

CHANGES IN BOTANICAL COMPOSITION UNDER FREE-RANGE CHICKEN FARMING

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Abstract

A field experiment is being conducted at University of New England's Laureldale Research Station in Armidale to study the impact of free-range chickens on soil properties and pasture persistence and growth. Birds occupy 5 m x 15 m plots at a stocking rate of 1,500/ha. Different chicken-occupation and chicken-free periods were used as treatments, *ie.* one month occupation with one month free, one month occupation with two months free, two months occupation with two months free, control plots without chicken occupation, and plots spread with chicken manure from caged birds. Plant cover (grass, legume or weed) was determined using photographs that were taken from four fixed sampling points per plot, *ie.* 2.5 m, 5 m, 7.5 m, and 10 m from the chicken shed. Within one month of occupation the plant types had changed. The largest changes occurred near the shed. Initial composition could not be maintained with a two month chicken-free period.

Key words: free-range chicken, botanical composition, rotational grazing

Free-range chicken (FRC) farming is an alternative poultry system for egg production. However, FRC systems have been questioned in terms of environment stability. The impact of nutrient loads (1) and soil exposure are some of the aspects being questioned.

The study is undertaken to investigate the impact of FRC farming on vegetation and a range of soil properties. This paper presents only preliminary results about the impact of chicken grazing on pasture composition.

Materials and methods

Chickens at a stocking rate equivalent to 1,500 birds/ha (maximum allowable stocking rate) occupy plots (size 5 m x 15 m) for different time-length rotational treatments, *ie.* one month rotation between two sites, two-months rotation between two sites and one month rotation among three sites, unstocked control plots, and plots spread with chicken manure from caged birds. Each treatment is replicated. The rotational grazing is conducted to limit the adverse impacts of FRC on soil as suggested by Bartlett (2), and Bartlett and Murphy (1).

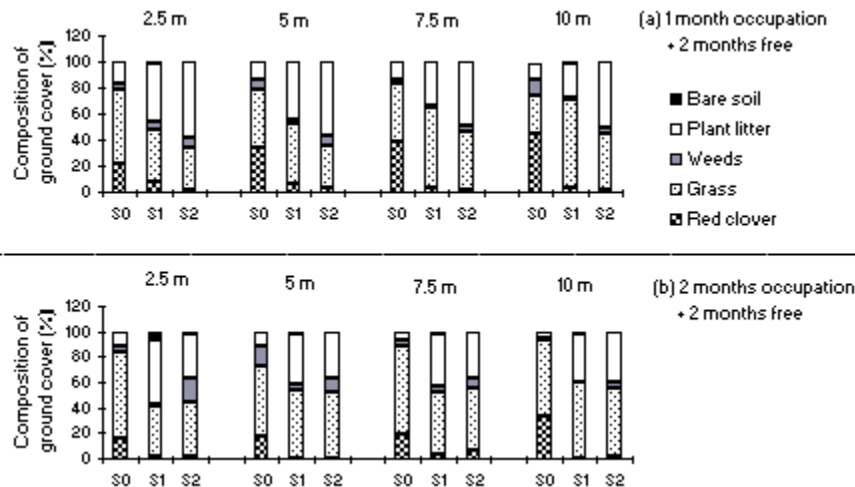
To assess plant cover, photographs of 0.5 m² of areas were taken from four marked sampling points in each plot with distances from the chicken shed of 2.5 m, 5 m, 7.5 m, and 10 m. To quantify the proportion of legume, grass and weeds, a grid of 345 points is placed over the photograph and the number of dots covering each type of vegetation is recorded. Photographs were taken on January, March, and May 1997.

Results and discussion

Pasture composition assessed prior to initial grazing was quite variable in each plot. However, there were similar trends in composition change. Figure 1a and 1b show the changes of treatments 'one month occupation with two months free' and 'two months occupation with two months free', respectively. The proportion of legume, which was dominated by red clover (*Trifolium pratense*), was reduced by 40 - 100 % from the ground cover prior to stocking. This obvious reduction of legume occurred even in plots occupied by chickens for only one month. A one month or two month chicken-free period was not enough for pasture cover to return to previous levels.

In all grazed plots, when clover was available at the initial grazing, the proportion of legume reduction was greater than that of grass or weeds. When legume was consumed, either grass (mainly *Paspalum dilatatum*) or broadleaf weeds (mainly *Plantago lanceolata*) dominated the composition.

Total reduction of vegetation is different among sampling points inside the plot. Greatest reduction occurred closest to the shed (2.5 m) and the lowest reduction furthest away from the shed (10 m). These results show that chicken consumed more pasture near the shed.



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Figure 1. Changes in composition of ground cover with distances from the chicken shed; (a) : initial stage (S0), occupied 1 month (S1) and free 2 months (S2); (b) : initial stage (S0), occupied 2 months (S1) and free 2 months (S2)

Apart from grazing, the poor recovery may have been affected by low rainfall during the period from the end January to mid May 1997. There was 76 mm of rain at the end of January, 35 mm in February, 4 mm in March, and 34 mm for the period 1-13 May 1997.

Conclusion

Depletion of pasture cover under a free-range chicken system was marked by legume loss. Botanical composition changed after grazing, and even a longer chicken-free period (2 months) could not maintain the initial composition. Grasses and broadleaf weeds became dominant in the composition. Greatest destruction of pasture occurred near the chicken shed.

Acknowledgments

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References

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