated the situation and people were furious.

Interestingly, according to what I heard, it wasn't outsiders like Hui or Han people pushing in for collection, it was people from Nangchen (Chin: Nangqian) who were invited into Zatoe county and were charged large amounts by the Zatoe administration. When the local people heard about this they said: "Our administration is embezzling that money and not using [it] for community use". So, I don't know the full background, and there are a couple of storylines out there, but it is a contentious issue. It seems that since some of these incidents, there is an awareness that it is a very sensitive issue and in order to keep ethnic harmony, it would be better avoid situations like that. But also in Qinghai, there are places where people rent out their own space; they charge fees for people to come in to collect from their pastures. Where do you draw the line? If private individuals can do that, counties or districts might do that too.

Q: Are there any other issues related to the ecological impact of the collection?

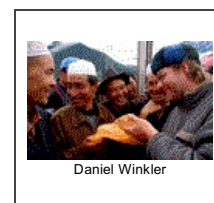
Daniel Winkler: [The presence of so many] people in alpine areas, around the tree line or often above it during spring raises some issues for wildlife. In many places, there is not much wildlife left in Tibet but still, in spring the grass is just starting to come back, and the animals are still weak, so it could well add a stress factor on, for example, the Tibetan gazelle [*Procapra picticaudata*] or the blue sheep [*Pseudois nayaur*]. On the other hand, in some areas they also used to have livestock and herders out there, so it might not be that big a problem. Another issue is that digging out a caterpillar fungus leaves a hole of about 10 sq centimetres. If people don't care and don't put back the grass, animals could step in there hurt their legs. It could also support erosion. That's an issue being raised, but when you look at the size of the area; yes, we have millions of holes each year, but they are tiny and I think if we have more and more local people collecting, it becomes a thing easily addressed. Where collectors have to get a license, they should also get instructions explaining the dos and don'ts, including graphic explanations on how to fill the holes. I have seen instructions like this in some TAR counties. This is one advantage of the licensing system.

Some people were trying to say that the desertification on the plateau is being spread by caterpillar fungus collection. I don't really think so and if I imagine any other economic activity generating only a fraction of the money for rural Tibetans, it would have more negative ecological impact. So, I think we are pretty well off with caterpillar fungus as a source of income.

Q: You say that Tibetans are to a large extent in control of the yartsa gunbu business, but rural production the world over tends to be brought to an industrial level; this is the declared policy of the PRC too. Considering the high profits at stake, how much is going on of research aiming at getting the financial benefit of the caterpillar fungus without having to go and collect it in the wild as it has been for hundreds of years. Are you aware of any such efforts?

Daniel Winkler: Actually, caterpillar fungus is a declared crucial rural industry, or indigenous industry, in many Five Year Plans, not just the recent one, and I think that goes back at least to the 1980s. There is a lot of research going on in China looking into the artificial production of Cordyceps, [just the fungus without the caterpillar] in a sugar solution in a tank. It's also been grown on grain or rice and that process has been going for years. In fact, the West is basically supplied only by artificially grown Cordyceps. There is such production for instance in the US and also in China. I think in the West, Aloha Medicinals in Nevada is now the biggest producer. But in eastern cultures, people have an appreciation for the wild fungus so they want to see the caterpillar. In the West, people don't want to see the caterpillar. It's bad enough being called caterpillar fungus; nobody wants to eat the actual caterpillar. So, the artificially produced Cordyceps is just perfect for the western market and I think is also very good news for sustainability.

Another research project that's been going for a long time is artificially breeding the caterpillars, which are actually larvae that live underground. They are naked; they are not like a hairy caterpillar. Chinese researchers use their knowledge from the silk industry, which is also dependent on larvae. Then the larvae can be infected with caterpillar fungus and spread in the grasslands. Each Tibetan area, Qinghai, TAR, Sichuan, have small research facilities for this. I have visited one in west Sichuan. So far though, they have not really been that successful in introducing them on a large scale on the slopes. If that worked, it would be a very worrying development. If just a few people captured all the profits by breeding the caterpillar, infecting it, putting it out on the slopes, then digging it and having the whole thing indistinguishable from the natural product, they could make millions or even billions of yuan, while undercutting the natural market, and rural Tibetans would be pretty much left out. At least the prices could come down so substantially that rural Tibet could be really cash stripped again. I am worried about it, but I don't see anything like that happening in the immediate future. But, of course, somebody might be really close to it and if they were, they would not disclose it.



