

PAPER • OPEN ACCESS

Kinship of the swamp buffalo (*bubalus bubalis*) in Tanjung Senai, Ogan Ilir, South Sumatra based on morphological characteristics

To cite this article: Yuanita Windusari *et al* 2019 *J. Phys.: Conf. Ser.* **1282** 012095

View the [article online](#) for updates and enhancements.



IOP | ebooks™

Bringing you innovative digital publishing with leading voices to create your essential collection of books in STEM research.

Start exploring the collection - download the first chapter of every title for free.

Kinship of the swamp buffalo (*bubalus bubalis*) in Tanjung Senai, Ogan Ilir, South Sumatra based on morphological characteristics

Yuanita Windusari¹, Laila Hanum¹, Arum Setiawan¹, Rahmat Pratama²,
Desi Puspita Sari³, and Rizki Palupi⁴

¹Department of Biology, Faculty of Mathematic and Natural Science, Sriwijaya University, Jl. Palembang - Prabumulih KM.32 Kabupaten Ogan Ilir, Sumatera Selatan, Indonesia.

²Graduate School of Agricultural Science, Faculty of Agriculture, Sriwijaya University, Indralaya 30662, Indonesia.

³Alumnus of Mathematic and Natural Sciences, Sriwijaya University, Indralaya, Indonesia

⁴Department of Animal Science, Faculty of Agricultural, Sriwijaya University

Abstract. Research conducted for observe phylogenetic relationship swamp buffalo (*Bubalus bubalis*) Ogan Ilir regency, South Sumatra based on morphological characteristic. The Sampling done by using a survey method and inventory in the field (on-farm) to obtain data of the characterization and swamp buffalo morphological. The result indicate that there are six variant, namely are BlackBuffalo, Lampung Buffalo, Red Buffalo, Dungkul Buffalo, Straight Buffalo, and Tunjang Langit Buffalo. Black Buffalo has black body colour and horns bent backwards. Lampung has black body colour and horns bent upwards. Red Buffalo has red body colour and horns bent upwards. Dungkul has black body colour and horns bent downwards. Straight has black body colour and horns bent straight to the side. Tunjang Langit Buffalo has black body colour and horns bent upwards and downwards.

1. Introduction

Buffalo was farm animal whose distribution in almost all parts of Indonesia and ie was generally grouped into two types, namely swamp buffalo and river buffal [3]. Buffalo used as working livestock, milk producer, producer of organic fertilizer in agriculture, and meat producer which is complement or substitution of beef.

Buffalo is a ruminant animal that has its own advantages to be developed in various agro-ecosystems because it has good adaptability such as being able to survive with low quality feed, and a high level of resistance to diseases and parasites [4]. Buffalo in Indonesia, especially in South Sumatra is still maintained traditionally and is usually inherited from families that are hereditary. The cultivation of buffalo livestock still requires development. Especially in the Tanjung Senai area, which is traditionally known as a buffalo production area or center. Information regarding data on characteric appearance such as qualitative and quantitative traits, especially in the Tanjung Senai area, is expected to be useful to determine the policy of developing buffalo livestock.

Based on research conducted by [10] it was found in the Pampangan Buffalo variant in Banyuasin that the kinship relationships of the four variants of the Swamp Buffalo Buffangan were the closest to the Black Buffalo and Lampung Buffalo variants. Both variants have real similarities in hair color,



namely black, while Red Buffalo and Striped Buffalo are different. The same basic morphological characters of Black Buffalo and Lampung Buffalo are on hair color, skin color, and horn shape.

Development of buffalo cattle should be accompanied by improvements, one of which is to improve genetic quality in order to obtain superior buffaloes. Genetic quality improvement can be done by breeding, namely selection or crossing that is adapted to the current buffalo situation[6]. Then we need information about kinship relationships based on morphological characteristics and diversity of buffalo phenotypes, especially in the Tanjung Senai area. Morphology is the external appearance of living things as an expression of biological balance so that it can be used to determine the origin and kinship.

2. Materials and Methods

This research begins with a field survey beforehand to determine the location of observation, maintenance information, livestock cultivation from the research location community. This research was carried out quantitatively and qualitatively. Quantitatively it means that every member of the buffalo is measured. And qualitatively it means observing the characteristics possessed by buffalo variations that appear.

2.1. Data Retrieval Techniques

2.1.1. Preliminary Survey

The survey was conducted together with the owner of the farm, which is to find information related to maintenance, the number of livestock, methods of cultivation, gender, age, and the process of livestock marriage. The initial survey results obtained information that there are 6 variants of buffalo in the Tanjung Senai Region (Figure 1), namely Black Buffalo, Lampung Buffalo, Red Buffalo, Dungkul Buffalo, Straight Buffalo, and Buffaloes Supporting the Sky. Measurement of morphological characteristics further needs to be done to determine the classification of these variants.

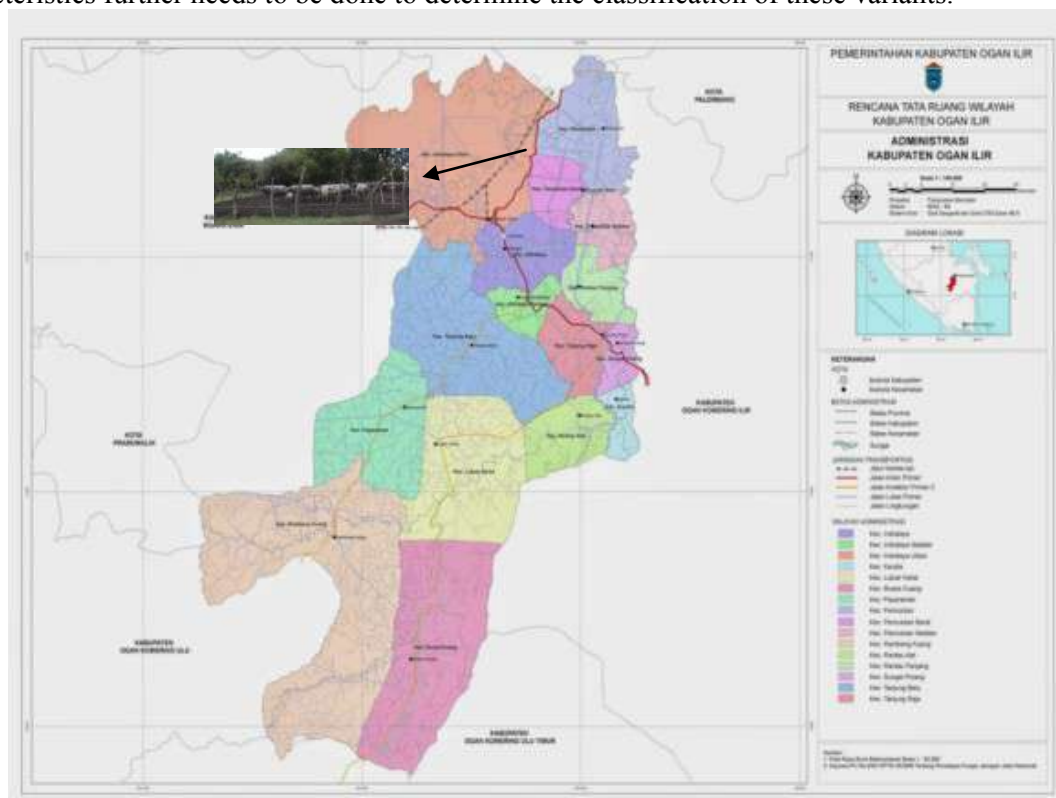


Figure 1. Map of Observation Locations of Tanjung Senai and Sejaro Sakti Hamlets, Ogan Ilir Regency, South Sumatra

2.1.2. Data collection

Data collection or sampling is done randomly. The total sample taken was 25 of the total population estimated at ± 200 buffaloes, where each buffalo variant was taken randomly to represent the population of buffalo variants in the Tanjung Senai region.

2.2. Observation Variable

2.2.1. Morphology and Characteristics of Swamp Buffalo

The buffalo body parts measured according to [6,10], namely shoulder height, hip height, body length, and chest circumference. Each variable is measured in cm. To find out the morphology of a buffalo variation can be done by measuring several variables from the buffalo body members and sketching the buffalo body for variable measurements (Figure 2). And characteristics observed such as horn shape, ear shape, nose shape, eye shape, and body shape.

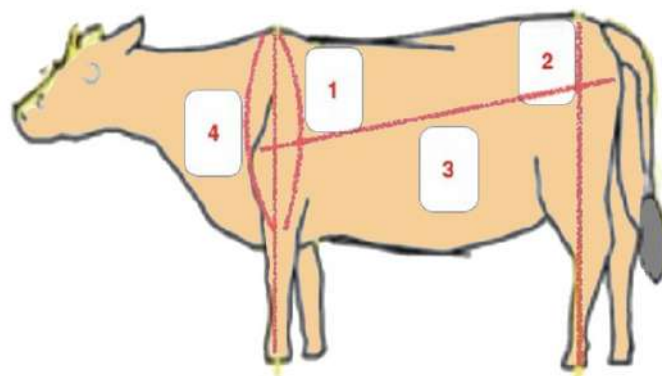


Figure 2. Morphological variables observed

2.2.2. Body parts measured include:

a. Shoulder height

Measured from the highest shoulder distance through the back of the scapula perpendicular to the ground measured using a measuring stick,

b. Hip Height

Measured from the highest distance of the hip perpendicular to the ground, measured using a measuring stick,

c. Body Length

Measured from the distance of a straight line from the edge of the bone Processus spinocus to a lump of plywood (Os ischium), measured by a measuring stick,

d. Chest size

Measured in a circle just behind the scapula using a measuring tape. Figure 2. Sketch of Swamp Buffalo Body (*Bubalus bubalis*) [10].

2.3. Data analyses

According [8] Body characteristics are calculated to determine the average, standard deviation, and coefficient of diversity :

$$\bar{X} = \frac{\sum_{i=1}^n X_i}{n}; s = \frac{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2}}{n-1} \text{ and } KK = \frac{S}{\bar{X}} (100\%)$$

Information :

- x : Average value
- S : Baku Deviation
- KK : Diversity Coefficient
- xi : Is the 1st Size of Properties x
- n : Number of Samples Obtained from Population

2.4. Interfaith Relationship between Swamp Buffalo

Observation of morphological characters was carried out descriptively covering several parts of the body. The characteristics of the research object according to [4,7] which is presented in the table, and attached to Table 1. The morphological characters are then given a score based on the results of observations made. Data obtained from the morphological characters of each buffalo analyzed by the cluster using a statistical program SPSS version 23.0 to know each genetic distance and presented in the form of dendrogram.

