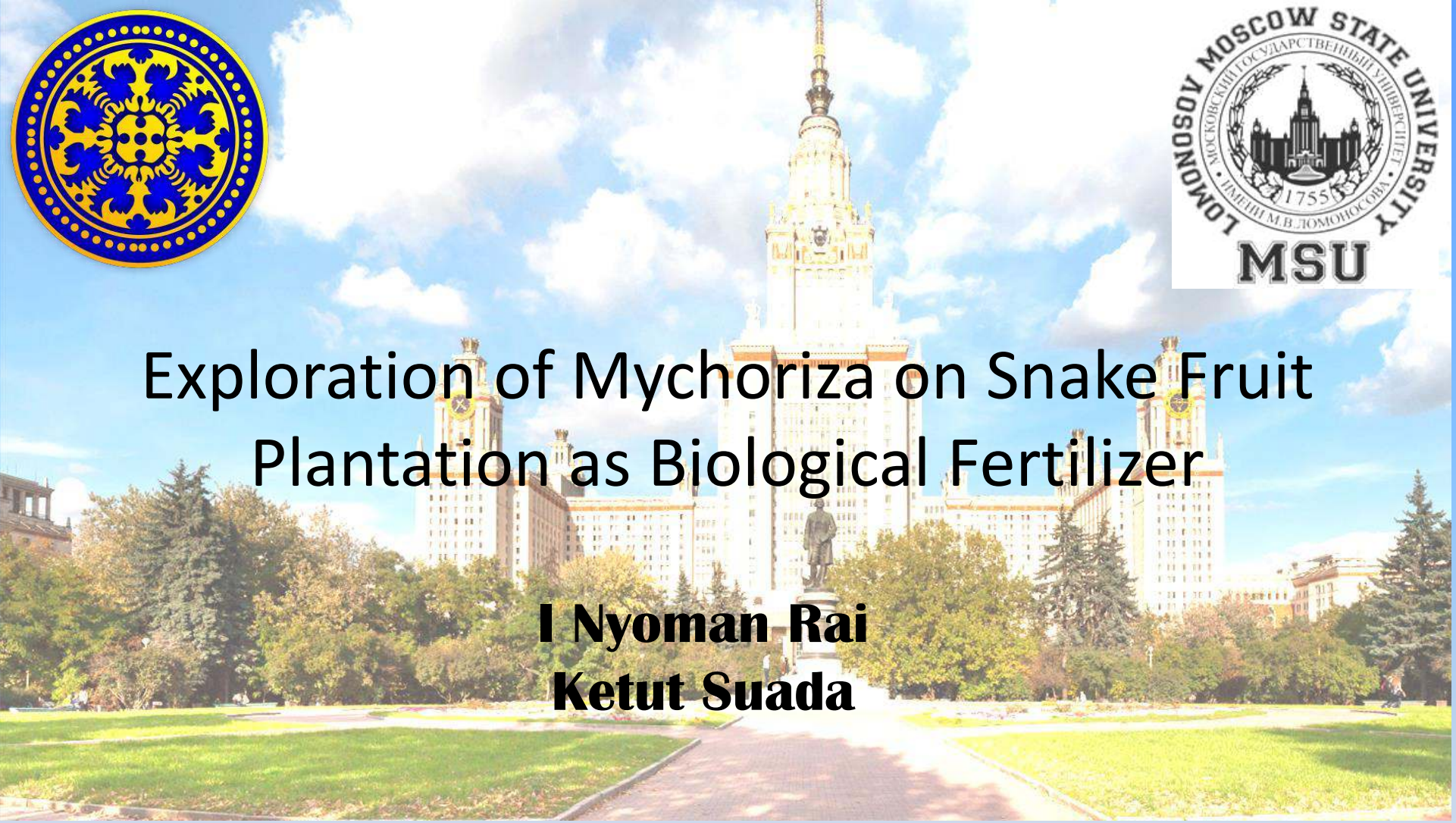


Exploration of Mychoriza on Snake Fruit Plantation as Biological Fertilizer

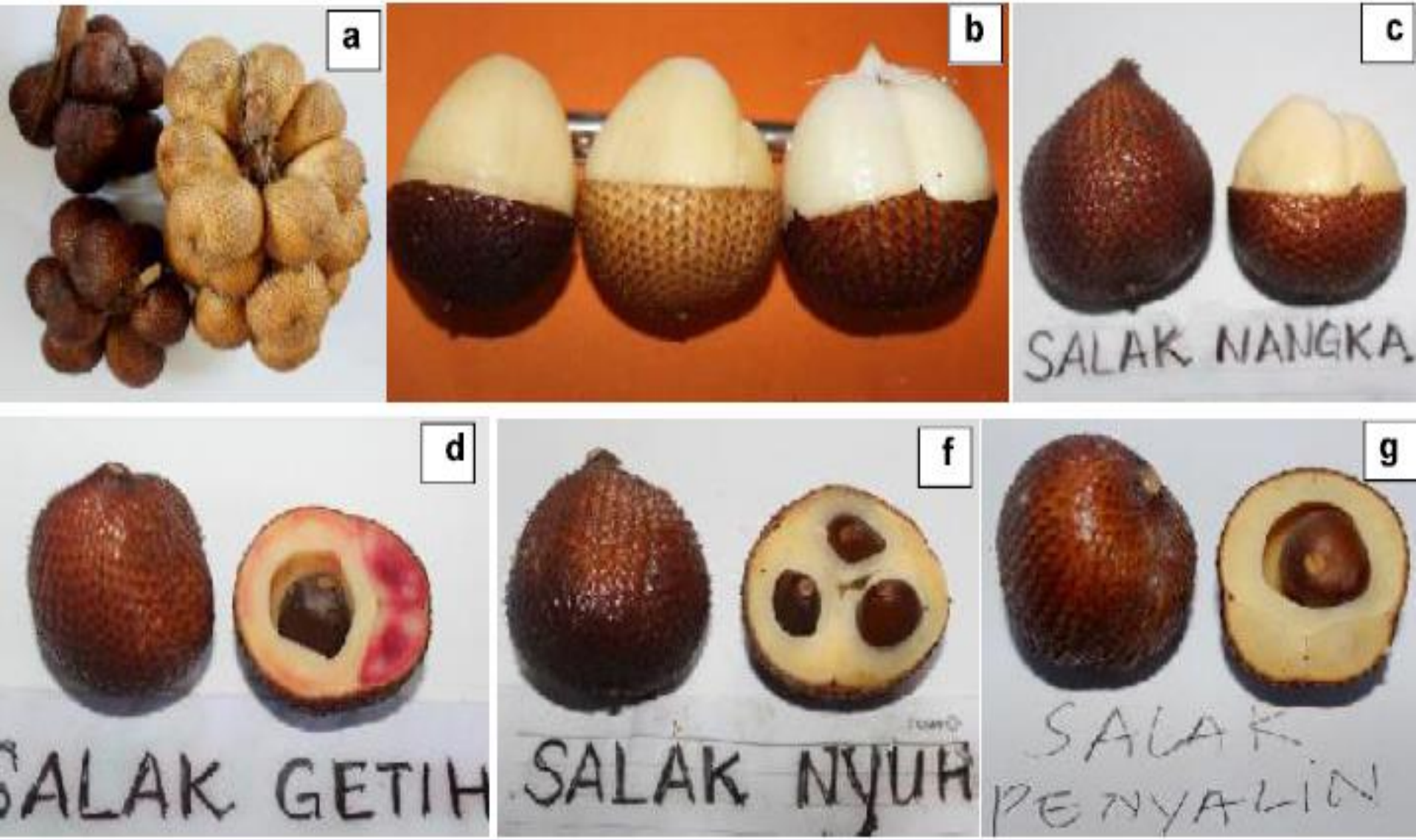
I Nyoman Rai
Ketut Suada

Workshop on Development and Implementation of Innovative Agricultural Technologies to Increase Sustainability of Agro-ecological Systems.

Research Collaboration between Udayana University - Indonesia & Soil Science Faculty Lomonosov Moscow State University - Russia.

