



ICSAE-7

**7th International Conference
on Sustainable Agriculture and Environment**

CONFERENCE GUIDE AND BOOK OF ABSTRACTS

**7th International
Conference
on Sustainable Agriculture
and Environment**

August 27, 2020
Surakarta - Indonesia

THE 7th INTERNATIONAL CONFERENCE ON SUSTAINABLE AGRICULTURE AND ENVIRONMENT (ICSAE-7)

Conference Guide and Book of Abstracts

SURAKARTA - INDONESIA

AUGUST 27, 2020

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Preface

Contemporary events shows us that we humans are very vulnerable to economic and environmental fluctuations. As humanity progress, produce and consume like it will exist until infinity. Sustainability has always been the case, is accepted as life guidance but until then we; researchers, companies and students should try to work on this concept so that next generation can benefit from our efforts.

Sustainable way of dealing with environment and agriculture is not easy. The benefits from sustainable agriculture vary and sustainable agriculture doesn't have harmful effects on environment or sources. In agricultural activities have been performed for chaining the environment or utilizations of environment as sources with maximum benefits. If we do not success that, it is impossible for us to talk about modern agriculture. Under poor management of agriculture, biodiversity and soil properties can be damage, contaminate and some problems limiting efficient agricultural activities may be occur.

The main objective of farming is to produce food for human being, but unfortunately some parts of the farmlands have used also as settlements areas. By this way, some natural resources have been deteriorated; consequently size of farmland has reduced day by day. In that regard, it is possible to say that we are in going in a circle. More than one-third of food supplies is as form of wastes due to the over buying than required amounts of food by costumers.

In the lights of the information mentioned above, there is no doubt that continues sustainable agricultural activities are practical solution to prevent the human being from the starvation. The International Conference on Sustainable Agriculture and Environment (ICSAE) series were aimed to provide a platform for researchers and academics as well as practicing professionals from all over the world, to present their research and professional development activities in agriculture, environment, food and other relevant subjects. This conference series was an effort to identify the ideas, practices and policies that constitute our concept of sustainable agriculture. The concept of sustainable agriculture itself is still evolving and thus, we published not as a definitive or final statement, but as an invitation to continue our dialogue. Moreover, as we experinced lately during COVID-19 pandemic situation, agriculture is a sector which stay struggle and can be souce of many materials for fight the diseases.

Now, I would like to thank whole people being at Scientific Board, Managerial Board, authors or participants by supporting their valuable works and particularly Prof. Ahmad Yunus from Universitas Sebelas Maret Indonesia and his team, for all their contributions on continuity of these conference series since it was held, for the 1st, at 2013 in Surakarta Indonesia, then move around the globe and at 7th ICSAE its back again in Surakarta. I do appreciate all the efforts given to prepare this event. This is the first digital conference of ICSAE series which could be reach wider and bigger participant around the world.

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Conference Guide

As informed, ICSAE-7 will be held by online due to current Covid-19 pandemic circumstances. Considering time constraints and to avoid various technical problems (such as lagging internet connection, different time zone, etc) during the conference, the conference is held by online.

There are two different sessions in this conference, namely paralel session and general assembly. The pararell session can be accessed through conference website (<https://icsae.id>), all the digital format of paper presentation (recorded video and poster) are listed and opened to all participants. The generall assembly, invited speakers talk, will be performed through live meeting. Both stages can be enjoyed by all participants which are listed and/or invited with the following time frame:

- 1. Parallel session in digital venue : August 25-27, 2020**
- 2. General assembly : August 27, 2020**

ICSAE-7th Stages

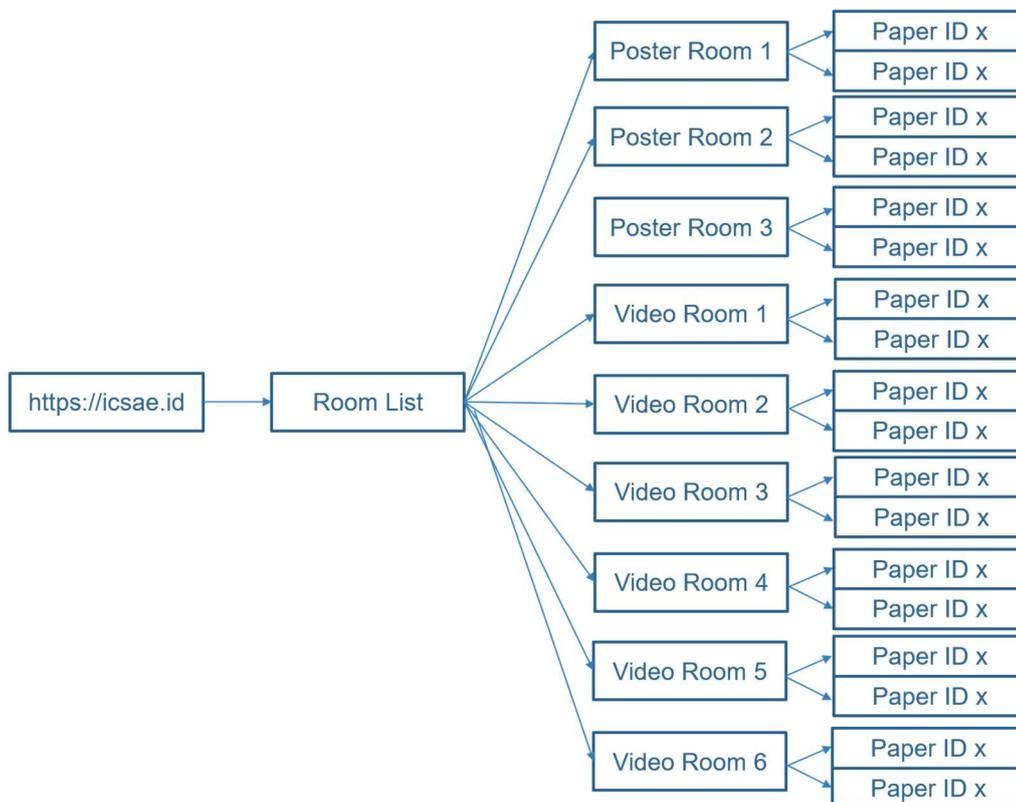


Parallel Session Guide

The following is the guide to access the digital venue for parallel session:

1. Please visit ICSAE-7 Website (<https://icsae.id>)
2. Click '**ICSAE Parallel Session**' button. You will be redirected to the room list, there are 3 poster rooms and 6 video rooms
3. Click on the presentation type and the preferred topic in specific room
4. Click the presentation title
5. The abstract, and presentation media can be viewed accordingly
6. Leave any comments in the form for Q & A, please write your name and email for further contact.
7. The presenter is able to reply every the comments.

Flowcart Parallel Session ICSAE-7



General Assembly Rundown

Time (GMT+7; AM)	Activities	Person in Charge
07.30-08.00	Registration and preparation	Committee
08.00-08.10	Opening	MC
08.10-08.25	Opening Remarks (Prof. Jamal Wiwoho)	UNS-Rector
08.25-08.30	Preparation for Session 1 (2 Invited Speakers) Announcements	MC
08.30-08.55	Invited Speaker 1 (USA - Prof. Henry Utomo)	Moderator
08.55-09.20	Invited Speaker 2 (UNS - Prof. Ahmad Yunus)	Moderator
09.20-09.30	Q n A	Moderator
09.30-09.35	Preparation for Session 2 (2 Invited Speakers) Announcements	MC
09.35-10.00	Invited Speaker 3 (USA - Prof. Taifo Mahmud)	Moderator
10.00-10.20	Invited Speaker 4 (UNS - dr. Betty Suryawati)	Moderator
10.20-10.30	Q n A	Moderator
10.30-10.35	Preparation for Session 3 (2 Invited Speakers) Announcements	MC
10.35-11.00	Invited Speaker 5 (Turkey - Dr. Mithat Direct)	Moderator
11.00-11.20	Invited Speaker 6 (UNRAM - Prof. M. Sarjan)	Moderator
11.20-11.30	Q n A	Moderator
11.30-11.45	Closing remarks	MC
11.45-11.55	Announcements	MC

Link for live meeting via Zoom will be distributed exclusively to the listed participants and/or listeners via e-mail, prior the General Assembly.

Poster Room 1

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Paper ID: 4

**STRATEGY FOR REDUCING ENVIRONMENTAL DISASTER
BASED ON SOCIAL CAPITAL (A CASE STUDY IN
INDONESIA)**

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Abstract

Social capital is the main resource in developing strategies to overcome natural disasters as well as to mobilize community participation in preserving environmental based-local wisdom. Social capital is the ability of individual and communities to represent their own resources and transgenerational solidarity driven by high trust and shared values to achieve goals through established social relations. This paper is intended to explore why the social capital are able to build communities' behavior that minimize the occurrence of environmental degradation. The study was conducted in Wonosobo Regency, Central Java Province. Historically, the region was the first place for bottled water production in Indonesia. However, the source of the spring water of the region remain sustainable up until now. The study's results show that the strength of social capital in local communities contributes to the effectiveness of building collective action for environmental conservation. The strength of social capital also accelerates capacity building and transformation process of local institutions in order to reduce environmental degradation. More specifically, social capital entities that play an important role are participation in a network, trust, reciprocity, solidarity, togetherness and mutual cooperation.

Keywords: *collective action, environmental, disaster, social capital, springs water*

Paper ID: 5

SEMAR SANDY-APP: IRRIGATION SYSTEM FOR SANDY SOIL BASED ON ANDROID APPLICATION

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Abstract

Indonesia's population increase leads to the increase in food needs. The increasing need for food requires national food security ensurement. However, in achieving food security, the country faces the problem of agricultural land diminishing. Consequently, we need suboptimal land use that can serve a solution for land depreciation. Sandy soil is one of the sub-optimal land that can be used for agricultural cultivation. Sandy soils have low water holding capacity, high infiltration and high run off. The low of water-holding capacity will impact in decrease of soil moisture. Whereas, soil moisture content is a very important factor in plant growth. Accordingly, we need an alternative solution to solve the problem. One of technology used in agriculture is an application developed irrigation system. The purpose of this research was to develop an effective irrigation system design for sandy soil. Semar Sandy-App is a monitoring system as well as a system that provides direct supply water in the plant root zone. The system uses subsurface irrigation through drip irrigation with perforated pipes then water comes out of the hole to wet the soil in plant root zone. This system can be a solution to optimize sandy soil through efficiency and effective in providing water to plants. In addition, the system can control and monitor the plant water requirements through the use of a microcontroler that is connected directly to the android system in smartphones. Through this system, which can be done by field testing in advance, it is expected to increase agricultural productivity so that it can support the availability of food for the community.

Keywords: *direct supply, irrigation system, sandy soil*

Paper ID: 6

ALTERNATIVE DEMAND FORECASTING METHODS FOR FMCG IN INDONESIA

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Abstract

Abstract– This study aims to obtain an accurate bread demand forecasting method in one of the major bread producers in Indonesia. Given the many types of bread sold, this study is limited to five categories of products. Using several time-series forecasting methods including moving average, exponential smoothing, multiple regression, ANN (Artificial Neural Network), and SVR (Supports Vector Regression) method. Forecasting bread demand using the best method, which is the method that produces the smallest error value. Forecasting error methods used are Mean Absolute Percentage Error (MAPE), Mean Absolute Deviation (MAD), and Mean Squared Error (MSE). This research empirically proves that store classification combined with seasonal factors such as weekends, public holidays, and pay periods has an influence on forecasting accuracy.

Keywords: *fmcg, bread, forecast, demand, data mining, time-series, multivariate*

Paper ID: 7

THE IMPORTANCE OF TROPICAL EDIBLE FRUIT PLANTS FOR TRIBAL COMMUNITIES IN EAST ACEH REGION, INDONESIA

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Abstract

The study investigated the diversity and use of tropical edible fruits consumed by tribal communities in East Aceh, Indonesia. The plant materials were randomly collected from four villages in two districts, while local knowledge was gathered through a survey and in-depth interviews. Data were collected by surveying 80 people, 20 from each of four study areas, simple random sampling selected for this study. A total of 15 tropical edible fruit plant species were found in the study area. The fruits are rich in macro and micro-nutrients. Besides being a source of food, they can also be used as remedies for various diseases. This plant has the potential to be used as a commercial crop to increase food shortages, tribal economy, and to regenerate degraded lands. In addition, this study could contribute to educating the younger generation on the importance of tropical wild edible fruit plants.

Keywords: *Tropical wild edible fruits, food, economics, traditional knowledge, Aceh*

Paper ID: 8

SEASONAL VARIATION IN HYBRID SEED ADOPTION: THE CASE OF CHILI IN INDONESIA

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Abstract

While seasonality in the consumer demand and producer supply of agricultural commodities is well understood, relatively little is known regarding seasonal variation in the adoption of farm technologies, such as hybrid seeds, whose effectiveness may vary across seasons. Hybrid seed adoption studies in developing countries tend to suffer from a problem of temporal aggregation where data is either (1) measured in a snapshot of time, in which case seasonal variation cannot be analysed, or; (2) aggregated over the course of a year or multiple years, where cyclical seasonal variation is washed out. This study will uncover the seasonal dynamics in hybrid seed demand by analysing the case of Chili in Indonesia, which is an important commodity that is produced all year long despite seasonal variation. However, there appear to be significant seasonal bottlenecks in input markets and identifying seasonal change in hybrid seed use by farmers will be critical for improving the functioning of the seed-system. In analysis, factor demand functions will be estimated using a unique dataset of 251 chili producers. The study will test for structural change in the demand for hybrid seeds going from dry season to wet season and identify season specific constraints to hybrid seed use. Results will inform the seed research program and seed value-chains on seasonal constraints or demand for seed attributes that are important for farmers. This can improve targeting of hybrid seed diffusion programs that tend to be uniform across seasons.

Keyword: *hybrid seed, adoption, season, chilli, Value Chain Analysis, Indonesia*

Paper ID: 9

THE EFFECT OF ROW PROPORTION OF MAIZE AND SOYBEAN INTERCROPPING ON GROWTH AND YIELD OF COMPONENT CROPS IN SANDY SOIL NORTH LOMBOK, INDONESIA

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Abstract

This study aimed to determine nutrient status, mycorrhiza population, and yields of maize-soybean strip intercropping in sandy soil environments of North Lombok, Indonesia as affected by different row proportions of maize and soybean. The experiment was conducted at Akar-Akar village in Bayan district of North Lombok Indonesia designed with Randomized Block Design with three blocks and five treatments i.e. P₁ (2 rows of maize + 2 rows of soybean), P₂ (3 rows of maize + 2 rows of soybean), P₃ (3 rows of maize + 3 rows of soybean), P₄ (4 rows of maize + 2 rows of soybean), P₅ (4 rows of maize + 3 rows of soybean). Variables observed were soil nutrient status (N-total and P availability), nutrient uptake (N and P), arbuscular mycorrhizal fungi (AMF) population (colonization and spore counts), vegetative growth (dry weight of root and shoots), and yield (dry cob and pods yield and weight of 1000 grains of maize and soybean). The results show that crops intercropping density of 3 rows of maize:3 rows of soybean maintains a high concentration of N contents in soil and maize until 92 DAS. Increase of one more row from 3 to 4 rows, significantly decreases the weight of maize cobs (3.5-folds), pods (2.3-folds), and 1000 seeds (1-folds). The addition of one row of maize plant density which was originally 3 rows to 4 rows causes a decrease in the weight of dry root biomass and canopy of maize and soybean plants. The root weight and dried shoots of maize fell to 3.5 and 4.5 times and the weight of dried roots of soybeans fell to 1.41 times at the age of 92 days after observing the 4:3 ratio of maize and soybean plants. the results showed that intercropping patterns of 3 rows of maize and 3 rows of soybean (P₃) with the addition of 15 tons of cattle manure per hectare and AMF inoculation can increase soil nutrient status of N and, P, plant nutrient sorption (N and P), mycorrhizal development, and yield.

Keywords: *Arbuscular mycorrhizal fungi (AMF); cattle manure; maize-soybean intercropping; sandy soil*

Paper ID: 11

MUNG BEAN COVER CROP IMPROVED SOIL ORGANIC CARBON AND MAIZE YIELD IN A SEMI-ARID AREA

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Abstract

Cover crops have been part of sustainable agriculture movements. The potential use of mung bean (*Vigna radiata* L. Wilzeck) as a cover crop and its effect on soil organic carbon and maize yield were explored in this study. Six cover crop treatments; 250,000 plants/ha desiccated at 28 days after sowing (DAS), 250,000 plants/ha desiccated at 35 DAS, 375,000 plants/ha desiccated at 28 DAS, 375,000 plants/ha desiccated at 35 DAS, 500,000 plants/ha desiccated at 28 DAS, 500,000 plants/ha desiccated at 35 DAS and one control treatment (without cover crop), were tested in a semi-arid area of North Lombok, West Nusa Tenggara. Maize seeds at a population density of 98,000 plants/ha were planted two weeks following the desiccation times. The treatments were arranged in a Randomized Block Design with three replications. The results revealed that the higher cover crop population density coupled with the later desiccation time, the higher the above ground biomass produced, being the highest at 8.3 Mg/ha and the lowest at 2.6 Mg/ha. The highest cover crop biomass improved soil organic carbon content by 60%, nitrogen, phosphorous and potash concentrations in maize plants tissue by 54%, 54% and 63%, respectively at tasseling, compared to those plants in the control treatment. Maize yield increased by 24%, being 7.24 ton/ha at the control treatment and 8.95 ton/ha at the highest cover crop population density desiccated at 35 DAS. The use of mung bean as a cover crop sounds promising and further studies are needed to explore more of its potential benefits.

Keywords: *biomass, canopy, density, desiccation, sustainable agriculture, tasseling*

Paper ID: 12

THE GROWTH CURVE OF GOMPERTZ AND LOGISTIC MODELS IN BODY WEIGHT OF ECOTYPE FULANI CHICKENS (GALLUS DOMESTICUS)

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Abstract

The growth curve in livestock animals are important to evaluate the management system and selection program. This research was carried out to estimate the growth curve of body weight in Ecotype Fulani (EF) chickens. Two growth curves of Logistic (L) and Gompertz (G) models were performed in this study. Total of 211 birds were used in this study for growth curve analysis. Research showed that the coefficient of determination (R^2) in both curves were similar (0.99). Hence, the standard error (SE) in G model was lower than L model in each sex group. The adult weight (A) in birds were 1575.96 g (male) or 1411.69 g (female) in L model and 2386.63 g (male) or 2250.30 g (female) in G model. The inflection weight (W_i) in bird was 787.98 g (male) or 705.85 g (female) in L model and 877.44 g (male) or 827.32 g (female) in G model. The inflection time (t_i) in birds were 13.58 week (male) or 15.58 week (female) L model and 18.57 week (male) or 13.89 week (female) in G model. Thus, the maximum growth rate (MGR) in birds were 78.80 g/wk (male) or 63.53 g/wk (female) in L model and 61.42 g/wk (male) or 74.46 g/wk (female) in G mode. It was concluded that the growth curve of G model was accurate to predict the body weight of EF chickens from hatching to adult age.

Keywords: *Body weight, EF chicken, growth curve model, inflection*

Paper ID: 13

IN VITRO FIBROBLAST CELLS CULTURE FROM PELUNG CHICKEN EMBRYO AND ITS POTENTIAL APPLICATION

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Abstract

The availability of in vitro cell culture derived from local species provides opportunity for tackling problems related to preservation of its genetic materials and can potentially be applied for downstream in vitro-based studies. Here, we established primary fibroblast cell culture from Indonesian local chicken, Pelung chicken, then explored its growth characteristic and potential uses for wound healing assay and cytotoxicity tests of medicinal bioactive compounds. Fibroblast cells were isolated from embryonic skin tissue using explant technique. Cells were maintained in DMEM-FBS media at 37° C. In vitro wound healing assay was performed by creating a "scratch" in a cell monolayer, followed by capturing the images of migrating cells at regular intervals. Cell viability was measured using trypan blue dye exclusion assay in various doses of extracts of *Centella asiatica* leaves. Cells outgrowth from the skin explant revealed typical morphology of fibroblast-like cells, showing spindle shaped cells forming monolayer which firmly adhered to the substrate. Early passage of Pelung fibroblast cells reached maximum growth at 7.95×10^4 cells/cm² after 5 days with population doubling time (PDT) of 184 h. With continuous passage, population of the cells became more homogeneous and PDT was higher. In the wound healing assay, Pelung fibroblast cells migrated towards the wound area and after 24 hours closing the whole area, suggesting their ability to normally respond mechanical stimuli. In the cytotoxicity test, the viability of the cells corresponded in a dose-dependent manner with the amount of *Centella asiatica* extract tested into the culture.

Keywords: *pelung chicken, cell culture, fibroblasts, wound healing assay, Centella asiatica.*

Paper ID: 14

NUTRITION OF LOCAL WILD EDIBLE FERN (*DIPLAZIUM ESCULENTUM*) LEAVES

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Abstract

Vegetable fern species distributed throughout the world are diverse, but there is a lack of scientific data about the nutritional content of local vegetable ferns. This study aimed to provide preliminary data of *Diplazium esculentum* nutrition obtained from Bone Bolango District, Gorontalo area, Indonesia, in order to support the developing of pharmaceutical and mixed animal feed products. Tests for the proximate characteristics of leaf extracts and the phytochemical analysis were carried out through qualitative screening following Indonesian National Standard (SNI) Method year 2006, while the detail amino acid compound analyzed using Gas Chromatography Mass Spectrometry (GCMS) method. The results showed that *D. esculentum* from Gorontalo Land is rich with proteins and amino acids. The amount of protein and fat is detected as $21.52 \pm 2.70\%$ and $2.47 \pm 0.97\%$ respectively. The fern also contains complete secondary metabolites in the form of alkaloids, saponins, tannins, phenolics, flavonoids, triterpenoids, steroids, and glycosides with a high amount.

Keywords: *amino acids, Diplazium esculentum, edible fern, phytochemical test, tropical fern.*

Paper ID: 16

MANAGING ECOTOURISM IN GENILANGIT BASED ON A STIMULUS OF RELIGIOUS ECOLOGY IN ORDER TO ADAPT TO CLIMATE CHANGE

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Abstract

Climate change has created a sense of global kinship and increased levels of religiosity. People have an obligation to manage natural and environmental resources by adapting to climate change. Environmental management is essentially based on two factors, namely reducing environmental risk and increasing environmental benefit. This article describes the sustainability of ecotourism developments, the development of ecotourism in Genilangit based on participation, the management of ecotourism in Genilangit based on a stimulus of religious ecology, and the strategies of the mountainside community for adapting to climate change. The research uses a qualitative method with a case study, which aims to gain a deep understanding of the attitudes and behaviour of the community with regard to religious ecology in developing ecotourism sector as an adaptation strategy to climate change. The results of the research show that ecotourism in Genilangit is "Green and Fair" in its concern for sustainable development and conservation, in aspects of economic sustainability, social sustainability, and environmental sustainability. Ecotourism in Genilangit is community based, and the principle of religious ecology is always implemented as the basis for managing ecotourism which is adaptive to climate change. The success of the Genilangit community in adapting to climate change is due to their social and cultural adaptations which are implemented within a framework of religious ecology.

