PENGALAMAN MEREVIEW ARTIKEL
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Scopus ID : **15046179100**; URL: https://www.scopus.com/authid/detail.uri?authorId=15046179100
WoS ID : **A-1065-2019** (ps: Wayan@2011), URL: https://www.webofscience.com/wos/author/record/430480

Pengalaman menelaah (Review) artikel jurnal internasional bereputasi (terindeks Scopus), dapat dilihat pada link WoS (https://www.webofscience.com/wos/author/record/430480), tetapi yang artikelnya sudah terbit (terlampir), dengan judul artikel dan nama jurnalnya adalah, sbb:

1. **Frontiers in Microbiology (Scopus Q1 & WoS):** Intercropping Pinto Peanut in Litchi Orchard Effectively Improved Soil Fertility, Optimized Soil Bacterial Community Structure and Increased Bacterial Community Diversity.
2. **Sustainability – MDPI (Scopus Q1 & WoS):** Indonesia Rice Irrigation System: Time for Innovation.
3. **Chiang Mai Journal of Science (Scopus Q4 & WoS):** Community Structure of Arbuscular Mycorrhizal Fungi in Different Rice Cultivation Systems.
4. **Biodiversitas Journal of Biological Diversity (Scopus Q3):** Biological Control of *Sclerotinia minor* Attack on Pyrethrum Plants by *Trichoderma harzianum* in Glasshouse Scale Experiments.
5. **Universal Journal of Agricultural Research (Scopus Q3):** Response of String Beans (*Vigna unguiculata* L.) on Saline Soil Amended with Vermicompost.

English Products

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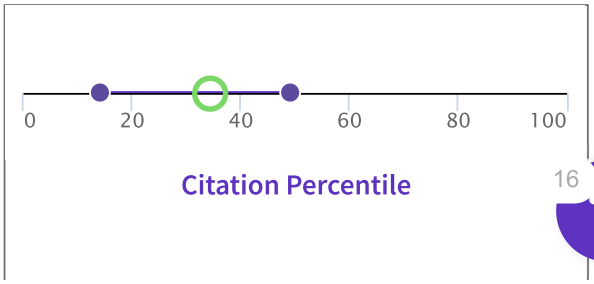

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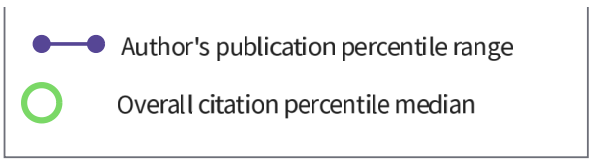

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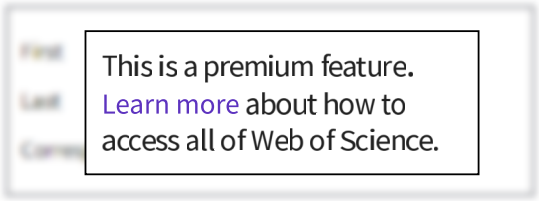

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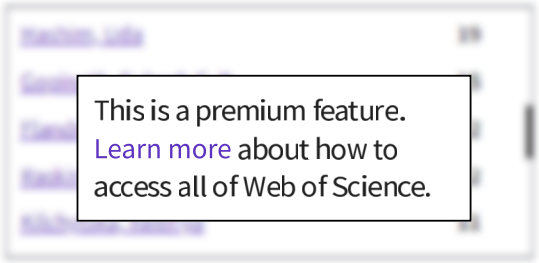

REVIEWING

Frontiers in Microbiology

(Scopus Q1 & WoS)

Paper title:

"Intercropping Pinto Peanut in Litchi Orchard Effectively Improved Soil Fertility, Optimized Soil Bacterial Community Structure and Increased Bacterial Community Diversity"

Wayan WANGIYANA <w.wangiyana@unram.ac.id>

Invitation to Review a Manuscript (ID 868312)

1 message

Bruno Brito Lisboa (Via FrontiersIn) <noreply@frontiersin.org> Thu, Feb 24, 2022 at 7:54 PM
Reply-To: Bruno Brito Lisboa <bruno-lisboa@agricultura.rs.gov.br>
To: W Wangiyana <w.wangiyana@unram.ac.id>

Dear Dr W Wangiyana ,

I am writing to ask whether you would be able to review a manuscript submitted for consideration in Frontiers in Microbiology, section Microbial Physiology and Metabolism:

"Intercropping Pinto peanut in litchi orchard effectively improved soil fertility, optimized soil bacterial community structure and increased bacterial community diversity"
by Zhao Ya, Yan Caibing, Hu Fuchu, Luo zhiwen, Zhang Shiqing, Xiao ming, Zhe Chen and Fan hongyan

Please read below for details concerning the submission and inform us of your interest using the hyperlinks enclosed. In agreeing to review this manuscript, we trust that its subject matter falls within your area of expertise.

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Thank you for considering to review this manuscript.

With best regards,

Bruno Brito Lisboa
Associate Editor, Frontiers in Microbiology
https://www.frontiersin.org/

----------MANUSCRIPT DETAILS----------
Journal: Frontiers in Microbiology, section Microbial Physiology and Metabolism
Article type: Original Research
Manuscript title: Intercropping Pinto peanut in litchi orchard effectively improved soil fertility, optimized soil bacterial community structure and increased bacterial community diversity
Manuscript ID: 868312
Authors: Zhao Ya, Yan Caibing, Hu Fuchu, Luo zhiwen, Zhang Shiqing, Xiao ming, Zhe Chen and Fan hongyan
Submitted on: 02 Feb 2022
Edited by: Bruno Brito Lisboa

Abstract: Intercropping is wildly used in due to the function of raising land productivity and providing an opportunity to achieve sustainable intensification of agriculture. In present study, soil samples from 10~20 cm depth of intercropping Pinto peanut in litchi orchard and litchi monoculturing mode were selected to determine the contents of physical and chemical factors, enzyme activities, as well as the effect to soil bacterial diversity. On this basis, 16S rRNA V4-V5 region of soil bacterial communities in litchi /Pinto peanut intercropping mode (LP) and litchi monoculturing mode (CK) were detected by Illumina MiSeq sequencing platform. The results showed that the available potassium (AK) content was extremely significantly increased by 138.9%, the available nitrogen (AN) content was significantly decreased by 19.6%, as the pH value was slightly decreased without significant difference. The soil enzyme activities were increased as a whole, especially the sucrose and acid protease were extremely significantly increased by 154.4% and 76.5%, respectively. The absolute abundance and alpha diversity of soil microbiota were highly increased in intercropping group. Most importantly, endemic species with significant difference in LP was increased approximately 60 times compared to CK treatment. In the aspect of soil bacterial community structure, the dominant phyla of the two groups were Acidobacteria, Proteobacteria, Chloroflexi and Actinobacteria. At genus level, the absolute abundance of Flavobacterium, Nitrososphaera was significantly increased by 79.20%, 72.93%, while Candidatus_Koribacter significantly decreased with amplitude of 62.24%. Furthermore, the redundancy analysis (RDA) suggested that AK, highly associated with the dominate genera and phyla, is the vitally dominate environmental factors in LP groups, while it's AN and pH in CK groups. Additionally, PICRUSt2 analysis indicated that intercropping improved the metabolic activity of bacteria so as to increase the resistance to soil soil-borne disease. Overall, this study expected to provide theoretical basis and technical support for the healthy intercropping cultivation of litchi.

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Wayan WANGIYANA <w.wangiyana@unram.ac.id>

Action needed: Your new review assignment - 868312

1 message

Frontiers in Microbiology Editorial Office <microbiology.editorial.office@frontiersin.org> Sat, Feb 26, 2022 at 10:57 AM
Reply-To: Frontiers in Microbiology Editorial Office <microbiology.editorial.office@frontiersin.org>
To: Wayan Wangiyana <w.wangiyana@unram.ac.id>

Dear Dr Wangiyana,

Thank you for accepting to review the manuscript "Intercropping Pinto peanut in litchi orchard effectively improved soil fertility, optimized soil bacterial community structure and increased bacterial community diversity". In order to keep the review process timely, please aim to complete your review report by 05 Mar 2022 via this link https://review.frontiersin.org/review/bootstrap/c02f826f-98d5-46f2-b4d5-880990313e58

You will be presented with an online structured questionnaire that will guide you through the review, focusing on objective criteria. Where appropriate, please provide detailed feedback to the authors on how they can improve the manuscript.

You can find full Review Guidelines here https://www.frontiersin.org/Journal/ReviewGuidelines.aspx?s=677&name=microbial_physiology_and_metabolism

Many thanks for taking the time to support the review process of this submission, and for providing the authors with expert feedback and valuable input.

Best regards,

Your Frontiers in Microbiology team

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----------MANUSCRIPT DETAILS----------
Manuscript title: Intercropping Pinto peanut in litchi orchard effectively improved soil fertility, optimized soil bacterial community structure and increased bacterial community diversity
Manuscript ID: 868312
Authors: Zhao Ya, Yan Caibing, Hu Fuchu, Luo zhiwen, Zhang Shiqing, Xiao ming, Zhe Chen and Fan hongyan
Journal: Frontiers in Microbiology, section Microbial Physiology and Metabolism
Article type: Original Research
Submitted on: 02 Feb 2022
Edited by: Bruno Brito Lisboa

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Intercropping Pinto peanut in litchi orchard effectively improved soil fertility, optimized soil bacterial community structure and increased bacterial community diversity

General comment: It is a very good topic, full of many analyses, but the paper as a whole needs to be better written in better details using the results obtained to build a theory based on the results obtained.

Unfortunately, the number of replication was too low, with only three replication, under Randomized Block Design (RBD) will produce only 2 df error, which is normally at least 12 df error, or for comparing only two treatments (LP & CK), the replications are normally 10 times, not only 3 times. With only 3 replications, under RBD, the tabular F in ANOVA will be very high, i.e. 18.51, so there has to be a very big difference between LP & CK that results in calc. F > 18.51 to say that the difference is significant. Thus, the authors should acknowledge this very low number of replications, for example to minimize cost of biochemical, enzymatic and biotechnological analyses.

In addition, since the author did not measure soil conditions before planting Pinto peanut around the litchi tree, they cannot conclude for example that "intercropping increased AK" just because AK in LP was higher than in CK, which imply that the authors consider soil conditions in CK at the end were exactly the same as soil conditions in LP before Pinto peanut was planted around the litchi tree. It also means that the authors consider soil conditions were static or unchanged from 2015. In the reality, soil is a dynamic thing in which its physical, chemical & biological properties change over time, but the rates may be different between CK and LP, which were not measured in this study.

Furthermore, total N (TN) consists of unavaiable N (such as those bound in proteins & enzimes) and available N (which is in the form of Nitrate and Ammonium ions that are available for uptake by plants). In Table 1, available N (AN) is a lot higher than total N (TN); and this is not explained by the authors about the "How" & "Why".

Please also check the References. There are some errors. For example for Xu, there should be Xu et al. (2020a) & Xu et al. (2020b) both in the text and in the References, so the readers will be sure which Xu et al. was cited in the text. There are also some cited references that are not listed in the References, please add them there. It is suggested that the authors use a Reference Manager to manage those references & citations.

Suggestions for minimum standard revisions are as follows:

Line no.	Written	Reviewer's comments
Line 13	….is wildly used in ….	is "wildly" a correct word? ….used in (what or where)?
Line 13	…due to the function of…	suggestion: …due to its capability of …
Line 14	In present study, …..	suggestion: In the present study, …..
Line 16	selected…	suggestion: established…
Line 17	effect to…	suggestion: effect on…
Line 20	...significantly increased by 138.9%...	Please reconsider in using the word "increased" since the comparison was not between after & before the Pinto peanut planted around the litchi tree. With this comparison, the conclusion is simply "higher in LP
Line 21	...pH value was slightly decreased...	This should not be a conclusion because it was not significant
Line 22	…the sucrose…	should be: sucrase…
Line 23	...significantly increased by 154.4%...	Similar to comment for Line 20, it should not be concluded as an "increase"
Line 29	...significantly decreased …	Similar to comment for Line 20, it should not be concluded as an "decrease"
Line 30	…the dominate	should be …the dominant
Line 31	…vitally dominate…	should be …vitally dominating…
Line 31-32	…it's AN and pH in CK groups.	should be …in CK groups, it's AN and pH.
Line 38	Litchi chinensis Sonn….	normally in the second, third, etc mention, should be L. chinensis (normally only in the first mention the scientific name of a plant is written complete with its author).
Line 44	…can not only…	shoud be …not only can…
Line 45	…but also …	shoud be …but also can… [parallelism]
Line 46-49	Arachis pintoi….	This four lines of text shoud not be here, but in the Materials & Methods

Line 50	...practice that simultaneous growing of two or more crops near…	shoud be:...practice of simultaneously growing two or more crops …
Line 51	...which widely used in production.	should be: ...which is widely practiced in crop production.
Line 53	...less fertilizer N use (Xu et al. 2020)	should be ...less N-fertilizer use (Xu et al. 2020)... Also **which Xu et al. 2020,** since there are two in the References
Line 54	...fossil-based fertilizer N by…	should be: ...fossil-based N-fertilizer by…
Line 60	...showed that concluded that the …	should be: ...showing that the.…
Line 61-62	…(Li et al., 2020).	Similar ti Line 53:… should be identified with a or b to show which Li, because there are two Li et al. (2020) in the References
Line 67	and the effect to soil …	should be: ...and its effect on soil …
Line 68	...especially the research on the…	should be: ...especially the…
Line 72	…with peanut pinto…	should be: …with pinto peanut …
Line 76	…mode selection.	should be: …mode.
Line 79	...planting specification at …	should be:...plant spacing of …
Line 91	respectively.	Please insert photographs of the intercropped and monocropped litchi plants to see how was the pito peanut growth; also to easier for the readers to see the positions of the sampling sites. Please also explain how dense was the pinto peanut planted or what is the plant population per m square.
Line 103	...(SOC) determinate by …	should be:...(SOC) was determined by …
Line 114	…method (Xu et al., 2020).	please make it certain which Xu et al. 2020 since there are two of them
Line 118	…by Sodium Sodium…	may be …by Sodium…
Line 120	…was determined by was…	should be:…was…
Line 147	…(vegan pack-age)…	…(vegan package) ?
Line 157	...one-way analysis of variance…	Minitab release 13 calls this ANOVA as two way Anova (treatments & blocks as the replications)
Line 162	...significant changes in most soil parameters ….	This conclusion is not based on the data. In fact only 2 of the 9 soil parameters are significantly different between LP & CK. Therefore, the conclusion shoud be opposite, i.e. in general, there were no significant differences between LP & CK in terms of soil parameters, except AN, which was higher in CK and AK, which was higher in LP (Table 1). It could be possible also that the non-significant differences in TP & AP was due to the insufficient number of replications, which resulted in the error df of the Anova only 2 under only 3 replication per treatment, while based on the SE (standard error) TP & AP could be significantly different between LP & CK.
Line 164	...content of AP was extremely significantly increased…	The correct one is AK not AP. AP is not significantly different between LP & CK. Again, the "increased" cannot be used in this case because the comparison was not between "after" and "before" the pinto peanut was intercropped around the litchi tree. In addition, the statistical terms for $p<0.01$ is normally "highly significant" not "extremely significant"; maybe this words are for $p<0.001$ or $p<0.0001$, but not for $p<0.01$. Please fix the terms, so not to use "increased" or "decreased" as well as those tables, especially Table 1, Table 2 & Table 3.
Line 165	...AN significantly decreased by 19.6% with intercropping treatment…	AN was 19.6% lower in LP than in CK, not "decreased" unless the authors can compare between "after" and "before" pinto peanut was intercropped around the litchi tree.
Line 166	…was slightly decreased..	comments are similar to those for Line 165
Line 169	...was extraordinarily increased …	comments are similar to those for Line 165; and the author should look for statistical terms whether or not the term "extraordinarily" applicable for the statistical analysis results (which p-value means "extraordinary".