Moscow, 21 Agust 2017

- **Before 10 years ago Balinese snake fruit (salak)** is very popular fruit in Indonesia.
- **Now days the condition is worsening**, not only can't compete with imported fruits but also with the similar salak fruit from outside area of Indonesia.
- **The development of salak fruit organically** is limited by the unavailability of production inputs → soil fertility decrease over time so that the quantity, quality and continuity of production are low.
- **THIS STUDY AIMED** to find out indigenous endomychoriza on salak plantation as a biological fertilizer.


a
b
c
SALAK NANGKA
d
f
g
SALAK GETIH
SALAK NYUH
SALAK
PENYALIN

- **Soil and root samples was taken in four districts** salak production center in Bali i.e. Bebandem and Selat District (Karangasem Regency), Pupuan District (Tabanan Regency) and Payangan District (Gianyar Regency).
- **Samples were taken from top soil layer** (10-15 cm depth). 1-2 kg of soil was taken and put in to the 2 kg-size of plastic bag, while the root sample was taken by taking the 10 cm-length of root tip, wrapping with wet tissue and then put it in the cool box.

- **Spore isolation was done** at Laboratory of Genetic Resources and Molecular Biology, Unud, by using wet filtration technique according to Brunndret *et al*. (2009).
- **The identification of morphological characters** (spore arrangement, hypha shape, spore size, spore color, and spore shape) was done using Manual for The Identification of Mychoriza Fungi according to Schenk and Perez (1990).
- **Molecular identification will be done** by using random amplified polymorphic DNA marker (RAPD).
- **Observation of root infection percentage** was done by staining method using tryfan blue.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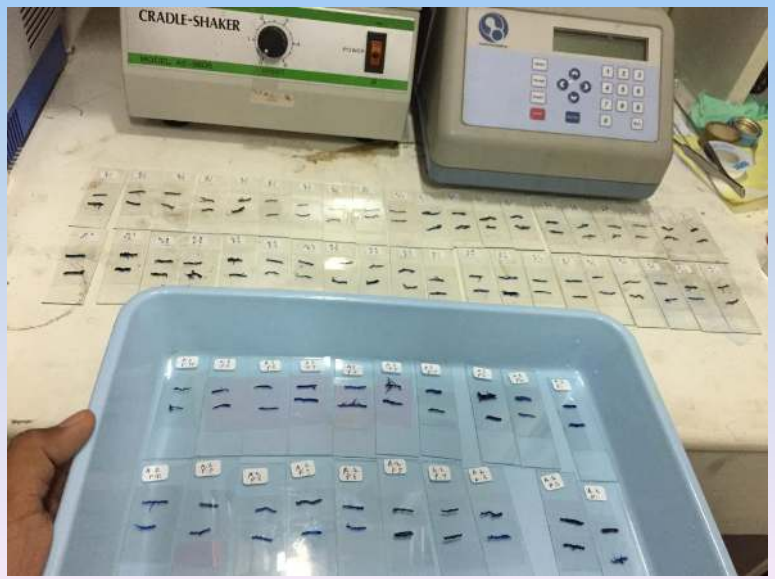
Retrace Code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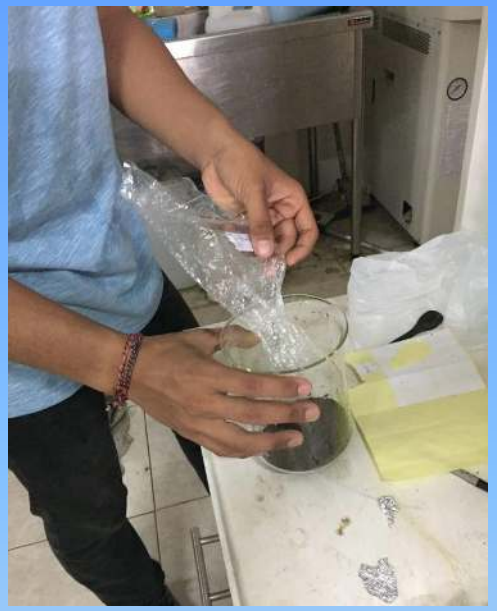
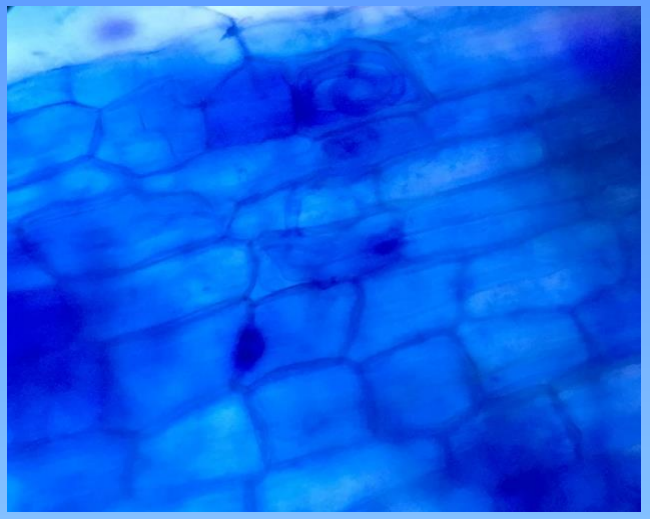
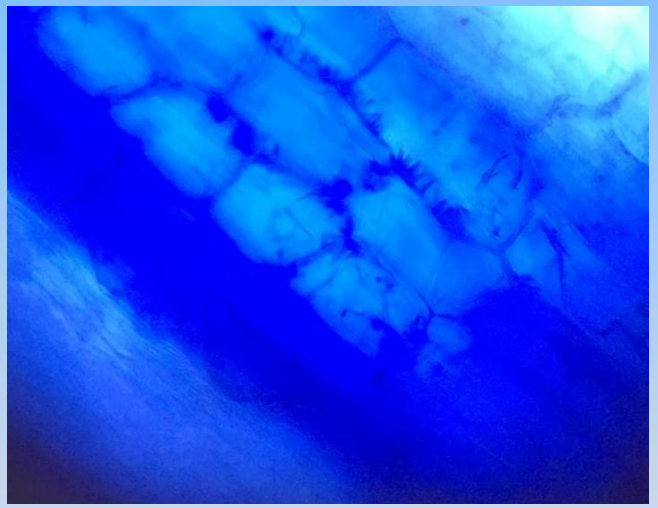
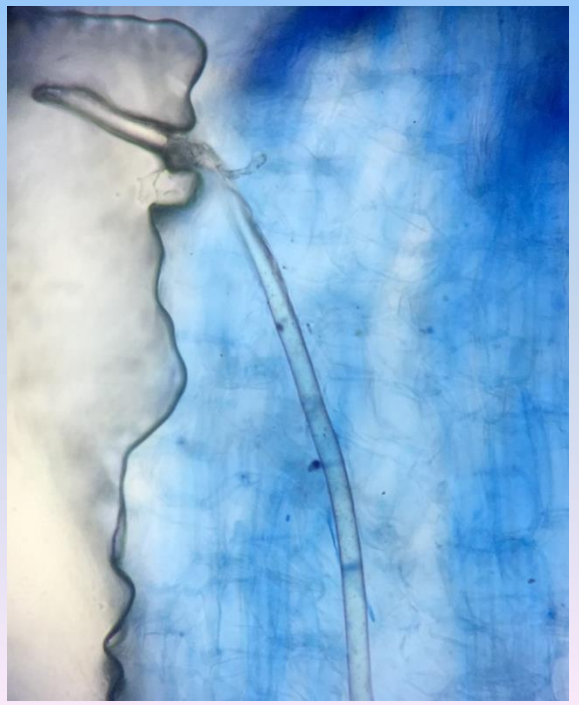
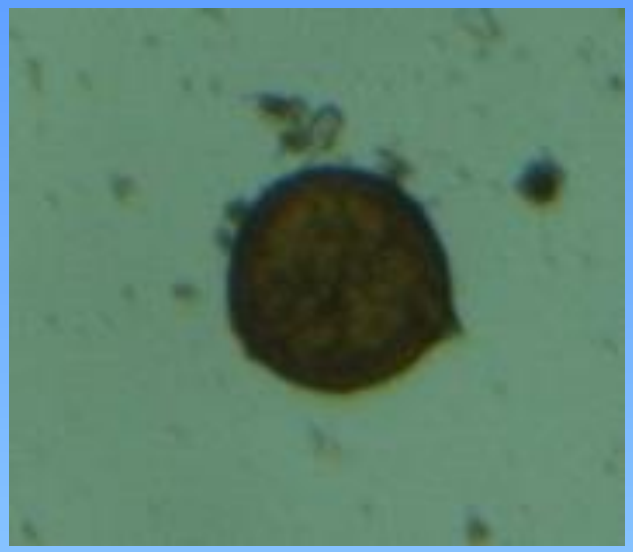
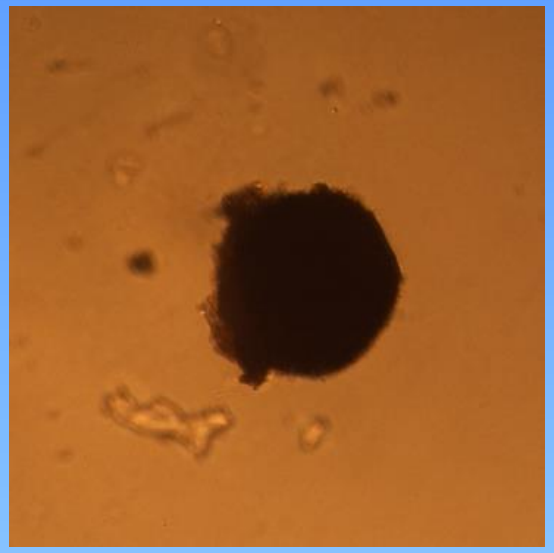
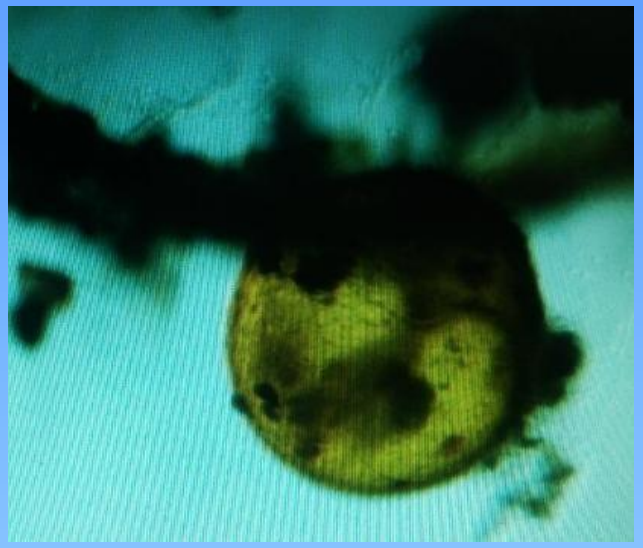