Daniel Winkler

Q: Do the local authorities, either at a provincial or central level, run these facilities or are they private or local enterprises?

Daniel Winkler: My understanding was that they are usually government funded semi-private organisations, or straightforward government research institutes. Universities have been working on artificial cultivation, at Chongqing, in Sichuan, for instance. It's one of the most famous Chinese medicinal products and one of the most precious ones. So of course, all over China, administrators and researchers are aware of it and [are] looking at the profit potential.

Q: Should such an endeavour become successful, would it effectively put Tibetans out of business?

Daniel Winkler: Yes, and it would be devastating if that cash was suddenly not there anymore. People have got used to having cash for necessities and for consumer goods. It would cause a lot of social turmoil if it suddenly were not there any more. We can only hope it doesn't happen, but if it did happen, my vision would be to make the yak herders become caterpillar herders. This would mean getting this kind of business out into rural areas to generate the income [locally], instead of having some two or three big facilities generating big profits for a few owners or shareholders.

Q: Do you see any further impact of the caterpillar fungus trade on Tibetan society?

Daniel Winkler: Well, maybe we can see the impact of the yartsa gunbu cash in the recent events [of spring 2008] in Tibet. The fact that people have cell phones in many areas is because there's surplus income, the cash, which comes from that trade. People all over the Tibetan areas heard about the events in Lhasa via their cell phones and thus the incidents spread.

Also one thing I haven't mentioned yet is that a lot of the money generated in the industry goes into donations to Tibetan cultural institutions, which mostly happen to be monasteries. A good example is stupa(8) building. Yes, government agencies support some causes, but the local population

finances many religious institutions and buildings, like stupas. Some are built for tourism, but most aren't, and you can't really afford fancy great stupas just by growing barley to sell at low prices. So yartsa gunbu really reaches into every aspect of rural Tibetan life.

Notes:

1: Yartsa gunbu (*Cordyceps sinensis*; Chin: *dongchong xiacao*) is a fungus which infects ghost moth larvae and grows its fruiting body out of the head of the larva in spring or early summer, after overwintering superficially buried in the ground. The Tibetan name of this larva-fungus is translated as "summer grass-winter worm". Yartsa gunbu is in high demand for Traditional Chinese Medicine (TCM), generating prices equivalent to their weight in gold.

2: See: [Yartsa gunbu, Tibet's underground cash cow](#)

3: Many of Winkler's publications are available on his website at See: <http://www.danielwinkler.com/>.

4: Some collectors sell their first loads of caterpillar fungus directly after collection to traders who travel to the collection sites on the slopes of Tibet's alpine grasslands. Prices on the slopes are the lowest.

5: Chang Thang (which in Tibetan means 'Northern Plateau') is the vast high-altitude desert area, sprinkled with a great number of lakes, that extends in the north and in the west of the Tibetan plateau, in Ngari and Nagchu prefectures in the TAR and Yushu Tibetan Autonomous Prefecture (TAP) in Qinghai. It accounts for almost half of the surface area of Tibet and is almost uninhabited.

6: *Tricholoma matsutake*, known in Tibetan as beshu; lit. "Oak mushroom".

7: *Morchella species*, known in Tibetan as *gugu shama*; lit. "Cuckoo mushroom".

8: Stupas (Tib: *Choerten*) are sacred structures that range in height between 1-2 metres to 10 metres or even higher; holy objects, mostly relics, are interred inside. The largest stupas may be partially hollow and contain a shrine room, but most are solid. Stupas are the most characteristic religious structures throughout the Tibetan cultural area in Tibet and Himalayan regions.

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Website: www.tibetinfonet.net
Phone: +44 (0) 20 300 206 33
Fax: +49 (0) 2238 9494466
Email: tin@tibetinfonet.net