RINGKASAN

Peningkatan jumlah penduduk serta fluktuasi iklim berdampak pada kestabilan ketersediaan kentang nasional. Selain itu, rendahnya benih bermutu juga berkontribusi terhadap menurunnya produktivitas kentang. Teknologi aeroponik mulai dikembangkan untuk mengurangi rendahnya kecukupan benih kentang. Proses yang terjadi pada produksi benih kentang secara aeroponik sangatlah kompleks, karena berkaitan dengan iklim mikro (suhu, radiasi, intensitas cahaya, RH), dan nutrisi tanaman. Hubungan unsur iklim pada produksi benih kentang secara aeroponik belum diperoleh informasi ilmiah. Komplektivitas tersebut dapat disederhanakan dengan menggunakan permodelan. Oleh karena itu, tujuan penelitian ini adalah (1) menyusun permodelan sederhana pertumbuhan dan hasil produksi benih kentang secara aeroponik di dataran tinggi, (2) mendapatkan unsur iklim yang berpengaruh pada pertumbuhan dan hasil benih kentang, dan (3) mendapatkan pertumbuhan dan hasil benih kentang.

Penelitian ini dilaksanakan dari bulan November 2018 sampai Maret 2019 berlokasi di greenhouse Perusahaan Benih Difa Banjarnegara. Lokasi berasa di ketinggian ± 1.663 mdpl. Penelitian ini menggunakan instalasi aeroponik sebanyak 2 buah, masing-masing berukuran 5 m x 1 m. Setiap box aeroponik berisi 125 tanaman. Faktor yang dicoba yaitu penambahan lampu LED *red blue* 12 Watt ketinggian 110 cm (T1) dan kontrol (tanpa lampu). Variabel yang diamati iklim mikro (suhu, radiasi, intensitas cahaya, RH) dan pertumbuhan tanaman (jumlah daun, tinggi daun, dan bobot umbi). Data evapotranspirasi dianalisis dengan model linear dan model nonlinear eksponensial.

Hasil penelitian menunjukkan bahwa model linear didapatkan persamaan Y = 433,84 – 1,75 (ET) dengan R^2 sebesar 0,67 dan RMSE sebesar 8,10 untuk T1, sedangkan model linear didapatkan persamaan Y = 1490,41 – 6,12 (ET) dengan R^2 sebesar 0,36 dan RMSE sebesar 8,20 untuk Kontrol. Model nonlinear didapatkan persamaan $Y = 115.205\ e^{-0,04\ (ET)}$ dengan R^2 sebesar 0,59 dan RMSE sebesar 8,84 untuk T1, sedangkan model nonlinear didapatkan persamaan $Y = 4E+11\ e^{-0,10\ (ET)}$ dengan R^2 sebesar 0,34 dan RMSE sebesar 8,58 untuk Kontrol. Evapotranspirasi memiliki pengaruh terhadap pertumbuhan dan hasil benih kentang aeroponik. Evapotranspirasi rata-rata sebesar 40,56 mm/hari pada T1 memberikan tinggi tanaman sebesar 54,67 cm, jumlah daun sebesar 143,58 helai dan bobot umbi sebesar 19 gram. Evapotranspirasi rata-rata sebesar 19,39 mm/hari pada Kontrol memberikan tinggi tanaman sebesar 51,92 cm, jumlah daun sebesar 236, 67 helai dan bobot umbi sebesar 26 gram.

Kata kunci: Kentang, Aeroponik, model linear, model nonlinear

SUMMARY

Increased population and climate fluctuations have an impact on the stability of national potato availability. In addition, low quality seeds also contribute to the decline in potato productivity. Aeroponic technology began to be developed to reduce the lack of adequacy of potato seeds. The process that occurs in aeroponic potato seed production is very complex, because it is related to the microclimate (temperature, radiation, light intensity, RH), and plant nutrition. The relationship of climate elements to aeroponic potato seed production has not yet been obtained scientific information. This complexity can be simplified by using modeling. Therefore, the objectives of this study are (1) to compile a simple modeling of aeroponic growth and yield of potato seeds in the highlands, (2) to obtain climate elements that affect the growth and yield of potato seeds, and (3) to obtain growth and yield of seeds potato.

This research was conducted from November 2018 to March 2019 located in the greenhouse of the Difarn Seed Company in Banjarnegara. Location tastes at an altitude of ± 1,663 meters above sea level. This study used 2 aeroponic installations, each measuring 5 m x 1 m. Each aeroponic box contains 125 plants. The factors that were tried were the addition of 12 Watt red blue LED lamps with a height of 110 cm (T1) and controls (without lights). Variables observed were microclimate (temperature, radiation, light intensity, RH) and plant growth (number of leaves, leaf height, and tuber weight). Evapotranspiration data are analyzed by linear models and nonlinear exponential models.

The results showed that the linear model obtained equation Y = 433.84 - 1.75 (ET) with R2 of 0.67 and RMSE of 8.10 for T1, while the linear model obtained equation Y = 1490.41 - 6.12 (ET) with R2 of 0.36 and RMSE of 8.20 for Control. The nonlinear model obtained the equation Y = 115.205 e -0.04 (ET) with R2 equal to 0.59 and RMSE equal to 8.84 for T1, while the nonlinear model obtained the equation Y = 4E + 11 e-0.10 (ET) with R2 amounted to 0.34 and RMSE of 8.58 for Control. Evapotranspiration has an influence on the growth and yield of aeroponic potato seeds. The average evapotranspiration of 40.56 mm / day at T1 gave a plant height of 54.67 cm, number of leaves of 143.58 strands and tuber weight of 19 grams. The average evapotranspiration of 19.39 mm / day in Control gave a plant height of 51.92 cm, number of leaves of 236, 67 strands and tuber weight of 26 grams.

Keywords: Potatoes, Aeroponics, linear models, nonlinear models