

Teerapong Tonusin 2006: Effects of Water Stress at Different Growth Stages on Chlorophyll Content, Growth and Yield of Maize (*Zea mays*). Master of Science (Agriculture), Major Field: Agronomy, Department of Agronomy. Thesis Advisor: Associate Professor Nawarat Udomprasert, Ph.D. 89 pages.
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Water is a basic factor for crop production. Water stress at different growth stages affects growth and yield differently. The purpose of this study was to determine the relationship between a change of chlorophyll content and photosynthetic rate, growth and yield of maize (*Zea mays*) under water stress at different growth stages. The experimental design of this study was strip plot in RCBD. The main plot consists of two varieties of maize, i.e. Suwan 1 and DK 888. The sub plot consists of 4 water supplying methods (treatments) as follows: 1) regular water supply (control) 2) withholding water at 4th-6th wk. (vegetative growth) 3) withholding water at 7th-9th wk. (pre-flowering stage) and 4) withholding water at 9th-11th wk. (post-flowering stage). The study consists of 3 replications and 2 growing area started from September 2004 to March 2005 in the experimental field of Agronomy Department, Faculty of Agriculture, Kasetsart University, Kamphaeng Sean Campus, Nakhon Pathom. From the soil examination in the first growing area, the electrical conductivity ranged from 0.81 to 6.72 dS/m and from 2.82 to 12.07 dS/m in the second one. This indicated that beside water stress, there was also the effect of saline soil on maize chlorophyll content and yield. It was found in the first growing area that plant heights of the two maize varieties exposed to different water supplying methods were not significantly different. However, in the second growing area, plant heights of both varieties were lowest when exposed to water stress during post-flowering stage. Leaf area index and leaf area ratio of the two maize varieties with different water supplying methods in both growing area were not significantly different. A change of chlorophyll content affected by water stress during pre-flowering stage had less influence on maize yield than that affected by water stress during post-flowering stage. In the first growing area, water stress at pre-flowering stage, reduced chlorophyll content and maize yield by 11.3 % and 29.2 %, respectively. In the second growing area, the chlorophyll content and maize yield were reduced by 19.1 % and 45.8 %, respectively. The ear and seed size were also reduced. Typically, the maize with high chlorophyll content produces higher yield. Water stress during pre-flowering stage reduced growth and yield of maize greater than water stress during post-flowering stage. This suggests that pre-flowering stage might be more important in determining the yield of maize.

Student's signature

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