The Effect Stubble Cutting Height on the Vegetative and Reproductive Phase of Rice Ratoon in a Tidal Swamp [1-7]
Evriani Mareza, Zainal Ridho Djafar, Rujito Agus Suwignyo, Andi Wijaya

A Path Analysis of Sustaining Small Scale Fishing Industry in Indonesia [9-17]
Dedy Putra Wahyudi, Eko Sri Wiyono, Budy Wiryawan, Iin Solihin

Seed Priming with PEG 8000 for Improving Drought Stress Tolerance of Soybean (Glycine max) [19-26]
Syatrianty A. Syaiful, Novaty E. Dungga, Muh. Riadi, Ifayanti Ridwan

Determinants of Rural Household Income in Jiangxi, China [27-47]
Fu Gonghua, Ge Zhijun

Extracting Apis dorsata Binghamii Honey using Incision Technique [49-57]
Rosmartinasiah, Sitti Marwah, Meisanti

Influence of Sowing Depth and Shade on Emergence and Seedling Growth of Centrosema pubescens [59-67]
Muhammad Rusdy, Rinaldi Sjaril

Structural Elucidation of Secondary Metabolites in Sponge (Callyspongia pseudoreticulata) with N-Hexane Extract [69-75]
M. Nurdin, Hanapi Usman, Ambo Ala, Baharuddin
Climate Change Adaptation in the Perspectives of Food, Energy Crisis and Environmental Degradation for Food Sovereignty in Indonesia [77-89]
Rahim Darma, Rahmadanih, Nixia A. Tenriawanu, Riri Amandaria

[Full Text] [Abstract & References]

The Effect of Mulch and Fertilizer on Soil Temperature of a Potato Growth [91-102]
Sofyan Samad

[Full Text] [Abstract & References]
Seed Priming with PEG 8000 for Improving Drought Stress Tolerance of Soybean (Glycine max)

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Abstract: The experiment was carried out to evaluate the effects of seed priming with osmoticum Polyethylene glycol (PEG) 8000 in improving tolerance of soybean to drought stress. Green house factorial experiment in a completely randomized design with three replications was conducted. Treatments consisted of five levels of seed priming (dry seeds – untreated, PEG concentration: 0, 100, 200, 300 g L\(^{-1}\) water, respectively) and three levels of drought stress treatments (100 % field capacity, 75% field capacity and 50% field capacity). Results showed that seedling growing from primed seeds differed significantly with respect to plant height increment, shoot/root ratio, chlorophyll content and protein content. However, seed priming with PEG had no effect on relative growth rate (RGR), number of stomata, 100 grains weight and grain yield. Among the various concentration of PEG used, priming with 300 g PEG L\(^{-1}\) water significantly increased chlorophyll content and protein content. Drought stress treatment applied significantly affected plant height, shoot-root ratio, chlorophyll and protein content. Seed priming and drought stress treatments proved to be significant with respect to shoot-root ratio, 100 grains weight, protein and chlorophyll content. Seeds treated with 300 g PEG L\(^{-1}\) water demonstrated to be superior to the non-primed and all other primed seeds when water stress increased (50% field capacity). The results indicate that seed priming with PEG can improve plant growth in soybean by conferring more resistant seedlings to drought stress.

Keywords: Seed priming; drought tolerance; soybean
References


