

INTISARI

Dusun Nawungan merupakan daerah dengan iklim kering. Pengairan tanaman bawang merah di Dusun Nawungan dilakukan secara manual. Berdasarkan penelitian sebelumnya, pengairan yang diberikan termasuk dalam jumlah yang berlebih. Oleh karena itu diperlukannya urgensi efisiensi air irigasi yang digunakan. Penelitian ini bertujuan untuk menentukan kebutuhan air tanaman, efisiensi penggunaan air tanaman, dan efisiensi penggunaan air irigasi tanaman bawang merah pada dua tingkat lengas tanah dengan menggunakan irigasi tetes terkendali dalam studi rumah kaca.

Metode penelitian yang diterapkan adalah percobaan desain eksperimen rumah kaca dengan pengukuran beberapa parameter fisik tanah di laboratorium. Percobaan dilakukan dengan 4 macam kombinasi perlakuan yaitu irigasi tetes 100% *available water* (D100), irigasi tetes 150% *available water* (D150), irigasi manual 100% *available water* (M100), dan irigasi manual 150% *available water* (M150). Jumlah irigasi tetes diberikan berdasarkan persentase kapasitas lapang dan titik layu dengan menggunakan sensor kadar lengas. Perkolasi diukur dengan menampung sejumlah air yang berlebih dan keluar pada dasar pot. Kebutuhan air tanaman dihitung berdasarkan cerminan nilai evapotranspirasi menggunakan persamaan evapotranspirasi referensi Penman-Monteith menggunakan data cuaca aktual rumah kaca. *Crop water use efficiency* dihitung dengan membagi hasil produksi dan evapotranspirasi. Sedangkan *irrigation water use efficiency* dihitung dengan membagi hasil produksi dan jumlah irigasi yang diaplikasikan.

Volume irigasi tertinggi adalah perlakuan D150, diikuti D100, M150, M100 dengan volume berturut-turut 212.87, 166.70, 146.04, 105.83 L/m². Evapotranspirasi terendah adalah pada fase *initial* dengan nilai 1.86 mm/hari dan terus meningkat pada fase *development*, *mid-season*, dan *end-season* berturut-turut 1.99, 2.22, dan 2.25 mm/hari. Nilai *crop water use efficiency* tertinggi adalah perlakuan D150 dan terendah adalah M100. Hal ini menjelaskan hasil produksi tanaman bawang merah pada perlakuan D150 efisien dalam memanfaatkan air untuk tumbuh. Sedangkan nilai *irrigation water use efficiency* tertinggi adalah perlakuan D150 dengan efisiensi sebesar 88% dari perlakuan M100 dan 72% dari perlakuan M150. Perlakuan D150 menjadi jenis irigasi yang paling efisien dalam memberikan air bagi tanaman bawang merah.

Kata Kunci: Evapotranspirasi, efisiensi penggunaan air, efisiensi penggunaan air tanaman, efisiensi penggunaan air irigasi, bawang merah.

ABSTRACT

Nawungan Hamlet is an area with a dry climate. The irrigation of shallot plants in Nawungan Hamlet is done manually. Based on previous research, the amount of irrigation provided was excessive. Therefore, there is an urgent need for efficiency in the irrigation water used. This research aims to determine the plant water requirements, plant water use efficiency, and irrigation water use efficiency of shallot plants at two levels of soil moisture using controlled drip irrigation in a greenhouse study.

The research method applied was a greenhouse experimental design experiment by measuring several physical soil parameters in the laboratory. The experiment was carried out with 4 types of treatment combinations, namely drip irrigation with 100% available water (D100), drip irrigation with 150% available water (D150), manual irrigation with 100% available water (M100), and manual irrigation with 150% available water (M150). The amount of drip irrigation is given based on the percentage of field capacity and wilting point using a moisture content sensor. Percolation is measured by collecting excess water that comes out at the bottom of the pot. Plant water requirements are calculated based on a reflection of evapotranspiration values using the Penman-Monteith reference evapotranspiration equation using actual greenhouse weather data. Crop water use efficiency is calculated by dividing production and evapotranspiration. Meanwhile, irrigation water use efficiency is calculated by dividing production results by the amount of irrigation applied.

The highest irrigation volume was treatment D150, followed by D100, M150, and M100 with volumes of 212.87, 166.70, 146.04, and 105.83 L/m² respectively. The lowest evapotranspiration was in the initial phase with a value of 1.86 mm/day and continued to increase in the development, mid-season, and end-season phases, respectively at 1.99, 2.22, and 2.25 mm/day. The highest crop water use efficiency value was the D150 treatment, and the lowest was M100. This explains why the production results of shallot plants in the D150 treatment are efficient in utilizing water to grow. Meanwhile, the highest irrigation water use efficiency value was the D150 treatment, with an efficiency of 88% from the M100 treatment and 72% from the M150 treatment. D150 treatment is the most efficient type of irrigation for providing water for shallot plants.

Keywords: Evapotranspiration, water use efficiency, crop water use efficiency, irrigation water use efficiency, shallot.