



Yields of forage crops in Schleswig-Holstein 1985-2008 under farm scale and trial conditions

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Introduction

Background: Forage production in Schleswig-Holstein is dominated by the production of maize- and grass silage. Due to subsidisation, as for instance for biogas production, the area of silage maize has increased substantially to 150.000 ha from, i.e. 23% of arable land. The area of permanent grassland, in contrast, has declined to a total of 317.000 ha.

The **objective of the present study** was to quantify the trend in dry matter (DM) and energy yield of maize and grass silage under farm conditions in the 1985-2008 period as well as under trial conditions over the 1966-2009 period.

Material & Methods

- ✓ Data sets on land use were obtained from official governmental institutions of Schleswig-Holstein (Statistisches Landesamt, 2009).
- ✓ Dry matter and energy yield of grass- and maize silage under farm conditions were provided by the reports on 'Results of cost analysis dairy cattle farms in Schleswig-Holstein' (Rinderreport).
- ✓ Silage maize DM yield data were obtained from field trials conducted in Schleswig-Holstein, comprising various hybrids as well as different soil and climatic conditions.
- ✓ Weather data (temperature, duration of sunshine, precipitation and irradiation) were kindly provided by the German Weather Service (DWD).

Results

Fig. 1 Energy yield (MJ NEL/ha) of maize- and grass silage under farm scale conditions (1985-2008).

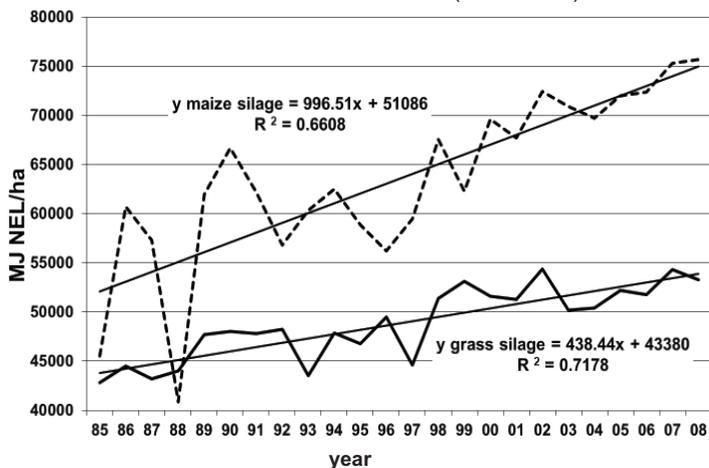
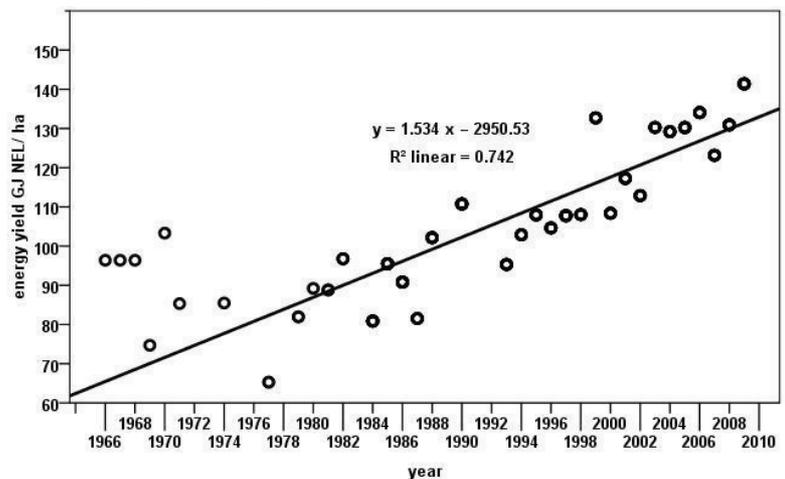


Fig. 2 Silage maize energy yield (GJ NEL/ha) from field trials (1966-2009).



- ✓ Maize showed a higher DM yield increase (0.125 t DM/ha, year) than grassland (0.013 t DM/ha, year), see Fig. 1.
- ✓ Energy-concentration of maize increased by about 0.02 MJ NEL/kg DM annually (corresponding 1000 MJ NEL/ha, year), leading to a current energy yield level of 70-75 GJ NEL/ha.
- ✓ Grassland showed no progress in DM yield, but an increase in energy concentration of 0.04 MJ NEL/kg DM and year.
- ✓ Farm level data were confirmed by field trial results (1966-2009), see Fig. 2.
- ✓ Temperature increase was identified as a main driver of the observed yield changes, with an increase of 1 C average temperature (vegetation period) resulting in a progress of 5.900 MJ NEL/ha for maize and of 3.200 MJ NEL/ha for grass.

Conclusion

Climate change has substantially contributed to the observed progress in dry matter and energy yield of silage maize and permanent grassland, which are the main feedstocks for dairy production and biomethanisation. A close relationship between yield changes and temperature was documented.