Table 1. Morphological Character of Swamp Buffalo Variants for Kinship Analysis

No	Character	Information	
Head			
1.	Horn	Color	0=black
		Base Texture	0=notched
		Edge Texture	0=flat
		Edge Shape	0=flat/blunt, 1=tapering
		Direction of Growth	0=straight, 1=backward, 2=upward, 3=downward, 4=upward and downward
		Accessories	0=nothing
		Color of Pangkal Tanduk	0=black
		Horn Tip Color	0=black
		Horn Pangkal Form	0=flat
		Horn Tip Form	0=tapering
		Ear	General form
	Color		0=grayish black, 1=sorrel black, 2=red
	Acessoris		0=nothing
	Edge Shape		0=taper
	Nose	Color	0=black, 1=red
		Mustache Color	0=nothing
		Accessories	0=taper
	Eyeball	Sclera color	0=Black, 1= sorrel
		Sclera form	0=black
		Iris color	0=black
		Iris form	0=circular
		Pupil Color	0=black
		Pupil form	0= circular
	Eyelid	Color	0=black, 1=red
		Accessories	0=nothing
		Edge form	0=blunt
		Base form	0=taper
	Eyelashes	Color	0=white, 1=black
		Form	0= straight
	Eyebrow	Color	0=blck, 1=red
		Edge form	0=blunt
		Base Form	0=taper
		Accessories	0=nothing
Accessories form		0=nothing	
Accessories color		0=nothing	
2.		Neck	Color
	Neck Necklace		0=nothing, 1=present
	Color of Neck Necklace		0=white, 1=black, 2=red
	Accessories		0=nothing
3.	Body	Color	0=black, 1=red

		Hair Growth Direction	0=top to bottom
		Form	0=elongated
		Navel hair	0=nothing
		Navel hair color	0=nothing
4.	Feet	Hair color	0=black, 1=red
		Shoe Color	0=black
		Hair Growth Direction	0=up and down
		Accessories	0=nothing
5.	Tail		
	Tail Body	Hair color	0=black, 1=red
		Accessories Hair Growth Direction	0=top to bottom
			0=nothing
	Whip Tail	Color	0=black, 1=red
		Texture	0=bumpy
		Edge Shape	0=tapering

3. Results and Discussions

3.1. Morphology of Swamp Buffalo

Morphological data are body measurements such as shoulder height, hip height, body length, and chest circumference. The data that has been obtained is analyzed to get the mean, standard deviation, and coefficient of diversity. The measurement results can be seen in Table 2.

Table 2. Average value, standard deviation, and diversity coefficient of the six swamp buffalo variants in Tanjung Senai

No	Observation Variable	Swamp Buffalo Variations					
		Black n=16	Lampung n=4	Red n=1	Dungkul n=2	Straight n=1	Tunjang Langit n=1
1.	Shoulder height	124,4±5,6 4,5%	117,7±5 4,3%	131	125±4,2 3,4%	120	125
2.	Hip Height	123,6±6,9 5,6%	117,7±2,5 2,1%	132	125,5±5 3,9%	121	123
3.	Body Length	112±19,3 17,3%	120±19 15,8%	100	124±1,4 1,1%	121	126
4.	Chest size	196,1±11,9 6%	196,5±12,7 6,5%	163,7	194,2±0,3 0,1%	190,7	199

3.2. Black Buffalo

Observed blackbuffalo obtained shoulder height 124.4 cm, hip height 117.7 cm, body length 112 cm, and chest circumference 196.1 cm, lower than the study [10] namely hip height 126.5 cm, body length 124.4 cm, but larger on the chest circumference that is 181 cm. In accordance with [7] the quantitative requirements for female buffalo seeds aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, and black buffalo chest circumference has met the Indonesian National Standard [5] said that a population is still considered uniform if it has a coefficient of variation below 15% and is not effective if it is selected. Shoulder height, hip height, and chest circumference of black buffalo can be said to be uniform and not effective for selection.

3.3. Lampung Buffalo

Lampung buffalo observation results obtained shoulder height 117.7 cm, hip height 117.7 cm, body length 120 cm, and chest width 196.5 cm. In accordance with the [7] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, body length and buffalo chest circumference have met the Indonesian National Standard. [5] said that a population is still considered uniform if it has a coefficient of variation below 15% and is not effective if it is selected. Shoulder height, hip height and buffalo chest circumference can be said to be uniform and ineffective for selection.

3.3.1. Red Buffalo

Red buffalo observation results obtained shoulder height 131 cm, hip height 132 cm, body length 100 cm, and chest circumference 163.7 cm, higher than the study [10] namely hip height 125 cm, but lower in body length 117.5 cm, and chest circumference is 183 cm. In accordance with the [7] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. The height of the red buffalo shoulder has met the Indonesian National Standard.

3.3.2. Dungkul Buffalo

Dungkul buffalo observation results obtained 125 cm shoulder height, 125.5 cm hip height, 124 cm body length, and chest circumference 194.2 cm, higher than the study [10] namely hip height 125 cm, body length 118 cm, but smaller on the chest circumference that is 176 cm. In accordance with the [7] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, body length, and buffalo chest circumference dungkul meet Indonesian National Standards. [5] said that a population is still considered uniform if it has a coefficient of variation below 15% and is not effective if it is selected. Shoulder height, hip height, body length, and buffalo chest circumference can be said to be uniform and ineffective for selection.

3.3.3. Straight Buffalo

Blackbuffalo observation results obtained shoulder height 120 cm, hip height 121 cm, body length 121 cm, and chest circumference 190.7 cm. In accordance with the [5] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, body length, and buffalo straight chest circumference have met the Indonesian National Standard.

3.3.4. Tunjang Langit buffalo

Black buffalo observation results obtained shoulder height 125 cm, hip height 123 cm, body length 126 cm, and chest circumference 199 cm. In accordance with the [7] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, body length, and buffalo chest circumference supporting the sky have met the Indonesian National Standard.

From the data above it can be seen that each variant has a different body size. [9] states that the characteristics of body measurements can describe the characteristics of a nation. In addition to genetic and environmental differences in the form of climate differences, other things that can affect the characteristics of body measurements are the management of feeding and maintenance that differ between locations. Climate factors do not significantly affect this performance because it is still in one area. Differences in growth in body measurements are likely caused by differences.

The proportion of bones, muscles and fat in the body of the animal. [2] states that during growth and development, parts and components of the body undergo changes. Body tissues experience different growths and achieve maximum growth at different speeds.

3.3.5. Kinship Relations of Swamp Buffalo Variants

The genetic distance matrix results from cluster analysis using SPSS statistical program version 23.0 between each variant of swamp buffalo presented in Table 3. are used to make phenogram construction.

Table 3. Genetic Distance Matrix Between Swamp Buffalo

Swamp Buffalo Variant	Black	Lampung	Red	Dungkul	Straight	Tunjang Langit
Hitam	0,000					
Lampung	2,000	0,000				
Red	4,123	3,873	0,000			
Dungkul	2,499	1,414	3,606	0,000		
Straight	2,000	2,499	4,123	3,162	0,000	
Tunjang Langit	3,317	2,236	4,000	1,000	4,123	0,000

Determination of genetic distance based on the characteristics of the qualitative phenotype showed that the smallest distance was found between the variants of the Tunjang Langit Buffalo and Dungkul buffalo which were 1,000, followed by the Dungkul Buffalo and Lampung variants of 1,414. The farthest genetic distance was found between the Red and Black Buffalo variants at 4,123, 4,123 Straight and Red Buffalo variants, and 4,123 variants of the Tunjang Langit and Straight Buffaloes.

The results of the dendrogram below can be seen from the characteristics of the qualitative phenotype indicating that the Dungkul buffalo variant has a closer relationship with the buffalo supporting the sky. Then the Dungkul Buffalo variant is closer to the Lampung Buffalo derivative. The kinship relationship is the furthest between the Red Buffalo variant and the Black Buffalo variant, then the Straight Buffalo variant with the Red Buffalo variant, and the Buffalo Supporting the Sky variant with the Straight Buffalo variant.

From the dendrogram above it can be seen that there are 3 clusters, where the Dungkul, Tunjang Langit, and Lampung variants are included in the same cluster. Then the Black and Straight Buffalo variants are the same cluster, and the next cluster is only the Red Buffalo variant.

For the first cluster has the same character in the shape of the horn tip, nose color, eye color, eyelash color, eyebrow color, neck necklace color, bada color, and tail hair color. Then for the second part of the cluster has the same character on the color of the ear, nose color, eye color, eyelash color, body color, and tail hair color. For example, the shape of horns on Dungkul Buffalo, Buffalo Supporting Sky, and Lampung despite the different direction of horn growth, but morphologically it looks more similar to each other.

If productivity improvements (out breeding) will be carried out, it is advisable to marry buffaloes with different clusters and have a considerable genetic distance. [6] The goal is to marry cattle that have far genetic kinship, it is estimated that heterosis effects will be greater than that between cattle with close kinship or in the same cluster.

4. Conclusion

Based on the research that has been done, the following conclusions are obtained: (1). It is known that there are 6 variants of swamp buffalo in the Tanjung Senai region, namely Black, Lampung, Red, Dungkul, Straight, dan Tunjang Langit buffaloes. (2). Among the swamp buffalo variants Dungkul buffalo and Tunjang Langit buffalo have the closest kinship because of its small genetic distance.

References

- [1] Anggraeni A, Sumantri C, Praharani L, Dudi and Andreas E 2011 Estimation of genetic distance a local swamp through morphological analysis approach. *Jitv*, **16** (3), 199–210.
- [2] Borghese A 2005. *Buffalo production and research*, Rome: Food And Agriculture Organization of The United Nations.
- [3] Cockrill W R 1981. The Water Buffalo: A Review. *British Veterinary Journal*, **137** (1), 8–16.

- [4] Erdiansyah E and Anggraeni A 2008. Phenotype diversity and estimation of genetic distance between local swamp buffalo subpopulation in Dompu, West Nusa Tenggara. National seminar and workshop on buffalo cattle business. *Tana Toraja : Animal husbandry Research Center*, 55–67.
- [5] Nasution 1992. *Naturalistic research method*, Bandung: Tarsito.
- [6] Sitorus A J and Anggraeni A 2008. Morphological characteristization and estimation of the genetic distance of swamp, river (Murrah) buffalo and its crossing in Northern Sumatra . National seminar and workshop on buffalo cattle business 2008, 38–54.
- [7] Indonesian National Standards 2016. *Buffalo sheet -Part 1 : Kalimantan*, Jakarta: Department of National Standardization.
- [8] Steel RG & Torrie JH, 1960. *Principles and procedures of statistics*, New York: McGraw. Available at: <https://www.agronomy.org/publications/aj/abstracts/53/5/AJ05300500NPb>.
- [9] Suparyanto A, Purwadaria T & Subandriyo, 1999. Estimation of genetic distance and national differentiating factors and sheep groups in Indonesia through a morphological analysis approach. *Jity*, 4(2), pp.80–88.
- [10] Windusari Y, Hanum L & Pratama R, 2016. Diversity and Kinship of the Swamp Buffalo (*ubalus bubalis*) from Pampangan South Sumatra Based On Morphological Characteristics *Sriwijaya Journal of Environment*, 1(3), pp.53–57.

**SJR**

Scimago Journal & Country Rank

Enter Journal Title, ISSN or Publisher Name

[Home](#)[Journal Rankings](#)[Country Rankings](#)[Viz Tools](#)[Help](#)[About Us](#)

Ads by Google

[Stop seeing this ad](#)[Why this ad?](#) ⓘ

Journal of Physics: Conference Series

Country[United Kingdom](#) - [SJR Ranking of United Kingdom](#)**Subject Area and Category**[Physics and Astronomy](#)
[Physics and Astronomy \(miscellaneous\)](#)**Publisher**[Institute of Physics](#)**Publication type**[Journals](#)**ISSN**

17426588, 17426596

Coverage

2005-ongoing

Scope

The open access Journal of Physics: Conference Series (JPCS) provides a fast, versatile and cost-effective proceedings publication service.