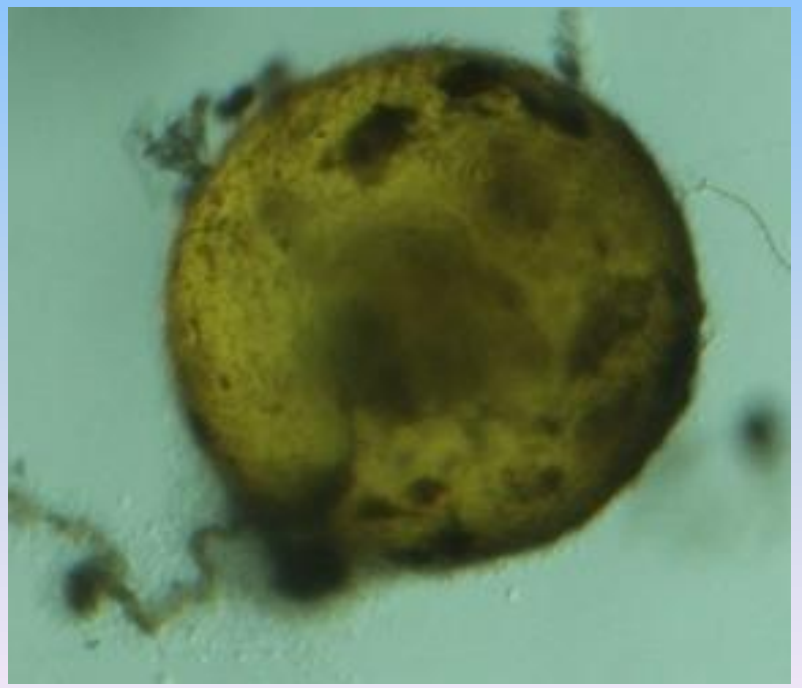
- **The result** : only one genus of mycoriza i.e. **Glomus** was found in the area of observation with average number of **15.3 spores**, while the the average of root infection was **96.67%**.
- **Observations of morphological and molecular** characters are still being done.
- **Identification process of spores required high accuracy** because the size of mychoriza spores at root of salak was very small.
- **Spores obtained from the field need to be reproduced** in the corn plants with zeolite media to obtain more spores and large enough size to be observed and analyzed.

