



sucipto hariyanto <sucipto-h@fst.unair.ac.id>

[PLANTA TROPIKA] Journal Registration

1 message

Indira Prbasari <journalumy@gmail.com>
To: "Mr. Sucipto - Hariyanto" <sucipto-h@fst.unair.ac.id>

Thu, Jul 19, 2018 at 4:56 AM

Mr. Sucipto - Hariyanto

You have now been registered as a user with PLANTA TROPIKA: Jurnal Agrosains (Journal of Agro Science). We have included your username and password in this email, which are needed for all work with this journal through its website. At any point, you can ask to be removed from the journal's list of users by contacting me.

Username: suciptohariyanto
Password: sucipto57

Thank you,
Indira Prbasari

Jurnal Planta Tropika
<http://journal.umy.ac.id/index.php/pt>



sucipto hariyanto <sucipto-h@fst.unair.ac.id>

[PLANTA TROPIKA] Submission Acknowledgement

1 message

Indira Prabasari <journalumy@gmail.com>
To: "Mr. Sucipto - Hariyanto" <sucipto-h@fst.unair.ac.id>

Thu, Jul 19, 2018 at 5:08 AM

Mr. Sucipto - Hariyanto:

Thank you for submitting the manuscript, "EFFECTS OF PLANT MEDIA AND FERTILIZATION ON THE GROWTH OF ORCHID PLANT (*Dendrobium sylvanum* Rchb. f.) IN ACCLIMATIZATION PHASE" to PLANTA TROPIKA: Jurnal Agrosains (Journal of Agro Science). With the online journal management system that we are using, you will be able to track its progress through the editorial process by logging in to the journal web site:

Manuscript URL: <http://journal.umy.ac.id/index.php/pt/author/submission/4654>
Username: suciptohariyanto

If you have any questions, please contact me. Thank you for considering this journal as a venue for your work.

Indira Prabasari
PLANTA TROPIKA: Jurnal Agrosains (Journal of Agro Science)

Jurnal Planta Tropika
<http://journal.umy.ac.id/index.php/pt>



sucipto hariyanto <sucipto-h@fst.unair.ac.id>

PLANTA TROPIKA: Surat Rekomendasi Guest Reviewer

2 messages

Plantatropika <plantatropika@umy.ac.id>

Mon, Dec 24, 2018 at 5:27 PM

To: "wulandarireine@gmail.com" <wulandarireine@gmail.com>, "tutisetianingsih20@gmail.com" <tutisetianingsih20@gmail.com>, "zahraeni.km@gmail.com" <zahraeni.km@gmail.com>, "sutarman.g@faperta.untan.ac.id" <sutarman.g@faperta.untan.ac.id>, "astutikurnianingsih@fp.unsri.ac.id" <astutikurnianingsih@fp.unsri.ac.id>, "septarini@ikipjember.ac.id" <septarini@ikipjember.ac.id>, "aya_noone@yahoo.co.id" <aya_noone@yahoo.co.id>, "idayusidah16@gmail.com" <idayusidah16@gmail.com>, "saputra22hendra@gmail.com" <saputra22hendra@gmail.com>, "sudadi62@staff.uns.ac.id" <sudadi62@staff.uns.ac.id>, "wanarfianibarus@umsu.ac.id" <wanarfianibarus@umsu.ac.id>, "fakhrurrazi.ahfa@gmail.com" <fakhrurrazi.ahfa@gmail.com>, "jamilahfatika@gmail.com" <jamilahfatika@gmail.com>, "acepatma.w@gmail.com" <acepatma.w@gmail.com>, "paul.timotiwu@fp.unila.ac.id" <paul.timotiwu@fp.unila.ac.id>, "sukristiyonuboworicky@yahoo.com" <sukristiyonuboworicky@yahoo.com>, "muzayanahid@yahoo.com" <muzayanahid@yahoo.com>, "ika.rusdiana@gmail.com" <ika.rusdiana@gmail.com>, "bs_daryono@mail.ugm.ac.id" <bs_daryono@mail.ugm.ac.id>, "hpssp.henny@gmail.com" <hpssp.henny@gmail.com>, "bud1arto@yahoo.com" <bud1arto@yahoo.com>, "b3r3kkl4u@gmail.com" <b3r3kkl4u@gmail.com>, "hendrival@unimal.ac.id" <hendrival@unimal.ac.id>, "maurenmiranti@unesa.ac.id" <maurenmiranti@unesa.ac.id>, "arum.pink@yahoo.com" <arum.pink@yahoo.com>, "fitri.uh@gmail.com" <fitri.uh@gmail.com>, "koko.tampubolon@gmail.com" <koko.tampubolon@gmail.com>, "r19dwi.puspita@gmail.com" <r19dwi.puspita@gmail.com>, "my_ayda@yahoo.com" <my_ayda@yahoo.com>, "Junaidi.sp5@gmail.com" <Junaidi.sp5@gmail.com>, "dewi_nusarini_r@yahoo.com" <dewi_nusarini_r@yahoo.com>, "laili_maulidiyah@yahoo.com" <laili_maulidiyah@yahoo.com>, "prasetyabayu280@yahoo.com" <prasetyabayu280@yahoo.com>, "vritta@umm.ac.id" <vritta@umm.ac.id>, "septiana260@gmail.com" <septiana260@gmail.com>, "dianwindriyanan@gmail.com" <dianwindriyanan@gmail.com>, "muthiaalfi@yahoo.co.id" <muthiaalfi@yahoo.co.id>, "mohrezabhahesty@gmail.com" <mohrezabhahesty@gmail.com>, "mrukan@gmail.com" <mrukan@gmail.com>, "nurcholis@upnyk.ac.id" <nurcholis@upnyk.ac.id>, "n.rahmawatiwijaya@gmail.com" <n.rahmawatiwijaya@gmail.com>, "eyusnawan@litbang.pertanian.go.id" <eyusnawan@litbang.pertanian.go.id>, "kkelanit@yahoo.com" <kkelanit@yahoo.com>, "o.herliana@gmail.com" <o.herliana@gmail.com>, "512013009@student.uksw.edu" <512013009@student.uksw.edu>, "okti_purwaningsih@yahoo.com" <okti_purwaningsih@yahoo.com>, "ws.suharti@gmail.com" <ws.suharti@gmail.com>, "iradhat76@gmail.com" <iradhat76@gmail.com>, "zahrulfuady17@yahoo.com" <zahrulfuady17@yahoo.com>, "retnodwiandayani@yahoo.co.id" <retnodwiandayani@yahoo.co.id>, "titiki160@gmail.com" <titiki160@gmail.com>, "marlinsefrila@gmail.com" <marlinsefrila@gmail.com>, "Sri.hartuti@gmail.com" <Sri.hartuti@gmail.com>, "susilاهرlambang@upnyk.ac.id" <susilاهرlambang@upnyk.ac.id>, "setyastuti_purwanti@yahoo.com" <setyastuti_purwanti@yahoo.com>, "sucipto-h@fst.unair.ac.id" <sucipto-h@fst.unair.ac.id>

