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EMBRYONIC AND EARLY LARVAE DEVELOPMENT OF WILD BETTA (Betta imbellis LADIGES 1975)

Widyariset Vol. 1, No.1, Desember 2015, page: 1–10

Abstract

Cupang (Betta imbellis) is a popular ornamental and fighting fish in Indonesia. Its popularity is not followed by its scientific information. The aim of this study was to explore the embryonic stages and early larva development. This information is needed for fish breeding. Total of 20–40 eggs and larvae were observed under a microscope with 40 and 100 magnifications. Eggs were observed every cleavage stage and larvae were observed every 12 hours. Fertilized eggs were seen translucent with dark yolk egg in a diameter of 1.09±0.04 mm. Cleavage stages occurred during 4–55 minutes after fertilization. Larvae hatched ±29 hrs after fertilization. The length of hatched larvae was 2.42 ±0.076 m, while yolk volume was 0.11 ±0.028 mm^2. Larvae became free-swimming in 2-3 days and yolk was fully absorbed in 3–4 days after hatching and started to eat. The cleavage stage occurrs for 55 minutes after fertilization and becomes foraging with size of mouth opening 0.31±0.005mm which could consume nauplii of Artemia sp.

Keywords: *Betta imbellis, Embryo, Development, Stages*

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RELIABILITY EVALUATION OF COMPOSITE STANDARD BRIDGE USING VEHICULAR WEIGH-IN-MOTION MEASUREMENT DATA

Widyariset Vol. 1, No.1, Desember 2015, page: 11–20

Abstract

The Bina Marga standard bridge has been implemented as bridge designing references in Indonesia. One of the standard bridge types is composite bridge. This composite bridge is designed based on RSNI T-02-2005, an Indonesian bridge loading standard. This standard is based on Load and Resistance Factored Design (LRFD) method. LRFD method is treating statistical data on loads and strengths as random variables that has to be evaluated periodically using reliability index as indicator. The purpose of this research is to evaluate the reliability of a 25 m simple span composite bridge structure due to statistical load data from weigh-in-motion (WIM) vehicular loads measurement in Pantura highway of Cikampek-Pamanukan, West Java in 2011 and RSNI T-02-2005 nominal vehicular load. The results of this research are maximum bending moment due to RSNI T-02-2005 nominal vehicular load is 526.55 kNm with probability of exceedance of 4.5×10^{-7} and the reliability index of this composite bridge is 7.16, which is larger than reliability target of AASHTO of 3.50.

Keywords: *Reliability, LRFD, Composite bridge, Vehicular load, Weigh-in-motion*

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CHARACTERIZATION OF SOME MORPHOLOGY, ANATOMY AND PHYSIOLOGY OF THE WHEAT MUTANT (Triticum aestivum L.) DEWATA AND SELAYAR IN TROPICAL LOWLAND

Widyariset Vol. 1, No.1, Desember 2015, page: 21–30

Abstract

Wheat mutant characterization is a part of the breeding programs to investigate the diversity that can influence in production increased. The aim of this research was to obtain data characterization morphology, anatomy and physiology that could be used as selection criteria and obtain an adaptive wheat mutant in tropical lowland area. The research was conducted in Seameo-Biotrop Experimental Garden, located on ± 250 m above the sea level, on April until November 2013. There were 18 Dewata wheat mutants and two Selayar wheat mutants, which is an M3 derivative resulted from EMS treatment, were used. LC_{50} Dewata got the 0.3% EMS treatment for 30 minutes, while LC_{50} Selayar got the 0.1% EMS treatment for 60 minutes. The data analysis used Augmented Designs Method. The results showed that the mutant Dewata that was significantly affected the morphology was indicated by four characters i.e. cooking time (two mutants), grain weight pergenotipe (seven mutants), leaf area (five mutants), and green leaves (one mutant). There are two characters in mutant Selayar that bring significant influence on morphological factors, those are seed weight per genotype (one mutant) and leaf area (one mutant), while the cooking time and green leaves have no real effect. Anatomical character appearance on leaf thickness and the size of stomata showed different levels of tolerance between Dewata plant mutant (DW-0,3.30-2-13-3), Selayar mutant (SL-0,1.60-2-14-2), and its both controls. As for the physiological character there were significant differences in the amount of proline and glucose levels. Proline level in Dewata control was 79.29 µg/gBB, while in DW mutant -0,3.30-2-13-3 was 332.37 µg/gBB. Proline levels in Selayar control was 201.53 µg/gBB, while in mutant SL mutant-0,1.60-2-14-2 was 335.79µg/gBB. Likewise, glucose level in Dewata control was 14.32mg/gBB, while in DW mutant-0,3.30-1-15-1 was 29.06 mg/gBB, Selayar controls (5.87 mg /GBB) with SL mutant-0,1.60-2-14-2 (17.68 mg /gBB).

