

Project Update: November 2018

First Trimester (15th July - 14th November 2018)

Overview of research activities

Recapitulate the objectives of the study

The overall goal of this research is to understand ecology, to document ethnomycology and to identify and analyse threats and opportunities related with wild mushrooms in different altitudinal strata in Nepal. Core study region for this study is southern aspect of Annapurna Conservation Area characterised by hyper-oceanic climate starting from 1000 m to 4000 m altitudinal ranges. This report provides data and information relating to progress of research over the last trimester and plans for the next trimester. Project was on track in meeting research progress and financial targets set for the period.

Progress in implementation of the activities planned during the first trimester period

Activity 1 # Design of the programme

- In line with the work plan proposed in research proposal, concise concept on rationale, objectives, methodologies, time frame and budget is made and implemented successfully.
- Research permit was obtained from the Department of National Parks and Wildlife Conservation under Ministry of Forest and Environment, and another permission was obtained from National Trust for Nature Conservation - Annapurna Conservation Area Project's (NTNC-ACAP) office at Pokhara for a research period (one year).
- All the necessary field equipment (Handheld Garmin GPSmap60CSx), and consumables (Diameter tape of 20mx5m Yammayo Company; 2 measuring tapes Cai Hong Company; leech proof socks, solar battery charger, chargeable batteries, stationary, chemicals for the fields, and archiving materials for herbarium specimens) were purchased.
- The successful development and implementation of a research programme in very remote areas of mountain require the effective participation and support of the institutions. Discussions were made with the officials of DNPWC, NTNC, ACAP, local stakeholders about the project. Good response was obtained from all the stakeholders for the successful implementation of a project.

Activity 2 # Conservation campaigns / strengthens the capacity of local stakeholders in research sites

- Conservation cum awareness meetings have been planned, and some of them are delivered in small and local scales. Group discussions, informal meetings while staying with local communities and field observations with key informants were carried out.
- As per the suggestions made by Conservation Officer and field staff of ACAP, and local schoolteachers, local level workshops will be organised before starting monsoon (mushroom harvesting period) next year incorporating all the experiences from this year.

- Outreach articles on mushrooms (for the national dailies) will be submitted only after the identification of collected mushrooms specimens from first trimester.
- A poster with a pictures taken from 2018 fieldwork is being prepared in collaboration with ACAP entitled "Mushrooms Biota of Annapurna Conservation Area" to distribute next year before season starts. Posters and awareness materials prepared from this year collections will help to intensify the level of understanding on mushrooms among the locals.



Plates: Discussion with the local people and collectors on availability, edibility and sustainability of wild mushrooms.

Activity 3 # Documentation of indigenous local knowledge (ILK) and socioeconomic importance of wild mushrooms

- Prior informed consent was taken verbally from key informants including shamans, village elites, healers and mushrooms collectors (from different socio-economic and cultural background) before documenting their traditional knowledge on mushrooms. Key informant interview, forest walk and, questionnaire survey methods were employed to generate information.
- Questionnaire survey on ethnomycology has been conducted with 42 local respondents from the age of 9 to 81 covering different casts (mainly Brahmins, Gurungs, Magars and Dalits) and religions.
- Interactions were made with local people showing the samples and photograph album.
- Nearby 17 species of highly used mushrooms in their culinary and medicinal values are identified and their details is noted.
- *Laetiporous*, *Grifola*, *Termitomyces*, *Russula*, *Sprassis*, *Boletus* and *Cantharellus* are highly preferred mushrooms.
- There are no significance uses of mushrooms among Brahmin community except using *Termitomyces* and *Laetiporous* species.



Plates: Pictures showing discussion with professional mushroom collector and ways to prepare mushrooms. *Termitomyces* sp (in a small bowl and plate) is highly preferred and widely collected mushroom in lowland and mid hills of study area. Local hoteliers even prepare a mushroom curry to serve. Nepali lunch/dinner set refer to Dal-bhat-tarkari in Nepal. *Dal* is made of lentils soup, *bhat* is rice and *tarkari* is vegetable stew. During season, local mushrooms collectors prepare mushroom`s *tarkari*.