[Homepage](#)[How to publish in this journal](#)[Contact](#)[Join the conversation about this journal](#)

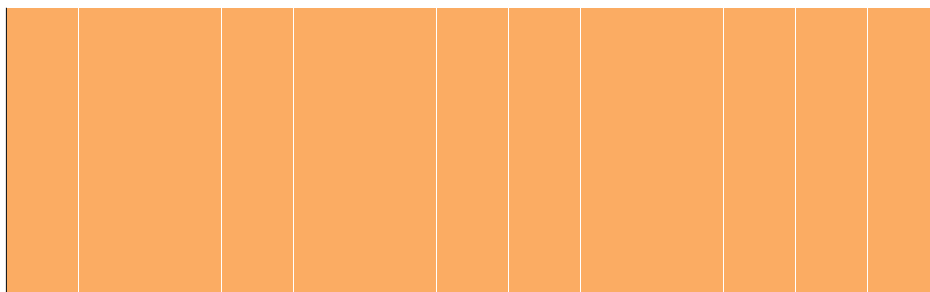
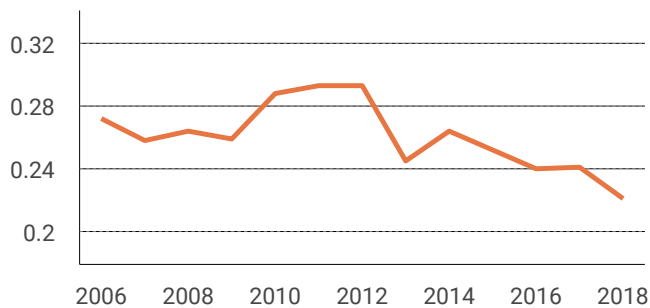
65

H Index

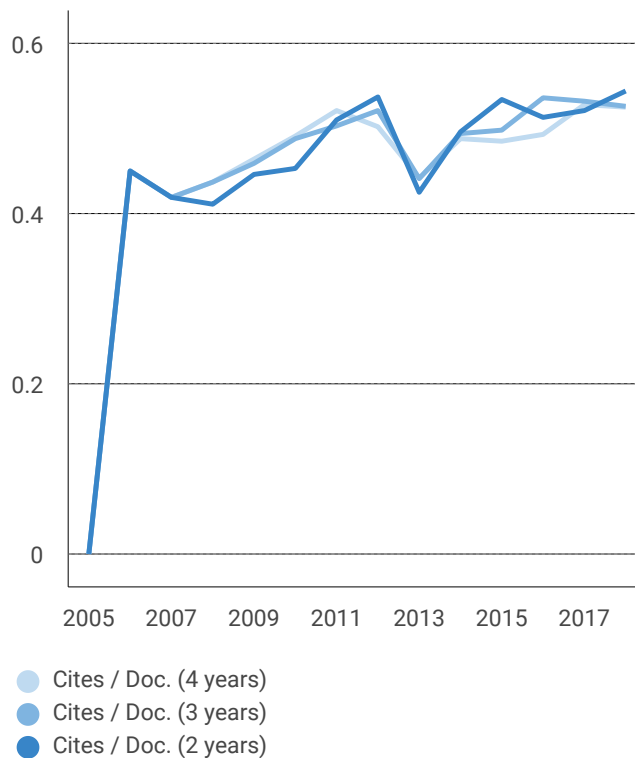
Quartiles



Physics and Astronomy (miscellaneous)

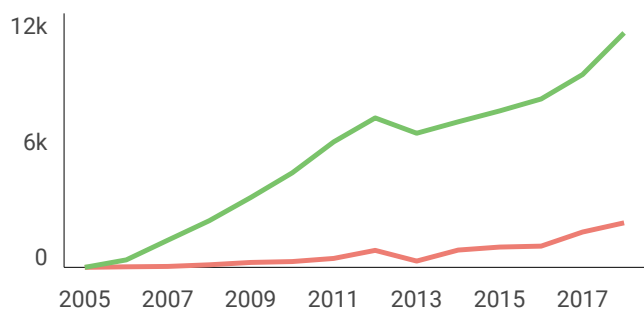
SJ_R

Citations per document



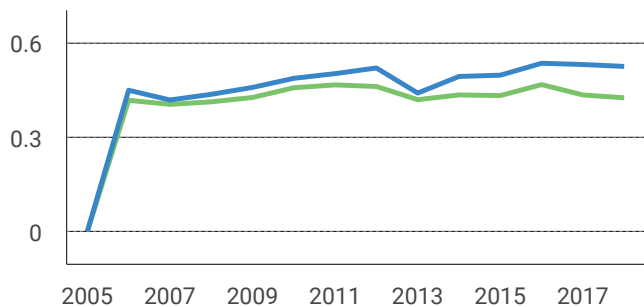
Total Cites

Self-Cites

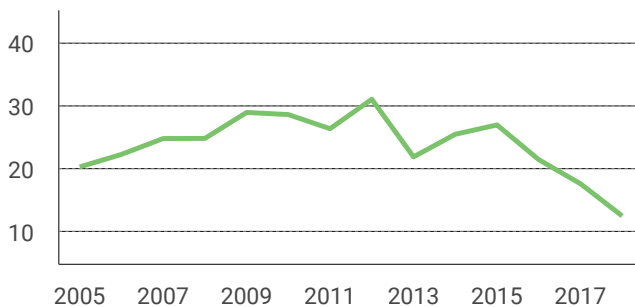


External Cites per Doc

Cites per Doc



% International Collaboration



Citable documents

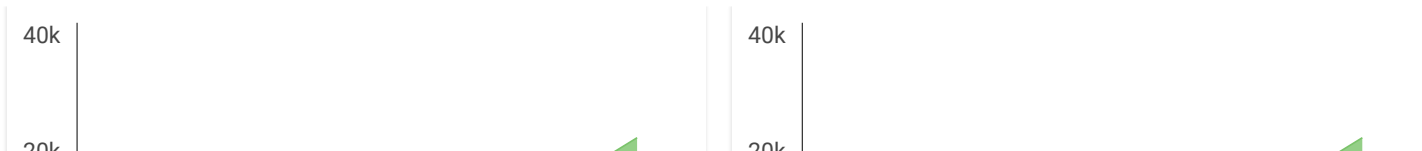
Non-citable documents



Cited documents

Uncited documents





← Show this widget in your own website

Just copy the code below and paste within your html code:

```
<a href="https://www.scimaç
```

R **Rose** 2 months ago

Dear SCImago Team,

It is stated in the JPCS homepage that the journal is a proceeding publication (<https://iopscience.iop.org/journal/1742-6596>). Is it valid and common for proceeding publication to have Q3 rank over years in scopus?

Looking forward for you explanation.

reply



Melanie Ortiz 2 months ago

SCImago Team

Dear Rose,

Thank you for contacting us.

As you probably already know, SJR is a portal with scientometric indicators of journals indexed in Scopus. All the data have been provided By Scopus /Elsevier. This fact implies that Scopus sends us an annual update of their publications and their metadata. If Journal of Physics: Conference Proceeding appears as a "Journal publication's type " it means that Scopus has categorized it like this. In addition, we have to say that the metadata belongs to Scopus, thus SCImago doesn't have the authority over this data which are exclusively property of Scopus/Elsevier. SCImago has a signed agreement that limits our performance to the generation of scientometric indicators derived from the metadata sent in the last update.

Referring the indicators, we inform you that we calculate the SJR data for all the

PAPER • OPEN ACCESS

Preface

To cite this article: 2019 *J. Phys.: Conf. Ser.* **1282** 011001

View the [article online](#) for updates and enhancements.



IOP | ebooks™

Bringing together innovative digital publishing with leading authors from the global scientific community.

Start exploring the collection—download the first chapter of every title for free.

PROCEEDINGS

SICBAS 2018

**THE 1st SRIWIJAYA INTERNATIONAL CONFERENCE ON BASIC
AND APPLIED SCIENCES**

“Sciences for Sustainable Development”

Horison Ultima Hotel Palembang, South Sumatra - Indonesia
November 6-7th, 2018

PREFACE

The 1st SRIWIJAYA INTERNATIONAL CONFERENCE ON BASIC AND APPLIED SCIENCES (SICBAS 2018) with the theme “Sciences for Sustainable Development”. The conference held on November 6-7th, 2018 at the Horison Ultima Hotel Palembang, South Sumatra, Indonesia. This event is launched so as to provide a chance and venue for researchers to come together for research presentations and dissemination's. The conference is biennial important event to publish communicate they research results in basic and applied sciences.

Hopefully this international proceeding will be able to encourage students, teachers, lecturers, practitioners, researchers, and higher education community in developing scientific and academic atmosphere in Indonesia.

On behalf of the committee of the SICBAS 2018 we would like to thank to all parties for their participation in supporting this publication and we would like to invite all of researchers and scientists to take a part in the 2nd SICBAS which will be held in 2020 by The Faculty of Mathematics and Natural Sciences, Sriwijaya University.

Palembang, November 7th 2018
Chairman,

Dr. Fiber Monado

ORGANIZING COMMITTEE

Advisory Board

Prof. Anis Saggaf (Sriwijaya University, Indonesia)
Prof. Zainuddin Nawawi (Sriwijaya University, Indonesia)
Prof. Khairurrijal (ITB, Indonesia)
Associate Prof. Minetaka Sugiyama (Osaka University, Japan)
Prof. Ibrahim Mohamed (University of Malaya, Malaysia)
Prof. Mitra Djamal (ITB, Indonesia)

Scientific Board

Prof. Iskhaq Iskandar (Sriwijaya University, Indonesia)
Prof. Kamaruzzaman Seman (USIM, Malaysia)
Prof. Irawati (ITB, Indonesia)
Eko Siswanto, Ph.D. (JAMSTEC, Japan)
Dr. Haris Gunawan (Peatland Restoration Agency, Indonesia)
Dr. Hagi Yulia Sugeha (LIPI, Indonesia)
Dr. Rashid Mehmood (Ottawa Hospital Research Institute, Canada)
Prof. Aldes Lesbani (Sriwijaya University, Indonesia)

Local Committee (Sriwijaya University, Indonesia)

Chairman : Dr. Fiber Monado
Vice Chairman : Dr. Frinsyah Virgo
Secretary : Dr. Bambang Suprihatin
Treasurer : Dr. rer. nat. Indra Yustian
Members:

- Dr. Rozirwan
- Dony Setiawan, M.Si
- Dr. Poeji Loekitowati
- Dr. Eliza
- Dr. Arum Setiawan
- Dr. Siti Sailah, M.Si
- Hermansyah, Ph.D
- Anna Ida Sunaryo P, S.Pi., M.Si
- Dr.rer.nat. Mardiyanto, M.Si
- Dr. Fitri Maya Puspita, M.Sc
- Dr.rer.nat. Risfidian Mohadi
- Dr. Idha Royani
- Dr. T. Zia Ulqodry
- Dr. Akhmad Aminuddin Bama, M.Si
- Zainal Fanani, S.Si., M.Si
- Sutopo, S.Si., M.Si
- Alfensi Faruk, M.Sc
- Akmal Johan, M.Si
- Andy Agussalim, M.Sc
- M. Fuad, M.Kom
- Sisca Oktarina, M.Sc
- Miyanto, S.AP

Editorial Team

Editor in Chief : Dr.rer.nat Risfidian Mohadi, M.Si

Deputy of chief editor : Dr. Idha Royani

Reviewer Board Members

1. Prof. Dr. Iskhaq Iskandar	Universitas Sriwijaya
2. Prof. Dr. Aldes Lesbani	Universitas Sriwijaya
3. Dr. Adhitya Ronnie Effendie	Universitas Gajah Mada
4. Dr. Arum Setiawan	Universitas Sriwijaya
5. Dr. Azhar Kholiq Affandi	Universitas Sriwijaya
6. Dr. Bambang Suprihatin	Universitas Sriwijaya
7. Dr. Eliza	Universitas Sriwijaya
8. Dr. Fauziyah	Universitas Sriwijaya
9. Dr. Fiber Monado	Universitas Sriwijaya
10. Dr. Fitri Maya Puspita	Universitas Sriwijaya
11. Dr. Frinsyah Virgo	Universitas Sriwijaya
12. Dr. Harry Wijayanti	Universitas Sriwijaya
13. Dr. Heri Satria	Universitas Lampung
14. Dr. Hermansyah	Universitas Sriwijaya
15. Dr. Idha Royani	Universitas Sriwijaya
16. Dr. Masturi	Universitas Negeri Semarang
17. Dr. Menik Ariani	Universitas Sriwijaya
18. Dr. Poeji Lukitowati	Universitas Sriwijaya
19. Dr. Rahadi Wirawan	Universitas Mataram
20. Dr. rer.nat Mardiyanto	Universitas Sriwijaya
21. Dr. rer.nat. Maya Shovitri	Institut Teknologi Sepuluh November
22. Dr. Siti Sailah	Universitas Sriwijaya
23. Dr. Yulianto Suteja	Universitas Udayana
24. Dr. Zia Ulqodri	Universitas Sriwijaya
25. Dr.rer.nat Risfidian Mohadi	Universitas Sriwijaya
26. Dr. A. Aminuddin Bama	Universitas Sriwijaya
27. Anna Ida Sunaryo, M.Si	Universitas Sriwijaya







This site uses cookies. By continuing to use this site you agree to our use of cookies. To find out more, see our Privacy and Cookies policy.



