

'Gucchii' : The Edible Mushroom of the Himalayan Wilds

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The Himalayan biodiversity shows up several plants and fungi, the uses of which are long known to the indigenous community. One such fungus species is the morel mushroom or gucchii, an important food source and now also an important source of supplemental income for rural households in Himachal Pradesh. The paper describes the morel, its mode of collection and its potential contribution to the economy, while also revealing the hazards of indiscriminate collection from the wild.

Occurrence

Mushrooms, as exotic sources for vegetarian food, are macroscopic members of higher fungi belonging to the class of ascomycetes and basidiomycetes. *Morchella*, commonly known as the sponge-mushroom or morel-mushroom, is known locally as 'Gucchii' [literally, 'bunch'] and is an important mushroom belonging to discomycetes of Ascomycotina. All the 11 species identified so far as belonging to the genus *Morchella* are edible. These morels are more usually known by characteristic names, viz. thick-footed morel (*M. crassipes*), yellow morel (*M. esculenta*), grey morel (*M. deliciosa*), grey-black morel (*M. conica*), black morel (*M. angusticeps*), half-free morel (*M. semilibra*), etc. False morels, on the other hand, are known as laurels, lorches and brain fungi, and can cause severe to fatal poisoning. False morels can be easily identified by their convoluted heads which look more like a brain than a sponge.

In India, the morel is distributed over the states of Kashmir, the hills of Uttar Pradesh and Himachal Pradesh. The altitudinal range of the species is between 1000-4000m. At the higher elevations, morel blooming occurs just after the snow-melt each year. In the Kullu district of Himachal Pradesh, this fungus is widely recognised as a cash crop, and the livelihoods of several people depend on its collection. Collection of morel species from the wild goes back a long way since people of the area report the practice from ancestral times and use it moreover as a common vegetable. Commercialisation of the species began in the late-Sixties when it found an international market, and was exported to several developed countries such as the US, France, Germany and Switzerland primarily to be used as a delicacy soup. Over the Eighties and Nineties the species has assumed greater commercial value because of increased demand and decreased supply on the international market. The present situation of the species assumes considerable importance because of the fact that so far *ex-situ* cultivation of the species has not achieved any success, and natural survival and regeneration is much below the extraction rate.

Table 1. Composition of Mature Ascocarp of *Morchella esculenta*

Constituents	% Composition on fresh-weight basis
Moisture	89.5
Protein	20.4
Fat	4.8
Total Carbohydrates	64.4
N-free Carbohydrates	55.7
Fibre	8.7
Ash	10.4
Energy-value (Kcal/100g)	385.0

Based on an Annual Report of FAO.

Collection

All species of morel come in muted shades of black, brown and grey, scarcely distinguishable from the forest floor, which makes it difficult for an inexperienced *gucchii* collector to notice them on the ground. Rich crops can be harvested in the spring that follows the forest-fire season. Forest fires make essential nutrients available to the charcoal-loving morel species. An important related point needing to be pondered is that the surface fire kills most of the surface-dwelling microbiota and partially sterilises the surface layer which can then be easily colonised by mycelium. The forest fire also makes an environment where competitive saprophytic colonisation is minimal. Thus after devastation from World War II, the European arena was able to produce record crops of the species for some time. Keeping in view the importance of fire in morel production, the tribal peoples in the Himalaya set fire to certain pockets of the forest in order to harvest a rich crop the following year.

In the Kullu Valley, most people residing in close proximity to forests are dependent on the collection of morel and enter the forest for their daily requirements. As stated, the season for *gucchii* commences with snow-melt i.e. from March, and lasts till the time that other

medicinal herbs like *Viola* (Banfisa), *Dioscorea* (Singli-Mugali), *Jurinea* (Dhoop), *Aconitum* (Patis), *Picrorrhiza* (Karu), *Dactylorhiza* (Hath panja), etc. take over in the months of May-June. Collection starts at the different forest sites very early in the morning. The effort of the collector involves thorough search of the ground as if looking for some very small lost object and thus needs good eyesight, intense concentration and above all, experience. Only more experienced collectors can manage to collect a good quantity of *gucchii*, of upto 1 kg. per day (fresh-weight). The mushroom is distributed all over the forest under herbs and grasses and even hidden inside litter. The search therefore is tedious and the collector can sometimes return empty-handed. The effort can also take the collector into very difficult terrain where collection has to be accomplished while holding onto shrubs of *Arundinaria* (Rigal), *Indigofera* (Kathi), *Desmodium* (Kali Kathi), *Sorybaria temntosa* (Kanthri), etc. with one hand. Once spotted, the *gucchii* is uprooted and placed in a small carry-bag in which it is taken out of the forest.

