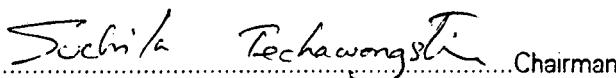


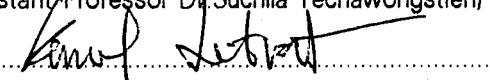
**Thesis title** Studied on the physiological characteristics for screening drought - resistant chilli pepper.

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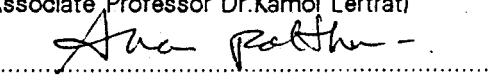
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### Abstract

Studied on the physiological-responses directly related to drought resistance and high yield performance is considered to be an important alternative approach. For making the selection programs more rapidly and accurately, it is necessary to clarify the physiological responses and yield performances of chilli pepper under water stressed and optimum moisture conditions.

Two experiments were conducted during October 1994 to April 1995. Six lines of  $F_6$  - hybrid between "Huay sithon" the Thai variety of chilli pepper which has been reported as a drought resistant variety, and "Yatsubusa" the Japanese-cluster variety which classified as drought sensitive variety, were compared with their parents in these experiments. In the first experiment, 6 lines of  $F_5$  - hybrid were compared with their parents to determine their yield performances under the optimum moisture condition in the field. For the second trial, all the seedling of all varieties were grouped into two sets of nine plants each and grown in the plastic pots. The first group was subjected to gradual water stress until severe wilting occurred and then rewatered. The physiological responses, yield performances and their correlation were determined

From the first experiment, HY2-1-10-1-2 gave the highest yield, 102.69 and 109.67 g/plant in the mature and total fruit yield, respectively. However, all varieties gave the similar values of mature fruit yield on each harvest, except for Huay sithon which it gave the relatively lower value on the first and second harvest, but higher on the third harvest. However the immature fruit yield in Huay sithon were obviously higher than those in the others. Yatsubusa gave the total yield similar to Huay sithon. Although, HY2-1-10-1-3 gave the lowest total yield, 60.71 g/plant, however, its was not significantly difference from Huay sithon.

From the results of the second experiment, it was obviously observed that the total fruit yield in both control and stressed plants of Huay sithon and HY2-1-10-1-2 were higher than those in the others. In fact, the control plant in each variety gave the higher yield than the stressed plant. It was interesting to observe that Yatsubusa, YH1-1-8-1-2 and HY1-1-9-1-2 gave the relatively lower yield in both control and stressed plants. Furthermore, it was found that the reduction in fruit number caused by water stressed was more than in fruit size and fruit weight. Root : Shoot Ratio in the stressed plant was higher than in the control one.

For the physiological responses, it was observed that leaf water potential (LWP), osmotic potential (OP) and photosynthesis rate (PS) were slowly decreased when initially subjected to water stress and than rapidly decreased when completely restricted water. Almost of all the physiological values in the stressed plant returned to normal within 30 hours after rewated, while OP and PS values did not return throughout the measurement period. After determined the correlation coefficients, it was found that all the physiological values showed a positive correlation with mature fruit yield and total yield. Therefore all of the physiological characteristics may considered to be a reliable criterion for screening drought resistant chilli pepper. Particularly, OP should be a good criteria for drought resistance, since its value was not as much fluctuated with environmental conditions as LWP and PS. And finally, it was observed that all varieties showed 3 bands and the same Rf values of each band in responses of isozyme peroxidase. The third band in the stressed plant of all varieties showed the relatively thicker and darker band than those in the control ones. The responses of isozyme peroxidase in this experimented, However, could not classify the differences between drought resistant and sensitive varieties of chilli pepper.