Security in food, renewable resources, and natural medicines

SFRN 2019

PROCEEDING

ISBN:978-602-51262-8-4

hosted by,
Politeknik Pertanian Negeri Payakumbuh

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Universitas Andalas (UNAND)

3rd INTERNATIONAL CONFERENCE ON SECURITY IN FOOD, RENEWABLE RESOURCES, AND NATURAL MEDICINES 2019 (SFRN 2019)

Convention Hall Politeknik Pertanian Negeri Payakumbuh
INDONESIA

QUANTUM-LEAP OF AGRI-FOOD SYSTEM 4.0 AND DELIVERY OF SUSTAINABLE DEVELOPMENTS GOALS (SDGS)

September 25-26, 2019

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Welcome Message
Executive Chairman of The 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019

Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikum wr.wb

On behalf of the SFRN 2019 organizing committee, I am really honoured and delighted to welcome all of you to the 3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the State Polytechnic of Agriculture Payakumbuh, West Sumatra Indonesia

Our technical program is rich and varied with 8 keynote speeches and 4 invited talks and more than 170 technical papers split between 8 parallel oral sessions and 1 poster sessions. The speakers and participants came from 8 different countries, consist of Academicians, Scientists, Researchers, Practitioners, Professionals, and Government Officialsin multidiscipline branch of knowledge, who gathered here today to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and HealthCare Free for All, in particular for those who in needs. As the chairman of conference 2019 SFRN, I know that the success of the conference depends ultimately on the how many people who have worked in planning and organizing both the technical program and supporting social arrangements. This year, the conference is jointly organized by the Payakumbuh State Agricultural Polytechnic and Andalas University. We also thank to the steering committee fortheir wise and brilliant advice on organizing the technical program; and also to the the Program Committee, both from the Payakumbuh State Agricultural Polytechnic and Andalas University , for their thorough and timely reviewing of the papersand to the Directorof Payakumbuh State Agricultural Polytechnic and the rector of Andalas University, and the Head of the Institute forResearch and Community Service of Andalas University, and Payakumbuh State Agricultural Polytechnic. Our recognition should go to the Organizing Committee members who have all worked really hard for the details of the important aspects of the conferenceprograms and social activities, and then we extend our gratitude to our students who bore the arduous burden for preparing this event.

We hope this event is also a good step in gaining strengthenn cooperation between our universities as we know that the State Agricultural Polytechnicof Payakumbuh is part of the Andalas University previously, of course the psychological relationship between the State Agricultural Polytechnicand the Andalas University is really close.

Finally on behalf of the committee, we apologize profusely for all the shortcomings and everything that is not properly in organizing this event and hopefully AES-Network contributes significantly to the research and technology for the good of humanity.

Thank you

Fithra Herdian, S.TP, MP

Message from Afro-Eurasia Scientific (AES) Network
3rdInternational Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

On behalf of the AES Network, I am honored and delighted to welcome you to the 3rdInternational Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019 at the Agricultural State Poly Technique of Payakumbuh, Indonesia. I believe we have chosen a venue that guarantees a successful technical conference amid the culture, delicacy and scenery of Payakumbuh, the city of "Rendang".

The AES-Network aims to Promote Livelihood Through Food Security, Promote Future Smart and Green Mobility by Using Renewable Energy, Promote Prosperity by Equally Managing and Distributing the Sustainable Resources and Promoting Enjoyable Long-Life by using Natural Medicines With Free Health Care For All. The AES-Network was established in 2018 and already have memberships from 12 countries. Our members consist of Academicians, Scientists, Researchers, practitioners, professionals, and government officials from multidiscipline branch of knowledge, who gathered and contributed their expertise to share and discuss new findings and applications of innovations for promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All.In particular, the network aims to alleviate the condition of those who in dire needs. In the future, we also expect to provide technical demonstrations, and numerous opportunities for informal networking for Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care for All. In this opportunity, we invited you to become our members and join our efforts for a better life to all of mankind.

