Productivity and growing period of expanding crops under climate change in Sweden

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The main factor limiting the expansion of winter wheat and forage maize in Sweden is the risk of crop failure, due to unfavourable weather conditions lowering the winter survival of winter wheat and shortening the growing season for maize.

Winter wheat

Yield is predicted as function of time and air temperature

$$Yield_{tX} = a_{tX} + b_{tX} \, Year + c_{tX} \, (T_{Februry} + T_{March})$$

Floating 25-year regressions
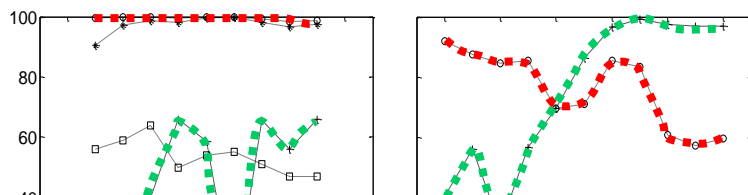
Forage maize

A growth and quality simulation model, calibrated to cultivars used in German maize production, was applied for climate variability and climate change in Sweden.

DM content $\approx f_1(\Sigma_{Acc}(Temp., Radiation, Water))$
Daily shoot growth $\approx$ Shoot biomass $\cdot$ $f_2(Temp., Rad., Water, t)$

Results for the (early) cultivar Janna :

Location	DM content	Harvest date	Yield