



# Effects of climate change on crop performance of selected species in Baden-Württemberg

Katharina Mensch, Petra Högy, Andreas Fangmeier

University of Hohenheim, Institute for Landscape and Plant Ecology, Stuttgart, Germany

## Introduction

Climate change has been an intensively discussed issue since two decades and will become more and more important in the future. Two consequences of climate change are more extreme weather events and shifting seasons. Combined with a growing population and agricultural area utilized for farming competing against renewable resources, climate change is a big threat to food security all over the world. It might affect some crops somewhere in a positive way, but generally it is expected to have negative impacts on agriculture.

The intention of this project is to identify the impacts of climate change on crop performance and senescence of five selected crops. Therefore, the study was performed at two sites with different climatic conditions, one in Kraichgau, the other one at the Swabian Alb.

The study is part of the Humboldt-Reloaded study program, which is financially supported by the Federal Ministry of Education and Research, and associated to the DFG Research Unit "Agricultural Landscapes under Global Climate Change – Processes and Feedbacks on a Regional Scale" (FOR 1695) at the University of Hohenheim.

## Material and Methods

The crops that were measured are maize, oilseed rape, wheat, summer and winter barley. Until flowering, the plants were measured in monthly intervals, after flowering in bi-weekly intervals by using the BBCH code.

At each of the five plots on every field, canopy height, number of green leaves and phenological development was measured. The data were analysed in order to identify the effects of climate change on performance and senescence progress of different crops in Baden-Württemberg.

## Results and discussion

At the Swabian Alb, the phenological development of crops was behind that ones in the Kraichgau area (Fig. 1). This is because the mean annual temperature of the Swabian Alb is around three degrees lower than at Kraichgau. This has a great impact on the crop development.

The maize at Kraichgau was about 50 cm higher than that one at the Alb (Fig. 2), which is most likely due to the different cultivars selected by the farmers for their special purposes.

The number of green leaves (Fig. 3) decreases faster at Kraichgau than at the Swabian Alb, which is due to the different climate conditions.

Summing up the results of the project show that future climate change may affect crop performance in Baden-Württemberg, thus adaptation is necessary in order to avoid negative impacts on crop development.