Keywords: *climate change, religious ecology, sustainable development*

Paper ID: 19

EVALUATION OF DIETARY BETA-AGONIST ON PRODUCTION PERFORMANCE AND CARCASS OF BEEF CATTLE: A META-ANALYSIS

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Abstract

Beta-agonist has been used in feedlot in order to improve production performance of beef cattle. Despite its common use, to date there is lack of study to quantitatively summarize the effect of beta-agonist across different studies. This study therefore aimed to evaluate the use of beta-agonist on beef cattle by integrating data from various experiments and analyzing the data by a meta-analysis method. A total of 42 articles were used to build a database in which the articles reported dietary addition of beta-agonist on performance and carcass of beef cattle. Treatments were grouped into control (without beta-agonist) and with beta-agonist addition. The treatments were considered as fixed effects whereas different experiments were considered as random effects. Model statistics used was P-value in order to distinguish between the two groups, and the P-value less than 0.05 was considered to be significant. Results showed that dietary beta-agonist addition increased average daily gain and gain to feed ratio of beef cattle ($P<0.05$). Beta-agonist elevated hot carcass weight and carcass percentage ($P<0.05$), but had no effect on fat thickness. Longissimus muscle area increased ($P<0.05$) while marbling score decreased ($P<0.05$) due to the addition of beta-agonist. The additive positively influenced Warner-Bratzler shear force of carcass ($P<0.05$) but had no effect on its pH value. In conclusion, beta-agonist favorably affects production performance and carcass property of beef cattle.

Keywords: *adrenergic, agonist, feed additive, ruminant, performance*

Paper ID: 20

MODELLING FEED ENERGY AND PROTEIN VALUES FOR RUMINANTS

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Abstract

Current feed energy and protein values in Indonesia is based on total digestible nutrient (TDN) and crude protein (CP), respectively. This system is rather old and other countries have moved towards a new system, in which feed energy and protein are represented by metabolizable energy (ME) and metabolizable protein (MP), respectively. This study aimed to perform an empirical modelling to estimate feed ME and MP contents by their chemical composition. A total of 134 feeds from various categories (dry forage, fresh forage, silage, concentrate rich in energy, concentrate rich in protein and by-product) were integrated into a database. Values of TDN and CP were regressed against ME and MP, respectively. The value of ME was predicted from neutral detergent fiber (NDF), non-fiber carbohydrate (NFC), ether extract (EE) and CP whereas MP was predicted from rumen degradable protein (RDP) and rumen undegradable protein (RUP). The RDP to RUP ratio was regressed to MP in order to obtain optimum value of the ratio. Results showed that TDN and CP could predict quite accurately ME and MP by explaining 78.2% and 92.7% of their total variations, respectively. The ME was accurately predicted by NFC, NDF, EE and CP, whereas MP was accurately predicted by RDP and RUP. Lower RDP/RUP led to a higher MP percentage to CP. It can be concluded that TDN, CP and other feed chemical constituents could predict quite accurately ME and MP. This indicates that the old system is still valid to be used for formulating ruminant diets.

Keywords: *feed, energy, protein, rumen, ruminant*

Paper ID: 21

COMBINATION OF MS MEDIA AND GANDASIL D AGAINST GROWTH *IN VITRO* BANANA SHOOTS

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Abstract

Cavendish banana is one type of banana that has a high economic value, especially for food export commodities. High export opportunities need to be balanced with increased productivity by selecting superior seedlings through *in vitro* seed propagation. The tissue fruitfulness depends on the media used. The study was conducted at the Biotechnology Laboratory of Agriculture Faculty UNS in May to December 2019. Cavendish banana explant which obtained from KBH in Salaman, Magelang. The media used substitution between MS media and Gandasil D leaf fertilizer with different concentrations. The researcher also used a completely randomized design (CRD) of one factor with five treatment combinations and six repetition. The treatment used is G1 = MS 100% as a control; G2 = 75% MS + 25% Gandasil D; G3 = G3 = 50% MS + 50% Gandasil D; G4 = 25% MS + 75% Gandasil D; and G5 = 100% D. the variables observed include time of buds, number of shoots, plantlet height, time of leaves, number of leaves, time of roots, number of roots, and root length. The data analysis used is the physical analysis method based on the F test of 5% level. The results of the research showed that 100% Gandasil D and 25% MS + 75% Gandasil D treatment had the highest influence on the number of leaves, number of shoots, plant height, and number of roots. The mixture of MS media and leaf fertilizer can be used as an alternative medium for multiplication of Cavendish bananas.

Keywords: *In vitro*, media, banana, Gandasil D.

Paper ID: 22

**THE EFFECT OF MURASHIGE AND SKOOG (MS) AND
GROWMORE FERTILIZER MEDIA COMPOSITION ON
GROWTH OF AMBON BANANA PLANTS *IN VITRO***

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Abstract

Efforts to propagate banana seeds with good quality on a large scale can be pursued through tissue culture techniques. In tissue culture often uses Murashige and Skoog (MS) media but these media are difficult to obtain. Growmore is a leaf fertilizer that has the potential to replace MS media because it has a complete nutrient content. This study aims to obtain the most effective composition of MS media and growmore fertilizer for the growth of ambon banana shoots *in vitro*. The study was conducted at the Plant Physiology and Biotechnology Laboratory, Sebelas Maret University using a completely randomized design pattern (CRD) with a single factor divided into 5 levels with 6 replications. Variables observed include the time of buds, number of shoots, plant height, time of leaves, number of leaves, time of roots, number of roots, root length. The results showed the composition of 25% MS + 75% Growmore gave the highest results on the number of shoots, the composition of 50% MS + 50% gave the best results on plantlet height, number of leaves, and number of roots.

Keywords: *Composition, MS, Growmore, Ambon Banana*

Paper ID: 23

SELECTION OF M3 GENOTYPE SHORT STEM RESULTS OF IRRAY GAMMA 250 GRAY IN MENTIK WANGI RICE

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Abstract

Mentik Wangi rice has the potential to be developed because Wangi Mentik rice has several advantages namely high prices because it is favored by the community because it has a fragrant odor and when cooked has a fluffier texture and is white. This study aims to determine the performance of the M3 generation mutant rice and select the M3 generation mutant plants as a result of 250 gray gamma irradiation which has short stems with high productivity. This research was conducted in November 2018 - April 2019 in the experimental field of the Faculty of Agriculture, Sebelas Maret University, located in Palur Village, Mojolaban District, Sukoharjo Regency. The research was carried out by planting 70 M2 lines of 250 gray gamma irradiation and control plants. The observations of the variables in this study were plant height, total number of tillers, number of productive tillers, flowering age, harvest age, panicle length, number of seeds per panicle, panicle bush thickness index, weight of 100 seeds, weight of seeds per clump. Observation data were analyzed descriptively and t test was used to determine the difference of M3 generation of fragrant mentik rice from 250 gray gamma irradiation with control plants (without irradiation). There are 24 individual selected lines of M3 generation of fragrant Mentik Wangi mutants from 250 Gy gamma ray radiation which have a short stem character and have higher productivity than control plants (without radiation).

Keywords: *Wangi Mentik Rice, Gamma 200 Gray Irradiation, Scientific Journal Mutation*

Paper ID: 24

RICE STRAIN SELECTION FOR MENTIK WANGI VARIETY M3 GENERATION RESULTING FROM 200 GRAY GAMMA IRRADIATION

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Abstract

Mentik Wangi rice is a local variety that is quite popular with the people of Magelang. Mentik Wangi rice has a distinctive aroma and has a fluffier texture. The disadvantage of Wangi Mentik rice is the potential for lower production and also relatively high crops. There is an effort done to overcome that problem were planted mutation through the utilization of gamma-ray irradiation. The aim of this research is to select M3 generation mutant rice resulting from 200 Gray gamma-ray irradiation which has a short stem and has higher productivity and preparation of the performance of M3 generation mutant rice resulting from 200 Gray gamma-ray irradiation. The observational data were analyzed descriptively and compared the performance of the Mentik Wangi M3 rice plants as a result of 200 gray gamma-ray irradiation with control plants (without irradiation) through T-test analysis. The results showed that the performance of the M3 generation of Mentik Wangi rice was better than control plants, there were several strains with potential mutants traits based on the positive character of each individual. The M3-200-G147-10 strain with an irradiated dose of 200 grays has the shortest plant height of 96 cm. The M3-200-G29-11 strain, with an irradiated dose of 200 grays has the highest productive tiller of 22.80 stems. The M3-200-G147-4 has the highest panicle thickness index of 6,65 and The M3-200-G147-2 strain has the highest seed yield per plant of 50,52 gram.

Keywords: *Mentik Wangi Rice, Gamma Ray Irradiation 200 Gray, Mutation.*

Paper ID: 25

APPLICATIONS OF BIO-LIQUID ORGANIC FERTILIZER (BIO-LOF) TO INCREASE THE GROWTH AND PRODUCTION OF CORN (ZEA MAYS (L))

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Abstract

Based on data from the Directorate General of Food Crops of the Ministry of Agriculture in 2020 predicted corn of Indonesia has a surplus where the average corn demand is 1.5 million tons/month while the average corn production is 1.65 million tons/month. To face global competition, Indonesia must be able to increase the competitiveness of agricultural products by reducing production costs, increasing quality and productivity and developing environmentally friendly technologies such as the application of liquid organic fertilizer combined with biological fertilizers (BIO-LOF) which can be functioned as organic fertilizers and biological fertilizers. Liquid Organic Fertilizer is produced using cow urine ingredients, Gliricedia and titonia leaves and coconut coir. While the biological fertilizer added is a consortium of bacteria *Serratia marcescens*, *Pseudomonas fluorescens* and *Bacillus thuringiensis*. The research aims to find out the BIO-LOF application technique to increase corn growth and production. The design used is factorial randomized block design (RBD) with 3 replications, where the P Factor (Bio-LOF concentration) with 4 levels, namely P1 = without Bio-LOF, P2 = 25% concentration, P3 = concentration of 50%, and P4 = concentration of 75% . Factor W (application time) with 3 levels, namely W1 = treatment of seeds + when planting + age 3 weeks + age 6 weeks, W2 = treatment of seeds + every week, W3 = treatment of seeds + every 2 weeks, so that it is obtained 36 trial plots. The best BIO-LOF application is 50% concentration can increase the number of leaves and increase corn production by 42.2% compared without BIO-LOF application. The best application time is that the seed treatment is repeated at planting time and weeding 1 and weeding 2.

Keywords: *Bio-Liquid Organic Fertilizer (BIO-LOF)*, *Serratia marcescens*, *Pseudomonas fluorescens*, *Serratia marcescens*, *Pseudomonas fluorescens*, corn.

Paper ID: 26

ECONOMIC ANALYSIS OF SWEET POTATO FARMING (*IPOMOEA BATATA L.*) IN LAMONGAN DISTRICT

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Abstract

Sweet Potatoes have the potential to be developed for food consumption diversification programs based for a local resource, sources of carbohydrates, various nutrients, the risk of failure is relatively small, low production costs, the results of processing are very diverse, as providers of food, industrial raw materials, and animal feed. The research objective was to analyze economically, socially, and culturally sweet potato farming. The study was conducted in Lamongan, East Java. The sampling method was carried out by a purposive method in Kalitengah and Kedungpring, in 5 sweet potato center villages, with 348 respondent farmers. Data analysis used Revenue Cost (R/C) Ratio, Break Event Point (BEP), and descriptive analysis. The R/C ratio of cash costs and total costs were 2.94 and 1.89, respectively, so sweet potato farming is profitable and feasible to be developed. The price BEP and production BEP were Rp 1,210 and 2,543 kg, respectively. The age of farmers over 50 years was 80.17%, while the education of farmer did not graduate/graduated from elementary school were 80.46%. The experience of sweet potato farmers over 20 years was 67.53% while the number of dependents of farm families between 4-6 people was 60.92%. The use of small sweet potato tubers was used as a fish feed by 19.54%. Sweet potato stems and leaves were used as animal feed for goats as much as 51.72% of farmers, while 100% of farmers stated that planting sweet potatoes was a hereditary culture, and 81.90% of farmers consuming sweet potatoes were not a culture.

Keywords: *Sweet potato farming, economic analysis, R/C ratio, BEP.*

Paper ID: 27

GROWTH AND YIELD OF SWEET CORN (*ZEA MAYS L. SACCHARATA*) AS AFFECTED BY INCUBATION TIME OF PREPARATION FOR TITHONIA (*TITHONIA DIVERSIFOLIA*) ENRICHED LIQUID ORGANIC FERTILIZER

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Abstract

The use of organic fertilizers could be an alternative for synthetic fertilizer because of its high price and limited availability. Organic fertilizer is commonly found in the form of solid or liquid organic fertilizer (LOF). Tithonia (*Tithonia diversifolia*), a broadleaf weed containing high N, P, and K, is often used to enrich LOF. However, the quality of LOF is highly dependent on the incubation time. This study aimed to examine the influence of LOF incubation time on sweet corn plant growth and yield. This experiment was conducted at the Experiment Station, Faculty of Agriculture, University of Bengkulu, from August to December 2019. The experiment used a completely randomized design (CRD), with five treatments and five replications. The treatments were LOF prepared for four, five, six, and seven weeks of incubation. No LOF was allocated as control. The result showed that the incubation time for LOF preparation had no significant effect on plant height, the number of leaves, stem diameter, ear weight, and ear length of sweet corn. It is suggested that the preparation of Tithonia enriched LOF be incubated for four weeks.

Keywords: *liquid organic fertilizer, time of incubation, Tithonia diversifolia, sweet corn*

Paper ID: 28

OPTIMIZATION OF CROP-LIVESTOCK INTEGRATION BETWEEN PADDY AND BEEF CATTLE TO ACHIEVE INPUT EFFICIENCY

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Abstract

This research aims to investigate profiles resource farmers who have for implementing the integration of farming the crop-livestock and analyze the right resources allocation applied to farmers to obtain the optimal revenue. The research was implemented at the Mojogedang Subdistrict, Karanganyar Regency. Design research using the survey method. In purposive sampling method sampling by the number of 35 respondents who are members of the beef cattle farmers group. Data analysis is a descriptive analysis, analysis of cost and income of farming-livestock, as well as data analysis Linear Programming (LP). The results show that the value of total receipts that exceed the total costs ($TR > TC$) and effort assessed beneficial because R/C ratio > 1 . Based on the results of the analysis note that R/C Ratio of the beef cattle business and farming paddy business was 1.08 and 1,36. The results of optimizing the use of labor resources at a surplus value of 6.34 means that labor resources at the respondent farmer level have excessive status and have not been fully utilized. Conclusion on the research is the integration between paddy and beef cattle can be applied in the subdistrict of Ngargoyoso.

Keywords: *optimization, rop-livestock integration, paddy, beef cattle*

Paper ID: 30

METHIONINE SUPPLEMENTATION TO QUAILS DIET IMPROVES EGG WEIGHT CONSISTENCY

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Abstract

Methionine is an essential amino acid which plays important roles in metabolism. Methionine sufficiency is expressed in the animals' performance. This research aimed to study the effect of methionine supplementation on the consistency of quails' egg weight. There were three treatments groups with five replicates of 15 birds each as follows: D0 (control), D1 (control + 0.06% methionine) and D2 (control + 0.12% methionine). The egg weight data were collected for two periods of 28 days (2 × 28 days) started from when the egg productions reached 50% (63 days of age). The D1 and D2 yielded heavier egg than D0 ($P < 0.01$). The data were split and averaged into eight weeks and were divided into two subsets: the consistency of the first period (1st-4th weeks) and second period (5th-8th weeks). Intraclass correlation was used as the measure of egg weight consistency. Result showed that intraclass correlation of D0, D1 and D2 in the first period were 0.29, 0.79 and 0.63 respectively; whereas in the second period were -0.11, 0.54 and 0.08 respectively. Intraclass correlation of D1 and D2 were higher than D0. Finally, methionine supplementation in the diet consistently increases egg weight.

Keywords: quail, methionine, intraclass correlation, repeatability.

Paper ID: 31

EFFICACY AND SAFETY IN CONSUMING PYTHON BILE : A LITERATURE STUDY

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Abstract

Consumption of animal bile including snakes for treatment has been done since centuries and still survive today. In Indonesia, python snake bile is quite popular to cure various diseases. However, there is not much scientific evidence that can be used as a basis for the use in the current modern era. This research is a literature study to determine the efficacy and safety of python bile consumption. Literature search was conducted in June 2020 through the Google search engine, Google Scholar and PubMed. Keywords: python, bile, python, snake and additional words related to the efficacy, safety, taxonomy, content of active substances. The results are python bile has the main content of bile acids Tauropythocholate (TPC), Taurocholate (TC), Taurodeoxycholate (TDC). Deoxycholic acid shows anti-inflammatory activity in vitro, while cholic and deoxycholic bile salts could kill *Staphylococcus aureus* bacteria in vitro. Other compounds are protein and antioxidants. Consumption of python bile can provide benefits like bile function itself, namely elimination of toxins, increase the absorption of fat-soluble vitamins and cholesterol. However, Python bile can be a source of transmission of several bacteria and parasites. Consumption with high doses (> 2 biles) and routine for a long time can cause damage to liver and kidney. Python bile has the potential for efficacy in accordance with its empirical claims, but it must still be strengthened with experimental evidence. From the safety side, the consumption of healthy snake bile, in accordance with the dosage and not often is quite safe.

Keywords : *bile, python, safety, efficacy, snake*

Paper ID: 32

SELECTION OF MUTANT SHORT STEM M5 FROM 200 GRAY GAMMA RAY IRRADIATION ON MENTIK SUSU RICE

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Abstract

Mentik susu rice is a local rice variety from Magelang, Central Java has an advantage but it is not interesting to farmers because of it's high stem, long life and low yield. One method of using physical mutagen isi gamma ray radiation. The purpose of this research are observing the performance of mutated M5 generation of mentik susu rice which already irradiated with 200 Gy gamma ray and selecting the short-stemmed ones which have high productivity. The research was conducted on Palur Village, sub-district of Mojolaban, Sukoharjo Regency. The experiment was done by planting 35 individual M5 and control seeds, by using simple design experiment. The variables observed were plant height, total number of tillers, number of productive tillers, age of flowering and harvesting, panicle length, number of seeds per panicle, panicle intensity index, weight of 100 seeds, seed yield per plant. Data from the observations were analyzed descriptively and compared the performance of mentik susu rice M5 with control via T test analysis. The results showed that there was a difference in the performance of the M5 mutants of mentik susu rice as a result of 200 Gy gamma ray irradiation compared to control mentik susu rice. There are 22 selected mutant plant individuals in the M-MS2-G15T3-5-2 (18,25,16,8) lines; M-MS2-G15T3-4-15 (10) lines; M-MS2-G15T3-2-5 (56, 18, 9) lines; M-MS2-G18T7-4-4 (11) lines; M-MS2-G18T7-4-(15, 13, 18) lines; M-MS2-G17T17-13-9 (23, 21, 29) lines; M-MS2-G18T7-4-9 (17 dan 12) lines; M-MS2-G15T3-2-18 (35) lines; M-MS2-G15T3-2-14 (28, 61, 36) lines; and M-MS2-G18T3-6-13 (35) lines.

Keywords : 200 gray Gamma irradiation, Mutation, Mentik Susu rice, Selection

Paper ID: 33

ESTIMATION OF ABOVEGROUND BIOMASS AND CARBON STOCK IN A PINE-MAHOGANY MIXTURE STANDS AT KHDTK GUNUNG BROMO, KARANGANYAR

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Abstract

Forest plays an important role on reducing the impact of global warming as carbon sink. Forest has an ability to absorb carbon on large scale and store it as biomass. This research was aimed to determine the potential of aboveground biomass and carbon stock in pine-mahogany mixture stands in KHDTK Gunung Bromo. The systematic sampling with random start was used to determine the plot, and the distance between plots were 100 m. In total, there were 35 square plots, 20 × 20 m in size, that had been set up under the pine-mahogany mixture stands. This research was conducted by using non-destructive sampling method by measuring the tree diameter at breast height. The diameter ranges of pine and mahogany were 10-70 cm. Tree biomass was estimated by allometric equations. The result showed that biomass and carbon stock in pine stands were 113.84 ton/ha and 53.50 ton C/ha while for mahogany stands were 32.06 ton/ha and 15.07 ton C/ha. Thus, the total biomass and carbon stock in pine-mahogany mixture stands were 45.90 ton/ha and 68.57 ton C/ha.

Keywords: *global warming, pine, mahogany, biomass, carbon stock*

Paper ID: 34

INTEGRATED CROP-LIVESTOCK MANAGEMENT SYSTEM IN RAINFED LOWLAND

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Abstract

Rainfed lowland rice is the second largest rice growing areas in Indonesia. One of the most vulnerable agro-ecosystems to the climate change is the rainfed lowland because of the erratic, unpredictable rainfall and most of them have very limited access on water resources. The aim of this study was to observe the integrated crop-livestock management system (ICLS) in rainfed areas to support small scale farmers to improve their livelihood by maximizing all resources for environmental sustainability and better production. The study was conducted at the farmer's field in Jaken, Pati, Central Java, Indonesia during wet season. The result showed that ICLS in rainfed lowland areas could (1) reduced greenhouse gas (GHG) emission from paddy rice by implementing integrated crop (paddy rice) management technique (ICM), (2) avoided CH₄ release from manure of livestock using anaerobic digester to the atmosphere and used the CH₄ production for energy purpose, (3) improved the soil fertility by giving additional composted farmyard manure to the soil, and (4) enhanced the economic benefit for farmers. ICLS approach is one of the options where adaptation and mitigation technology could be conducted in a synergistic way.

Keywords: *Adaptation, greenhouse gas emission, livestock, mitigation, paddy rice*

Paper ID: 36

INSTITUTIONAL STRENGTHENING MODEL SAMIRAN BOYOLALI TOURISM VILLAGE (DEWI SAMBI) CENTRAL JAVA, INDONESIA

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Abstract

The development of tourism villages is an important issue in contributing income of developing countries like in Indonesia. One of the tourist villages that participated in Boyolali Regency is Samiran Boyolali Tourism Village (Dewi Sambu). Rural participants is the main point of sustainability Dewi Sambu, that focused to empower Samiran's villagers. The method used in this research is qualitative which leads to the constructivist paradigm. This research uses a case study that investigates institutions in line with the development of a tourism village. This research to identify a partnership model of Dewi Sambu and develop an institutional strengthening model Dewi Sambu as a village tour. This research took place in the Samiran village. Data obtained directly from relevant informants, they are the Samiran's village head, village head of tourism, local leaders, and members of the tourism village. The object researched about natural and human resources, history, and regional potential. The results of this study indicate the research conducted by Dewi Sambu has 4 interaction patterns: Government interaction with Dewi Sambu, Ministry interaction with Dewi Sambu, manager interaction with Dewi Sambu, and members with Dewi Sambu. The institutional strengthening model for the sustainability of Dewi Sambu as village tourism is a synergy of strengths internally (managers and members) and externally (bureaucracy) Dewi Sambu.

