

RINGKASAN

Bibit karet (*Hevea brasiliensis*) merupakan komoditas perkebunan strategis di Indonesia, dengan klon IRRC 100 menjadi salah satu varietas unggul karena produktivitas lateks dan adaptasi terhadap lingkungan tropis. Pertumbuhan tajuk bibit karet pada fase semai sangat krusial karena menentukan kesiapan bibit untuk ditransplantasikan ke lapangan. Namun, pertumbuhan optimal bibit karet sering terhambat oleh faktor lingkungan, terutama ketersediaan air dan kualitas media tanam. Di daerah dengan iklim kering atau musim kemarau panjang, frekuensi penyiraman yang tidak tepat dapat menyebabkan stres air, menghambat perkembangan daun, dan mengurangi kerapatan stomata yang merupakan faktor kunci dalam efisiensi fotosintesis. Di sisi lain, penyiraman berlebihan berisiko menyebabkan genangan yang merusak perakaran.

Penggunaan mulsa organik, seperti sekam padi bakar (biochar), menjadi solusi potensial untuk meningkatkan retensi air tanah dan mengurangi evaporasi. Biochar sekam padi bakar memiliki porositas tinggi, mampu menyerap air 3-5 kali lipat dari bobotnya, serta memperbaiki struktur tanah. Namun, dosis aplikasi sekam padi bakar sebagai mulsa perlu dioptimalkan karena dosis berlebihan dapat mengubah pH tanah atau menghambat pertumbuhan akar. Pada bibit karet, kombinasi antara frekuensi penyiraman dan dosis sekam padi bakar sebagai mulsa belum banyak diteliti, padahal interaksi kedua faktor ini dapat memengaruhi keseimbangan air tanah, ketersediaan nutrisi, dan perkembangan tajuk bibit karet.

Penelitian ini bertujuan untuk: (1) mengetahui frekuensi penyiraman yang tepat terhadap pertumbuhan tajuk (jumlah daun, total luas daun, tinggi bibit, dan diameter batang) serta morfologi dan fisiologi (jumlah stomata, kerapatan stomata dan Kandungan Air Relatif daun) bibit karet klon RRIC 100 asal semai; (2) mengetahui dosis mulsa sekam padi bakar (biochar) yang tepat terhadap pertumbuhan tajuk (jumlah daun, total luas daun, tinggi bibit, dan diameter batang) serta morfologi dan fisiologi (jumlah stomata, kerapatan stomata dan Kandungan Air Relatif daun) bibit karet klon RRIC 100 asal semai; dan (3) mengetahui kombinasi frekuensi penyiraman dengan mulsa sekam padi bakar (biochar) yang tepat terhadap pertumbuhan tajuk (jumlah daun, total luas daun, tinggi bibit, dan diameter batang) serta morfologi dan fisiologi (jumlah stomata, kerapatan stomata dan Kandungan Air Relatif daun) bibit karet klon RRIC 100 asal semai.

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 (F) yang terdiri dari dua taraf, yaitu: frekuensi penyiraman 7 hari sekali (F1), dan 15 hari sekali (F2).

Faktor kedua sebagai anak petak adalah Sekam padi bakar (biochar) (K) yang terdiri dari empat taraf, yaitu: 0 g/polybag (K0), 5 g/polybag (K1), 10 g/polybag (K2), dan 15 g/polybag (K3). Variabel yang diamati adalah pertambahan pertumbuhan tajuk bibit karet (tinggi bibit, diameter batang, jumlah daun, dan total luas daun) yang diamati pada 0, 21, 42, dan 63 HSP. Kemudian diamati juga jumlah dan kerapatan stomata serta KAR daun pada 63 HSP.

Hasil penelitian menunjukkan bahwa Frekuensi penyiraman (7, 15 hari sekali) dan sekam padi bakar sebagai mulsa dalam berbagai dosis (0, 5, 10, 15 g/polybag) serta kombinasi antara kedua perlakuan belum mampu memberikan pengaruh yang nyata terhadap pertumbuhan tajuk (tinggi bibit, diameter batang, jumlah daun, dan total luas daun) bibit karet klon RRIC 100 asal semaian pada 21-0 HSP, 42-21 HSP, dan 63-42 HSP. Frekuensi penyiraman (7, 15 hari sekali), sekam padi bakar sebagai mulsa dalam berbagai dosis (0, 5, 10, 15 g/polybag) serta kombinasi antara kedua perlakuan mampu memberikan pengaruh yang nyata terhadap jumlah dan kerapatan stomata serta KAR daun bibit karet klon RRIC 100 asal semaian pada 63 HSP. Frekuensi penyiraman 7 hari sekali (F1) mampu menghasilkan jumlah, kerapatan stomata serta KAR daun tertinggi dibandingkan perlakuan frekuensi penyiraman 15 hari sekali (F2), yaitu berturut-turut sebesar 17,25, 7,26/mm², dan 108,51%. Dosis sekam padi bakar sebagai mulsa (K) bervariasi dalam mempengaruhi jumlah, dan kerapatan stomata serta KAR daun bibit karet. Jumlah dan kerapatan stomata terbanyak dijumpai pada perlakuan dosis sekam padi bakar sebagai mulsa 10 g/polybag (K2), yaitu berturut-turut sebanyak 19,00 stomata dan 8,00/mm². KAR daun tertinggi dijumlah pada perlakuan tanpa sekam padi bakar sebagai mulsa (K0), yaitu 112,07%. Kombinasi perlakuan frekuensi penyiraman 15 hari sekali dengan dosis sekam padi bakar sebagai mulsa 10 g/polybag (F2K2) menghasilkan jumlah dan kerapatan stomata serta KAR daun bibit karet tertinggi, yaitu berturut-turut 22,00 stomata, 9,26/mm², dan 118,92%.