Keywords: *Some characterization, Wheat (Triticum aestivum L.), Dewata and Selayar mutant, EMS, Tropical lowland.*

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DETERMINATION ON MATURITY LEVEL OF SALAM (Syzgium polyanthum (WIGHT) WALPERS) FRUIT FOR SEEDLING USING GERMINATION TEST AND SEED VIGOR

Widyariset Vol. 1, No.1, Desember 2015, page: 31–40

Abstract

Study on determination on maturity level of salam (Syzygium polyanthum (Wight) Walpers) fruit for seedling with germination test and vigor of seed was conducted at Research Centre for Biology, Cibinong Science Center. The experiments were carried out in 3 stages i.e. stage-1, observation of morphological and anatomical characteristics of fruits and seeds. Stage-2, determine of seed germination percentage on 3 levels of fruit maturity. Stage-3, determination of seedling vigor in 3 level of fruit maturity. The experiments were arranged with a Completely Randomized Design. The results showed that there were 3 levels of fruit maturity of Syzygium polyanthum based on morphological of skin color i.e. pre-ripe (reddish green), ripe (red), and after-ripe (red-black). In general, the morphological characteristics of fruits and seeds of 'salam' was not differ i.e. the fruit is globular buni, slick texture; and the seeds is oval, soft texture, the location of 'hilum' at the end, elongated shape, the color is white, position concave. The color of endosperm is green, the embryo located at the base, and the color is green. But, they were differ in the size of the fruit. The more ripe fruit causes fruit diameter, flesh thickness, seed diameter, seed slices (transverse and longitudinal) look bigger. The seeds germinate quickly, on day 2 already germinated 10-20%, on day 7 reaches 80-95%. The percentage of seed germination at pre-ripe fruit showed the highest (93.33%), the highest germination rate, the most rapid germination rate (3.83 days), also the highest germination value (226.67) than the other. Therefore, it was recommended for harvesting fruit on pre-mature level, with color fruit of reddish green.

Keywords: *Determination, Maturity, Fruit, Seedling, Germination, Vigor, Salam (Syzygium polyanthum)*

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ACIDITY AND ALKALINITY LEVEL OF MAYAN BAMBOO ACTIVATED CHARCOAL (MBAC) ON SATURATED VAPOR OF ACID CHLORIDE AND NATRIUM HYDROXIDE