Keywords: *Dewi Sambu, Partnership, Institutional Strengthening, Empowerment*

Paper ID: 37

LAND SUITABILITY EVALUATION OF CROPS THAT FORM AGROFORESTRY IN TANRALILI DISTRICT MAROS REGENCY

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Abstract

In Maros Regency, especially Tanralili District, some people do not only farm on paddy fields, but also on land planted with trees, such as gardens in the yard, or commonly called agroforestry system. This study aims to decided land capability and land suitability classes for agricultural and forestry, and analyze limiting factors in developing agroforestry in Tanralili District. The methods used in this study were land survey, soil sampling, laboratory analysis, and matching methods to evaluate land capacity and land suitability for peanut and sengon in 10 land units from work maps. The results of this study show that land capability classes in Tanralili that can be pursued for agroforestry systes are class III and IV, with limiting factors such as slopes, erosion, rocks, soil texture, and rooting condition in sub-class III, and drainage factor in sub-class IV. The actual land suitability class for Peanut is S3 (marginally suitable) and class N (unsuitable), and for Sengon is S2 (moderately suitable), S3 (marginally suitable) and N1 (unsuitable for now). The threat of erosion is a limiting factor that can inhibit optimal growth of peanut, and sengon. Nutrition availability affects inhibition of peanut. Water availability and the rooting condition and land preparation becomes limiting factors for Sengon.

Keywords: *Land suitability, agroforestry, Peanut, Sengon*

Paper ID: 38

THE EFFECT OF AGRICULTURAL CREDIT POLICY AND CATTLE-RAISING BUSINESS INPUT PRODUCTIVITY ON FARMER HOUSEHOLD WELFARE

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Abstract

This study examined the allocation of agricultural credits by farmer households and the effect of changes in agricultural credit policies and cattle-raising business input. The study was conducted in Kupang and East Central Timor (Timor Tengah Selatan (TTS) Regencies, East Nusa Tenggara (Nusa Tenggara Timur (NTT) Province, which is cattle production center and where the largest number of farmer households received agricultural credit in NTT. The data were analyzed using the 2-SLS method and the results were then validated and utilized using simulation models. In simulation 1, the agricultural credit increase was 25%, in simulation 2 the cattle-raising business input productivity increase was 20%, and simulation 3 was a combination between simulations 1 and 2. The study results revealed that in order to stimulate the increase in productivity and cattle-raising business production, it was not enough to provide agricultural credit, but it must be followed by improvements in the productivity of the cattle-raising business input such as improvements in the quality feeder calves, feed, and veterinary drugs. The policy implications are that agricultural credit is needed and it stimulates the use of better livestock-raising business input.

Keywords: *agricultural credit, input productivity, livestock-raising business, welfare*

Paper ID: 39

STRATEGY OF BOEZEM DEVELOPMENT TOWARDS WATER SENSITIVE CITY IN SURABAYA CITY

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Abstract

Water sensitive city is an ideal concept in the future that able to manage the water resources to become a productive city and become resilient to disasters. as one of the flood-prone cities, Surabaya city has boezem as a rainwater reservoir. This study aims to examine the potential of boezem water that can be used as an alternative water resource and determine the strategy of boezem development as an effort to become a water sensitive city. The boezem that is used in this research is boezem with a capacity of more than 50,000 m³. This research uses water quality, rainfall, and land use data to see the availability of water, which is processed by the Mock method. Analyze the results of interviews with the manager of boezem using SWOT analysis to determine the development strategy of boezem management. The result showed that the available water discharge to meet water needs was at Boezem Kedurus at 0.050 m³/second, Boezem Bratang 0.009 m³/second, and Boezem Slamet 0.01 m³/second each month. The current condition of boezem management carried out by the Department of Highways and Drainage of the Surabaya government is not in accordance with Minister of Public Works Regulation No. 12 of 2014 concerning the implementation of urban drainage systems. To develop boezem management, strategies that need to be carried out are scheduling maintenance of boezem property, building complements, and documenting all activities related to boezem management. This is the initial step to get Surabaya city to become a water sensitive city.

Keywords: *Alternative water, Boezem, Surabaya city, Water sensitive city*

Paper ID: 40

DISTRIBUTION OF BLACK SHANK DISEASE ON TEMANGGUNG TOBACCO AND ENVIRONMENTAL FACTORS AFFECTING DISEASE DEVELOPMENT

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Abstract

Temanggung tobacco recognized for its aromatic character and high-nicotine content is known as a main component of cigarette. Currently, it only fulfills 30% of market request. A major issue is low productivity caused by land fertility degradation and pathogens attack especially the infection of soil-borne pathogens such as *Phytophthora nicotianae*. This research aimed to determine the incidence level and distribution of black shank disease across tobacco plantation in Temanggung. A survey was conducted on 53 locations determined by a land system. The incidence of black shank was recorded for each location as well as soil samples were also taken to identify soil nutrient contents. The results revealed that black shank was found at almost all of 53 locations with various incidence levels. In dry land, none of black shank was found. In contrast, in paddy land black shank incidence reached up to 44%. It indicated that environmental condition influenced development of black shank. C organic has negative correlation with black shank incidence. High black shank incidence took place in low C organic areas. C organic has an important effect on the improvement of physical and chemical structure of soil characters as well as the equilibrium of soil microbes.

Keywords: *black shank, Phytophthora nicotianae, Temanggung tobacco*

Paper ID: 41

SIMULATING ALLELE FREQUENCY CHANGES IN INDONESIAN GOAT CROSSBREEDING SCENARIOS

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Abstract

A strategy to improve local goat performance is by crossbreeding, which main benefit comes from the effect of heterosis. The occurrence of heterosis is determined by the combination of parental alleles. Crossbreeding would change allele frequency by improving heterozygosity and lowering homozygosity. This study was aimed to predict the heterozygosity value related to BW trait by using simulation of allele frequency changes in different crossbreeding scenario of Indonesian goat breed. Five crossbreeding scenarios were studied: Indonesian goat breed called Jawarandu (Etawah grade ♂ >< Kacang ♀), Boer (Boer ♂ >< Boer ♀), Boerja F1 (Boer ♂ >< Jawarandu ♀), Boerja F2 (Boer ♂ >< Boerja F1 ♀) and Boerja F3 (Boer ♂ >< Boerja F2 ♀). Allele frequency simulation was conducted, the heterozygosity in different crossbreeding scenarios were estimated and the associated to the observed BW measured in crossbreed goat samples. BW (kg) data was retrieved from 1.5-year-old goats from the studied samples. In this study, allele that control BW trait was coded as "B" for high and "b" for low BW. The initial allele frequencies in Jawarandu were set up as (B=0.45; b=0.55) and in Boer were (B=0.7; b=0.3). The simulation resulted in the allele frequency in Boerja F1 were (B=0.57; b=0.43), Boerja F2 (B=0.64; b=0.36) and Boerja F3 (B=0.67; b=0.33). The estimated heterozygosity values were 0,42; 0,54; 0,52; 0,47 and 0,44 in Jawarandu, Boer, F1, F2 and F3 respectively. Whereas the respective the average of BW was 33,20±8,70; 49,50±5,90; 41,80±4,10; 41,60±3,60; and 39,80±3,20 respectively. We confirmed that crossbreeding increases heterozygosity in our simulation study. Our attempt to associate this allele frequency changes with BW trait in Indonesian crossbred goats yields in positive association results.

Keywords: *allele frequency, heterozygosity, Indonesian goat breed, crossbreeding*

Paper ID: 42

GROWTH AND YIELD OF TOMATO PLANTS (*Lycopersicum Esculentu*, Mill.) GROWN IN SOIL MEDIA CONTAINING SEVERAL DOSES OF INORGANIC FERTILIZERS AND SPRAYED WITH BROWN ALGAE EXTRACTS

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Abstract

The excessive use of inorganic fertiliers in horticulture plant production, increases production cost, reduces soil fertility and harm environment. On the other hand, demand for organic horticultural products in makert is increase recently. Therefore, the effort to find out organic stimulant to induces absorbtion of essential elements, growth and production of horticultural plants in low dose of inorganic fertilizers in soil media, is very important. This article reports growth and yield of tomato plants grown in soil media containing several doses of inorganic fertilizers and sprayed with Lombok brown algae extracts. Tomato plants were grown in soil media containing 0, 50, or 100% dose of NPK. Then, the plants we sprayed with or without 10% of *Sargassum crassifolium*, *Sargassum cristaefolium*, *Sargassum aquifolium* or *Turbinaria murayana* liquid extract. Each extract containing different phytohormones influenced similar effect of essential elements, growth and yield of tomato plants. However, the effect of algae extract depend on dose of NPK in soil media. Essensial element absorption, growth and yield were increaesed in the plants grown in media containing 50% NPK sprayed with Lombok brown algae extract. This increase was not significant different compared with the plants grown in media containing 100% NPK sprayed with Lombok brown algae extract. This indicates that lombok brown algae extracts could reduce application dose of NPK into 50% in tomato production, eliminate enviromental hazard and increase farmers income.

Keywords: *Inorganic fertilizers, brown algae, liquid extract, growth, yield and tomato plants*

Paper ID: 43

ANALYSIS ADDING VALUE AND PROFIT MARGIN ON SMALLHOLDER DAIRY FARMING AT BATU CITY, EAST JAVA

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Abstract

Study was held on the smallholder dairy farming at Batu City, East Java. This research addressed to examine dairy farming value added and profit margin. Multistage sampling method was a technique to select 33 farmers who grouped into 3 scales involving scale -1 (having 5.-5.5 Animal Unit (AU), n= 9), scale-2 (owning 6-7 AU, n= 7), and scale-3 (controlling 7.5-8.5 AU, n= 17). Primary and secondary data collection was about two months (April - June 2019). Descriptive analysis using economic formulation method was employed to analyse the data. Results reported that respondents were male farmers aged 50-59 years old with secondary school education and length experience (20-30 years) in raising dairy cattle and they came from medium family member (4-5 persons). Farmers who raised 5-7 AU (scale-2) achieved the highest value added about 57.36%, followed by 43.30% for scale-3 and 37.46% for scale-1. Similarly, profit margin was best-performing in scale-2 (30.63%) compared to scale-3 (24.75%) and scale-1 (22.27%)

Keywords: *multistage, economic, education, experience, Animal Unit*

Paper ID: 44

REPRODUCTIVE PERFORMANCE COMPARISON BETWEEN NATURAL AND ARTIFICIAL SERVICE IN JAWARANDU GOAT

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Abstract

This study was aimed to compare the reproductive performance of Jawarandu goat which serviced naturally and artificially. In total 433 Jawarandu goat ewes were randomly allocated into two main groups namely Natural Mating (NM; n=233) and Artificial Insemination (AI; n=200). In this study, the reproductive performance was measured in the percentage of pregnancy, litter size, and percentage of kid born single, twin and triplet. Between groups, data were statistically compared using t-test at $\alpha = 5\%$. Natural mating group was performed in mating pen, and per Boer buck goat was colonized with 20-25 ewes for 45 days, followed with pregnancy check using ultrasonography (USG). In AI group, oestrous signs were observed in morning and evening, while insemination was done maximum 12 hours after the sign of oestrous using Boer frozen semen. Later, USG was applied to test the pregnancy at day 45 post insemination. The percentage of pregnancy in NM was significantly higher ($p < 0.05$) compared to AI group (73.39 vs 21.00%). However, there was no difference in litter size parameter (1.37 ± 0.49 vs 1.35 ± 0.56 ; $p > 0.05$). Similarly, in the percentage of kid born single, twin and triplet, no differences were found in both groups (63.35 vs 64.86; 36.02 vs 35.14; and 0.62 vs 0%; respectively). All in all, natural service gives better reproductive performance compared to the artificial one. Its suggested due to factors related to the ability to determine the right time for service. Others factor might involve, such as the oestrus observation time and operator experience, especially in observing oestrus of ewe which didn't show observable oestrus sign.

Keywords: *reproductive performance, natural service, artificial insemination, Jawarandu, Boer goat*

Paper ID: 45

**CONSORTIUM BACTERIA DESIGN OF PATHOGENIC FUNGI
DEVELOPMENT CONTROLLER *FUSARIUM OXYSPORUM F. SP.
CUBENSE (FOC)***

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Abstract

Banana plants (*Musa sp.*) on PT Perkebunan Nusantara (PTPN) VIII, Parakansalak, Sukabumi West Java plantation were indicated infected by panama wilt was caused by *Fusarium oxysporum f.sp. cubense* (Foc). In this case, rhizosphere bacteria is one of a kind of organism, which can be used as a biocontrol to induct the systemic resistance on the plants. This research was done to obtain the designation and evaluate the potential of bacteria consortium, which has the ability to slowed down the growth of the Foc. The candidates of non -pathogenic Foc inhibitor bacteria are being selected through the antagonistic test, pathogenic test, and compatibility test. The effectiveness of inhibition selected bacteria will be tested in-vitro through the greenhouse-scale of suppressive soil experiments. The result shows that the *Bacillus cereus* strain CCM 2010 and BS 3-4B has the highest percentage of inhibition to the Foc (25.68 - 29.02%). Non-pathogenic bacteria with a percentage of inhibition above 20%, consists of 3 consortia by compatibility testing. 1st consortium (BS 3-4B, *Bacillus cereus* strain CCM 2010, *Staphylococcus arlettae* strain ATCC 43957, *Bacillus cytotoxicus* strain NVH 391-98 and *Bacillus pseudomycoides* strain NBRC 101232), 2nd consortium (*Bacillus cereus* strain CCM 2010 and *Lysinibacillus xylanilyticus* strain XDB9), and 3rd consortium (*Lysinibacillus xylanilyticus* strain XDB9 dan *Bacillus pseudomycoides* strain NBRC 101232). Results of the observation show that the infected control plant by Foc having the yellow symptom on the day-3. Meanwhile, the infected plants with the addition of singular bacteria and consortium bacteria showing the symptoms on the day-5 and day-7.

Keywords : *Fusarium oxysporum f.sp. cubense* (Foc), *antagonistic test*, *pathogenic test*, *compatibility test*, *consortium*

Paper ID: 46

NOVEL MICROBIAL CONSORTIUM FORMULATION AS PLANT GROWTH PROMOTING BACTERIA (PGPB) AGENT

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Abstract

PGPB enhance plant growth through nitrogen fixation, phosphorus and potassium solubilization, and IAA production. PGPB as biofertilizer provide an alternative for chemical fertilizer to reduce environmental damage. PGPB in consortium could be more effective instead of single strain inoculant. Biofertilizer must contain bacteria that compatible, non-pathogenic and actively in many biogeochemical process. The aim of this study are to investigate compatibility, design soil bacteria consortium isolated from rubber-*Canna* intercropping plantation and evaluate the consortium's potential as biofertilizer. Functional roles of PGPB was tested such as nitrogen fixation, potassium and phosphate solubilization, and IAA production. Detection of pathogenic bacteria was tested by Blood Agar method. Compatibility test was performed by cross streak method. Bacteria were identified using sequencing of 16srRNA gene and verified using BLAST to database of NCBI. The results showed that among 19 bacterial isolates, all showed the nitrogen-fixing activity, G5 had the highest phosphorus and potassium solubilization index, whereas *Citrobacter braakii* strain 167 produced the highest IAA concentration. Compatibility analysis showed that *Citrobacter freundii* strain LMG 3246, *Citrobacter braakii* strain DSM 17596 and G5 are compatible as a bacteria consortium and may developed as biofertilizer. This study found a possible new and beneficial biofertilizer formulation to enhance plant growth and to reduce the application of chemical fertilizer.

Keywords : *Biofertilizer, Plant Growth Promoting Bacteria, Rubber-Canna intercropping system,*

Paper ID: 47

THE MORPHOLOGY AND DENSITY OF PASAK BUMI (*EURYCOMA LONGIFOLIA*, JACK) LEAF TRICHOMES IN SEVERAL NATURAL POPULATIONS IN INDONESIA.

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Abstract

Eurycoma longifolia Jack is one of the important medicinal plants in Indonesia and is used in many traditional as well as modern medicine. Until now, there is no information regarding the trichome characteristics of *E. longifolia* and its relationship with environmental factors is unknown. The purpose of this study was to investigate the morphology and density of the leaf trichomes of *E. longifolia*, and observed its correlation with geographic and climate factors of population. The morphology and density of the leaf trichome of six populations of *E. longifolia* were investigated using a light microscope. Analysis of variance, correlation analysis, principal component analysis (PCA), and clustering of the population were performed. The results of this study detected two types of glandular trichome in the leaf of *E. longifolia*, namely peltate and capitate. Analysis of variance showed a significantly different density of trichome among populations. Inter-population variation in trichome density may be caused by different micro-environmental of each population and genetic factors of plant individuals within population. We confirmed that geographic and climate factors of the population have significant positive/negative correlations with types and density of trichomes. The PCA analysis exhibited that trichomes density could be used as a distinguishing characteristic among populations. Analysis of PCA and UPGMA divided population studies into two groupings.

Keywords: correlation, environmental factors, leaf trichome, population differentiation

Paper ID: 48

IMPACT OF HEAT STRESS ON GERMINATION AND SEEDLING GROWTH OF CHILI PEPPER (*CAPSICUM ANNUUM L.*)

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Abstract

Temperature plays an important role in plant growth and development. The increased temperature suddenly may cause severe consequences. This study aimed to observe the impact of temperature, exposure of duration, and the interaction between temperature and exposure duration at the germination phase and seedling growth of chili pepper. The research design used Factorial Completely Randomized Design. The first factor was the temperature consisted of five-level of temperature namely: 35°C, 37°C, 39°C, and 41°C. The second factor was the exposure duration consisted of four hours, eight hours, and twelve hours. The Parameters observed were percentage of seed germination, shoot length, root length, number of roots, seedling height, number of leaves, fresh weight of seedling, dry weight of seedling, and chlorophyll content. The results of this study showed that there is an interaction between temperature and duration of exposure, the higher the temperature and duration of exposure decrease shoot length, root length, number of roots, wet weight of seedling, number of leaves, chlorophyll content.

Keywords: *Heat stress, high-temperature, germination, chlorophyll content.*

Paper ID: 50

PERFORMANCE SELECTION OF MENTIK WANGI M5 RICE FROM 100 GRAY GAMMA IRRADIATION

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Abstract

Mentik Wangi rice is a local rice originating from the Special Region of Yogyakarta which has a distinctive fragrant aroma and fluffier texture. The problems that occur in Mentik Wangi rice cultivation are that the harvest time is longer, and the plants are too high so that it gives a potential lower production impact because it is easy to collapse. One way to overcome this problem is through plant breeding with gamma ray irradiation. This study aims to determine the performance of the Mentik Wangi mutant strains so as to get mutant strains that have short stems, early maturity and high productivity. The research was carried out by planting 35 M5 strain codes resulting from 100 gray gamma ray irradiation and control plants (without irradiation). The variables observed were plant height, flowering age, harvest age, total number of tillers, number of productive tillers, panicle length, number of seeds per panicle, bushiness index, weight of 100 seeds, and weight of one clump. Observation data were analyzed descriptively followed by T-test to compare the performance of Mentik Wangi M5 rice plants from 100 gray gamma irradiation with control plants. The selection results of Mentik Wangi M5 rice plants from 100 gray gamma irradiation amounted to 21 individual plants namely M-MW1-G35-02-06-19 (70) (81) lines, M-MW1-G35-02-06-20 lines (82) (76), M-MW1-G35-02-06-13 (90), MM-MW1-G35-02-06-01 strain (105), M-MW1-G12-01-18-01 strain (86) (88) (109), M-MW1-G12-01-18-01 (70) strain, M-M-MW1-G12-01-18-05 strain (8) (41) (69), strain M-MW1-G80-11-08-15 (20) (29) (50) (15), M-MW1-G89 lines-20-03-01 (11) (21), and M-MW1-G89 lines -20-12-17 (33) (76).

Keywords : *Breeding, Mutant Strains, Short Stem.*

Paper ID: 51

SELECTION OF M5 SHORT-STEMMED MUTANTS FROM 200 GRAY GAMMA RAY IRRADIATION IN MENTIK WANGI RICE

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Abstract

Mentik Wangi rice is a local varieties native to Indonesia. Mentik Wangi has a characteristic shape of oval round rice, yellow brown rice, and fragrant rice aroma. Mentik Wangi has a weakness that is relatively long harvest time, the plant is too high so it easily fell. This research aims to determine the performance of M5 generation of mutant rice and to select M5 generation of mutant plants as a result of 200 gray gamma irradiation which has short stems with high productivity. This research was conducted in November 2018 - April 2019 in the experimental field of the Faculty of Agriculture, Universitas Sebelas Maret, located in Palur Village, Mojolaban, Sukoharjo. The research was carried out by planting 36 genotypes, namely 35 M4 lines of 200 gray gamma ray irradiation and control plant (without irradiation). Observation data were analyzed descriptively and t test to determine differences in M5 generation of Mentik Wangi rice from 200 gray gamma ray irradiation with control plants (without irradiation). Based on the research results that Mentik Wangi rice plants with gamma ray irradiation 200 Gray have better performance compared to control plants (without irradiation) and there are 28 individual M5 Mentik Wangi rice mutants selected by short-stemmed plants and have high productivity.

Keywords: *Mentik Wangi Rice, Gamma Ray Irradiation 200 Gray, Mutation*

Paper ID: 52

DIVERSITY INDUCTION WITH GAMMA RAY IRRADIATION ON *DENDROBIUM ODOARDI* ORCHID

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Abstract

Orchid is an ornamental plant commodity that has potential to be developed. One species of orchid that is in demand is *Dendrobium odoardi*. The aims of this research is to determine the characteristics and morphological diversity of *Dendrobium odoardi* orchid irradiated gamma ray results and without gamma ray irradiation. This research was conducted in two places, the implementation of gamma ray irradiation at the PATIR-BATAN Laboratory (Pusat Aplikasi Teknologi Isotop dan Radiasi-Badan Tenaga Nuklir Nasional), Pasar Jumat, South Jakarta and subculture in Plant Physiology and Biotechnology Laboratory of Agriculture Faculty, University of Sebelas Maret Surakarta. The research was conducted start from March 2019 - January 2020. The research used a simple design of one factor, the dose of gamma ray irradiation with 5 levels, 0 Gy (control), 10 Gy, 15 Gy, 20 Gy, and 25 Gy. Each level of treatment was planted and observed 50 plantlets. Observational data were analyzed descriptively by comparing observational data from *Dendrobium odoardi* orchids irradiated with control plants. The results showed that the induction of gamma ray irradiation at doses of 10 Gy, 15 Gy, 20 Gy, and 25 Gy resulted changes in morphological characters in *Dendrobium odoardi* orchid plant. The changes that occur are increasing plant height, increasing leaf width, decreasing number of roots, decreasing root length, change in leaf shape and change in leaf color. Changes in the morphological character of *Dendrobium odoardi* orchids produce plant diversity.