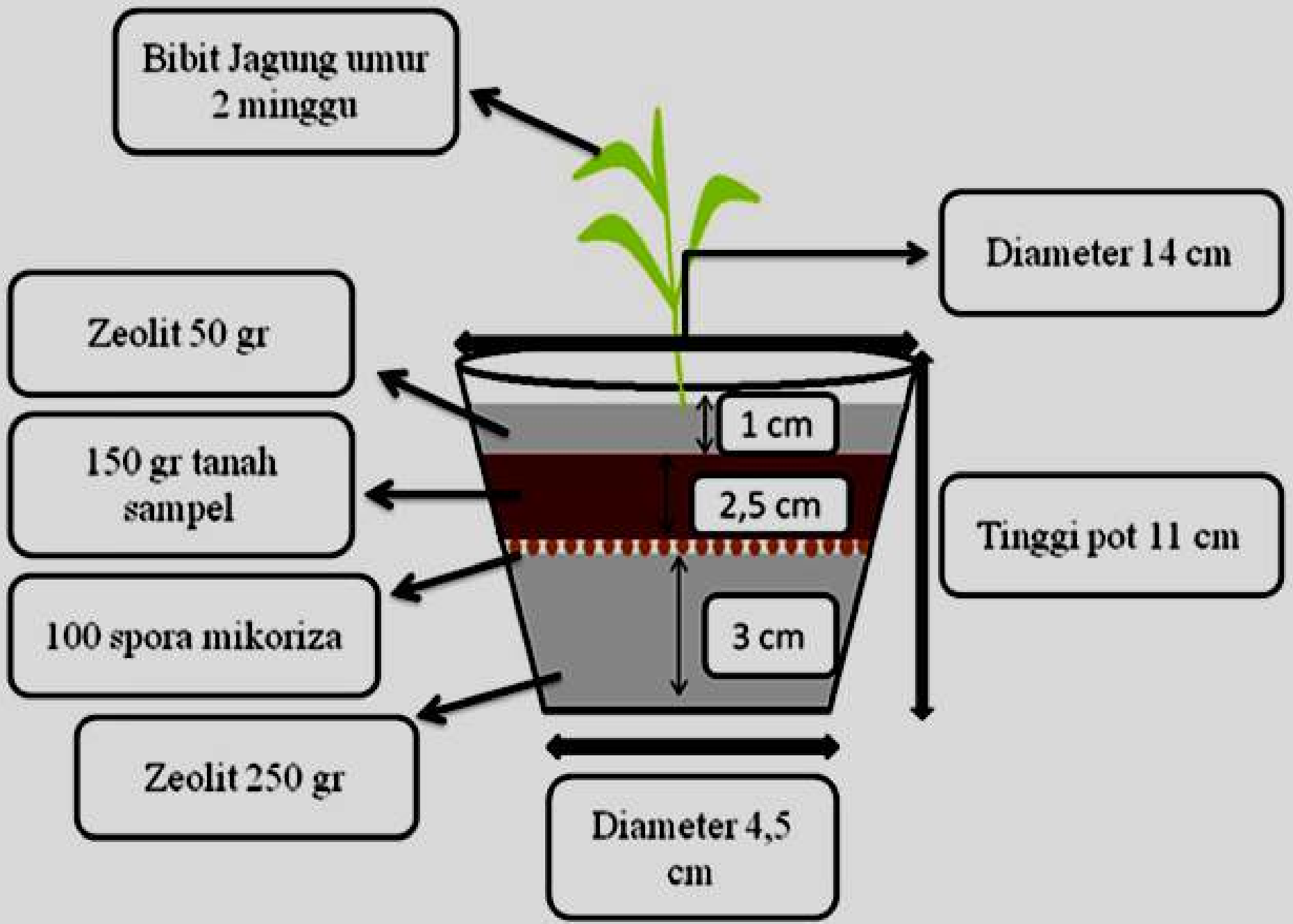






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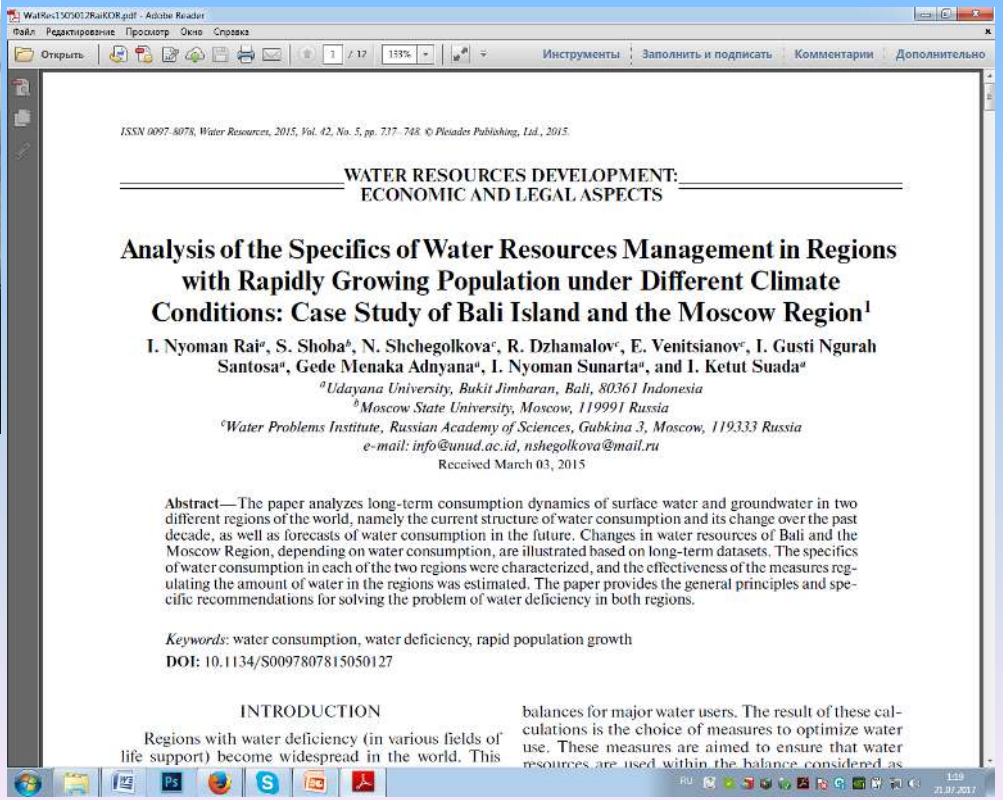
Diameter 14 cm
Zeolit 50 gr
1 cm
150 gr tanah sampel
2,5 cm
Tinggi pot 11 cm
100 spora mikoriza
3 cm
Zeolit 250 gr
Diameter 4,5 cm

Discussion of joint scientific and educational activities: meetings, skype meetings, correspondence

Skype lectures for students of Moscow State University and Udayana University “Water management”



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WATER RESOURCES DEVELOPMENT:
ECONOMIC AND LEGAL ASPECTS

Analysis of the Specifics of Water Resources Management in Regions with Rapidly Growing Population under Different Climate Conditions: Case Study of Bali Island and the Moscow Region[1]

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Received March 03, 2015

Abstract—The paper analyzes long-term consumption dynamics of surface water and groundwater in two different regions of the world, namely the current structure of water consumption and its change over the past decade, as well as forecasts of water consumption in the future. Changes in water resources of Bali and the Moscow Region, depending on water consumption, are illustrated based on long-term datasets. The specifics of water consumption in each of the two regions were characterized, and the effectiveness of the measures regulating the amount of water in the regions was estimated. The paper provides the general principles and specific recommendations for solving the problem of water deficiency in both regions.

