

The interactive effects of fertilizer and water stress on plant growth, leaf gas exchange and nutrient uptake on strawberry *Fragaria x ananassa*, Duch

ABSTRACT

Strawberry (*Fragaria x ananassa* Duch) has a large number of nutrients, which are useful for human health. In Indonesia, water stress is one of the climate changes that affect the growth and quality of strawberry. Therefore, fast recovery can be crucial to adjusting crops to water stress. Additional fertilizers can alleviate the negative impact of water stress. The experiment was carried out to determine the best fertilizer sources for the growth, leaf gas exchange, and nutrient uptake of strawberry under water-stressed conditions in April 2019–August 2019. The experiment was arranged in a factorial randomized completely block design (RCBD) with three replications and four fertilizer sources (P1 = without fertilizer, P2 = 92:90:90 kg/ha Nitrogen:Phosphorus:Potassium (NPK) fertilizer, P3 = 20 kg/ha goat dung fertilizer, P4 = 46:45:45 kg/ha NPK fertilizer + 10 kg/ha goat dung fertilizer) and water stress levels (W1 = daily irrigation 100% field capacity (FC); W2 = 2 days irrigation interval (II) 75% FC; W3 = 6 II 75% FC). It was observed that the interaction of different water stress and fertilizer sources had a significant effect on all parameters except in the total sugar of strawberry fruits. The results indicate that plant growth, leaf gas exchange and nutrient uptake decreased under water stress conditions whereas total proline, total sugar, and water use efficiency (WUE) enhanced. The maximum value of plant height, leaves number, shoot-root fresh weight, shoot-root dry weight, photosynthesis rate, chlorophyll content, nitrogen content and phosphorus content were obtained from the application of 46:45:45 kg/ha NPK fertilizer + 10 kg/ha goat dung fertilizer at 2 days II 75% FC. Application of NPK and goat dung fertilizers increased the growth and leaf gas exchange under water stress conditions. Plants that were not fertilized had the lowest growth compared to those with fertilizers.

Keyword: Strawberry; Fertilizer; Water stress; Growth; Leaf gas exchange; Nutrient uptake