Keywords : *Dendrobium odoardi*, Mutation, Phenotypic Variation, PLBs

Paper ID: 53

GENETIC VARIABILITY OF PHAIUS AND DENDROBIUM ORCHIDS BASED ON MOLECULAR MARKERS

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Abstract

This study aimed to assess the variability and grouping degree of several species of orchids existing in Indonesia. The laboratory works were done in the Laboratory of Study Centre of Horticulture and Tropics (PHKT) of IPB by analyzing the variability of orchids using RAPD. The plant materials were taken from the orchid collection at Kebun Raya Bogor. The relationship of 9 orchids were analyzed using the phenotype binary data and the DNA ribbon pattern which were assessed from amplification of 3 random primer RAPD. Cluster analysis was done under the program of NTSYSpc version 2.02 and UPGMA function SimQual. The study concluded that there were genetic variability and grouping among the species of Orchid, the RAPD under primer of OPA7, OPA 9, and OPA 19, on the dendrogram based on Similarity coefficient of 0,40 showed that there were four group. First group : *Phaius tankervilleae* (1), *Phaius montanus* (2) and *Phaius callosus* (3), group II : *Dendrobium mirbelianum* (5), *Dendrobium lamellatum* (6), *Dendrobium liniale* (8) and *Dendrobium biggibum* (9). Group III : *Dendrobium anosmum* (7). Group IV : *Phaius ambionensis* (4).

Keywords: *Genetic, Phaius, Dendrobium, Molecular Markers*

Paper ID: 55

REVISITING THE APPLICATION OF CLASSICAL FORMULAS TO ESTIMATE BALI CATTLE'S BODY WEIGHT BASED ON BODY MEASUREMENT VARIABLES

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Abstract

Predicting cattle's body weight is a common practice considering various reasons. Using the approximate of cattle's body weight as observed variable in experiments, however, poses questions on how accurate are the estimates. This paper revisits four classical formulas commonly found in papers published by Indonesian researchers in predicting cattle's body weight based on their body measurements namely Schoorl, Winter, Smith and Lambourne models. Data on body weight (BW) and body measurements (Chest Girth=CG and Body Length=BL) of 118 male and 106 female Bali cattle (2-3 yo) were collected from Bali cattle Breeding Center. The estimates from the prediction formulas were compared to the actual body weight. We run 10-folds cross validation procedure to obtain the predictive ability parameters. The mean BW, CG and BL for male cattle were 439.14±113.55lbs; 295.98±22.62 and 273.80±22.01 inches; whereas for females were 355.70±75.73lbs; 318.68±29.60 and 223.72±13.89 inches respectively. The accuracy of the estimates was defined as the correlation coefficient between actual and predicted BW. All four formulas have the accuracy between 84.90 to maximum of 89.68% in both male and female cattle groups. RMSE were considerably higher in both male group (38.97 - 73.44) and female group (25.26 - 45.81). Although the correlations between actual and predicted BW are high, further study need to be done to determine whether the utilization of these predicted values as a response variable will introduce enough bias to affect the results of a research. Or, alternative methods to predict BW with higher accuracy need to be explored.

Keywords: *Bali cattle, body weight, body measurements, prediction formula, accuracy*

Paper ID: 56

GENETIC CHARACTERIZATION OF ILER (*PLECTRANTHUS SCUTELLARIOIDES* (L.) R. Br.) BASED ON RAPD MOLECULAR MARKER

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Abstract

Iler (*Plectranthus scutellarioides* (L.) R. Br.) is an ornamental plant and also used as medicinal plant. The plant is one of medicinal plant for anti hemorrhoids Jamu Saintifik herbal formula in B2P2TOOT Indonesian Ministry of Health. This will lead to commercialization opportunities in herbal drug industry that recently has become increasingly popular. With the emergence of substitution and adulteration of herbal drug and the lack of information on coleus genetic diversity which may result in misidentification, this research was conducted to determine Iler genetic characteristics using RAPD markers. The genomic DNA was extracted from 15 accessions of Iler and 3 accessions from genus *Plectranthus* as an outgroup. Six selected RAPD primers were used in amplification. Dice similarity index was used to calculate similarity index followed by cluster analysis and dendrogram construction using Unweighted Pair Group Method with Arithmetic Mean (UPGMA). The results showed 52 DNA fragments were produced within the size range 293-2.667 bp and polymorphism level among accessions at 95,31%. Cluster results results in genetic diversity ranging from 40,45-97,87% and a dendrogram that shows clustering trend of Iler accessions based on the similarity of morphological characters such as leaf shape and color. Specific bands of Iler for future authentication purpose are also determined with the band sizes as follows: OPA-1 (800 and 1246 bp), OPA-18 (388 bp), OPB-1 (315 and 1159 bp), OPC-2 (364 bp), OPD-2 (1166 bp), OPH-13 (1002 and 1493 bp).

Keywords: Iler (*Plectranthus scutellarioides* (L.) R. Br.), genetic characterization, species authentication, RAPD

Paper ID: 57

ENSO AND CPO PRICE VOLATILITY IN INDONESIA

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Abstract

ENSO (El Niño Southern Oscillation) climate anomaly has become more frequent and stronger because of global warming and climate change. ENSO has arguably played a critical role in tropical countries such as Indonesia, primarily due to its intrinsic linkage with agricultural production and prices. This study examines one such relationship between ENSO and the price volatility of Crude Palm Oil (CPO), one of the most produced and consumed vegetable oil in the world. By applying monthly time-series data from 2006 to 2018 and Ocean Niño Index (ONI) from the Niño 3.4 region which serves as a proxy for the ENSO variable, this research used Autoregressive Conditional Heteroscedasticity (ARCH) methods to find out the CPO price volatility and Vector Error Correction Model (VECM) to investigate the impact of ENSO on the CPO price volatility both in the short-run and long-run. The results showed that the price volatility of CPO in Indonesia is low and will be persistent in the long term. ENSO affects the volatility of CPO prices in the long run, but there is no effect in the short run. The result is important for the stakeholders and government in preventing the risk and uncertainty condition of CPO price fluctuation caused by climate anomaly.

Keywords: CPO, ENSO, Price Volatility, VECM

Paper ID: 59

APPLICATION OF BIOLOGICAL CONTROL *PAENIBACILLUS POLYMYXA* TOWARD BACTERIAL LEAF BLIGHT DISEASE IN RICE PLANT

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Abstract

Rice is a very important crop for humans because more than half of the world's population including Indonesia depends on these plants as a source of food. Diseases that often attack rice plants are bacterial leaf blight, this disease can reduce rice production by up to 60%. Control of bacterial leaf blight in addition to using chemicals can also use biological agents, one of which is *Paenibacillus polymyxa*. Testing of biological control applications begins with inoculation of *Xanthomonas oryzae* bacteria on ciherang rice seeds 9 days after planting (DAP). Planting rice using Randomized Block Design using biological control *Paenibacillus polymyxa* consists of four treatments, Control (P0), 2,5 ml l⁻¹ (P1), 5 ml l⁻¹ (P2), and 7,5 ml l⁻¹ (P3). The biological control application is carried out on seeds, 10 DAP, 2 week after planting (WAP), and 4 WAP. Observations were made once a week to observe the rice growth and intensity of the disease. Observations were made in the vegetative phase. The results of the *Paenibacillus polymyxa* biological control test can reduce the level of bacterial leaf blight attack even though the difference in each treatment is not significantly different. The recommended concentration of *Paenibacillus polymyxa* biological control is 7,5 ml l⁻¹. This concentration can reduce the level of bacterial leaf blight attack in the vegetative phase.

Keyword: *attact, bacteria, vegetative*

Paper ID: 60

UNDERSTANDING THE PALM OIL SMALLHOLDERS PREFERENCE AND COMPLIANCE TOWARDS ISPO: A CASE STUDY IN NORTH SUMATERA, INDONESIA

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Abstract

Along with spreading of negative campaign on palm oil, Indonesian government established a regulation requiring all palm oil plantations to be certified by ISPO and it supposed to be achieved in 2025. On the other side, ISPO itself contained of many criterias that is difficult to complied by smallholder such as the land legalities, Good Agricultural Practices (GAP), and other obligation that should be addressed as a whole. This paper aimed to (1) see the difference in socioeconomic characteristics between independent and managed smallholders, (2) identify the mandatory sustainable scheme from the independent and managed smallholder perspectives as well as (3) analyze the compliance of smallholder towards the sustainability standard of ISPO. One hundred and fifty smallholders of Padang Lawas Regency, North Sumatera were interviewed by using the structured quetionnare to collect the data in terms of socio-economic characteristics, attitude, subjective norms, perceived behavior control, intention, and compliance towards ISPO sustainability standards. The results of the study showed that socioeconomic characteristics of independent and managed smallholder are significantly different in term of ages, education, family member, experiences, farm sizes, and on farm income. Besides, there is a gap between the preferences of managed and independent smallholder towards ISPO sustainability standards. It is implied by the behavioral variables of attitude, subjective norm, PBC, and intention to comply with the sustainable scheme. However, both of smallholders considered to have bad compliance towards the standard of ISPO.

Paper ID: 61

CASHEW : CONTRIBUTION TO THE HOUSEHOLD ECONOMY AND CARBON STOCK (CASE STUDY IN WONOGIRI DISTRICT)

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Abstract

Wonogiri Regency is a cashew crop center in Central Java. Cashew is planted in dry land at an elevation of 100 to 400 m above sea level with a monoculture and multicultural pattern. Cashew plants are cultivated as people plantations, planted regularly on each plot or as a fence on the ownership limits of dry land, plots and mounds. Cashew plants are evergreen, have tight canopy with sympodial branching patterns, flowering all the time so they can cover the surface of the soil. Such plant patterns provide acceptance for households and protect the environment. Research to reveal the contribution of household income, land cover rates and carbon stocks has been carried out by survey methods. Data collection techniques were carried out by interviewing the head of the household and the measurement of cashew land. The results showed that B / C ratio > 1 and increased with age of the plant, it contributed to the acceptance of household income. Canopy cover and carbon stock increase every year so that it is beneficial to maintain soil fertility.

Keywords: *cashew nuts, household income, carbon stock*

Paper ID: 62

MEDICINAL PLANT UTILIZATION FOR HYPERCHOLESTEROLEMIA BY TRADITIONAL HEALERS IN JAVA ISLAND

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Abstract

This ethno-medicine study aimed to reveal the medicinal plant utilization as traditional medicine for preventing as well as curing of hypercholesterolemia by traditional healers in Java Island including Banten, DKI Jakarta, West Java, East Java and Central Java Province of Indonesia. Data was collected based on purposive random sampling among five selected traditional healers in each ethnic on 2015. The results exhibited as of 38 medicinal plant species distributed in 24 families showed to have pharmacological effect on treating hypercholesterolemia whereas *Guazuma ulmifolia* Lam. and *Zingiberaceae* were identified as the most prominent medicinal plant and family used by traditional healers. The most frequent plant part used was leaves (34.5%) followed by rhizome (17.3%), fruits (12.7%) and others. Most medicinal plant were gained from house yard (37.6%) with planting efforts as of 45.9%. The most prescribed method by traditional healers was by drinking the formula (97.2%) as many as two times a day (59.63%). The study clearly demonstrated whether traditional healers still had a pivotal role on overcoming ailments and disease especially hypercholesterolemia in Java Island.

Keywords: *hypercholesterolemia, traditional healers, Guazuma ulmifolia*

Paper ID: 63

THE PHYTOEXTRACTION OF Cu AND Zn BY ELEPHANT GRASS (*PENNISETUM PURPUREUM*) FROM TROPICAL SOIL 21 YEARS AFTER AMENDMENT WITH INDUSTRIAL WASTE CONTAINING HEAVY METALS

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Abstract

Increased concentrations of heavy metals in soils are suggested to cause plant roots to work harder in obtaining nutrient elements for their growth and development. This research was aimed to study the root/shoot growth and heavy metal phytoextraction behaviors of elephant grass in soil about 21 years after amended with a Cu- and Zn-containing industrial waste. Soil samples were obtained from an experimental field factorially treated in 1998 with the heavy metal containing waste at 0, 15, and 60 Mg ha⁻¹, lime at 0 and 5 Mg ha⁻¹, and organic compost at 0 and 5 Mg ha⁻¹. Soil samples were planted with elephant grass, 8 weeks after which the soil samples were analyzed for their DTPA-extracted Cu and Zn. Plant roots and shoots were harvested separately and weighed for their dry-masses and analyzed for Cu and Zn contents. The results demonstrate that the Root-To-Shoot Ratios increased and show good correlations with the increase in the soil DTPA-extracted Cu or Zn. The plant accumulation of Cu or Zn increased with the increase in the soil DTPA-extracted Cu or Zn resulted from waste treatments but decreased with lime treatment. Plant accumulation of Cu and Zn in roots and the whole plant roots and shoots as well as their translocation factors (in general > 1.00) were well correlated with their respective concentrations in soil ($r^2 > 0.90$). These observations confirm that the root/shoot growth and heavy metal absorption by elephant grass are governed by the concentrations of heavy metals in soils and elephant grass is a Cu and Zn phytoextractor.

Keywords: *Elephant Grass, Heavy-Metal Toxicity, Napier Grass, Plant Biomass, Plant Roots, Soil Pollution, Translocation Factor, Tropical Soils*

Paper ID: 65

FORMULATION AND EVALUATION OF ANTIOXIDANT SYRUP CONTAINING AGARWOOD (*AQUILARIA MICROCARPA BAILL.*) LEAVES EXTRACT

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Abstract

Opportunities for developing agarwood-producing plants (*Aquilaria microcarpa* Baill.) as medicinal plants are still wide open. One of natural ingredients that has potential as herbal medicines is the leaves of agarwood-producing plants. Ethanol extract of *Aquilaria microcarpa* Baill leaves contains flavonoid compounds which have antioxidant activity. The extract was made in the form of syrup preparations to facilitate use. This study aimed to formulate agarwood leaves extract into syrup preparations. Syrup preparations were made with variations in the concentration of sorbitol as sweetener (60%, 63% and 65%). The syrup preparations were then evaluated for physical evaluation included organoleptic tests, viscosity tests, pH tests, homogeneity tests, syrup specific gravity tests and hedonic tests. The results of physical evaluation showed that all syrup formulas met the range of good syrup requirements. From the results of the hedonic test, it could be concluded that Formula 2 was preferred over Formula 1 on all parameters namely color, aroma and taste. Formula 2 also had the appropriate pH, viscosity and specific gravity as syrup.

Keywords: *agarwood, syrup, sorbitol*

Paper ID: 66

KARYOTYPIC ANALYSIS OF PIGEONPEA (*CAJANUS CAJAN L.*)

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Abstract

Pigeonpea has great potential to be alternate source of plant protein beside mungbean, soybean, and ground nut. The potential of pigeonpea needs to be improved by plant breeding program. Genetic informations are needed to improved plant breeding. This research aims to gain genetic information based on chromosome numbers, chromosome shape and chromosome length to visualize pigeonpea karyotypic. The research was conducted at Plant Physiology and Biotechnology Laboratory Faculty of Agriculture UNS and Plant Breeding Laboratory Mendel Room Faculty of Agriculture UGM. This research had be done by making glass slides using squashing method include fixation use Carnoy 1 solution (3 absolute ethanol : 1 96% acetic acid), hydrolysis (1N HCl) and chromosome staining (aceto orcein 2%). Observation used light microscope then measured and analyzed use Photoshop and Image Raster. The results showed that chromosome number of pigeonpea is $2n = 2x = 22$ with chromosome length $5.73 \pm 1,15 \mu\text{m}$ until $10.92 \pm 2.69 \mu\text{m}$. Shape of pigeonpea chromosomes are metacentric and submetacentric which are metacentric is dominant. Karyotypic formula of pigeon pea is $2n = 2x = 9 m + 2 sm$. Intrachromosomal asymmetry index (As1%) of pigeon pea is 59% and Interchromosomal asymmetry index (A2) value of pigeon pea is 0.34 ± 0.02 .

Keywords: *Pigeonpea, karyotypic, chromosome, analysis.*

Paper ID: 67

IMPROVEMENT GROWTH OF SAPODILLA (*ACHRAS ZAPOTA L.*) BY CHITOSAN

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Abstract

Indonesia's palm oil production needs to be developed, generative sapodilla cultivation has a very long growth. The effort that can be done to increase the growth of sapodilla seeds for the provision of quality seedlings. Giving chitosan expected to increase the growth of sapodilla seeds because there are chitosan content that accelerate plant growth, and age planting shorter. The aim of this research is to know the concentration and time of spraying of chitosan to be applied to generative sapodilla seeds. The study used Randomized Complete Block Design (RAKL) of 2 factors. The first factor was phytosan concentration consisting of four levels (0, 2, 4, and 6 mL/L) and the spraying time consisted of three levels (morning, afternoon, and morning and afternoon), each treatment combination was repeated three times. that the concentration of chitosan have significant effect to the leaf area with the best treatment at 6 mL/L concentration and the time of spraying treatment had significant effect on the increase of the number of branches with the best treatment during the morning spraying.

Keywords: *Sapodilla, chitosan, growth regulator, seed growth.*

Paper ID: 68

RESPONSE OF ARTEMISIA ANNUA ACCESSIONS TO NITROGEN FERTILIZER ON LOW LAND

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Abstract

Growing *Artemisia annua* in tropical areas cause a short vegetative period and resulted in low content of artemisinin. To increase the artemisinin content of *Artemisia annua* in the tropical area could be carried out by administering of Nitrogen fertilizer. In order to increase production and extension of grow areas, the selection of superior accession which adaptable in low areas is also needed. The study was carried out using an experimental method by applying 3 levels dosage of Nitrogen fertilization (100, 200 and 300 kg/Ha) to 3 *Artemisia annua* accessions (V1, V2 and V5). The research was conducted at April-August 2018 at Karangpandan research station with an elevation of 600 m asl. The parameters observed were plant height, stem diameter, number of branches, fresh biomass weight, dry biomass weight, artemisinin content and essential oil content. The results showed that the growth and productivity of 3 accession of *Artemisia annua* is strongly influenced by the Nitrogen dosage. The lower dosage of Nitrogen decline growth and productivity, and plant entry into the generative phase later for the highest dosage of Nitrogen. The Nitrogen application didn't effect on the artemisinin content of *Artemisia annua*.

Keywords: *Artemisia annua*, artemisinin, accession, altitute.

Paper ID: 69

**ANTIBACTERIAL EFFECTS OF KEPOK BANANA
BUNCH (*MUSA PARADISIACA* L.) AGAINST
*STAPHYLOCOCCUS AUREUS***

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Abstract

Banana plants well-known to contain diverse phytochemical compound. This study aimed to identify the antibacterial effects of Kepok Banana bunches (*Musa paradisiaca* L.) against *Staphylococcus aureus* bacteria. This research was conducted in two stages. In the first step were a meta-analysis of the potency for antibacterial content of banana bunches based on published studies. Then, laboratory analysis were carried out to determine the zone of bacterial inhibition. The experiment use completely randomized design with 3 treatments (50 μ L, 70 μ L Kepok Banana bunches extract and 50 μ L Cloramphenicol as a positive control), each treatment replicated three times. The study was performed used wells agar diffusion. Data were analyzed by analysis of variance (ANOVA) and followed by Duncan Multiple Range Test (DMRT). Results showed that Kepok Banana bunches had several potential antibacterial contents. Phytochemical content that has the potential as an antibacterial are tannins, alkanoids, glycosides, flavonoids, saponins and volatile oils. Treatments showed different ($P < 0.05$) results in bacterial inhibition zones. Cloramphenikol produces the highest inhibitory zone (34.78 mm), while the difference in the concentration of banana bunches produces the same inhibitory zone (50 μ L : 11.52 mm; 70 μ L : 15.52). It is concluded that Kepok Banana bunches has potency to use as an antibacterial against *Staphylococcus aureus*.

Paper ID: 72

THE EFFECT OF SLUDGE DAIRY CATTLE AND EXPIRED MILK POWDER WASTE AS GROWTH MEDIA FOR WHITE OYSTER MUSHROOM (*PLEUROTUS FLORIDA*)

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Abstract

White oyster mushroom is mushroom which is known to have a delicious taste and complete nutrition. White oyster mushroom media is usually added additional nutrients as stimulants for mushroom growth like bran, but bran is cattle feed so its availability is limited. Sludge biogas of dairy cattle and expired milk powder waste is the result of livestock waste which is still rich in carbon, nitrogen, carbohydrates, crude fiber, phosphorus, and protein which are important substances for mushroom growth. This study aims to determine the effect of differences in the composition of the biogas sludge growing media and expired milk powder waste on mushroom productivity. This study was designed with four treatments and three repetitions, the treatment is the difference in the ratio of the concentration of dairy cow biogas sludge and expired milk powder with a ratio of 0%: 0% (P0), 50%: 50% (P1), 25%: 75% (P2), 75%: 25% (P3). Data taken include fresh weight, a diameter of caps, stem length, number of caps, pinhead growth time, and harvest time, The data was processed using analysis of Variance-Completely Randomized Design Unidirectional and the average difference was tested using Duncan's Multiple Range Test (DMRT). The best result is P2 treatment, fresh weight, a diameter of caps, stem length, and harvest time obtained the results are 124.15 gram, 10.57 cm, 5.98 cm, and 46.00 days. In this study, it was concluded that the greater the proportion of expired milk powder waste that was given increasingly increased the growth of white oyster mushrooms.

Keywords: *White Oyster Mushroom, Oyster Mushroom Growing Media, Sludge Biogas from Dairy Cattle, Expired Milk Powder Waste, Growth of White Oyster Mushroom.*

Paper ID: 73

ANALYSIS MANGROVE CO-MANAGEMENT TOWARDS ENHANCEMENT OF COASTAL COMMUNITIES IN MADURA ISLAND

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Abstract

Mangroves have various functions and benefits that are important both directly and indirectly. As an economic function, mangroves can be used as a source of food and understanding of the Coastal community. Coastal community poverty is still a national strategic issue, therefore this is one of the solutions to the problem. The purpose of the research was to analyze the effect of mangrove forest management on the economic development of the coastal community on Madura Island. Sample in this study came from four districts in Madura, namely Bangkalan, Sampang, Pamekasan and Sumenep, which consisted of water management communities, Related Offices, Environmentalists, Academics, NGOs / Institutions, and CSR totaling 170 respondents. Data analysis tool with SEM Warp Partial Least Square method. The research result that mangrove forest management has a significant positive effect on economic development. Improving economic development, in this case, was increasing income, new employment opportunities, and mangrove sustainability.

