Towards early prediction of potential yield for maize in center-southeastern of Buenos Aires: Relationships with the extension of vegetative and reproductive subperiods

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Summary

Changes in climate patterns modify the crop growing season and the environment of exposure and then, the resultant yield. The assessment of agricultural practices by generation of scenarios is useful to identify options of adaptation to minimize risks and improve the benefits. The objective was to assess the relation of potential yield (Ymax) to the extension of growing season (EC) and the vegetative (S-R1) and reproductive (R1-R6) subperiods for maize as affected by planting date and maturity cultivar in center-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 (flowering, R1 and physiological maturity, R6) were predicted. Vegetative and reproductive subperiods were calculated based on timing of occurrence of R1 and R6. Potential yield (Ymax) of each scenario was estimated by the product between maximum evapotranspiration (ETM) and water use efficiency (EUA). Environmental indexes were proposed to assess the effect of planting dates on potential yield for each maturity cultivar and location through the variation on duration of developmental subperiods. Delay in planting date exposes the crop to more productive conditions during vegetative subperiod. Benefits of quantification of environmental productivity could be extended to the assessment the agricultural strategies for a changing climate.

Key words: planting date; contrasting maturity cultivars; flowering; physiological maturity