

Geographical Distribution of Rainfall and Temperature Optimum at "Sowing to Emergence" Canola using GIS in Khuzestan Province

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Submitted: 17-12-2015

Accepted: 27-09-2016

Cheraghi, R., Ramroudi, M., Tae Semiroumi, J., and Lorzadeh, S. 2018. Geographical distribution of rainfall and temperature optimum at "sowing to emergence" canola using GIS in Khuzestan province. *Journal of Agroecology* 9(4): 1007-1019.

Introduction

Specific characteristics of canola and its adaptability to the various climatic conditions, have increased the importance of this product, and has turned it into a hope to supply the edible oil needs of the country. Canola, like other crops, with its own ecological characteristics, with the lack of any of these features lead to the development of the crop in some parts of the country. The total rainfall for the growing season dry land canola about 400-500 millimeters and lack of water and drought at planting and seedling emergence can result in a weak and ultimately reduce performance. The temperature suitable for the development of this plant is 25 to 30 °C and temperatures over 35 °C cause prolonged loss of germination ability and the ability of pollening. A study to compare the thermal needs of rape in the provinces of Khorasan came to the conclusion that different parts of the study area in terms of providing optimal temperatures are different for canola. Study as potential climatic zoning wheat cultivation in West Azerbaijan province, it concluded that the role of each of temperature and rainfall, according to the different stages of development in different regions is different. The study also aimed to assess the distribution of suitable rainfall and suitable temperature in the "planting to emergence" of rainfed canola was conducted in various parts of the Khuzestan province.

Materials and Methods

Khuzestan province in the range of 47 degrees and 42 minutes to 50 degrees and 39 minutes east of Greenwich and 29 degrees 58 minutes to 32 degrees and 58 minutes north of the equator is located. According to the climatic classification based on Domarten, the Khuzestan province has three arid, semi-arid and is Mediterranean. Parameters studied were daily maximum and minimum temperature, total daily precipitation, Growth Degree Day (GDD) and land topography condition.

To determine the exact time of the end of "planting to emergence" rainfed canola index GDD was used. Rainfed canola GDD required for this stage is 120.

$$GDD = \sum_{n=1}^N \left[\frac{T_M + T_m}{2} \right] - T_b$$

In order to determine probability of rainfall for the "planting to emergence" of rainfed canola, according to the amount of precipitation for this period is 50 mm, the log-Pearson Type III distribution was used.

To determine probability of suitable temperature stage "planting to emergence" of canola rainfed, normal distribution was used. Suitable temperature at this stage is between 10 and 25 °C,

$$Z = \frac{x - \bar{x}}{s}$$

Z= level probability, \bar{x} = Average, S= standard deviation, and X as desired temperature us.

The feasibility of canola

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DOI:10.22067/JAG.V9I4.49563

For this purpose, probability suitable rainfall and suitable temperatures of different stations in the GIS software was used.

Results and Discussion

Humidity is an important factor affecting agriculture, especially in rainfed agriculture, and correct information is useful in precipitation during the last few years. Geographical distribution of the suitable rainfall probability in the "planting to emergence" of canola rainfed was reached. Geographical distribution of the suitable temperature probability in the "planting to emergence" of rainfed canola was reached. The overlay map of the geographic distribution of probability of suitable rainfall, and map of the geographical distribution of probability of suitable temperatures, and land use map of the province, the software Arc Map, map of the geographical distribution of probability of suitable rainfall and temperatures for rainfed canola was obtained.

Conclusion

According to the results, arable land study area was classified into three parts. Very poor areas, which probability of suitable rainfall and temperatures for the "planting to emergence" is less than 25 percent, and 33.7% of the arable land in the province are included. A poor area, which probability of suitable rainfall and temperatures for the "planting to emergence" is between 25 to 50 percent and 66.2% of the arable land covers the province. A middle-class area, which probability of suitable rainfall and temperatures for the "planting to emergence" of 50 to 75 percent, which is 0.01% of the arable land, covers the province.

Keywords: Climate, GDD, Probability, Rainfed, Suitability, Temperature

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