Keywords: *Mangrove, co-management, economics development, coastal, and PLS.*

Paper ID: 74

THE IMPLICATIONS OF THE COVID-19 PANDEMIC ON RICE MARKET INTEGRATION IN EASTERN JAVA ISLAND, INDONESIA

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Abstract

Applying the multivariate cointegration tests with daily prices (daily - 5 day week) during the period July 25, 2016, to July 02, 2020, period (980 data), this paper examines whether prices in the rice deficit market (Yogyakarta) are co-integrated with prices in surplus markets (Semarang and Surabaya). Research data is the average daily price in a group of traditional markets in Yogyakarta, Semarang, and Surabaya. Traditional markets are determined as a research sample based on the results of a 2018 market survey conducted by the Central Statistics Agency. The proportion of the existence of the largest trade center in Indonesia is the traditional market, which reaches around 88.52 percent. The main focus is on the effect of the implementation of various programs and policies relating to controlling the spread of COVID-19 to the integration of the rice market in the eastern part of Java Island. On March 02, 2020, the first two COVID-19 cases that occurred in Indonesia were confirmed. The cointegration tests find that the domestic rice prices of Yogyakarta and Semarang are integrated both in short-run and long-run periods. In the short term, programs and policies relating to controlling the spread of COVID-19 have affected integration in the Yogyakarta and Semarang markets, but not in the Surabaya market. The reason is that the distance between Yogyakarta and Semarang is relatively closer compared to Surabaya. Long distances between markets resulting in low volumes of trade between the Yogyakarta-Surabaya and Yogyakarta-Semarang markets.

Paper ID: 75

CHILI FARMERS' BEHAVIOR IN DEVELOPING CHILI AGRIBUSINESS IN CENTRAL JAVA

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Abstract

Chili production decreases continuously in Central Java today. Similarly, chili's selling price is fluctuating, sometimes too low and some other times too high. Farmers as one of chili agribusiness development actors have a very large potency to develop, so that a study should be conducted on farmers' behavior in developing chili agribusiness development as the foundation to conduct empowerment. This research aimed to describe a) chili farmers' characteristics, and (b) empowerment program conducted, and (c) to analyze factors affecting farmers' skill of developing chili agribusiness in Central Java. Research location was selected purposively. Techniques of collecting data used were interview and field observation. The data was analyzed descriptively and quantitatively with multiple regression, and qualitative information. The result of research showed that the farmers are 49.7 years old on average, graduated from Senior High School (formal education), 46.6% of which have not attended yet non-formal education such as extension and training program related to chili agribusiness, and have less than 0.5 ha-wide area, 13.06 years experience with chili cultivation, 53.3% of which are less skillful in developing chili agribusiness. The result of analysis indicated that non-formal education and year of experience with farming affected chili farmers' behavior and skill positively and significantly, while age, formal education, and land width did not affect chili farmers' skill significantly in chili agribusiness development.

Keywords: *farmer behavior, chili agribusiness, characteristic, skill*

Paper ID: 76

DOES RSPO CERTIFICATION AFFECT THE SIZE OF FOREST AND LAND COVER IN INDONESIA?

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Abstract

As the biggest Crude Palm Oil (CPO) producer, Indonesia is now facing some issues in regard to the environmental aspects. The expansion of palm oil industries has affected the environmental aspects of Indonesia, one of them is reduced forest area. In 2004, a non-profit organization named Roundtable Sustainable Palm Oil (RSPO) was founded, aimed at reducing the negative effect created by the palm oil industries. This study will examine the effect of RSPO certification in the Indonesian palm oil industries on the forest cover of Indonesia. This study used time series data from 1992 to 2015, collected from Food and Agriculture Organization (FAO), World Bank and UnComtrade. Structural Partial Least Square Analysis, with the forest area and land cover of Indonesia as the dependent variables, was run against Indonesia's CPO export, Indonesia's CPO price, Indonesia's real Gross Domestic Product (GDP) and RSPO. RSPO was a voluntary certification of Indonesia's palm oil starting in 2008, and was included as a dummy variable.

Results showed that the relationship between Indonesia's CPO export, Indonesia's CPO price, Indonesia's real Gross Domestic Product (GDP) as the variation of independent variables and the forest and land cover area of Indonesia is negatively associated. While the RSPO is positively associated to the Indonesia's CPO export, Indonesia's CPO price, Indonesia's real Gross Domestic Product (GDP). Nonetheless, RSPO is no association with the forest and land cover area of Indonesia.

Keywords: *RSPO Certification, Sustainability, Crude Palm Oil, Environmental Issues*

Paper ID: 77

INITIAL GROWTH OF KIPAS PUTIH SOYBEAN (*GLYCINE MAX (L) Merril*) IN VARIOUS DOSAGE OF GAMMA RAYS IRRADIATION

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Abstract

Gamma irradiation is the widely used mutagen in assembling plant genetic diversity. The important thing to do is look for the most appropriate dose that gives rise to a great deal of diversity without turning off irradiated plants. This study aims to determine the initial growth response of Kipas Putih soybean seeds due to gamma ray irradiation treatment. Kipas Putih soybean seeds measure their water content up to 11%. Furthermore, gamma ray irradiation was carried out at doses 0, 200, 300, 400, 600, 800 and 1000 Gray. The results showed that there was decrease % germination in the Kipas Putih soybean seeds at 200 Gray reaching 50% at 3 weeks after planting. Irradiation doses of 400 Gray and 600 Gray reduce % germination until 20% and 30%, respectively. While at doses of 800 Gray and 1000 Gray, all seeds died at 3 week after planting. Giving gamma ray irradiation also showed a decrease in plant height along with increasing irradiation dose.

Keywords : *Gamma rays, soybean, % germination*

Paper ID: 78

THE EFFECT OF BENZILAMINOPURINE AND KINETIN FOR SHOOT MULTIPLICATION OF INDIGOFERA (*INDIGOFERA ZOLLINGERIANA* MIQ.) BY IN VITRO CULTURE

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Abstract

Indigofera (*Indigofera zollingeriana* Miq.) is one of the legume trees that are useful as forage and have advantages in the production and quality of forage compared to other types of legumes. This forage contains high protein and mineral sources, good fiber structure and high digestibility value. Nutrient contents of Indigofera are crude protein (31%) with 76% of dry matter digestibility (DMD) and 83% of organic matter digestibility (ODM). Indigofera has low germination due to thick seed coat and fungal invasion during germination. Propagation by in vitro culture promise to multiply superior seeds from Indigofera. The aim for this research was to determine the effect of Benzylaminopurine and Kinetin for multiply of shoots of Indigofera. The research was designed using Completely Randomized Design (CRD) with 2 factor (BAP and Kinetin concentration) and repeated 3 times. BAP concentration consists of four levels, ie: 0, 1, 1.5 and 2 mg/L and Kinetin concentration consists of four levels too, ie: 0, 1, 2 and 3 mg/L. The results showed that BAP gave the best results for number of shoots parameter at any concentration. But compact callus appears in basal of shoots at BAP (1.5 mg/L and 2 mg/L) media. Whereas media with Kinetin showed no significant effect on all parameters and there was no interaction between BAP and Kinetin.

Keywords: *Indigofera zollingeriana*, multiplication of shoots, BAP, and Kinetin.

Paper ID: 79

CONSUMER PERCEPTION ON SELECTING MARKETPLACE FOR LIVESTOCK PRODUCTS FOOD PURCHASING

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Abstract

The purpose of this paper is to analyse the relationship between the underlying factors of product and market attributes and socio-demographic profiles of consumers. The aim of the analysis is to assess whether consumer responses vary across product and market attributes. Simple statistical analysis such as descriptive statistical analysis, frequency distribution, cross tabulation, analysis of variance, and factor analysis to assess the consumers' preferences for livestock products food and market attributes were carried out. Results of this study indicate that the socio-demographic profile of consumers (gender, age, education and income) significantly influences the purchase decisions. A higher income and educational level of consumers influences their decisions on product and market attributes while gender and age seems to have no significant impact. Consumers express significantly different views on various product attributes. Packaging and convenience are important for approximately 60 per cent respondents. Various market attributes clearly indicate that consumers prefer a convenient marketplace with additional service facilities. Development of marketing strategy regarding the products that can be offered at a marketplace based on consumer preferences and behavior.

Paper ID: 80

MERCURY POLLUTION IN DRINKING WATER AND ITS EFFECT ON RENAL FUNCTION OF SCHOOL AGE CHILDREN IN ASGM AREA SEKOTONG WEST LOMBOK

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Abstract

Background. Artisanal Small Scale Gold Mining has affected environment, since the gold processing method released mercury into the environment. Contaminated water was used as drinking water and could be the route of mercury entered human body. Kidney was one of mercury target organ. Mercury poisoning signs depend on nature of mercury, dose, route, duration of exposure and age of host. The objective of this research was to find out mercury pollution in drinking water and its effect on renal function of children in ASGM area Sekotong in West Lombok.

Method. This preliminary study design was cross sectional. The study was conducted in ASGM area Sekotong subdistrict. Sample of drinking water collected from various sources which located ASGM area. Mercury concentration was assessed by using AAS. Renal function of school age children were evaluated from urine sample by using dipstick kit. Correlation between contaminated water consumption and renal function was analyzed statistically by Spearman's test.

Result. Concentration of mercury found in water samples taken from well was 4.009 ppb, while water sample from wellspring water was 0.724 ppb and 0 ppb from pipe water samples. From 15s samples, 12s samples had higher value than mercury threshold for drinking water. Two of 30 school age children were positive proteinuria. Correlation between mercury contaminated water and proteinuria analyzed by Spearman's test showed p value of 0.000.

Conclusion. Drinking water in ASGM subdistrict Sekotong West Lombok has been contaminated by mercury and affected kidney function of school-age children.

Keywords: mercury, drinking water, school age children, ASGM.

Paper ID: 81

**THE IMPACT OF COVID-19 PANDEMIC ON THE
PERFORMANCE OF COMPANIES SELLING AGRICULTURAL
PRODUCTS
(A Case Study on Toko Ayu in Panjer, Denpasar)**

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Abstract

The Covid-19 pandemic outbreak, which has now spread all over the world, is something to be feared. Because this pandemic not only affects the health sector, but also in terms of social and economic aspects, including the food and agriculture sectors. The aim of this study is to understand and analyse the impact of Covid-19 on the performance of companies selling agricultural products (a case study on Toko Ayu in Panjer, Denpasar). The findings from this study show that the performance of Toko Ayu as a seller of agricultural products (i.e. flour, sugar, etc.) continues to experience an increase in sales compared to before the spread of the pandemic. In addition, the increase in sales results can also be seen from the main financial performance, namely the profitability, which reached 78%. Therefore, it can be concluded that the Covid-19 pandemic outbreak has a positive impact on Toko Ayu in terms of their performance in selling agricultural products.

Keywords: *Impact of Covid-19, companies' performance, agricultural products*

Paper ID: 82

SALICYLIC ACID TREATMENTS FOR EXTENDING POSTHARVEST QUALITY OF TOMATOES MAINTAINED AT DIFFERENT STORAGE TEMPERATURES

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Abstract

Salicylic acid (SA) is known to be an effective tool on extending the postharvest quality of horticultural commodities by preventing synthesis and movement of ethylene. Thus, the present study was established to study the effect of different dozes of SA treatments (0.5%, 1.0% and 2.0%) on extending postharvest quality of pink maturity tomatoes maintained at two different storage conditions (5 °C with 90% relative humidity and 20 °C with 65% relative humidity). SA treatment at all doses significantly retarded weight loss at both storage conditions. SA treated tomatoes were firmer, higher in titratable acidity, and exhibited less biochemical changes than the control fruit at the end of storage. Among the applied dozes, SA at 2% can be recommended as it was pioneering for most of the parameters analyzed during cold storage at both 5 °C for 20 d and at 20 °C for 10 d. SA treatment may be recommended as an environmental friendly, healthy and sustainable method for extending postharvest quality of tomatoes cold storage and shelf life, without significant adverse effect on produces.

Keywords: *Tomato, salicylic acid, postharvest, quality*

Paper ID: 83

**CARBON STOCK ESTIMATION ON SOME LAND COVER:
SECONDARY FOREST, AGROFORESTRY, PALM OIL
PLANTATION AND PADDY FIELDS**

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Abstract

The diversity of plant in some land uses at East Luwu Regency has potential to absorb and store carbon, which varies due to the plant different constituent. The differences of carbon stored of each land cover need to calculate in order to find the amount of carbon stock available. This study aims to estimate carbon stocks in the land cover of secondary forest, agroforestry, oil palm plantation and rice fields. The research use sample plot size 20 x 50 that taken 9 times for each land cover. Biomass data was collected using non-destructive sampling, since for undergrowth and necromass using destructive sampling by cutting and taking all the undergrowth and litter that are in a 1 x 1 meter quadrant. There are two kinds of soil sampling that collected; disturbed soil and intact soil. The results showed that the highest estimated carbon stock is secondary forest with carbon stock value of 265.86 tons / ha, as for agroforestry the carbon stock value of 131.31 tons / ha, while oil palm with a carbon stock value of 100.89 tons / ha and the lowest is paddy fields with carbon stock value of 70.50 tons / ha.

Paper ID: 84

ISOLATION AND CHARACTERIZATIONS OF PROBIOTIC PROPERTIES OF LACTIC ACID BACTERIA FROM WADI PATIN

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Abstract

Wadi patin is a traditional fermented fish product from Central Kalimantan made from patin (*Pangasius* sp.). One of the most common microorganisms found in fermented food products is lactic acid bacteria (LAB). This research aims to isolate the LAB from the wadi patin and characterize its potency as a probiotic candidate. The isolation of LAB from wadi patin was carried out using serial dilution and spread plate method on Mann Rogosa Sharpe (MRS) agar medium supplemented with CaCO₃. Isolates that formed a clear zone around its colony were chosen and screened based on its microscopic and biochemical characteristics. Isolates with Gram-positive, catalase-negative, and KOH-negative characteristics were confirmed as LAB and selected for further study on its probiotic properties. The characterization of probiotic properties on LAB isolates was carried out by assessing its tolerances to acid and bile salt, and also its antibacterial activity against Enteropathogenic *E. coli* (EPEC). A total of 9 isolates were isolated from the wadi patin samples. After the initial screening, only five isolates were confirmed as LAB and subjected for further assessment. All selected LAB isolates displayed high tolerances to acid and bile salt with 63-98 % survival rates after 4-5 hours of exposure. They also exhibited good antibacterial activity against EPEC with 2.8-7.6 mm diameter of inhibition zone. Out of 5 isolates used, isolate W2 possesses the best properties as a probiotic candidate. These results suggested that LAB isolates from wadi patin have a promising potency as a probiotic candidate and food preservative agent.

Keywords : *characterization, isolation, lactic acid bacteria, probiotic, wadi patin*

Paper ID: 85

**THE APPLICATION OF AMENDMENTS TO GROWTH AND
NUTRIENT ABSORPTION OF MEDICINAL PLANT PETIVERIA
ALEACEAE (SINGAWALANG) ON ENTISOL SOILS**

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Abstract

The COVID-19 pandemic encouraged efforts to find its prevention and treatment. The Indonesian state has a diversity of plants, many of which have anti-microbial effects. Singawalang plant (*Petiveria aleaceae*) has been used as an alternative treatment for tuberculosis, malaria, and other diseases in Indonesia and other countries. Active ingredients of this plant are flavonoids and several types of amino acids, which are contained in the leaves and roots. In addition to its use as a medicinal plant, Singawalang is also useful as an insecticide and akarisisida for plant pests and ticks in livestock. The main problem of the sustainable use of natural / international scale medicinal plants is its raw material, while Singawalang has not been cultivated in Indonesia. The purpose of this study is to investigate the role of dolomite, zeolite, and NPK fertilizers in increasing nutrient absorption and growth Singawalang in entisol soils. *P. aleaceae* were planted in polybags using entisol soils medium by Completely Random Design (CRD). Zeolite, Dolomite (2.5 tons / ha) and NPK Fertilizer 15:15:15 at a dose of (0; 1.5; 3; 4.5) g / plant were applied. The results showed that the amendment application had a significant effect on the number of leaves but it did not significantly affect other growth parameters and nutrient absorption of NPK. In general, Zeolites can increase growth and absorption of nutrients higher than Dolomite.

Keywords: *Amendment; Zeolite; Dolomite; Petiveria aleaceae, Entisol*

Paper ID: 86

MAINTAINING THE GRAPE CLUSTER QUALITY ON ORGANICALLY GROWN VINES AT VINEYARD CONDITION UNDER TEMPERATE CLIMATE CONDITION

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Abstract

Organically grown conventional produces have gained great attention in accordance with the increasing awareness on healthy foods as well as improvements in living standards. Environment friendly strategies to extend the quality of grapes after commercial maturity provide healthy and profitable sustainability in market chain. In the present study, possibilities to maintain the quality of grape clusters on grapevines without any chemical treatments have been studied under vineyard conditions in temperate climate characteristics of Konya Province in Central Anatolia. Grape clusters of 'Alphonse Lavallée' and 'Narince', one of the most popular conventional grape cultivar in Turkey, were kept at the vines trained with bilateral cordon system. The vines were drip irrigated during the hot summer and the vine canopy was covered with black nets to protect from the birds, hail and climatic extremities. After commercial maturity, twelve cluster samples per cultivar were collected with monthly intervals to investigate the changes in quality. Up to the 3rd sampling date (at the end of November 2019), little losses in quality features were determined in both cultivars. At the end of the study, at 4th moth (December) significant decay incidences were observed with the greatest value in 'Alphonse Lavallée'. General findings demonstrated that the grape clusters could be maintained on grapevines under intact condition of the cool autumn season in temperate zone by protecting them from the external damages using convenient protective materials up to three or four month depending on the cultivar's adaptation potential.

Keywords: *Grapevines, healthy foods, grape quality, quality maintenance.*

Paper ID: 87

THE EFFECTS OF CATFISH OIL SUPPLEMENTATION AS UNSATURATED FATTY ACID SOURCE ON BALI COW GAS PRODUCTION KINETICS, IN VITRO DRY MATTER DIGESTIBILITY, AND IN VITRO ORGANIC MATTER DIGESTIBILITY IN VITRO

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Abstract

Catfish oil (CFO) was a byproduct of catfish meal, which has high proportion of unsaturated fatty acids. The purpose of this study was to investigate the effects of catfish oil supplementation on gas production kinetics, dry matter, and organic matter digestibility in vitro with Bali cow rumen fluid. The materials used in this study consisted of Bali cow rumen fluid as inoculum, and treatment diets. The design of this study was a completely randomized design with 5 treatment consist of T0 (control diet: *Pennisetum purpupoides* (60%): wheat pollard (40%): soybean meal (10%)), T1 (T0 + 2% DM CFO), T2 (T0 + 4% DM CFO), T3 (T0 + 6% DM CFO), T4 (T0 + 8% DM CFO) and 3 replication. Gas production technique described by Menke and Steingass was used in this study with 48 hours of incubation time. Gas produced at 0, 2, 4, 8, 12, 24, 36, 48 hours after fermentation were recorded. Gas production kinetics was analyzed by Fit Curve application. The result showed that CFO supplementation at the level of 8% significantly ($P < 0,05$) decreased total gas production, b fraction value, in vitro dry matter digestibility (IVDMD), and in vitro organic matter digestibility (IVOMD), but there were insignificant ($P > 0,05$) effect on a and c fraction value. It could be concluded that supplementation catfish oil at the level of 6% DM in the Bali cow diet did not give a negative effect on rumen substrates degradation.

Keywords: *Catfish oil, Gas Production Kinetics, IVDMD, IVOMD*

Paper ID: 88

ECONOMIC FEASIBILITY ANALYSIS OF SERVICE BUSINESS OF AGRICULTURAL EQUIPMENT AND MACHINERY IN KUBU RAYA REGENCY, INDONESIA

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Abstract

The use of agricultural equipment and machinery has become the main farmer's need as technically it can accelerate and improve the quality of soil cultivation, water supply, increase the cropping index, reduce lost yields, maintain freshness and completeness, and preserve the environmental functions. Economically, it can increase the added values through product processing, productivity, and resource efficiency. Institutional service business of agricultural equipment and machinery needs to develop to facilitate farmers' access to the use of affordable agricultural equipment and machinery in order to increase the sustainable food production. The sustainability of the service business is influenced by many aspects including economic aspects. This study aimed to analyze financial feasibility of service business of agricultural equipment and machinery (UPJA) in Parit Keladi village, Sungai Kakap subdistrict, Kubu Raya Regency. Both R/C ratio and B/C ratio were the analysis applied. Based on R/C ratio of feasibility analysis, all kinds of agricultural equipment and machinery including transplanter, water pump, rice thresher, mini combine harvester, and hand tractor provided by the service business were feasible, shown by R / C ratio > 1,52 and B/C ratio >0,52. Whereas, The R / C value of water pump of 2.5; hand tractor 2.0; 1.81 transplant machine and 1.67 mini combaine and 1.31 power thresher machine, respectively.

Keywords: *sustainability, institutional agricultural enterprise, rice production*

Paper ID: 89

INCREASING NUTRIENT QUALITY AND IN VITRO DIGESTIBILITY OF MIXED FEED OIL PALM WASTE FOR RUMINANT FEED BY SOLID-STATE FERMENTATION TECHNOLOGY

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Abstrak

Local feed ingredients are widely available from industrial and agricultural waste byproducts. Palm oil cake (BS) and Solid ex decanter (SD) are feed ingredients produced from palm oil processing which is available in large quantities. Palm oil cake (BS) and Solid ex decanter (SD) have high protein content could be used as ruminant feed but have high fat content could be decreased rumen metabolism. They also have a physical properties that are easily damaged when stored. Therefore, solid-state fermentation (SSF) technology is one way to overcome this problem. This study aims to improve the nutritional quality and digestibility of mixed feed palm oil cake and solid ex decanter (BS/SD) which is fermented by *Rhizopus oligosporus* mushroom. Application SSF technology for different combination of mixed feed BS/SD (70/30, 50/50 and 30/70) was carried out for 5 days which was then analyzed on the quality of the proximate, fiber fractions and in vitro true dry matter digestibility (IVTDMD) value (daisy incubator ANKOM Technology). The result showed that the mixed feed BS/SD 50/50 was the best combination with *Rhizopus oligosporus* inoculum with doses of 0.2, 0.4 and 0.8%. hence, this SSF technology was effective process for increasing protein content and in vitro true dry matter digestibility (IVTDMD) 60 % - 67.26% with combination BS/SD 50/50 and RO inoculoum with doses 0.2 and 0.4 percent.

