2008 Range Vegetation Assessment in the Darkhad Valley, Mongolia

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ABSTRACT

The rangeland vegetation of the Tsakhiriin tal study site in the Darkhad Valley of north-western Mongolia was assessed in the summer of 2008. Field measurements were made at 100 randomly generated point locations throughout the study site. Ground cover types, their percent cover, and available forage biomass were estimated within 10m x 10m plots at the 100 locations. Live herbaceous species and litter had the greatest mean percent cover, while rock, weeds, and shrub cover types were estimated to have a mean of less than 0% cover. Available forage biomass estimates were 1086 lbs per acre and 1218 kg per hectare in the Tsakhiriin tal study site. The observed patterns were consistent with the expected trends in the Darkhad Valley rangelands that are continuously grazed throughout the growing season.

KEYWORDS: Field measurements, forage estimate, ground cover estimate

INTRODUCTION

Mongolia, a continental semi-arid country, is known as one of the five most heavily grazed places in the world (Asner et al., 2004). All grazing lands in Mongolia are public lands, although the herds are privately owned by nomadic herders who migrate at least four times a year between seasonal pastures. Darkhad Valley in north-western Mongolia is grazed by several different livestock species: cattle, sheep, goats, and horses. The Tsakhiriin Tal area in the Darkhad Valley, the focus area of this study (Figure 1), is primarily used as summer pasture by approximately 30 nomadic households. Rangeland wildfires are very rare in the Darkhad Valley potentially due to low fuel accumulation associated with continuous grazing use. The isolated small forest stands along the boundary of this study site (Figure 1) are also likely excluded from fire disturbance, although the continuous, expansive forest stands surrounding the Darkhad Valley might have higher fire frequency (Sankey et al., 2006).

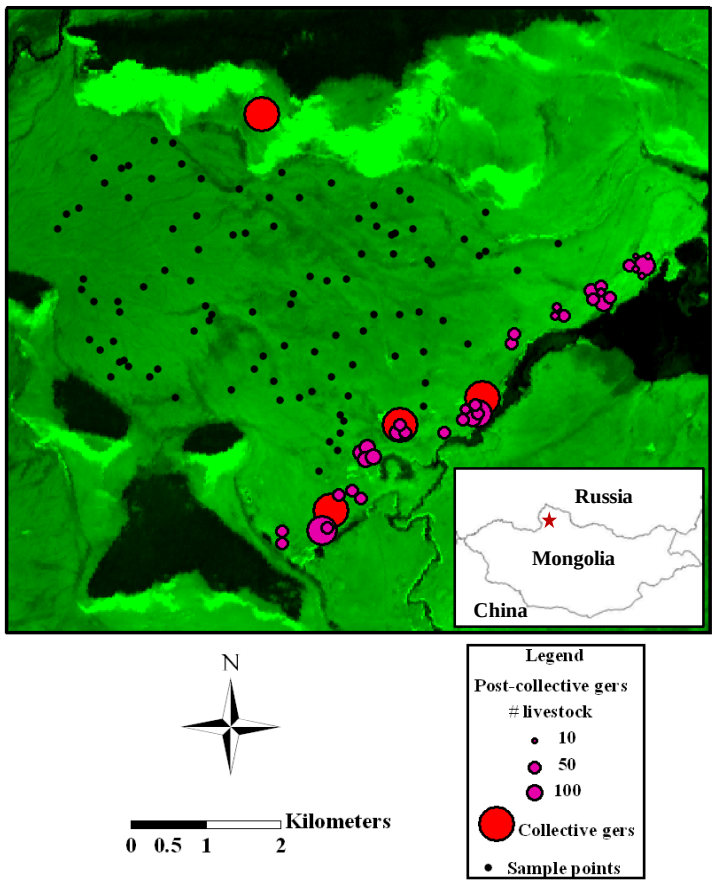

Figure 1. Mongolia and the Tsakhiriin tal study site in the Darkhad Valley. The point locations in the Tsakhiriin tal indicate 100 randomly generated points at which field-based measurements were made in the summer of 2008.

The objective of this study is to assess the rangeland vegetation in the Tsakhiriin tal area of the Darkhad Valley using SPOT satellite imagery and field measurements. The field-based measurements of the Tsakhiriin tal rangeland vegetation assessment were performed in early-mid July, 2008. The results of the field-based measurements are presented here and will be later combined with satellite imagery analysis results.