Line 174	no significantly but slightly increase in intercropping group.	should be: no significantly different between LP and CK.
Line 179	…indicated that…	should be: … indicating that…
Line 180	...significant change after the intercropping…	this conclusion is also not applicable UNLESS the comparison was made between "after" and "before" the pinto peanut was intercropped.
Line 192	obviously higher than that of …	this conclusion is also not applicable because it was "non-significant"
Line 193	…was decreased 4.5%...	6.6%? But the author cannot use the term "decreased" unless the comparison was between "after' and "before" intercropping.
Line 201	…been identified.	should be: …had been identified.
Line 202	… Figure 3B, the…	should be: …Figure 3B, indicating that the… Please also fix the rest of the sentence for its parallelism to make it easier to understand the
Line 209	...that intercropping with litchi and peanut …	should be: ...that intercropping litchi with peanut …
Line 215	...samples were same…	should be: ...samples were the same…
Line 219	...were significantly increased ...	should be: ….were significantly higher.....
Line 227	...Furthermore, the highest absolute abundance of...	should be: ...Furthermore, the genus having the highest absolute abundance in...
Line 228	while it's Gp6 in intercropping group.	should be: ...while in intercropping group, it is Gp6.
Line 229	...was increased in absolute ...	should be: ...were higher in absolute ...
Line 230	...Gp6 was significantly increased...	should be: ...Gp6 were significantly lower…
Line 232	...GP1 was significantly decreased, with an decrease amplitude of ….	should be: ...GP1 was significantly lower, with a difference of ….
Line 237	which these variables totally explained	shoud be: ...which in total these variables explained…
Line 238	...the variety in bacterial communities.	should be: ...the variation in bacterial communities.
Line 243	...dominate environmental factors, followed by pH, AP and AK, which…	should be: ...dominating environmental factors, followed by pH, AP and TK, in which…
Line 244	...for 91.71% of the total shift in microbial communities, affect...	should be: ...for 96.80% of the total shift in microbial communities, which affected....
Line 245	...the dominate genera...	should be: ...the dominating genera… OR …the dominant genera...
Line 250	The soil samples…..	Please fix the entire sentence from Line 250 to Line 253 to be written based on Figure 6A & Figure 6B, especially in terms of the quadrant position because CK is in the third & fourth not second and third, while LP is in the first and second not in first and fourth quadrant, also adjust with the posisition of TK & AK as well as TP & PH.
Line 251	… indicated the…	should be: … indicated that the…
Line 257	…soil property…	should be:…soil properties…
Line 258	…activity which AK was found...	should be: …activity in which AK was...
Line 259	..and positively correlated with	should be: ...and Urease;
Line 261	...negatively correlated with Urease…	should be: ...Urease…
Line 262	…Urease (Table 6).	should be: …Urease and Alkaline Protease (Table 6).
Line 263	...improve soil properties.	Please specify which were improved and which were not….
Line 269	...were affected with ...	should be: …which were affected, with ...
Line 270	...especially of which responsible ...	should be: ...especially those responsible ...
Line 273	…genes were…	should be: … genes than were…
Line 283	...improving soil disease resistance...	should be: ...improving resistance to soil-borne disease ...
Line 289	..Yang et al., 2017; Zebec et al. 2017..	Please find other refs related to "improving fruit quality" (Line 288) since "Yang et al" is on cotton while "Zebec et al" is not related to any
Line 290	...potassium was increased extremely significantly ...	Again, the word "increased" may not appropriate here UNLESS the comparison was made between "after" and "before" pinto peanut was intercropped.

Line 291	...led the available potassium in non-root zone soil transferred …	Please also explain further, from how far (how deep) available K was transferred to peanut root zone. Any thing made K more available in LP than in CK? Don't pinto peanut plants take up K or it just accumulated in the rhizosphere?
Line 292	…(Zhan 2013).	This fital literature for the explanation is cited but it is not listed in the References?
Line 294	"Nitrogen repression", namely, the reduction of nodulation and biological nitrogen fixation in legume (Li et al., 2009).	Please check the accuracy of the citation, the word "repression" was not found in (Li et al., 2009), it may be in other references… In addition, fertilization was not described in the Materials & Methods; so please explain more there, i.e. when, at what doses, and what fertilizers were applied especially relative to the sampling date, and these may also help explain the soil properties.
Line 295	...intercropping of litchi and Pinto peanut resulted in significant reduction of AN….	This statement needs to elaborated and explained further. We know pintoi peanut is a legume plant and has BNF capability, so has the potential for N-rhizodeposition. However it was found AN significantly lower in LP than in CK. In addition, how can AN much higher than TN (up to 50 times in CK)? These need more serious explanation in the discussion of soil properties in Table 1. Is these related to fertilizer application???, which is not explained in the Materials & Methods.
Line 297	...by litchi tree's absorption of nitrate in soil…	This statement needs to be supported with some data, at least in relation to the performance of litchi trees between LP & CK. Like the one reported in Emirates J. Food & Agric Vol. 33(3): 202-210 (2021), that red rice intercropped with peanut showed higher levels of green color of the leaves measured using leaf color chart, indicating higher N-uptake. Was that happen to the litchi plants intercropped with pinto peanut?
Line 299	transfer" (Hauggaard et al., 2009).	There are better references for N transfer because it is an experiment from peanut to rice or maize or other crops.
Line 300	...intercropping Pinto peanut in litchi was closely related to the nitrogen fixation of Pinto peanut.	No data were presented in relation to this statement from Line 299 to Line 300. If lower AN was concluded due to the presence of pinto peanut, it means that pinto peanut does not have BNF capability, and this is contrast with properties of legumes in general. In addition, this conclusion was based on the comparison of AN between LP & CK, not based on the dynamic of AN in the intercropping of litchi & pinto peanut from before to after intercropping was established. Therefore, other reasons need to be found out.
Line 309	…pintoi increased	Please check and make sure whether this concluding word "increased' is applicable; it was based on comparison what and what….
Line 310	…especially the activities…	should be: … especially in relation to the activities…
Line 311	….(Rodriguez et al., 2020)	should be: ….(Rodriguez et al., 2020)**, which**
Line 314	...intercropping can greatly improve soil fertility and nitrogen use efficiency in soil.	There are no data on N-use efficiency presented in this manuscript; this has to be supported with relevant data. In addition, the higher AK in LP than in CK has not been fully determine in Line 291 to Line 292.
Line 316	Orchard weeding can effectively control the growth of weeds….	This kind of discussion statement cannot suddently appear in the discussion because "weeding" was not mentioned in Materials and Methods; when weeding was done, how frequent, how it was done, etc.
Line 317	...the litter and root exudates of weeding provided rich nutrients …	should be "exudates of weeds" NOT "exudates of weeding"… This statement also cannot be appropriately use here as a suddent statement that sounds like a conclusion. In fact, the existance of weeds was never mentioned elsewhere; no mention of weedings, and no mention of species of weeds and their intensity; so where root exudates of weeds came from???
Line 228	… difference of the…	normally… difference in the…

Line 333	…there is reported…	should be…it was reported…
Line 334	… much higher in the maize-sanqi ginseng…	Please find more relevant reference crops; why maize - sanqi ginseng? They are not the same genus with litchi or Arachis pintoi….
Line 338	…. (Lim et al., 2009).	This reference is not listed in the References, please add and make sure it is the correct citation.
Line 339	...was significantly increased…	Again, the word "increased" and "decreased" in Line 340 may not appropriate here UNLESS the comparison was made between "after" and "before" pinto peanut was intercropped.
Line 342	…consistent with previous reported…	should be …consistent with previously reported… In addition, please provide with the relevant references to the statement in Line 342-343. Reference is required there.
Line 344	… is widely…	should be: … are widely…
Line 355	Interestedly, we found soil available...	should be: Interestingly, we found that soil available...
Line 362	...primary factor affected soil property was changed from pH or AN in…	should be: ...primary factor affecting soil properties was changed from pH or TP in…???
Line 363	...to AK in intercropping group.	should be: ...to AK or TK in intercropping group???
Line 376	… sucrase and urease while ...	shoud be: … sucrase, urease and catalase while ...
Line 377	sucrose in our study,...	should be: sucrase in our study,...
Line 378	decomposition of soil properties such as AN, AK, and improve soil fertility.	The words "decomposition of soil properties" seem to be not appropriate words; please find more relevant words to explain changes in soil properties. "**improve soil property**" may not also the appropriate words because only AK was significantly higher in LP than in CK, and it was known what the difference between "after' and 'before' pintoi peanut was intercropped around litchi tree.
Line 383	Zhang et al. 2014), due to different plant species secrete distinct root exudates profiles …	shoud be: Zhang et al. 2014), because different plant species secrete distinct root exudate profiles … In addition, **Zhang et al. (2014)** is not listed in the References.
Line 386	… of FON was…	what is FON? It has to be explained…
Line 390	…. enhance the soil-borne disease resistance of litchi trees.	This has to be supported with some data; there were no data about the diseases of the litchi tree presented in the paper, and no information wheter it was different between LP & CK. More data are needed for this type of conclusion.
Line 393	N utilization efficiency, as well as maintains pH stability.	a concluding statement cannot suddently appear in the conclusion. In relation to N utilization efficiency, there were no data presented and discussed. If this is to be maintained here, the supporting data have to be presented and discussed. There were also no data about pH stability; no information of periodic measurement of pH from the beginning of intercropping to the end of soil sampling... So, please provide with relevant data for this conclusion.
Line 396	…. transformation efficiency of soil nutrient elements by improving soil fertility.	"transformation efficiency" was also never discussed and no supporting data presented. In addition, "improving soil fertility" is also not relevant conclusion UNLESS "why AN was much lower in LP than in CK" can be explained in more appropriately using more data because the data presented in this paper cannot explain that phenomenon. In addition TN was also much lower than AN; so, it has to be explaned why.
Line 399	conductive…	should be: conducive
Line 400	healthy growth of plants….	The authors need to provide the paper with more data related to the health and growth performance of the litchi plants to be able to maintain this conclusion. Measurement of N content of the litchi leaves may also be needed???
Line 417	Bao S.D.	should be: Bao, S.D.

Line 584	Table 1	**Just comment related to the insifficient replications in relation to ANOVA:** If the number of replications was not only 3x but at least 10x, TP & AP could be significantly different, because based on the standard error (SE), the difference is significant.
Line 588	WDR: wet to dry ratio	Please add an explanation what is the number behind the plus-minus sign; is it SE or SD?
Line 594	Table 3	the notation a & b or A & B should be based on the value it follows; the higher value should be A or a while the lower value should be B or b (according to Statistics).

10-Feb-22
Reviewer #2

Wayan WANGIYANA <w.wangiyana@unram.ac.id>

Frontiers: Acceptance of manuscript you reviewed - 868312

1 message

Frontiers Microbiology Editorial Office <microbiology.editorial.office@frontiersin.org> Wed, Apr 13, 2022 at 1:55 PM
Reply-To: Frontiers Microbiology Editorial Office <microbiology.editorial.office@frontiersin.org>
To: w.wangiyana@unram.ac.id

Dear Dr Wangiyana,

Frontiers Microbiology Editorial Office has sent you a message. Please click 'Reply' to send a direct response

The manuscript you reviewed was accepted for publication:

Manuscript title: Intercropping Pinto Peanut in Litchi Orchard Effectively Improved Soil Available Potassium Content, Optimized Soil Bacterial Community Structure and Advanced Bacterial Community Diversity
Journal: Frontiers in Microbiology, section Microbial Physiology and Metabolism
Article type: Original Research
Authors: Zhao Ya, Yan Caibing, Hu Fuchu, Luo zhiwen, Zhang Shiqing, Xiao ming, Zhe Chen, Fan hongyan
Edited by: Bruno Brito Lisboa

Here's the link to the article:
http://www.frontiersin.org/Review/EnterReviewForum.aspx?activationno=bc374d85-63ce-42ab-a42b-a2dbab05f4dc

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ORIGINAL RESEARCH
published: 12 May 2022
doi: 10.3389/fmicb.2022.868312

Intercropping Pinto Peanut in Litchi Orchard Effectively Improved Soil Available Potassium Content, Optimized Soil Bacterial Community Structure, and Advanced Bacterial Community Diversity

*Ya Zhao, Caibin Yan, Fuchu Hu, Zhiwen Luo, Shiqing Zhang, Min Xiao, Zhe Chen and Hongyan Fan**

Key Laboratory of Tropical Fruit Tree Biology of Hainan Province, Ministry of Agriculture and Rural Affairs/Haikou Tropical Fruit Tree Scientific Observation and Experimental Station, Institute of Tropical Fruit Trees, Hainan Academy of Agricultural Sciences, Haikou, China

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Edited by:
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Specialty section:
This article was submitted to Microbial Physiology and Metabolism, a section of the journal Frontiers in Microbiology

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Zhao Y, Yan C, Hu F, Luo Z, Zhang S, Xiao M, Chen Z and Fan H (2022) Intercropping Pinto Peanut in Litchi Orchard Effectively Improved Soil Available Potassium Content, Optimized Soil Bacterial Community Structure, and Advanced Bacterial Community Diversity. Front. Microbiol. 13:868312. doi: 10.3389/fmicb.2022.868312

Intercropping is widely used in agricultural production due to its capability of raising land productivity and providing an opportunity to achieve sustainable intensification of agriculture. In this study, soil samples from 10 to 20 cm depth of intercropping Pinto peanut in litchi orchard and litchi monoculture mode were established to determine soil attributes, enzyme activities, as well as the effect on soil bacterial diversity. On this basis, 16S rRNA V4-V5 region of soil bacterial communities in litchi/Pinto peanut intercropping (LP) mode and litchi monoculture mode (CK) was detected by the Illumina MiSeq sequencing platform. The results showed that the content of available potassium (AK) in LP was significantly higher than that in CK by 138.9%, and the content of available nitrogen (AN) in LP was significantly lower than that in CK by 19.6%. The soil enzyme activities were higher in LP as a whole, especially sucrase (SC) and acid protease (PT) were significantly higher by 154.4 and 76.5%, respectively. The absolute abundance and alpha diversity of soil microbiota were significantly higher in the intercropping group. Most importantly, endemic species with a significant difference in LP was higher by ~60 times compared to CK treatment. In the aspect of soil bacterial community structure, the dominant phyla of the two groups were *Acidobacteria*, *Proteobacteria*, *Chloroflexi*, and *Actinobacteria*. At the genus level, the absolute abundance of *Flavobacterium* and *Nitrososphaera* was significantly higher by 79.20 and 72.93%, respectively, while that of *Candidatus_Koribacter* was significantly lower with an amplitude of 62.24% in LP than in CK. Furthermore, the redundancy analysis (RDA) suggested that AK, which was highly associated with the dominant genera and phyla, is the vitally dominating environmental factors in LP groups, while in CK groups, it is AN and pH. In addition, PICRUSt2 analysis

REVIEWING

Sustainability - MDPI

(Scopus Q1 & WoS)

Paper title:

"Indonesia Rice Irrigation System: Time for Innovation"

Wayan WANGIYANA <w.wangiyana@unram.ac.id>

[Sustainability] Manuscript ID: sustainability-1894431 - Review Request Reminder

3 messages

Anastasija Milenkovic <anastasija.milenkovic@mdpi.com> Fri, Aug 19, 2022 at 3:11 PM
Reply-To: anastasija.milenkovic@mdpi.com
To: w.wangiyana@unram.ac.id
Cc: sustainability@mdpi.com, anastasija.milenkovic@mdpi.com

Dear Dr. Wangiyana,

On 17 August 2022 we invited you to review the following paper:

Type of manuscript: Review
Title: Indonesia Rice Irrigation System: Time for Innovation

You can find the abstract at the end of this message, and we would be grateful if you could let us know if you are available to provide a review. If you are unable to provide a review, we would appreciate it if you could decline our invitation. Please click on the following link to either accept or decline our request:

https://susy.mdpi.com/user/review/review/29614151/5P3SqH1A

Do not hesitate to contact us if you have any queries about this request. We look forward to hearing from you soon.

Kind regards,
Ms. Anastasija Milenkovic
Section Managing Editor
E-mail: anastasija.milenkovic@mdpi.com
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Sustainability Editorial Office

MDPI Branch Office, Belgrade
Bulevar Mihajla Pupina 115, 11070 Belgrade, Serbia
Tel: +381 11 74 55 363

Manuscript details:
Journal: Sustainability
Manuscript ID: sustainability-1894431
Type of manuscript: Review
Title: Indonesia Rice Irrigation System: Time for Innovation
Authors: Rose Tirtalistyani *, Murtiningrum Murtiningrum, Rameshwar S. Kanwar

Abstract: Indonesia is likely to face a water crisis due to water mismanagement, inefficient water systems, and weak institutions and regulatory organizations. Most of the fresh water in Indonesia is used for irrigation (74%) to support the agricultural sector, which occupies 30% of the total land area in Indonesia. Of all agricultural commodities, rice is one of the essential commodities as it is the basic staple food for almost every Indonesian. However, in 2018, the Ministry of Public Works and Housing (MoPWH) reported that 46% of Indonesian irrigation infrastructures are moderately to heavily damaged. Looking at how irrigation can be very crucial to the welfare of Indonesian population, this study conducted an extensive literature review of the historical, current, and future management of rice irrigation system in Indonesia. It has clearly shown that the irrigation systems in Indonesia have existed thousands of years ago and thus has a close

coupling relation between irrigation and socio-cultural life of Indonesian population. Aside from how climate change influences water quantity for irrigation, rice production with constant water ponding system has been found to contribute to climate change as it emits CH4 and other greenhouse gases from agricultural fields of Indonesia. Therefore, irrigation modernization in Indonesia is needed by considering several factors, such as food demands for increasing population and impact of irrigated agriculture on global warming. Multi stakeholders such as Government, farmers, water user associations (WUA), and local research institutions need to work together on modernization of irrigation systems in Indonesia to meet the food demand for the growing population and to minimize the impacts of agriculture on climate change.

