

Translation of Danish article:

http://www.lr.dk/kvaeg/informationsserier/graesnyt/grovnyt_2008_132.htm

26 February 2008

Cultivation of fodder beets for co-ensilage with maize

Before taking a final decision to grow fodder beets for co-ensilage with maize, there are a number of matters relating to fodder beet cultivation and the co-ensilage equipment available in your area which require your attention.

The cultivation of fodder beets with or without co-ensilage with maize is particularly suitable in districts where the potential yield from fodder beets is 30-40% higher than from maize. If it is decided to embark on fodder beet cultivation for co-ensilage with maize, there are a number of points which need clarifying if the project is to succeed.

Plan on the basis that approx. 1 ha fodder beets can be co-ensiled with 3-4 ha maize when the potential yield for fodder beets is 30-40% higher than for maize. The aim is to have beets + top making up approx. 1/3 of the mixture, and maize approx. 2/3.

Machinery for whole plant harvesting

There are only a limited number of machines available which are able to harvest top and root simultaneously. For this reason, it must be ascertained that machinery is available in your district which can handle beets such that the root is sufficiently soil-free and small stones are separated during lifting. This applies whether you intend to save both root and top or only save the root for co-ensilage.

The complete harvester under development and in use since 2005 is a prototype. It requires further development to improve reliability of operation and for optimum cleaning of the root before it is mixed with the maize for silage.

The machine is based on a three-row sugar beet harvester, fitted with Opperl wheels and cleaning section. The top is transported by conveyor directly from the topper to the tank. The root passes through various cleaning systems on its way through the machine, one of which has a brush, and all of which are intended to remove sand and small stones. Immediately before the root falls into the tank, it is crushed between two rotating rollers.

Logistics

It is clear that logistics, capacity and reliability of operation of the two sets of machines for harvesting fodder beets and maize present a severe challenge on the day when co-ensilage is to take place. For this reason, there must be clear agreement as to who does what and how. If the two sets of machines work without pause, over 100 tonnes of crop per hour can be brought to store.

Only vehicles able to unload the crop while driving inside the silo or over the field stack should be used.

Compared to the ordinary ensilage of whole maize grain, there must be an extra wheel loader or stack evener for spreading the crop in thin layers and for compressing the layers. It will be an advantage to be able to load into two silos simultaneously, and it is important to have plenty of space with a firm underlay around the storage area.

Requirements for fodder beet growing area

- The area should be rectangular and preferably without headland.
- If maize was the prior crop, herbicides Calaris or Laddok TE must not have been used in 2007, as the product labels contain a warning against using beets as a subsequent crop. However, the risk for beets with the presently permitted doses of terbutylazine is considered relatively small.

- If the prior crop is grain, herbicides Ally ST and Monitor must not have been used in 2007.
- There should be a very limited stones content, and preferably no stones over 10 cm diameter. If larger stones get into the fodder mixer, this may cause damage.
- Choose light soil types. Very heavy clay land is less suitable for lifting with complete harvesters or ordinary lifters, and the adhering soil needs to be cleaned off.
- The area must be free of weeds and couch grass.
- The area must be close to the storage site so as to keep transportation costs down by using a single vehicle. If there are long distances between the beet area and the storage site, several vehicles must be used in order to make efficient use of the complete harvester.

Requirements for fodder beet variety

Characteristics limiting the amount of soil on the root and ensuring that the root remains standing after topping have high priority. When choosing a fodder beet, look for the following characteristics in the order given:

1. High root yield.
2. Maximum cleanness (i.e. as little adhering soil as possible).
3. Small root groove.
4. Position of crown over the ground (not too deep, not too high), i.e. 7-8 cm.
5. Small crown.
6. High uniformity (i.e. the crowns are positioned at a uniform height).
7. Medium to high dry substance content in root (i.e. 19% dry substance or higher).
8. Low tendency to bolting.
9. Good resistance to leaf diseases.
10. High top yield.

Experience with fodder beet varieties

During the development period, several varieties have been cultivated. Magnum has been cultivated with good results on most farms, while Colosse and Kyros have been used only to a very limited extent.

The Magnum variety has high yield and medium-high dry matter content. The root groove has limited depth and the crowns are uniformly positioned over the soil. The top generally remains fresh until the end of the growth period and the variety is only slightly susceptible to leaf mould attack.

The Kyros variety has low yield and low dry matter content. The root groove is very small, but the crowns are too high and not uniformly positioned over the soil and so not suitable for lifting with Opel wheels.

The Colosse variety has high root yield but relatively low dry matter content and can have a relatively high sand content in the root dry substance. The crowns are small and positioned at a uniform and suitable height over the soil. The top yield is low and can be severely attacked by *Rambularia*.

Requirements for maize varieties

The selected maize variety should achieve a dry substance content of approx. 32% by the expected harvest in mid-October. This means that different varieties must be selected in the most suitable growing districts and in those where climatic conditions are not optimal for maize cultivation.

When choosing a maize variety, look for the following characteristics in the order given:

1. Able to achieve dry substance content of approx. 32% by harvest in mid-October.
2. Good standing ability.
3. Gives high and stable yield over several years.
4. Has less than 1.17 kg dry matter per feed unit.
5. Good resistance to cold.
6. Good resistance to *Fusarium*.

With maize the net yield and fodder value fall away as the average daytime temperature drops below 10 C° in the autumn period. The loss of yield is very dependent on actual temperatures and rainfall.

Older trials have shown the loss of yield in October to be approx. 30 FU per ha per day. In new harvesting time trials (2007) using maize varieties Anvil and Patrick, the loss of yield was respectively 70 and 35 FU per ha per day from the optimum harvesting point for whole maize grain in the first half of October to a date approx. three weeks later at the start of November.

With respect to total yield, lifting of beets and co-ensilage with maize should start when the maize has achieved a dry matter content of approx. 32%. Further postponement of lifting will increase the yield in beets but cause a corresponding loss of yield in the maize.

Authors: Karsten A. Nielsen, Martin Mikkelsen and Jens Erik Jensen, Danish Agricultural Advisory Service