

Climate risks in maize crop in the southeastern of Buenos Aires Province: A. Extreme temperatures

Panunzio Moscoso, M. P.; A. I. Irigoyen, A. I. Della Maggiore and R.H. Rizzalli

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Summary

Water deficiencies and extremes temperatures are two environmental factors that limit maize production, often causing extensive economic losses. The impacts on crop depend upon the growth stage when adverse condition occurs, intensity and time of exposure. The objective was to assess the climatic risks for maize production due extreme temperatures in southeastern of Buenos Aires. Six planting dates and three cultivars with contrasting maturity were selected for the simulation scenarios. The maize growing season agroclimatology (1971-2010) was based on a simple model of crop development using growing degree-days as estimator. The approach was performed for four locations of the region. Dates of key stages of development (V4, R1 and R6) were predicted. A subperiod of development was considered as completed when a given accumulation of daily temperatures above the base temperature (8°C) has been achieved from planting (P), under the assumption of no other limiting conditions than temperature. Frost risks were computed from the occurrence of frosts after V4 and before R6 stages for each scenario. Relative frequency of days with maximum temperature above 30°C was computed for critical period and growing season. Late frosts are less frequent at Balcarce. Late planting should be avoided for long season cultivars. Early maturing cultivars and middle planting dates are more suitable options to reduce the frost damage risks in maize across all area. Scenarios with early planting had risks of occurrence of late frosts after V4 stage, whereas scenarios with late planting and long season cultivars increased the frost risks during the grain filling period. Frosts before R6 stage are most frequent at Azul and Tandil. Moreover, significant trends to anticipate the occurrence of early frosts were detected over time in both locations. In general, stress due to elevated temperatures is less feasible than damages by frost. The scenarios performed showed that the crop has more exposure to stress due elevated temperatures in Azul.

Key words: planting date; contrasting maturity cultivars; frosts; high temperature