Ir. Wayan Wangiyana, MSc(Hons), Ph.D. <w.wangiyana@unram.ac.id> Fri, Aug 19, 2022 at 8:39 PM
To: anastasija.milenkovic@mdpi.com

Dear Ms. Anastasija Milenkovic,

I really apologize for the late reply. If we can agree that the peer review process is a little bit delayed, I can help you review this paper. I am currently reviewing an article from the journal of soil science and plant nutrition with a deadline on 21st of August 2022. I will also have to review a revision form of an article from Journal of Applied Biology and Biotechnology.
So, I will be able to start reviewing this paper on 25th of August for 10 days. So I can accept this review invitation and do the peer review process for 10 days but from August 25, 2022. I cannot do the review process before August 25, 2022.
Please then send me my username, preferably using my email address or wwangiyana.
Thank you.

Best Regards,
Assoc. Prof. Wayan Wangiyana, Ph.D.
University of Mataram, Mataram, Lombok, Indonesia.
[Quoted text hidden]

Anastasija Milenkovic <anastasija.milenkovic@mdpi.com> Fri, Aug 19, 2022 at 10:39 PM
To: "Ir. Wayan Wangiyana, MSc(Hons), Ph.D." <w.wangiyana@unram.ac.id>
Cc: sustainability@mdpi.com

Dear Dr. Wangiyana,

Thank you very much for your kind reply.

Please note that I will be able to extend your due date by 4 September in our system when you accept our review request. Therefore, you may click on the following link for acceptance and then you will have the access to the manuscript and review report form:

https://susy.mdpi.com/user/review/review/29614151/5P3SqH1A

In case we receive enough review reports before the due date, I will contact you to check if you have started your evaluation.

If you have any questions, feel free to contact me. Thank you in advance!

Kind regards,
Anastasija Milenkovic
Section Managing Editor, MDPI Belgrade
E-mail: anastasija.milenkovic@mdpi.com

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[Quoted text hidden]

Indonesia Rice Irrigation System: Time for Innovation

Reviewer's Comments on the Manuscript

General comment: A well written paper. However, there are some expressions and data or figures need to be adjusted by using more relevant data.

In addition, for a review paper, the author(s) should be able to well organize and express their strong opinions based on the current facts and past published data as well as articles in scientific journals.

Suggestions for minimum standard revisions are as follows:

Line no.	Written	Reviewer's comments
Line 65	According to [14], ….	It should be: According to Azdan [14], ….
Line 81	[27] reported that …	It should be: Damayanti [27] reported that …
Line 88	can help to assure…	It should be: can help assure…
Line 109	...eleven million hectares of area in Indonesia are planted as paddy fields, and 63%... (Fig. 2)	If possible to find the data from each province in Indonesia or from remote-sensing (satelit) data, there have been a lot of reduction in the total area of irrigated land (paddy field) since 2000 due to changes in land use from paddy field into non-agricultural uses, such as settelements, airports, roads, offices, etc. This made rice growing area to shift from irrigated rice field to upland rice field (rainfed rice). Thus, Fig. 2 could change a lot with land-use change data.
Line 114	...irrigation systems to irrigation an additional…	It should be: ...irrigation systems to irrigate an additional…
Line 158-161		There should be a reference for that statement.
Line 166-170		There should be a reference for that statement.
Line 176-187		There should be a reference for that statement.
Line 184-190		There should be a reference for that statement.
Line 191-197		There should be a reference for that statement.
Line 218-219	...got its independence from the Dutch in 1945.	It should be: ...got its independence from Japan in 1945.
Line 223-227		There should be a reference for that statement.
Line 228-239		There should be a reference for that statement.
Line 245-251		There should be a reference for that statement.
Line 257-264		There should be a reference for that statement.
Line 265-275		There should be a reference for that statement. Decree No 53/2022 does not seem to regulate irrigation. More specific references about regulation of irrigation are needed.
Line286	Figure 3	Please make sure to use the data available on the internet; for example in 2010, the total area of rice harvested was 13,253,450 ha (https://bps.go.id/indicator/53/21/2/luas-panen.html); so the data point should be above the 12000. Please also make sure to do so for other figures.
Line 291	[13] reported a significant….	It should be: Panuju et al. [13] reported a significant….
Line 293-294	...of Indonesia, rice production has …	...of Indonesia, rice production has … (Fig.3). Please make sure that the left Y-axis is rice production. In Fig.3, it is rice productivity. When data of rice production (instead of rice productivity) are plotted in Fig.3, further discussion from Line 295 to Line 300 will change.

Line 296-297	...the irrigated area remains constant…	Please find more relevant references. In most cities in Indonesia, there have been huge land-use changes from irrigated paddy fields into non-agriculture uses, especially settlements, offices, new roads, and other infrastructures around the cities.
Line 314-315	….declined at the rate of 114.3 thousand hectares per year (Figure 3).	Please adjust Fig. 3 with published data such as (https://bps.go.id/indicator/53/21/2/luas-panen.html), then the statement in the line 314-315 will change accordingly. In addition, the total area of the irrigated paddy fields should no be constant from 2005 to 2020. There have been huge changes in land uses from irrigated paddy fields into non-agriculture uses, especially settlements and other infrastructures especially around the cities in Indonesia.
Line 316	...increasing rapidly, with a rate of 3.16 million people per year…	This has made a huge change in land uses, especially from irrigated paddy fields into other uses, especially settlements around the cities.
Line 318-319	This increment is faster than the increase of rice yield with a rate of only 0.05 tonnes per hectare per year	The correct term of this is "rice productivity" (not rice yield), BUT this type of data does not in line with population. It should be rice production per year. Therefore, type of data plotted in Fig. 4 should be rice production not rice yield. So, Fig.4 should be revised.
Line 325-327	… rice output…	It should be: … rice production… After Fig.4 changed using rice production each year (million tonnes instead of tonnes/ha), then the discussion in Line 325-327 will need to be revised accordingly.
Line 329	Figure 4	The correct term for tonnes/ha is productivity (not yield). However, in order to better predict rice production sufficiency in the left Y-axis has to be total rice production in each year in tons (not rice productivity like in Fig. 4). For example, rice production in 2020 was 54,649,202.24 tons (https://bps.go.id/indicator/53/1498/1/luas-panen-produksi-dan-produktivitas-padi-menurut-provinsi.html).
Line 333	4.2 The threat of climate change to rice production and irrigation system in Indonesia	Looking at the contents of this subtitle (4.2) from Line 334 to Line 338, including Fig. 5, plus Line 394 to Line 402, a suitable subtitle in 4.2 should be *4.2. The threat of irrigated rice production to climate*
Line 372	Figure 5.	The type of this figure should be "Line on two axes" because of the huge difference of CH4 emission between rice cultivation and manure management as well as crop residue, which makes these two lines almost undistinguishable (looks like very close to zero).
Line 372	Figure 5… CH4 emission (in kilotonnes)	Is the unit kilotonnes per year or per ha. Since there are huge differences between rice production and others such as crop residue and manure management then the data should be plotted on two axes of different scales so that all plotted lines are clearly plotted like in Fig. 4.
Line 376	[72] reported that….	It should be: Akiyama et al. [72] reported that….
Line 384-393		This paragraph plus Fig.6 are more suitable to be given a subtitle *4.3. The threat of climate change to rice production and irrigation system in Indonesia* . In addition, under this subtitle, more discussion also need to added, especially discussion about the prediction on the scarcity of irrigation water in the future so that the authors then introduce inovations to adapt rice production technologies that enable Indonesia to increase rice production to be able to cope with the increase in population growth.
Line 398	[77] discovered…	It should be: Yamane and Sato [77] discovered…

Line 413-415		It would be better if some other factors are incorporated into this sentence to make sense why Indonesia has been struggling in achieving self-sufficiency are significant increase in population followed by significant decrease in total area of irrigated lands, etc., since the time when self-sufficiency was achieved. Then it becomes clearly understood why INNOVATIONS are needed.
Line 426	...(e) sub-optimal land use through …	It should be: ...(e) use of sub-optimal lands through … "sub-optimal land use" could mean "type of land use that is still sub-optimal"?
Line 442	to contribute significantly to adaption	Shouldn't it be "adoption" instead of "adaption"?
Line 450	…reduce ponding time…	It should be: …reduce ponding duration…
Line 450-451	...save water and methane emissions	This statement needs some references.
Line 454	According to [81],…	It should be: According to Sass et al. [81],…
Line 457	…less flooding time…	It should be: …less flooding duration…
Line 456-458	… runs off, or evaporates	This statement needs some references.
		In relation to "saving irrigation water" in this paragraph, the authors can add some on-farm irrigation management technologies or techniques of growing rice (in the irrigated areas) that use less amount of irrigation water (could save water and reduce CH4 emission). This is to show the readers that "innovations" are really needed. One of the examples is "growing rice on raised-beds under aerobic irrigation systems". Using this technique of growing rice in irrigated lands, irrigation can be done once a week and rice can be intercropped in additive series with legume crops to improve rice yield and soil fertility. Using this technique, soil is not flooded, not puddled and unsaturated with water, so that rice can be relay-planted with legume crops such as groundnut, soybean or mungbean; and it was found that this technique significantly increased rice yield compared with growing rice under flooded conditions. There are some publications of the research that can be cited, such as: *Plant and Soil* 263: 17–27, 2004;
		https://doi.org/10.9755/ejfa.2021.v33.i3.2661
		https://dx.doi.org/10.1088/1755-1315/637/1/012087
		https://doi.org/10.1088/1742-6596/1869/1/012011
		Also, SRI technique of growing rice, such as: *Intl J Agric Sustainability* 1(1): 38-50
Line 472	[82] reported that….	It should be: Qureshi et al. [82] reported that….
Line 490	[87] reported that …	It should be: Wang et al. [87] reported that …
Line 507	...rice as a water plant.	It should be: ...rice as an aquatic plant.
Line 510	According to [93] successful…	According to Arif et al. [93] successful…
Line 545	Conclusions	The content of the Conclusions will also need to be changed after some details and discussion are changed. The authors' opinions need to be expressed very strongly why innovations are needed, but all opinions have to supported by the current facts and pas references. These all need also to be expressed in the Abstract.

10 September 2022.

Wayan WANGIYANA <w.wangiyana@unram.ac.id>

[Sustainability] Manuscript ID: sustainability-1894431 - Acknowledgement - Review Received

2 messages

sustainability@mdpi.com <sustainability@mdpi.com> Sun, Sep 11, 2022 at 1:58 AM
Reply-To: Anastasija Milenkovic <anastasija.milenkovic@mdpi.com>, Sustainability Editorial Office <sustainability@mdpi.com>
To: Wayan Wangiyana <w.wangiyana@unram.ac.id>
Cc: Sustainability Editorial Office <sustainability@mdpi.com>, Anastasija Milenkovic <anastasija.milenkovic@mdpi.com>

Dear Dr. Wangiyana,

A short note to thank you very much for your review of the following manuscript:

Manuscript ID: sustainability-1894431
Title: Indonesia Rice Irrigation System: Time for Innovation
Authors: Rose Tirtalistyani *, Murtiningrum Murtiningrum, Rameshwar S. Kanwar

To help us improve our services, we kindly ask you to fill in our online survey on the peer-review process at
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We also invite you to contribute to Encyclopedia (https://encyclopedia.pub), a scholarly platform providing accurate information about the latest research results. You can adapt parts of your paper to provide valuable reference information for others in the field.

Kind regards,
Ms. Anastasija Milenkovic
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E-mail: anastasija.milenkovic@mdpi.com
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Tel: +381 11 74 55 363

Ir. Wayan Wangiyana, MSc(Hons), Ph.D. <w.wangiyana@unram.ac.id> Sun, Sep 11, 2022 at 2:24 AM
To: reviews@webofscience.com

Dear Team Web of Science,

As you can see above, I have just completed a peer review of a manuscript submitted to Sustainability. Could you please certify if this peer review can be included in my Web of Science profile.

Thank you very much.

Best Regards,
Wayan
[Quoted text hidden]

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Indonesia Rice Irrigation System: Time for Innovation

by
Rose Tirtalistyani (https://sciprofiles.com/profile/author/QjcydU1WNCtLSDdRWk9YcnF1RWdNS3k2ZU9MT2NtOWg3TFVtV0JYVmNoQT0=) [1,2,*] (mailto:please_login),
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Rameshwar S. Kanwar (https://sciprofiles.com/profile/180630) [1]

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Academic Editor: Jan Hopmans

Sustainability **2022**, *14*(19), 12477; https://doi.org/10.3390/su141912477 (https://doi.org/10.3390/su141912477)

Received: 16 August 2022 / Revised: 24 September 2022 / Accepted: 26 September 2022 / Published: 30 September 2022

Abstract

Indonesia is likely to face a water crisis due to mismanagement of water resources, inefficient water systems, and weak institutions and regulatory organizations. In 2020, most of the fresh water in Indonesia was used for irrigation (74%) to support the agricultural sector, which occupies 30% of the total land area in Indonesia. Of all agricultural commodities, rice is one of the major and essential commodities, as it is the basic staple food for almost every Indonesian. However, in 2018, the Ministry of Public Works and Housing (MoPWH) reported that 46% of Indonesian irrigation infrastructure is moderately to heavily damaged. Looking at how irrigation can be very crucial to the welfare of Indonesian population, this study conducted an extensive literature review of the historical, current, and future management of irrigated rice production systems in Indonesia. This study has clearly shown that the irrigation systems in Indonesia have existed for thousands of years and, thus, there is a close relationship between irrigation and the socio-cultural life of the Indonesian population. Aside from how climate change influences water availability for irrigation, rice production with a constant water ponding system has been found to contribute to climate change, as it emits methane (CH_4) and other greenhouse gases from agricultural fields of Indonesia. Therefore, the required modernization of irrigation systems in Indonesia needs to consider several factors, such as food demands for the increasing

population and the impact of irrigated agriculture on global warming. Multi-stakeholders, such as the government, farmers, water user associations (WUA), and local research institutions, need to work together on the modernization of irrigation systems in Indonesia to meet the increasing food demands of the growing population and to minimize the impacts of agriculture on climate change. **View Full-Text (/2071-1050/14/19/12477/htm)**

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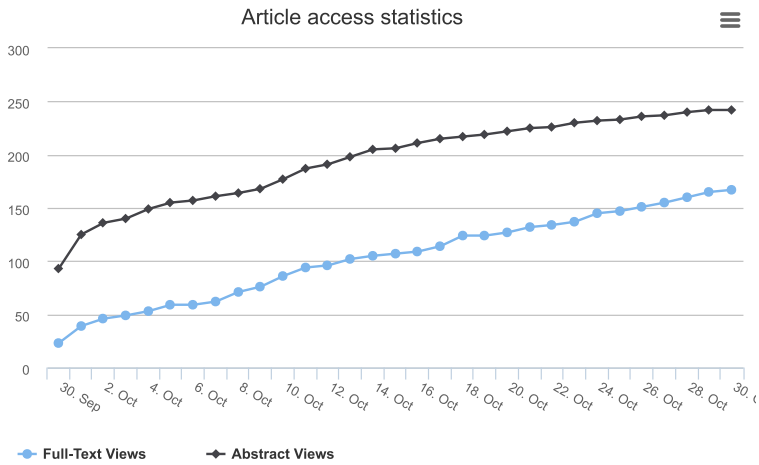

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Review

Indonesia Rice Irrigation System: Time for Innovation

Rose Tirtalistyani [1,2,*], Murtiningrum Murtiningrum [2] and Rameshwar S. Kanwar [1]

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[2] Department of Agricultural and Biosystems Engineering, Faculty of Agricultural Technology, Universitas Gadjah Mada, Yogyakarta 55281, Indonesia
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Abstract: Indonesia is likely to face a water crisis due to mismanagement of water resources, inefficient water systems, and weak institutions and regulatory organizations. In 2020, most of the fresh water in Indonesia was used for irrigation (74%) to support the agricultural sector, which occupies 30% of the total land area in Indonesia. Of all agricultural commodities, rice is one of the major and essential commodities, as it is the basic staple food for almost every Indonesian. However, in 2018, the Ministry of Public Works and Housing (MoPWH) reported that 46% of Indonesian irrigation infrastructure is moderately to heavily damaged. Looking at how irrigation can be very crucial to the welfare of Indonesian population, this study conducted an extensive literature review of the historical, current, and future management of irrigated rice production systems in Indonesia. This study has clearly shown that the irrigation systems in Indonesia have existed for thousands of years and, thus, there is a close relationship between irrigation and the socio-cultural life of the Indonesian population. Aside from how climate change influences water availability for irrigation, rice production with a constant water ponding system has been found to contribute to climate change, as it emits methane (CH_4) and other greenhouse gases from agricultural fields of Indonesia. Therefore, the required modernization of irrigation systems in Indonesia needs to consider several factors, such as food demands for the increasing population and the impact of irrigated agriculture on global warming. Multi-stakeholders, such as the government, farmers, water user associations (WUA), and local research institutions, need to work together on the modernization of irrigation systems in Indonesia to meet the increasing food demands of the growing population and to minimize the impacts of agriculture on climate change.

