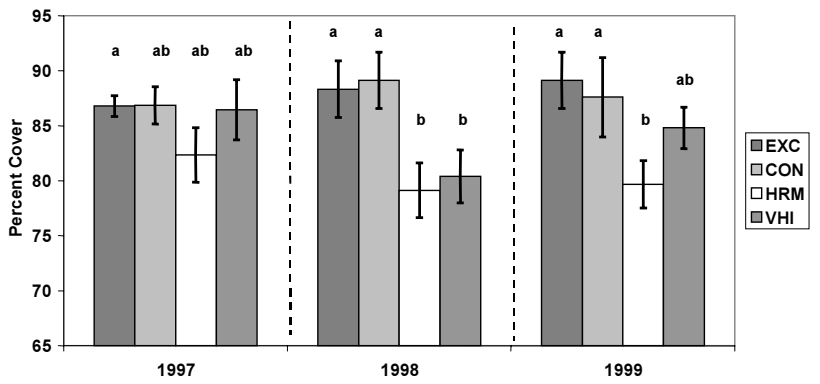

Figure 4. Percent plant cover for four grazing treatments (see Fig. 2 and text for treatment descriptions). EXC and VHI treatments were initiated following data collection in 1997, while CON and HRM treatments were put in place more than 12 years prior to initiation of this study. Between-year differences were not significant for any treatment; significant within-year differences among treatments are denoted by different letters (df=3, F=9.87, P<0.0001).

VHI treatment exhibited an 8% decline in plant cover after one year of treatment, but this difference did not persist into 1999. In general, short-term effects of treatments were measured, but their long-term implications remain unclear. Finer resolution measures, such as comparisons of community composition, are addressed in a separate paper (Loeser et al. in prep.).

Arthropods

Pre-graze and post-graze sampling of EXC and VHI plots showed a decline of greater than 50% in arthropod abundance following the VHI grazing event in 1998 (df=1, F=5.95, P=0.07; Fig. 5). In contrast to this short-term response, the pre-graze abundance, which is a measure of response since the 1997 grazing event, did not differ between treatments, suggesting that long-term effects may be negligible.

DISCUSSION

Although we are in the early stages of a long-term study, we have detected short-term differences among four treatments reflecting a gradient of grazing intensity. In general, it appears that soil properties and belowground processes are more sensitive, over the short-term, to differences in grazing treatments than are aboveground properties. This supports similar conclusions drawn by Anderson (1995) who argued that belowground organisms may be keenly susceptible to land-use change. Measurements of short-term changes in above- and belowground communities due to grazing were not unexpected, however, the more ecologically and policy relevant questions involve long-term shifts in biological diversity and ecosystem productivity.