The method used for drying the morel is simple, since it is either hung out in direct sunlight after being threaded into a garland or else is slung on a thread from a pillar above the house-fire where it is cured by the heat of the smoke. Once dry, the garlands are ready for market sale, or for sale to market agents who visit collectors in their respective areas. Moisture content in the *gucchii* varies with size and type, and with the region from which it has been collected. Moisture-losses are less in case of smaller morels of black colour that have been collected from dry slopes.

Income

One of the most important sites for *gucchii* collection is the Great Himalayan National Park in the Kullu Valley where about 1500-2000 people visit different forests daily from adjoining villages. Each individual collector collects between 500-750g. of fresh mushrooms (about 125-150g. dry-weight) valued at between Rs.250-750 per day, and each household collects between 1-10 kg. per dry season depending on the number of collectors from each household. A survey was conducted in the three valleys in the Park, and the table below shows the number of collectors, the estimated collection, and estimated income accruing from the *gucchii* season.

Table 2. Survey of *Gucchii* Collectors from the Great Himalayan National Park

Name Valley	No. of Collectors	Collection in kg.	Income in Rs.lakhs*
Tirthan	500-600	700-800	15-16
Sainj	900-1000	1000-1100	20-21
Jiwanal	600-700	500-600	10-12

*Income values are estimated because collections and earnings vary with season and rates.

The going rate for *gucchii* currently is Rs.2200 / Kg., when dry.

Field Notes

Mushroom collection starts in the valleys after 15 March, though a few collectors may be seen before this at lower altitudes of around 1500m. Collectors are observed to gather young fruiting bodies of *gucchii* (i.e. even before they have released their spores) in order to make up their collection. A few individuals are so involved with the collection process that they would qualify as professionals. *Gucchii* collection lasts till the month of May. Local belief has it that *gucchii* appear after lightning and rain, and so a lot of collectors enter the forest the next day after there has been rain or a thunderstorm. People of all ages from 10 to 50 years are involved with collection and state that they are compelled to depend on *gucchii* since their field crops can at best support them for three months, and they have thus to support themselves over the remainder of the year either through *gucchii* collection, or the collection of herbs.

Data collected through survey in the above valleys was cross-compared with collectors in the field, and it was found that almost every village and every household has its representatives among the collectors in a practice that has come down from times immemorial. Although people state they would give up the practice if they were provided an alternate source of income since the task of collection is not easy with a collector having to walk between 20-30km. in search of *gucchii*, and since they also feel that there has been a great decline in yields, they remain engaged because of the lack of alternatives.

Gucchii is found between 1000-4000m. in almost all areas and within all forest-types, but the best habitat for the species is the moist coniferous forest of *Cedrus deodara* (Dayar), *Abies pindrow* (Tos), *Pinus wallichiana* (Kail) and *Picea smithiana* (Rai). However, the recorded incidence in broad-leaved forests of *Prunus cornuta* (Jamru), *Ulmus wallichiana* (Marinu), *Juglans regia* (Akhrot), *Acer* spp.(Mandru), *Quercus* spp.(Banj oak), and *Celtis tetrandra* (Khadrik).

Commercial Trade

The actual income accruing to local collectors of *gucchii* is however much less than the profits of agents and of suppliers to the national and international markets. Because of the commercialisation local consumption has declined except for occasional use as a vegetable, and the mushroom is largely exported to the international market in western countries where it appears as a delicacy in foods and soups. *Gucchii* faces good demand in both national and international market, and in India the trade is concentrated in the hands of a few businessmen. Currently, India, Pakistan and Turkey as the major *gucchii*-exporter countries, pick up 40 percent of the world trade and export Grade-I *gucchii* to the United States, France Germany and Switzerland, which are the major morel-consuming countries on the international market.

