平成２９年度　環境科学院　修士論文内容の要旨

# The facilitative effects of tussocks on plant establishment are weakened by developing turfs

（谷地坊主の植物定着促進効果は低茎草本群集の発達により低下する）

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Tussocks formed by sedges and turfs made by *Rhynchospora alba* established on a post-mined peatland in Sarobetsu mire, northern Japan. The tussocks often have facilitative effects on the cohabitants. Although the turfs often developed with tussocks, the effects of turfs on cohabitants have been unclear. To clarify the mutual effects of tussocks and turfs, field observations and experiments were undertaken in four microsites: tussock edge with no turf (TEG), tussock edge with turf (TRA), bareground on flat (FBG) and turf on flat (FRA). In addition, the removal experiments of turfs on tussock edge (TRV) and flat (FRV) were conducted to detect the effects of tussocks and turfs on plant establishment. On each microsite, light intensity and temperature were monitored in 2016 and 2017. The seeds of four common species were collected in the late autumn of 2016 and then the seed-sowing experiments started in the early spring of 2017, to detect the mutual effects on the seed germination, seedling survival and growth, and resource allocation. Litter thickness was measured on each microsite in 2017.

The results were summarized as follows: Light intensity and temperature were lower on the tussock edge with thick litter than on flat. Vegetation cover increased by the turf, while species richness increased on the tussock edge whether the turfs established or not. The seed germination was highest on TEG for all the four examined species and showed no significant differences between FBG and FRV. *R. alba* and *Lobelia sessilifolia* showed the lowest seed germination when *R. alba* turf developed, in particular, on TRA where the litter was thick. The seed germination was restricted on TRA because of litter accumulation, although the tussocks facilitated the seedling establishment without the turfs. The seedling survivals of three other species were not affected by the tussocks and turfs except the lowest survival of *R. alba* on the turfs. *R. alba* seedlings had the highest biomass on unshaded microsites, while *L. sessilifolia* seedlings had the highest biomass on TEG. Both of the two species had the lowest biomass on TRA. These results indicated that the turfs restricted the seedling growth as well as the seed germination. The seedlings of *R. alba* and *L. sessilifolia* were shorter on the flat than on the tussock edge, suggesting that the heights were determined by light intensity. *R. alba* seedlings produced the shortest shoots and roots when the tussocks and turfs established, but did not change above-ground and below-ground biomass allocation between the microsites. The height of *L. sessilifolia* seedlings increased with litter, and the seedlings increased the resource allocation of height to above-ground biomass with increasing shade. The two most common species, *R. alba* and *L. sessilifolia*, coexisted by using the different allocation patterns, although their preferable microsites for seed germination were overlapped.

In conclusion, the tussocks had positive effects and the turfs had negative effects on the species richness, seed germination and seedling growth. The effects of turfs were higher than the effects of tussocks on the seed germination and seedling growth of cohabitants. Therefore, understanding the distribution of turfs and tussocks was a key to conserve the diverse plant communities.