Effect of intensive management on grassland mixtures

NIBIO
NORWEGIAN INSTITUTE OF BIOECONOMY RESEARCH

Khaled Muradagha, Synnøve Rivedal

Norwegian Institute of Bioeconomy Research, Grassland and livestock.

Introduction

The Norwegian growing season has become longer due to climate change. This requires seed mixtures that contain species with good regrowth throughout the season, or seed mixtures that complement each other over years as much as possible.

In most Norwegian marketed seed mixtures timothy has been the dominating species although it does not tolerate intense grazing or many cuts. Species with increased regrowth capacity should be increased in seed mixtures used for both grazing and harvesting.

This study aimed to investigate the appropriateness of different seed mixtures for grazing and harvesting in terms of yield and duration when they are used in climatically different areas and if a seed mixture with low proportion of timothy can produce at a satisfactorily yield level.

Materials and Methods

Eleven field trials were established in 2013 or 2014 in coastal and inland climates of Norway at about 59 - 68 ° N, of which 8 were considered as southern and 3 as northern trials, according to latitude or altitude over sea level (figure 2). Various seed mixtures were tested (table 1).

The number of harvests varied between the trials according to geographical location and the length of the growing season. There was at least one cut in spring and one in autumn to simulate grazing, in addition to one or two cuts for silage production during summer.

At harvesting, plant samples were taken to determine dry matter by drying for two days at 60 °C. Yield was registered for three ley years.

Figure 1: Southern field trial at Fureneset (nr.6 in figure 2).

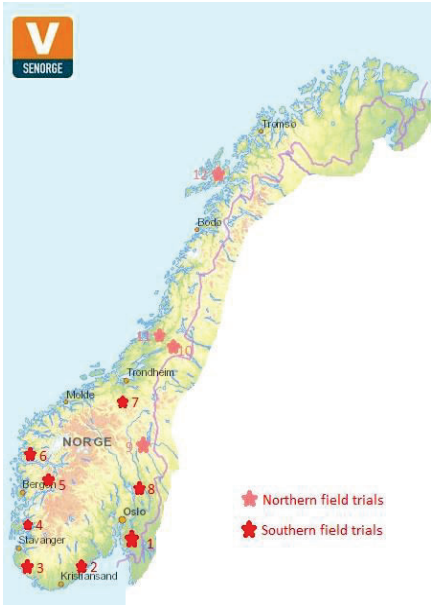

Figure 2: Map showing topography of Norway and the locations of the northern and southern fields (from senorge.no).

Table 1: Content of different species (weight %) in 8 tested seed mixtures.

Species	Scientific name	Cultivar	1	2	3	4	5	6	7	8
Timothy	*Phleum pratense*	Grindstad/ Nordeng	30	30	30	30	30			25
Meadow fescue	*Festuca pratensis*	Fure	20	20	20	20	20		20	
Smooth meadow-grass	*Poa pratensis*	Knut	20	20	20	20	30		20	15
Red clover	*Trifolium pratense*	Lea	10	10	10	10	10			10
White clover	*Trifolium repens*	Hebe	10	10	10	10	10			
Perennial ryegrass	*Lolium perenne*	Figgjo[1]/ Trygve[2]	10[1]	10[2]					20[1]	
Festulolium	*Festulolium sp*	Hykor[1]/ Lofa[2]			10[1]	10[2]			20[2]	
Orchard grass	*Dactylis glomerata*	Frisk/ Laban						100	20	
Smooth brome	*Bromus inermis*	Leif								50

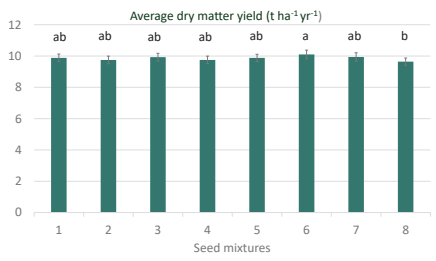

Figure 3: The average total dry matter yield (DMY) per year for 8 mixtures over all trials over three years (n = 99). Letters represent significant difference between mixtures.

Results

The average total dry matter yield (DMY) for all 11 trials over three years was 9.86 t ha-1 yr-1. DMY varied from 10.1 t ha-1 yr-1 (mixture 6, 100% orchard grass) to 9.64 t ha-1 yr-1 (mixture 8, smooth brome mixture), and pure orchard grass gave a significantly higher yield than the smooth brome mixture (figure 3).

There were significant interaction effects between trials and seed mixtures for all southern trials due to the large yield differences between locations. There were also significant interactions between trials and years, and treatments and years.

Southern and northern trials analysed separately did not give significant differences between the different seed mixtures. Both southern and northern trials were statistically different within their geographical group.

Discussion

The study showed that all the tested seed mixtures with the exception of the bromegrass mixture, are appropriate mixtures for an intensive grazing and harvesting regime in terms of yield and duration when they are used in climatically different areas.

The distribution in crops throughout the season varied for the different seed mixtures. The timothy-based mixtures did best in the spring, and 100% orchard grass and the mixture without timothy did best in the autumn. At sheep farms a seed mixture with low proportion of timothy will satisfy the need of good growth in spring and autumn.

As for timothy the regrowth capacity of bromegrass is rather restricted and is of low value in an intensive management system as studied.

The interesting results are the rather small differences between seed mixtures in the different field trials and a considerable yield difference between sites. This means that a multispecies seed mixture may facilitate for satisfactorily DMY when grown in very different environments both regarding length of growing season and overwintering conditions.

Winter damage can happen even in an area where it is not expected. It may therefore be appropriate to use versatile mixtures so that the more winter-hardy species can take over in the event of winter damage. The benefits of using versatile mixtures in a Nordic climate is also found in other studies.

The project was managed by Department of Grassland and Livestock, NIBIO.
In cooperation with the Norwegian Agricultural Extension Service (NLR).
It was funded by The Norwegian Ministery of Agriculture and Food.

Khaled Muradagha, +47 45050152 Khaled.agha@nibio.no Furenesvegen 210, 6967 Hellevik I Fjaler , Norway

nibio.no
PO Box 115, N-1431 Ås, Norway
+47 406 04 100

Norsk Landbruksrådgiving