Keywords: water consumption, water deficiency, rapid population growth

DOI: 10.1134/S0097807815050127

INTRODUCTION

Regions with water deficiency (in various fields of life support) become widespread in the world. This

balances for major water users. The result of these calculations is the choice of measures to optimize water use. These measures are aimed to ensure that water

Conducting joint experiments on the use of lignohumates in rice fields

EFFECT OF LIGNOHUMATE ON YIELD AND QUALITY OF RICE IN A PADDY FIELD IN BALI, INDONESIA

ВЛИЯНИЕ ГУМИНОВОГО ПРЕПАРАТА ЛИГНОГУМАТ НА УРОЖАЙНОСТЬ И КАЧЕСТВО ЗЕРНА РИСА В УСЛОВИЯХ ЗАТОПЛЯЕМОГО КУЛЬТИВИРОВАНИЯ НА О. БАЛИ, ИНДОНЕЗИЯ

Organic matter is needed in the soil as an essential component for good plant growth. While most of the paddy field in Bali is a shortage of organic matter so that the productivity of land for rice is very low. Therefore the effects of commercial humic product Lignohumate AM® (**LH**) on plant growth, yield, and grain quality were evaluated in a field trial using traditional wet rice (*Oryza sativa* L.) cultivation in Bali, Indonesia. The experimental design included insecticidal sprays with beta-cyfluthrinat 100, 50, and 0% of recommended application rates, either alone or in combination with LH. The LH was also applied for seed pre-treatment before sowing. For non-LH treatments, equal amounts of water were used. Plant growth variables and substances contents of the treated rice were recorded. The data were variant analysed according to a randomized complete design and the differences among treatments were compared by Duncan Multiple Range test at levels of 1% and 5%. No significant effects on plant height, number of tillers, leaf number, leaf area or rice yield were recorded. LH stimulated root growth at early stages of plant development, promoted chlorophyll synthesis in leaves, and increased 1000-grain weight and number of grains per hill. Due to the increased level of chlorophyll, LH application promoted an increase in carbohydrate levels and amylose content in rice. The experiment showed that when using LH, rice can be grown at significantly lower doses of pesticides than is currently used.

Key words: rice cultivation, humic product, grain quality

2.3.1. Chemical analysis of grain

Ash content was determined using thermogravimetric SNI 01-1891-1992. Total nitrogen was analyzed by modified of semi micro Kjeldahl AOAC 960.52; protein content was calculated from total nitrogen content with conversion rate of 6.25 [35].Lipids were analyzed by extraction series of diethyl ether, n-hexane, petroleum ether and benzene; the percentage of dry lipids was calculated after evaporation of extracts.Total carbohydrate percentage was determined by difference i.e. resulted from 100 subtracted by percentage of sample water content, ash, protein and lipid. Amylose was analyzed using colorimetric iodine assay index method.The amylose content calculated by adjusting absorbance (λ 625 nm of spectrophotometer) of sample to standard curve constructed using pure amylose [36, 37].

2.3.2. Statistics

The data were variant analyzed according to the randomized complete design using the Microsoft Excel software. When the difference between the treatments was significant, this difference was compared by Duncan Multiple Range Test on level of 1 and 5% [38].

Fig. 1. Seedling of 10 days after sowing on NLHT (left) and LHT (right). Seedlings with LHT looked more vigor than NLHT.

Table 3
Plant height, tiller number, and productive tiller number 3 weeks after transplanting

Treatments	Plant height (cm)	Total tiller hill^{-1} (No.)	Productive tillers hill^{-1} (No.)
A	60.8±0.2 a	27.4±0.4 a	16.6±2.3 a
B	59.3±1.1 a	25.0±0.9 a	17.4±2.2 a

2015-2016

A joint study on the reconstruction of a sewage treatment plant in Bali (Lagoon ITDC (Indonesia Tourism Development Corporation, Nusa Dua)

2015-2016

Carrying out of methodical researches on development of a technique of studying of bacterial communities of soils, rivers, lakes

Adaptation of biological water treatment for local environmental system:

Working meetings with farmers, with the staff of local television, with the staff of the Ministry of Environment

1/12/2015
Joint workshop on water treatment

Adaptation of biological water treatment for local environmental system