Table of contents

Volume 1282

2019

◀ Previous issue Next issue ▶

**Sriwijaya International Conference on Basic and Applied Science
6–7 November 2018, Palembang, Indonesia**

[View all abstracts](#)

Accepted papers received: 26 June 2019

Published online: 14 August 2019

Preface

OPEN ACCESS

011001

Preface

+ View abstract



View article



PDF

OPEN ACCESS

011002

Peer review statement

+ View abstract



View article



PDF

Papers

Mathematics and Applied Mathematics

OPEN ACCESS

012001

On selected issues of Boolean function application in symmetric key cryptography against side channel attacks

Kamaruzzaman Seman, Muhammad Fahim Roslan, Azni Haslizan Ab Halim and M Nor Azizi Syam Mohd Sayuti

+ View abstract



View article



PDF

OPEN ACCESS

012002

The effect of interactive demonstration method on heat energy learning

Ria Triayomi

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012003

Improved cloud computing model of internet pricing schemes based on Cobb-Douglas utility function

Indrawati, Fitri Maya Puspita, Evi Yuliza, Oki Dwipurwani, Yossy Eka Putri and Affriyanti

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012004

Optimization production and distribution using production routing problem with perishable inventory (PRPPI) models

Novi Rustiana Dewi, Eka Susanti, Eddy Roflin, Tiara Bella Octalia and Rika Novita

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012005

Naive Bayes classifier for infant weight prediction of hypertension mother

Anita Desiani, Rifkie Primartha, Muhammad Arhami and Osvari Orsalan

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012006

Joint life insurance based on Gompertz assumptions and interest rate affected by the exchange rate

Des Alwine Zayanti, Endang Sri Kresnawati and Mulya Megah

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012007

Simulation of pension plan supplemental cost based on withdrawal rate interpolation and different benefit

Endang Sri Kresnawati and Yulia Resti

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012008

Set covering models in optimizing the emergency unit location of health facility in Palembang

Robinson Sitepu, Fitri Maya Puspita, Setia Romelda, Ahmad Fikri, Beta Susanto and Hadir Kaban

[+ View abstract](#)[View article](#)[PDF](#)

OPEN ACCESS

012009

Triangular fuzzy number in probabilistic fuzzy goal programming with pareto distribution

Eka Susanti, Oki Dwipurwani, Robinson Sitepu, Wulandari and Liani Natasia

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012010

Support vector machines for classification of low birth weight in Indonesia

Ning Eliyati, Alfensi Faruk, Endang Sri Kresnawati and Ika Arifieni

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012011

A non-proportional hazards model with time-dependent variables for under-five mortality in Indonesia

Alfensi Faruk, Erlan Syahputra, Endro Setyo Cahyono and Sari Mutiara Aisyah

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012012

Implementation of branch and cut method on n -sheet model in solving two dimensional cutting stock problem

Putra BJ Bangun, Sisca Octarina and Ari Putra Pertama

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012013

Analysis of dengue fever disease transmission using suspected-infected-recovered (SIR) model

Endro Setyo Cahyono, Alfensi Faruk and Bambang Suprihatin

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012014

Pattern recognition for study period of student in Mathematics Department with C4.5 algorithm data mining technique at the Faculty of Mathematics and Natural Science Universitas Sriwijaya

Sugandi Yahdin, Anita Desiani, Ali Amran, Desty Rodiah and Solehan

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012015

Gilmore and gomory model on two dimensional multiple stock size cutting stock problem

Sisca Octarina, Vinny Ananda and Evi Yuliza

[+ View abstract](#)[View article](#)[PDF](#)

OPEN ACCESS

012016

A path analysis model of students' statistics achievement

Dian Cahyawati, Wahyudin and Sufyani Prabawanto

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012017

Timetable creation of BRT Trans Musi Palembang on AAL Ampera route

Irmeilyana, Indrawati, Ali Amran and Reyfaldo Tomy

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012018

Analyzing characteristics of Songket Palembang weavers productivity using path analysis

Irmeilyana, Anita Desiani, Ngudiantoro, Salman Alfarisy and Putri Asia Andreani

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012019

Limiting Distribution of the Bootstrap Parameter Estimator of a Second Order Autoregressive Model

Bambang Suprihatin, Endro Setyo Cahyono and Alfensi Faruk

[+ View abstract](#) [View article](#) [PDF](#)**Physics and Applied Physics****OPEN ACCESS**

012020

Investigate the effects of synthesizing techniques on the particle size reduction and thermal behaviors of carbon-based material from natural wood charcoal

Barlin and W C Chang

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012021

Is TRMM product good proxy for gauge precipitation over peat land area of the South Sumatera?

Muhammad Irfan, Wijaya Mardiansyah, Menik Ariani, Albert Sulaiman and Iskhaq Iskandar

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012022

Preparation and characterization of epoxy resin bonded magnet prepared by using jet milled NdFeB

Meiliyana Eka Sari, Ramlan and Mulyadi

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012023

Study of Saros cycle and non-partial solar eclipse with Newton mechanics approach

Akhmad Aminuddin Bama, M R Tamara, Arsali and D Marini

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012024

Integration of Gas Sensors as an Exhaust Gas Monitoring Device from Green Roasting Process of Various Coffee Beans

Samsidar, K N Sawitri, R Purbakawaca, M Ridho, Heriyanti, L Marlinda and Sutrisno

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012025

Application of advanced research WRF model using tropical (New Tiedtke) scheme and Kain-Fritsch scheme in predicting short-term weather in Palembang and its surrounding areas

Octavianus Cakra Satya, Arsali, Puad Maulana Mandailing and Hadir Kaban

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012026

Effect of Al_2O_3 addition with concentration ($x=0.1\%$, 0.2% , 0.4%) mol on the crystal structure and physical properties of permanent magnets barium hexaferrite ($\text{BaO}_6\text{Fe}_2\text{O}_3$)

Ramlan, Febriyani Amizwan, Mulyadi, Suprapedi and Dedi Setiabudidaya

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012027

The effect of drying temperature on chemical composition of chitosan powder from fishbone waste to hydroponic Deep Water Culture (DWC) application

Anita Ekawati, Fitri Suryani Arsyad and Idha Royani

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012028

Calculation of burnup fuel cell uranium metallic with carbon dioxide cooled

Enda Susanty, Menik Ariani, Zaki Su'ud and Fiber Monado

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012029

The effect of atrazine concentration on galvanic cell potential based on *molecularly imprinted polymers* (MIPS) and aluminium as contact electrode

Idha Royani, Assaidah, Widayani, Mikrajuddin Abdullah and Khairurrijal

[+ View abstract](#)[View article](#)[PDF](#)

OPEN ACCESS

012030

Effect of template removal process with methanol solvent on cavities number of melamine molecularly imprinted polymer (MIPS)

Farhan Syawali, Erry Koriyanti and Idha Royani

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012031

The effect of oil palm shell ash to asphalt characteristics

Winsyahputra Ritonga, Nila Yosefa Ritonga, Muhammad Aswin Rangkuti, Eddiyanto and Septian Prawijaya

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012032

Analysis crystal structure of magnetic materials $\text{Co}_{1-x}\text{Zn}_x\text{Fe}_2\text{O}_4$

Akmal Johan, Wisnu Ari Adi, Fitri Suryani Arsyad and Dedi Setiabudidaya

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012033

Synthesis of polyvinylpyrrolidone/mangosteen pericarp extract (MPE) fibered particles using electrospray

Y A Rezeki, N Wahyuni, M M Munir and K Khairurrijal

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012034

Determination of the Pythagorean scale using a half wavelength theory of standing-wave

Hadir Kaban, Yulinar Adnan, Jorena Bangun, Aleksi Cipta Yoga and Akhmad Aminuddin Bama

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012035

The irregularity of Avogadro's hypothesis and determination of the gas constant value (R)

Akhmad Aminuddin Bama and Almunady T. Panagan

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012036

An analysis of Coulomb stress change and triggering interaction toward seismic activities in the area West Sumatera within January 2000-June 2018

Asmaniar, Azhar K Affandi, Siti Sailah, Sabar Ardiansyah and Milzam Wafiazizi

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012037

Analysis of Kepler's law to the movement of celestial bodies

Galuh Titi Fatimah, Dian Marini, Supardi and Akhmad Aminuddin Bama

[+ View abstract](#)

[View article](#)

[PDF](#)

OPEN ACCESS

012038

Fracture indentification around the aum geothermal manifestation using 2d resistivity method

F Virgo, Erni, A K Affandi and M Y N Khakim

[+ View abstract](#)

[View article](#)

[PDF](#)

OPEN ACCESS

012039

The effect of milling time on the structure properties and morphology of aluminium powder from construction industry waste milled using high energy milling

Ratu Inayah Ilahi, Fitri Suryani Arsyad, Dwika Sari and Miftahul Jannah

[+ View abstract](#)

[View article](#)

[PDF](#)

OPEN ACCESS

012040

Surface Morphology Properties Doped RuO₂ (0, 2, 4, 6%) of Thin Film LiNbO₃

Irzaman, Mahfuddin Zuhri, Novitri, Irmansyah, Ardian Arif Setiawan and Husin Alatas

[+ View abstract](#)

[View article](#)

[PDF](#)

OPEN ACCESS

012041

Waste as fastest cycle of renewable energy sources through TOSS Model

Supriadi Legino, Ranti Hidayawanti and Irma Wirantika

[+ View abstract](#)

[View article](#)

[PDF](#)

OPEN ACCESS

012042

Dark matter hypothesis to maintain theory of gravity

Wardah Intan Meidina, Supardi and Akhmad Aminuddin Bama

[+ View abstract](#)

[View article](#)

[PDF](#)

OPEN ACCESS

012043

Temperature carbonization effect on the quality of activated carbon based on rubber seed shell

Aulia, Aprilianda, F S Arsyad and A Johan

[+ View abstract](#)