Keywords: Indonesian irrigation systems; rice production; food security; greenhouse gas emissions

Citation: Tirtalistyani, R.; Murtiningrum, M.; Kanwar, R.S. Indonesia Rice Irrigation System: Time for Innovation. *Sustainability* **2022**, *14*, 12477. https://doi.org/10.3390/su141912477

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1. Introduction

Water has always been an important source for any society to survive on this planet, and it is also vital for the survival of animals and plants. In recent years, water has become a precious source for food and energy production. At the same time, readily available water for agriculture and energy has become more and more scarce. The threat of a water crisis for drinking and sanitation has been long known as a global sustainability problem, and, thus, each of us needs to use and manage water mindfully and sustainably. Despite being one of the ten water-rich countries in the world, Indonesia is not exempted from these threats [1]. Indonesia is likely to face a water crisis due to water mismanagement, as evidenced by high levels of water pollution, inefficient water usage, and weak institutions and regulatory systems [2,3].

Based on the Food and Agricultural Organization (FAO) data, Indonesia was responsible for up to 8.4% of the total world's water usage in 2019 [4]. Out of the total water usage, agriculture is one of the most essential and important sectors, and consumes most of the available fresh water in Indonesia. In 2020, fresh water in Indonesia was mostly allocated for irrigation (74%), with the rest going to household, urban, and industrial uses

REVIEWING

Chiang Mai Journal of Science

(Scopus Q4 & WoS)

Paper title:

"Community Structure of Arbuscular Mycorrhizal Fungi in

Different Rice Cultivation Systems"

Wayan WANGIYANA <w.wangiyana@unram.ac.id>

Thank you for agreeing to review

1 message

Chiang Mai Journal of Science <em@editorialmanager.com> Fri, Dec 17, 2021 at 12:49 AM
Reply-To: Chiang Mai Journal of Science <cmjs@cmu.ac.th>
To: Wayan Wangiyana <w.wangiyana@unram.ac.id>

Dear Wangiyana,

Thank you for agreeing to review manuscript CMJS-D-21-00258 for Chiang Mai Journal of Science.

I would be grateful if you would review a paper entitled "Community Structure of Arbuscular Mycorrhizal Fungi in Different Rice Cultivation Systems" for this journal.

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Pongrawee Nimnoi, Ph.D.
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Community Structure of Arbuscular Mycorrhizal Fungi in Different Rice Cultivation Systems

General comments: A good article, but to make it easy for the readers to understand, the sentences and paragraph structure need to be better written based on a standard English sentences and paragraphs. In many sentences, the author(s) express a sentence that should be an active sentence as a passive sentence, which will confuse or mislead readers with no sufficient knowledge about mycorrhiza (AMF). Those sentences have to be fixed.

Suggestions for minimum standard revisions are as follows:

Line no.	Written	Reviewer's comments
Line 5	…fungi (AMF), play a…	should be without comma (,) separating subject & its verb
Line 7	…and that may…	omit: and
Line 13	…agriculture. Therefore, ..	Before the word "Therefore," there should be a sentence explaining the relation of AMF to rice production and food security.
Line 14	that indigenous….presence…	should be: that may make indigenous AMF present …
Line 14	….are needed	should be: needs
Line 15	….fungal -root	should be: fungus-root
Line 19	…belongs to…	should be: which belongs to…
Line 19	… Rice is	should be: Rice was
Line 20	derived…	should be: developed…
Line 27	…were proved…	should be: have proven…
Line 30	…enhance the…	should be: enhancement of plant…
Line 31	…are possitively	omit: are
Line 32	inluence on…	omit: on
Line 42	…Because…	These two sentences must be written as one cause & effect sentence (Line 42 is a dependent clause).
Line 43	…Then the…	
Line 45	This review…	These two sentences must be rewritten appropriately into one good sentence that should strongly express the objective of the author(s) in writing this
Line 46	With that…	
Line 47	Before going to…	These two sentences must be rewritten into one cause & effect sentence in an appropriate meaning.
Line 49	Because…..	
Line 69	, were…	omit them
Line 80	…was updated lastly..	should be: was last updated…
Line 85	…of AMF…	should be: Arbuscuar Mycorrhiza (not the fungi but the association)
Line 89	…is beginning…	shoud be: begins or starts
Line 95	Identification of…	the correct word: Recognition of…
Line 97	AMF spore germination….	This sentence has to be re-written because root exudate is not the only stimuli of spore germination; AMF spore can germinate without the presence of root exudates.
Line 98	36 hours after the inoculation…	The word inoculation is not the correct term in this context. Inoculation is a process of depositing AMF inoculum or biofertilizer (can be spores & colonized root fragments) and inoculation process does not necessary make a direct contact between roots and AMF inoculum. It may not be 36 hours.
Line 99	…does not induce…	This sentence has to be re-written because non-host will induce plant defence (see Mycorrhizal Symbiosis by Smith & Read, 2008), or the entire paragraph needs to be modified appropriately.
Line 101	After, those fungi….	This sentence cannot be independent; it must be combined with an independent sentence to make a meaningfull expression.
Line 110	…fertility. Mainly AMF regulates...	AMF is a plural word; please combine and re-write these two sentences.
Line 111	…root colonized…	should be: root is colonized…
Line 111	…AMF, that facilitate…	should be: …AMF, they facilitate…
Line 112	Mycelium of AMF…	This sentence should combined with the preceding sentence to form a meningfull cause & effect sentence
Line 118	With that…	shoud be: Therefore…
Line 118	…, soil can be enhanced…	should be: …, soil properties can be improved…
Line 124	…and make te resistance…	should be: …which improves the resistance of soil to erosion.
Line 125	….Arbuscular	These four lines have to re-written to compose a miningfull sentence. In line 126:…fungi that is colonized in… should be: fungi that colonize… very thin hyphae… should be: very thin extraradical hyphae… Please re-write line 127
Line 126	mycorrhizal….	
Line 127	plant root…	

Line 128	accumulation…	& 128 to make a meaningfull sentence about AMF. Otherwise, the meaning is not clear. Please also provides them with relevant reference(s).
Line 129	Line 129 to line 139	These lines of paragraph contain two different topics; should be separated into two paragraphs, and relate them with appropriate linking sentences and with the previous paragraph. Please also provides them with relevant reference(s).
Line 136	Now a day,…	Normally: Nowadays, ….
Line 137	…the plant. With that…	Please connect these two unstructured sentences with a correct word to make one correct and meaningfull sentence, and provide it with relevant reference(s).
Line 139	of root pathogen…	should be: of root by the pathogen…
Line 144	...morphology. between…	should be: …...morphology. Between…
Line 151	Molecular….	These two sentence have to be combined appropriately to compose a meaningfull cause & effect sentence
Line 152	organisms. Because…	
Line 162	have picked…	should be: can be picked …
Line 162	...(1992), improved…	should be: ...(1992) improved this technique using….
Line 173	…(2010), tested that how…	should be: …(2010) examined how…
Line 174	…rates. Here AMF…	should be: …rates, in which AMF…
Line 184	…comparison. To identification..	should be:…comparison. For identification….
Line 185	…25 sites, Korea…	should be:…25 sites in Korea…
Line 190	Line 190 - 203	Please provide this paragraph or its sentences with relevant reference(s).
Line 211	In Single-Strand…	These two sentences should be combined into one paragraph with the previous one.
Line 215	…can use as…	should be:…can be used as…
Line 230	…and water is influence by…	Please re-write this sentence to make a meaningfull sentence, because this sentence does not make sense about AMF and physiological processes. What the author(s) trying to say does not clear.
Line 231	…it colonizes with root…	shoud be:…they colonize rice root…
Line 234	…an important component…	should be:…important components…
Line 235	When the presence of…	Maybe: In the presence of…
Line 244	…that how the water regime was…	omit "that" & omit "was"
Line 264	…used abundantly than…	should be:…used more frequently than…
Line 264	But now a day, ….	should be: Nowadays, …..
Line 265	…studies showed that…	should be: …studies showing that…
Line 266	…dynamics of…	should be: …structure of…
Line 266	…differed when changing…	should be: …varied between…
Line 272	…soil concerning…	should be: …soil of…
Line 273	…AMF was	should be: …AMF were
Line 278	…studied region, …	should be:…studied regions, …
Line 283	…arid fields; three…	should be: arid fields showed that three…
Line 288	….polluted soil [2].	These two sentences must be combined to make a meaningfull cause & effect sentence. Please also provide line 289 with relevant reference(s).
Line 289	Because…..	
Line 289	But how it…	should be: However, how it…
Line 292	…a different cultivar of…	should be:…different cultivars of…
Line 304	…deal with three rice verities….	should be: …dealt with three rice varieties…
Line 307	…varieties investigated…	should be: …varieties indicated…
Line 308	…density is recorded…	shoud be:…density was recorded…
Line 309	…genus is ….	should be: …genus was…
Line 312	…AMF with…	should be: …AMF in…
Line 315	…output boosting material...	it's better:…yield boosting materials...
Line 316	…its absorption form…	should be: …its available forms….
Line 328	…monocropping farming system…	should be: …monocropping system…
Line 330	buildup the population…	should be: building up the population…
Line 330	…of AMF. Besause…	These two sentences have to be combined to make one meaningfull cause & effect sentence. The last sentence is an independent clause, not a sentence.

Line 337	…in India. But it…	These two sentences have to be combined to make one meaningfull cause & effect sentence. The second sentence is an independent clause, not a sentence.
Line 338	…was added.	should be: was applied.
Line 339	arbuscules development. And also..	should be: development of arbuscules, and they concluded…
Line 339	…fungicides were suppressed…	should be: fungicides suppressed…
Line 341	…length of root infection…	should be:…length of root colonization… (infection is normally infection sites)
Line 342	Usage of fertilizer only with….	This sentence does not have a clear meaning on what the author(s) is(are) trying to emphasize. Please explain further, and provide it with relevant reference(s).
Line 343	Then yield can be increased…	This sentence does not have a clear meaning on what the author(s) is(are) trying to emphasize, and what is the relation between this sentence and the previous ones in the paragraph. Please explain further, and provide it with relevant reference(s).
Line 344	…reported that AMF…	This sentence is incomplete, because it does not contain what is being reported
Line 345	The highest colonization…	Maybe it's better this sentence is combined with the preceding one to make a clear meaning.
Line 346	With that	Two sentences in these three lines need to be re-writted to make one clear meaningful sentence, which can express what the author(s) is (are) trying to emphazise in comparing between conventional and SRI rice systems.
Line 347	higher P….	
Line 348	community diversity…	
Line 358	AMF was effectively colonized in…	should be: AMF effectivey colonized roots during….
Line 359	Because rice plant has a role in…	This sentence does not have clear meaning. Should it be "rice plant" or "rice root"???
Line 363	…to form the higher colonization with…	Maybe better: …to increase colonization of…
Line 366	…colonization was increased…	omit: "was"
Line 367	and reach a maximum…	should be: and reached a maximum…
Line 367	…colonization was declined…	omit: "was"
Line 368	…it comes to…	should be: …it came to…
Line 369	…formation was increased…	omit: "was"
Line 369	…decreased up to…	omit: "up"
Line 370	…plant (42nd)…	should be: …plant growth (42nd)…
Line 375	…stages. In between these two stages,…	should be: …stages, and the ripening stage….
Line 378	…stages. But at the maturation stage…	should be: …stages, but at the maturity stage….
Line 379	But again, with the harvesting stage,…	should be: In the harvesting stage,…
Line 381	…sp is dominant…	should be: …sp was dominant…
Line 386	security of rice…	should be: security for rice production…
Line 387	…makes symbiosis relationship…	shoud be: …develop a symbiosis…
Line 388	…from AMF. Because AMF…	These two sentences have to be combined to make one cause & effect sentence.
Line 389	…where plant roots can't reach…	should be: …which cannot be reached by plant roots…
Line 392	…the saprophytic nature of AMF helps..	Please omit this sentence, because AMF do not have a saprophytic ability of life like saprophytes. That's why AMF cannot be proliferated using synthetic media like Fusarium sp for example. To complete their life cycle including producing viable spores, AMF have to infect living host roots and established a symbiosis. That's why AMF are considered as physiological obligaat symbionts, not saprophytes. Please read: C. Azcón-Aguilar, B. Bago & J.M. Barea (1999) in Mycorrhiza, pp. 391-408. DOI: 10.1007/978-3-662-03779-9_16. The reference #23 cited in this article stating "the saprophytic nature of AMF" was based only on two papers (Hepper & Warner 1983; Warner 1984) so old paper written by one author, who had not proven the saprophytic living ability of AMF. Maybe only Glomus mossae can interact with saprophytic microbes to live on organic matter, but still to complete their life cycle including producing viable spores, Glomus mossae also has to infect living host roots.

		In the dead host roots previously colonized by AMF that produce vesicles in fact AMF can be still alive even they have been store for 50 years in the soil as long as it dry, and when in contact with living host roots, the hyphae and vesicles in the dead root fragments can infect the living host roots, BUT without infecting living host roots they cannot complete their life cycle including producing viable spores. They cannot complete their life cycle in the dead root fragments without establishing symbiosis with living host roots.
Line 397	…(2019), has tested…	should be better: …(2019) have examined….(without separating comma)
Line 397	…colonization was an effect…	should be: …colonization had an effect…
Line 399	were given possitive….	should be: showed possitive…
Line 400	that mainly plants received….	This sentence has to be fixed, because photosynthetically fixed C cannot be supplied by AMF from the soil….. The fact is that AMF infect host roots to get photosynthetically fixed C from the living hosts.
Line 401	…micro-nutrition….	The correct word: micro-nutrient…
Line 402	Arbuscular	This sentences have to be combined and re-written to make one meaningfull sentence accoring to the context.
Line 403	mycorrhizal….	
Line 404	access to…	
Line 405	yield [55]	
Line 406	…Glomus intraradius…	Please check the spelling.
Line 408	…of AMF. And also that…	These two sentences have to be re-written to make one meaningfull sentence. You cannot start a sentence with And…
Line 410	By increasing…..	These two sentences are contradictive; please make sure which one is the correct one, and please provide with relevant reference(s).
Line 411	loss of rice….	
Line 411	…colonization. Because…	This sentence has to be combined with the preceding one(s) to make sense
Line 414	showed higher P…	missing subject; maybe: it showed higher P…..
Line 420	grain number….	Suggestion: grain number [57]. In addition to increased grain yield, application of mycorrhiza biofertilizer also increased anthocyanin content in the red rice grains, especially under intercropping with soybean [58], [59]. Aplication of mycorrhiza biofertilizer also increased yield of black rice grown on raised-beds under aerobic irrigation system [60]
		[58] Wangiyana W., Aryana I.G.P.M., Dulur N.W.D. 2021. J. Phys.: Conf. Ser., 1869, 012011. https://doi.org/10.1088/1742-6596/1869/1/012011
		[59] Wangiyana W., Aryana I.G.P.M., Dulur N.W.D. 2021 IOP Conf. Ser.: Earth Environ. Sci., 637 012087. https://dx.doi.org/10.1088/1755-1315/637/1/012087
		[60] Wangiyana W., Farida N., Aryana I.G.P.M. 2021. IOP Conf. Ser.: Earth Environ. Sci., 913, 012005. https://doi.org/10.1088/1755-1315/913/1/012005
Line 438	Microbes Environ., 2014…	Has to be: Microbes Environ., 2013; 28(3): 316–324.
Line 479	…Soil Microbiology…	has to be: …Soil Microbiology: Recent Trends and Future Prospects, Microorganisms for Sustainability 4

Wayan WANGIYANA <w.wangiyana@unram.ac.id>

Thank you for the review of CMJS-D-21-00258

2 messages

Chiang Mai Journal of Science <em@editorialmanager.com> Sun, Jan 16, 2022 at 6:41 PM
Reply-To: Chiang Mai Journal of Science <cmjs@cmu.ac.th>
To: Wayan Wangiyana <w.wangiyana@unram.ac.id>

Ref.: Ms. No. CMJS-D-21-00258
Community Structure of Arbuscular Mycorrhizal Fungi in Different Rice Cultivation Systems
Chiang Mai Journal of Science

Dear Wangiyana,

Thank You for your review of this manuscript.