Widyariset Vol. 1, No.1, Desember 2015, page: 41–50

Abstract

The use of strong acid and alkali give some disadvantages such as large volume, needs of washing process, and expensive in cost. The use of activated charcoal as a solid catalyst has grown, but its adsorption performance can be affected by the activation process. This study aimed to investigate the characteristic of mayan bamboo activated charcoal/MBAC (Giganchlotoa robusta Kurz). Carbonization was carried out at 500°C temperature for 4–5 hours. The charcoal was activated by steaming it at 800°C temperature for 60 minutes and 90 minutes. Activated carbon from mayan bamboo is tested for its acidity and alkalinity against saturated vapor of HCl and NaOH by using desiccator for five days. Characterization of mayan bamboo activated charcoal showed that the moisture content, ash content, volatile matter, and fixed carbon have met the Indonesian standards (SNI 06-3730-1995). The adsorption capacity of iodine resulted from MBAC with 90 minutes activation time hasmet Indonesian standard. Crystallinity of MBAC with 90 minutes activation time, which is 47.58%, is higher than MBAC with 60 minutes activation time, which is about 25.65%. Activated charcoal adsorption level on saturated vapor of HCl and NaOH showed that MBAC with 60 minutes activation time is more acidic, while MBAC with 90 minutes activation time is more alkaline. MBAC can be used as solid catalyst for various applications.

Keywords: *Activated charcoal, Adsorption, Mayan bamboo, Catalyst, Acidity.*

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THE NONMETALLIC COMPONENTS IMMERSION TEST OF THE FUEL LINE SYSTEM OF MOTOR VEHICLES WITH BIOSOLAR (B5)

Widyariset Vol. 1, No.1, Desember 2015, page: 51–59

Abstract

Biodiesel as a renewable alternative energy has been widely used in the last few years. The use of biodiesel into diesel oil is as an anticipation for the needs of diesel oil which increases drastically every year. This is in accordance with the national energy policy, that in 2025 energy mix, it is expected to use alternative energy up to 25%. Biodiesel Guidelines that is published by World Wide Fuel Charter (WWFC) recommend that the maximum limit of biodiesel to be mixed in the diesel oil is 5% (Vol/Vol)l. Therefore, in 2012, Original Equipment Manufacturers (OEMs) in the United States of America produced diesel engine that supports the use of B5. However, biodiesel as a solvent may react with nonmetal components of the fuel line system of diesel vehicles, especially for elastomer materials. This study was conducted onto the nonmetallic components of the fuel line system of a diesel fueled vehicle (i.e. Isuzu Panther), by means of immersion test which refers to the SAE 1747 test method. The objective of this current study is to identify the compatibility properties of diesel oil (B5) with the nonmetallic components. Characterization tests were carried out by measuring the volume and weight of the materials after immersion treatment. The results show that the use of 5% biodiesel in diesel oil (B5) causes swelling and contracts on the nonmetallic components tested, especially for the rubber material, plastic, and cork. Shrinkage occurred when the components were immersed for 100 hours, each of which has shrinkage level of 71,4%, 28,6%, and 25,5% for the rubber cup solar, rubber tank low- Solar, and rubber tank up- Solar respectively.

Keywords: *Immersion test, Nonmetallic components, Biodiesel, Diesel oil, SAE 1747 Test method*

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DETERMINATION OF OIL EXTRACTION RATE FROM Spirulina sp. AND Chlorella sp. BY USING CELL DISRUPTION TECHNIQUE

Widyariset Vol. 1, No.1, Desember 2015, page: 60–68

Abstract

Oil derived from microalga has a big potential to substitute fossil fuel so that the oil extraction method needs to be developed. This study aims to compare the method for cell disruption in oil extraction of Spirulina sp. and Chlorella sp. microalgae. Spirulina sp. and Chlorella sp. were cultivated each in a pond with maximum capacity of 600 liters at Biotechnology Laboratory of Research and Development Center for Marine and Fisheries Product Processing and Biotechnology. Spirulina sp. were harvested by filtered it using satin. Chlorella sp. was harvested using coagulant NaOH, so it was needed to be neutralized to pH 7 with citric acid addition. The cell wall of Spirulina sp. and Chlorella sp. then was ruptured using sonicator and microwave, while other sample without disruption as control. The suspension then was macerated with n-hexane solvent, to extract the oil content. Oil content of Spirulina sp. which has been collected from this experiment gave result control: microwave: sonicator as 1.17%, 1.28%, and 1.97% respectively. Meanwhile, oil content of Chlorella sp. gave result from control, microwave, and sonicator as 0.93%, 1.20%, and 1.69% respectively. It was concluded that sonicator is the best method in oil extraction of cultured microalgae.