METHODS

Prior to field assessment, a total of 100 random points were generated within the Tsakhiriin tal study site using Hawth's tool in ArcMap 9.1 software. Each point represented a sample location, at which

field measurements were made within 10m x 10m plots. The plots were centered at each random point and the edges of the plots were aligned in the cardinal directions. Four digital photographs (in the cardinal directions) were taken at each plot to record the general characteristics of each point at a landscape scale (Only one photograph was taken at some plots due to limited memory space on the digital camera). The field measurements included ground cover estimation and forage biomass measurement. Ground cover estimation included estimates of percent cover of bare soil, rock (coarse fragments >75 mm), litter, herbaceous standing dead, dead standing wood, live herbaceous species, live shrubs, and dominant weed. Percent cover estimates were made along two 10 m line transects, perpendicular to each other and crossing at the center of the plot at 5m of each line transect, using a point-intercept method. Records were made every 20 cm along each 10 m line, beginning at 10 cm and ending at 990 cm, to indicate the cover type at the point (n = 50 points for each line and 100 points for each plot).

Litter refers to biomass that is on the ground and in contact with the ground. Live herbaceous species refers to live (i.e., green) forbs and grasses, while live shrubs include all species of shrubs.
Forage biomass was measured in four cable hoops 93 inches in circumference and 0.44 m^2 in area. The hoops were tossed randomly in each of the four quadrants of each plot. All green and senescent herbaceous biomass was clipped and wet-weighed in a paper bag using a spring scale.

RESULTS

The most common ground cover type was live herbaceous species with a mean estimate of 49.04% cover (Figure 2). The second most common ground cover type was litter, which made up 41.31% cover on average. Bare soils made up 9.08%. Other ground cover types of standing dead herbaceous, rock, shrub, and weed comprised less than 0% cover (Figure 2).
Plot-level averages of wet forage biomass ranged between 26-144 gr per hoop. The average wet forage biomass at this study was 54.03 gr per hoop. These estimates translate to average forage biomass of 1086 lbs per acre and 1218 kg per hectare.

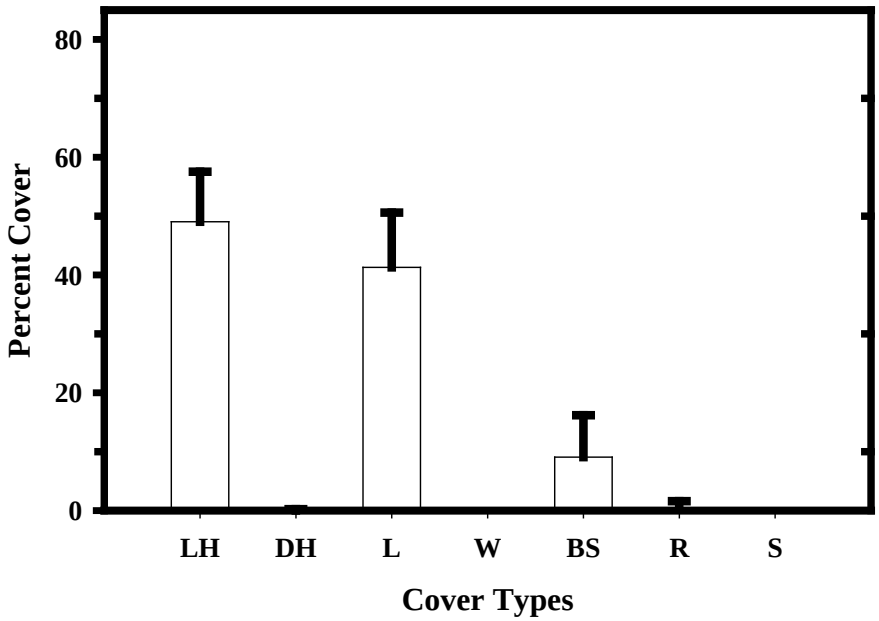

Figure 2. Mean (±SE) percent cover of all ground cover types (LH=Live Herbaceous, DH=Standing Dead Herbaceous, L=Litter, W=Weeds, BS=Bare soil, R=Rock, S=Shrubs) at the Tsakhiriin tal study site in the summer of 2008.

CONCLUSIONS

The observed ground cover types and their estimated percent cover were similar to the expected trends in the Darkhad Valley grasslands. Standing dead herbaceous species was estimated to have low percent cover, which might be expected in such continuously grazed areas. Low percent cover of bare soil and weeds, but high percent cover of live herbaceous species might suggest that this area is not overgrazed, although it is grazed continuously throughout the growing season. Shrubs were not found in any of the plots in the Tsakhiriin tal study area. This was consistent with the observed patterns in the Darkhad Valley, where shrubs are present only in ungrazed riparian areas.

ACKNOWLEDGEMENTS

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