[View article](#)

[PDF](#)

OPEN ACCESS

012044

Study the synthesis of LiBOB compounds using lithium sources from sea water

T. Lestariningsih, Q Sabrina, I. Nuroniah, B. Prihandoko, E. Marti Wigayati and C. Rina Ratri

[+ View abstract](#)

[View article](#)

[PDF](#)

OPEN ACCESS

012045

Change of Structure and Magnetic Properties of La-Substituted Barium Hexaferrite

Yana Taryana, Azwar Manaf and Wisnu Ari Adi

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012046

Effect of temperature sintering on physical properties, hardness and crystal structures of ceramic TiO₂ doped with 2 % Fe₂O₃

Fika Umia, Ramlan, Priyo Sardjono, Muljadi and Suprapedi

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012047

Effect of sintering temperature variations of barium hexa ferrite on physical properties and crystal structure

Mulyadi, Ramlan, A A Rahayu, P Sardjono and Djuhana

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012048

Analysis Physical and Crystal Structure of BaFe_{12-4x}Al_{4x}O₁₉ at x=0.007 Prepared by Powder Metallurgy Method

Anis Dharmayanti, Ramlan, Muljadi and Priyo Sardjono

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012049

Effect of various sintering temperature of ceramic TiO₂ on physical properties and crystall structure

Mulyadi, Ramlan, Siti Nur' Aini and Djuhana

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012050

Analysis mechanical, magnetic and micro structure on composite hybrid magnet NdFeB-BaO₆Fe₂O₃ prepared by using silicon rubber

Suprapedi, Muljadi and Ramlan

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012051

Design of digital resistivity-meter for subsurface exploration

Maison, K.N. Sawitri, Samsidar, L. Handayani, R. Purbakawaca and J. Nurjaman

[+ View abstract](#) [View article](#) [PDF](#)

OPEN ACCESS

012052

Sea surface temperature variability in the Makassar strait during ENSO (*El niño* Southern Oscillation) from the Terra-MODIS data sets

R N Purwandari, S Mubarrok and I Mandang

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012053

Analysis of seismicity level and return period of bengkulu area earthquake from 1960-2017

Desy Patrisia, Siti Sailah and Azhar K Affandi

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012054

Analysis of peak ground acceleration (PGA) using the probabilistic seismic hazard analysis (PSHA) method for Bengkulu earthquake of 1900 - 2017 period

Delita M Puteri, Azhar K Affandi, Siti Sailah, Nurul Hidayat and Mahdi Kokab Zawawi

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012055

Effect of composition of LiMn_2O_4 cathode sheet on the electrochemical performance of lithium ion battery

Beta Riana Liasari, Jorena Bangun, Slamet Priyono and Ramlan

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012056

Effect of polymer binders on the electrochemical Performance of Al-doped lithium titanate electrode

S Priyono, T D Sari, Ramlan, A Subhan and B Prihandoko

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012057

The attainment of 100 percent electrification ratio in the archipelago of Indonesia by people way electricity initiative

Supriadi Legino, Rakhmat Arianto and Nurmiati Pasra

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012058

Optical properties doped RuO_2 (0, 2, 4, 6%) of thin film LiNbO_3

Mahfuddin Zuhri, Novitri, Irmansyah, Ardian Arif Setiawan, Husin Alatas and Irzaman

[+ View abstract](#)[View article](#)[PDF](#)

OPEN ACCESS

012059

Crystalline structures properties doped RuO₂ (0, 2, 4, 6%) of thin film LiNbO₃

Ardian Arif Setiawan, Novitri, Irzaman, Mahfuddin Zuhri, Irmansyah and Husin Alatas

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012060

Mechanical and magnetic properties of flexible magnet Ba-hexa Ferrite

Ramlan, Muljadi, Priyo Sardjono, Suprapedi and Dedi Setiabudidaya

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012061

Natural rubber composites for solid tyre used for forklift tensile properties and morphological characteristics

Nasruddin and Aprillena T Bondan

[+ View abstract](#) [View article](#) [PDF](#)**Chemistry and Applied Chemistry****OPEN ACCESS**

012062

Analysis and enhancement of the ethanol resistance of *Pichia kudriavzevii* N77-4, a strain newly isolated from the Korean traditional fermentation starter *Nuruk*, for improved fermentation performance

M Sugiyama, T Fukaya, J Y Moon, K Ishida, A Matsushita, S Y Kim and S H Yeo

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012063

Synthesis and characterization of meropenem imprinted polymer

Lasmaryna Sirumapea, M Ali Zulfikar, M Bachri Amran and Anita Alni

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012064

Isolation of active compounds from the leaf extract of patah kemudi (*Abroma augusta* L.) and its anti-inflammatory activity

M Latief, H Amanda, A Utami, Muhaimin and Nurhayati

[+ View abstract](#) [View article](#) [PDF](#)**OPEN ACCESS**

012065

Utilization of catalyst-coated membrane (CCM) and spraying methods in fabrication membrane electrode assembly (MEA) for direct methanol fuel Cell (DMFC) using Pt-Co / C catalyst

D Rohendi, N Syarif, M Said, M T Utami and Y Marcelina

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012066

Biosorption of Cu(II) onto algae biomass (*Oscillatoria Splendida*) isolated from swamp water ecosystem in Palembang, South Sumatera

Risfidian Mohadi, Doni Setiawan and Hilda Zulkifli

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012067

Determination of quality parameters in nata de cocolawak as hepatoprotector functional food

Indah Solihah, Miksusanti, Rennie Puspa Novita and Sandy Yoga Ramadhan

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012068

Supramolecular design of Benzene-1,3,5-Tricarboxamide with Hydrophobic Alkyl side chains toward long-range liquid crystalline properties

H O Lintang, J Matmin and L Yuliati

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012069

Hemocompatibility study of surface-attached antibiofouling polymer monolayers

Bidhari Pidhatika

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012070

Tuning the stability of red color natural pigments in fruit extracts by pH control

Leny Yuliati, Juliana and R Indrawati

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012071

Development of potentiometry method for Zn analysis

Suheryanto, Rani Nawang Sari and Poedji Loekitowati Hariani

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012072

Physical properties analysis of the liquid produced by polystyrene pyrolysis

Selpiana, Budi Santoso, Dede Pramayuda and Damar Setyo Ismoro

[+ View abstract](#)[View article](#)[PDF](#)

OPEN ACCESS

012073

Film (patch) based on starch compound hydrolise by amylase from saliva and bacteria

Miksusanti, Herlina, A.N Fithri, Yuniar, V Novalin and Julinar

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012074

Synthesis and characterization schiff base and complexes with Copper (II) and Iron (II) and their application as antibacterial agents

N Hidayati, Fatma and W Purwaningrum

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012075

Adsorption of congo red using Mg/Fe and Ni/Fe layered double hydroxides

N Hidayati, D R Apriliani, Helda, T Taher, R Mohadi, Elfita and A Lesbani

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012076

Monitoring of formulation and hazardous ingredients of residential insecticide which sold in Palembang

Mia Hayati Khairunnisa, Ahmad Ghiffari, Chairil Anwar and Dalilah Dalilah

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012077

No antimalarial resistance of *Plasmodium falciparum* varian West Indonesia using molecular markers screening

Ahmad Ghiffari, Rahman Rahman and Chairil Anwar

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012078

Effect of impregnation methods and bioresin concentration on physical and mechanical properties of soft-inner part of oil palm trunk

R Hartono, Erwinsyah, W Hidayat and R Damayanti

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012079

Modification of cellulose with acetic acid to removal of methylene blue dye

Poedji Loekitowati Hariani, Fahma Riyanti and Asri Kurniaty

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012080

Synthesis of chitosan/alumina composite by sol gel method for adsorption of procion blue MX-R dye from wastewater songket industry

Fatma, Nova Yuliasari, Fahma Riyanti, Poedji Loekitowati Hariani and Barisah Nurbaiti

[+ View abstract](#)



[View article](#)



[PDF](#)

OPEN ACCESS

012081

The conversion of expanded polystyrene waste to liquid fuel using Cu-Al₂O₃ by the thermal catalytic cracking process

Selpiana, Budi Santoso, Debi Putri Suprpto, Ridho Patratama and Dede Pramayuda

[+ View abstract](#)



[View article](#)



[PDF](#)

OPEN ACCESS

012082

Quantification of volatile organic compounds (VOCs) to predict petroleum at Sungai Rambai in Jambi province

Rahmi, Sutrisno, Rayandra Ashyar and A T K Wardana

[+ View abstract](#)



[View article](#)



[PDF](#)

OPEN ACCESS

012083

Protection of mild steel from corrosion using methanol extract of avocado (*Persea americana mill*) seeds in a solution of sulfuric acid

D R Gusti, I Lestari, F Farid and P T Sirait

[+ View abstract](#)



[View article](#)



[PDF](#)

OPEN ACCESS

012084

Nanoparticulate formulatiom of christmas palm seed (*Adonidia merrillii*) ethanolic extract containing lactic acid for antidiarrheal therapy

Mardiyanto, Sofia Sandi, Herlina and Ivan Kurniawan

[+ View abstract](#)



[View article](#)



[PDF](#)

OPEN ACCESS

012085

Effectiveness of Ethanolic Extract Ketepeng cina Leaves (*Senna alata* L.) As Antidiabetic Activity Test In Male Wistar Rats Induced by Alloxan

Herlina, Annisa Amriani, Indah Solihah, Putri Damayanti and Sri Wahyuningsih Rais

[+ View abstract](#)



[View article](#)



[PDF](#)

OPEN ACCESS

012086

The Rationality of Antihypertensive and Oral Antidiabetic Patients with Chronic Kidney Disease with Hypertension and or Type 2 Diabetes Mellitus in RSI Siti Khadijah Palembang

Rennie Puspa Novita, Herlina, Arya Prasetya Beumaputra and Arini Alfa Hidayah

[+ View abstract](#)



[View article](#)



[PDF](#)

OPEN ACCESS

012087

Study on the anti-inflammatory properties of Karamunting (*Rhodomystomentosa* (Aiton) Hassk.) leaf extracts

Indah Solihah, Widya Wulandari, Herlina, Riana Sari Puspita Rasyid and Tri Suciati

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012088

Antioxidant activity of isolated compound from perepat roots (*Sonneratia alba*)

M Latief, A Utami, H Amanda, Muhaimin and Z Afifah

[+ View abstract](#)[View article](#)[PDF](#)**Environmental Sciences****OPEN ACCESS**

012089

Utilization of remote sensing imagery data to determine the priority location of green open space as child-friendly integrated public space in Palembang City

Nurrohman Nafiudin, Ardiansyah and Rokhmatuloh

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012090

Landcover change analysis of besitang watershed, Langkat-North Sumatera

Anita Zaitunah, Samsuri and Amaliyah Putri

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012091

Inventory of wildlife in the protected forest area Bukit Jambul Gunung Patah as basic data to support sustainable management

D Setiawan, E Patriono, H Marisa, A Setiawan, I Yustian, Pragustiandi and M Iqbal

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012092

Estimation of mixed layer depth from argo float data in Makassar strait during el niño southern oscilation

F Amalia, S Mubarrok and I Mandang

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012093

Air-Sea interaction in the Tropical Pacific Ocean during 2018 as revealed by multi-satellite data

Willy Antakusuma, Muhamad Nur and Iskhaq Iskandar

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012094

Implementing triple helix through *Listrik Kerakyatan* initiative: community-based energy from waste