Yth. Penulis

Dengan hormat,

Demi kelancaran proses penerbitan naskah, kami mengharapkan kerjasama Bapak/Ibu/saudara untuk dapat melengkapi data-data berupa surat pernyataan penulis dan rekomendasi *guest reviewer* oleh penulis. Kami sangat mengharapkan data tersebut bisa kembali ke redaksi kami selambat-lambatnya 10 Januari 2019.

Atas perhatian dan kerjasama Bapak/Ibu/Saudara, kami mengucapkan terima kasih.

PLANTA TROPIKA: Jurnal Agro Sains (Journal of Agroscience)
Department of Agrotechnology
Universitas Muhammadiyah Yogyakarta
Jl Brawijaya, Kasihan, Bantul
Telp (+62274) 387656,
+62856 4306 6922 (Chandra)

2 attachments

LAMPIRAN Surat Pemberitahuan.docx
20K



LAMPIRAN SURAT.docx
20K

sucipto hariyanto <sucipto-h@fst.unair.ac.id>
To: Plantatropika <plantatropika@umy.ac.id>

Tue, Jan 1, 2019 at 8:53 PM

Yth. Chief Editor Planta Tropika
Universitas Muhammadiyah Yogyakarta

Dengan hormat,
Bersama ini kami kirimkan Surat Pernyataan Penulis dan Surat Rekomendasi Guess Reviewer (attach).
Mohon dapat diterima. Apakah Surat asli harus saya kirim lewat pos? jika diperlukan mohon kami diberi tahu, sehingga kami segera kirim via pos atau via titipan kilat
Terima kasih atas perhatian dan kerjasamanya.

Wassallam,
Sucipto Hariyanto

[Quoted text hidden]



Surat Pernyataan Penulis dan Reviu A.n Sucipto Hariyanto.pdf
860K



sucipto hariyanto <sucipto-h@fst.unair.ac.id>

[PLANTA TROPIKA]

2 messages

Plantatropika <plantatropika@umy.ac.id>
To: "sucipto-h@fst.unair.ac.id" <sucipto-h@fst.unair.ac.id>

Thu, Feb 14, 2019 at 3:32 PM

To Sucipto

Your manuscript needs to revise; please check on OJS.

Best regards

Editor

PLANTA TROPIKA: Jurnal Agro Sains (Journal of Agrosience)
Department of Agrotechnology
Universitas Muhammadiyah Yogyakarta
Jl Brawijaya, Kasihan, Bantul
Telp (+62274) 387656,
+62856 4306 6922 (Chandra)

sucipto hariyanto <sucipto-h@fst.unair.ac.id>
To: Plantatropika <plantatropika@umy.ac.id>

Sun, Feb 17, 2019 at 8:40 AM

Thanks a lot of your information about my manuscript.
I will check and revise as soon as possible

Best regards
Sucipto Hariyanto
[Quoted text hidden]



sucipto hariyanto <sucipto-h@fst.unair.ac.id>

[PLANTA TROPIKA] Copyediting Review Request

2 messages

Dina Wahyu Trisnawati <journalumy@gmail.com>
To: "Mr. Sucipto - Hariyanto" <sucipto-h@fst.unair.ac.id>

Thu, Jun 20, 2019 at 8:44 PM

Mr. Sucipto - Hariyanto:

Your submission "EFFECTS OF PLANT MEDIA AND FERTILIZATION ON THE GROWTH OF ORCHID PLANT (*Dendrobium sylvanum* Rchb. f.) IN ACCLIMATIZATION PHASE" for PLANTA TROPIKA: Jurnal Agrosains (Journal of Agro Science) has been through the first step of copyediting, and is available for you to review by following these steps.

1. Open the attached file.
2. Review the text, including copyediting proposals and Author Queries.
3. Make any copyediting changes that would further improve the text.
4. When completed, upload the file in Step 2.
5. Click on METADATA to check indexing information for completeness and accuracy, included author data, abstract, etc
6. Send the COMPLETE email to the editor and copyeditor.

Submission URL:

<http://journal.umy.ac.id/index.php/pt/author/submissionEditing/4654>


Username: suciptohariyanto

This is the last opportunity to make substantial copyediting changes to the submission. The proofreading stage, that follows the preparation of the galleys, is restricted to correcting typographical and layout errors.