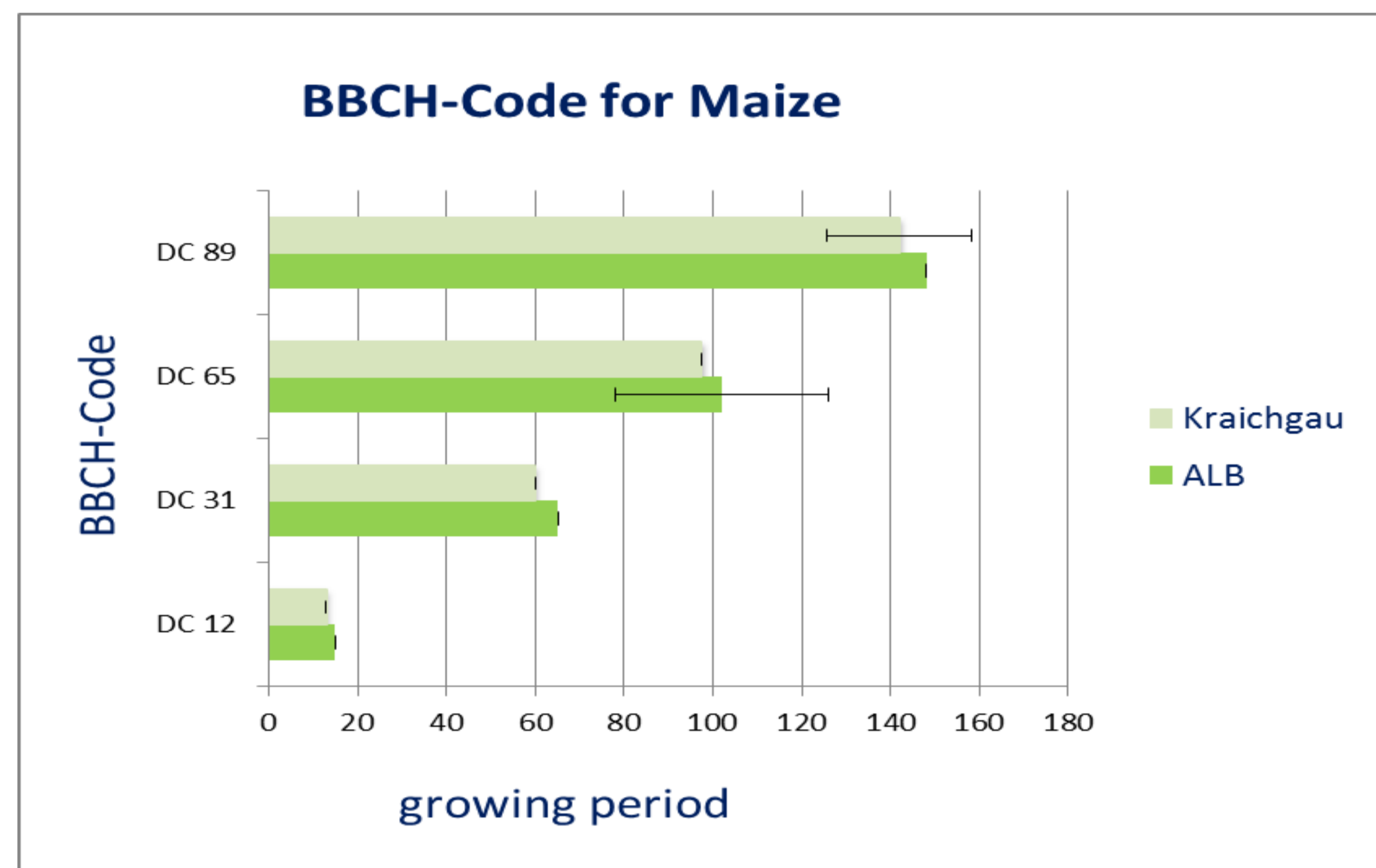


Fig.1: Phenology (presented as the number of days required to reach the BBCH-stage, respectively) for maize at Kraichgau and Swabian Alb.

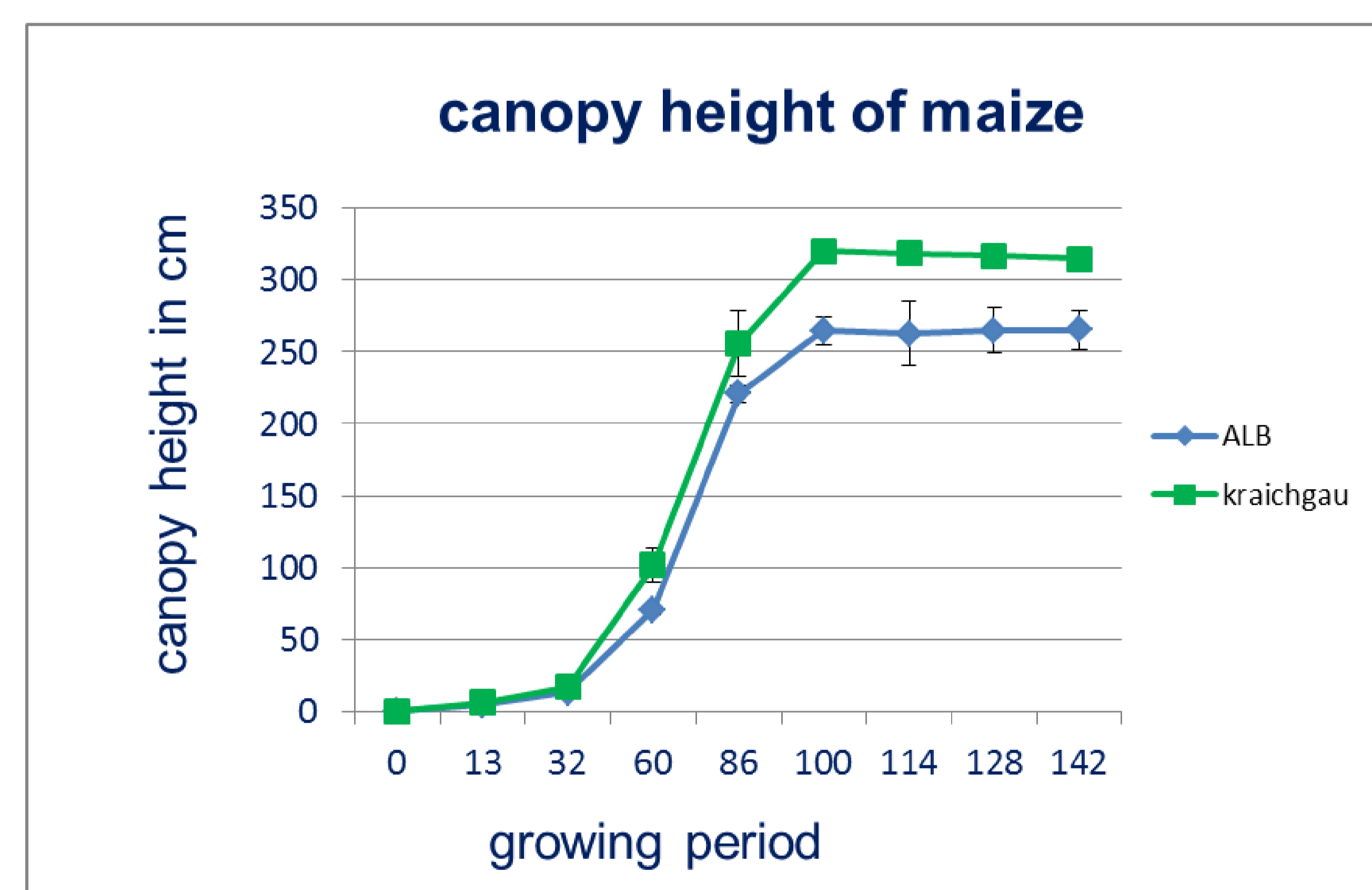


Fig.2: Canopy height of maize at Kraichgau and Swabian Alb.