As a team, we acknowledge the existence of mutual interest among university and college educators, researchers, activists, business sector, entrepreneurs, policy

makers, and all society members. We must promote the need to strengthen cooperation for establishing Security in Food, Renewable Resources, and Natural Medicines in Africa, Europe, and Asia.

The AES-Network believe, a firm foundation for mutual collaboration with the spirit of equality and partnership and thereby contribute towards sustainable development in these three regions.

Therefore, through networking, friendships, and joint efforts, the capacity of our network can be enhanced to address major challenges in securing the Food, Renewable Resources, and Natural Medicines in Africa, Europa, and Asia.Our Network goals areto increase the awareness of educators, researchers, scientific community, business sector, entrepreneurs, and policy makers in Africa, Europa, and Asia, that the future of a better world, lies within their responsibilities, and to improve the networking, mobility and mutual collaboration of scientific community, business sector, entrepreneurs, and policy makers in Africa, Europe, and Asia to energize the delivery of Sustainable Development Goals.

Finally, I hope that, by registering our network, you will be provideda common platform and support the exchange of knowledge, while at the same time, we offer constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrived at the best solutions to our terminal goal, Promoting Food Security, Renewable Energy, Sustainable Resources and Free Health Care based on scientific evidence in Africa, Europa, and Asianregion.

Thank You for Joining us!

President
Assoc. Prof. Dr. Eng. Muhammad Makky

Welcome Message
Head of Institute for Research and Community Service
Universitas Andalas

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

It is with great pleasure that I welcome the participants of the SFRN 2019 in Payakumbuh, the city of "Rendang", the prime of Indonesian delicacy.

In this esteem event, we share the knowledges, and imparted it to the people. The quest for knowledge has been from the beginning of time but knowledge only becomes valuable when it is disseminated and applied to benefit humankind. It is hoped that this conference will become a platform to gather and disseminate the latest knowledge which can be adopted for securing the food, resources, and health for mankind, in Asian, European and African region.

Academicians, Scientist, Researchers and practitioners from multidiscipline branch of knowledge who gathered here today will be able to share and discuss new findings and applications of innovations for ensuring food security, in particular for those who reside in developing countries. It is envisaged that the intellectual discourse will result in future collaborations between universities, research institutions and industry both locally and internationally. In particular it is expected that focus will be given to issues on environmental and sustainability. Therefore, we urge to all participants, to establish a scientific network that will voice the needs

Researchers in the multi sectoral aspects related to the benefit of mankind have been progressing worldwide. Food is a basic right, while energy drive the world. Human need a lot of resources so the civilization can be flourished. But human is not immune, and thus, ones need to take care of their health regularly. Modern Agri-food systems is the foundations of a decent life, a sound education and the achievement of

the Sustainable Development Goals. Over the past decade, we have witnessed a chain reaction that threatens the very foundations of life for millions of the world's people. Rising energy prices drove up the cost of food and ate away the savings that people otherwise would have spent on health care or education. Unsustainable plantation management induced forest fire and posed haze hazard to the whole Sumatra island and our neighboring countries.

The human cost of the food and energy crisis has been enormous. Millions of families have been pushed into poverty and hunger. Thousands more suffering from the collateral effects. Over the past year, food insecurity led to political unrest in some 30 countries. Yet because the underlying problems persist, we will continue to experience such crises, again and again -- unless we act now. That is why we are here today.

We must make significant changes to feed ourselves, and most especially, to safeguard the poorest and most vulnerable. We must ensure safety nets for those who cannot afford food, or energy, nor even a health service. We must transform agricultural development, markets and how resources is distributed. We must do so based on a thorough understanding of the issues. That is the only possible way we can meet the Goals of Sustainable Development.

Thank You,

Assoc. Prof. Dr.-Ing. Uyung Gatot S. Dinata,MT.

Opening Ceremony
Rector of Andalas University

Dear Honorable and Distinguished guests,
Ladies and gentlemen,

Assalamu'alaikum Warahmatullahi Wabarakatuh and Good Morning

I welcome the opportunity to address you at this important event.