Amanda Trisia Supriadi, Supriadi Legino, Yudhy S Purwanto, Dewi Arianti Wulandari and Hendra Jatnika

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012095

Kinship of the swamp buffalo (*bubalus bubalis*) in Tanjung Senai, Ogan Ilir, South Sumatra based on morphological characteristics

Yuanita Windusari, Laila Hanum, Arum Setiawan, Rahmat Pratama, Desi Puspita Sari and Rizki Palupi

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012096

Measurement and analysis of TS-Frequency relationship on mackerel tuna (*Euthynnus affinis*) using bandwidth frequency

I Jaya, R Aulya and Fauziyah

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012097

Comparative photocatalytic performances towards acid yellow 17 (AY17) and direct blue 71 (DB71) degradation using Sn₃O₄ flower-like structure

A Huda, R Ichwani, C T Handoko, M D Bustan, B Yudono and F Gulo

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012098

Enhanced photocatalytic CO₂ reduction activity of silvered titania prepared by wet deposition method

C T Handoko, A Huda, M D Bustan, B Yudono and F Gulo

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012099

Diversity, dominance and density of Tree Stage Plants of Sriwijaya University Forest Area Indralaya

D Setiawan, H Marisa and D P Indriani

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012100

Biological response to quails (*Coturnix coturnix*) given hydrolyzed feather meal at different levels

M I Said, E Abustam, W Pakiding and M Z Mide

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012101

Detecting the association between Salagundi (*Roudholia teysmanii*) and other vegetation at Salib Kasih tourism areas

K S Hartini and I L Silitonga

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012102

The dynamics of functional microbes population in two depths under raru (*Cotylelobium* spp) stand

D Elfiati, A Susilowati and C Modes

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012103

Influence of environmental parameters on the shrimp catch in Banyuasin Coastal Water, South Sumatra, Indonesia

Fauziyah, F Agustriani, A I S Purwiyanto, W A E Putri and Y Suteja

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012104

Microplastics Dissemination from Fish *Mugil dussumieri* and Mangrove Water of Muara Teluknaga, Tangerang, Banten

Nur H F Rahmawati and Mufti P Patria

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012105

Distribution of phytoplankton diversity and abundance in Maspari island waters, South Sumatera, Indonesia

Rozirwan, I Iskandar, M Hendri, R Apri, Supardi, N Azhar and W Mardiansyah

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012106

Identification of surface macro debris in river flow and estuary of Musi River, South Sumatera Province, Indonesia

R Maherisa, A IS Purwiyanto, F Agustriani, W AE Putri, Fauziyah and Ferdiansyah

[+ View abstract](#)[View article](#)[PDF](#)

OPEN ACCESS

012107

A numerical study of mixing and sediment transport caused by tidal in the Bontang waters

N Alghifari, Y N Nasution and I Mandang

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012108

Providing biodiversity information to support sustainable development of Sugihan wetlands, South Sumatra

Arum Setiawan, Muhammad Iqbal, Doni Setiawan and Indra Yustian

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012109

Microplastic contamination on *Anadara granosa* Linnaeus 1758 in Pangkal Babu mangrove forest area, Tanjung Jabung Barat district, Jambi

Syaidah Fitri and M P Patria

[+ View abstract](#)[View article](#)[PDF](#)**OPEN ACCESS**

012110

Propagation for conserving endangered taxol producing tree *Taxus sumatrana* through shoot cuttings technique

A Susilowati, H H Rachmat, C R Kholibrina, K S Hartini and H A Rambe

[+ View abstract](#)[View article](#)[PDF](#)**JOURNAL LINKS**[Journal home](#)[Information for organizers](#)[Information for authors](#)[Search for published proceedings](#)[Contact us](#)[Reprint services from Curran Associates](#)

Kinship of the swamp buffalo (*bubalus bubalis*) in Tanjung Senai, Ogan Ilir, South Sumatra based on morphological characteristics

By Arum Setiawan

Kinship of the swamp buffalo (*bubalus bubalis*) in Tanjung Senai, Ogan Ilir, South Sumatra based on morphological characteristics

Yuanita Windusari¹, Laila Hanum¹, Arum Setiawan¹, Rahmat Pratama²,
Desi Puspita Sari³, and Rizki Palupi⁴

¹ Department of Biology, Faculty of Mathematic and Natural Science, Sriwijaya University, Jl. Palembang - Prabumulih KM.32 Kabupaten Ogan Ilir, Sumatera Selatan, Indonesia.

² Graduate School of Agricultural Science, Faculty of Agriculture, Sriwijaya University, Inderalaya 30662, Indonesia.

³ Alumnus of Mathematic and Natural Sciences, Sriwijaya University, Indralaya, Indonesia

⁴ Department of Animal Science, Faculty of Agricultural, Sriwijaya University

Abstract. Research conducted for observe phylogenetic relationship swamp buffalo (*Bubalus bubalis*) Ogan Ilir regency, South Sumatera based on morphological characteristic. The Sampling done by using a survey method and inventory in the field (on-farm) to obtain data of the characterization and swamp buffalo morphological. The result indicate that there are six variant, namely are BlackBuffalo, Lampung Buffalo, Red Buffalo, Dungkul Buffalo, Straight Buffalo, and Tunjang Langit Buffalo. Black Buffalo has black body colour and horns bent backwards. Lampung has black body colour and horns bent upwards. Red Buffalo has red body colour and horns bent upwards. Dungkul has black body colour and horns bent downwards. Straight has black body colour and horns bent straight to the side. Tunjang Langit Buffalo has black body colour and horns bent upwards and downwards.

1. Introduction

Buffalo was farm animal whose distribution in almost all parts of Indonesia and ie was generally grouped into two types, namely swamp buffalo and river buffal [3]. Buffalo used as working livestock, milk producer, producer of organic fertilizer in agriculture, and meat producer which is complement or substitution of beef.

Buffalo is a ruminant animal that has its own advantages to be developed in various agro-ecosystems because it has good adaptability such as being able to survive with low quality feed, and a high level of resistance to diseases and parasites [4]. Buffalo in Indonesia, especially in South Sumatra is still maintained traditionally and is usually inherited from families that are hereditary. The cultivation of buffalo livestock still requires development. Especially in the Tanjung Senai area, which is traditionally known as a buffalo production area or center. Information regarding data on characteric appearance such as qualitative and quantitative traits, especially in the Tanjung Senai area, is expected to be useful to determine the policy of developing buffalo livestock.

Based on research conducted by [10] it was found in the Pampangan Buffalo variant in Banyuasin that the kinship relationships of the four variants of the Swamp Buffalo Buffangan were the closest to the Black Buffalo and Lampung Buffalo variants. Both variants have real similarities in hair color,



Content from this work may be used under the terms of the [Creative Commons Attribution 3.0 licence](https://creativecommons.org/licenses/by/3.0/). Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

Published under licence by IOP Publishing Ltd

namely black, while Red Buffalo and Striped Buffalo are different. The same basic morphological characters of Black Buffalo and Lampung Buffalo are on hair color, skin color, and horn shape.

Development of buffalo cattle should be accompanied by improvements, one of which is to improve genetic quality in order to obtain superior buffaloes. Genetic quality improvement can be done by breeding, namely selection or crossing that is adapted to the current buffalo situation[6]. Then we need information about kinship relationships based on morphological characteristics and diversity of buffalo phenotypes, especially in the Tanjung Senai area. Morphology is the external appearance of living things as an expression of biological balance so that it can be used to determine the origin and kinship.

2. Materials and Methods

This research begins with a field survey beforehand to determine the location of observation, maintenance information, livestock cultivation from the research location community. This research was carried out quantitatively and qualitatively. Quantitatively it means that every member of the buffalo is measured. And qualitatively it means observing the characteristics possessed by buffalo variations that appear.

2.1. Data Retrieval Techniques

2.1.1. Preliminary Survey

The survey was conducted together with the owner of the farm, which is to find information related to maintenance, the number of livestock, methods of cultivation, gender, age, and the process of livestock marriage. The initial survey results obtained information that there are 6 variants of buffalo in the Tanjung Senai Region (Figure 1), namely Black Buffalo, Lampung Buffalo, Red Buffalo, Dungkul Buffalo, Straight Buffalo, and Buffaloes Supporting the Sky. Measurement of morphological characteristics further needs to be done to determine the classification of these variants.

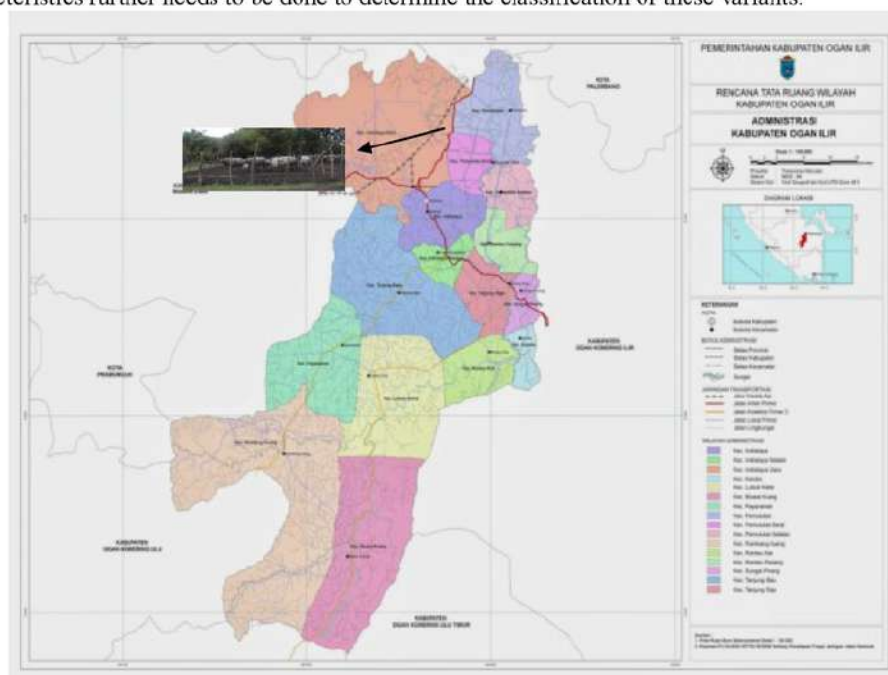


Figure 1. Map of Observation Locations of Tanjung Senai and Sejaro Sakti Hamlets, Ogan Ilir Regency, South Sumatra

2.1.2. Data collection

Data collection or sampling is done randomly. The total sample taken was 25 of the total population estimated at ± 200 buffaloes, where each buffalo variant was taken randomly to represent the population of buffalo variants in the Tanjung Senai region.

2.2. Observation Variable

2.2.1. Morphology and Characteristics of Swamp Buffalo

The buffalo body parts measured according to [6,10], namely shoulder height, hip height, body length, and chest circumference. Each variable is measured in cm. To find out the morphology of a buffalo variation can be done by measuring several variables from the buffalo body members and sketching the buffalo body for variable measurements (Figure 2). And characteristics observed such as horn shape, ear shape, nose shape, eye shape, and body shape.