If you are unable to undertake this work at this time or have any questions, please contact me. Please return it to us within 3 (three) days. Thank you for your contribution to this journal.

Dina Wahyu Trisnawati
Agrotechnology Department, Faculty of Agriculture, Universitas Muhammadiyah
Yogyakarta, Yogyakarta
dee_wtrisnawati@yahoo.com

Jurnal Planta Tropika
plantatropika@umy.ac.id

 **Proofread_4654-18445-1-CE.docx**
44K

sucipto hariyanto <sucipto-h@fst.unair.ac.id>
To: Dina Wahyu Trisnawati <journalumy@gmail.com>

Fri, Jun 21, 2019 at 2:49 PM

To: Ms/Mrs. Dina Wahyu Trisnawati

Thank you for the information about my manuscript, and as soon as possible I will make correction typographical and layout.

Best regards,
Sucipto Hariyanto

[Quoted text hidden]



sucipto hariyanto <sucipto-h@fst.unair.ac.id>

[PLANTA TROPIKA] INVOICE Vol 7 No 1

3 messages

Plantatropika <plantatropika@umy.ac.id>
To: "sucipto-h@fst.unair.ac.id" <sucipto-h@fst.unair.ac.id>

Tue, Jul 16, 2019 at 4:25 PM

Kepada Yth. Sucipto

Dengan hormat,
Berikut kami kirimkan **invoice biaya publikasi naskah** Bapak/Ibu di **Planta Tropika: Jurnal Agro Sains (Journal of Agrosience) Vol 7 No1. Pemberitahuan** kepada penulis yang menginginkan **cetakan berwarna pada publikasi naskah, akan dikenakan biaya tambahan sebesar Rp.100,000/lembar** untuk itu **mohon konfirmasi kepada kami selambat-lambatnya 31 Juli 2019.**

Atas perhatiannya kami ucapkan terimakasih.

Hormat kami,

Editor

PLANTA TROPIKA: Jurnal Agro Sains (Journal of Agrosience)
Department of Agrotechnology
Universitas Muhammadiyah Yogyakarta
Jl Brawijaya, Kasihan, Bantul
Telp (+62274) 387656,
+62856 4306 6922 (Chandra)

 **Sucipto.pdf**
1485K

sucipto hariyanto <sucipto-h@fst.unair.ac.id>
To: Plantatropika <plantatropika@umy.ac.id>

Wed, Jul 17, 2019 at 3:36 PM

Yth. Ibu Dina Wahyu Trisnawati, SP., M.Agr., Ph.D
Pengelola Jurnal Planta Tropika

Dengan hormat,
Memberitahukan bahwa uinvoice telah saya terima, dan akan segera saya transfer sesuai alamat rekening tersebut. Atas diterimanya artikel saya, saya sampaikan terima kasih. Dan secepatnya akan saya infokan dan lampirkan resi pembayarannya.

Salam hormat,
Sucipto Hariyanto

D
[Quoted text hidden]

sucipto hariyanto <sucipto-h@fst.unair.ac.id>
To: Plantatropika <plantatropika@umy.ac.id>

Wed, Jul 17, 2019 at 8:07 PM

Yth. Ibu Dina Wahyu Trisnawati, SP., M.Agr., Ph.D
Pengelola Jurnal Planta Tropika

Dengan hormat,

Bersama ini kami sampaikan, bahwa saya telah mentransfer biaya publikasi artikel yang berjudul " Effects of Plant Media and Fertilization on the Growth of Orchid Plant (*Dendrobium sylvanum* Rchb.f) in Acclimatization Phase" pada Tanggal 17 Juli 2019 (bukti resi attach).

Atas perhatian dan kerjasamanya diucapkan terima kasih.

Salam hormat,
Sucipto Hariyanto

[Quoted text hidden]



Resi bayar Planta Tropika.jpeg
122K

**REVIEWER RECOMMENDATIONS AND
COMMENTS & RESPONSES TO
REVIEWER COMMENTS**

Lampiran 1

SURAT PERNYATAAN PENULIS

Yang bertanda tangan dibawah ini:

Nama (*) :

Asal Institusi :

E-mail/No.HP :

Dengan ini menyatakan bahwa *Manuscript* yang saya tulis dengan judul

.....

.....yang diusulkan untuk publikasi di Jurnal Planta Tropika belum pernah dipublikasikan di jurnal ataupun media lain.

Bilamana dikemudian hari ditemukan ketidak sesuaian dengan pernyataan ini, maka saya bersedia dituntut dan diproses sesuai dengan ketentuan yang berlaku.

Demikian pernyataan ini dibuat dengan sesungguhnya dan dengan sebenar-benarnya.

Tempat, Tanggal-Desember 2018
Yang menyatakan,

Meterai 3000

(Penulis (*))

Keterangan:

(*) Penulis Pertama/Utama

Lampiran 2

SURAT REKOMENDASI

Guess Reviewer 1

Nama (*)	:	
Instansi	:	
Alamat E-mail	:	
Asal Almamater	:	

Guess Reviewer 2

Nama (*)	:	
Instansi	:	
Alamat E-mail	:	
Asal Almamater	:	

Keterangan:

(*) Dituliskan lengkap dengan gelar

Lampiran 1

SURAT PERNYATAAN PENULIS

Yang bertanda tangan dibawah ini:

Nama (*) : Dr. Sucipto Hariyanto, DEA

Asal Institusi : Fakultas Sains dan Teknologi Universitas Airlangga

E-mail/No.HP : sucipto-h@fst.unair.ac.id/082139070704

Dengan ini menyatakan bahwa *Manuscript* yang saya tulis dengan judul

“Effects of Plant Media and Fertilization ob The Growth of Orchid Plant (*Dendrobium sylvanum* Rchb. f.) in Acclimatization Phase” yang diusulkan untuk publikasi di Jurnal Planta Tropika belum pernah dipublikasikan di jurnal ataupun media lain.