It gives me great pleasure in welcoming you to this 3rdConference on "Security in Food, Renewable resources, and Natural Medicines (SFRN)" 2019. I am delighted that so many have accepted our invitation. I am particularly happy that we have in this room, dedicated individuals from so many stakeholder groups — including our most respected and distinguished guest "The ministry of Agriculture of the Republic of Indonesia". We also welcome the mayor of Payakumbuh and the Regent of Lima Puluh Kota. We extend our welcome to the civil society, the private sector, international organizations; the science community; and others dedicated to help create an environment in which people can escape food insecurity. Imagine what we can do together if we make the security for all as an our top priority, and pull in the same direction. We can make a difference in the lives of millions.

Food is a basic right. Food security are the foundations of a decent life, a sound education and the achievement of the Sustainable Development Goals Access to medicines - a fundamental element of the right to health. Health is a fundamental human right, indispensable for the exercise of many other rights in particular the right to development, and necessary for living a life in dignity. Moreover, human rights principles and language are being used to support resource access claims as rights-based approaches empower individuals and groups to gain or maintain access to natural resources

Much progress has been made during the last decades but much more needs to be done. Millions of people are Insecure worldwide, meaning that they either starve or they do not know from where their next meal, health care or resources will come.

Much of the progress on security has occurred at the expense of our environment. With business as usual, we foresee that the production improvements during the next decade will be less than the last one, while the environmental degradation will continue, and health will deteriorate significantly. Without available resources to seek, mankind will become endanger species in a very short time.

Solutions to the security problems need to be designed and implemented within a new and rapidly changing environment. Globalization and sweeping technological changes offer new opportunities for solving these problems. A number driving forces or trends must be taken into account in developing appropriate action. Some of the action needed, such as appropriate technology for small farms, is not new but it must be cast in the new and changing global and national environment, taking into account new opportunities and risks. I hope that by providing a forum for knowledge exchange, this conference will help identify the action to be taken. Furthermore, this conference will help to provide constructive dialogue across and within the various interest and stakeholder groups, including the intended beneficiaries, and arrive at the best solutions.

In conclusion, even if those responsible give high priority to achieving sustainable security for all and back it up with action, the world may not achieve the goal by 2030. But we will be much closer than with business as usual. I urge all of us to provide the strongest support for this event, to enable securing the food for all in the closest time possible. It is my sincere optimism that through the accomplishment of the objectives of this event, we will come to an important step nearer to secure the food for all.

Finally, I would like to thank the organizing committee who have spent their utmost efforts to prepare and manage this event successfully. Let me conclude my remarks by wishing our guests happiness, good luck and great success in the conference.

May I announce now the opening of the "3rd International Conference on Security in Food, Renewable resources, and Natural Medicines (SFRN) 2019" in Payakumbuh.

Thank you.

Rector,
Prof. Tafdil Husni, SE, MBA, PhD

Welcome Message
Director of Politeknik Pertanian Negeri Payakumbuh

Dear Honorable ladies and gentlemen,

Good Morning and Assalamu'alaikumwr.wb

I congratulate to all participants on the invitation and participate at our beloved campus Payakumbuh StateAgricultural Polytechnic. I feel really honoured to welcome all of you at our event, the 3rd International Conference on Security in Food, Renewable Resources, and Natural Medicines (SFRN) 2019 at thePayakumbuh State Agricultural Polytechnic, Indonesia.

Food security is a very important aspect in a country's sovereignty. Food also determines the future direction of a nation. Many social and political fluctuation can also occur if food security is disrupted. Food availability that is smaller than its needs can create economic instability. This critical food condition can even endanger economic and national stability. In the current situation, there are many challenges in exteriorize food security, such as climate change, population, limited natural resources and other challenges both locally, regionally and globally.

Renewable resources are also our starting point to start sustainable development. Research on renewable resources is also very important as the solution in meeting the principles of sustainable development. As we know that Sustainable development is the development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Sustainability is the foundation for today’s leading global framework for international cooperation - the 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs)

The discovery of treatment based on local culture also contributes greatly to the good of humanity. Unfortunately, there are still many treatments that have not been carried out by scientific research. So, through this conferencewe hope it can be a trigger to increase in traditional plant-based treatments that not go through complex

chemical processes, so that the effectiveness of the pillars can be further suppressed and also contribute to the community's economy.