Keywords : *Mixed feed, Plam oil cake (BS), Solid ex decanter (SD), Solid-state fermentation (SSF) and Nutrient Quality*

Paper ID: 90

DEVELOPMENT OF ORGANIC AGRO TOURISM FOR OPTIMIZING AGRICULTURAL RESOURCES IN NGAWI, EAST JAVA, INDONESIA

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Abstract

Ngawi Regency, part of East Java province in Indonesia, has started to initiate the development of organic tourism based on the organic agriculture potential. This program is promoted by motivating farming communities to develop organic agriculture and preparing several villages to become specific areas of tourism. According to that, this study was aimed for exploring agricultural resources and land suitability that can be developed as community-based organic tourism attractions and secondly for identification of factors which support and inhibit the development of community-based organic tourism attractions. To achieve that goals, study field observations, in-depth interviews, and focus group discussion were conducted to collect information for further data analysis. Moreover, a triangulation method is used for data validity. In this study data were analyzed by spatial analysis techniques to explore the agricultural resources and land suitability. The 4A (Attraction, Accessibility, Amenity, Activity) analysis techniques also applied to the data, to formulate the strategies for developing community-based organic tourism attractions. As the result, we found the needs and roles of community in developing agro-tourism areas. The development of agro-tourism areas requires community participation in various sectors. Economic point of view played an important role in management of agro-tourism areas, due to without economic benefits there is no motivation to contribute to community and businesses of agro-tourism. Since the agro-tourism has effect to environment, both natural and cultural, therefore taking advantage of agricultural resources need to be carefully considered in developing a community-based organic tourism attraction. In this term, the environmental elements must be preserved for sustainable benefit and function.

Keywords: *Agro-tourism, organic agriculture, community-based*

Paper ID: 92

EVALUATION OF SORGHUM GROWTH AND BIOMASS PRODUCTION ON CADMIUM CONTAMINATED PADDY FIELD

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Abstract

The use of agrochemicals that exceed doses and over-exploitation of land for an agricultural commodity contribute to increasing cadmium concentration. Sorghum is a multifunctional crop which has potential as a heavy metal remediation plant. This study aimed to evaluate six sorghum varieties for growth and biomass production on cadmium contaminated paddy fields. The study was carried out in paddy fields without crop rotation and technical irrigation. The study was arranged in a complete randomized factor group with four replications. Six sorghum varieties tested were: Super 1, Samurai, Suri 3, Numbu, Kawali, and Black sorghum. These varieties were planted with cadmium contaminated paddy fields. Generally, sorghum varieties can grow in cadmium contaminated paddy fields. Three of the six varieties tested namely Super 1, Samurai, and Kawali have advantages in growth such as plant height, leaf area, leaf chlorophyll levels, plant growth rate, and net assimilation rate. A large biomass production is also shown by these three varieties. The results in this study will be described and used as a reference to test the ability of sorghum varieties in absorption and accumulation of cadmium in plant organs.

Keywords: *Sorghum, Phytoremediation, Cadmium, Paddy fields.*

Paper ID: 93

**EXPLORATION OF ANTAGONISTIC BACTERIA AGAINST
PEANUT STEM ROT DISEASE (*SCLEROTIUM ROLFSII*
SACC.) ON THE PEATLAND OF KUALA PESISIR-NAGAN
RAYA, INDONESIA**

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Abstract

Peanut cultivation in peatlands has major obstacles in terms of controlling plant diseases. One of them is stem rot disease caused by *Sclerotium rolfsii* Sacc. Organic matter in peat provides nutrients for pathogens as long as there are no hosts. Disease control using pesticides may be effective, but is short term. Besides that, the use of pesticides unwisely can have a negative impact on the environment. biological control can be an option for this pathogen. besides being environmentally friendly, it also has a long-term effect in suppressing pathogens during favorable environmental conditions. The exploration of antagonistic bacteria as a biological control agent for *S. rolfsii* aims to find local bacteria that have the potential to control of peanut stem rot disease on the peatland of Kuala Pesisir-Nagan Raya. This research was conducted in the Kuala Pesisir sub-district, Nagan Raya District, Aceh, Indonesia. research activities include isolation, morphological identification, pathogenicity testing, antagonistic testing, and molecular identification. The results obtained 67 bacterial colonies from three sources including weed rhizosphere around peanut cultivated, peanut rhizosphere, and peanut roots. Bacterial isolates that have the potential to suppress *S. rolfsii* were identified as *Bacillus* sp.

Keywords: *peatland, Sclerotium rolfsii, Bacillus* sp.

Paper ID: 94

THE GROWTH AND YIELD OF HYBRID CORN ON DIFFERENT PLANT SPACING

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Abstract

Corn is the important food crop in the world. National demand for corn is increasing every year. The low productivity of corn can be caused by non-intensive cultivation techniques. Efforts to increase corn production can be done by using of high yielding varieties and fertilizing. The also important factor is plant spacing. Plant spacing affects the number of plants, the process of receiving sunlight, water and nutrients which also affect the process of photosynthesis and assimilation between plants. The aim of this research was to examine the effect of different plant spacing and to evaluate plant spacing that could increase the growth and yield of hybrid corn. This research was conducted in UNS experimental field Jumantono, Karanganyar start from June-November 2019. Design utilization was experimental method with Randomized Complete Block Design (RCBD) of 1 factor, consist of 4 levels, the treatment was 60 cm x 30 cm (J1); 60 cm x 40 cm (J2); 60 cm x 50 cm (J3); and 60 cm x 60 cm (J4). There was replicated 6 times. The result showed that plant spacing of 60 cm x 60 cm has increase on cob weight with husk, cob weight without husk, number of cob per plant and grain yield per plant compared with plant spacing of 60 cm x 30 cm. The plant spacing treatment of 60 cm x 60 cm can improve quality of yield per crop but have not been able to increase the quantity of hybrid corn yield.

Keyword: *plant spacing, hybrid corn, the growth and yield.*

Paper ID: 95

EFFECT OF SPACING ON GROWTH AND YIELD OF SANGGA SEMBALUN GARLIC VARIETY OF SEMBALUN HIGHLAND WEST LOMBOK

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Abstract

This study was carried out to determine the effect of plant spacing on growth and yield of local garlic (*Allium sativum sativum*) variety named Sangga Sembalun from Sembalun Highland of West Lombok District, Indonesia, from June 2018 to March 2019. The on-farm experiment was conducted in randomized complete block design (RCBD) for three plant spacing treatment which was 12 cm x 12 cm (T1), 12 cm x 10 cm (T2), and 10 cm x 10 cm (T3) with nine replication in 10 m² plot size for each. The results showed that there was no significant difference on effect of spacing on plant height, number of leaves, fresh weight, dry weight, moisture content, bulb weight, bulb size (length and diameter), cloves number, and cloves weight. However, plot yield was higher at T3 (4.84 kg/m²) than T2 (3.71 kg/m²) and T1 (3.77 kg/m²) due to significant increase in population which was, in average, 153, 107, and 90 plant per m² for T3, T2, and T1 respectively. Moreover, weight lost from fresh to dry yield was lower in T3 (55.32%) than T1 (58.13%). Weight lost in T3 was consistently the lowest at 4.35% after six months storage to produce seed bulb.

Keywords: *Garlic, Sangga Sembalun, Spacing*

Paper ID: 96

***PTERIS VITTATA* AS PHYTOREMEDIATOR OF ARSENIC
HEAVY METAL AND THE EFFECT ON PRODUCTION AND
QUALITY OF *IPOMEA REPTANS* POIR**

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Abstract

Kale (*Ipomea reptans* Poir) has high nutrition such as vitamin A, B and C as well as various minerals especially iron which is useful for human health and animal. Kale not only can be consumed by humans, kale can also be used as forage. Good and quality animal feed must be clean from diseases and heavy metal contamination in it such as Arsenic. Arsenic in the soil can be reduced naturally but using phytoremediator plants, one of which is *Pteris vittata*. The experiment was conducted at the Antirogo Green House, Sumbersari District, Jember Regency. Arsenic metal analysis was conducted in BARISTAND, Surabaya and BALITTANAH, Bogor in June 2019 to January 2020. The experimental design used in this study was a Factorial Complete Random Design consisting of 2 factors. The first factor consisted of 4 levels of heavy metal arsenic treatment on kale growth media, namely 0 ppm (D1), 5 ppm (D2), 10 ppm (D3) and 15 ppm (D4). The second factor consists of 2 levels of treatment time of planting ferns that is 1 month (P1) and 2 weeks (P2). Each treatment was repeated 4 times. The results showed that the interaction between the time planting fern and arsenic dose had no significant effect. Absorption power of ferns reaches 0,27 ppm to 4,589 ppm higher compared to kale absorption reaching 0,006 ppm to 0,155

Paper ID: 98

**APPLICATION OF SILICON BASED LIQUID FERTILIZER TO
DOUBLE DRY SEASON SOYBEAN (*GLYCINE MAX (L.)
MERRILL*) PRODUCTIVITY OF CENTRAL LOMBOK
RAINFED LOWLAND**

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Abstract

Soybean is the rotation crop that dominantly grown after rice during dry season in most lowland paddy field of Eastern Indonesia. This field experiment aimed to improve dry season soybean production by spraying liquid fertilizer (LF) containing silicon. Burangrang soybean variety grown from August to October 2018 at Tenandon of Penujak Village, Praya Barat sub-distict of Central Lombok, West Nusa Tenggara Province. Five treatments were arranged on randomized block design with three replications on 100 m² plot size. The treatments were application of silicon-based liquid fertilizer (SLF) named SLF-ON, SLF-BX, SLF-BS, compared to non-silicon liquid fertilizer named LF-BU and the control which was without any liquid fertilizer (LF-0). Land preparation, planting, irrigation, and harvest was guided using integrated soybean management handbook. Yield and yield component data was collected at harvest. The result showed that application of LF was significantly increase total dry matter weight, including percentage dry matter accumulation on leaf, pods weight, and percentage of filled pods. Soybean production improved about 102.06%, 95.88%, 61.86%, dan 47.42% by spraying SLF-BS, LF-BU, SLF-ON, dan SLF-BX respectively when compared to LF-0.

Keywords: *Liquid silikon fertilizer, soybean, dry season, Central Lombok*

Paper ID: 99

DIFFERENCE PLANTING TIME IN NO TILLAGE SOYBEAN (*GLYCINE MAX L.*) AFTER RICE ON GROWTH AND YIELD

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Abstract

Soybean is the third important food source after rice and corn in fulfill the nutritional needs of the community. This is because soy has a relatively inexpensive source of vegetable protein when compared to other protein sources such as meat, milk, and fish. Soybean needs continue to increase along with the increase in population, while the production achieved has not been able to offset those needs. Soybean planting after rice harvesting is a problem in decreasing production yield, this is due to planting too long so that the land becomes dry. Increasing soybean yields needs to be done with innovation in cultivation techniques, one of which is by applying the difference in planting time. This study aims to obtain planting time that can increase the growth and yield of soybeans in a system without tillage. The study was conducted from June to September 2019 on the former rice field land in Pengkok Village, Kedawung District, Sragen Regency, Laboratory of Ecology and Management Plant Production and Soil Chemical Laboratory, Faculty of Agriculture, UNS. This research was conducted using a Randomized Completed Block Design (RCBD) 1 factor with 5 treatments (2, 4, 6, 8 and 10 days after rice harvest) and repeated 5 times. Data from observations were analyzed using analysis of variance based on the 5% F test followed by Duncan's Multiple Range Test (DMRT) of 5% and a correlation test was performed to determine the relationship between soybean planting time difference and the yield. The results showed the difference in planting time was able to increase the growth and the yield variable was a difference of 2 days after the time of harvesting rice because it was able to increase leaf area, number of branches, number of pods, seed weight per plant, seed weight per plot weight 41.38%(1,41t/ha) compared to the difference 6 days after the time of harvesting rice(0,58t/ha).

Keywords: *planting time, no tillage, water use effiency*

Paper ID: 100

UTILIZATION OF INFERTILE EGG POWDER IN RATION IMPROVES THE DIGESTIVE TRACT DEVELOPMENT OF BROILER CHICKENS

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Abstract

The well-developed digestive tract will support the overall lifespan growth performance of broiler chickens. Providing the high level of nutrient for broilers plays pivotal role in supporting the digestive tract development. Infertile egg powder (IEP) is a potential feedstuff with high nutrient content. This experiment investigated the effect of IEP utilization in the ration on digestive tract development of broiler chickens. In total, 196 one-day-old male broilers were distributed into four dietary treatments. The experiment used 7 replicates of 7 birds each. The treatments comprised a basal diet (T0), 96% basal diet + 4% IEP (T1), 94% basal diet + 6% IEP (T2), and 92% basal diet + 8% IEP (T3). The weight and length of the digestive tract was measured at the end of feeding trial to observe their development. Analysis of variance was applied to analyze the effect of treatments, while Duncan's Multiple Range Test was applied to compare the mean of each treatment. The results indicated that feeding with IEP (T1, T2, and T3 groups) generated the longer duodenum, jejunum, ileum and whole small intestine compared with feeding without IEP (T0, $P < 0.05$), with the highest magnitude was observed for T3. Accordingly, IEP improved the weight of jejunum and small intestine ($P < 0.05$). In line with this, the IEP groups had heavier gizzard and liver than non-IEP groups. It can be concluded that IEP improves the development of digestive tract of broiler chickens.

Paper ID: 101

ROLE OF PHOSPHATE FERTILIZER FOR GROWTH AND YIELD OF HYBRID MAIZE (*ZEA MAYS*)

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Abstract

Maize (*Zea mays*) is a strategic commodity because its high productivity and diverse uses. This study aims to obtain a dose of phosphate fertilizer which increases growth and yield of hybrid maize. The research was conducted on the dryland, Faculty of Agriculture, UNS, Jumantono, Karanganyar in June-September 2019. The research method used was an experimental method with a Complete Randomized Block Design 1 factor with 4 dose and was repeated 6 times. The dose is 0; 100; 150; 200 kg/ha P fertilizer. The observed variables namely plant height, number of leaves, stem diameter, leaf area index, fresh stover weight, dry stover weight, weight of cobs with husks, weight of cobs without husks, average of cobs per plant, number of seeds per plant, weight of seeds per plant, weight of seeds per hectare, weight of 100 seeds. The application of 150 kg.ha⁻¹ of phosphate fertilizer SP-36 increases growth variable. The application of 100 kg. ha⁻¹ of phosphate fertilizer SP-36 increases yield variable of weight maize per hectare (5.91%) to 2.15 tons / ha.

Keywords: *hybrid maize (Zea mays), phosphate fertilizer, dry land.*

Paper ID: 102

**COMPARING PREFERENCE OF *BEMISIA TABACI* GENN.
(HEMIPTERA: ALEYRODIDAE) ON VARIOUS HOST PLANTS
(CHILI, TOMATO, EGGPLANT, CUCUMBER, OKRA) AND
CHILI GENOTYPES (*CAPSICUM ANNUUM* L.)**

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Abstract

Whitefly *Bemisia tabaci* Genn. is one of the main pests in vegetables. Whitefly can cause direct and indirect damage, as a vector of various viruses. Damage caused by whiteflies attack could cause a loss of 20-100%. These research were done in insect cages at glasshouse with antixenosis mechanisms (free choice test). Host plants were used 4-6 leaves or 6-8 DAP. The genetic material used for experiment with various host plant were chili (*Capsicum annum* L.) genotype Yuni, Kastilo and Laris, eggplant (*Solanum melongena* L.) genotype Ratih Ungu, tomato (*Solanum lycopersicon* L.) genotype New Mutiara, cucumber (*Cucumis sativus* L.) genotype Maestro and okra (*Abelmoschus schimosus* L.) genotype Nayla. While the genetic material used for chili genotypes were Yuni, Kastilo, Laris, C00265, PBC 495, Ayesha, Ungara, Landung, Cilibangi-2, 12 OP and Bara. The objective of this study was to evaluate the preference (antixenosis) of *B. tabaci* on various host plants and Chili genotypes. The number of eggs and early stage nymphs in the chilli genotype Yuni, Kastilo, Laris were higher in the chilli cropping compared to various host plants. This indicated that planting with various plants confused whitefly in choosing a host plant. Cucumber and eggplant were plants that had a higher preference than others. Therefore that are not recommended for intercropping with chili. Tomato and okra were alternative plants that can be used in intercropping with chili.

Keywords: whitefly, antixenosis, intercropping, monocropping

Paper ID: 103

RESPONSE OF LOCAL RICE VARIETIES WITH INTERMITTENT IRRIGATION IN MICRO CLIMATE FACTORS

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Abstract

Intermittent irrigation is a method of irrigation that is done for the efficiency of irrigation in rice cultivation. This study aims to study the interaction of local rice varieties and types of irrigation, the effect of local varieties and irrigation system on rice micro climate factors. The study was conducted with an experimental method of factorial 3x4 strip plot design with a Randomized Completely Block Design (RCBD) with 3 replications. The factor I type of irrigation consists of 3 levels, namely: conventional irrigation, irrigation 10 days inundated 5 days dry, irrigation 7 days inundated 3 days dry. Factor II of rice varieties, consisting of 4 levels, namely: Rojolele, Pandan Wangi, Mentik Wangi, and Ciherang. The results showed that the Pandan Wangi variety of rice with 7 days of inundation in 3 dry days had higher temperatures above the canopy while Ciherang with conventional irrigation had higher temperatures under the canopy. Ciherang with 10 days of inundation 5 days of irrigating have higher under-canopy air humidity. During the initial vegetative, irrigation 10 days inundated 5 days dry and 7 days inundated 3 days dry had higher soil temperatures above the surface than conventional irrigation. When flowering, irrigation 7 days inundated 3 days dry has a soil temperature above the surface higher than conventional irrigation. When flowering, irrigation 7 days inundated 3 days dry has a soil temperature-depth of 15 cm higher than conventional irrigation and irrigation 10 days inundated 5 days dry. The condition of the micro climate was expected to be useful concerning plant physiology, pests, diseases, and rice weeds and their control.

Keywords: *Micro climate, rice varieties, SRI, intermittent irrigation.*

Paper ID: 105

DETECTION OF GROWTH HORMON GENE POLYMORPHISM AND ITS ASSOCIATION WITH BODY WEIGHT OF KEBUMEN-PO CATTLE

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Abstract

Kebumen-PO cattle is one of local genetic resources that has good body weight and growth. The aim of this research was to detect growth gene polymorphisms (GHR, GH and Pit1) and their associations with body weight of Kebumen-PO cattle. The sample used was 100 heads of Kebumen-PO cattle belonging to *Asosiasi Peternakan Sapi PO Kebumen (ASPOKEB)* livestock group. This research observed Kebumen-PO cattle growth from birth to one year of age. DNA extraction of Kebumen-PO cattle used blood samples. After DNA extraction, PCR-RFLP method was used to observe three growth genes (GH, GHR and Pit1). This result of this research showed that GH and GHR gene was polymorphic, while the Pit1 gene is monomorphic. The Kebumen-PO cattle has average of birth weight, weaning weight and yearly weight 29.0 ± 0.29 kg, 150.5 ± 5.09 kg and 203 ± 5.62 kg, respectively. The analysis showed that three growth genes were not significantly associated with the body weight of Kebumen-PO cattle.

Keywords: *Growth hormone genes, polymorphisms, PO Kebumen cattle, associations*

Paper ID: 106

EMPLOYING LOGISTIC MODEL TO PREDICT THE EGG PRODUCTION OF QUAILS RECEIVING DIGESTIBILITY ENHANCER SUPPLEMENTATION

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Abstract

Supplementation with feed additive may affect the egg production curve of quails. This study aimed to predict the egg production of quails supplemented with a combination of betaine and silica+ as digestibility enhancer and the fitness of using the logistic model. Three hundred and fifty laying quails were divided into two dietary treatments and seven replicates with 25 quails each. The treatments consisted of control (T0), and supplementation with digestibility enhancer mixture consisted of 0.12% betaine and 200 ppm silica+ (T1). Egg production data were collected for three periods of 28 days (3 × 28 days), and they were subjected to T-test. The data were plotted to obtain the egg production curve. A logistic regression model was employed to identify the trend of the egg production pattern. The result showed that T1 groups produced more eggs than T0 groups (P<0.05), which attributed to the higher egg production during period II and III (P<0.01). This finding was confirmed by the egg production curves which indicated that the production rose sharply soon after the beginning of lay. The T1 groups had a higher peak production than T0 (76.43% vs 69.20%). Furthermore, production rate was 0.17 and 0.18 and prediction accuracy was 97% and 98% for T0 and T1, respectively. Thus, the logistic model proved to be employed to analyze the biological impact of egg production in quails with a high prediction accuracy.

Paper ID: 107

THE CHARACTER OF ASCORBIC ACID (VITAMIN C) IN PURSLANE (*PORTULACA OLERACEA* L.) AT VARIOUS HEIGHTS IN EAST JAVA, INDONESIA

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Abstract

Objective: to get purslane plants (*Portulaca oleracea* L.) as a source of quality bioactive components of ascorbic acid (vitamin C) from various heights in East Java Indonesia. Purslane (*Portulaca oleracea* L.) is a weed that can be used as a source of natural antioxidants. One of the ingredients in purslane is ascorbic acid (vitamin C). One of the preventive measures related to infections caused by the corona virus is taking vitamin C to support the body's immunity which is proven to have a positive effect on the body's immunity. Vitamin C can prevent susceptibility to reduce respiratory infections in certain conditions. COVID-19 has been reported to cause higher respiratory infections so vitamin C can be an effective choice for COVID-19 treatment.

Method: taking purslane planting material in the lowlands <200 m asl Surabaya, medium plains 200-800 m asl in Malang DAU and uplands > 800 m asl Batu. Poor. Vitamin C analysis was carried out using HPLC

Results: The analysis of the content of *Portulaca oleracea* L. Ascorbic acid (Vitamin C) from three heights was at plateau 9.24 mg / kg, medium plain 2.40 mg / kg and lowland 9.73 mg / kg.

Keyword: asam askorbat (Vitamin C), *Portulaca oleraceae* L., various heights

Paper ID: 108

**THE STUDY OF DISTRIBUTION OF CHICKEN MANURE
FERTILIZER FOR PAPAYA GROWTH AND PRODUCTION
BENEATH UNPRODUCTIVE PALM OIL**

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Abstract

The current study is aimed to examine the growth and production of papaya cultivated beneath unproductive palm oil (2 years old). The research was conducted Naga Sari village, Muaro Jambi regency, from February 2020 to June 2020. The design applied was group randomized group design with 2 treatment factors. The first factor was California variety (V₁) and ruby rise red variety (V₂). The second factor was chicken manure distribution without fertilizer distribution (P₀), 50 g of (P₁), 100 of (P₂), 150 of (P₃) and 200 of (P₄). The result of this research showed that the distribution of 150 g has real impact on the plants height, the number of leaf, stem diameter, and the number of fruit on 18 MST to 20 MST. Variety treatment doesn't have real impact on papaya observation parameter. The interaction among the varieties with a dose of chicken manure has real impact on stem diameter and number of leaf. Qualitative data form papaya varieties showed fruit color and taste experiment get the real impact. The impact of papaya plants and chicken manure showed the good growth tendency on palm oil cultivated with ruby rise red papaya as the side plant.