Kata Kunci : Pembibitan, Frekuensi, Mulsa, Biochar, Klon dll.

SUMMARY

Rubber seedlings (Hevea brasiliensis) are a strategic plantation commodity in Indonesia, with the IRRC 100 clone being one of the superior varieties due to its latex productivity and adaptation to tropical environments. The growth of rubber seedling crowns during the seedling phase is crucial because it determines the readiness of the seedlings to be transplanted into the field. However, optimal growth of rubber seedlings is often hampered by environmental factors, especially water availability and the quality of the planting medium. In areas with dry climates or long dry seasons, inappropriate watering frequency can cause water stress, inhibit leaf development, and reduce stomatal density, which is a key factor in photosynthetic efficiency. On the other hand, excessive watering risks causing waterlogging that damages the roots.

The use of organic mulch, such as burnt rice husk (biochar), is a potential solution to increase soil water retention and reduce evaporation. Burnt rice husk biochar has high porosity, can absorb water 3-5 times its weight, and improves soil structure. However, the dose of burnt rice husk application as mulch needs to be optimized because excessive doses can change soil pH or inhibit root growth. In rubber seedlings, the combination of watering frequency and dose of burnt rice husk as mulch has not been widely studied, even though the interaction of these two factors can affect soil water balance, nutrient availability, and the development of rubber seedling crowns.

This study aims to: (1) determine the appropriate watering frequency for crown growth (number of leaves, total leaf area, seedling height, and stem diameter) as well as morphology and physiology (number of stomata, stomatal density and leaf relative water content) of RRIC 100 clone rubber seedlings from seedlings; (2) determine the appropriate dose of burnt rice husk mulch (biochar) for crown growth (number of leaves, total leaf area, seedling height, and stem diameter) as well as morphology and physiology (number of stomata, stomatal density and leaf relative water content) of RRIC 100 clone rubber seedlings from seedlings; and (3) determine the appropriate combination of watering frequency with burnt rice husk mulch (biochar) for crown growth (number of leaves, total leaf area, seedling height, and stem diameter) as well as morphology and physiology (number of stomata, stomatal density and leaf relative water content) of RRIC 100 clone rubber seedlings from 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) which consists of two levels, namely: watering frequency once every 7 days (F1), and once every 15 days (F2). The second factor as a sub-plot is Burnt Rice Husk (biochar) (K) which consists of four levels, namely: 0 g/polybag (K0), 5 g/polybag (K1), 10 g/polybag (K2), and 15 g/polybag (K3). The variables observed were the increase in the growth of the rubber seedling crown (seedling height, stem diameter, number of leaves, and total leaf area) which were observed at 0, 21, 42, and 63 DAT. Then the number and density of stomata and leaf KAR were also observed at 63 DAT.

The results of the research showed that the frequency of watering (every 7, 15 days) and roasted rice husks as mulch in various doses (0, 5, 10, 15 g/polybag) as well

as the combination of the two treatments were not able to have a significant effect on increasing canopy growth (seedling height, stem diameter, number of leaves, and total leaf area) of RRIC 100 clone rubber seedlings from seedlings at 21-0 DAT, 42-21 DAT, and 63-42 DAT. Watering frequency (every 7, 15 days), roasted rice husks as mulch in various doses (0, 5, 10, 15 g/polybag) and the combination of the two treatments were able to have a significant effect on the number and density of stomata as well as RRIC 100 clone rubber seedling leaves from seedlings at 63 DAP. The watering frequency of once every 7 days (F1) was able to produce the highest number, density of stomata and leaf KAR compared to the watering frequency treatment of once every 15 days (F2), which were respectively 17.25, 7.26/mm², and 108.51%. The dose of burnt rice husk as mulch (K) varied in affecting the number, density of stomata and leaf KAR of rubber seedlings. The highest number and density of stomata were found in the treatment of burnt rice husk as mulch dose of 10 g/polybag (K2), which were respectively 19.00 stomata and 8.00/mm². The highest leaf KAR was found in the treatment without burnt rice husk as mulch (K0), which was 112.07%. The combination of watering frequency treatment once every 15 days with a dose of burnt rice husk as mulch of 10 g/polybag (F2K2) produced the highest number and density of stomata and leaf KAR of rubber seedlings, namely 22.00 stomata, 9.26/mm², and 118.92% respectively.

Keywords: Nursery, Frequency, Mulch, Biochar, Clones etc.