Finally, I would like to express my gratitude to all people who involved in organizing this event and to all ofstakeholders who have helped to make this event go on succesfully. Please accept my apologize for any shortage, Assalamu'alaikumwr.wb.

Thank you

Ir. Elvin Hasman, MP

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Growth and Results of Some Shallots Varieties in Two Ways of Planting in the Lowland

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Abstract. The study was conducted to obtain adaptable varieties and methods of planting shallots. The research was ordered in factorial using a randomized block design. The first factor was using mulch or without mulch, and the second factor was using six varieties of shallots. The planting is in 1 x 10 m seedbed by 15 x 15 cm apart with a tuber per planting hole. Each treatment was repeated three times. The results showed that the method of planting shallots using mulch generated better growth of the plants and better yield compared to planting shallots without mulch. The highest yield was obtained through planting method using mulch, which is 11.74 t/ha, whereas without mulch, only 9.36 t/ha. There was a 2.38 t/ha difference or an increase of 20.27% yield. Four shallots varieties that gave better results by using the planting method with mulch are Super Philip (12.92 t/ha), Manjung (12.85 t/ha), Ilocos Philip (11.94 t/ha) and Katumi (11.48 t/ha). Whereas three varieties that relatively gave better results by planting without mulch are Super Philip (10.76 t/ha), Ilocos Philip (10.55 t/ha), and Manjung (10.13 t/ha).

Keywords: Cultivation, Jambi, lowland, shallot

INTRODUCTION

Shallot (*Allium ascalonicum* L.) is a horticultural commodity that has high economic value and is needed every day as a food flavoring ingredient. It has an attractive market prospect to be cultivated and developed (Rukmana, 1994; Musyafak and Sahari, 2000). The increase in the food processing industry also tends to increase + 5% of the need for shallots in the country annually exclude the consumption for restaurants, hotels, and processed industries (Suwandi and Azirin, 1995). Adiyoga and Thoma (1997); Suwandi and Hilman (1995) states that shallot is commodity that has a comparative advantage and is eligible to enter free trade. In Jambi Province, the harvesting area of shallots in 2016 was 788 ha with total production 4,939 tons or 6.27 t/ha of productivity, cultivated in three districts, namely (1) Kerinci District, 713 ha harvesting area with 4,696 tons production or productivity of 6.59 t/ha, (2) Merangin District, harvested 55 ha with 183 tons production or 3.33 t/ha productivity and (3) Sungai Penuh District, 18 ha harvesting area with production of 57 tons shallots or 3.17 t/ha productivity (BPS of Jambi Province, 2017). Research results of technology improvement on shallot cultivation can reach 10-11 tons/ha (Thamrin et al., 2003; Maskar et al., 1999; Suwandi and

Hilman, 1995), even according to Winarto et al., (2009) it is known that shallot productivity can reach 20 tons/ha.

In Indonesia, shallots are cultivated more in the lowlands than in the highlands because the operations are more efficient and their agro-climate conditions are more supportive of optimizing plant growth (Suherman and Basuki, 1990). Basuki (2010) and Sumarno (1997) stated that among the existing shallot production centers, Brebes Regency is the most important lowland shallot production center, which accounted for about 30% of the total national shallot production.

Shallots are long-day plants and produce better in an open space and have enough sunlight (70%), especially if the exposure time is more than 12 hours. Shallots are not suitable in the high rainfall area, especially in the period before harvest. On the other hand, shallots also cannot stand the drought, especially at the time of tuber formation. Good rainfall for shallots is around 100-200 mm/month. Areas that are often foggy are not suitable for shallot cultivation, because it reduces the intensity of sunlight and also causes powdery mildew that can thwart harvests (Sumarni and Roliani, 1994 in Maryam et al., 2011; Sartono and Suwandi, 1996; Shahabuddin and Mahfydz, 2010).