System Impact

The dangerous spinoffs from *gucchii* collection are

the destruction of the forest understorey which is an ideal home for many ground-dwelling species, and destruction of the habitat of several wild animals like the *ghoral* and *tahr* and of pheasants like the *monal*, *kokkias*, *kalij*, *cheer* and Western Tragopan, whose breeding season coincides with *gucchii* collection. Several instances exist where collectors have destroyed clutches of pheasant eggs and have killed *ghoral* for their meat, using their dogs. By far the greatest dangers lurk in the fires set off by the villagers each year in order to ensure a good *gucchii* crop over the next season. Not only do these cause ecological disbalance from the burning of surface cover and stands along with micro and macrobiota, but there is also a resultant scarcity of forage and fodder for the herbivores over the period. Certain plant species which colonise the burnt areas do not let other species thrive, thus reducing local biodiversity. During *gucchii* collection, forest litter which otherwise is the ideal habitat of many invertebrates is removed from the ground. This slows down the rate of organic decomposition and ultimately reduces soil nutrients. Apart from all of these, there are also instances of *gucchii* collectors damaging forest trees when they mark their routes using the weapon they carry to protect themselves from wild animals like the black bear.

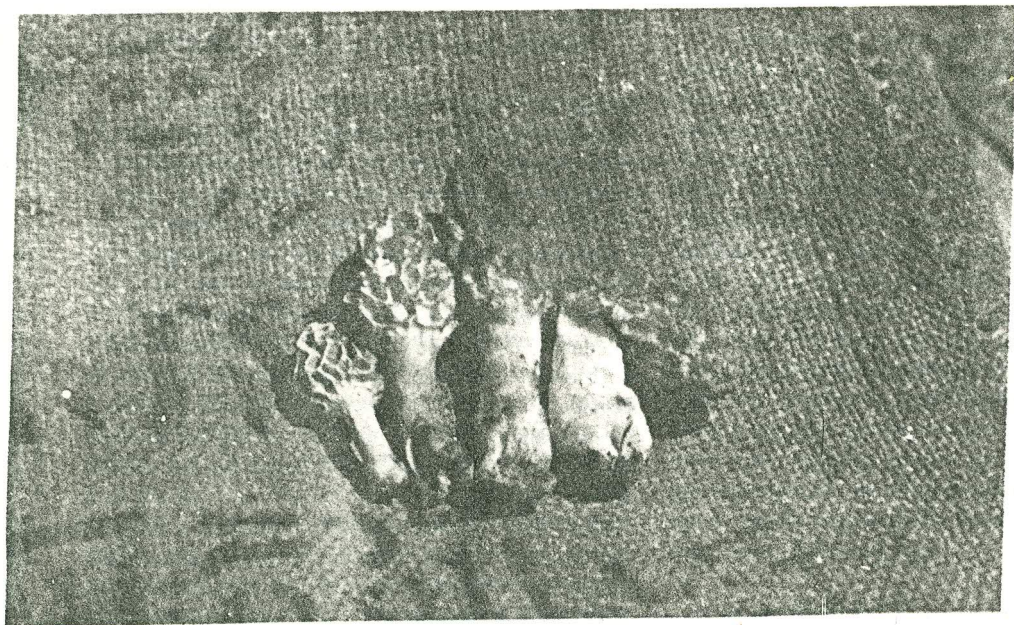
Besides these direct impacts, there are also indirect consequences like the acceleration of soil erosion, secondary collection of fuelwood and certain lichens and trampling effects.

The Conservation Perspective

If extraction continues at the present rate, there is

no doubt that the more species will be extinct from the area. Thereafter, although people will search, they will not find it and then the absence of this secondary source of income on which they base their lives will tell on the local economy. Immediate steps therefore need to be taken to preserve this natural resource intact until *ex-situ* cultivation techniques are discovered. Certain points essential to sustainability of *gucchii* collection as an economic activity would need to be observed:

- i) Public contact and awareness programmes should be intensified to learn the biology of the species.
- ii) Only mature fruiting bodies which have seeded their spores should be collected.
- iii) Collection should only be allowed after the 15th of May to ensure bigger sizes and mature *gucchii*.
- iv) During collection the *gucchii* should be cut at the root with a sharp blade instead of being bodily uprooted, so that the mycelium is not uprooted along with the fruiting body.
- v) *Gucchii* collection should be done on rotational basis.
- vi) Research on various ecological habitats should be undertaken to discover the biological potential of the species and the possibilities of *ex-situ* cultivation.



Gucchii for sundrying