

Wuthida Rattanapichai 2007: Effect of Mulching Material on Water Uses and Growth of *Brassica alboglabra* and Variety of Soil Physical and Chemical Properties. Master of Science (Agriculture), Major Field: Soil Science, Department of Soil Science. Thesis Advisor: Assistant Professor Pimphan Jomesawatdipong, Ph.D. 218 pages.

The study of the effect of mulching materials on water uses and growth of *Brassica alboglabra* and variety of soil physical and chemical properties were conducted under both greenhouse and field conditions. The main objectives of this experiment were to decrease water loss by evaporation and soil temperature and increase the water use efficiency of Chinese Kale (*Brassica alboglabra*). The studies were performed separately in three experiments: **Experiment I:** The objectives of this experiment was to study the effects soil texture and rice straw thickness applied as mulching material on the water use of Chinese kale, soil moisture, temperature and variety of soil physical and chemical properties. This study was conducted in the greenhouse using two different types of soil texture: clayey texture (Bang phae series, Bph) and sandy textured (Ban bung series, Bbg). Irrigation water was applied continuously from a constant water level (18 cm) at the bottom of the pot. Three depths of rice straw mulching used were 0, 1, 2 and 3 cm. which were applied on the soil surface on the first day after sowing. **Experiment II:** This was the improvement of Experiment I by increasing the size of planting materials and depth of water table. Clayey textured soil used was Damnoen Saduak series (Dn). **Experiment III:** The objectives of this experiment were to compare the effects of mulching materials; 5 and 7.5 cm rice straw thickness, white plastic sheet, black plastic sheet, red plastic sheet and silver plastic sheet on growth, water use, and variety of soil physical and chemical properties of the Chinese kale. The results of this study reveal that rice straw can efficiently reduce water use of Chinese Kale to the amount of about 50% in clayey texture soil and 20% in sandy textured soil. and maintain soil moist at nearly constant throughout cultivation period. It was found also that rice straw mulching caused reduction in soil temperature by 0.4 C in clayey texture soil while a reversed effect was observed in sandy textured soil. In addition, the effects on physical and chemical properties were in the followings: increasing in hydraulic conductivity of both soil textures, increasing in numbers of macropore in the clayey textured soil, decreasing in numbers of micropore in sandy textured soil, increasing in organic matter content and decreasing in electrical conductivity of soil. Insignificantly changes in total soil porosity and bulk density and soil pH were observed. Rice straw mulching significantly increased Chinese kale productivity. It was found that soil moisture content under rice straw mulching was higher than all color of plastic mulching. The air temperature underneath black plastic sheet was increased higher than no mulching treatment as high as 10 C, red plastic sheet, silver plastic sheet, white plastic sheet, and rice straw respectively. The highest soil temperature was observed at the 10cm.depth under no mulching treatment. All types of mulching materials used caused changes of soil physical and chemical properties to some extent, similar to the observations found in Exoeriment I and II. Higher kale production was observed in the treatment under plastic mulching than rice straw mulching. Kale grown under silver color plastic mulching consumed highest amount of water, corresponding to the highest growth and production observed.

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Thesis Advisor's signature