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Kind regards,

Pongrawee Nimnoi, Ph.D.
Editor
Chiang Mai Journal of Science

Ir. Wayan Wangiyana, MSc(Hons), Ph.D. <w.wangiyana@unram.ac.id> Sun, Jan 16, 2022 at 10:20 PM
To: reviews@publons.com, "Dr.Ir. Wayan Wangiyana MSc(Hons)." <wy.wyana@gmail.com>

Dear Publons Team,

I have just finished reviewing an article submitted to the Chiang Mai Journal of Science (Ms. No. CMJS-D-21-00258). Could you please verify the review and add it to my Publons profile when verified.

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https://gmsmushrooms.org/: A comprehensive Online Database of Mushrooms in the Greater Mekong Sub Region (journal-detail.php?id=11622)
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Chiang Mai J. Sci. 2022; 49(3): 598-607.
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Review Article

Arbuscular Mycorrhizal Fungi Community Dynamics and Functioning in Different Rice Cultivation Systems

Ruwanthika Kalamulla [a], Samantha C. Karunarathna [b], Jaturong Kumla [c] and Neelamanie Yapa*[a]

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ABSTRACT

As a main component of soil microbiota arbuscular mycorrhizal fungi (AMF) play a beneficial role in the agro-ecosystems. Introduction of AMF inoculum as a biofertilizer to the rice cultivation system is one of the environmentally healthy solutions that may increase crop productivity and yield, when compare to the non-AMF relationships. Within an ecosystem, both biotic and abiotic factors affect the diversity, distribution, and ecological role of AMF. Here we reviewed the effect of the variables including production area, environmental conditions, agricultural management systems, rice varieties, and different growth stages of the host on dynamics and structure of the AMF community mainly in the rice fields. Understanding of this co-relation is required to explore their future enrolment in agriculture. To ensure food security, identification of all variables that may make indigenous AMF presence and active in different rice growing systems needs to be done in order to explore this specific fungus-root interaction.

Keyword: rice, arbuscular mycorrhizal fungi, biofertilizer, soil inoculums

1. INTRODUCTION

Rice (*Oryza sativa* L.) which belongs to the Family Poaceae is the main staple food crop in Asia [1,2]. Rice was developed from a semi-aquatic ancestor with unique characteristics in its root anatomy and physiology. Globally, more than 75% of rice is produced from lowland under submerged conditions, and the rest is from upland under non-submerged conditions [3]. Most of the terrestrial plants in the world, including crop plants also form symbiotic relationships with soil microorganisms especially with arbuscular mycorrhizal fungi (AMF) [1]. Arbuscular mycorrhizal fungi belong to the separate Phylum; Glomeromycota forms a mutualistic symbiotic association with more than 90% of the world plants [4]. AMF are aerobes and researchers have shown that AMF colonization in rice under waterlogged conditions is absent or very rare. However, new findings have proved that they can survive under waterlogged (anoxic) conditions with rice roots and make a beneficial role in plant growth and development [1]. Improvement of phosphorus (P) and nitrogen (N) uptake to plant [5], formation of soil aggregates, enhancement of plant the tolerance to pathogen and abiotic

REVIEWING

Biodiversitas Journal of Biological Diversity

(Scopus Q3)

Paper title:

"Biological Control of *Sclerotinia minor* Attack on Pyrethrum Plants by *Trichoderma harzianum* in Glasshouse Scale Experiments"

Wayan WANGIYANA <w.wangiyana@unram.ac.id>

[biodiv] Article Review Request

2 messages

Ayu Astuti <smujo.id@gmail.com> Mon, Apr 25, 2022 at 9:36 PM
To: Wayan Wangiyana <w.wangiyana@unram.ac.id>

Wayan Wangiyana:

This regards the manuscript "Biological control of Sclerotinia minor attack on pyrethrum plants by Trichoderma harzianum in glasshouse scale experiments ," which is under consideration by Biodiversitas Journal of Biological Diversity.

Following the review of the previous version of the manuscript, the authors have now submitted a revised version of their paper. We would appreciate it if you could help evaluate it.

Please log into the journal web site by 2022-05-16 to indicate whether you will undertake the review or not, as well as to access the submission and to record your review and recommendation. The web site is https://smujo.id/biodiv

The review itself is due 2022-05-23.

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Submission URL: https://smujo.id/biodiv/reviewer/submission?submissionId=11012

Thank you for considering this request.

Ayu Astuti
sectioneditor6@smujo.id

"Biological control of Sclerotinia minor attack on pyrethrum plants by Trichoderma harzianum in glasshouse scale experiments "

Abstract. Due to many drawbacks of chemical-based fungicide application to control *Sclerotinia minor* infection in various plants, development of novel alternative methods, including biocontrol approach, to control such pathogen is urgently needed. The main aim of this research was to elucidate the efficacy of *Trichoderma harzianum* (isolate Td_{22}) previously grown in the ratio of 2:8 millet seeds and wood fibre waste (WFW) compost mixture to suppress *S. minor* infection in pot trails on pyrethrum plants (in 0.5 L pots). The pots were filled with soil and mixed with Td_{22}-grown WFW compost to obtain concentration of 5% v/v. The millet seed-grown *S. minor* amounted at 2.0 g per pot was then evenly inoculated at 2 cm below the surface of potting mix. Soil without compost amendment, amended with pathogen only, or without pathogen inoculation served as controls. Pre-incubation of pots was conducted for 4 days in a shade house prior to sowing (4 seedlings per pot) of pyrethrum seedlings (aged of 3 weeks). Eight replications per treatment were run in this experiment and all pots were destructively sampled at week 8 for dry weight measurement. The results showed that high protection on the pyrethrum plants were indicated in this study at week 7, where 100% survival of plants were observed in pots amended with both *S. minor* and 5% v/v compost-grown Td_{22}, while 78% mortality was found in pots amended with pathogen only. Each survived plant sown in pots amended with Td_{22} or those planted in pots in the presence of both Td_{22} and *S. minor* had significantly higher average dry weight ($p<0.05$) when compared to those planted in the *S. minor* control treatment, indicating that Td_{22} has potential to be developed as a novel fungal antagonist as well as a plant growth promoting agent.

Biodiversitas Journal of Biological Diversity

Ir. Wayan Wangiyana, MSc(Hons), Ph.D. <w.wangiyana@unram.ac.id> Wed, May 25, 2022 at 8:12 PM
To: Ayu Astuti <smujo.id@gmail.com>

Dear Editor of Biodiversitas,

I have to apologize that I thought that the due date for reviewing the article "Biological control of Sclerotinia minor attack on pyrethrum plants by Trichoderma harzianum in glasshouse scale experiments" was on 26 May 2022. I have just finished the review process on the printed manuscript; now I will finish the review on the manuscript file, and upload it or send it to you tonight or tomorrow morning.

Again, I am sorry for the misunderstanding. I was unable to review the manuscript before our international conference finished (19-21 May 2021), because I had to prepare 3 full papers since preparing the abstract from the beginning of May 2022.

I will send my review result as soon as possible.

Best Regards,
Wayan Wangiyana, Ph.D.
University of Mataram
[Quoted text hidden]

Biological control of *Sclerotinia minor* attack on pyrethrum plants by *Trichoderma harzianum* in glasshouse scale experiments

Abstract. Due to many drawbacks of chemical-based fungicide application to control *Sclerotinia minor* infection in various plants, development of novel alternative methods, including biocontrol approach, to control such pathogen is urgently needed. The main aim of this research was to elucidate the efficacy of *Trichoderma harzianum* (isolate Td_{22}) previously grown in the mixture of millet seeds and wood fibre waste (WFW) compost of 2:8 ratio to suppress *S. minor* infection on pyrethrum plants in pot trials (in 0.5 L pots). The pots were filled with soil and mixed with Td_{22}-grown WFW compost to obtain concentration of 5% v/v. The millet seed-grown *S. minor* amounted at 2.0 g per pot was then evenly inoculated at 2 cm below the surface of potting mix. Soil without compost amendment, amended with pathogen only, or without pathogen inoculation served as controls. Pre-incubation of pots was conducted for 4 days in a shade house prior to sowing (4 seedlings per pot) of pyrethrum seedlings (aged of 3 weeks). Eight replications per treatment were run in this experiment and all pots were destructively sampled at week 8 for dry weight measurement. The results showed that high protection on the pyrethrum plants was indicated in this study at week 7, where 100% survival of plants was observed in pots amended with both *S. minor* and 5% v/v compost-grown Td_{22}, while 78% mortality was found in pots amended with pathogen only. Each survived plant sown in pots amended with Td_{22} or those planted in pots in the presence of both Td_{22} and *S. minor* had significantly higher average dry weight ($p<0.05$) when compared to those planted in the *S. minor* control treatment, indicating that Td_{22} has potential to be developed as a novel fungal antagonist as well as a plant growth promoting agent.

Keywords: Biocontrol, compost, millet seeds, *Sclerotinia minor*, *Trichoderma harzianum.*

Running text: Biological control of *Sclerotinia minor*

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INTRODUCTION

Sclerotinia minor infection on various plants, such as lettuces, cabbages, and pyrethrum plants has been commonly found in countries with cool and moist climate (Tozlu et al., 2016). Sclerotinia rot symptoms, for example, has been reported by Hahm et al. (2017) to consistently attack basil plants in Korea. In Australia (Tasmania in particular), *S. minor* has also been reported to infect pyrethrum plant and causes significant annually profit loss in this country (Macdonald, 1995). Such infection on the same plant species was also reported in Kenya by Natrass (1950). Plants infected by *S. minor* will commonly show typical symptoms, such as brownish spot on leaf and stem, and then advancing margins, wilting the whole plant and blighting, then they eventually died. In the last three decades, such fungal pathogen has been controlled by applying chemical-base fungicides (Tyagi et al. 2020). Due to many drawbacks caused by such chemical-base fungicides to our environment, their use in agricultural sectors has been reduced significantly worldwide in the last 3 decades, especially in developed countries. To avoid excessive application of chemical-based fungicides, attention has recently been focussed on development of biological control approach, in which cost competitiveness becomes important.

Some limitations on the application of biological control in large scale agricultural sectors are difficulties in handling, storage, and delivery of biological control agents in the form of cell suspension. Farmers prefer solid or semi solid preparations of biocontrol agents prior to their application in the field (Muñoz Torres et al., 2021). Metcalf (1997) used millet seeds as a supplement in the medium to improve the growth *Trichoderma koningii*. Application of such seeds as a growth supplement however, was found to increase the production cost of this fungal antagonist, and therefore its large scale production cost could not compete chemical-based fungicides. Therefore research on alternative media is urgently required with a view to minimize this production cost biocontrol development. In our current research, the millet seeds were mixed with mature compost of WFW of paper mill origin to reduce the production cost of biocontrol agent.

Ramona and Line (2002) reported that supplementation of millet at the rate of 20% w/w to composted or raw WFW successfully triggered the growth of *Trichoderma* spp. (isolate Td_{22}) which is antagonistic against *S. minor* and *S.*

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sclerotiorum. In such composition of millet and WFW compost, this antagonistic fungus produced spores with a density of ~10^{10} per gram dry weight of mixture following 14 days incubation (Ramona and Line 2002).

Based on the above rationale, the effectiveness of Td_{22} grown in the mixture described above to protect pyrethrum seedlings/plants from attack by *S. minor* in glasshouse trials was investigated in our current study. The main objective of this study was to investigate the efficacy of Td_{22} grown in this mixture to provide protection on pyrethrum plants from attack by *S. Minor*, with a view to develop a novel and environmentally friendly method of plant pathogen control with reduced use of chemical-based fungicides.

MATERIALS AND METHODS

Isolates of fungal pathogen (*S. minor*) and fungal antagonist *Trichoderma* sp. (Td_{22})

The fungal antagonist isolate (*Tichoderma* sp. isolate Td_{22}) used in our study was kindly provided by Dr. Dean A Metcalf from his stock culture collection at the School of Agricultural Science, Tasmania University in Australia, while the pathogen (*S. minor*) was obtained from Microbiology Laboratory, Faculty of mathematics and Sciences, Udayana University, Bali. This fungal pathogen was previously isolated from lettuce farm in Bedugul area (Bali) and maintained at the laboratory of Microbiology, Udayana University.

In vitro Dual culture assay of Td_{22} against *S. minor*

This *in vitro* assay was conducted at the Integrated Laboratory for Biosciences and Biotechnology, Udayana University to investigate the capability of the Td_{22} to antagonize *S. minor* prior to its application in pot trial experiments. These two fungi were challenged on sterile pectin agar (PA) plates. A plug (1 cm^2) of each fungus previously grown for 48 hours on the same medium was placed face to face on a plate (approximately 5 mm from the edge of the Petri dish) of PA and incubated for 7 days at 30°C (until heavy mycelia was evident) with regular day to day observations.

Production of wood fibre waste compost

The composting process of WFW of paper mill origin, using open windrow method, was conducted in a glasshouse of the School of Agricultural Science, Tasmania University, Australia for 3 months at ambient temperature (temperature range of 15°C – 25°C). Prior to composting, the C:N:P:K ratio of the waste was adjusted to 35:1:0.6:0.1, respectively. Monthly sample collection of the compost was conducted and the compost was subjected to maturity evaluation (radish seed germination test) prior to use as a component of cultivation medium for the Td_{22} isolate. The assessment of compost maturity was done following the method specified in Ramona (2003). The 3 months old compost was decided for use as a component of Td_{22} medium as its toxicity was close to zero (support >90% radish seed germination following 5 days incubation).

Preparation of Td_{22} inoculum

The compost previously produced was used as the main component of the Td_{22} medium. This mature compost was mixed with millet seeds to obtain 20% w/w ratio. The moisture content of this mixture was adjusted to field capacity by applying the method specified in Ramona (2002). This mixture was then autoclaved at 121°C at 15 lbs for 15 minutes, inoculated with mycelia plus spores of Td_{22} previously grown on pectin agar (PA), and incubated at 30°C for 2 weeks until heavy spores was evident.

Preparation of *S. minor* inoculum

The medium for the production of *S. minor* mycelia was prepared by autoclaving the wet millet seeds (2 : 1 ratio of millet seeds and distilled water, respectively) at temperature of 121°C and 15 lbs for 15 minutes. This sterile millet seeds were then inoculated with 1 cm^2 plugs of 48 hour old *S. minor* mycelia previously grown on Pectin Agar medium and incubated at 25°C for 1 week (until heavy mycelia of the pathogen was observed) prior to use in the glasshouse trials.

Efficacy of Td_{22} to protect pyrethrum plants from attack by *S. minor* in a glasshouse scale experiment

This trial was conducted in 0.5 L capacity pots. Four variants of treatments, included A0B0 (pyrethrum plants sown in soil, in the absence of both Td_{22} and *S. minor*); A0B1 (pyrethrum plants sown in soil inoculated with pathogen only and served as control treatment), A1B0 (pyrethrum plants sown in soil amended with Td_{22}-grown compost only), and A1B1 (pyrethrum plants sown in soil in the presence of both *S. minor* and Td_{22}-grown compost), were set. Field soil used as the potting media was mixed with suppressive compost (compost with Td_{22} grown in it) to obtain 5% v/v compositions and then added into pots with appropriate treatments. The pathogen (*S. minor* grown on millet seeds) amounted at 2.0 g was inoculated evenly at approximately 2 cm from the surface of potting medium and acclimatized for 4 days in a shade house. Four pyrethrum seedlings of 3 weeks old (4 seedlings per pot) were then sown in these pots and maintained for 8 weeks with weekly observation on the seedling conditions (weekly recording on the healthiness of seedlings/plants). This trial was terminated at week 8 and all survive plant shoots were harvested, dried at 65°C until their weight was relatively constant and then their dry weight was determined. The density of pathogen's sclerotia in pots inoculated with *S. minor*

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only (A0B1) and those amended with both *S. minor* and Td_{22}-grown compost (A1B1) were also retrieved (using a 0.5 mm sieve) at week 8 by applying the method as specified in Metcalf (1997). The effectiveness of Td_{22} to parasitise *S. minor* sclerotia was assessed by randomly sampling 20 retrieved *S. minor* sclerotia and plating them onto pectin agar medium with 60 µg/mL tetracycline in it.

Data analysis

Quantitative data obtained from this trial were statistically analysed using Minitab software for windows version 12. When significant difference were indicated at $p<0.05$, the results were further analysed with least significant different (LSD) test.

RESULTS AND DISCUSSION

In the *in vitro* dual culture assay, both Td_{22} and *S. minor* initially showed approximately the same growth response on PA medium. After 24 hours of incubation at 30°C, the mycelial tips of both fungi met at a certain point on the medium and slowed down the growth of both fungi until day 3 of incubation. In the prolonged incubation, the mycelia of Td_{22} started to overgrow the *S. minor* mycelia, and totally covered the whole surface of *S. minor* mycelia following 7 days incubation (Figure 1). This likely indicated that the Td_{22} parasitized the mycelia of *S. minor*.

