



The quest for persistent green in outdoor chicken runs – an investigation on fourteen grassland species

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Introduction

The vegetation cover of outdoor chicken runs is exposed to particularly high levels of stress due to pecking and scratching. Areas of bare soil often arise posing the risk of erosion and nitrogen leaching. We tested the suitability of fourteen native grassland species for a persistent greening of outdoor chicken runs.

Hypotheses

1. Biomass removal by chicken grazing differs among pasture plant species due to different feeding preferences of the animals
2. Stocking duration impacts the post-grazing growth rates of aboveground biomass of pasture plants to an inter-specifically different extent.

Material and Methods

- Experimental design: randomized split-plot, $n = 3$ (Fig. 1a)
Rotational grazing of blocks in subsequent order

Main factor	Plant species	Number of factor levels
Subordinate level	Stocking duration	4 ⁱⁱ

ⁱ fourteen plant species and cultivars as monocultures and one seed mixture comprising equal proportions of all those species. For species list see Fig. 2

ⁱⁱ four laying hens (ISA Warren brown) for a) 1*5 hours, b) 2*5 hours and c) 3*5 hours on consecutive days; d) non-grazed control

- Data sampling: repeated measurements of standing biomass using a rising plate meter (Castle 1976) → calculation of target variables: 1. growth rate during rest periods and 2. relative biomass removal by grazing
- Statistics: two-way ANOVA, Tukey HSD test (95% confidence level) using the software package R (www.r-project.org)



Fig. 1 a) Detail of the experimental site. b) mixed sward before (left) and after (right) a grazing period of 15 hours

Results

- Relative aboveground biomass removal caused by grazing differed significantly ($P < 0.001$) among the investigated species (Fig. 1b, Fig. 2).

Hypothesis 1

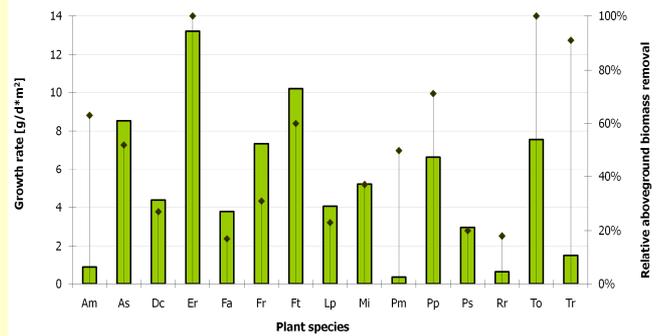


Fig. 2. Growth rates (bars) and relative aboveground biomass removal (diamonds) after 15 hours of stocking with laying hens. Am – *Achillea millefolium*; As – *Agrostis stolonifera*; Dc – *Deschampsia caespitosa*; Er – *Elymus repens*; Fa – *Festuca arundinacea*; Fr – *F. rubra*; Ft – *F. trichophylla*; Lp – *Lolium perenne*; Mi – seed mixture; Pm – *Plantago major*; Pp – *Poa supina*; Ps – *P. supina*; Rr – *Ranunculus repens*; To – *Taraxacum officinale*; Tr – *Trifolium repens*

- Growth rates of aboveground biomass differed significantly among the investigated species (Fig. 2).
- Duration of stocking was a significant ($P < 0.001$) explanatory factor for the growth rates during the following rest period.
- Growth rates of aboveground biomass were significantly higher than in the ungrazed control for *A. stolonifera*, *D. caespitosa*, *L. perenne* ($P < 0.01$), *F. rubra* and *P. pratensis* ($P < 0.05$). For the other species, growth rates did not differ significantly among treatments.

Hypothesis 2

„So what's the best plant for greening our outside run?“

Conclusions

Among the species tested, *Festuca arundinacea* and *Poa supina* potentially are the most eligible for establishing a durable vegetation cover in chicken outside runs due to small (< 20%) relative aboveground biomass removal by chicken and comparatively high growth rates which are not significantly impacted by stocking duration level.

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References

Castle M. E. (1976) A simple disc instrument for estimating herbage yield. *Journal of the British Grassland Society* 31, 37-40

