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# POPULATION DYNAMICS OF TARAXACUM OFFICINALE IN GRASSLAND

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## 1. INTRODUCTION

In the Netherlands most intensively used grasslands are rotationally grazed in combination with one or two silage cuts. The main species occurring in these grasslands after *Lolium perenne* is *Poa trivialis*; second and third species are *Poa annua* and *Elymus repens*. However, occasionally high contaminations of *Taraxacum officinale* occur. Three field experiments will be discussed which illustrate the significance of the defoliation regime in the regulation of the amount of *Taraxacum* in grassland.

## 2. MATERIAL AND METHODS

**Experiment 1:** In a grassland sward sown with *Lolium perenne* on sand in 1972, combinations of 3 types of grassland use and 2 levels of nitrogen (N) were applied during four consecutive years (1974 up to and including 1977). Fields were only grazed (G) or grazed with one (M1) or two (M2) silage cuts. In both M-treatments the first cut was always mown; in the M2 treatment so was the third cut. Annual nitrogen applications were 120 (N1) and 360 (N2) kg ha<sup>-1</sup>; all treatments were laid out in three replicates. In the fifth year (1978), all treatments were equally fertilized at 360 kg N ha<sup>-1</sup> to measure the after-effects on botanical composition and yield.

**Experiment 2:** In a grassland sward on peat soil four fields were fertilized with 0, 150, 300 or 600 kg N ha<sup>-1</sup> yr<sup>-1</sup>. In all cases, the first cut was mown at a yield of about 3000 kg DM ha<sup>-1</sup>; the following cuts were grazed. The treatments started in 1977. In early spring and in the autumn of 1981 mean ground cover percentages of the main species were determined.

**Experiment 3:** In a grassland sward on clay on areas with high proportions of *Taraxacum* two different harvest regimes were applied during 1984. In one treatment 6 plots were harvested 6 times with an early first cut on 8 May; in a second treatment, 6 plots were harvested 4 times with a late first cut on 28 May. The two treatments had the same cover of *Taraxacum* in early spring. The sward was fertilized annually with 350 kg N ha<sup>-1</sup> and besides *Taraxacum* consisted mainly of *Lolium perenne* and *Poa trivialis* (first cut) or mainly *Lolium perenne* (later cuts). At each cut in 1984 and at a common first cut for both treatments in 1985 (20 May) samples were taken for botanical analysis in permanent quadrats of 6 m<sup>2</sup>.

## 3. RESULTS

In experiment 1 (Table 1) *Taraxacum* plants had invaded all treatments by 1978, but significantly more strongly in the treatments that had been mown annually once or twice at the low N level. This effect could therefore have been related to the later date of the first cut. The first cut of the lower N treatment had generally not been harvested before 20 to 30 May, i.e. after the peak of seed production of *Taraxacum* (Dutch climate conditions). At the high N level the first cut had been harvested between 10 and 20 May, i.e. mostly before this peak.

In Experiment 2, the highest percentages of *Taraxacum* cover were also found in the lower N treatments in which the first cut had been mown late, i.e. in the second half of May; mean ground cover percentages (means of the early spring- and autumn estimations) were: 24% (N0), 16% (N150), 12% (N300) and 4% (N600) (J.Keuning, NMI, Lelystad, The Netherlands, pers. comm.).

Figure 1 (experiment 3) shows that the dry weight proportion of *Taraxacum* in grassland can change considerably in a short time.

**Table 1:** Botanical composition after four years of application of different uses and levels of nitrogen in the grassland (experiment 1). Botanical composition was determined in the first week of May 1978. G=grazing only; M1=grazing and one silage cut (first cut); M2=grazing and two silage cuts (first and third cuts). Tar=*Taraxacum*, Lp=*Lolium perenne*, Pa=*Poa annua*, Stell med=*Stellaria media*. Cover was measured by means of point quadrat.

