Forage Cuts as a By-product in Organic Seed Production

Lise C. Deleuran and Birte Boelt

A major problem in organic grass seed production on arable farms is to provide for a sufficient nitrogen supply. A nitrogen-fixing crop may be able to cover the nitrogen requirement - wholly or partly. However mixed cropping of a grass seed crop and a nitrogen-fixing crop is expected to reduce the establishment of the seed crop, especially for species that require a long establishment period. One way to achieve a satisfactory establishment of the seed grass crop can be to introduce an intervening year for cutting forage between cover crop harvest and seed harvest. This will enhance tillering, since the light supply for the undersown grass is increased after each cut. However excessive biomass will hinder drying of the crop at maturity and therefore the growth of the nitrogen-fixing crop must be terminated or reduced in the seed production year.

One of the first organic seed experiments established at Research Centre Flakkebjerg focused on the above-mentioned factors. The experiment was divided into two parts (figure 1) – system A: a combined cutting/seed growing part, and system B: a part exclusively focusing on seed production. The experiment was established in rows with an undersown crop mixed with spring barley at a row distance of 24 cm, and exactly between the grass/grain row red clover was undersown as a green manure crop – also at 24 cm row distance. The grasses in the experiment are meadow fescue, cocksfoot, tall fescue, two festulolium varieties Hykor (has a resemblance to tall fescue) and Paulita (has a resemblance to Italian ryegrass), Italian ryegrass, perennial ryegrass and timothy.

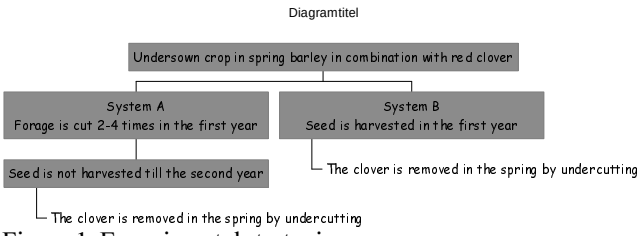

Figure 1. Experimental strategies

Undercutting of clover

In both systems the red clover is removed by undercutting in the spring prior to seed harvest. The undercutting of the clover is done by means of a wing cutter (Plates 1 and 2). The aim is to cut off the clover plants just below the root collar. If a deeper cut is made the plants may re-establish and develop in the grass seed crop.

The Danish Institute of Agricultural Sciences, Department of Plant Biology, Research Centre Flakkebjerg, DK-4200 Slagelse

Forage yields

In system A, we now have two years' forage yields (figure 2). In both years two cuts were made, and prior to each cut 30 kg NH_4 - N/ha was applied in the form of degassed slurry. In 1999 the forage yields were high and the difference in yield between the two cuts – mid May and mid July - was insignificant. In 2000 the yield was 30-50% lower, dependent on the grass/clover combination in question. In particular last cut gave a low yield, which was due to a dry period early summer resulting in poor regrowth.

Prior to each cut the proportion of clover in the different grass/clover mixtures was determined. In both years the clover proportion was highest in tall fescue (90-95%), which is one of the more slow-establishing species, and it does not compete very well with the clover. The proportion of clover was lowest in Italian ryegrass (50%), the growth of which is more aggressive.

.

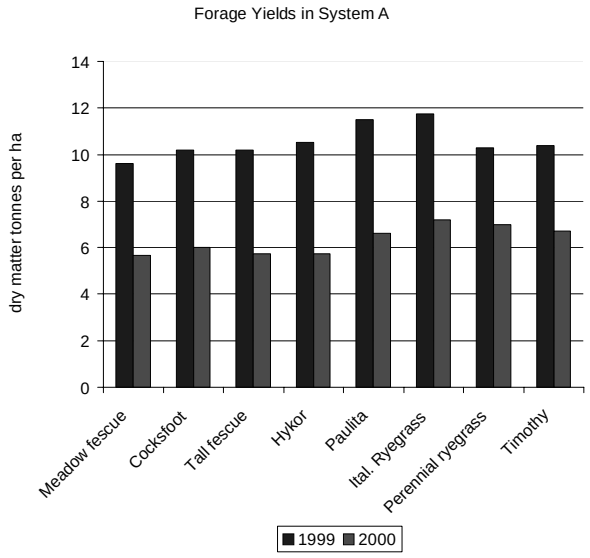

Figure 2. Total dry matter production in 1999 and 2000.