Bilamana dikemudian hari ditemukan ketidak sesuaian dengan pernyataan ini, maka saya bersedia dituntut dan diproses sesuai dengan ketentuan yang berlaku.

Demikian pernyataan ini dibuat dengan sesungguhnya dan dengan sebenar-benarnya.

Tempat, 31 Desember 2018
Yang menyatakan,



Dr. Sucipto Hariyanto, DEA

Keterangan:

(*) Penulis Pertama/Utama

Lampiran 2

SURAT REKOMENDASI

Guess Reviewer 1

Nama (*)	: Dr. Tutik Nurhidayati, M.Si
Instansi	: Fakultas Sains Institut Sepuluh Nopember
Alamat E-mail	: tutik@bio.its.ac.id
Asal Almamater	: Universitas Brawijaya Malang

Guess Reviewer 2

Nama (*)	: Dr. Andi Salamah
Instansi	: Fakultas Matematika dan IPA Universitas Indonesia
Alamat E-mail	: salamah@sci.ui.ac.id
Asal Almamater	: Universitas Indonesia

Keterangan:

(*) Dituliskan lengkap dengan gelar

EFFECTS OF PLANT MEDIA AND FERTILIZATION ON THE GROWTH OF ORCHID PLANT (*Dendrobium sylvanum* Rchb. f.) IN ACCLIMATIZATION PHASE

Sucipto - Hariyanto
Fakultas Sains and Technology Universitas Airlangga
sucipto-h@fst.unair.ac.id

ABSTRACT

This study aimed to evaluate the effect of plant media variation, time of fertilization, and combination of both on the growth of orchid plant *Dendrobium sylvanum* Rchb. f. in acclimatization phase. This study was designed using 6x4 factorial experimentation. The first factor was the variation of plant media: charcoals, coconut husk, bagasse, combination of charcoal and coconut husk, combination of charcoal and bagasse, combination of coconut husk and bagasse. The second factor was fertilization time: no fertilization, 7 day-fertilization, 14 day-fertilization, and 20 day-fertilization for three months. Data obtained from this statistical analysis used Two Way MANOVA ($\alpha = 5\%$) and Duncan test. Based on the results, there were differences between media variation and fertilization time on the increase of leaf length and width, stem diameter, and root length of *Dendrobium* orchid in acclimatization phase. Combination of bagasse and coconut husk media showed the best result on media treatment. The best of fertilization time was 14 days. Moreover, the best of interaction between media and fertilization time showed by the combination of bagasse and coconut husk with 14 day-fertilization.

Keywords: growing media; fertilization; growth; *Dendrobium*.

ABTRAK

Penelitian ini bertujuan untuk mengetahui pengaruh variasi media tanam, waktu pemupukan dan kombinasi keduanya terhadap pertumbuhan tanaman anggrek *Dendrobium sylvanum* Rchb. f. pada fase aklimatisasi. Rancangan yang digunakan adalah faktorial 6x4. Faktor pertama yaitu variasi media tanam yaitu media arang, sabut kelapa, ampas tebu, arang kombinasi sabut kelapa, arang kombinasi ampas tebu dan ampas tebu kombinasi sabut kelapa. Faktor kedua waktu pemupukan adalah tanpa pemupukan, 1x7 hari pemupukan, 1x14 hari pemupukan dan 1x20 hari pemupukan selama 3 bulan. Hasil penelitian menunjukkan ada beda pada variasi media dan waktu pemupukan terhadap pertambahan pertumbuhan panjang dan lebar daun, diameter batang dan panjang akar tanaman anggrek *Dendrobium* pada fase aklimatisasi. Data yang didapat dianalisis secara statistik menggunakan MANOVA dua arah ($\alpha=5\%$) dan tes Duncan. Hasil pada perlakuan media terbaik ditunjukkan oleh perlakuan media ampas tebu kombinasi sabut kelapa. Perlakuan pemupukan terbaik adalah perlakuan pemupukan 1x14 hari, sedangkan untuk interaksi antara media dengan pemupukan hasil terbaik adalah media ampas tebu kombinasi sabut kelapa dengan perlakuan pemupukan 1x14 hari.

Kata kunci: media tanam; pemupukan; pertumbuhan; *Dendrobium*.

INTRODUCTION

Orchid is the most beautiful ornamental plant because it has a variety of shapes and colors, distinctive flavor, and it is quite durable in room condition. Nowadays, orchids often used as decorative flowers and potted plants that have become a flower industry in the world (Mirani et al., 2017). One of Orchid species that has top selling price and quite popular is *Dendrobium sylvanum* Rchb. f (Iswanto, 2001).

Orchid can't uptake nutrient significantly from root so foliar nutrient application is very widespread practice in orchid cultivation (Monda et al., 2014). *Dendrobium* orchid has very low growth rate. This requires appropriate strategy on the distribution of fertilizer concentration to give real effect on its growth rate. Fertilizer is used to increase the growth of potted *Dendrobium* because it contains nutrients needed for orchids.

Orchid plant propagation is conducted using in vitro tissue culture. Tissue culture has several stages such as acclimatization phase in which in vitro plantlets adjust from heterotrophic environment to ex vitro environment or autotrophic environment. Acclimatization is the final and decisive stage of in vitro propagation. Acclimatization phase is a critical period in orchid micropropagation, because there are high percentages of damaged and lost plants whenever they are transferred to ex vitro condition (Deb and Imchen 2010). In vitro plantlets are very sensitive to evapotranspiration. Mold and bacteria attack, as well as excessive light intensity, can affect the vegetative growth. Vegetative growth of *Dendrobium* orchid during acclimatization influenced by environmental conditions such as light, temperature, humidity, and other factors such as the range of media and fertilization intensity.