kg N ha <sup>-1</sup> yr <sup>-1</sup>	120			360		
	G	M1	M2	G	M1	M2
Cover percentages						
% Tar	9	38	39	3	13	18
% Lp	91	88	81	93	91	89
Dry weight proportions						
% Tar	3	17	28	1	6	10
% Lp	67	48	44	77	68	67
% Pa	19	22	14	15	21	6
% Stell med	4	9	8	4	2	14
% other species	7	4	6	3	3	3

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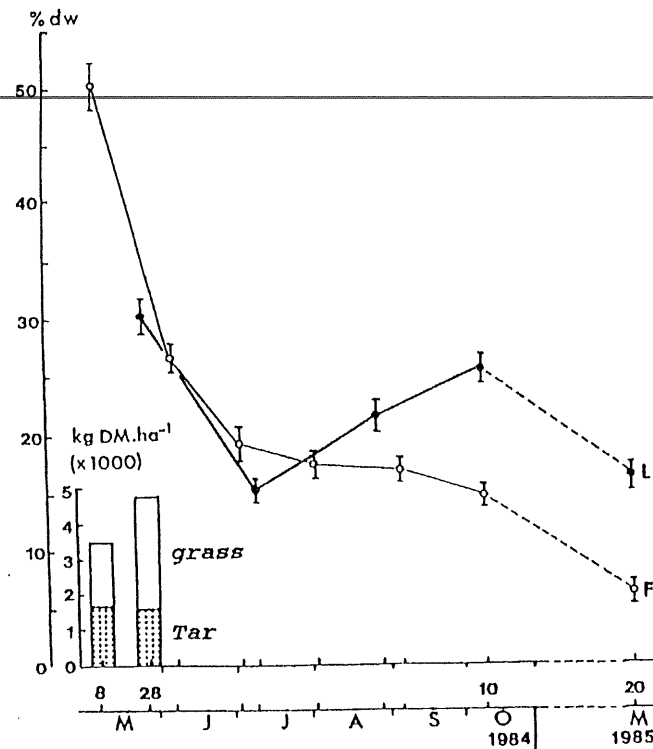


Figure 1: Experiment 3. Dry weight proportions (%dw) of *Taraxacum* at consecutive cuts in 1984 and at the first cut in 1985, and dry matter yields (kg DM ha<sup>-1</sup>) of *Taraxacum* (Tar) and grass at the early and late first cuts in 1984. F (frequent mowing) = 6 cuts, first cut on 8 May; L (late mowing) = 4 cuts, first cut on 28 May. In all cases, means and standard errors of 6 replicates are presented.

The sharp decrease of *Taraxacum* between the early and the late first cut from 50% to 30% (undisturbed

growth) has to be attributed to the fact that after the early first cut the grass continued growing, whereas the growth of *Taraxacum* had ceased. This also appears from the presented dry matter yields at the early and the late first cuts shown in Figure 1. Thus, *Taraxacum* seems to be an early growing species. In both mowing treatments *Taraxacum* continued decreasing until the end of June, and in the more frequent mowing treatment even up to and including the first cut in 1985 (Figure 1). In this latter treatment *Taraxacum* had a low dry weight proportion of only 6% at that time. Less frequent mowing had allowed some recovery of *Taraxacum* in autumn, but after winter the dry weight proportion of the species in this treatment had decreased to 16%. This difference in the amount of *Taraxacum* between both treatments was significant and was also reflected in the higher cover of *Taraxacum* (66% versus 26%) and the lower cover of grass (70% versus 90%) in early November and in the significantly greater number of *Taraxacum* rosettes (159 versus 58 per m<sup>2</sup>) at the first cut of 1985 in the frequently mown treatment compared with the late mown treatment.

#### 4. CONCLUSIONS

Experiments 1 (Table 1) and 2 suggest that in particular late mowing of the first cut in the second half of May can lead to *Taraxacum* invading grassland. Many *Taraxacum* seeds are present then because this is the main period for seed production of *Taraxacum*, while late mowing of the first cut encourages in an open sward.

The continuous decline of *Taraxacum* in the frequently mown treatment (see Figure 1) suggests that in a sward recovering from mowing the species is easily repressed by *Lolium perenne*. Therefore chemical control of *Taraxacum* is not necessary.