Does defoliation frequency and severity influence plant productivity? The role of grazing management and soil nutrients

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Table S1 Baseline vegetation and soil characteristics measured before the initiation of the Merino Walk experimental grazing trial in December 2015. All sampling was performed at regularly spaced (90 m apart) sampling points over the farm. Standing biomass was measured using a disc pasture meter and calibrated using oven dried clippings of vegetation foliage. The normalised difference vegetation index (NDVI), NDVI heterogeneity, and percentage bare ground were measured using satellite imagery captured during 2015. Five soil cores were taken at each sampling location, bulked, air dried, sieved to 2 mm and sent to a lab for total soil nutrient analysis. Treatment means for season-long (SLG), four-camp (FCG) and holistic planned grazing (HPG) are presented ± standard error, along with the results from an ANOVA of a linear mixed models.

| Attribute                  | SLG         | FCG         | HPG         | \(\chi^2\) | df | \(p\) |
|----------------------------|-------------|-------------|-------------|------------|----|-------|
| Standing biomass (kg ha\(^{-1}\)) | 605.2\(^{b}\) ± 17.97 | 1021.7\(^{a}\) ± 36.26 | 922.3\(^{a}\) ± 19.94 | 10.51 | 2 | 0.005* |
| NDVI                       | 0.453 ± 0.027 | 0.457 ± 0.003 | 0.46 ± 0.003 | 1.462 | 2 | 0.481 |
| NDVI heterogeneity         | 0.012\(^{ab}\) ± 0.0003 | 0.015\(^{b}\) ± 0.0012 | 0.023\(^{a}\) ± 0.0018 | 6.224 | 2 | 0.045* |
| Bare ground (%)            | 0.05 ± 0.0027 | 0.042 ± 0.004 | 0.053 ± 0.002 | 4.39  | 2 | 0.111 |
| Soil N (%)                 | 0.11 ± 0.0035 | 0.137 ± 0.0018 | 0.109 ± 0.001 | 0.89  | 2 | 0.642 |
| Soil P (%)                 | 0.0375 ± 0.0024 | 0.043 ± 0.0004 | 0.042 ± 0.0004 | 0.61  | 2 | 0.736 |
| Soil K (%)                 | 0.97\(^{b}\) ± 0.012 | 1.063\(^{ab}\) ± 0.005 | 1.094\(^{b}\) ± 0.007 | 6.17  | 2 | 0.046* |

Significance is indicated at \(p < 0.05^*\) and \(p < 0.001^{**}\). For direct treatment effects, significant differences are indicated with letters.
Figure S1 Vegetation greenness, as measured by the normalised difference vegetation index (NDVI), recorded every two weeks for the experimental plots located on the Merino Walk (Goedehoop section) experimental farm. Responses to two levels of clipping severity and four levels of frequency (A and B), and dung application with 60 d defoliation at 10 cm severity (C) are compared to an unclipped control (red). Plot lines and colour ribbons represent treatment means ($n = 3$) and 95% confidence intervals, respectively. NDVI peaks during the growing season between Nov and Apr.