Appropriate media selection with low septicity, high aeration, suitable permeability, and acidity level are required to ensure initial and autotrophic growth condition. The media is also required to maintain a long-term condition with no reduction in quality to avoid compaction and lack of aeration and permeability (Diaz et al., 2010). The substrate is a solid and porous material, synthetic or natural, combined or uncombined, which allows plants to grow well under controlled environmental conditions (Abad, 1989).

This study aimed to get the optimum growing media and the suitable fertilization time for the growth of *Dendrobium sylvanum* Rchb. f. on acclimatization phase.

MATERIAL AND METHODS

This research had been carried out in Green House of DD'Orchid Nursery, Areng-Areng Village, Batu, East Java. The implementation of the research began in February to May 2016.

Materials used in this study were orchid plantlets, which has been obtained from the cultivation of orchid propagation in DD'Orchid Nursery (all of them were using plantlets which had the same number of leaves); pieces of shell charcoal (approximately 2 cm), coconut husk, mineral water, bagasse from sugar factory in Kediri, and 2 g/L of Gandasil fertilizer (volume of spraying = 10 mL per plant).

The experiment was laid out in Factorial Design with 6x4 treatment was replicated three times. The first factor was growing media which consisted of six media i.e. charcoal media (M), coconut husk media (M2), bagasse (M3), combination of charcoal and coconut husk (M4),

combination of charcoal and bagasse (M5), and combination of bagasse and coconut husk (M6), and the second factor consisted of four fertilizer treatments, i.e., without fertilization (P0), 1x7 day fertilization (P1), 1x14 day fertilization (P2) and 1x20 day fertilization (P3) for 3 months. The order of treatment can be seen in table 1.

Table 1. Experimental Design

Fertilization	Orchid's media					
	M1	M2	M3	M4	M5	M6
P0	P0M1	P0M2	P0M3	P0M4	P0M5	P0M6
P1	P1M1	P1M2	P1M3	P1M4	P1M5	P1M6
P2	P2M1	P2M2	P2M3	P2M4	P2M5	P2M6
P3	P3M1	P3M2	P3M3	P3M4	P3M5	P3M6

Preparation and planting

A month before planting period, bottles filled with orchid seeds were transferred from DD Orchid Nursery to the greenhouse. They were removed from the bottles using a hook and put into a basin filled with sterile water to separate and remove the media from their roots. After that, they were drained onto dry newspaper. After being dried, 72 seeds were selected that had two homogeneous features. The seeds were grown individually into a single pot sized 5 cm wide and 6 cm high with growing media according to the treatments. Treatment media were put into each pot as much as 1/3 part of the bottom of the pot.

Cultivation

Orchid plants needed to be watered once a day in the morning at 6 – 7 a.m. using a sprayer to moist growing media. 2 g/L of Gandasil was used as fertilizer. The technique was to apply fertilizer directly to the leaves using spray with suitable fertilization time according to the treatments.

Data retrieval

Data taken from the growth of stem diameter (cm), leaves length and width (cm) and root length (cm). Measurements were made after three month-planting. The number of leaves was calculated from the leaves at the bottom to the top of the stem.

Data analysis

Data normality was tested using Kolmogorov Smirnov test and homogeneity was tested using the Levene test. Furthermore, data were analyzed using two-way manova with a significance level of 0.05. If the data were significantly different, then analysis will be continued using Duncan DMRT test to compare each treatment.

RESULTS AND DISCUSSION

Statistical analysis showed the difference of *Dendrobium* plant growth on several media as well as the effect of fertilization time. The plant growth can be seen in several media and treatments using variation of fertilization time (this included the size of stem diameter, leaf length, leaf width, and root length).

Effect of growing media on orchid growth

The effect of growing media on orchid growth presented in Table 1.

Table 1. The effect of growing media on orchid growth (*Dendrobium sp.*)

Treatments of growing media	Growth			
	Stem diameter	Leaf length	Leaf width	Root length
M1 (charcoal)	0.19±0.17 a	0.25±0.07 a	0.05±0.03 a	0.39±0.17 a
M2 (coconut husk)	0.32±0.11 e	0.31±0.13 b	0.13±0.07 c	1.58±1.06 e
M3 (bagasse)	0.30±0.11 d	0.31±0.12 b	0.13±0.03 c	1.48±1.16 d
M4 (charcoal+coconut husk)	0.22±0.09 b	0.27±0.09 a	0.11±0.05 b	0.85±0.43 c
M5 (charcoal+bagasse)	0.23±0.04 c	0.30±0.14 b	0.13±0.04 c	0.67±0.44 b
M6(bagasse+coconut husk)	0.33±0.10e	0.39±0.16c	0.19±0.11d	1.84±1.13f

Description: The numbers marked with the same letters in each column showed no significant difference. Meanwhile, the different letters show significant difference according to Duncan Multiple Range Test at the real level of 5%.

From Table 1 above, it can be seen that charcoal media produced the lowest root length, leaf width, leaf length, and stem diameter among to others. On the contrary, combination media of bagasse and coconut husk increased the size of root length, leaf width, leaf length, and stem diameter. The increase in stem diameter was 0.19 ± 0.07 **a** cm, different from other growth media treatment. This is due to the charcoal media has a hard texture which made it impenetrable for the roots. Thus orchid growth was obstructed and couldn't stand in an upright position, charcoal media also has poor nutrients (Supari, 1999).

