

Project Update: April 2020

Project objectives:

- 1) Design a community-based monitoring program to gather ecological field experiment data on the current state of shrub encroachment in this area,
- 2) Conduct a series of greenhouse experiments to compare with the field data, and
- 3) Analyze these data to improve understanding of how these shrubs may continue to alter the landscape and livelihoods of the area for years to come.

Activities:

Soil Sample Collection: a soil sample from each field experiment plot to be grown in a comparative greenhouse experiment was collected.

Soil seed bank was collected to assess the restoration potential of the study area and density, diversity, vertical distribution and composition from quadrants. Four hundred eighty soil samples were collected carefully from the 3 separate soil layers, each layer having 3 cm thick (0-3 cm, 3-6 cm and 6-9 cm) by using digger. The samples were taken from five points (one at the centre and the other four at the corners). Sampling was completed within three weeks to avoid differences between habitats, and thus any temporal bias in seed availability and composition following the method used by Toledo and Ramos (2011). The samples from each soil layer will be used to determine variations of seed distribution at each depth of the soil layers. Soil samples from each layer was picked into plastic bags and transported to Addis Ababa University.

Then each sample was transferred to the prepared plastic trays in Addis Ababa University glasshouse site for germination of the seeds. Germination is currently being conducted. After germination, counting the recovered seed and identification of the species will be followed. Each plastic tray is perforated at the bottom and plugged by cotton to facilitate proper drainage of water without losing soil. To control and detect contamination of external seed rain, thin transparent plastic/glasshouse is prepared.

The seedling trays is being kept continuously moist by watering every two or three days; and to avoid differences in light exposure, the position of the trays is being changed every 2 weeks following the method used by Esmailzadeh *et al.* (2011). The emerging seedlings will be identified, counted, recorded and discarded. Species identification will be done at the National Herbarium (ETH), Addis Ababa University.



Figure 1. Soil seed bank collection from the study site (January 2020: © Shambel Alemu)



Figure 2. Transferring soil sample to plastic tray (February 2020: © Fiseha Getachew)



Figure 3. Prepared glass house for seed bank germination (December 2020: © Shambel Alemu)

Glass house Experiment set up: the glass house is constructed to conduct a series of greenhouse experiments to compare with the field data.

Prior to soil sample collection, I have made ready the glass house for seed bank germination. The setup was adjusted, the roof was cleaned, and everything was ready to proceed the germination process.

Conduct Monitoring. Monitoring is being done monthly to record growth parameters from the field experiment.

I am travelling from Addis Ababa to the study area to monitor and record the growth of *Helichrysum splendidum* removed from the selected plots (the detail was stated in my first report). This is intended to inform our understanding of the competition between *Festuca macrophylla* and *Helichrysum splendidum*, and to explore management options for the removal of the invasive *Helichrysum splendidum*.

Identification of the collected plant specimens

I have collected specimens from the established plots. Thus, identification process is going on.

Data entry for the biodiversity inventory

Baseline survey or the cover abundance of all plant species found in the plots, altitude, longitude, latitude and aspect recorded during field work are all entered in to the excel sheet for further data analysis.

Ongoing activities:

1. Field data collection, monitoring and record the growth of *Helichrysum splendidum*
2. Soil seed bank germination in the glass house: watering, monitoring the growth and recording
3. Writing of the reports and publications for scientific papers
4. Specimens identification

Table 1. Biodiversity Inventory collection data sheet (only for sample)

Biodiversity Inventory Data Sheet

Block number – B1

Plot I.D. – 1, 2, 3, 4, 5

GPS Co-ordinates – Lat: 1017.563 Long: 03947.912

Altitude-3320m

Collector – Shambel Alemu

Date of collection -26/03/2020

Key:

Presence/Abundance = (1/0)

Cover abundance estimate = (CA)

Local Name	Species Name	B ₁ P ₁		B ₁ P ₂		B ₁ P ₃		B ₁ P ₄		B ₁ P ₅
Amharic name		(1/0)	(CA)	(1/0)	CA	(1/0)	CA	(1/0)	CA	(1/0)
Yefyel dabo	<i>Aeonium leucoblepharum</i> A. Rich	0		0		0		0		0
Midir koso	<i>Alchemilla abyssinica</i> Fresen.	1	3	1	2	1	4	0		
Dihanet	<i>Alchemilla ellenbecki</i> Engl.	1	1	1	3	1	2	1	4	1
Unknown	<i>Alopecurus baptarhenius</i> S.M. Phillips	0		1	3	0		1	2	0
Gaya sar	<i>Andropogon abyssinicus</i> Fresen.	1	3	1	4	1	2	1	4	1
Unknown	<i>Anthemis tigrensensis</i> J.Gray ex A. Rich	0		0		0		0		0
Yayt misir	<i>Argyrolobium ramosissimum</i> Bak.	1	1	1	2	0		1	2	1
Chqugn	<i>Artemisia abyssinica</i> Sch.Bip. ex A. Rich.	1	3	1	3	0		1	1	1
Adey abeba	<i>Bidens pachyloma</i> (Oliv. & Hiern) Cufod.	0		1	1	0		1	1	1
Unknown	<i>Calamagrostis epigejos</i> L.	0		1	5	0		1	3	1
Yahya koshele	<i>Carduus schimperii</i> Sch. Bip. ex A. Rich.	1	2	1	1	0		0		
Guassa	<i>Festuca macrophylla</i> Hochst. ex A. Rich.	1	45	1	80	1	10	1	95	1
Nachlo	<i>Helichrysum splendidum</i> (Thunb.) Less.	1	45	1	10	1	80	1	5	1

Coming activities

Writing of the reports and publications for scientific papers

Challenges

The Guassa Community Conserved Area is located at about 320 km from Addis Ababa University, where I am based. There are two roads that give access to the area but both roads are very challenging and require four-wheel drive. Both roads are under construction and sometimes closed for normal traffic. One of the roads is a gravel road and it broke the car tires several times. Except the accessibility, there are no challenges I encountered so far.



Figure 4. Road construction a challenge for transportation (March 2020: © Shambel Alemu)