Activity 4 # Ecological studies and implication for the conservation of the wild mushrooms

- Two field trips were made in the southern terrains of Annapurna Conservation Area en route to Annapurna Base Camp (4130m) from Birethanti (about 1000m) covering mid-monsoon (20th July - 17th August) and late monsoon (24th August - 16th September) period.
- Mushroom species composition and diversity along the elevational gradients (16 elevation levels with a regular interval of 200 m) starting from Birethanti (1000m) to nearby Annapurna Base Camp (3800 m) were studied.
- Quadrats (25 by 2.5 m) were selected up to 50 m above and below each elevation level if the suitable habitat was not available at the exact elevation.
- In prior, it was planned to find four land use types: a) natural forests, b) exploited forest, c) meadow and d) crop field at each elevational level whenever possible. In field level reality, it was not possible to find every land use types at each level. So, keeping our research questions as planned, we slightly adjusted our methodology following the protocol developed by Scheidegger et al 2010: *Botanica Orientalis*.
- Altogether 30 quadrats were set up starting from 1000 m up to highest level (tree line band i.e. 3800 m asl). In each level (every 200m altitudinal bands) two

sample quadrats (at least 10 m from each other) were investigated. A quadrat was sub-divided into the four equal parts (5 x 2.5 m).

- GPS was used to record the elevation of each quadrat. Brunton compass was used to record the aspect in degree angle while a clinometer was used to record the slope angle.
- To determine the floristic composition of forests i.e. trees having DBH (diameter at breast height i.e. 1.37 m height from the ground) equal to or greater than 10 cm was recorded with their basal diameter (with a diameter tape), and canopy coverage (with a spherical densiometer). Plant ecologist was responsible in making this kind of additional study.
- Apart from the established quadrats, the mushrooms diversity and vegetation patterns along the horizontal trail (walking trail) was also observed and noted for the additional information.
- Unidentified fungal specimens are collected, dried and herbarium has been prepared for the further identification processes.
- Lowland and alpine tree line are relatively poor sites for the mushrooms and there is no significance increased in the species numbers even in the two supplementary transects.



Left: Midhills *Alnus* forest (1040m). Middle: Study inside a transect. Right: Tree line (3800m) *Betula* forest is reached.





Plates: Some of the mushroom species observed and collected from study areas. Scientific details and a complete list of the collections will be provided after their scientific treatments during next trimester period.

Major problems encountered during a first trimester

It was problematic to reach field sites and work in highlands when rainy season start with much landslide and road blockade, slippery trails, increase in river level and more streams on the way. The threat of insects and leeches were challenges to the field trips. Principal researcher was caught with bugs and had got serious problems with swollen leg, high degree of fever and nausea. Though there were bit physical problems including altitudinal sickness, we accomplished our two field missions of 2018, safely within the scheduled timeframe.



Plates: Mountain trails in several places obstructed due to landslides, and floods. The bridge is only temporary and could be washed away anytime in the summer monsoon.

Plans for the next trimester

The group shows an excellent team work. Everybody feels responsible for the group and the project. In next trimester, initial data analyses have to be conducted to show if basis

assumptions of the project are fulfilled – or adaptations of the sampling protocol are necessary. Meanwhile, the work plan for the second trimester involves the following activities:

- Morphological and microscopic studies will be made to identify all the collected specimens from the field. Priority will be given to identify locally used mushrooms so that we can start writing manuscript on ethnomycological approaches soon.
- Though not planned in a proposal, we will try to conduct laboratory works to find out nutrient profiling of some of the major edible and medicinal mushrooms as of pilot study. The preliminary results may help to develop further broader concept on developing research questions in next in-depth round of research.

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