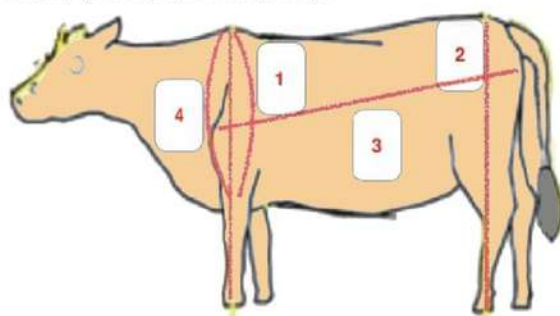


Figure 2. Morphological variables observed

2.2.2. Body parts measured include:

a. Shoulder height

Measured from the highest shoulder distance through the back of the scapula perpendicular to the ground measured using a measuring stick,

b. Hip Height

Measured from the highest distance of the hip perpendicular to the ground, measured using a measuring stick,

c. Body Length

Measured from the distance of a straight line from the edge of the bone Processus spinocus to a lump of plywood (Os ischium), measured by a measuring stick,

d. Chest size

Measured in a circle just behind the scapula using a measuring tape. Figure 2. Sketch of Swamp Buffalo Body (*Bubalus bubalis*) [10].

2.3. Data analyses

According [8] Body characteristics are calculated to determine the average, standard deviation, and coefficient of diversity :

$$\bar{X} = \frac{\sum_{i=1}^n X_i}{n}; s = \frac{\sqrt{\sum_{i=1}^n (x_i - \bar{x})^2}}{n-1} \text{ and } KK = \frac{S}{\bar{X}} (100\%)$$

Information :

- x : Average value
- S : Baku Deviation
- KK : Diversity Coefficient
- xi : Is the 1st Size of Properties x
- n : Number of Samples Obtained from Population

2.4. Interfaith Relationship between Swamp Buffalo

Observation of morphological characters was carried out descriptively covering several parts of the body. The characteristics of the research object according to [4,7] which is presented in the table, and attached to Table 1. The morphological characters are then given a score based on the results of observations made. Data obtained from the morphological characters of each buffalo analyzed by the cluster using a statistical program SPSS version 23.0 to know each genetic distance and presented in the form of dendrogram.

Table 1. Morphological Character of Swamp Buffalo Variants for Kinship Analysis

No	Character	Information
Head		
1.	Horn	Color
		0=black
		Base Texture
		0=notched
		Edge Texture
		0=flat
		Edge Shape
		0=flat/blunt, 1=tapering
		Direction of Growth
		0=straight, 1=backward, 2=upward, 3=downward, 4=upward and downward
		Accessories
		0=nothing
	Horn Pangkal Tanduk	Color of Pangkal Tanduk
		0=black
		Horn Tip Color
		0=black
	Horn Pangkal Form	0=flat
		Horn Tip Form
		0=tapering
Ear	General form	0=Leaf
		Color
		0=grayish black, 1=sorrel black, 2=red
		Accessoris
Nose	Edge Shape	0=nothing
		0=taper
		Color
		0=black, 1=red
Nose	Mustache Color	0=nothing
		Accessories
		0=taper
		0=taper
Eyeball	Sclera color	0=Black, 1= sorrel
		Sclera form
		0=black
		Iris color
		0=black
		Iris form
		0=circular
Eyelid	Pupil Color	0=black
		Pupil form
		0= circular
		Color
		0=black, 1=red
		Accessories
		0=nothing
Eyelashes	Edge form	0=blunt
		Base form
		0=taper
		0=taper
Eyebrow	Color	0=white, 1=black
		Form
		0= straight
		0= straight
Eyebrow	Color	0=blek, 1=red
		Edge form
		0=blunt
		Base Form
		0=taper
		Accessories
		0=nothing
2.	Neck	Accessories form
		0=nothing
		Accessories color
		0=nothing
		Color
		0=hitam, 1=red
		Neck Necklace
3.	Body	0=nothing, 1=present
		Color of Neck Necklace
		0=white, 1=black, 2=red
		Accessories
3.	Body	0=nothing
		Color
		0=black, 1=red
		0=black, 1=red

		Hair Growth Direction	0=top to bottom
		Form	0=elongated
		Navel hair	0=nothing
		Navel hair color	0=nothing
4.	Feet	Hair color	0=black, 1=red
		Shoe Color	0=black
		Hair Growth Direction	0=up and down
		Accessories	0=nothing
5.	Tail		
	Tail Body	Hair color	0=black, 1=red
		Accessories Hair Growth Direction	0=top to bottom
			0=nothing
	Whip	Color	0=black, 1=red
	Tail		
		Texture	0=bumpy
		Edge Shape	0=tapering

3. Results and Discussions

3.1. Morphology of Swamp Buffalo

Morphological data are body measurements such as shoulder height, hip height, body length, and chest circumference. The data that has been obtained is analyzed to get the mean, standard deviation, and coefficient of diversity. The measurement results can be seen in Table 2.

Table 2. Average value, standard deviation, and diversity coefficient of the six swamp buffalo variants in Tanjung Senai

No	Observation Variable	Swamp Buffalo Variations					
		Black n=16	Lampung n=4	Red n=1	Dungkul n=2	Straight n=1	Tunjang Langit n=1
1.	Shoulder height	124,4±5,6 4,5%	117,7±5 4,3%	131	125±4,2 3,4%	120	125
2.	Hip Height	123,6±6,9 5,6%	117,7±2,5 2,1%	132	125,5±5 3,9%	121	123
3.	Body Length	112±19,3 17,3%	120±19 15,8%	100	124±1,4 1,1%	121	126
4.	Chest size	196,1±11,9 6%	196,5±12,7 6,5%	163,7	194,2±0,3 0,1%	190,7	199

3.2. Black Buffalo

Observed blackbuffalo obtained shoulder height 124.4 cm, hip height 117.7 cm, body length 112 cm, and chest circumference 196.1 cm, lower than the study [10] namely hip height 126.5 cm, body length 124.4 cm, but larger on the chest circumference that is 181 cm. In accordance with [7] the quantitative requirements for female buffalo seeds aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, and black buffalo chest circumference has met the Indonesian National Standard [5] said that a population is still considered uniform if it has a coefficient of variation below 15% and is not effective if it is selected. Shoulder height, hip height, and chest circumference of black buffalo can be said to be uniform and not effective for selection.

3.3. Lampung Buffalo

Lampung buffalo observation results obtained shoulder height 117.7 cm, hip height 117.7 cm, body length 120 cm, and chest width 196.5 cm. In accordance with the [7] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, body length and buffalo chest circumference have met the Indonesian National Standard. [5] said that a population is still considered uniform if it has a coefficient of variation below 15% and is not effective if it is selected. Shoulder height, hip height and buffalo chest circumference can be said to be uniform and ineffective for selection.

3.3.1. Red Buffalo

Red buffalo observation results obtained shoulder height 131 cm, hip height 132 cm, body length 100 cm, and chest circumference 163.7 cm, higher than the study [10] namely hip height 125 cm, but lower in body length 117.5 cm, and chest circumference is 183 cm. In accordance with the [7] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. The height of the red buffalo shoulder has met the Indonesian National Standard.

3.3.2. Dungkul Buffalo

Dungkul buffalo observation results obtained 125 cm shoulder height, 125.5 cm hip height, 124 cm body length, and chest circumference 194.2 cm, higher than the study [10] namely hip height 125 cm, body length 118 cm, but smaller on the chest circumference that is 176 cm. In accordance with the [7] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, body length, and buffalo chest circumference dungkul meet Indonesian National Standards. [5] said that a population is still considered uniform if it has a coefficient of variation below 15% and is not effective if it is selected. Shoulder height, hip height, body length, and buffalo chest circumference can be said to be uniform and ineffective for selection.

3.3.3. Straight Buffalo

Blackbuffalo observation results obtained shoulder height 120 cm, hip height 121 cm, body length 121 cm, and chest circumference 190.7 cm. In accordance with the [5] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, body length, and buffalo straight chest circumference have met the Indonesian National Standard.

3.3.4. Tunjang Langit buffalo

Black buffalo observation results obtained shoulder height 125 cm, hip height 123 cm, body length 126 cm, and chest circumference 199 cm. In accordance with the [7] Quantitative requirements for female buffaloes aged ≥ 36 months have a minimum shoulder height of 115 cm, a body length of 120 cm, and a chest circumference of 170 cm. Shoulder height, body length, and buffalo chest circumference supporting the sky have met the Indonesian National Standard.

From the data above it can be seen that each variant has a different body size. [9] states that the characteristics of body measurements can describe the characteristics of a nation. In addition to genetic and environmental differences in the form of climate differences, other things that can affect the characteristics of body measurements are the management of feeding and maintenance that differ between locations. Climate factors do not significantly affect this performance because it is still in one area. Differences in growth in body measurements are likely caused by differences.

The proportion of bones, muscles and fat in the body of the animal. [2] states that during growth and development, parts and components of the body undergo changes. Body tissues experience different growths and achieve maximum growth at different speeds.

3.3.5. Kinship Relations of Swamp Buffalo Variants

The genetic distance matrix results from cluster analysis using SPSS statistical program version 23.0 between each variant of swamp buffalo presented in Table 3. are used to make phenogram construction.

Table 3. Genetic Distance Matrix Between Swamp Buffalo

Swamp Buffalo Variant	Black	Lampung	Red	Dungkul	Straight	Tunjang Langit
Hitam	0,000					
Lampung	2,000	0,000				
Red	4,123	3,873	0,000			
Dungkul	2,499	1,414	3,606	0,000		
Straight	2,000	2,499	4,123	3,162	0,000	
Tunjang Langit	3,317	2,236	4,000	1,000	4,123	0,000

Determination of genetic distance based on the characteristics of the qualitative phenotype showed that the smallest distance was found between the variants of the Tunjang Langit Buffalo and Dungkul buffalo which were 1,000, followed by the Dungkul Buffalo and Lampung variants of 1,414. The farthest genetic distance was found between the Red and Black Buffalo variants at 4,123, 4,123 Straight and Red Buffalo variants, and 4,123 variants of the Tunjang Langit and Straight Buffaloes.

The results of the dendrogram below can be seen from the characteristics of the qualitative phenotype indicating that the Dungkul buffalo variant has a closer relationship with the buffalo supporting the sky. Then the Dungkul Buffalo variant is closer to the Lampung Buffalo derivative. The kinship relationship is the furthest between the Red Buffalo variant and the Black Buffalo variant, then the Straight Buffalo variant with the Red Buffalo variant, and the Buffalo Supporting the Sky variant with the Straight Buffalo variant.

From the dendrogram above it can be seen that there are 3 clusters, where the Dungkul, Tunjang Langit, and Lampung variants are included in the same cluster. Then the Black and Straight Buffalo variants are the same cluster, and the next cluster is only the Red Buffalo variant.

For the first cluster has the same character in the shape of the horn tip, nose color, eye color, eyelash color, eyebrow color, neck necklace color, bada color, and tail hair color. Then for the second part of the cluster has the same character on the color of the ear, nose color, eye color, eyelash color, body color, and tail hair color. For example, the shape of horns on Dungkul Buffalo, Buffalo Supporting Sky, and Lampung despite the different direction of horn growth, but morphologically it looks more similar to each other.

If productivity improvements (out breeding) will be carried out, it is advisable to marry buffaloes with different clusters and have a considerable genetic distance. [6] The goal is to marry cattle that have far genetic kinship, it is estimated that heterosis effects will be greater than that between cattle with close kinship or in the same cluster.

4. Conclusion

Based on the research that has been done, the following conclusions are obtained: (1). It is known that there are 6 variants of swamp buffalo in the Tanjung Senai region, namely Black, Lampung, Red, Dungkul, Straight, dan Tunjang Langit buffaloes. (2). Among the swamp buffalo variants Dungkul buffalo and Tunjang Langit buffalo have the closest kinship because of its small genetic distance.