Keywords: *Varieties, Chicken Manure Dose, 2 Year-Old Palm Oil.*

Paper ID: 109

**ANALYSIS OF INCOME DISTRIBUTION AS PREVENTION
OF ENVIRONMENTAL DAMAGE IN
AGRIBUSINESS MANAGEMENT OF CASSAVA
IN BENGAWAN SOLO WATERSHED, WONOGIRI DISTRICT**

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Abstract

In the perspective of human ecology, Pranaji (2005) states that massive environmental damage due to the community's ability to manage the environment is very weak, and it also indicates damage to cultural values. Pranaji's reference in his research refers to Grootaert (1998) which states that the problem of socio-economic inequality (income distribution) and environmental damage is rooted in cultural values and social capital in the local community. Departing from that thought, this study was conducted with the aim to 1) find out the income distribution or income gap among cassava farmers, 2) find solutions to efforts to increase cultural value in preventing environmental damage related to the agribusiness management of cassava in the Bengawan Solo Watershed Wonogiri District as indicated there was environmental damage to land degradation and erosion that led to the silting of the Wonogiri Reservoir. Survey approach of this research conducted with cross sectional data, with questionnaire research instruments. Data were analyzed by income analysis and income distribution analysis by finding the Gini Index value and illustrated by the Lorentz curve. The results showed that the level of income gap was quite high with the Gini Index reaching 0.4 in the agribusiness management of cassava. It is recommended to strengthen cultural values through increasing the capacity of farmer in social empathy, the spirit of cooperation and appreciation for environmental knowledge and rational collective decision making and a high level of accountability in the agribusiness management of cassava while preventing environmental damage to the land.

Keywords: *cassava agribusiness, inequality, income distribution, Gini Index*

Paper ID: 110

MORPHOLOGICAL CHARACTERIZATION OF INDONESIAN NATURAL ORCHIDS *PHAIUS* SPP

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Abstract

Phaius spp orchid plant has a large enough plant size and dark and striking flower color which is an attraction for *Phaius* spp. Morphological characterization of orchids is needed for the preservation of germplasm and selecting a variety of natural orchid germplasm that has superior plant and hash surface properties to be used in crossing. The study used plant collection materials from the Bogor Botanical Gardens Conservation Center. (Sulawesi: *Phaius tankervilleae*, *Phaius indigoferus*, Papua: *Phaius montanus*, and Bali: *Phaius amboinensis*, *Phaius callosus*). This study aims to determine the genetic proximity to become parents in crossing. The morphological characterization method was carried out descriptively based on direct observation surveys and documentation of parts of natural orchid plants. The study was conducted in May-August 2019 at the Bogor Botanical Gardens Conservation Center. The study was conducted on 20 characters with quantitative observations based on each orchid species (BALITHI 2007).

Keywords: *Orchid, Characterization, vegetative, generative*

Paper ID: 112

APPLICATION ZnSO₄ ON TOMATO GROWTH UNDER DROUGHT STRESS CONDITIONS

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Abstract

An alternative that can be used to reduce the impact of drought stress is the addition of micro-nutrients, one of which is Zn. Zn application on several plants has been done and showed an increase in the ability of plants to deal with drought stress. However, the application of Zn in drought tomatoes has not been well investigated. Therefore, the research aims to study the application of ZnSO₄ on root and shoot growth of drought tomatoes. The study used two factors, namely cultivar ('Tyrana F1' and 'Permata F1') and ZnSO₄ doses (0, 10, 20, 30 and 40 mg Zn kg⁻¹ soil). The treatments were arranged in factorially based on a complete randomized block design. Drought conditions are applied by watering every 8 days. The results showed that there is a different response in a total root length in both cultivars within the ZnSO₄ application. ZnSO₄ application increased root dry weight, however, there is no different response in the shoot growth of tomato under drought stress in ZnSO₄ application

Keywords: *drought, root, shoot*

Paper ID: 113

AGRICULTURAL SUSTAINABILITY AND WOMEN: AN ANALYSIS

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Abstract

Agricultural sustainability has been a great issue to discuss. Sustainable agriculture is at the heart of the 2030 Agenda and first fundamental step to securing zero hunger. Sustainability in agriculture is considered from three dimensions of sustainability: economic, social and environmental (The 2030, Sustainable Development Goal Agenda, 2030 indicator 2.4.1.). Interestingly, in the agricultural sector a large number of women are engaged worldwide. In India, feminisation of agriculture has been a recognized phenomenon. They have been playing a very important role in the entire process from sowing the seeds to cutting of crops. Unfortunately, when we look at this section of supplier of food, it is quite understandable that they are suffering due to several reasons e.g.- domestic violence, deprivation of the right to property, uneven distribution of household works as their male counterpart mostly found reluctant to shoulder the responsibility. Apart from these stumbling blots at home, in the fields also they are subjected to great number of discriminations starting from inequal remuneration for works, sexual harassments, lack of institutional support and safety nets, non- availability of Kisan Credit Card, lack of training facilities, reluctance to maternity issues (incidents of removal of uterus of some of the women farmers in Maharastra in recent times) and so on. Keeping these things in mind, it may be clearly stated that unless adequate safety arrangements are made for women farmers in India, particularly when feminisation of agriculture has become a prominent picture in India, it is very difficult to achieve Agricultural sustainability. Hence, this paper aims to explore the relationship between the Agricultural sustainability and women and secondly, will find out the ways how this problem may be resolved.

Keywords: *Agricultural sustainability, feminisation of agriculture, dimensions of sustainability, institutional support system, right to property.*

Paper ID: 114

MORPHOPHYSIOLOGICAL CHARACTERISTICS AND YIELD OF BLACK RICE (*Oryza sativa* L. *Indica*) INDUCED BY GAMMA RAYS 100 GY AT M3 GENERATION

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Abstract

Black rice is one of local rice popular as functional food and potential to be developed because it has benefits for health. The high crop posture, long time period for cultivating, and low productivity being limited factors for cultivating black rice. Induced mutation using irradiation of gamma rays was expected to produce M3 mutant black rice that has better agronomic and physiological properties. The aims of this research were the examine morphophysiological characters by growth analysis and yield performance on M3 generation of local black rice varieties from Boyolali and Bantul as a result of 100 Gy gamma ray irradiation. The research was conducted on a paddy field that located in Jati Village, Karanganyar on April- August 2019. The parameters observed were Leaf Area Index (LAI), Net Assimilation Rate (NAR), Relative Growth Rate (RGR), Specific Leaf Weight (SLW) on 2-4 WAP, plant height, the total number of tillers, the number of productive tillers, panicle density index, number of filled grains per panicle, and weight of grain per clump. The result showed morphophysiological character on M3 mutant black rice of Bantul varieties with dose 100 Gy based on growth analysis showed that the value of NAR, SLW, and RGR is high on 2-4 WAP. The local varieties of black rice on Bantul 0 Gy had a high increase of LAI on 2-4 WAP. Mutation that occurs on mutant M3 black rice at a dose of 100 Gy cause it had a short plant height, but the yield components were still low.

Keywords: *Gamma rays irradiation, growth analysis, local black rice varieties, mutation*

Paper ID: 115

RESPONSES OF FOUR VARIETIES OF CARROT PLANT (*DAUCUS CAROTA* L.) GROWN IN MEDIUM LATITUDE TO DIFFERENT RATES OF FERTILIZATION

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Abstract

A study was carried out to investigate the effect of different rates of NPK fertilization on growth and yield of carrot plants cultivated in medium latitude in Lombok Island. The experiment was conducted in Setiling Village of Central Lombok (at ca. 650 m above sea level) and arranged in Randomized Completely Block Design with two factors: carrot variety (v) and rates of NPK fertilization (n). The first factor comprised of four carrot varieties: Gundaling (v1), Ratu Jabar (v2), New Nantes (v3) and New Kuroda (v4), while the second factor comprised of four rates of NPK fertilization: 50 kg/ha (n1), 100 kg/ha (n2), 200 kg/ha (n3) and 400 kg/ha (n4). Growth of plants was evaluated every two weeks and after harvesting, the tap root samples were collected and evaluated for yield and tap-root quality. The results showed that there was no interaction between carrot varieties and the rate of NPK fertilization on influencing the growth and yield of carrot in medium latitude. However, growth and yield of carrot in medium latitude were significantly influenced by the variety and rate of NPK fertilization, as shown by differences in the ratio of above and below ground biomass, tap root texture and sweetness, tap-root length and diameter as well as the ratio of cortex to stele. Accordingly the suitable variety for cultivation in the medium latitude was Gundaling variety (v1), with a higher growth and yield were obtained by NPK fertilization at rate of 200 kg/ha (n3).

Keywords: Carrot tap-rot, Gundaling, sweetness, texture, biomass

Paper ID: 116

BIODECOMPOSER OF SEAWEED COMPOSTING

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Abstract

Indonesia as an archipelago has the longest coastline in the world, after Canada, which is 95,181 km, The potential of marine and coastal resources is very large and has the potential to be explored further to support the welfare of people living on land. One of the economically valuable marine resource commodities is seaweed. The potential for seaweed in agriculture has not been utilized optimally. Seaweed can be used as raw material for making organic fertilizers, soil enhancers and biostimulants. In some countries seaweed-based fertilizers and seaweed extract have been widely used. The compounds contained in seaweed extract are polysaccharides (ie galactan, fucoidan, alginate, and laminarin), proteins (lectins), unsaturated fatty acids, pigments, polyphenols, macro nutrients (K, Mg, Ca, and Na), and fitohormon (Chojnacka et al, 2012). The existence of growth-stimulating activity from the seaweed-based formulation, can be used as a biostimulant to increase food crop productivity (Sivasankari et al, 2008; Khan et al, 2009; Rathore et al, 2009). The purpose of this research was to obtain a biodecomposer isolates and formulas for making seaweed compost. The results of the research, conducted at ISRI, show that the F3 formula contained three isolates (GK5.7 ; SW2.1 ; NP2.4) is the best formula for the decomposition of *Sargassum* seaweed, based on CO₂ evolution parameters, decreasing of raw material weight, and C/N.

Keywords : *seaweed, compost, biodecomposer*

Paper ID: 117

FEASIBILITY STUDY AND ANALYSIS OF INVESTMENT RISK OF WATER SUPPLY SYSTEM IN SIDOARJO KOTA BARU AREA

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Abstract

The revised Perda of Sidoarjo Regency No.6 Tahun 2009 states that the Sidoarjo Regency will form the Sidoarjo Kota Baru area which functions as a housing, trade, and service area in Sukodono Subdistrict. Drinking water services in Sukodono Subdistrict 2017 were 32% using PDAM and 238 using HIPPAM. The realization of PDAM Delta Tirta's revenue in 2018 did not reach the RKAP set, causing the limitations of PDAMs in the development of a 100% water supply network. The development of drinking water infrastructure that is technically, economically, and financially feasible but does not have a budget, can be submitted as a Kerjasama Pemerintah dengan Badan Usaha (KPBU) project. Based on these problems, it is necessary to conduct a feasibility study and investment risk analysis of the drinking water supply system using the KPBU concept. Based on the analysis, the investment in drinking water supply systems in Sidoarjo Kota Baru area with ready water quality is declared technically feasible using the KPBU concept referred from PT. Penjaminan Infrastruktur Indonesia.

Keywords: *Drinking Water, Sidoarjo Kota Baru Area, KPBU*

Paper ID: 118

**STUDY OF INVESTMENT RISK ANALYSIS FOR
PREPARATION OF FEASIBILITY OF WATER SUPPLY
SYSTEM USING FAILURE MODE AND EFFECT ANALYSIS
(FMEA) METHOD CASE STUDY: MANYAR SUBDISTRICT,
GRESIK REGENCY**

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Abstract

The condition of drinking water services in Gresik Regency based on the Department of Public Works and Spatial Planning (DPUTR) in 2018 only reached around 48.15% which was served by the Regional Water Supply Company (PDAM) and the Drinking Water Supply Facility Management Group (KPSPAM). A small portion of Manyar Subdistrict is served by PDAM and the majority is served by KPSPAM. Manyar Subdistrict which is served by KPSPAM uses supply water sources that come from deep ground water taken by pump or better known as bore wells. most of the groundwater used is also brackish. In 2019 the Bendung Gerak Sembayat's Water Treatment Plant (WTP) will be built with a capacity of 1,000 lps to serve industrial and residential areas in the North Gresik Region, especially in Manyar District. The supply water from the WTP is taken from the Bengawan Solo River, but it will be met in the dry season in 2019 and the quantity will decrease drastically and dry up. This condition also caused water crisis at the village around the Bengawan Solo watershed. "The dry season is common. But this time it seems the worst. " said the Head of Baron Village, Shaman District (<https://www.jawapos.com/surabaya/10/10/2019/drought-long-river-bengawan-solo-even-dried-up/>). In addition, population growth that continues to increase every year will also have an impact on increasing drinking water needs so that its capacity is insufficient. Therefore, another alternative to raw water is needed to meet drinking water needs. Brackish water or sea water can be used as alternative raw water with an appropriate drinking water treatment plant (WTP). Every infrastructure development of a drinking water treatment plant (WTP) requires a pre-feasibility study, namely legal and institutional studies, technical studies, environmental studies, economic and financial studies, social studies. Each of these studies has risks that need to be analyzed to minimize investment failures that might occur. Therefore, a Risk Analysis in Investment Study was prepared using the Failure Mode And Effect Analysis (FMEA) method. The FMEA method is one of the risk management methods for identifying potential causes of failure and their impact and root causes. This method was chosen because it is more feasible and effective for operational improvement and is able to analyze risks on a large scale and complex when compared to other risk management methods. Drinking water needs for Manyar District services are 450 l / sec where the supply water comes from brackish water with a drinking water treatment

plant (WTP) using RO technology. Financially, investment for the construction of WTP using RO is still feasible where the NPV, BCR, IRR, and PP are in accordance with the criteria. But in the investment there is a risk of failure, so we need a strategy to minimize the risk of failure starting from the pre-construction, construction, and post-construction stages. The main strategy used in the pre-construction stage is obtaining suitable land, in the construction stage, which is to collaborate with the private sector related to capital, and in the post-construction stage, which is to carry out maintenance, cleaning, and RO replacement periodically in accordance with the specifications used.

Keywords: *Drinking water, Manyar District, FMEA, risk management*

Paper ID: 119

IMPACT OF FARMERS' EDUCATION LEVELS ON THEIR FARMS' SUSTAINABILITY (TUNISIA)

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Abstract

In agriculture, conventional production methods are called into question because of their impacts on the rapid degradation of non-renewable natural resources through overexploitation and on the environment in general. This study was carried out with a view to assess the sustainability of farms in the Mornag area, north Tunisia, using the Farm Sustainability assessment method universally called 'IDEA method' according to a determining factor: the level of education of the manager. On the basis of a sample of farmers, an empirical analysis allowed to assess the sustainability of different farms at three scales: agro-ecological, socio-territorial, and economic; and then compare the results between the different groups. Results showed that although the group of university farmers have an advantage in the components of the socio-territorial and economic scales, they are less so in the agro-ecological scale. This could be explained by the ambition of high-educated farmers to achieve higher profitability targets by adapting agricultural practices that are sometimes harmful to environment such as return to scale or intensive arboriculture. The other two scales (socio-territorial and economic) are more sustainable when the level of education is high. This reveals the significant impact of training and the acquisition of certain technical concepts on the agronomic and technical choices to be applied to raise the awareness of farmers on the importance of applying a more sustainable agriculture.

Keywords: *Farms, Agricultural sustainability, IDEA, Mornag, Tunisia.*

Paper ID: 120

RELATIONSHIP BETWEEN SUSTAINABILITY AND SIZE OF FARMLANDS IN MORNAG ZONE, TUNISIA

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Abstract

In the field of agriculture, the scientific community has followed studies on methods and tools to meet the growing need to reassess agricultural operations and therefore to judge the degree of deterioration and pollution of natural capital. In this study, the IDEA method -which is Farm Sustainability assessment method-, was used to meet this objective, at Mornag area in Tunisia. This detailed analysis based on the factor: farm size, allowed us to identify the characteristics of the different groups and the adaptation strategies for agricultural sustainability upon three scales: agro-ecological, socio-territorial and economical scales. The results showed that the overall scales' scores at each group are positively affected by the size of the farm. Indeed, the detailed analyzes of the scores of indicators and components showed that the land size turned out to be a limiting factor against sustainability. It is therefore useful to take into account the failures that are detected at the different indicators and components in order to try to improve production systems and to facilitate the transition to sustainable agriculture able to combine economic efficiency and to reduce ecological costs.

Keywords: *Farms, size, sustainable agriculture, Tunisia.*

Paper ID: 121

A RESEARCH ON SOME QUALITY PROPERTIES OF BREAD CRUMBS IN MARKET

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Running title: Some properties of bread crumbs

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Abstract

The present research was focused on determination of some quality characteristics of five different bread crumbs obtained from market. For this purpose, some physical, chemical, microbiological and functional properties of samples were examined. Generally lightness values were close to each other but redness and yellowness values of samples showed statistically differences. Ash, protein and salt contents were ranged between 1.51-2.03%, 7.18-8.78%, 1.32-1.67%, respectively. On the other hand, the mineral composition of samples was similar. Especially Mg, Mn and Zn contents of bread crumbs didn't display statistically a significant ($p < 0.05$) difference. The water absorption capacity value was higher than the others for only one sample. Besides oil absorption capacity values didn't exhibit extreme changes. However the highest sedimentation value of samples was determined as 17.00 mL. TMAB counts were found between 2.51-3.59 log₁₀ cfu/g and the highest mould and yeast enumeration was observed as 3.07 log₁₀ cfu/g.

Keywords: Bread crumbs, composition, quality, usability

Paper ID: 122

CONSUMER ACCEPTANCE OF CHOCOLATE FORMULATED WITH FUNCTIONAL INGREDIENT

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Abstract

Giving added-value on locally-based agricultural products such as mung bean, fenugreek and moringa leaf is considered as an effective way to support the sustainability of agriculture and environment. In this study, powdered mung bean, fenugreek and moringa leaf were added into chocolate bar formula. The purpose of this study was specifically to determine the effect of powdered mung bean, fenugreek and moringa leaf addition on the consumer acceptance of chocolate bar. The ingredients were added at concentration of 5%, 10% and 15%. A 7-point scale scoring method was used to perform a hedonic test with 60 panellists for colour, taste, texture, aroma and overall attributes. One-way ANOVA followed by DMRT was carried out to analyse the result statistically. The results show that the addition of mung bean, fenugreek and moringa leaf significantly decrease the panelists' acceptance on the chocolate bar at all parameters. As such, the chocolate control obtained an overall score of 6.2 while the chocolate formulated with mung bean, fenugreek and moringa leaf got a score range of 3.8-4.7, 2.1-2.9 and 4.5-4.8, respectively. The similar trends were also found at aroma and taste attributes. The decrease of panelists' acceptance depended on the type of the additional ingredient. The results obtained in this study show the importance of ingredient selection in the making of functional chocolate.

Keywords: *chocolate, mung bean, fenugreek, moringa leaf*

Paper ID: 123

EFFECT OF DIFFERENT VEGETABLE OILS IN RATIONS ON CHEMICAL QUALITY OF LOCAL DUCK MEAT

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Abstract

Food needs derived from livestock, especially poultry meat continues to increase. Duck meat is one of the poultry food products that is high in nutritional content. good meat one of which can be known from the chemical quality. This study aimed to determine the effect of vegetable oil in the ration on the chemical quality of local duck meat. The research design used was Randomized Complete Design (CRD) in a unidirectional pattern with 4 treatments, each treatment consisting of 6 replications and each replication consisted of 6 ducks. The treatments in this study include; P1: (96% basal ration + 4% palm oil); P2: (96% basal ration + 4% canola oil); P3: (96% basal ration + 4% coconut oil) and P4: (96% basal ration + 4% soybean oil). The observed variables were chemical quality of meat (collagen, fat, moisture, and protein). The data obtained were analyzed by variance analysis and the real difference test between treatments. The results showed that the use of vegetable oil was a significant effect ($P < 0.05$) on the duck meat protein but was not significantly different ($P > 0.05$) on collagen, fat, and moisture. It can be concluded that the addition of vegetable oil in the ration can increase the protein of local duck meat but did not affect collagen, fat, and moisture.

Keywords: *local duck, vegetable oil, chemical quality of meat*

Paper ID: 124

PHYSICAL QUALITY OF LOCAL DUCK MEAT WITH ADDITION OF DIFFERENT VEGETABLE OILS IN THE RATION

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Abstract

The increasing need for meat can be done by optimizing the utilization of the potential of local livestock resources, one of which is local duck. Ducks are waterfowl and duck meat can be used as a source of animal food. This study aimed to determine the physical quality of duck meat with the addition of vegetable oil in the ration. The research design used was Randomized Complete Design (CRD) in a unidirectional pattern with 4 treatments, each treatment consisting of 6 replications and each replication consisted of 6 ducks. The treatments in this study include; P1: (96% basal ration + 4% palm oil); P2: (96% basal ration + 4% canola oil); P3: (96% basal ration + 4% coconut oil) and P4: (96% basal ration + 4% soybean oil). The observed variables were physical quality of meat (cooking losses, tenderness, pH, water holding capacity). The data obtained were analyzed by variance analysis and the real difference test between treatments. The results showed that the use of vegetable oil was a significant effect ($P < 0.05$) on the tenderness of duck meat but not significantly different ($P > 0.05$) on cooking losses, pH, and water holding capacity. It can be concluded that the addition of vegetable oil in the ration affects the tenderness of duck meat but did not affect the cooking losses, pH, and water holding capacity.

Keywords: *local duck, vegetable oil, physical quality of meat*

Paper ID: 125

**NEW TECHNIQUES FOR IMPROVING THE QUALITY OF
COTTON YARN USING NATURAL DYES FROM TEAK
LEAVES (*TECTONA GRANDIS*), KETAPANG LEAVES
(*TERMINALIA CATAPPA*), AND TENDER SKIN (*LANNEA
COROMANDELICA*)**

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Abstract

Sade village woven fabric is one of Lombok's superior woven fabrics. The process of producing this woven fabric is still traditional by using yarn spun from cotton. The purpose of this study is to obtain the optimal strength of cotton yarn using natural dyes. The yarn coloring process is carried out in three stages, namely mordant, coloring, and fixation. Mordant stage and fixation using alum solution. The coloring stage uses teak leaves, ketapang leaves, and banten skin. All three ingredients are dissolved in water with concentrations 1:10, 1: 8, and 1: 5. In the mordant stage, 8 grams of alum is dissolved in 1 liter of water. While at the fixation stage, 50 grams of alum is dissolved in 1 liter of water. This study shows that teak leaves produce a dark brown color, ketapang leaves produce turmeric yellow color, and banten skin produces a brick red color. After going through the coloring process, the yarn is tested using Tensilon RTG 1310 with the ASTM D2256 test standard. The result show that the yarn strength increase during the coloring process. In addition, differences in the concentration of the solution also affect the strength of the yarn produced. Solution with a concentration ratio of 1: 8 produces optimal tensile strength of 0.3450 cN / dtex on teak leaves, 0.3369 cN / dtex on ketapang leaves, and 0.2450 cN / dtex on banten skin.