Coconut husk media was good enough to influence root length growth, in which the root length was longer than that of bagasse media or media using a combination of charcoal and bagasse. However, the size was still lower than treatment using media combination of bagasse and coconut husk (Table 1), whereas the size of stem diameter was bigger than that of charcoal media, bagasse media or combination of charcoal and bagasse media with average value 0.32 ± 0.11 **e** cm. The value was not significantly different from a combination of coconut husk and bagasse media. While the increase in leaf length in media coconut husk + bagasse was higher than using in media charcoal media. However, it was not significantly different from the increase of leaf length in bagasse media or combination of charcoal media with bagasse. The increase in leaf width was higher and significantly different from charcoal media. This was caused by the capacity of water storage of

coconut husk was very good, and it contained essential elements such as N, P, K compared to charcoal media (Toharisman, 1991).

Treatment using a combination of charcoal and coconut husk media on root growth was higher than that of charcoal media. However, the growth of stem diameter was lower than that of coconut fibers media and combination of charcoal and coconut husk media, the value was $0.22 \pm 0.09\mathbf{b}$ cm, whereas the growth of leaf length was not significantly different from that of charcoal media (Table 1). The growth of leaf width was significantly different from charcoal media and others, $0.11 \pm 0.05\mathbf{b}$ cm. Media using a combination of charcoal and coconut husk had advantages and disadvantages such as low water storage capacity in charcoal media and low nutrients in coconut husk (Ismail, 1987). From Suradinata *et al.* (2012) study showed that treatment using a combination of coconut husk and charcoal (1: 1) with 2L^{-1} Gavaota fertilizer has the best growth.

Combination of coconut husk and bagasse media showed the optimal growth (stem diameter, leaf length, leaf width, and root length) and was significantly different from other growing media. This media combination has met the criteria of growing media needed for orchid plants to grow optimal because this media had good aeration and drainage. Thus the water storage was very good and rich in nutrients (Novian, 2002). Factors that affected plant growth were water, light as well as air temperature and optimal air humidity, if all of those factors were met then plant growth will accelerate through cell division and elongation (Sitompul & Guritno, 1995).

Effect of fertilization on orchid growth

Effect of fertilization on acclimatization of orchid in different growing media showed on Table 2.

Table 2. Effect of fertilization time on *Dendrobium* sp. growth

Time of fertilization	Growth (cm)			
	Stem diameter	Leaf length	Leaf width	Root length
P0(without fertilization)	$0.17 \pm 0.04\mathbf{a}$	$0.17 \pm 0.05\mathbf{a}$	$0.07 \pm 0.03\mathbf{a}$	$0.24 \pm 0.07\mathbf{a}$
P1(1x7 day-fertilization)	$0.25 \pm 0.06\mathbf{b}$	$0.3 \pm 0.04\mathbf{b}$	$0.12 \pm 0.05\mathbf{b}$	$1.12 \pm 0.49\mathbf{b}$
P2(1x14 day-fertilization)	$0.40 \pm 0.09\mathbf{c}$	$0.46 \pm 0.1\mathbf{c}$	$0.19 \pm 0.09\mathbf{c}$	$2.18 \pm 0.09\mathbf{c}$
P3(1x20 day-fertilization)	$0.24 \pm 0.05\mathbf{b}$	$0.29 \pm 0.06\mathbf{b}$	$0.13 \pm 0.05\mathbf{b}$	$0.99 \pm 0.50\mathbf{b}$

Description: The numbers marked with the same letters in each column show no significant difference while the different letters show significant difference according to Duncan Multiple Range Test at the real level of 5%.

Fertilizer used in these treatments was Gandasil which contains N nutrient (20%), P (15%), K (15%) and additional micro elements Mg, Mn, B, Cu, Co, and Zn (Iswanto, 2002). Plant-feeding was done in the morning because orchids belong to the CAM group (Crasulacean Acid Metabolism), the stomata open at night and close during the day. CAM uses the mechanism to bind

carbon dioxide at night when stomata open, at the same time water and nutrients also enter through stomata. Thus, CAM plants can photosynthesize without losing a large amount of water due to stomatal transpiration (Salisbury & Ross, 1992).

Treatment using fertilizer for 1 x 7 days showed no significant difference in growth (stem diameter, leaf width and length, and root length) compared to that with 1 x 20 day-fertilization time.

The optimum growth was shown from treatment P2 which used 1 x 14 day- fertilization. This treatment displayed significant difference to the other three treatments (Table 2). This happened because orchid plants absorbed nutrients in growing media and distributed the nutrients through the leaves. Nutrients were given through the leaves by spraying fertilizer directly through the leaves to allow the leaves to grow and develop (Sutedjo, 1999).

In treatment P2 (1x14 day-fertilization time), there was an increase in root length compared to the other treatments which recorded 2.12 ± 0.09 cm based on the Duncan test. Stem diameter, leaf length, leaf width, were significantly different from treatment P0, P1, and P3. This was caused by the nutrient capacity applied to the plants was quite sufficient therefore photosynthesis process can run well. This affected plant growth. Foliar spray fertilizer which applied periodically and evenly can result better in plant growth rather than being applied in one spot at once (Novian, 2002).

The root growth in treatment P3 (1x20 day-fertilization) was lower than compared to treatment P2 (1x14 day-fertilization) and P1 (1x7 day-fertilization). Duncan test showed the growth only 0.99 ± 0.50 cm as seen in Table 2. Stem diameter, leaf length, and width were not significantly different from other treatments. It could be seen in treatment P3 which used 1x20 day-fertilization time. This result might be caused by fewer nutrients available so the growth couldn't be as optimum as in treatment P2 with 1x14 day-fertilization time.

