Springtime grazing for meadowbird conservation

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Abstract

European meadow bird populations are declining. In the Netherlands, particularly the black-tailed godwit and lapwing show reduced breeding success and limited chick survival because of increased predation, urbanization and agricultural intensification. In order to increase breeding success and chick survival, farmers are compensated for implementing conservation measures, including delayed first harvest until 1, 8 or 15 June. These measures help to create a period of rest with enough shelter against predators and sufficient food availability for the chicks. However, this delayed harvest results in a heavy grass crop, which limits chick mobility and feeding success, but also negatively affects forage quality and regrowth. In the current experiment we tested the effect of pre-grazing until 1 or 8 May on the yield, sward density (% cover at soil surface) and nutritive value of the grass harvested at a delayed harvest. Pre-grazing significantly reduced the average herbage dry matter (DM) yield from 7 t ha^{-1} to 4.6 and 3.2 ton DM ha^{-1} (1 and 8 May, respectively). The sward density after the delayed harvest was 18% higher with pre-grazing, and both the energy and protein content were higher. In conclusion, pre-grazing is a good tool to prevent some of the problems associated with delayed harvests under meadow bird conservation management.

Keywords: grazing, meadowbird conservation, sward density, herbage yield, nutritive value

Introduction

European meadow bird populations are declining. In the Netherlands, particularly the black-tailed godwit and lapwing show reduced breeding success and limited chick survival because of increased predation, urbanization and agricultural intensification. In order to increase breeding success and chick survival farmers are compensated for implementing conservation measures, including delayed first harvest until 1, 8 or 15 June. These measures help to create a period of rest with enough shelter against predators and sufficient food availability for the chicks. However, this delayed harvest often results in a heavy grass crop, which limits chick mobility and feeding success, but also negatively affects forage quality and regrowth. In order to prevent these problems, there are also conservation measures in which farmers are allowed to graze these fields until 1 or 8 May, followed by a rest period of 4 to 6 weeks. The objective of the current experiment was to assess the effect of pre-grazing until 1 or 8 May on the yield, sward density and nutritive value of the grass harvested at a delayed harvest.

Materials and methods

In 2018 we carried out a plot experiment in which we tested the effect of delayed harvest (1, 8 or 15 June) without grazing (NG) or with grazing until 1 or 8 May (G-1/5, G-8/5), resulting in 8 treatments (see Figure 1). The experiment was conducted in a perennial ryegrass-dominated sward at the Knowledge Transfer Centre Zegveld, which is situated on drained peat soil. The plots were 3 x 7 m and placed within a grazing trial (5 LU / ha) in 8 replicate blocks. All plots received 25 m^3 cattle slurry at the end of March. Additionally, after the first cut the plots received 155 kg N/ha in the form of calcium ammonium nitrate divided over 3 cuts. During each of the four cuts the dry matter yield (DMY) and nutritional value was determined by cutting the plots to 6 cm height using a Haldrup plot harvester. Grazing started on 15 April and residual sward height was on average 6.5 cm. The grass growth and dry matter during grazing was estimated based on weekly grass height measurements under 1.5 x 4 m grass cages in the grazing area adjacent to the plots. On 15 June the sward density cover at soil surface was determined using the point quadrat method (Hoekstra *et al*., 2019). ANOVA was carried out to assess the treatment effect on DMY, sward density and nutritional value.

Results and discussion

There was a significant ($P<0.001$) treatment effect on the DMY of the first cut. The DMY without grazing ranged from 6.7 on 1 June to 7.3 t ha^{-1} on 15 June (Figure 1). The grazed plots had a significantly

($P<0.001$) lower DMY at cut 1: on average 4.6 and 3.2 t DM ha^{-1} for grazing until 1 May and 8 May, respectively. This shows that grazing was an effective way to reduce the heaviness of the grass crop at delayed harvest. However, under the conditions of spring 2018, grazing until 1 May still resulted in a DMY of 4.6 t DM ha^{-1}, which is still very high in relation to chick mobility. This highlights the need to also minimize the fertilization rates on these fields with a relatively intensive management history.

The high herbage yields of the first cut had a negative effect on sward density and regrowth (Figure 1b). The sward density ranged from 31% (no grazing, date first cut 15 June) to 70% (G-1 May, date first cut 1 June). A delay in cutting from 1 June to 15 June resulted in a decrease in sward density of on average 30% points, whereas grazing until 1 May and 8 May (compared to NG) resulted in an increase in sward density of 10 and 18% points, respectively.