Seed yields

In system B, where seed is harvested in the first year after cover crop harvest, we now have the results of 1999 and 2000. Low seed yields are obtained in species, which establish slowly and do not compete very well against the red clover. The cause of this is that not all clover plants were undercut satisfactorily, therefore too many clover plants established in the seed crop, creating undesirable competition and too much biomass for obtaining dryness at maturity. In late maturing species such as perennial ryegrass and timothy harvested seeds were contaminated with clover in system B. In Italian ryegrass the seed yield was satisfactory due to the aggressive growth of the

Plates 1 and 2 . Undercutting in white clover

grass and consequently good competitiveness against the remaining clover plants was obtained. The seed yields of the two systems appear from figure 3. It is important to note that seed is only pre-cleaned and seed purity varied between 81.8 – 98.5 % and 92.0 – 99.9 % in system B and A respectively. The seed yields from harvest 2000 show pronouncedly higher yields in system A, where forage was cut in the intervening year between cover crop harvest and seed harvest.

In system A seed was harvested for the first time in 2000 – in the second year after establishment. Red clover was removed successfully in spring, and it is not considered to decrease seed yield in the grass seed crops since only very few red clover plants were observed at harvest. All grass seed crops developed satisfactorily and for most species the seed yields were as high as the national 10-year average in conventional production.
In autumn prior to seed harvest no nitrogen was applied and in the spring of the seed harvesting year 30 kg NH_4 - N/ha was

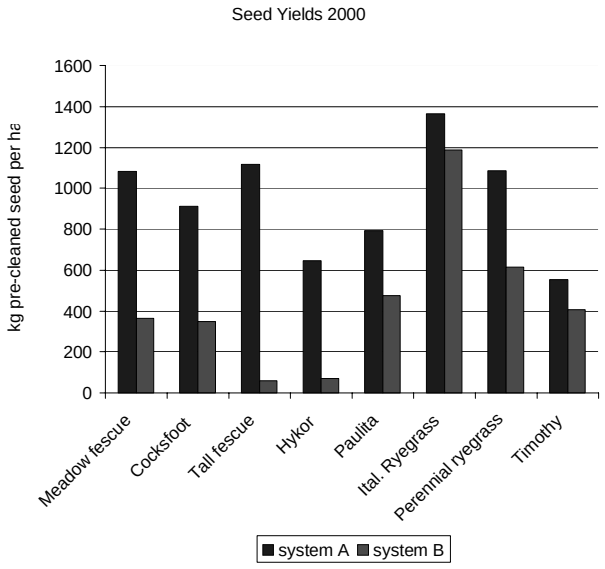

Figure 3. Seed yields (pre-cleaned only) in 2000 for system A (established in 1998) and system B (established in 1999).

applied in the form of degassed slurry to all grass species in both systems. This means that relatively high seed yields are obtained at low nitrogen application rates. In particular for slowly establishing species, the perspectives of system A are very interesting, whereas grass species with a more aggressive growth such as Italian ryegrass, hybrid ryegrass and tetraploid ryegrass might be able to produce high yields already in the first year after establishment.

The quite promising tendencies give occasion to further development of this system. We are now evaluating system B red clover with ryegrass varieties that differ in aggressiveness. With red clover being very aggressive and difficult to remove the first year after establishment, it is of essential importance to examine the suitability of other clover species in order to optimise the interaction between grass and clover. The screening of seven nitrogen-fixing crops has also been initiated (see the article of Boelt, Deleuran and Gislum).

****

Presidents Column continued.....

Some business matters
Recall that in the June 1999 newsletter (No. 30) John Hampton (then JASP editor) requested subscription payment for JASP Vol. 18. Although some of us paid for Vol. 18, we know it won't ever be received. I have confirmed that those dollars were necessary to pay for the printing and mailing costs associated with JASP Vol.17 and the IHSPRG newsletter No.33. Unfortunately, there were a number of un-collectable debts from members receiving Vol.17. Thus, there can be no refunds on checks sent to New Zealand for Vol. 18.

More recently, in the June 2001 IHSG newsletter (No. 33) Athole Marshall (newsletter editor) solicited £20 (pounds sterling) as a subscription fee to continue the newsletter. Response to this fee-based idea was poor, and in the light of the evolving decisions to move towards an electronic-only newsletter those checks have not been cashed and will be returned soon.

In summary, I want to again emphasize the importance of visiting the IHSG web site and providing us with your e-mail address. This will be critical if we are to continue to be accessible to each other in the future. As I said in the last issue, throughout my term as your president I will welcome input at any time. Sending your comments, suggestions or ideas through the web site or to my personal e-mail address is the most efficient way to communicate with me. I look forward to hearing from many of you.

Bill Young

****