Keywords: *Microalgae, Spirulina sp., Chlorella sp., Disruption technic, Cell wall, Oil extraction*

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FLOWERING PERIOD OF THREE SPECIES OF Prunus COLLECTION IN CIBODAS BOTANIC GARDEN

Widyariset Vol. 1, No.1, Desember 2015, page: 69–75

Abstract

This study aims to explore the flowering period of three species of Prunus collection in Cibodas Botanic Garden during the a four-year period (time series 2009–2012). This flowering data is able to give an information about Prunus flowering ability, which later can improve the amount of Prunus collection through cross breeding and seed collection. Those three Prunus species are Prunus arborea, Prunus costata, and Prunus cerasoides. The result indicated that P.arborea has the rarest flowering cycle compares to other Prunus species On the other hand, P.costata has the most active flowering cycle, which is around 3–4 times/year and it is often followed by development of fruit set and seeds, and P.cerasoides flowering cycle is twice a year, but it is rarely followed by seeds development. The current habitat is more suitable for P. arborea's flowering and fruiting initiation than for the other two Prunus'. Light intensity induced flowering initiation, while fruit and seed development were influenced by rainfall, air temperature, and other factors such as pollinator.

Keywords: *Flowering period, Prunus, Cibodas Botanic Garden*

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SEAGRASS ECOSYSTEM IN THE COASTAL AREA OF SOUTHERN KEI BESAR DISTRICT, SOUTHEAST MALUKU REGENCY, PROVINCE OF MALUKU, INDONESIA

Widyariset Vol. 1, No.1, Desember 2015, page: 76–82

Abstract

The aims of this research were to determine the seagrass bed coverage and its ecosystem condition. The research result obtained ten seagrass species, those are Cymodocea serullata, Cymodecea rotundata, Syringodium isotefilium, Halophila ovalis, Halophila minor, Enhalus acroides, Halodule pinifolia, Halodule uninervis, Thalassia hempirichii, and Thalossodenron ciliatum. The biggest percentage of seagrass coverage was found in Tamangil Nuhuten (50,75 %), followed by Tamangil Nuhuyanat (62,61%), Soindrat (51,53%), Ngafan (58,70%), dan Tutrean (57,15%).Water quality of this area was good for the life of seagrass.

Keywords: *Sea grass, Ecosystem, Water Quality, Southern Kei Besar*

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PERFORMANCE DIAGNOSIS OF SEPTAGE TREATMENT PLANT

Widyariset Vol. 1, No.1, Desember 2015, page: 83–95

Abstract

The sanitation program which has targetted that everybody has access to sanitation infrastructure has not fulfilled yet, and only 65% of 146 units of septage treatment plant operated well. These conditions need to be improved and the first thing to do is analysing existing condition and composing scientific information as a reference for implementation. The aim of this research is to map the condition and management status of septage treatment plant system in 8 selected cities. This research use assestment of the content of septage treatment technologies using technology atlas approach, which consists of elements technoware, humanware, infoware and orgaware. The mapping carried out on two types of septage treatment plant, that uses Imhoff tank and Anaerobic Baffle Reactor (ABR). Mapping was also conducted on the status of rehabilitation and operational conditions for each septage treatment plant.The results of this study shows that the sophistication level of septage treatment technology is a medium category with coefficient contribution is 50%. Operational conditions of septage treatment plant is almost optimum with the ability of septage processing is 54%. A recommendation to increase the performance of septage treatment plant are: improving septage supply, improving the maintenance quality of processing units, improving SOP quality, sharpening tasks and responsibilities as well as improving human resource competencies.

Keywords: *Sanitation, Septage treatment plant, Anaerobic baffle reactor, Imhoff tank, Technology atlas*