

Project Update: December 2012

By the end of this year, we completed following activities:

1. Field studies

Thirty-two 1 m² (1 × 1 m) quadrats were placed regularly in a 78 × 34 m plot within a 1 ha area in Lalahan, Ankara. These quadrats were marked via metal pin in which driven into the ground (Figure 1). Quadrat numbers were attached to metal pin by using small plaques (Figure 2) and position of each quadrat was recorded using a GPS receiver and mapped. To avoid the edge effect disturbance was applied to 1.5 × 1.5 m quadrats, but measurements of species diversity/cover were held, and biomass samples were taken in the core 1 m² centre of each quadrat (Figure 1).



Figure 1: A view of a disturbed quadrat.**Figure 2:** The quadrat number plaque.

We had to make a change in the study design; we removed the slope aspect from the study, and rather we added another disturbance type. This change was done since we observed too much grazing activity by livestock in one of the slopes aspects, we had planned to sample at first, and this might have affected our final results. Therefore, we decided not only to remove this slope aspect from the study but also to add another disturbance type to show how different disturbance types affect steppe vegetation. By this way, we sampled the same number of quadrats as we had planned at first, but we obtained more useful data than the first design since the disturbance component of the study became more pronounced by now. Therefore, this change actually improved the extent of the study by including another parameter of disturbance.

By now, the design of the study includes two disturbance types differ in severity (cut or spudded) and three classes of disturbance frequency treatments (once-disturbed, twice-disturbed and thrice-disturbed) and one control. Each disturbance type and frequency combination include four replicates, so we can compare data from different treatments statistically at the end of the study. In summary, we have 12 cut quadrats, 12 spudded quadrats, and eight control (untouched) quadrats in the study area.

Until now, we conducted two treatments (1st and 2nd disturbances) with 3 months interval, and the next disturbance treatment will be held in the following spring. In the second disturbance time, the quadrats assigned as “once-disturbed” were not treated. In the next disturbance time, similarly, once- and twice-disturbed quadrats will not be treated. By this way, we will obtain a gradient of disturbance frequency.

The cut treatments were applied with pruning shears by removing all above-ground plant material within a quadrat (Figure 3) to simulate the effect of grazing activities. The second type of

disturbance, the spud treatments were applied with a spud by grubbing up to 5 cm deep of the soil from the surface to simulate agricultural activities such as ploughing (Figure 4).



Figure 3: Application of cut disturbance. **Figure 4:** Application of spud disturbance.e

Before starting any disturbance, two main measurements were taken from each quadrat.

Plant species richness was estimated as total number of plant species within each plot. Some species could be identified in the field, but some could not. To identify those species, a sample of the plant in examination was taken from the out of the quadrat and it bring into the Hacettepe University Herbarium (HUB) for further inspection. The identification of species was held based on the Flora of Turkey.

Coverage was estimated as cover of individual plant species and of total vegetation using point-intercept method (Figure 5). We identified three transects parallel to the lines of the quadrat, and checked 10 points on each if any plant tissue touches to the point or not. We sampled 30 points in each quadrat, and the ratio of touch points to total points will give the cover of a species in that quadrat.

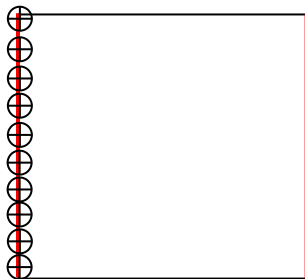


Figure 5: Schematic representation of the point-intercept method.

During the application of a disturbance, the plant material found in the quadrat was taken as biomass sample for each disturbed quadrat. This procedure was not applied for the control quadrats. Species were assigned to functional types to evaluate their recolonisation success. The functional types were annuals, perennial forbs, grasses, and woody plants. Some species which dominated study area such as *Festuca valesiaca*, *Artemisia taurica*, *Alyssum sibiricum*, and *Jasminium fruticans* were separately collected for further measurements in the laboratory.

A data logger was placed in the study area to obtain climatic data including temperature and humidity. It placed on the canopy of a shrub found nearby the study area.

2. Laboratory studies:

The plant material collected from field were separated into small pieces and heated in the oven for 48 hours at 80 °C (Figure 6). During this procedure, each sample was separately placed into aluminum containers. After the treatment, the samples were weighed with an electronic precision scale to determine their dry weight. This measurement will be used as biomass of the weighted species or functional groups.



Figure 6. Laboratory studies for biomass measurements.

All the data from field and laboratory studies were recorded on data sheets, and digitisation and evaluation of data are still in progress. I am hoping to present some preliminary results in the next project update report.