Effect of interaction between growing media and fertilization intensity on orchid growth

For survival, orchids need more nutrients than those that are provided by growth media. Orchids also need fertilizer to apply through the leaves. Fertilizer applied directly through the plant's leaves by spraying or watering them. Fertilizer would be absorbed through stomata by diffusion and would subsequently enter chloroplast cells through guard cells, mesophyll cells, and bundle sheath and would play a role in photosynthesis (Salisbury & Ross, 1992).

Table 3. Effect of growing media and fertilization time on *Dendrobium sp.* growth

Treatments		Growth (cm)			
Media	Fertilizations	Stem diameter	Leaf length	Leaf width	Root length
M1	Without fertilizer	0.12±0.02a	0.19±0.01bcd	0.03±0.00a	0.17±0.01a
M1	1 x 7 day	0.18±0.03bc	0.24±0.04def	0.04±0.01abc	0.49±0.01f
M1	1 x 14 day	0.30±0.02ghi	0.36±0.04jkl	0.08±0.03bcde	0.58±0.01h
M1	1 x 20 day	0.16±0.01b	0.23±0.03cde	0.07±0.01abcd	0.31±0.01d

M2	Without fertilizer	0.21±0.02de	0.18±0.01bcd	0.03±0.01ab	0.26±0.01c
M2	1 x 7 day	0.31±0.03hi	0.28±0.03efghi	0.16±0.03ijk	1.50±0.01q
M2	1 x 14 day	0.49±0.02k	0.51±0.06o	0.21±0.01l	3.10±0.01t
M2	1 x 20 day	0.29±0.02g	0.26±0.01efg	0.13±0.01ghij	1.44±0.01p
M3	Without fertilizer	0.20±0.01cde	0.17±0.05bc	0.10±0.03defgh	0.26±0.01c
M3	1 x 7 day	0.26±0.02f	0.33±0.03hijkl	0.13±0.03ghij	1.27±0.01m
M3	1 x 14 day	0.47±0.02k	0.48±0.04no	0.17±0.01jkl	3.29±0.01u
M3	1 x 20 day	0.26±0.01f	0.28±0.03efghi	0.13±0.03fghij	1.09±0.01i
M4	Without fertilizer	0.12±0.01a	0.15±0.03b	0.08±0.03bcde	0.21±0.01b
M4	1 x 7 day	0.19±0.01cde	0.30±0.03fghij	0.08±0.04cdef	0.92±0.01k
M4	1 x 14 day	0.35±0.01j	0.37±0.04kl	0.17±0.01jkl	1.38±0.02o
M4	1 x 20 day	0.21±0.01e	0.27±0.04fghi	0.12±0.03fghij	0.87±0.01j
M5	Without fertilizer	0.19±0.06bcd	0.08±0.01a	0.09±0.01defg	0.16±0.01a
M5	1 x 7 day	0.21±0.01de	0.36±0.01jkl	0.13±0.05ghij	0.66±0.01i
M5	1 x 14 day	0.29±0.01gh	0.43±0.01mn	0.18±0.01kl	1.32±0.01n
M5	1 x 20 day	0.24±0.01f	0.33±0.08ijkl	0.12±0.02efghi	0.53±0.02g
M6	Without fertilizer	0.33±0.01de	0.23±0.03cde	0.08±0.03bcde	0.36±0.01e
M6	1 x 7 day	0.48±0.01i	0.32±0.01ghijkl	0.14±0.01hijk	1.87±0.01s
M6	1 x 14 day	0.48±0.01k	0.63±0.03p	0.35±0.03m	3.42±0.01v
M6	1 x 20 day	0.30±0.01ghi	0.38±0.01lm	0.21±0.01i	1.73±0.01r

Description: The numbers marked with the same letters in each column show no significant difference and the different letters show significant difference according to Duncan Multiple Range Test at the real level of 5%.

The media variation with the intensity of fertilization was expected to give maximum growth result on the growth of orchid plants in the acclimatization phase. Duncan test showed that the interaction between media with the highest value of fertilization on root length was significantly different from other treatments. The result of treatment P6*P2 (combination of coconut husk + bagasse media with intensity 1x14 day-fertilization) showed $3.42 \pm 0.01v$ cm which can be seen in Table 3. Treatment with the highest value of stem diameter showed no a significant difference to treatments M3*P2; M6*P2, and M2*P2. These results can be seen in Table 3. Whereas, treatment with the highest growth value in leaf length and width showed significant difference to other treatments. The highest value in leaf length and width was shown from treatment M6*P2 (combination of coconut husk + bagasse media with the intensity of 1x14 day-fertilization), the leaf length was $0.63 \pm 0.03p$ cm, and leaf width was $0.35 \pm 0.03m$ cm.

Optimal growth was probably due to the suitability between media structures, spraying intervals, and good fertilization. It was also caused by an environmental condition (humidity and sunlight). According to Gunawan (1998), orchid plants can adapt to any media; the most important thing is adequate watering and fertilization for each species. In the area with a high intensity of rain and humidity, media which can store water is not recommended because the media would always

wet and cause decomposition on roots, but the orchid plant could be maintained according to the condition and the surrounding environment.

Treatment M6*P2 (combination of coconut husk and bagasse media with intensity 1x14 day-fertilization) has optimal growth. The cause of that has been explained on the influence of media and the effect of fertilization intensity. This result was in accordance with Suradinata et al. (2012), which stated that treatment using a combination of coconut husk and charcoal media with 1: 1 ratio and the application of 2L⁻¹ Gaviota fertilizer showed the best effect on plant height, leaf width, and *Dendrobium* sp. buds at several observations. Combination and interaction of the media, as well as the intensity of fertilization, could accelerate the growth of orchid plants, particularly in acclimatization phase due to the environmental factors such as humidity, light, water, and temperature. Nutrient contents present in the media supported by appropriate fertilization intensity would also accelerate the growth of orchid plants in the acclimatization phase.

