

Effect of Taskforce herbicide application on soil pH and soil microbial biomass carbon

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Background

Taskforce is a selective herbicide used for the residual control of Chilean needlegrass, nassella tussock and kangaroo grass. It contains the active ingredient flupropanate which has been shown to bind to soil and be readily absorbed by plant roots. It is slow acting, selective and the residual action may last up to 5 years after application.

However, some Marlborough land owners have raised concerns that the application of Taskforce to control Chilean needlegrass, nassella tussock and kangaroo grass at recommended rates can result in acidification of soil and a reduction in soil microbial health.

Aim

Assess the effect of Taskforce herbicide application on soil pH and soil microbial biomass carbon.

Materials and Methods

- Three field sites (A, B, C) located in south Marlborough and infested with Nassella tussock and/or Chilean needlegrass were selected for the trial. At each site, three separate transects, each approximately 50m long, were marked out at the mid-slope, and similar contour, aspect and soil type.
- Soils were sampled from the three transects on three occasions i.e. prior to herbicide application, 1 week after application and again after 3 months.
- Soil sampling involved taking approximately 25 subsamples (0 – 37.5 mm soil depth) from each transect and combining soil to produce one composite sample for analysis. Hence there were three composite samples per site.
- Soils were analysed for soil pH and microbial biomass carbon.
- Taskforce was applied by aerial boom spraying to the infested sites at the recommended rate of 3L per ha in early August 2012.

Results

Soil pH

Soil pH is a measure of the acidity and alkalinity in soil. It is an important soil indicator because it affects nutrient and contaminant availability in plants and the functioning of beneficial soil macro- and micro-organisms. Results indicate there were no differences in soil pH values measured at sites B or C after the application of Taskforce herbicide, while pH increased and then decreased slightly at site A (Figure 1). Three subsamples of diluted Taskforce herbicide were also measured for pH prior to boom application. The average pH value was 8.3.

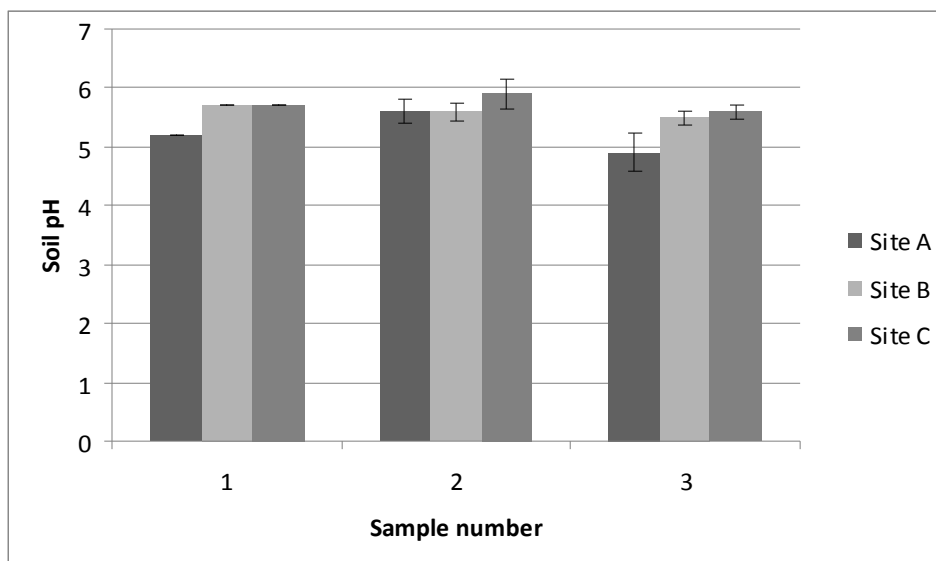


Figure 1 Average soil pH values at the three trial sites measured prior to application of Taskforce (1) and then 1 week (2) and 3 months (3) after application.

Soil microbial biomass carbon

Soil microbial biomass carbon is one of a large number of soil measurements used to help assess soil biological health. It measures the mass of living micro-organisms in soil e.g. bacteria, fungi, protozoa. Results indicate there were no significant differences in microbial biomass carbon values at sites A or B after the application of Taskforce herbicide, and only a slight decrease at site C (Figure 2).

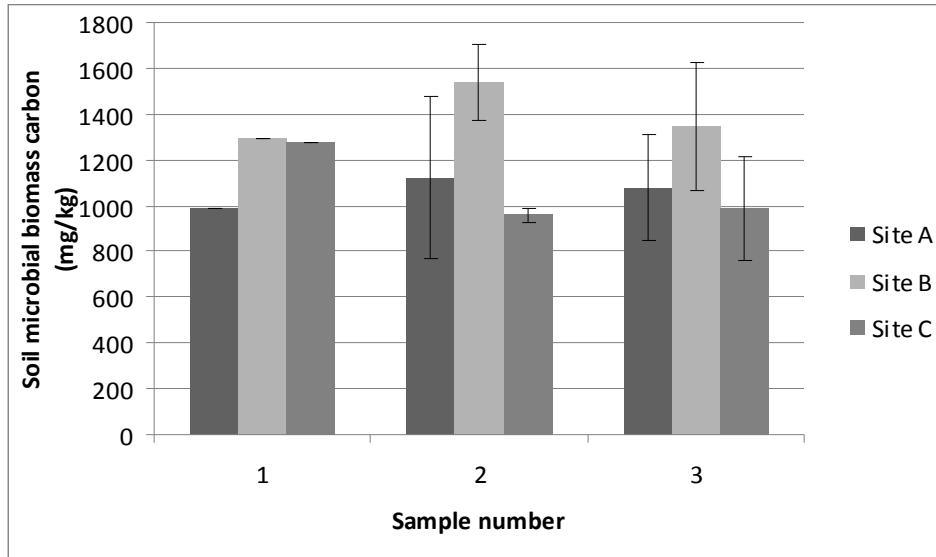


Figure 2 Average soil microbial biomass carbon values at the three trial sites measured prior to application of Taskforce (1) and then 1 week (2) and 3 months (3) after application.

Conclusions

- The application of Taskforce has not resulted in acidification of soil and given its alkalinity in its diluted state is not likely to result in a significant change in soil pH.
- The application of Taskforce has not resulted in any change in soil microbial biomass carbon at two sites and a small decrease at one site.