Keywords: *Tensile strength, natural dyes, cotton yarn*

Paper ID: 126

STUDY OF CLOSURE ZONE 1 GRIYO MULYO'S LANDFILL IN SIDOARJO REGENCY

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Abstract

TPA Griyo Mulyo has an area of 28.62 Ha consisting of two zones of waste. Zone 1 covering an area of 8.49 Ha with full condition and zone 2 covering 5.89 Ha under construction. Zone 1 Griyo Mulyo Landfill was built in 2005. In 2019, a Risk Index assessment was conducted in zone 1 of the Griyo Mulyo Landfill with a result of 614.5 which, based on Minister of Public Works Regulation No. 03 of 2013, the Risk Index in the range 601 - 1000 is included in the very high hazard evaluation. This research method covers technical aspects and financing aspects. The technical aspects consist of calculating the stability of land, reconturing, drainage planning, leachate and gas handling. Funding aspects analyzed are the results of the planning, then the calculation of the financing of closure is carried out with 2 alternative cover layers. The results of this study recommend the contour arrangement with a maximum height of waste is 15 meters by forming terraces at each 5 meters high. Leachate discharge produced is 0.067 liters / second or 5.8 m³ / day. Cost estimation for waste closure based on technical analysis is Rp. 60,927,648,757 (alternative 1), and Rp. 46,422,790,031 (alternative 2).

Keywords: *Closure Landfill, Cost Estimate, Sidoarjo*

Paper ID: 128

**CHARACTERIZATION OF NATIVE PLANT GROWTH
PROMOTING RHIZOBACTERIA AND THEIR ANTI-
OOMYCETE POTENTIAL AGAINST *PHYTOPHTHORA
CAPSICI* AFFECTING CHILLI PEPPER (*CAPSICUM ANNUM
L.*)**

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Abstract

Phytophthora capsici is a notorious fungus which infects many crop plants at their early and late growth stages. In the present study, twelve *P. capsici* isolates were morphologically characterized, and based on pathogenicity assays; two highly virulent isolates causing post-emergence damping-off on locally cultivated chilli pepper were screened. Two *P. capsici* isolates, HydPak1 (MF322868) and HydPk2 (MF322869) were identified based on internal transcribed spacer (ITS) sequence homology. Plant growth promoting rhizobacteria (PGPR) play a significant role in disease suppression and plant growth promotion in various crops. Out of fifteen bacterial strains recovered from chilli rhizosphere, eight were found potential antagonists to *P. capsici* *in vitro*. Bacterial strains with strong antifungal potential were subjected to biochemical and molecular analysis. All tested bacterial strains, were positive for Hydrogen cyanide (HCN), catalase production and Indole-3-acetic acid (IAA) production (ranging from 6.10-56.23 µg ml⁻¹), while siderophore production varied between 12.5 to 33.5%. The 16S rRNA sequence analysis of tested bacterial strains showed 98 to 100% identity with *Pseudomonas putida*, *P. libanensis*, *P. aeruginosa*, *Bacillus subtilis*, *B. megaterium*, and *B. cereus* sequences available in the National Center for Biotechnology Information (NCBI) GenBank nucleotide database. All sequences of identified bacteria were submitted to GenBank for accessions numbers (MH796347-50, MH796355-56, MH801129 and MH801071). Greenhouse studies concluded that all tested bacterial strains significantly suppressed the *P. capsici* infections (52.3-63%) and enhanced the plant growth characters in chilli pepper. Efficacy of many of these tested rhizobacteria is being first time reported against *P. capsici* from Pakistan. Plant growth promoting rhizobacteria (PGPR) exhibiting multiple traits may be used in the development of new, eco-friendly, and effective bioformulations as an alternative to synthetic fungicides.

Keywords: Antagonism, *Bacillus* spp., *Capsicum annum*, Dual culture, *Pseudomonas* spp., *Rhizobacteria*.

Paper ID: 129

WATER USE, WATER USE EFFICIENCY, WATER SOLUBLE CARBOHYDRATE AND YIELD OF FOUR VARIETIES OF WHEAT IN CONTINUOUSLY HIGH TEMPERATURES

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Abstract

High temperatures are a common feature of the environment of tropical regions such as Lombok Island and although the effect can be alleviated by altitude, heat stress will be an important limitation to the productivity of wheat in this environment. The objective of the experiment were to observe the responses of water use (WU), water use efficiency (WUE) and water soluble carbohydrate (WSC) to prolonged high temperatures on growth and yield of wheat under controlled conditions. In this experiment plants were grown under growth chambers at temperatures to simulate low and high elevation locations on Lombok Island. Water use, water use efficiency, WSC and yield of 4 wheat genotypes (2 Australian and 2 Indonesian varieties) grown at 3 temperatures (32°/23°C, 28°/20°C, and 25°/15°C day/night) were compared. Variation in water use, water use efficiency, and the concentration of water soluble carbohydrate was found. Indonesian wheat varieties, Nias and Dewata produced higher yield and biomass and maintaining higher rates of water use and remobilisation of water soluble carbohydrate from vegetative tissues to grain. The accumulation of water soluble carbohydrates was an important adaptive characteristic that was strongly associated with grain weight and grains per spikelet and maintained better yield

Keywords: *wheat, tropics, WU, WUE, WSC, yield*

Paper ID: 131

ORGANIC FERTILIZER DOSAGES AND BIOFILMED BIOFERTILIZER FORMULA ON NITROGEN UPTAKE AND SHALLOT YIELDS IN ALFISOLS

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Abstract

Research aims to study the effect of organic fertilizer dosages and *Biofilmed Biofertilizer* formula on nitrogen uptake and shallot yield in Alfisols. Field experiment was conducted at Sukosari Village, Jumantono, Karanganyar district, Central Java, Indonesia. The experimental design used was Randomized Completely Block Design with two factors namely dose of organic fertilizers (D_0, D_1, D_2) and Biofilmed biofertilizer formula (F_0, F_1, F_2, F_3). Each combination treatment repeated three times. Variables observed included N-uptake, plant fresh and dry weight, number and diameter of bulb, and shallot yield. Data was analyzed by F test at 95% of level confidence, followed by Duncan Multiple Range Test (DMRT) if any significant influence. The result showed that organic fertilizer doses influence significantly on bulb weight, while the interaction of organic fertilizer dose and biofertilizer formula influence N uptake. Highest bulb weight achieved by the use of 20 tons ha^{-1} organic fertilizer (62,9 g clump⁻¹), increase 348,65% compared to control treatment (14.04 g clump⁻¹). The highest N-uptake was taken from the treatment combination of 10 tons ha^{-1} organic fertilizer and biofertilizer formula F_1 (0,17 gr N/clumps), increase 183,33% than control treatment (0.06 g clump⁻¹).

Keywords : *biofertilizer; organic fertilizer; Alfisols; N-uptake; shallot yield*

Paper ID: 132

THE ROLE OF SILICON ON CONTENT OF PROLINE, PROTEIN AND ABCISIC ACID ON SOYBEAN UNDER DROUGHT STRESS

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Abstract

Silicon is the second most abundant in the soil and Silicon could be considered as an essential element in many crops to enhancing growth and alleviating biotic and abiotic stresses. Silicon present exclusively and absorbed by plants in the form of silicic acid. Drought stress that occurs in plants inhibit of several metabolic processes in plant tissue, so that the availability of sufficient water in the soil becomes very important in plant cultivation. Plants have different adaptability to drought conditions, one of the efforts to increase plant resistance in conditions of limited water availability can be done with physiological engineering through controlling levels of proline, protein and abscisic acid, by giving silicon as an element that is known to increase power plants against drought. The research evaluated the role of silicon on proline, protein and abscisic acid in soybean under drought stress conditions and the research was arranged in screen house. The results showed that silicon had closely related to decreased content of proline and abscisic acid, an increased in silicon concentration tended to decrease proline ($R^2 = 0.94$) and abscisic acid ($R^2 = 0.95$), and applying a higher silicon increased crude protein ($R^2 = 0.95$).

Keywords : *Drought stress, silicon, proline, protein, abscisic acyd*

Paper ID: 133

MYCORRHIZA BIOFERTILIZER AND INTERCROPPING WITH SOYBEAN INCREASE ANTHOCYANIN CONTENTS AND YIELD OF UPLAND RED RICE UNDER AEROBIC IRRIGATION SYSTEMS

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Abstract

Red rice kernels are known to have high antioxidant properties due to its anthocyanins, and application of biofertilizer containing arbuscular mycorrhizal fungi (AMF) was reported to increase anthocyanin content in the grains. This study aimed to examine the effects of intercropping with soybean and mycorrhiza biofertilizer application on grain anthocyanin content and yield of two upland red rice genotypes under aerobic irrigation system. The field experiment was conducted in Beleke, West Lombok, Indonesia, from March to July 2018, in a Split Split-Plot design with three blocks and three treatment factors, namely upland red rice genotypes as the main plot (G04 and G10), intercropping as the sub-plot (monocrop or intercropping with soybean), and mycorrhiza biofertilizer as the sub-sub-plot (without or with biofertilizer application). The results indicated that both intercropping with soybean and biofertilizer application significantly increased grain anthocyanin contents and yield components of the upland red rice genotypes, but both genotypes showed differences only in grain yield per clump. However, there was a three-way interaction effect on percentage of filled grain number, and two-way interaction effects on anthocyanin contents in the grains. Mycorrhiza application resulted in more significant increases in anthocyanin contents and grain yield of the upland red rice plants in intercropping with soybean than in monocrop. Therefore, application of mycorrhiza biofertilizer and intercropping with soybean, in addition to increasing grain yield, are also capable of increasing health values of the husked grains of the upland red rice grown on raised-beds in aerobic irrigation system.

Keywords: *anthocyanins, red rice, mycorrhiza biofertilizer, soybean, intercropping*

Paper ID: 134

TIDAL WATER QUALITY OF ACID SULFATE SOIL AFTER CANALS NORMALIZATION FOR RICE PLANTS' IRRIGATION AT LOWLAND SWAMPS

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Abstract

Optimization tidal swamps acid sulfate soil is an alternative solution in increasing rice productivity to overcome a food crisis threat. Water management is the primary key to be successful in agriculture on tidal swamps. This study aims to recognize the dynamics of tidal water quality in secondary and tertiary canals for rice plants' irrigation in the transition season. The measurement starts from the peak of the dry season to the peak of the rainy season, which is carried out every month at the tidal peak. Measurements consist of 1) every hour for 24 hours in the secondary canal at the point 3km from the Barito river. 2) Every 1 kilometer from the edge of the Barito river to a distance of 8 km at peak tide and neap tide. 3) Every 50m from 0-450m in the tertiary canal also at peak tides and neap tide. The main parameters measured are pH and Electro conductivity (EC). The results show that water quality fluctuations are very contrasting between the salinity transition to extreme acidity. The further away from the Barito river, the secondary water channel quality decreases, and the further away from the secondary channel, the tertiary canal water quality also decreases. Not all tides that overflow their land are of good quality. The best water quality for the irrigation of rice plants is at peak tides which occur around 7-9 hours after the start of the tides.

Keyword: *Water quality, pH, EC, secondary and tertiary canals*

Paper ID: 135

SPECIES COMPOSITION AND ENDEMICITY STRUCTURE OF FLORA MALESIANA IN THE GREEN BELT OF UDAYANA MATARAM CITY, WEST NUSA TENGGARA

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Abstract

The Greenspace of Udayana Mataram city is the smallest green area that should describe the endemicity of phytogeographic small Sundanese islands flora malesiana. The objectives of this research is to obtain basic data on the structure and composition of the Udayana green space and authenticity of the Malesiana flora in NTB province as a first step in determining the criteria and indicators of tree species suitability based on species autecological parameters. This research was conducted in January to Juli 2020 in the RTH Udayana. In this study, an overall stand inventory was carried out using the tree census method (100%). The sampling unit, trees with a diameter of ≥ 2 cm are identified and the diameter size (DBH) of trees height was recorded. The results showed that 64 species belong to 27 families, dominated by the Fabaceae family (27.39%). Besides, the results showed that 28.13% (18 species) of plants were invasive plants that had been recorded nationally and globally, namely tree habitus (*P. longifolia*, *S. campanulata*, *T. mantaly*, *A. pavonina*, *B. purpurea*, *D. regia*, *E. crista-galli*, *L. leucocephala*, *S. saman*, *T. indica*, *P. Americana*, *S. mahagoni*, *M. calabura*, *C. citrinus*, *F. decipiens*, *M. zapota*), palm habitus (*R. regia*), dan woody bush (*T. vulgaris*). The type that dominates at the seedling and sapling level is *T. mantaly* with each IVI of (86.11% and 29.56%) with a highly dominance level. The highest IVI value at the pole level is (29.54%) with moderate species dominance level and tree-level was dominated by *Samanea saman* with IVI value (59.33%) with high species dominance level. The species dominance index (C) is in the range (0.00012-0.24) indicated there is no concentration of the species in the plant community in RTH Udayana. Ecology index showed at seedling level $H'=1.29$ (low), $E'=0.21$ (low) dan $R'=1.04$ (low); Sapling level showed $H'=3.21$ (moderate), $E'=0.93$ (high) dan $R'=5.23$ (high); Pole level showed $H'=3.61$ (high), $E'=0.58$ (moderate), $R'=7.76$ (high); and Tree level showed $H'=3.52$ (high), $E'=0.90$ (high), $R'=7.33$ (high). The horizontal structure of the stand shows the tree density decreasing exponentially as the diameter of the trunk increases. Vertical stand structure shows that canopy stratification in RTH Udayana is found mostly in stratum C (121.31 ind/ha), followed by stratum D (5.80 ind/ha) and stratum B (3.43 ind/ha).

Keywords: *Flora malesiana, species composition, stand structure, Udayana green space, invasive species.*

Paper ID: 136

THE OPTIMAL DISTRIBUTION OF POTATOES BETWEEN EGYPTIAN GOVERNORATES

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Abstract

Determined search problem in the presence of the unbalanced distribution of potatoes between the governorates of Egypt and wholesale markets and are in the process of transfer of the crop from areas of production to consumption areas. The unbalance as result farmers to sell the crop in close areas avoid to increasing the cost of transports. This research aimed to minimize transport distance to potatoes crop, between surplus and deficit governorates. It is worth mentioning that minimize transport distance necessarily mean to minimize transport costs.

Paper ID: 137

POTENTIAL AGRO-INDUSTRIAL COMMODITIES FOR THE DEVELOPMENT OF INDONESIA-TURKEY ECONOMIC PARTNERSHIP

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Abstract

Indonesia and Turkey have different geoclimates which cause each country to produce different agricultural commodities. This presents a great opportunity for the two countries to trade these different commodities. Turkey and Indonesia have had a commercial, diplomatic, and military relationship since the 16th century as the Ottoman Empire and Aceh Sultanate. After both countries established as republic and independent countries, the bilateral relationship between two countries was rebuilt with the first trading agreement signed on September 14, 1958, followed by other cooperation and partnership agreements later on. At present, the bilateral relations between the two countries, especially in the economic sector are increasing. With the latest bilateral agreement, Indonesia-Turkey Comprehensive Economic Partnership Agreement (IT-CEPA), launched on July 6, 2017, economic cooperation between the two countries is expected to increase even more. Even though each year the value of trade between the two countries has increased, but those numbers are still far below the potential of the two countries. Therefore, it is necessary to increase trade commodities from both countries, especially agro-industrial commodities. This paper aims to provide a brief overview of some potential agro-industrial commodities to increase trade value between Indonesia and Turkey.

Keywords: *Agricultural products, agro-industry, cooperation, export-import, trade.*

Paper ID: 138

USE OF GREENHOUSE WASTE FOR ANIMAL NUTRITION IN TURKEY

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Abstract

Turkey has a negative impact on animal husbandry of farmers engaged steadily growing fodder prices. In this study availability of residual substances after greenhouse production has been using of animal feeding. As it is known, substantial vegetable waste is produced at the end of the season in greenhouse production, and their disposal causes serious costs and environmental pollution. Experiments on whether these waste materials can be used as animal feed have shown that this is possible. In this way, the residual substances that occur at the end of the season can be evaluated for the greenhouse farmers.

This study is for trials conducted and results obtained from these trials. It will also model predictable advantages by making assumptions. There are 757,201 decare under cultivation in the greenhouse in Turkey the year of 2019. Depending on the products grown in greenhouse cultivation, 4-5 tons / decare is now formed. There was over 3 million tons of vegetable waste is produced. This amount is 5-6 million decares of clover is equivalent. Considering the water, energy and other inputs consumed by alfalfa, it is only found in animal feeding of greenhouse wastes.

Keywords: *vegetable waste, coarse animal feed, greenhouse wastes*

Paper ID: 140

EXTRACTION AND CHARACTERIZATION OF CELLULOSE FROM PANDANUS (*PANDANUS TECTORIUS*)

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Abstract

Cellulose is abundant renewable carbon source which is widely distributed in plants. It is the most natural polymer which is considered a long-term renewable fossil fuel alternative as an environmental friendly substitute to petroleum based non-biodegradable materials. The cellulose conversion into derivatives has gained great interest in the fields of green and sustainable chemistry, and has proportioned the development of friendly environmental technologies. Pandanus (*Pandanus tectorius*) grows naturally in the tropics area, including Indonesia. Pandanus leaves can produce strong fibers that are used to make ropes, woven caps and mats. However, Pandanus is not quite profitable if only planted for the production of mats, beds, chairs, and baskets. Pandanus leaves have great potential as a source of cellulose. Research on the extraction cellulose from Pandanus leaves is still limited. The present study focus is to extract cellulose from Pandanus via fast and simple technique. The Pandanus leave powder was treated with alkali and then bleached to separate the cellulose from the lignin and hemicellulose. The extracted cellulose was characterized by modern analytical methods such as FT-IR, SEM and TG-DTA. This cellulose can be converted into its derivatives for industrial applications.

Keywords: *cellulose, hemicellulose, lignin, Pandanus, Pandanus tectorius*

Paper ID: 141

STUDY OF PLANTING MEDIA AND NUTRITION CONCENTRATION ON GROWTH RATE AND YIELD OF LETTUCE (*LACTUCA SATIVA* L.) IN NFT HYDROPONIC SYSTEMS

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Abstract

Lettuce (*Lactuca sativa* L.) is a vegetable whose commercial value is quite good and the demand for lettuce has increased, along with the narrowing of cultivated land. The solution is hydroponic cultivation with the NFT system. Dependence on imported rockwool planting media on hydroponic cultivation often becomes a constraint for availability when needed and is expensive. Therefore it is necessary to study the feasibility of using local planting media, such as: coconut fiber and rice husk charcoal as a replacement media for rockwool and whether the increased concentration of nutrients given to the planting media affects the rate of plant growth and lettuce yield. The purpose of this study was to determine the interaction between planting media and nutrient concentrations (AB Mix) on the growth and development rate of plants, as well as the yield of lettuce hydroponically with the NFT system.

The research was arranged in factorial (two factors) using a Split Plot Design. The first factor as the main plot of AB Mix nutritional concentration (K) consisting of 3 levels (600 ppm, 900 ppm and 1,200 ppm), while the second factor as subplot is a planting media (M) consisting of 3 levels of treatment, namely: Rockwool, Rice Husk Charcoal and Coconut Fiber. The data obtained were analyzed using analysis of variance (ANOVA), if there was a significant influence followed by a 5% BNJ test.

The results showed that there was a significantly interaction between the treatment combination of planting media and AB Mix concentration on fresh weight of lettuce. The combination treatment of rice husk charcoal planting media and AB Mix concentration of 1200 ppm (M3K3) produced the best growth and increased the fresh weight of lettuce plants by 447.54% compared to the combination of rockwool media treatment and AB mix concentration of 600 ppm (M1K1). Rice Husk Charcoal planting media produced the growth rate of plant length and leaf area of 26% and 81.54% compared to rockwool growing media. AB Mix concentration of 1200 ppm gives the best response and increases the growth rate of plant length and lettuce leaf area respectively by 367.5% and 165% compared to the concentration of 600 ppm.

Keywords: Concentration, NFT, Hydroponics, Lettuce, Nutrition and Planting Media

Paper ID: 142

POOR COMMUNITY PROFILE BASED ON LOCAL FUTURE FROM MATARAMAN CULTURAL ETHNIC

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Abstract

National data on the number of poor people has declined. However, it still remains vulnerable. The existence of economic turmoil, such as crop failure and rising fuel prices can quickly add to the poverty rate of farmers. This research question relies on the fact that there are still many empirical studies that deal with poverty seen from local wisdom. Therefore, the researchers tried to find a solution (way out) of how to alleviate poverty in society viewed from the culture and its causes. Meanwhile the research design was aimed at and focused on the Mataraman cultural ethnic in Pacitan Regency, based on investigative investigators. The purpose was to identify the poor based on local wisdom from the Mataraman cultural ethnic. This research used a qualitative approach (qualitative research) with a purposive method to explore and understand the meaning of poverty by a number of individuals or groups of people considered to come from social or humanitarian problems, and even still many other local wisdom activities that are very helpful for the poor, for example: Ciprotan, Lungkangan, Resik Desa, Tandur Panen, Genggongan (Tayuban), Ringgit (Wayangan), Sambatan, Bawonan, Bedah Bumi, the above activities produce values of mutual cooperation between the poor and capable people in their economic status, as well as the case, at the time of planting and harvesting, and when there are members of the village community building a house, it can be ascertained that the workforce is a member of the community and is not paid, but for consumption those who work from someone has an interest, in addition to cheaper costs, the house finishes faster.

Keywords: *Poor people, Local Wisdom, Mataraman Culture.*

Paper ID: 143

ADAPTING MODERN GUIDELINES OF BALANCED DIET TO SUSTAINABLE LIFE STYLE

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Abstract

Introduction: Human hedonism and the need for material goods are the biggest "enemy" of a sustainable lifestyle, where the need for food is in the greatest focus. Globalization and the improvement of intercontinental and international transport created conditions for food consumption from different areas and created food-dependent nations in the world. All modern guidelines to proper nutrition are based on guidelines that require daily moderate and varied consumption.

Aim of the paper: Aim of the paper is to point out the importance of adapting the modern diet guidelines with the need for consumption of locally produced and seasonal food.

Result and discussion: All modern guidelines to proper and balanced nutrition are based on guidelines that require daily moderate and varied consumption, healthy and nutritionally valuable foods. The improvement of these guidelines it would be achieved with recommendation to consume seasonal and locally produced food.

By practicing such guidelines would be achieved: diet with less impact on the environment, increased food security, better preserved biodiversity and the ecosystem, especially create conditions for a healthier life for present and future generations.

Humane relations in food production are especially important, it implies production without use of slave and children works labor. Consumption of locally produced and seasonal food enables better control of health security and better development of the domestic economy. Particularly important, facts of influence of nutrigenetics and nutrigenomics, regarding consumption locally produced and seasonal foods on health.

The importance of consuming locally produced and seasonal food is shown at the time of the Covid 19 epidemic when the conditions of international transport became difficult.

Conclusion: Changing modern diet guidelines, especially through education, can contribute to the development of sustainable lifestyles.

Keywords: *diet guideline, importance of consuming locally produced and seasonal food.*



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