References

- [1] Anggraeni A, Sumantri C, Praharani L, Dudi and Andreas E 2011 Estimation of genetic distance a local swamp through morphological analysis approach. *Jitv*, **16** (3), 199–210.
- [2] Borghese A 2005. *Buffalo production and research*, Rome: Food And Agriculture Organization of The United Nations.
- [3] Cockrill W R 1981. The Water Buffalo: A Review. *British Veterinary Journal*, **137** (1), 8–16.

- [4] Erdiansyah E and Anggraeni A 2008. Phenotype diversity and estimation of genetic distance between local swamp buffalo subpopulation in Dompu, West Nusa Tenggara. National seminar and workshop on buffalo cattle business. *Tana Toraja : Animal husbandry Research Center*, 55–67.
- [5] Nasution 1992. *Naturalistic research method*, Bandung: Tarsito.
- [6] Sitorus A J and Anggraeni A 2008. Morphological characterization and estimation of the genetic distance of swamp, river (Murrah) buffalo and its crossing in Northern Sumatra . National seminar and workshop on buffalo cattle business 2008, 38–54.
- [7] Indonesian National Standards 2016. *Buffalo sheet -Part 1 : Kalimantan*, Jakarta: Department of National Standardization.
- [8] Steel RG & Torrie JH, 1960. *Principles and procedures of statistics*, New York: McGraw. Available at: <https://www.agronomy.org/publications/aj/abstracts/53/5/AJ05300500NPb>.
- [9] Suparyanto A, Purwadaria T & Subandriyo, 1999. Estimation of genetic distance and national differentiating factors and sheep groups in Indonesia through a morphological analysis approach. *Jiv*, 4(2), pp.80–88.
- [10] Windusari Y, Hanum L & Pratama R, 2016. Diversity and Kinship of the Swamp Buffalo (*ubalus bubalis*) from Pampangan South Sumatra Based On Morphological Characteristics *Sriwijaya Journal of Environment*, 1(3), pp.53–57.

Kinship of the swamp buffalo (bubalus bubalis) in Tanjung Senai, Ogan Ilir, South Sumatra based on morphological characteristics

ORIGINALITY REPORT

1%

SIMILARITY INDEX

MATCH ALL SOURCES (ONLY SELECTED SOURCE PRINTED)

★Yuanita Windusari, Laila Hanum, Arum Setiawan, Veronika Larasati. "Characteristics of the Genetic Variation of a Swamp Buffalo () of South Sumatra Based on Polymerase Chain Reaction-Random Amplified Polymorphic DNA (PCR-RAPD) ", E3S Web of Conferences, 2018

Crossref

1%

EXCLUDE QUOTES	ON	EXCLUDE MATCHES	< 1%
EXCLUDE BIBLIOGRAPHY	ON		

LEMBAR

Judul Karya Ilmiah	: Kinship of the swamp buffalo (bubalus bubalis) in Tanjung Senai, Ogan Ilir, South Sumatra based on morphological characteristics
Jumlah Penulis	: Yuanita Windusari, Laila Hanum, Arum Setiawan , Rahmat Pratama, Desi Puspita Sari, and Rizki Palupi
Identitas Prosiding	: a. Nama Prosiding : IOP Conf. Series: Journal of Physics: Conf. Series (Scopus), Sriwijaya International Conference on Basic and Applied Science 2018 b. ISBN/ISSN : 1742-6588/1742-6596 c. Nomor/Volume/Hal : 1/1282/1-8 d. Penerbit : Fakultas MIPA Universitas Sriwijaya e. Jumlah Halaman : 8

Kategori Publikasi Jurnal Ilmiah (Beri \surd pada kategori yang tepat)

- ☒ Prosiding Forum Ilmiah Internasional
- ☐ Prosiding Forum Ilmiah Nasional
- ☐ Makalah tidak disajikan dalam seminar/symposium.lokakarya, tetapi dimuat dalam prosiding internasional
- ☐ Makalah tidak disajikan dalam seminar/symposium.lokakarya, tetapi dimuat dalam prosiding nasional
- ☐ Makalah disajikan dalam seminar internasional (Tetapi tidak dimuat dalam prosiding)
- ☐ Makalah disajikan dalam seminar nasional (Tetapi tidak dimuat dalam prosiding)

I. Hasil Penilaian Validasi:

No.	ASPEK	URAIAN/KOMENTAR PENILAIAN
1	Indikasi Plagiasi	1 %
2	Linieritas	Sudah linier dengan bidang biologi konservasi

II. Hasil Penilaian *Peer Review*:

Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah (Isikan di kolom yang sesuai)						Nilai Akhir Yang Diperoleh
	Prosiding Forum Ilmiah Internasional (Maks. 30)	Prosiding Forum Ilmiah Nasional (Maks. 10)	Makalah Tidak diseminarkan tetapi dimuat dalam prosiding internasional (Maks. 10)	Makalah Tidak diseminarkan tetapi dimuat dalam prosiding nasional (Maks. 5)	Makalah disajikan dalam seminar internasional (Tetapi tidak dimuat dalam prosiding) (Maks. 5)	Makalah disajikan dalam seminar nasional (Tetapi tidak dimuat dalam prosiding) (Maks. 3)	
Kelengkapan dan Kesesuaian unsur isi paper (10 %)	3						3
Ruang Lingkup dan kedalaman pembahasan (30 %)	9						8
Kecukupan dan Kemutakhiran data/Informasi dan metodologi (30 %)	9						9
Kelengkapan unsur dan Kualitas penerbit / prosiding (30 %)	9						9
Total = (100 %)	30						29
Kontribusi Pengusul (Penulis Pertama/Anggota Utama)	Anggota Utama=(0,4x29)/5= 2,32						

KOMENTAR/ULASAN PEER REVIEW

Kelengkapan dan Kesesuaian Unsur	Paper terkait karakteristik kerbau rawa di Tanjung Senai, Ogan Ilir Sumatera Selatan. Isi paper sudah memenuhi kaidah-kaidah karya ilmiah dan sudah sesuai dengan bidang biologi konservasi
Ruang Lingkup dan Kedalaman Pembahasan	Hasil penelitian dibahas cukup komprehensif dengan penyampaian pembandingan dari temuan-temuan penelitian lainnya dan teori terkait. Referensi yang diacu dalam pembahasan sudah cukup update untuk bidang kajian ini.
Kecukupan & Kemutakhiran Data & Metodologi	Data-data hasil penelitian sudah baik dan didukung peta lokasi sampling, tabel dan gambar yang ditampilkan menarik. Data didapatkan dengan menggunakan metode yang sudah standard.
Kelengkapan Unsur & Kualitas Penerbit	Penerbit Fakultas MIPA Universitas Sriwijaya berkualitas baik, tidak termasuk predatory publisher, dan prosiding terindeks di scopus

Surabaya, 15 Mei 2020
Penilai 1

A handwritten signature in black ink, appearing to be 'Hery Purnobasuki', with a large, stylized initial 'H' and 'P'.

Prof. Hery Purnobasuki, M.Si., Ph.D.
NIP 196705071991021001
Unit Kerja : Jurusan Biologi FST Unair
Bidang Ilmu : Biologi
Jabatan/Pangkat : Guru Besar/ Pembina Utama Madya

LEMBAR
HASIL PENILAIAN SEJAWAT SEBIDANG (PEER REVIEW)
KARYA ILMIAH: PROSIDING

Judul Karya Ilmiah : Kinship of the swamp buffalo (bubalus bubalis) in Tanjung Senai, Ogan Ilir, South Sumatra based on morphological characteristics

Jumlah Penulis : Yuanita Windusari, Laila Hanum, **Arum Setiawan**, Rahmat Pratama, Desi Puspita Sari, and Rizki Palupi

Identitas Prosiding : a. Nama Prosiding : IOP Conf. Series: Journal of Physics: Conf. Series (**Scopus**), Sriwijaya International Conference on Basic and Applied Science 2018
 b. ISBN/ISSN : 1742-6588/1742-6596
 c. Nomor/Volume/Hal : 1/1282/1-8
 d. Penerbit : Fakultas MIPA Universitas Sriwijaya
 e. Jumlah Halaman : 8

Kategori Publikasi Jurnal Ilmiah : ☒ Prosiding Forum Ilmiah Internasional
 (Beri \checkmark pada kategori yang tepat) ☐ Prosiding Forum Ilmiah Nasional
☐ Makalah tidak disajikan dalam seminar/symposium.lokakarya, tetapi dimuat dalam prosiding internasional
☐ Makalah tidak disajikan dalam seminar/symposium.lokakarya, tetapi dimuat dalam prosiding nasional
☐ Makalah disajikan dalam seminar internasional (Tetapi tidak dimuat dalam prosiding)
☐ Makalah disajikan dalam seminar nasional (Tetapi tidak dimuat dalam prosiding)

I. Hasil Penilaian Validasi:

No.	ASPEK	URAIAN/KOMENTAR PENILAIAN
1	Indikasi Plagiasi	1 %
2	Linieritas	V

II. Hasil Penilaian Peer Review:

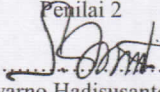
Komponen Yang Dinilai	Nilai Maksimal Jurnal Ilmiah (Isikan di kolom yang sesuai)						Nilai Akhir Yang Diperoleh
	Prosiding Forum Ilmiah Internasional (Maks. 30)	Prosiding Forum Ilmiah Nasional (Maks. 10)	Makalah Tidak diseminarkan tetapi dimuat dalam prosiding internasional (Maks. 10)	Makalah Tidak diseminarkan tetapi dimuat dalam prosiding nasional (Maks. 5)	Makalah disajikan dalam seminar internasional (Tetapi tidak dimuat dalam prosiding) (Maks. 5)	Makalah disajikan dalam seminar nasional (Tetapi tidak dimuat dalam prosiding) (Maks. 3)	
Kelengkapan dan Kesesuaian unsur isi paper (10 %)	3						3
Ruang Lingkup dan kedalaman pembahasan (30 %)	9						8
Kecukupan dan Kemutakhiran data/Informasi dan metodologi (30 %)	9						9
Kelengkapan unsur dan Kualitas penerbit / prosiding (30 %)	9						9
Total = (100 %)	30						29
Kontribusi Pengusul (Penulis Pertama/Anggota Utama)	IOP Conf. Series: Journal of Physics: Conf. Series (Scopus), International Conference on Basic and Applied Science 2018 ISBN/ISSN 1742-6588/1742-6596 Vol.1282(1): 1-8 Penulis ke 3 dari 6 penulis. Nilai maksimal 96,7%. Nilai Pengusul: $(0,4 \times 0,967 \times 30)/5 : 2,32$						

KOMENTAR/ULASAN PEER REVIEW

- Kelengkapan dan Kesesuaian Unsur	Unsur sudah lengkap dan sesuai
- Ruang Lingkup dan Kedalaman Pembahasan	Ruang lingkup masih dalam bidang ilmu.
- Kecukupan & Kemutakhiran Data & Metodologi	Data layak dan metode biasa dikerjakan
- Kelengkapan Unsur & Kualitas Penerbit	Penerbit Fakultas MIPA Universitas Sriwijaya sangat berkualitas.

Yogyakarta, 6 Juli 2020

Penilai 2

tanda tangan 

Prof. Dr. Suwarno Hadisusanto

NIP 195411161983031002

Unit Kerja : Fakultas Biologi UGM

Bidang Ilmu : Biologi

Jabatan/Pangkat : Guru Besar/ Pembina Utama Madya