

The Effects of Heat Stress on Citrus Crops in Southern Provinces

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Introduction

Main regions of citrus plantation are between 40 degrees northern and southern geographical latitudes. A considerable part of these regions are located at Mediterranean sub tropic (WMO, 1997). Citrus plantation has grown into a global industry for the last 70 years. Producing oil and citric acid is another reason for citrus plantation besides fresh fruit production. Temperature is the most important climatic element in citrus plantation. On the one hand, frosts threaten yield and on the other hand, high temperatures through extreme transpiration, make the fruit formation difficult. Optimum means daily temperature for citrus growth is from 23 to 30 degrees Celsius and growth is considerably reduced if the temperature is organization, 2004). Another effective process in the occurrence of heat waves at the southern strip is the air subsidence at a synoptically scale. Regarding the above mentioned studies, the most significant climatic restrictions that affect the yield quantity and quality in southern provinces are high temperature and air dryness.

Method and Material

The climate of the southern parts of the country is suitable for Citrus plantation.

Air temperature more than 40 degrees Celsius, along with relative humidity equal or below 20%, cause leaf drop, increase of water loss from the trees through transpiration, and decrease of fruit quality. Most of the shock from high temperatures occur at fruit formation and youth periods. A sudden increase in air temperature and decrease in relative humidity during this period may result in serious damages. When the mentioned condition occurs in one day, this day is called "a critical day". These conditions often occur in southern provinces. In this study, the climatological situation of some important citrus plantation regions in the southern parts of the country is investigated. Statistical periods differ in different stations and all are ended in 2005. Critical combination of temperature and humidity is extracted from daily data. As the occurrence of temperatures above 45 degrees Celsius at the investigated time period is probable, thus two cases of the critical day are considered in the following manner.

1. Number of days with maximum temperature above 40 degrees Celsius and minimum relative humidity below 20% (critical day)
2. Number of days with maximum temperature above 45 degree Celsius and minimum relative humidity below 20% (very critical day)

The program is implemented from mid-April to mid-July. Critical days are important in citrus fruit drop in the region. For better application, the results are submitted in decade and month.

Results and Discussions

Number of days with maximum temperature equal or more than 40 and 45 degrees Celsius along with minimum relative humidity equal or less than 20% are calculated.

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Mean monthly critical and very critical days at the region under study is shown in the figure.

Conclusion

Results show that all stations in Khuzestan Province are affected by critical conditions but Safiabad, Shooshtar, Ramhormoz, and Behbahan stations are more at risk. Ize are less affected than the others. In Hormozgan Province, Minab region is most affected. In Boushehr Province, Kanganjam and Bandardaier are more affected. In Sistan and Baluchistan Province, Iranshahr is the most affected area. These results can be applied in making decisions to promote citrus cultivation and create new orchards.

Key words: The Southern Provinces, Heat Stress, High Temperature, Low Relative Humidity, Citrus.

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