

Long-term trends of community structures in tall grassland vegetation under three treatments in northeastern Japan

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Introduction In order to acquire fundamental knowledge on sustainable use and conservation of grasslands in an Asian monsoon climate, we have investigated since 1982 the vegetation of typical Japanese tall-grass, *Miscanthus sinensis* (Japanese plume-grass) dominant grassland. Three treatments, cattle-grazing, cutting and abandoning were carried out at the study site. We report the results of this research here, in particular focusing on the analysis of the changes in community structure and the influence of different utilization.

Materials and methods Our study site was an *M. sinensis* grassland located in northeastern Japan. The grassland was divided into four paddocks, where grazing (two paddocks, Paddocks Ga and Gb, hereafter), cutting (Paddock C) and abandoning (Paddock A) treatments were conducted. One transect was set at each of Paddocks Ga and Gb, and two transects at each of Paddocks C and A. In 1994, as investigation at Paddock Gb was discontinued, an additional transect was set at Paddock Ga. Along each transect, ten 2 × 2 m permanent quadrats were set. Vegetation survey was conducted from late August to early September in every year. Within each quadrat, coverage, community height, and cover and the longest length of respective occurring species were measured. Data analysis was performed on each transect. Species diversity of each transect was estimated as an average of the number of species occurring within respective quadrats. Changes in species composition from 1982, the year we started this research, were calculated as an average of a beta diversity index (β_T , Wilson & Shimida 1984) between data from 1982 and any given year on respective quadrats.

Results Figure 1a shows the changes in species diversity. Species diversity increased with grazing treatment, while it remained stable with cutting and abandoning treatments in the long term. Figure 1b shows the changes in species composition from 1982. The species composition in Paddocks Ga and A started to change from the middle 1980's, and kept on changing gradually after that time, while in Paddock C it did not change largely in the long term.

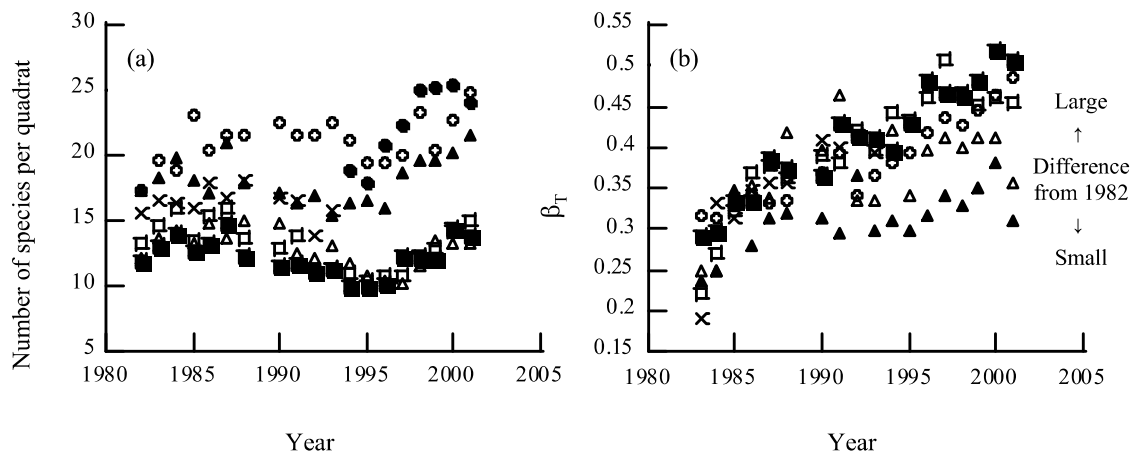


Figure 1 (a) The changes in species diversity and (b) the changes in species composition from 1982.

○	Ga-1	●	Ga-2	□	A-1	■	A-2
×	Gb	△	C-1	▲	C-2		

Conclusions In *M. sinensis* grassland in an Asian monsoon climate, grazing management promoted species diversity in the community, and cutting management made the community structurally stable.

References

Wilson M.V. & A. Shimida (1984). Measuring beta diversity with presence-absence data. *Journal of Ecology*, 72, 1055-1064.