

ABSTRAK

ANALISIS PERUBAHAN PROFIL PROTEIN DAN RESPONS FISIOLOGIS ANGGREK BULAN [*Phalaenopsis amabilis* (L.) Blume] TERHADAP CEKAMAN KEKERINGAN TERINDUKSI PEG 6000

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Phalaenopsis amabilis (L.) Blume merupakan tanaman hias bernilai ekonomi dan estetika tinggi yang ditetapkan sebagai bunga nasional Indonesia, tetapi cekaman kekeringan dapat menghambat pertumbuhan tanaman akibat rendahnya kelembapan dan ketersediaan air. Upaya peningkatan produksi anggrek memerlukan ketersediaan bibit berkualitas dalam jumlah besar, yang sering kali sulit dicapai melalui metode konvensional. Oleh karena itu, diperlukan kajian mengenai respons fisiologis dan perubahan profil protein tanaman terhadap cekaman kekeringan. Penelitian ini bertujuan untuk (1) menentukan konsentrasi *Polyethylene Glycol* (PEG) 6000 yang masih dapat ditoleransi oleh *P. amabilis* di bawah cekaman kekeringan, (2) menganalisis kandungan karbohidrat terlarut total dan kerapatan stomata pada tanaman yang diinduksi PEG 6000, serta (3) membandingkan profil protein antara tanaman tercekam dan kontrol. Penelitian disusun menggunakan Rancangan Acak Lengkap (RAL) satu faktor dengan lima taraf konsentrasi PEG 6000 (0%, 10%, 20%, 30%, dan 40%), masing-masing lima ulangan. Data dianalisis menggunakan analisis ragam (ANOVA) pada taraf signifikansi 5% dan dilanjutkan dengan Uji Beda Nyata Jujur (BNJ). Hasil penelitian menunjukkan bahwa konsentrasi PEG 6000 sebesar 40% merupakan batas toleransi optimum terhadap cekaman kekeringan yang masih dapat dipertahankan oleh tanaman. Peningkatan konsentrasi PEG 6000 secara signifikan meningkatkan kandungan karbohidrat terlarut total dan kerapatan stomata. Analisis profil protein menunjukkan adanya perubahan pola pita protein pada tanaman tercekam, yaitu munculnya pita protein baru pada berat molekul ± 60 kDa dan hilangnya pita protein pada berat molekul ± 25 kDa pada perlakuan PEG 6000 konsentrasi 40%. Hasil tersebut menunjukkan adanya keterkaitan antara respons fisiologis dan perubahan profil protein pada *Phalaenopsis amabilis* dalam menghadapi cekaman kekeringan, yang berpotensi mendukung pengembangan strategi seleksi tanaman toleran kekeringan.

Kata kunci: cekaman kekeringan, *Phalaenopsis amabilis*, PEG 6000, karbohidrat terlarut total, profil protein .

ABSTRACT

ANALYSIS OF PROTEIN PROFILE ALTERATIONS AND PHYSIOLOGICAL RESPONSES OF MOON ORCHID [*Phalaenopsis amabilis* (L.) Blume] TO PEG 6000-INDUCED DROUGHT STRESS

By

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Phalaenopsis amabilis (L.) Blume is an ornamental plant with high economic and aesthetic value and has been designated as the national flower of Indonesia. However, drought stress can inhibit plant growth due to low humidity and limited water availability. Efforts to increase orchid production require the availability of high-quality planting materials in large quantities, which are often difficult to achieve through conventional propagation methods. Therefore, it is necessary to investigate the physiological responses and alterations in protein profiles of plants subjected to drought stress. This study aimed to (1) determine the concentration of Polyethylene Glycol (PEG) 6000 that can still be tolerated by *P. amabilis* under drought stress conditions, (2) analyze total soluble carbohydrate content and stomatal density in PEG 6000-induced plants, and (3) compare protein profiles between drought-stressed plants and control plants. The experiment was arranged in a Completely Randomized Design (CRD) with a single factor consisting of five PEG 6000 concentrations (0%, 10%, 20%, 30%, and 40%), each with five replications. Data were analyzed using analysis of variance (ANOVA) at a 5% significance level, followed by the Honestly Significant Difference (HSD) test. The results showed that 40% PEG 6000 represented the optimum tolerance threshold to drought stress that could still be maintained by the plants. Increasing PEG 6000 concentration significantly increased total soluble carbohydrate content and stomatal density. Protein profile analysis revealed alterations in protein band patterns in droughtstressed plants, indicated by the appearance of a new protein band at approximately 60 kDa and the disappearance of a protein band at approximately 25 kDa in plants treated with 40% PEG 6000. These findings indicate a relationship between physiological responses and protein profile alterations in *Phalaenopsis amabilis* under drought stress conditions, which may support the development of selection strategies for drought-tolerant plants.

Key words: drought stress, *Phalaenopsis amabilis*, PEG 6000, protein profile, total soluble carbohydrates.