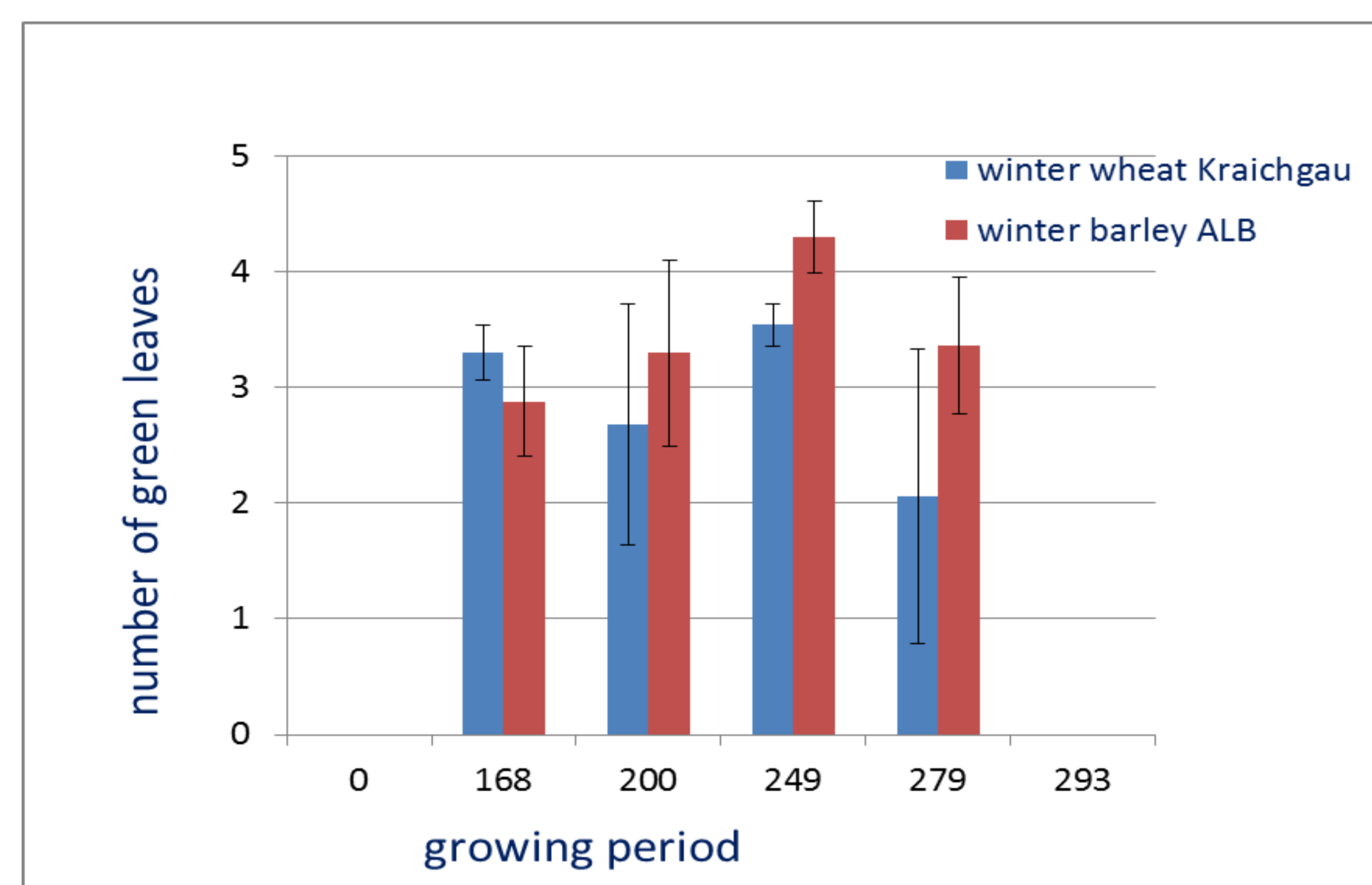


Fig.3: Number of green leaves during the growing period for winter wheat at Kraichgau and winter barley at Swabian Alb.