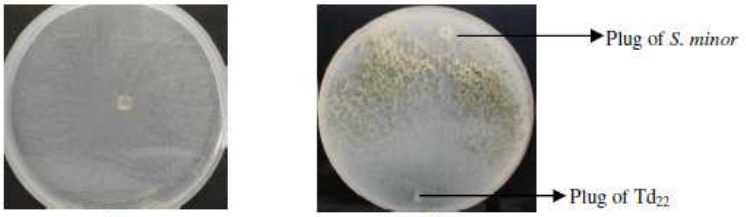

Figure 1. Dual culture assay to challenge *Trichoderma harzianum* (Td_{22}) and *S. minor* on pectin agar medium. (A) Normal growth of *S. minor* on pectin agar following 48 hours incubation at 30°C; (B) Td_{22} mycelia totally overgrow the mycelia of *S. minor* on pectin agar after 7 days of incubation at 30°C.

The ability of *Trichoderma* spp. to parasitize plant pathogenic fungi have widely been reported and reviewed extensively by researchers worldwide. Błaszczyk et al. (2014) mentioned various types of mechanisms, including hyperparasitism, by which this fungal antagonists control plant fungal pathogens. Similar results were also reported by Yusnawan et al. (2019) who studied the effectiveness of *Trichoderma* sp. to control several fungal pathogens, such as *Rhizoctonia solani* and *Fusarium sp.* in soybean and mung bean. In their dual culture assay, their Trichoderma isolates also overgrew these two pathogens, indicating initial parasitism by the *Trichoderma* sp. on these two pathogens. In more recent study conducted by Nurzannah et al. (2022) also reported hyperparasitic activity of Trichoderma species on fungal pathogens (*Ganoderma boninense*, the causative agent of basal stem rot in oil palm plants). Hyperparasitic properties of Trichoderma could be due to its ability to produce chitinase (Urbina-Salazar et al., 2018), an enzyme required to hydrolyze the main cell wall component of pathogenic fungi.

The efficacy of Td_{22} grown in the mixture of compost and millet seeds (20% w/w millet seeds) to reduce disease incident due to *S. minor* attack in pyrethrum seedlings/plants is presented Table 1. The data shown in Table 1 clearly demonstrated that Td_{22} grown in a mix of compost and millet seeds with a ratio of 8:1 provided significant protection ($p<0.05$) on pyrethrum seedlings/plants from attack by *S. minor*. Over the period of glasshouse trial, all seedlings/plants grown in pots, in the presence of Td_{22} and *S. minor* (A1B1), were found to survive in healthy condition. In contrast, an increase in mortality was observed in pots inoculated with *S. minor* only (A0B1) (56±6.3% survivals on week 1 after sowing to 21.9±5.7% survivals at week 7). This indicated that 78% protection ($p<0.05$) was provided by the Td_{22} against *S. minor* after 7 weeks of maintenance in the glasshouse. Table 1 also shows that Td_{22} did not attack the pyrethrum plants, as 100% of seedlings/plants survival over this period of glasshouse trial were observed in pots inoculated with Td_{22} only, in the absence of *S. minor* (A1B0). The results shown in pots of nil control (A0B0) were as expected where 100% of the seedlings/plants were found to be healthy during this pot trial up to week 7 (Table 1). The mechanisms by which this fungal antagonist (Td_{22}) controls plant pathogenic fungi may be through one or combination of the following mechanisms: antibiosis and parasitism (Silva et al., 2019), induction of plant host systemic resistance (Yu et al., 2022), improvement of plant stress resistance (Hidangmayum and Dwivedi, 2018), or competition (Oszust et al., 2020).

The effectiveness of *Trichoderma* sp. to control pathogenic fungi belonging to the genera of Sclerotinia in various plants has been reported. Tancic Zivanov et al (2016) and Tozlu et al. (2016) found that this fungal antagonist effectively controls *S. sclerotiorum* in lettuce plantation. Similar result was also reported by Colak Ates (2019) who reported the efficacy of *T. Harzianum* to protect lettuce plants from attack by *Sclerotinia sclrotiorum* with protection percentage between 80 and 86% when applied in the field in combination with *Coniothyrium minitans* at the rate of 4 kg/ha. This

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combination of biocontrol agents was also found to increase the lettuce yield by 13-34% when applied in combination with *C. minitans*. This indicates that biocontrol agents belonging to the genera of Trichoderma also have the capability to promote plant growth in addition to provide protection to plants from attack by fungal pathogens. Martanto et al. (2020) reported the efficacy of *T. Harzianum* to control the causative agent of leaf rust disease on soybean. An increase in the weight of soybean seeds was also observed by these researchers following application of this fungal antagonist.

Table 1. Efficacy of *Trichoderma harzianum* (Td_{22}) grown in the 8:2 w/w ratio of compost and millet seeds mixture to suppress *S. minor* infection on pyrethrum seedlings/plants

Treatments*	Percentage of survive seedlings/plants (%)			
	Week 1	Week 2	Week 4	Week 7
A0B0	100.00±0.00 a	100.00±0.00 a	100.00±0.00 a	100.00±0.00 a
A0B1	56±6.3 b	28.3±5.7 b	21.9±5.7 b	21.9±5.7 b
A1B0	100.00±0.00a	100.00±0.00a	100.00±0.00a	100.00±0.00a
A1B1	100.00±0.00a	100.00±0.00a	100.00±0.00a	100.00±0.00a

* A0B0 (pyrethrum plants sown in soil, in the absence of both Td_{22} and *S. minor*); A0B1 (pyrethrum plants sown in soil inoculated with pathogen only and served as control treatment), A1B0 (pyrethrum plants sown in soil amended with Td_{22}-grown compost only), and A1B1 (pyrethrum plants sown in soil in the presence of both *S. minor* and Td_{22}-grown compost). Values in Table 1 are averages of 8 replicated pots with 4 pyrethrum seedlings/plants per pot. Values ± standard error followed by the same letter in the same column are not significantly different ($p>0.05$), based on the LSD test following ANOVA.

In more recent study, Sriwati et al. (2022) reported the role of peroxidase enzyme to improve resistance of the local varieties of patchouli plants in addition to growth induction of this plant by *T. harzianum*. Growth induction by Td_{22} on pyrethrum seedlings/plants was also observed in our study, and this is indicated by significantly higher average dry weight of the plants ($p<0.05$) at week 8 in the Td_{22} amended treatments (A1B0 and A1B1) when compared to control treatment (A0B1; Table 2). These Td_{22} amended treatments also produced relatively higher plant dry weight than that of nil control (A0B0), although these results are not significantly different ($p>0.05$) (Table 2 and Figure 2). Growth promotion on pyrethrum plants observed in our study was probably due to physiological effects of the fungus (Td_{22}) on the plants. Sood et al. (2020) and Alfiky and Weisskopf (2021) in their review mentioned that *Trichoderma* sp. may promote the growth of its plant hosts by improving uptake of Mg^{2+} ions from soil and improving on nutrient solubilization and absorption.

Table 2. Averages dry weight of pyrethrum plants at week 8 (trial termination).

Treatments	Average dry weight per plant (g)*
A0B0	1.07 ± 0.1 ab
A0B1	0.72 ± 0.12 b
A1B1	1.14 ± 0.07 a
A1B0	1.11 ± 0.12 a

* A0B0 (pyrethrum plants sown in soil, in the absence of both Td_{22} and *S. minor*); A0B1 (pyrethrum plants sown in soil inoculated with pathogen only and served as control treatment); A1B0 (pyrethrum plants sown in soil amended with Td_{22}-grown compost only), and A1B1 (pyrethrum plants sown in soil in the presence of both *S. minor* and Td_{22}-grown compost). Each value is an average of 8 replicates ± standard error, except A0B1 (average of 5 replicates, with plants in other pots having died). Values followed by the same letter(s) are not significantly different at $p<0.05$ using the LSD test following ANOVA.

An increase in Mg^{2+} uptake by plants following their interaction with *Trichoderma* spp. (Halifu et al., 2019) will lead to stimulation of chlorophyll formation in plant leaves, because this ion is being a key chlorophyll constituent (Hasanah et al., 2020). This ion has also been reported to be involved in catalyzing enzymatic activity as well as in regulating genes engaged in photosynthesis (Tränkner et al., 2018). Growth stimulation of the pyrethrum plants as presented in Figure 2 and Table 2 could be partly due to interaction of Td_{22} with the plants which lead to increment of Mg^{2+} uptake from the potting mix medium, although this hypothesis needs to be further elucidated. Stimulation on the chlorophyll formation is closely related to the rate of photosynthetic process in plants. In such condition, the rate of plant biomass formation will also increase.

On the completion of this pot trial (week 8 after sowing) the relative abundant of *S. minor* sclerotia in all pots inoculated with *S. minor* (A0B1) and those inoculated with both *S. minor* and compost-grown Td_{22} were retrieved using a 0.5 mm mesh sieve. The results are presented in Table 3. As shown in Table 3, the density of *S. minor* sclerotia in the pots inoculated with *S. minor* only (A0B1) was found to be almost twice higher than that of treatment A1B1 (pyrethrum plants sown in soil in the presence of both *S. minor* and Td_{22}-grown compost) which is statistically significant at $p<0.05$ (Table 3). This suggested that inhibition of growth or sclerotial development of the pathogen, or parasitism and death of the sclerotia occurred in the presence of Td_{22}. The latter possibility was supported by the finding of Ramona and Line (2002) who reported that 92.5% of the sclerotia retrieved from the pathogen/Td_{22} treatment (A1B1) were parasitised by Td_{22}, even though 15.6% of those retrieved from the pathogen-only treatment (A0B1) were also found to be parasitised by the fungus (this probably attributable to splash contamination). The non-infected sclerotia retrieved in this trial still had capability to cause root-rot disease. The efficacy of fungal antagonists (belong to genus of Trichoderma) to parasitise sclerotia of pathogenic fungi was also reported by many studies, such as by Smolińska and Kowalska (2018), and Colac Ates (2019).

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Figure 2. The conditions of the pyrethrum plants at week 8 prior to termination for dry weight measurements. From left to right are A0B1 (pyrethrum plants sown in soil inoculated with pathogen only and served as control treatment); A1B1 (pyrethrum plants sown in soil in the presence of both *S. minor* and Td_{22}-grown compost); A0B0 (pyrethrum plants sown in soil, in the absence of both Td_{22} and *S. Minor*); and A1B0 (pyrethrum plants sown in soil amended with Td_{22}-grown compost only).

The use of WFW compost mixed with millet seeds (at the ratio of 8:2 w/w) as presented in our current study could be applied for large scale production with moderate cost to avoid liquid cultures as reviewed by Leggett et al. (2011). The Td_{22} previously grown in composted WFW and incubated for at least 2 weeks produced high density of spores (Ramona and Line, 2002). Application of Td_{22} in the form of spores appeared to be more advantageous, because it reduces concerns related to its viability in the field. In the form of spores, this fungal antagonist will be relatively more resistant to environmental stresses than in mycelial form (Huang and Hull, 2019).

Table 3. Relative abundant of *S. minor* sclerotia at week 8 (trial termination)

Treatments*	Average density of *S. minor* sclerotia per pot*
A0B0	ND
A0B1	108 ± 11.74 a
A1B1	58.3 ± 8.58 b
A1B0	ND

* A0B0 (pyrethrum plants sown in soil, in the absence of both Td_{22} and *S. minor*); A0B1 (pyrethrum plants sown in soil inoculated with pathogen only and served as control treatment), A1B0 (pyrethrum plants sown in soil amended with Td_{22}-grown compost only), and A1B1 (pyrethrum plants sown in soil in the presence of both *S. minor* and Td_{22}-grown compost). Values in Table 3 are averages of 8 replicates ± standard error. Values followed by the same letter are not significantly different using the LSD test following ANOVA. ND: not determined.

Our formulation (compost-grown Td_{22}) appeared to be excellent to control *S. minor* from attacking the pyrethrum plants in the glasshouse scale experiment (Table 1 and Figure 2). The effectiveness of similar formulation (compost-grown fungal antagonists) to control plant pathogens was also reported or reviewed by Ivayani (2018) and Joos et al. (2020). The survival of a *Trichoderma harzianum* strain in compost medium used as its carrier was also extensively reviewed by Joos et al. (2020).

Our current investigation clearly demonstrated that the compost-grown *Trichoderma harzianum* (isolate Td_{22}) applied at the rate of 5% provided significant protection to pyrethrum plants from attack by *S. minor*. When compared to the control pots (pots inoculated with *S. minor* only), the compost-grown Td_{22} provided 78% protection at seven week after sowing ($p<0.05$) in addition to improve the growth of pyrethrum plants. No toxicity was evident to the pyrethrum plants when compost-grown Td_{22} only was applied at this concentration.

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[biodiv] Article Review Acknowledgement

2 messages

Smujo Editors <smujo.id@gmail.com> Wed, May 25, 2022 at 10:11 PM
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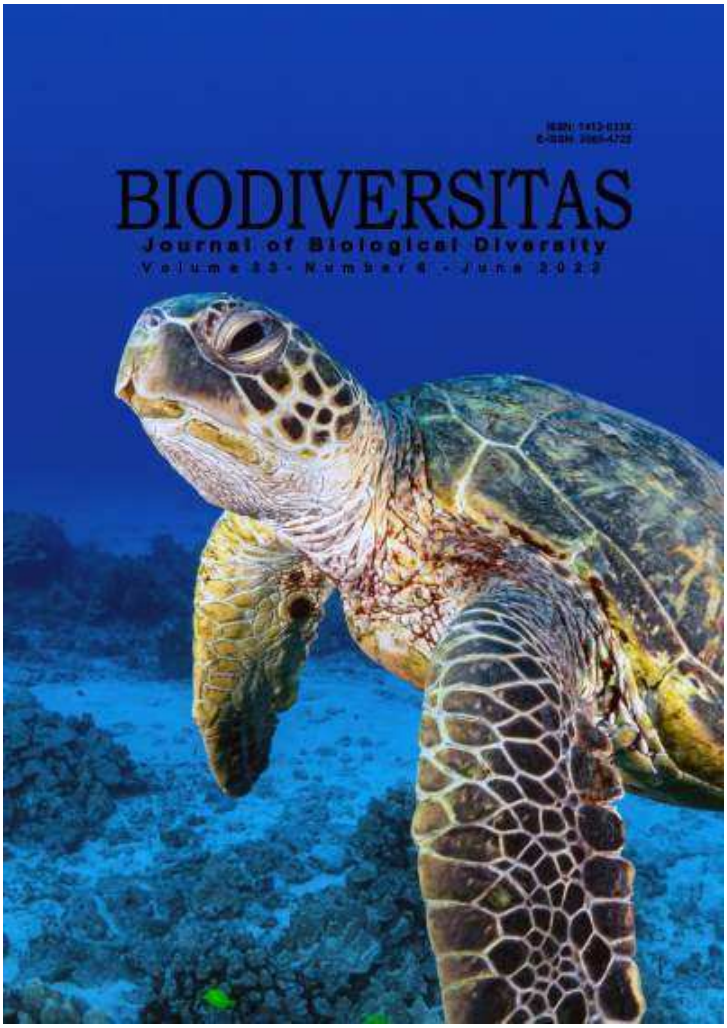

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Section

Articles

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Abstract

Abstract. *Ramona Y, Darmayasa IBG, Line MA. 2022. Biological control of* Sclerotinia minor *attack on pyrethrum plants by* Trichoderma harzianum *in glasshouse experiment. Biodiversitas 23: 3264-3269.* The aim of this research was to elucidate the efficacy of *Trichoderma harzianum* (isolate Td_{22}) grown in a ratio of 2:8 millet seeds and wood fiber waste (WFW) compost mixture to suppress *Sclerotinia minor* infection in pot trails on the pyrethrum plants (in 0.5 L pots). The pots were filled with soil and mixed with Td_{22}-grown WFW compost to obtain a concentration of 5% v/v. The *S. minor* (fungal pathogen) previously grown in millet seeds amounted at 2.0 g per pot, was then evenly inoculated at 2 cm below the surface of potting mix. Soil without compost amendment, amended with pathogen only, or without pathogen inoculation served as controls. All pots were acclimatized for 4 days in a shade house prior to transplanting (4 seedlings per pot) of pyrethrum seedlings (aged of 3 weeks). Eight replications per treatment were run for 8 weeks. The results showed that 5% v/v compost-grown Td_{22} provided 78% protection to pyrethrum plants at week 8. Each surviving plant in Td_{22}-treated pots also showed significantly higher average dry weight ($p<0.05$) than those planted in *S. minor* control treatment, indicating that Td_{22} has a potential to be developed as a novel fungal antagonist or a plant growth-promoting fungus.

