

Evaluation of Dust Effect on the Quantitative and Qualitative Growth of Sugarcane Varieties CP57-614

Abbas Ali Arvin (Spanani)*

Assistant Prof. in Geography, Dep. of Payame Noor University

Sedigheh Cheraghi

Instructor in Dep. of Architecture, Islamic Azad University, Masjed Soleiman Branch

Shahram Cheraghi

Student of Climatology, Payame Noor University, Isfahan

Received: 09/03/2013

Accepted: 16/09/2013

Extended Abstract

Introduction

One of the natural disasters that affected Khuzestan province's is the phenomenon undesirable of dust due to its geographical location and its neighborhood with a large expanse of desert regions. When dust sits on leaf crops, it can reduce the amount of light absorption and photosynthesis and the growth and production will suffer loss consequently (Abdali Dehdezi 1390: 19). The effects of dust on leaf surfaces are done in different ways:

a) Impact on the process of photosynthesis in plants; Reduction in photosynthetic leaf surface is a function of light intensity reduction. Hirano Takashi (2003: 275) studies in Japan show that plants exposed to dust are the major sources of risk facing chronic photosynthesis and consequently reduce the growth face. The 10-5g of dust particles per square meter of leaf area can reduce photosynthesis significantly.

b) The effects of dust on leaf stomata: Dust reduces stomata conductance due to stomata closure. The effect of dust on reduce the stomata conductance would be greater at time that the size of dust particles is smaller. Dust particles with a diameter less than (0.05mm) caused disruption of the mechanisms and functions of the openings leaves.

c) The effects of dust on leaf temperature: Dust increase leaf temperature of 4-2°C. Because of dust on the leaf surface will absorb more short waves. Increase in temperature of 3-2°C increase in light respiration of leaf in plants.

*E-mail: se_cheraghi@yahoo.com

Tel: 09163235086

d) The effect of dust on the amount of light hitting the plant: The light intensity and day length effect on the growth and production. Water absorption and evaporation is proportional to the light intensity completely. Mvchv and colleagues (1993) showed that during the linear growth phase, the accumulation of biomass per hectare is linearly correlated with solar radiation received.

Khozestan as one of the major poles of agricultural province, the epicenter of the injury is the loss of natural plants. Damage to the agricultural sector in this province, will account for a major share. Sugarcane crop with a cover nearly 80 thousand hectares of land under cultivation in this province are one of the vulnerable sectors. Thus the objectives of this study are:

1. Survey of relationship between quantities of sugarcane yield (weight of single, stem density per unit area and product yield) and dust.
2. Survey of relationship between the quality of sugarcane (Pol, Brix, purity, recovery and quality of white sugar cane) and dust.
3. Survey of relationship between leaf chlorophyll amount and dust density.
4. Survey on interactions between nitrogen and chlorophyll.

Methodology

The location of field experiment was Da'bal Khazaei Agro Industry Co. The experiment carried on varieties 614 CP57-L09-06. Soil type was Silt loam. The test community consists of washing the leaves and failure to wash the leaves that carried out after dust occurrence each with 21 repetitions on each community. Each plot had 7 Farrow. To eliminate the side effects caused by dusts from car traffic on the farm road and irrigation, farm plots was at a distance of 20 m from the edge of farm. Plot size was segmentation 200 sqm for each treatment. Chlorophyll leaves were by chlorophyll meter by 502-Spad Minolta models. This process is performed after each dust. The plots should be washed. This process carried out after each wash. Plots in each phase were washed with car wash tank. Cane growth and Lamina sheaths nitrogen and moisture was measured each time after vigorous dust at an intervals period time.

Results and Discussion

Results on quality performance show that there are significant different on level of %1 for purity and on level of %5 for getting amount of sugar and straw quality for test treatments that indicate on excellence of treatments wash. On the other hand survey of treatment means also show that washing treatment is superior. Based on the results of treatments, there are no significant differences on quantitative factors. Student t-test showed that there is no effect of the washing operation factors on increased performance. Survey of relationship between amount of chlorophyll and dust density show that student t-test were significant at 1% for both treatments. This means that the presence of dust on the leaves is effective on chlorophyll readings. The amount of chlorophyll in treatments wash the leaves are higher than failure to wash the leaves consistently that it due to impaired gas exchange system, carbon dioxide and water vapor and oxygen respectively. The stomata closure with decreasing in sunshine hours has slowing the rate of photosynthesis. This process disturbs the gas exchange and download of sun light that

lead to reduce in photosynthesis and yellow leaves. Finally, it shows as the poor quality of cane juice.

The relationship was examined between nitrogen and chlorophyll content of flag leaves. According to the requirements of sugarcane to nitrogen during the growing season, the amount of nitrogen fertilizer is very important. So, we can by measuring of chlorophyll in the plant to estimate the nitrogen concentration. In table and graph, the correlation between chlorophyll and nitrogen lamina clearly shows that this correlation is statistically significant at the 5% level. Using the linear equation and only by reading chlorophyll Machine, we able to achieve nitrogen levels in each stage of growth.

Conclusion

The results of experiments on wash the leaves and failure to wash the leaves treatments show that washing treatments had higher purity and higher concentration of sugar and straw quality is better. Thus, dust has a negative effect on cane quality (yield and quality of sugar cane). Dust had been affected on the amount of sunlight received by the leaves. Chlorophyll content in leaves has been decreased in the occurrence of dust. So, absorbed nitrogen also has been decreased. Finally, yield quality is reduced consequently. However, dust has no negative effect on quantitative growth of sugarcane because many factors affect quantitative performance of sugarcane.

Keywords: *Dust, Qualitative Performance, Quantitative Performance, Sugarcane.*