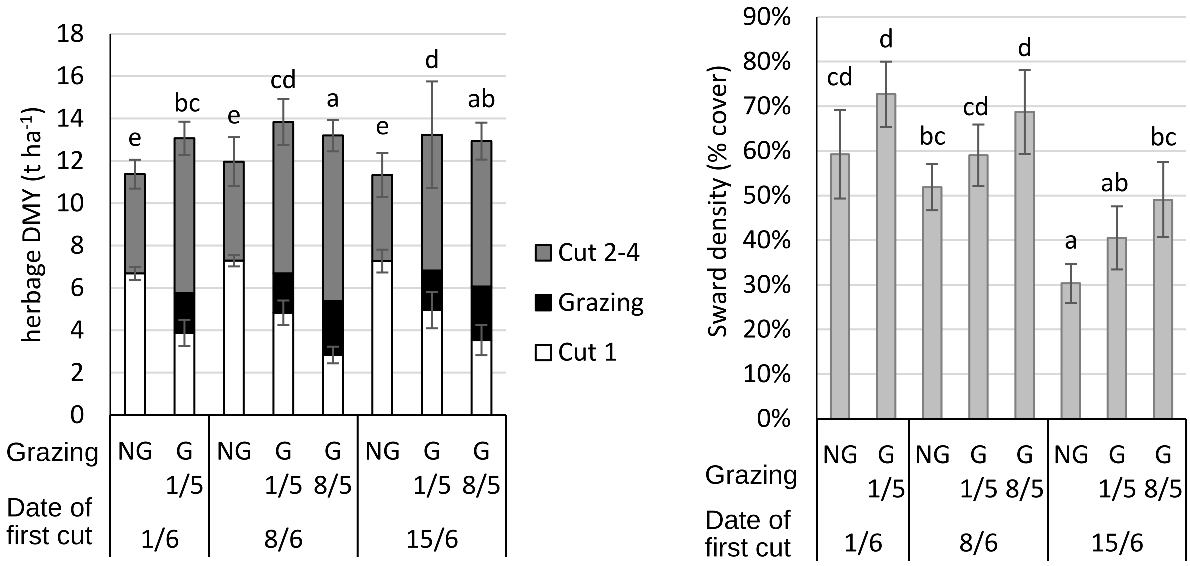

Figure 1. The effect of grazing (NG = no grazing, G 1/5 = grazing until 1 May, G 8/5 = grazing until 8 May) and cutting date of the first cut (1/6, 8/6 and 15/6) on a) the herbage dry matter yield of the first cut, and cut 2-4 and the herbage uptake during grazing and b) the sward density (% cover at soil surface) measured on 15 June. Error bars are 2×SE, n=8. Different letters above bars indicate significant differences ($P < 0.05$) in (a) the herbage DMY of Cut 1 and (b) sward density.

The DMY of the regrowth (cut 2-4, Figure 1a) was significantly higher when plots had been grazed: on average 4.5, 7.0 and 7.3 t DM ha^{-1} for NG, G-1/5 and G-8/5, respectively. The cumulative herbage yield, including the estimated uptake during grazing was on average 11 t DM ha^{-1} and not significantly affected by the treatments.

Table 1. The effect of grazing (NG = no grazing, G 1/5 = grazing until 1 May, G 8/5 = grazing until 8 May) and cutting date of the first cut (1/6, 8/6 and 15/6) on the energy content (VEM) and crude protein content of the herbage harvested during the first cut.

	VEM (g kg^{-1} DM)			Crude protein (g kg^{-1} DM)		
	Date of first cut			Date of first cut		
Grazing	1 June	8 June	15 June	1 June	8 June	15 June
NG	737 ^{b*}	684 ^{a}	657 ^{a}	117 ^{ab}	112 ^{ab}	103 ^{a}
G-1/5	826 ^{cd}	783 ^{bc}	764 ^{b}	143 ^{cd}	130 ^{bc}	125 ^{abc}
G-8/5		845 ^{d}	835 ^{d}		160 ^{de}	147 ^{cd}

Delaying the harvest date of the first cut had a strong negative effect on the energy (VEM = net energy for lactation) and protein content of the herbage harvested during the first cut. At 15 June VEM was only 657 and CP only 103 g kg^{-1} DM, a reduction of -29% and -39% in comparison to the nutritional value at a regular harvest date (15 May, 927 VEM and 169 CP). This decrease in nutritional value was partly compensated by grazing: for the delayed harvest at 15 June, VEM was 835 g kg^{-1} DM and CP 147 g kg^{-1} DM when plots were grazed until 8 May.

Conclusions

Grazing was an effective way to reduce the DMY of the delayed harvest and thus possibly improve the habitat quality for meadowbird chicks, by reducing the negative impact of a heavy grass crop on chick mobility. In addition, grazing reduced the negative effects of the delayed harvest on sward density, herbage regrowth and herbage quality of the first cut. However, spring grazing by itself was not sufficient to reduce the herbage biomass in all cases, and it is also important to minimize fertilization on these fields. Care should always be taken to avoid disturbance of nests and chicks by grazing animals.

Acknowledgements

This project was funded by the Province Zuid-Holland.

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EGF 2021

Sensing – New Insights into Grassland Science and Practice

Edited by

T. Astor
I. Dzene

EGF

Volume 26

Grassland Science in Europe