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Biological control of *Sclerotinia minor* attack on pyrethrum plants by *Trichoderma harzianum* in glasshouse experiment

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Abstract. *Ramona Y, Darmayasa IBG, Line MA. 2022. Biological control of* Sclerotinia minor *attack on pyrethrum plants by* Trichoderma harzianum *in glasshouse experiment. Biodiversitas 23: 3264-3269.* The aim of this research was to elucidate the efficacy of *Trichoderma harzianum* (isolate Td_{22}) grown in a ratio of 2:8 millet seeds and wood fiber waste (WFW) compost mixture to suppress *Sclerotinia minor* infection in pot trails on the pyrethrum plants (in 0.5 L pots). The pots were filled with soil and mixed with Td_{22}-grown WFW compost to obtain a concentration of 5% v/v. The *S. minor* (fungal pathogen) previously grown in millet seeds amounted at 2.0 g per pot, was then evenly inoculated at 2 cm below the surface of potting mix. Soil without compost amendment, amended with pathogen only, or without pathogen inoculation served as controls. All pots were acclimatized for 4 days in a shade house prior to transplanting (4 seedlings per pot) of pyrethrum seedlings (aged of 3 weeks). Eight replications per treatment were run for 8 weeks. The results showed that 5% v/v compost-grown Td_{22} provided 78% protection to pyrethrum plants at week 8. Each surviving plant in Td_{22}-treated pots also showed significantly higher average dry weight ($p<0.05$) than those planted in *S. minor* control treatment, indicating that Td_{22} has a potential to be developed as a novel fungal antagonist or a plant growth-promoting fungus.

Keywords: Biocontrol, compost, millet seeds, *Sclerotinia minor*, *Trichoderma harzianum*

INTRODUCTION

Sclerotinia minor infection on various plants, such as lettuces, cabbages, and pyrethrum plants, are commonly found in countries with cool and moist climates (Tozlu et al. 2016). Hahm et al. (2017) reported that *Sclerotinia* sp. causes rot symptoms on basil plants in Korea. In Australia (Tasmania in particular), *S. minor* has also infected pyrethrum plants and causes significant profit loss annually (Macdonald 1995). Such infection on the same plant species was also reported in Kenya by Natrass (1950). Plants infected by *S. minor* commonly show typical symptoms, such as brownish spots on leaf and stem, and then advancing margins, wilting the whole plant and blighting, eventually die. Over the last three decades, such fungal pathogen has been controlled by applying chemical-based fungicides (Tyagi et al. 2020). Due to the many harmful effects of such chemical-based fungicides to our environment, their use in agricultural sectors has been reduced significantly worldwide, especially in developed countries. To avoid the application of excessive chemical-based fungicides, attention has recently been focused on the development of biological control approach, where cost competitiveness becomes important. There are some limitations on the application of biological control in large-scale agricultural sectors, such as difficulties in handling, storage, and delivery of biological control agents in the form of cell suspension. Farmers prefer solid or semi-solid preparations of biocontrol agents prior to their application in the field (Muñoz-Torres et al. 2021). To overcome this limitation, Metcalf (1997) used millet seeds as a supplement in the medium to improve the growth *Trichoderma koningii*. Application of such seeds as a growth supplement, however, was found to increase the production cost of this fungal antagonist, and therefore its large-scale production cost could not compete chemical-based fungicides. Therefore, research on alternative media is urgently required with a view to minimizing this production cost of biocontrol development. In our current research, the millet seeds were mixed with mature compost of WFW of paper mill origin to reduce the production cost of the biocontrol agent.

Ramona and Line (2002) reported that supplementation of millet at the rate of 20% w/w to compost or raw WFW successfully triggered the growth of *Trichoderma* spp. (isolate Td_{22}), which is antagonistic against *S. minor* and *S. sclerotiorum*. In such composition of millet and WFW compost, the fungal antagonist produced a spore density of ~1010 per gram dry weight of mixture after 14 days of incubation.

Based on the above rationale, the main aim of this study was to investigate the efficacy of Td_{22} grown in wood fiber waste compost and millet seed mixture to provide protection on pyrethrum plants from attack by *S. Minor*, with a view to developing a novel and eco-friendly method of plant-pathogen control, with reduced use of chemical-based fungicides.

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"Response of String Beans (*Vigna unguiculata* L.) on Saline Soil Amended with Vermicompost"

Wayan WANGIYANA <w.wangiyana@unram.ac.id>

Universal Journal of Agricultural Research - Review Assignment (ID: 10428435)

6 messages

Sherley Miller <editorialboard.hrpub@gmail.com> Thu, Jul 14, 2022 at 5:17 PM
To: "Ir. Wayan Wangiyana, MSc(Hons), Ph.D." <w.wangiyana@unram.ac.id>, "Dr.Ir. Wayan Wangiyana MSc(Hons)." <wy.wyana@gmail.com>

Dear Assoc. Prof. Wayan Wangiyana ,

On the base of your expertise, we invite you to review this manuscript.

It would be nice of you to complete the review within 21 days. Sending in a review after the deadline will slow down the publication process.

During the review process, you are suggested to at least highlight sentences requested for polishing. It will be easier for authors to fix syntax errors if they know what the problem is.

Once the review is completed, please submit the review report attached in this email to us.

At the end of your peer review, we ask you to indicate your final decision on the manuscript, by selecting one of the following recommendations:

Accept as it is
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Requires Major Revision
Reject

Please let me know whether you are able to carry out the review by Accepting or Declining this invitation. In case, you are unable to review this manuscript at this point of time, please suggest suitable reviewers if you know any.

Besides, we are now in the process of expanding our editorial board members. You are warmly welcomed to recommend some suitable reviewers to us.

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For more detailed information, please refer to our website: http://www.hrpub.org/journals/jour_info.php?id=04

If you need the review certificate, please let us know when sending your review report to us.

Look forward to hearing from you soon.

Best Regards

Sherley Miller
Editorial Assistant
editorialboard.hrpub@gmail.com
Horizon Research Publishing, USA
http://www.hrpub.org

2 attachments

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Ir. Wayan Wangiyana, MSc(Hons), Ph.D. <w.wangiyana@unram.ac.id> Sun, Jul 17, 2022 at 12:11 AM
To: Sherley Miller <editorialboard.hrpub@gmail.com>

Dear Ms Sherley Miller,

Yes, I accept the review task, but I cannot start the review in these two weeks because 10 out of the 20 students I supervise are in need to finish their study at the end of July 2022 to avoid paying another semester tuition fee. I should be able to start the review on the 30th

of July for no longer than a week. I have downloaded the paper.

Best Regards,
Wayan
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Sherley Miller <editorialboard.hrpub@gmail.com> Mon, Jul 18, 2022 at 3:35 PM
To: "Ir. Wayan Wangiyana, MSc(Hons), Ph.D." <w.wangiyana@unram.ac.id>

Dear Assoc. Prof. Wayan Wangiyana ,

Thanks for your kind Email.

Yes, it's OK.

That's very kind of you to review this manuscript.

Thanks in advance for your time and assistance.

Best Regards

Sherley Miller
Editorial Assistant
editorialboard.hrpub@gmail.com
Horizon Research Publishing, USA
http://www.hrpub.org

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Ir. Wayan Wangiyana, MSc(Hons), Ph.D. <w.wangiyana@unram.ac.id> Thu, Aug 4, 2022 at 8:41 PM
To: Sherley Miller <editorialboard.hrpub@gmail.com>

Dear Ms Sherley Miller,

Please find attached my review report for the manuscript entitled "Response of String Beans (Vigna unguiculata L.) on Saline Soil Amended with Vermicompost". I also attach the manuscript with my comments and some revisions on it (which I converted to DOC from PDF).

The current quality of the paper is low but it can be much improved. In order to make it better, the authors need to run more data analysis to which their conclusion has to be based on. If the authors are willing to do further data analysis to improve the paper, please also ask them to attach the dataset, so that we can see the quality of their data (if possible).

Thank you very much for letting me review this paper. I hope next time I will have a better paper to review.

Please also send me an acknowledgement email for completing this peer review, and if possible attached with a certificate. Thank you very much.

Best Regards,
Wayan
University of Mataram, Mataram, Lombok, Indonesia

On Mon, Jul 18, 2022 at 3:35 PM Sherley Miller
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Sherley Miller <editorialboard.hrpub@gmail.com> Fri, Aug 5, 2022 at 10:36 AM
To: "Ir. Wayan Wangiyana, MSc(Hons), Ph.D." <w.wangiyana@unram.ac.id>

Dear Assoc. Prof. Wayan Wangiyana ,

Thank you for reviewing the manuscript.
Your constructive suggestions will help authors in their revisions and improve the manuscript to a better scientific level.

We do appreciate your contribution to the quality of our publications.

Herewith attached is the certificate for the review.

Best Regards

Sherley Miller
Editorial Assistant
editorialboard.hrpub@gmail.com
Horizon Research Publishing, USA
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Ir. Wayan Wangiyana, MSc(Hons), Ph.D. <w.wangiyana@unram.ac.id> Fri, Aug 5, 2022 at 10:53 PM
To: reviews@publons.com

Dear Team Publons,

Last night I submitted a review report to the Universal Journal of Agric Research, and this morning I got the certificate for completing the peer review process. Here I attach that certificate. I will also attach my peer review report.

Please verify if this peer review can be added to my peer review records in publons.com. Thank you very much.

Best Regards,
Wayan
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Manuscript Information

Manuscript ID:	**10428435**
Manuscript Title:	**Response of String Beans (*Vigna unguiculata* L.) on Saline Soil Amended with Vermicompost**

Evaluation Report

General Comments	**For better and more informed conclusion further data analysis is required, and the discussion and conclusion have to be based on relevant results of analysis. Materials & Method need to be written in more details with relevant references. For example, P content was in what form and what analysis was used. The discussion also needs to be improved.**
Advantage & Disadvantage	**The results of this study could advantage landless coastal area farmers in order they can use saline soil for growing vegetable crops for example.**
How to improve	**The quality of this paper still can be improved by applying more data analysis, improving the writing skill, and extracting better conclusion, with a sound scientific basis. Please also be more exact in referring the references. Further statistical analyses could also result in different conclusion. The discussion also needs to be extended based on the additional but crucial data analysis.**

Please rate the following: (1 = Excellent) (2 = Good) (3 = Fair) (4 = Poor)

Originality:	3 (= Fair); there are many similar researches on other crops
Contribution to the Field:	**2**
Technical Quality:	**4**
Clarity of Presentation :	**3**
Depth of Research:	**3**

Recommendation	
Kindly mark with a ■	
☐ ~~Accept As It Is~~	
☐ ~~Requires Minor Revision~~	
☐ Requires Major Revision	
☐ ~~Reject~~	Please reanalyzed the data, some require transformation.

Return Date: 4th August, 2022

Response of String Beans (*Vigna unguiculata* L.) on Saline Soil Amended with Vermicompost

Abstract *Vigna unguiculata L.* also known as string beans is one of the major vegetable crop produced in the Philippines all year round because of its adaptability to all types of soils except for saline soil. Thus, its response to saline soil amended with vermicompost was determined. Growth and yield of string beans in saline soil applied with varying amount of vermicompost was obtained. Level of nitrogen, phosphorus, potassium and pH was also tested before and after vermicompost application. The study was laid out in Randomized Complete Block Design, composed of 5 treatments and replicated 4 times. The treatments were: T1 - 100% Garden soil; T2 - 100% Saline soil; T3 - 75% Saline soil and 25% Vermicompost; T4 - 50% Saline soil and 50% Vermicompost and; T5 - 75% Vermicompost and 25% Saline soil. All the data gathered were interpreted and analyzed using ANOVA. The result of the study revealed that combination of 75% vermicompost and 25% saline soil is the most effective in decreasing soil salinity and the most productive in terms of yield. Thus, using vermicompost as soil amendment is recommended to decrease soil salinity and make the plants more productive.

Keywords soil salinity, vermicompost, *Vigna uniguiculata*, yield

Comment [WW1]: Not italics.

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Comment [WW2]: The data should be analyzed first, for example using ANOVA, then interpreted accordingly.

Comment [WW3]: Please add more details of the results and conclusion up to the maximum number of words allowed.

1. Introduction

Soil salinization is one of the abiotic stresses that greatly affect crop growth and yield [1]. It has been said that 20% of the arable lands in the world are saline which could greatly affect crops [2]. It is one of the greatest threats in crop production since the high concentration of salt in soil solution will affect the physiology of plants. It could result in inhibition of water uptake and would also lead to nutrient imbalance because of uptake inhibition of calcium and phosphorus [3]. Thus, this would lead to growth restriction and eventually death. It is also a major factor that affects seed germination, shoot growth and dry matter production [4]. Salinity also affects photosynthesis by decreasing CO_2 availability, hence lead to leaf growth retardation [2].

To counteract the salinity and be able to cultivate crops, several techniques were used and one of those is the application of organic amendments to soil. Results of the study by Gondek et al. [5] showed that the use of compost reduced the salinity and sodicity of the soil since sodium is replaced by calcium. Rady et al. [6] also reported an increase in yield and growth of beans applied with compost. Vermicompost is one of the popular organic fertilizers known to help increase plant growth and tolerance to salinity [7]. It is made from various organic wastes such as animal manure, kitchen wastes, dried leaves, twigs, etc with the earthworm excretions. Previous studies [Bidabadi, 2017 and Zurbano, 2018) have shown that addition of vermicompost on potting media showed a promising result, which modulated the harmful effect of salinity.

String beans, locally known as sitao is, one of the most cultivated crop in the Philippines and has an average yearly production of 112,311.00 tons. It is a legume and eaten as vegetable. It is normally consumed before the bean inside gets fully matured. It has been said that string beans are salt-sensitive crop and various responses on salinity was recorded such as dry matter and yield reduction [10]. Hence, an attempt has been made to examine the effect of vermicompost on salinity and growth indices of string beans. Therefore, this aimed to assess the efficiency of vermicompost in moderating saline soil and mitigate its negative effect on string beans' growth and productivity.

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Comment [WW5]: Please fix this sentence, it is not clear what the author is trying to say.

Comment [WW6]: Please fix these sentences in expressing the objectives of the study based on what were measured during the experiment, because there were no efficiency data presented.

2. Materials and Methods

2.1. Experimental Area

The experiment was carried out at Polytechnic University of the Philippines Field Laboratory Area from June to October 2019.

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2.2. Test Crop

Pole string bean (Mariposa) was used in the study. It is a viny crop with 60 cm light green pods. It is high yielding and quick growing. Seeds were obtained from East West Seed Company.

2.3 Treatment and Experimental Design

The experiment in this research study was laid out in a Completely Randomized Design (CRD) composed of five (5) treatments and five replications. The following were the treatments: T1- (Control) Ordinary Garden Soil; T2- 100% Saline Soil; T3- 25% Vermicompost 75% Saline Soil; T4- 50% Vermicompost 50% Saline Soil; and T5- 75% Vermicompost 25% Saline Soil.

2.4. Treatment Preparation

Garden soil was obtained from the riverbanks of Brgy. Talolong, which is dark brown and friable. Vermicompost was obtained from the Municipal Agriculture Office which is a quality product of Kahariam Realty & Farms Inc with an analysis of N (1.89 %), P (2.49 %) and K (1.40 %). Saline soil was collected from Barangay Sta. Lucia Lopez, Quezon. It has a salinity of 6.8 dS/m. The depth of sampling for each hole was 12 cm. The sample was collected from the location where the soil is uncultivated.

2.5. Pot Preparation of Treatments and Replicates

Each pot contained 5 kg of each treatment. The seeds were directly planted in a pot about an inch deep. After planting, the pots were watered to stay evenly moist until all of the seedlings emerged. Watering was done every 3 days, early in the morning and late in the afternoon. Weeding was done by pulling the weeds in order to avoid nutrient competition. No any synthetic fertilizer or chemical pesticide was use in the whole duration of this research study. Harvesting of the string beans was done 55 days after planting. The best time for harvesting string beans is as early 6 in the morning.

2.6. Data Gathered

The salinity of the soil before and after treatment application was analyzed at PUP Lopez Laboratory through the use of electrical conductivity meter while, pH, nitrogen, phosphorus and potassium content of the samples before and after treatment application were analyzed at Regional Soils Laboratory Region 4-A at Lipa City, Batangas. Root length, yield and biomass yield was also obtained.

2.7. Statistical Data Analysis

The Analysis of Variance for the data under CRD method was done to determine the level of significance among treatments. Further tests using Scheffe was used to compare the differences among means through Statistics for Agricultural Research (STAR) software.