This result corresponded to Tisdale et al. (1990) which stated nitrogen is the macronutrient that is needed by plants. The orchid plant could grow well if exposed to the low intensity of sunlight (25-50% °C), it prefers a rather dry environment with the best air temperature 21°C-25°C during the day and night 18°C-21°C, humidity 60-80% and sufficient watering (Toharisman, 1991). This study was conducted during the rainy season, so the expected condition was achieved.

Conclusion

Growing media affect the growth of *Dendrobium sylvanum* Rchb. f. Treatment using combination media of coconut husk and bagasse was the best media to use for *Dendrobium sylvanum* Rchb. f. Optimal fertilization on *Dendrobium sylvanum* Rchb. f was 1x14 day-fertilization time. The interaction between growing media (coconut husk + bagasse) and 1x14 day-fertilization time can accelerate the highest growth.

REFERENCES

- Abad, M. (1989). Los sustratos en horticultura ornamental. *Revista Agricola Vegetal*, 3, 146-152.
- Diaz, L.P., Namur, J.J., Bollati, S.A. & Arche, O.E.A. (2010). Acclimatization of Phalaenopsis and Cattleya obtained by micropropagation, *Rev. Colomb. Biotechnol.* 12(2), 27-40. <http://www.scielo.org.co/pdf/biote/v12n2/v12n2a03.pdf>
- Deb, C.R. & Imchen, T. (2010). An efficient In vitro hardening technique of tissue culture raised plants. *Biotechnol* 1-5
- Gunawan, L, W., 1998. *Budidaya Anggrek*. Penerbit Swadaya, Jakarta.
- Ismail, I. 1987. Peranan bioearth terhadap status hara makro, sifat-sifat tanah, pertumbuhan, dan bobot kering tanaman tebu pada berbagai ketebalan lapisan tanah atas. *Buletin Agronomi* 2(2): 7-8.
- Iswanto, H. 2001. *Petunjuk Perawatan Anggrek*. Jakarta: Agro Media Pustaka.
- Iswanto, H. 2002. *Petunjuk Perawatan Anggrek*. Jakarta: Agro Media Pustaka.

- Mirani, A.A., Abul-Soad, A.A. & Markhand, G.S. (2017). Effect of different substrates on survival and growth of transplanted orchids (*Dendrobium nobile* cv.) into net house. *International Journal of Horticulture and Floriculture*, 5(4), 310-317.
- Monda, T., Dash, P.K., Ahmed, M., Islam, Md.M. and Ali, Md. H. (2014). Growth performance of orchid (*Dendrobium* sp.) as influenced by different npk spray concentration. *International Journal of Biosciences*, 4(7), 15-27.
- Novian, 2002. *Petunjuk Pemupukan yang Efektif*. Agro Media pustaka, Jakarta.
- Salisbury, F.B., dan Ross C.W., 1992. *Fisiologi tumbuhan* terjemahan jilid 2, Biokimia Tumbuhan. Bandung: ITB.
- Supari, DH. 1999. *Tuntunan Membangun Agribisnis*. PT. Alex Media Komputindo. Sutedjo, M.M. 1999. *Pupuk dan Cara Pemupukan*. Jakarta: Rineka Cipta.
- Tisdale, S.L., E.L. Nelson, and J.D. Beaton. 1990. *Soil Fertility and Fertilizer*. Fourth edition. New York: Mc Millan Pub. Co.
- Toharisman, A. 1991. *Potensi Dan Pemanfaatan Limbah Industri Gula Sebagai Sumber Bahan Organik Tanah*.
- Suradinata, Y.R., Nuraini, A. & Setiadi, A. (2012). Effect of plant media and concentrations of foliar fertilization on growth of orchids *Dendrobium* sp. On acclimatization. *J. Agrivigor*, 11(2), 104- 116.
- Sitompul, S.M.& Guritno, B. (1995). Analisis pertumbuhan tanaman, Gadjah Mada University Press, Yogyakarta.

Kepada Yth. Sucipto,
Fakultas Sains and Technology Universitas Airlangga
Kampus C Jl. Mulyorejo, Surabaya 60115

Dengan hormat,

Dengan ini kami sampaikan **rincian biaya Publikasi** artikel yang berjudul "EFFECTS OF PLANT MEDIA AND FERTILIZATION ON THE GROWTH OF ORCHID PLANT (*Dendrobium sylvanum* Rchb. f.) IN ACCLIMATIZATION PHASE" di *Planta Tropika: Jurnal Agrosains (Journal of Agro Science)* Edisi Februari 2019.

Rincian	Jumlah	Satuan	Unit	Harga per Judul (Rp)	Subtotal (Rp)
Artikel Publikasi	1	Judul	Vol. 7 No.1	1,000,000	1,000,000
Total					1,000,000

Biaya publikasi dapat dikirimkan ke Bank Syariah Mandiri (BSM) 7130724657 an. PLANTA TROPIKA. Demikian info ini kami sampaikan Terimakasih atas perhatian dan kerjasamanya.

Yogyakarta, 15 Juli 2019

Hormat kami,

Pengelola

Planta Tropika


Dina Wahyu Trisnawati, SP, M.Agr, PhD

**Program Studi Agroteknologi, Fakultas Pertanian
Universitas Muhammadiyah Yogyakarta**

Jl. Ring Road Selatan, Tamantirto, Kasihan, Bantul, Phone (0274) 387646 psw 224
E-mail : plantatropika@umy.ac.id