Influence of single and multiple water application on yield and water use efficiency in tomato (var. First power).


Abstract:

A greenhouse experiment was conducted at Japan International Research Center for Agriculture Science (JIRCAS), Okinawa Subtropical Station, Ishigaki, Japan with three multiple water application and two single water applications to study the effects of them on tomato yield, soil water content and water use efficiency. Multiple water application is a technique used to add the required amount of water during irrigation in multiple equal parts a day instead of one complete set (single water application) during the irrigation event. The multiple water application treatments were the day time (DT), day–night time (DNT) and night time (NT) while the single water application treatments were morning time (MT) and evening time (ET). In multiple water irrigation treatments the water was added to the soil into three equal parts. The supplied irrigation water was the same for all treatments and gradually increased with plant age to cover the crop water requirement during the growing season. The results revealed that multiple water application increased tomato yield by 5% over the highest yield of single water application. The DT treatment increased tomato yield by 5% and 15% compared to ET and MT treatments, respectively. For multiple water application, the DT was the best irrigation timing because it increases the tomato yield by 8% and 12% compared to DNT and NT, respectively. ET irrigation was better than MT irrigation for single water application. Multiple water application led to an increased in soil water content compared to single water application. By applying the same amount of water for all treatments, the DT treatment increased water use efficiency by 5–15% compared to ET and MT treatments of single water application. In conclusion, multiple water application is better than single water application and by choosing the proper irrigation timing, higher tomato yield resulting from efficient water management can be obtained.

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