FACTORIAL ANALYSIS ON FLOODED SOIL RECOVERY USING SOIL CONTAINING ARBUSCULAR MYCORRHIZAL FUNGI

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ABSTRACT

This paper presents the factorial analysis on flooded soil (FS) recovery using soil containing Arbuscular Mycorrhizal fungi (SA) with the help of a selected host plant, Allium cepa L. (onion plant). In order to study the most contributing factor for the soil recovery, five factors were selected namely; pH of soil, water content, SA/FS ratio, light supply and depth of soil. This was to study the ability of SA to recover the nutrients (nitrogen, phosphorus and potassium) in the FS. Experimental design table was constructed using the concept of two level factorial by employing Design Expert® software (Ver 7.1.6). Soil sample was collected after 12 days and analyzed for nitrogen, phosphorus and potassium concentrations using HACH Spectrophotometer. Later, the data was analyzed in the named software to determine the main effect of respective factors and interaction between factors. The results showed that water content, light supply and depth of soil were the important factors for nutrients recovery. The best condition for FS recovery using SA was at: pH of soil (4), water content (28 ml), SA/FS ratio (1:5), depth of soil (5 cm) and with light supply.

INTRODUCTION

The rainy season to the eastern part of Peninsular Malaysia which occurs in the period between October and March always bring about the devastative effect not only to human being but also to ecosystem. This effect is especially on agricultural soil since agriculture occupies a large proportion of the landscape. Flooded soils create significant challenges for agricultural lands. The floods have many direct impacts, with the most prominent one being the flooded soil syndrome where the soils losses their beneficial fungi which mobilize soil based plant nutrients. Flooding and long periods of waterlogging have resulted in the depletion of nutrients. Prolonged flooding reduces the concentration of nitrogen, N, phosphorus, P and potassium, K. N appears to have been denitrified and lost from the system. Since P uptake depends on microbes in most plant, prolonged waterlogging has reduced microbial activity which in turns affects the absorption of P into the plant roots [1]. Soil K is less available in soils that remain wet since wet soils are more prone to compaction, which restricts plant root growth and uptake of soil K.