3. Results

Effects of Vermicompost on pH, levels of N, P and K in the Soil

As seen in Table 1, soil pH increased in all treatments. The increase is 1.11 in T1, 0.5 in T2, 0.38 in T3, 0.77 in T4 and 0.24 in T5, while, major decrease in % N was evident in all treatments by 3.11 in T1, 8.762 in T2, 17.74 in T3, 19.155 in T4 and 24.515 in T5 which mainly shows that as the amount of vermicompost increases, the decrease in the nutrient was higher. For its phosphorus content, an increase was observed in the control treatment, T1 to T3, while a decrease

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Comment [WW7]: It is normally P2O5 for P, and K2O for K, but what is exactly in here? Can it be expressed as P2O5 & K2O as commonly practiced? Please also specify exactly which analysis method was used, for example P, whether it was total P or available P, and using which method (Colwell P, Bray-1 P, Olsen P, etc)

Comment [WW8]: Please explain how the saline soil and vermicompost were put in the pots, evenly mixed, or how; and what was the level of moisture contents of them when they were applied?

Comment [WW9]: Which hole & what was the diameter?

Comment [WW10]: Please specify at what level of moisture content?

Comment [WW11]: Was this the total crop harvest (including harvest for biomass weight)?

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Comment [WW12]: Is this word to mean “statistically significant”? If so, please use the scientific word “significant” to mean that p-value was < 0.05.

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was observed in T4 and T5. For the potassium content, an evident increase was observed in all treatments.

Table 1. Soil Test Data of pH, N, P, K Before and After Treatment Application

Treatment	pH		% N		P (ppm)		K (ppm)	
	Before	After	Before	After	Before	After	Before	After
T1 (100% Garden Soil)	6.02	7.13 a	6.911	3.80	48	146.4	93.6	580
T2 (100% Saline Soil)	5.69	6.19 d	13.652	4.89	12	259.4	81.9	1138
T3 (25% Vermicompost 75% Saline Soil)	5.65	6.03 e	24.800	7.09	195	211.4	101.4	1795
T4 (50% Vermicompost 50% Saline Soil)	5.84	6.61 c	25.645	6.49	244	211.2	113.1	2213
T5 (75% Vermicompost 25% Saline Soil)	6.66	6.84 b	33.705	9.19	239	152.92	136.5	3161

Soil Salinity Before and After Treatment Application

The effect of vermicompost on salinity was evident in all of the treatments as shown in Table 2. Among the treatments, garden soil had the lowest salinity and saline soil was the most saline (6.872) which is classified as moderately saline. For the rest of the treatments, as the amount of saline soil becomes higher, the salinity content also becomes higher. After the observation period, the salinity of the soil for all treatments was lower than its salinity before planting. Those treatments with vermicompost become non-saline after being moderately saline.

Table 2. Salinity of the Treatments Before Planting

Treatment	E.C (dS/m)		Degree of Salinity	
	Before	After	Before	After
T1 (100% Garden Soil)	2.151	1.282	Non-Saline	Non-Saline
T2 (100% Saline Soil)	6.872	3.602	Moderately saline	Slightly saline
T3 (25% Vermicompost 75% Saline Soil)	5.148	2.508	Moderately saline	Non- saline
T4 (50% Vermicompost 50% Saline Soil)	4.538	2.421	Moderately saline	Non-saline
T5 (75% Vermicompost 25% Saline Soil)	3.808	1.538	Slightly saline	Non-saline

Growth and Yield of String Beans Grown in Saline Soil Amended with Vermicompost

Table 3 shows the weight of string beans after harvesting for a month (10x harvesting). Treatment 5 (75% vermicompost and 25% saline soil) got the highest yield per pot with a mean of 990 g which is significantly different with the rest of the treatments. It was followed by T1 (Garden Soil) and had the yield of 550.25 g. It was followed by T4 (50% Vermicompost and 50% Saline Soil) with a yield of 450.25 g. On the other hand, T3 had a yield of 280.25 g which is not significnatly different with T1, T2 and T4, while those stringbeans planted in 100% saline soil died 2 weeks after planting.

Table 3. Yield of String beans Applied with Different Levels of Vermicompost

Treatments	Yield per pot (g)
Treatment 1 (100% Garden Soil)	550.25 b
Treatment 2 (100% Saline Soil)	0.00 c
Treatment 3(25% Vermicompost 75% Saline Soil)	280.25 bc
Treatment 4(50% Vermicompost 50% Saline Soil)	450.25 b
Treatment 5(75% Vermicompost 25% Saline Soil)	999.00 a

Table 4 shows the root length of string beans after harvesting where garden soil had the longest root (33 cm) but not significantly different to the saline soil ameliorated with vermicompost. However, it was evident that in pure saline soil, root growth was restricted since it has a mean length of only 4.0 cm.

Comment [WW13]: Is this word to mean "statistically significant"? If so, please use the scientific word "significant" to mean that p-value was < 0.05. However, the author has to prove the significance using a statistical analysis, for example using t-test of paired samples. To conclude the increase or decrease to be significant, the t-test result has to show the p-value < 0.05, otherwise, the difference was not significant (although the values were different). That is a scientific conclusion.

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Comment [WW14]: This table only show the differences among treatments, not between "before" and "after" growing the crop. Therefore, at least another statistical analysis has to be done, such as t-test.

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Comment [WW15]: This has to be proven using a statistical analysis, such as t-test, otherwise this statement has no scientific basis.

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Comment [WW16]: Yield data here are stange. In our country, Vigna anguiculata normally get flowering after 30-35 days and pod harvest can be done after 3-4 months after seeding. In section 2.5 it is stated that "harvest was done 55 days after planting". If after 55 days the harvest of pod & biomass then the first pod harvest was started on (55-30 = 25 days after planting (it was done for a month). Was the 55 days the correct statement or miss-typed?

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Comment [WW17]: How these yield data were analyzed? How can 280.25 g was not significant with 0 g? Was the data transformed and run Anova on the transformed data?
A data set with zero values cannot be analyzed using Anova because the distribution is usually not normal WHILE Anova can be applied only to normally distributed data.

Comment [WW18]: How to prove this? Was it because of growth restriction or because the plants died?

Table 4. Mean Root Length of Stringbeans After Harvesting

Treatments	Root Length (cm)
Treatment 1 (100% Garden Soil)	33.00 a
Treatment 2 (100% Saline Soil)	4.0 b
Treatment 3(25% Vermicompost 75% Saline Soil)	27.50 a
Treatment 4(50% Vermicompost 50% Saline Soil)	29.25 a
Treatment 5(75% Vermicompost 25% Saline Soil)	28.29 a

As shown in Table 5, Treatment 5 had the highest biomass yield and significantly different with the rest of the treatment. It could also be noted that the lowest biomass was obtained from crops planted in 100% saline soil.

Table 5. . Biomass yield (dry weight) of string beans

Treatments	Biomass (kg/pot)
Treatment 1 (100% Garden Soil)	0.0056 d
Treatment 2 (100% Saline Soil)	0.0008 e
Treatment 3 (25% Vermicompost 75% Saline Soil)	0.0063 c
Treatment 4 (50% Vermicompost 50% Saline Soil)	0.0066 b
Treatment 5 (75% Vermicompost 25% Saline Soil)	0.0077 a

Comment [WW19]: Why these data are not presented in the form of g/pot line those in Table 3? What was used to weigh the biomass? No explanation was found in the Method.
Please also specify exactly what the author means with "biomass", was it dry stover + dry pods and grains? Please use the correct word

4. Discussion

Effect on pH, nitrogen, phosphorus and potassium

The pH of the vermicompost used was 6.8 which was considered to be neutral and it generally increased the pH for all of the treatments. It has been said that the addition of organic materials in the soil may cause an increase in soil pH due to the organic anion and nitrogen decomposition. Since there is a degradation of organic compounds, mineralization immediately occur which produces ammonium which could help increase soil pH [11]. Moreover, the vermicompost used has an alkaline reaction [12] and might be due to its near neutral pH (6.8). The result is generally in contrast with the general belief that organic fertilizers decrease soil pH [13].

The nitrogen content of the vermicompost used is 1.89% and all of the the N content after planting decreased in all treatments. It can be noted that among the treatments, that with 75% vermicompost had the highest nitrogen content but after planting, N decreased. The decrease in the amount of nitrogen could be attributed to crop removal and as gases. If nitrogen is converted into ammonia, it has been said that it rapidly lost from soil especially if the temperature is high. According to study, even if there is a constant addition of N in the soil, the nitrogen randomly stays in the soil. That could be the case for the garden soil. However, for saline soil alone and that with vermicompost amendment, the soil salinity itself affects the usual pathways of N transformation which usually ends up with nitrate. As a result, accumulation of Nitrite and NH_4 happens in the soil [14]. The result is in contrast with the pot experiment done by Rekha et al. [15] where the N content increased upon vermicompost application.

For the phosphorus, T1 to T3 had higher P content after planting while, T4 and T5 had a decrease in P content. The reason could be the accumulation of P because of the organic matter contributed by the crop. Subsequently, it was also fixed in the soil which might be the reason why it barely moved in the soil. However, the decrease of P in T4 and T5 could be the utilization and crop removal since high amount of organic matter was put in the soil.

Potassium is one of the primary nutrients and very essential in plant growth and development. Ideally the amount of potassium in the soil should be 20-50 ppm [16] and what transpired in the soil sample before and after planting is way higher than the ideal amount. An evident increase was also observed in the soil after planting in all of the treatments. The reason could be the amount of moisture in the soil. Higher soil moisture usually means greater K availability. Increasing soil moisture increases K's movement to plant roots and enhances availability.

It is important for crop yield as well as for the quality of edible parts of crops. Based on the result of the analysis, potassium (K) in the soil had a decrease on its content before and after planting. The result shows that after the application of vermicompost the potassium content decreased it shows that the potassium available to the soils is already absorbed by the plants.

Soil salinity not only delays but also reduces flowering and yield of crop plants [17]. It may affect pollination and thus decrease seed set and grain yield [18]. According to Shrivastava and Kumar [17] plant adversely affected by salinity grow more slowly and are, therefore, stunted. Leaves are smaller, but may be thicker than those of normal

Comment [WW20]: Please check again; the results presented in ref [12], vermicompost reduces soil pH, not increase, and their vermicompost pH was 7.73, in this study, the pH was 6.8

Comment [WW21]: Is this a new finding? If yes, please discuss what mechanism in this study caused soil pH to increase instead of the general belief that vermicompost decrease soil pH, as in ref [12].

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Comment [WW22]: This needs clarification on what was the mechanism.

Comment [WW23]: Please be more accurate in citing the references for discussion of the results obtained. Ref [15] does not indicate N increase after vermicompost application BUT indicating higher N content in soil treated with vermicompost than in control (soil only). They used Capsicum anuum grown for 5 weeks, but in this study, the author grew Vigna anguiculata, which is a legume crop. HJow can N content was reduced after cropping?

Comment [WW24]: These have to clarified with a scientific basis on where did the P increase come from under what mechanism, and in what form of P. Please support it with relevant references.

plants, T1 (Control) Garden soil) had a salinity of 2.151 ds/m which is the lowest among all treatments. According to USDA Salinity Laboratory soil having a result range 1-2 is considered non-saline, 2-4 is slightly saline, 4-8 is moderately saline, 8-16 is severely saline and T5 > 16 is considered severely saline. Before and after planting, the result range of salinity decrease for all the treatments. It shows that vermicompost is an effective soil amendment to decrease the salinity of the soil.

Table 4 shows the root length of string beans after harvesting. The root is important because it absorbed the nutrients needed by plants, it holds the stem base to hold the plants. The growth of plants planted on saline soil is often limited by the ability of roots to extract water from the soil and transport it to the shoot [19]. Based on the result T1 got the longest root length which means that the soil characteristics is friable which makes the root to easily penetrate the soil. String beans on 100% saline soil had the shortest roots because of its salinity. A decrease in root and shoot growth under saline environment caused reduced total plant growth [20]. Growth inhibition under salt stress may be due to the diversion of energy from growth to maintenance [21]. Salt stress caused low intra-cellular water potential and water scarcity around the root zone due to which roots failed to absorb sufficient water and nutrients for adequate plant growth [22]. However, based on the result, all of the root length for each treatment does not significantly differ with one another.

Table 5 shows the average mean of the standing biomass (oven dry weight) of string beans after harvesting. Oven dry weight is the quasi-constant weight attained by plant. Sample biomass refers to plants or plant-based materials that are not used for food or feed because biomass contains stored energy from the sun. Plants absorb the sun's energy in a process called photosynthesis. When biomass is burned, the chemical energy in biomass is released as heat. Biomass can be burned directly or converted to liquid biofuels or biogas that can be burned as fuels. According to Standard Operating Procedure (Plant Biomass Determination). getting the biomass used to normalize analytical data, such as contaminant, protein, or nutrient content. If the sample weight is the same to the other sample a comparison on this basis is significant but if the result of sample weight is not the same it is considered not significant. Their biomass are not significantly different with one another.

Comment [WW25]: This sentence is not clear what the author is trying to say because total plant growth equals to "root + shoot growth"; they are not cause and effect. Please specify what causes plant growth to reduce and why, and based on which data, supported by which references.

Comment [WW26]: Please specify, these sentences are used to explain which data. It is not clear. …are not used for food or feed…by who?

Comment [WW27]: These sentences are also not clear to discuss which data.

5. Conclusions

Vermicompost is an effective soil amendment to increase soil pH and decrease salinity. It can be concluded that combination of 75% vermicompost and vermicompost is highly recommended as a soil amendment to enhance the growth and yield of crops affected by soil salinity. 25% Saline soil is the best combination for increasing the yield of string beans in saline soil. Hence, the use of vermicompost is highly recommended as a soil amendment to enhance the growth and yield of crops affected by soil salinity.

Comment [WW28]: This conclusion was not based on scientific data & analysis. In fact (Table 1), garden soil (without vermicompost) shows the highest increase in pH (from 6.02 to 7.13) while in T5 (75% vermicompost) it was only from 6.66 to 6.84.
So, please formulate conclusions using relevant data and discussion.

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Initiating Model of Agricultural Development Based on Local Wisdom: The Case of Risk Mitigation of Organic Rice Farming in Indonesia

Ujang Maman, Abuddin Nata, Djawahir Hejazziey, Yusron Razak, Asep Usman Ismail, Armaeni Dwi Humaerah, Muksin, Irwa Rochimah Zarkasi, Bambang Eko Samiono

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Analysis of Methods of Machine Learning Techniques for Detection and Classification of Brown Spot (Rice) Disease

Shashank Chaudhary, Upendra kumar

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Response of String Beans (*Vigna unguiculata* subsp *sesquipedalis* L.) on Saline Soil Amended with Vermicompost

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Abstract *Vigna unguiculata subsp sesquipedalis* L. also known as string beans/pole sitao is one of the major vegetable crop produced in the Philippines all year round because of its adaptability to all types of soils except for saline soil. Thus, its response to saline soil amended with vermicompost was determined. Growth and yield of pole sitao in saline soil applied with varying amount of vermicompost was obtained. Level of nitrogen, phosphorus, potassium and pH were also tested before and after vermicompost application. The study was laid out in Randomized Complete Block Design, composed of 5 treatments and replicated 4 times. The treatments were: T1-100% Garden soil, T2-100% Saline soil, T3-75% Saline soil and 25% Vermicompost, T4-50% Saline soil and 50% Vermicompost, and T5-75% Vermicompost and 25% Saline soil. All the data gathered were analyzed using T-test and ANOVA. Generally, vermicompost helps in decreasing soil salinity, increasing potassium content of the soil and increasing root length. To increase pole sitao's yield and biomass, addition of 75% vermicompost to 25% saline soil is recommended.

Keywords Soil Salinity, Vermicompost, *Vigna Uniguiculata*, Yield

1. Introduction

Soil salinization is one of the abiotic stresses that greatly affect crop growth and yield [1]. It has been said that 20% of the arable lands in the world are saline which could greatly affect crops [2]. It is one of the greatest threats in crop production since the high concentration of salt in soil solution will affect the physiology of plants. It could result in inhibition of water uptake and would also lead to nutrient imbalance because of uptake inhibition of calcium and phosphorus [3]. Thus, this would lead to growth restriction and eventually death. It is also a major factor that affects seed germination, shoot growth and dry matter [4] production. Salinity also affects photosynthesis by decreasing CO_2 availability, hence leading to leaf growth retardation [2].

To counteract the salinity and be able to cultivate crops, several techniques were used and one of those is the application of organic amendments to soil. Results of the study by Gondek et al. [5] showed that the use of compost reduced the salinity and sodicity of the soil since sodium is replaced by calcium. Rady et al. [6] also reported an increase in yield and growth of beans applied with compost. Vermicompost is one the popular organic fertilizers known to help increase plant growth and tolerance to salinity [7]. It is made from various organic wastes such as animal manure, kitchen wastes, dried leaves, twigs, etc with the earthworm excretions. Previous studies have shown that addition of vermicompost [8,9] on potting media showed a promising result and modulated the harmful effect of salinity.

String beans, locally known as pole sitao is one of the