

RINGKASAN

Tanaman karet (*Hevea brasiliensis*) merupakan komoditas perkebunan strategis di Indonesia. Namun, produktivitasnya masih rendah akibat tantangan seperti manajemen air yang tidak optimal dan persaingan dengan gulma. Ketersediaan air menjadi faktor kritis dalam fase pembibitan, terutama di musim kemarau, sementara gulma sering dianggap sebagai pengganggu yang menghambat pertumbuhan. Ketersediaan air yang tidak mencukupi menyebabkan penurunan ketersediaan unsur hara dan kelarutan unsur hara dalam tanah. Dengan demikian, pengangkutan nutrisi ke jaringan tanaman juga akan lebih rendah. Air berperan penting pada proses translokasi unsur hara dari akar ke seluruh bagian tanaman, kekurangan air akan berakibat pada penurunan proses fotosintesis, sehingga mengakibatkan pertumbuhan dan perkembangan tanaman terhambat.

Penggunaan mulsa organik, termasuk gulma, menjadi solusi potensial untuk menjaga kelembaban tanah dan menekan gulma kompetitor. Gulma seperti *Paspalum conjugatum*, *Nephrolepis biserrata*, dan *Asystasia gangetica* memiliki kemampuan retensi air tinggi, tetapi efek alelopatinya belum banyak diteliti. Selain itu, klon RRIC 100 dipilih karena potensi adaptasinya terhadap cekaman lingkungan, namun responsnya terhadap kombinasi mulsa gulma dan frekuensi penyiraman masih belum jelas.

Tujuan penelitian ini adalah untuk: (1) mengetahui pengaruh jenis mulsa gulma terhadap pertumbuhan bibit karet klon RRIC 100; (2) mengetahui pengaruh frekuensi pemberian air terhadap pertumbuhan bibit karet klon RRIC 100; (3) mengetahui kombinasi antara kedua perlakuan terhadap pertumbuhan bibit karet klon RRIC 100.

Penelitian menggunakan Rancangan Petak Terpisah (RPT) dalam Rancangan Acak Kelompok (RAK) Faktorial dua faktor perlakuan yang disusun dalam tiga ulangan. Faktor pertama sebagai petak utama adalah Frekuensi Penyiraman Air (F) yang terdiri dari tiga taraf, yaitu: 5 hari sekali disiram (F1), 10 hari sekali disiram (F2), dan 15 hari sekali disiram (F3). Volume air penyiraman 900 mL/polybag yaitu 75% dari volume kapasitas lapang sebesar 1200 mL dengan ukuran polibag 12 cm x 17 cm. Faktor kedua sebagai anak petak adalah Jenis Gulma (G) yang terdiri dari empat taraf, yaitu: tanpa mulsa gulma (G0), mulsa gulma *Asystasia gangetica* (G1), mulsa gulma *Paspalum conjugatum* (G2), dan mulsa gulma *Nephrolepis biserrata* (G3). Variabel yang diamati adalah pertambahan pertumbuhan tajuk (jumlah daun, luas daun, tinggi bibit, diameter batang) pada 0, 21, 42, dan 63 hari setelah perlakuan (DAT), jumlah stomata, kerapatan stomata, dan kandungan air relative (KAR) daun.

Pertumbuhan pertambahan tajuk (jumlah daun, luas daun, tinggi bibit, diameter batang) bibit karet klon RRIC 100 tidak dipengaruhi secara nyata oleh perlakuan frekuensi pemberian air, mulsa gulma, serta kombinasi antara kedua perlakuan. Jumlah stomata, kerapatan stomata, dan KAR daun bibit karet klon RRIC dipengaruhi secara nyata oleh perlakuan frekuensi penyiraman, mulsa gulma, dan kombinasi antara kedua perlakuan. Perlakuan frekuensi penyiraman 5 hari sekali (F1) mampu meningkatkan jumlah dan kerapatan stomata. Frekuensi penyiraman 10 hari sekali (F2) merupakan pemberian air yang optimum bagi bibit karet dengan media tanam yang mengandung liat tinggi dengan nilai KAR sebesar 91,91%, karena KAR yang optimal biasanya berkisar antara 80-90% pada sebagian besar spesies tanaman. Perlakuan mulsa gulma *P. conjugatum* (G2)

