

عنوان مقاله:

Potential effects of individual versus simultaneous climate change factors on growth and water use in chickpea

محل انتشار:

مجله تولید گیاهان، دوره 1، شماره 2 (سال: 1386)

تعداد صفحات اصل مقاله: 16

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خلاصه مقاله:

It has been reported that in different regions and sowing dates, the response of crops to past climate change is not the same, due to different rates of decrease/increase in each climatic variable at different regions and months of year. This study was aimed to assess the effect of individual versus simultaneous changes in solar radiation (S), precipitation (P) and temperature (T) on rainfed- and irrigated-chickpea, using model CYRUS. The observed weather data for year 2004 in Kermanshah, Iran, was used as the control. Firstly, the responses of chickpea to individual changes in S and P (25, 50, 75, 125 and 150%) and T (± 1 , ± 2 °C) with respect to control were studied. Secondly, S, P, and T were simultaneously changed by 50%, 150%, and ± 2 °C, and the interactions were analyzed. Results indicated that the value of change in biomass, harvest index (HI) and evapotranspiration (ET) was higher for S, compared to P and T. For irrigated-chickpea, the biomass and ET were directly, but HI (nearly) inversely affected by S. T had no impact on HI and ET. The biomass was slightly lower for warmer T. When T, S and P were simultaneously changed, P and T slightly interacted with huge effect of S. For rainfed-chickpea, it was found non-linear response to S for biomass, but linear response for HI. For high S levels, ET was same as control. The decreased levels of P positively affected biomass and HI. There was proportionally change in biomass and HI with changing T. It was found various considerable interactions between variables for biomass, HI and ET. For example, when T was cool, high values of S and P synergistically decreased biomass. These single- and interaction-based results would be adapted as one possible scenario of multi-parameter sensitivity analysis, and could be useful for identifying appropriate management/genotypes for future climate.

کلمات کلیدی:

Chickpea, Climate Change, Sensitivity analysis

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