Control of pests and diseases of shallots can be done with biopesticides or microbial antagonists. Control of *Spataropthera exigua* leaf caterpillars not only using insecticides but can also by using Feromon-Exi (Nurjanani and Ramlan, 2008; Haryatai and Nurawan, 2007), neem leaves, or *Beauveria bassiana* (Shahabuddin and Mahfudz, 2010). Wilt or moler disease caused by the fungus *Fusarium oxysporum* purple spots and leaf rot caused by *Alternaria porri* and Peronosfora (Suprapto et al., 2007; Putra, 2010).

Shallot cultivation in Jambi Province is generally carried out in the highlands, although there are in the lowlands, but only in a small planting area. However, shallot cultivation can be carried out in the lowlands to the highlands (Permadi, 1995). Rosmayati et al., (2011), stated that the productivity of shallots in the lowlands has not been able to match the production in the highlands. The main problem is the unavailability of varieties that can adapt to the lowlands that encourage farmers to use seeds derived from shallots for consumption, and the weak knowledge of farmers about cultivation technology. Besides, the rapid growth of weeds disrupts the growth of shallots and also the hosts for pests and diseases, resulting in low production.

One effort to overcome the problems above is to introduce new high yielding varieties of shallots that are adaptive and have superior characteristics, especially in terms of production and resistance to pests and diseases, so that they can produce high yields (Permadi, 1995). If one or two varieties of superior location-specific have been obtained and developed on a wider planting scale, it can maintain the sustainable production of shallots on the market. Other than that, the development of shallots is directed to the optimal suitability of environmental factors. In this connection, the availability of varieties suitable for the local environment and high yield potential is a factor that directly affects the yield and adaptability of varieties.

Shallots are a new commodity cultivated by farmers in Jambi City. However, farmers are accustomed to farming vegetables such as mustard greens, spinach, kale, cauliflower, pakchoi, kailan, celery, bitter melon, pare, chinese okra, eggplant, chilies, tomatoes, and others. In collaboration with the Agriculture Department of Jambi Province with the source of funding from the 2015 State Budget and technological guidance by the Assessment Institute for Agricultural Technology of Jambi, carried out a demonstration plot of several shallot varieties. Shallot commodity was chosen because of supportive agroecosystems, high demand, and market opportunities. By looking at the problems above, a study was carried out aimed at obtaining adaptive varieties and ways of planting shallots in the Jambi lowlands.

MATERIAL AND METHOD

The research was carried out on the farmer's land in the Paal Merah Village on Jambi City from April to August 2015, with the sources of funds from the State Budget that were managed by the Jambi Provincial Agriculture Office and the Jambi Agriculture Fisheries and Forestry Agriculture Office. The research area includes the agroecosystem of Wet Climate Lowland Wetlands, an altitude of 30 meters above sea level, alluvial soil types, moderate to deep solum depth, good drainage, smooth texture, and acidic soil pH with a range of 4.5-5.5. The research was carried out factorial using a randomized block design and each treatment was repeated three times. The first factor is the use of with and without black silver plastic mulch (mulsa plastik hitam perak/MPHP). The second factor is six shallot varieties (Super Philip, Ilocos Philip, Tajuk, Biru Lancor, Katumi, and Manjung). The size of seedbed is 1 x 10 m, with 15 x 15 cm space and a tuber per planting hole. The seeds used are 1.5-1.8 diameter, with an average weight of 5-10 grams in medium size.

The land used is the land used for mustard planting, soil processing is done with a hoe and after the first tillage made seedbeds with 100 cm wide, 30 cm high, 10 m long and 60 cm between the beds. Basic fertilizer in the form of organic fertilizer from 50 kg of chicken manure/seedbed, plus 3 kg of dolomite/ seedbed, spread evenly on the surface of the seedbed and stirred flat with the soil surface, then rested for seven days. Chemical fertilizer treatment for MPHP is given seven days after applying the organic fertilizer and dolomite, with the form of compound NPK (16:16:16) dose 4 kg/seedbed, spread evenly on the surface of the seedbed and stirred with soil in seedbed surface of approximately 10 cm depth, then installed MPHP, three days later did the planting. For treatment without MPHP, basic chemical fertilizer is given at the time of planting with the form of compound NPK (16:16:16) a dose of 4 kg/seedbed on the runway beside the plant.

