IJSBAR

International Journal of

Sciences: Basic and Applied Research

Print & Online

Published by :

GSSRR

Global Society of Scientific Research and Researchers

International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Study of the Growth of *Nephrolepis biserrata* Kuntze and Its Utilization as Cover Crop Under Mature Oil Palm Plantation

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Abstract

Nephrolepis biserrata is one kind of weeds in oil palm plantations that have the potential to be used as cover crop. Spreading in the areas of oil palm plantations, this plant should be easy to be planted in other areas related to the utilization of *N.biserrata* as soil cover.

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This study was a field research that included the observation of *N.biserrata* growth and development, as well as the experiment of *N.biserrata* to find out its further potential with regard to its use as cover crop. The study was carried out from November 2013 to September 2014 under mature oil palm plantation with 17-year-old oil palm trees in Cikabayan Experimental Garden, University Farm, IPB, Bogor, West Java. *N.biserrata* Kuntze. can be planted as cover crop under mature oil palm plantations and can grow well after 8 WAP in terms of plant height, number and length of leaves. The planting of *N.biserrata* can improve physical and chemical properties of the soil, making it possible to increase ground water reserves. In comparison, the land not planted with *N.biserrata* experienced an average ground water deficit of 0.26 mm, while the land planted with *N.biserrata* had an *average* surplus of soil water content of 1.33 mm in September 2014. The land planted with *N.biserrata* showed an increase in the element content such as C-organic (12.74%), N (15%), P (26.82%) and K (17:45%) and a decrease in the value of the C / N (2.02%). The planting of *N.biserrata* seemed to be able to reduce the content of clay in the soil by 25.13% and raise the sand and dust content by 5.35% and 148.53% respectively. During the decomposition process, *N.biserrata* could increase the soil nutrient content of N, P, K and C-organic, respectively as high as 41%, 11%, 93%, and 11.3%.

Keywords: *Nephrolepis biserrata* Kuntze; cover crop; oil palm plantation

1. Introduction

The growth and development of a plant species is affected by the habitat where it grows. The plant that has a wide adaptability tends to live in places where other plants cannot grow or can only grow less well. *N.biserrata* Kuntze. is a plant species of ferns that grows wild and has high adaptability. For oil palm plantations, *N.biserrata* is very useful because it can keep the humidity around the plantations.

N.biserrata has properties that enables it to grow in shaded areas, so that it can potentially be used as cover crop in the shaded areas of mature oil palm plantations (TM). Cover crop protect soil surface from disperse power and destructive power by rain drops, slow runoff, enrich soil organic matters and increase soil porosity [1].

Cover crop may be specifically planted to protect the land from the threat of destruction by erosion. In addition, cover crop are also used to improve soil physical and chemical properties both in the system of crop rotation and land rehabilitation system. According to [1], there are some requirements in the use of plants as cover crop and in a crop rotation system, i.e.: (1) not as a competitor for the main crops in the utilization of natural resources; (2) rapid growth; (3) dense and lush condition; (3) ability to compete with other weeds; and (4) not a host of pests and diseases that can attack the main crops.

The study of cover crops under plantation area emphasizes more on their function as soil and water conservation efforts. Cover crops have several functions: to reduce soil density [2], to serve as a place to store carbon [3], to influence soil hydrology, to protect an area from erosion caused by water and wind [4], and to increase the rate of water infiltration [5]. Cover crops play a number of roles as holding or reducing the damage caused by rain drops and surface runoff, increasing soil organic matters, and doing transpiration which reduces the soil water content when soil moisture is high.