

## Project Update: October 2013

Despite some barriers, I have done to the best level of my capacity to make sure I confirm the exact time for submitting the final report. I'm quite certain that in four months, i.e. November 2013 - February 2014, will be a prime period to finish the major part of the project (mapping of lichens, data collection, awareness and sensitisation programmes) and if I have found favour before your sight, kindly allow me to submit my final report in March 2014. Meanwhile, I can send intermittent progressive reports.

Kindly receive my poster which was presented at the 21st and 22nd October 2013 RSG recipient's conference in Mombasa, Kenya. This conference was an eye opener, inspiring and motivating towards my project.

RSG RECIPIENTS CONFERENCE  
MOOMBASA - KENYA  
21<sup>st</sup> - 22<sup>nd</sup> OCTOBER 2013

### Population size, Threats and Conservation measures of *Lobaria pulmonaria* in Tanzania.

A case study of forest lichens on Mount Kilimanjaro.

Mulu Nyakirara Kilara  
Department of Forest Biology  
Sokoine University of Agriculture (SUA), Tanzania.  
Email: [mulukilara@yahoo.co.uk](mailto:mulukilara@yahoo.co.uk)

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#### Introduction

Lichens are mutually symbiotic organisms composed of a fungus partner (the mycobiont), and one or more photosynthetic partners (the photobionts), which are referred to either a green alga or cyanobacterium (N.T.). Our focus is on *Lobaria pulmonaria* also known as the lungwort which consists of a three-lobed or lobed mycobiont. In addition to the fungus and alga, it also contains a cyanobacterium (blue-green algae).

*Lobaria pulmonaria* is an important component of the forest mycobionts because of the ability of its cyanobacterial symbiont to fix atmospheric nitrogen (N<sub>2</sub>). Also, it is an indicator of air quality forests and has been used to monitor various signs of environmental changes including air pollution, climate change and acidification (2).



*Lobaria pulmonaria*

Studies show that African lichen knowledge is limited especially in tropical areas and the global estimates of the number of lichen species vary from 11450 (3) to approximately 17000 (4). In Tanzania, several lichen species are known to exist on Mt. Kilimanjaro (5, 6) including *Lobaria pulmonaria* around the altitude between 1500 m and 2600 m. However, the population size and threats of this species on Mt. Kilimanjaro is unknown.

#### Main Objective

To assess population size, threats and establish conservation measures of *Lobaria pulmonaria* on Mount Kilimanjaro.

#### Specific Objectives

1. To assess the influence of altitudinal ranges on the population size of *Lobaria pulmonaria*.
2. To assess the influence of habitat variables on the population size of *Lobaria pulmonaria*.
3. To assess the influence of disturbed habitats on the population size of *Lobaria pulmonaria*.
4. To assess the genetic differentiation across different altitudinal vegetation belts of *Lobaria pulmonaria*.
5. To assess the general knowledge of local people around Mt. Kilimanjaro on lichens and their habitats.

#### Upcoming activities

1. Mapping the population distribution of *Lobaria pulmonaria* and related lichens of the genera *Lobaria*
2. Sampling and data collection
3. Data analysis
4. Awareness and Sensitisation programs
5. Reporting
6. Publication

#### Methods

##### Study Location



Southern east of Mt. Kilimanjaro above Moshi, Kilicho, Maranga and Koba. Moshi forest district is selected for this study because it receives much higher annual rainfall than any other parts of the mountain (2). Five transects will be situated by the use of GPS across different altitudinal ranges (1800 m, 2100 m, 2400 m, 2700 m, 3000 m and 3300 m) following the distribution of altitudinal vegetation belts. In each transect, four trees greater than 15 cm in diameter will be searched for *L. pulmonaria* in a plot of one hectare. A random 30 meter of *L. pulmonaria* will be collected from the trunk of different host trees and if there will be less than 30 scattered trees are present, multiple trees will be sampled from the same tree (7). For molecular studies, only fragments (0.06 mg) of 10-15cm will be collected from the trunk of *L. pulmonaria* and stored at -20°C in silica DNA preservation (8).

For assessment of threats, a survey will be conducted purposively to identify the disturbed areas by the GPS location. Then, the plots of similar size (10 m x 10 m, 150 m<sup>2</sup>) in each transect using altitudinal ranges will be established for monitoring the incidence of *L. pulmonaria* and related species of the genera *Lobaria* on natural habitat variables such as disturbance at forest height (DBH), surface texture, pH, tree height, host tree species and tree cover soil disturbance.

In order to assess the knowledge of local people on forest lichens, a survey will be conducted in 3 villages of Moshi, Kilicho and Koba districts respectively. The villages are selected purposively based on the proximity to forest on Mt. Kilimanjaro. Data will be collected through questionnaires which will be administered to 30 heads of families randomly selected in each village. But outside the village, the project will involve local school communication clubs around the forest reserve and conduct forest tour study among the school children. Only if an in-person school children can enhance our lichen conservation message to be heard and implemented for the coming decades. Additionally, various competitions will be conducted among the school clubs involving national opening, tree cover plant raising, drama and story writing with the themes related to conservation of lichens species and their habitats.

Interviews, focus, video clips and posters will be prepared with a preliminary the "Lichens - the tree allies in our forests" subsequently, the reports result will be disseminated through local TV's such as DUK TV, Haya TV, Pafimom, public presentation will be organized to different stakeholders such as Sokoine University of Agriculture (SUA), Commission for Science and Technology (COMSTEC). New data will be added to Tanzania national herbarium of the Global Biodiversity Information Facility (GBIF) and some findings will be published on the peer-reviewed international journals.

#### Preliminary Results

Preliminary survey which was conducted through Maranga route on Mt. Kilimanjaro has revealed very interesting results.

- Level of the *Lobaria pulmonaria* species were found between 2340 m and 2740 m.
- The number of lobes per population on host trees at the same elevation same under and near (2300m/2700m) 60-450m.
- Most of the dominant host trees were *Eragrostis* and *Podocarpus* species.
- Generally, the thallus of *L. pulmonaria* species were dry and brownish in colour which is an indicator of low moisture in the montane forests.




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#### References

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