meningkatkan jumlah dan kerapatan stomata karena kemampuannya menjaga kelembaban tanah, minimnya efek alelopati, serta pelepasan nutrisi mikro selama dekomposisi. Walaupun KAR daun dipengaruhi secara nyata oleh perlakuan mulsa gulma, namun nilai KAR daun untuk semua perlakuan mulsa gulma berkisar pada KAR optimum, yaitu 80-90%. Kombinasi frekuensi penyiraman 5 hari sekali dengan mulsa *P. conjugatum* (F1G2) meningkatkan jumlah dan kerapatan stomata melalui mekanisme retensi air, dekomposisi nutrisi, dan reduksi stres abiotik. Sebaliknya, penyiraman 15 hari sekali tanpa mulsa (F3G0) menurunkan jumlah dan kerapatan stomata. Berdasarkan nilai NTA bibit karet yang didapatkan dengan pemberian frekuensi penyiraman dan mulsa gulma menunjukkan bahwa bibit karet siap untuk dipindahkan ke lapangan karena nilai NTA bibit karet berkisar antara 1-3 yang mengindikasikan bahwa jumlah akar yang dimiliki telah mencukupi untuk menunjang pertumbuhan tanaman.

Kata Kunci: Bibit karet, Frekuensi penyiraman, Mulsa, RRIC 100, Gulma.

SUMMARY

Rubber plants (Hevea brasiliensis) are strategic plantation commodities in Indonesia. However, their productivity is still low due to challenges such as suboptimal water management and competition with weeds. Water availability is a critical factor in the nursery phase, especially in the dry season, while weeds are often considered as nuisances that inhibit growth. Insufficient water availability causes a decrease in the availability of nutrients and the solubility of nutrients in the soil. Thus, the transport of nutrients to plant tissues will also be lower. Water plays an important role in the process of translocation of nutrients from the roots to all parts of the plant, lack of water will result in a decrease in the photosynthesis process, resulting in stunted plant growth and development.

The use of organic mulch, including weeds, is a potential solution to maintain soil moisture and suppress competing weeds. Weeds such as Paspalum conjugatum, Nephrolepis biserrata, and Asystasia gangetica have high water retention capabilities, but their allelopathic effects have not been widely studied. In addition, the RRIC 100 clone was selected because of its potential adaptation to environmental stress, but its response to the combination of weed mulch and watering frequency is still unclear.

The objectives of this study were to: (1) determine the effect of the type of weed mulch on the growth of RRIC 100 clone rubber seedlings; (2) determine the effect of the frequency of watering on the growth of RRIC 100 clone rubber seedlings; (3) determine the combination of the two treatments on the growth of RRIC 100 clone rubber seedlings.

The study used a Split Plot Design in a Factorial Randomized Block Design with two treatment factors arranged in three replications. The first factor as the main plot is the Watering Frequency (F) consisting of three levels, namely: watering once every 5 days (F1), watering once every 10 days (F2), and watering once every 15 days (F3). The volume of water for watering is 900 mL/polybag, which is 75% of the field capacity volume of 1200 mL with a polybag size of 12 cm x 17 cm. The second factor as a subplot is the Type of Weed (G) consisting of four levels, namely: without weed mulch (G0), Asystasia gangetica weed mulch (G1), Paspalum conjugatum weed mulch (G2), and Nephrolepis biserrata weed mulch (G3). The variables observed were the increase in shoot growth (number of leaves, leaf area, seedling height, stem diameter) at 0, 21, 42, and 63 days after treatment (DAT), number of stomata, stomatal density, and relative water content (RWC) of leaves.

The growth of the shoot increase (number of leaves, leaf area, seedling height, stem diameter) of RRIC 100 clone rubber seedlings was not significantly affected by the treatment of watering frequency, weed mulch, and the combination of the two treatments. The number of stomata, stomatal density, and leaf RWC of RRIC clone rubber seedlings were significantly affected by the treatment of watering frequency, weed mulch, and the combination of the two treatments. The treatment of watering frequency once every 5 days (F1) was able to increase the number and density of stomata. The frequency of watering once every 10 days (F2) was the optimum watering for rubber seedlings with a planting medium containing high clay with a RWC value of 91.91%, because the optimal RWC usually ranges from 80-90% in most plant species. The treatment of P. conjugatum weed mulch (G2) increased the number and density of stomata due to

its ability to maintain soil moisture, minimal allelopathic effects, and the release of micronutrients during decomposition. Although leaf RWC was significantly affected by weed mulch treatment, the leaf RWC values for all weed mulch treatments ranged from the optimum RWC, which was 80-90%. The combination of watering frequency once every 5 days with P. conjugatum mulch (F1G2) increased the number and density of stomata through the mechanisms of water retention, nutrient decomposition, and abiotic stress reduction. Conversely, watering once every 15 days without mulch (F3G0) decreased the number and density of stomata. Based on the shoot-root ratio value of rubber seedlings obtained by providing watering frequency and weed mulch, it showed that rubber seedlings were ready to be transferred to the field because the shoot-root ratio value of rubber seedlings ranged from 1-3, indicating that the number of roots owned was sufficient to support plant growth.

Keyword: Rubber seedlings, Watering frequency, Mulch, RRIC 100, Weeds.