Additional fertilizers in the form of compound NPK (16:16:16) are given twice at the age of 15 days and 30 days after planting, by leaking at a dose of 2 and 5 grams/liter of water each. Plant maintenance includes watering, weeding, controlling plant-disturbing organisms, and adds Carbofuran along with basic fertilizers at the time of planting. Leaf caterpillar control is carried out by using selective insecticides made from active abamectin and spinous according to the recommended dosage. To

control anthracnosis caused by the fungus *Colletotrichum* sp., diphenoconazzol, selective fungicides used as active ingredients according to the recommended dose. Harvesting is done at the age of 65 days after planting. The observed variables included an agronomic performance of plants, including plant height at 28 and 42 days after planting, number of leaves at 28 and 42 days after planting, and also the number of tubers per clump. Observations were made on ten clumps of plants taken randoml. These plants were marked with bamboo poles and were the sample of observations in subsequent observations. For production, yields are taken per seedbed at harvest time, and then converted to hectares. Data were analyzed statistically using ANOVA and DUNCAN follow-up tests at 5 % significance level.

RESULTS

During the growth of the plant was not found any Plant Pest Organisms (PPO) in the form of significant pests or diseases. Some pests and diseases encountered with population and intensity of attacks below the threshold control such as thrips pests, caterpillars, and aphids, while purple spots. The pest control is carried out by sanitation and spraying selective insecticides with active ingredients abamectin and spinosad, while to control disease attacks by using diphenoconazzol, active ingredients of selective fungicides, according to the recommended dosage. During the research, spraying activity has done three times, i.e. at the age of 15, 23, and 40 days after planting.

Growth of plant height and number of shallot leaves, at observations of age 28 and 42 days after planting, are presented in Table 1. The two planting methods tested did not show any significant difference in plant height at 28 and 42 days after planting. However, from the six treatment varieties tested, there are significant differences, especially in the observation at 28 days after planting. The Ilocos Philip variety has the highest plant height, with or without MPHP (24.10 and 24.15 cm), and the Biru Lancor variety with MPHP treatment is significantly different from other varieties (23.12 cm). in contrast, the shortest plants were Katumi varieties treated with MPHP and without MPHP (20.87 and 20.46 cm). Observation of plant height at 42 days after planting was no significant difference in plant height, either in the treatment of planting methods or between varieties tested.

Table 1. Average plant height and number of leaves of shallots, on lowland dry land

Treatment		Plant height (cm)		Number of leaves	
Planting method	Variety	28 days after planting	42 days after planting	28 days after planting	42 days after planting
With black silver plastic mulch (MPHP)	Biru Lancor	23,12 a	32,62 a	24,21 b	18,76 a
	Katumi	20,87 c	30,83 a	24,02 b	17,32 ab
	Manjung	22,48 b	30,60 a	23,45 b	16,01 b
	Ilocos Philip	24,10 a	31,80 a	27,97 a	15,68 b
	Super Philip	22,08 b	31,27 a	26,75 a	19,03 a
	Tajuk	22,81 b	30,46 a	27,34 a	17,23 ab
	Average	22,41 A	31,93 A	25,62 A	17,34 A
Without black	Biru Lancor	22,18 b	31,17 a	23,76 b	15,62 b

Treatment		Plant height (cm)		Number of leaves	
Planting method	Variety	28 days after planting	42 days after planting	28 days after planting	42 days after planting
silver plastic mulch (MPHP)	Katumi	20,46 c	30,12 a	22,86 b	15,21 b
	Manjung	22,61 b	30,04 a	23,32 b	15,65 b
	Ilocos Philip	24,15 a	30,13 a	25,35 ab	16,35 b
	Super Philip	22,68 b	31,11 a	24,73 ab	17,42 ab
	Tajuk	22,43 b	30,18 a	25,21 ab	16,75 b
	Average	22,25 A	30,46 A	23,87 B	15,83 B

Note: The numbers in the same column, followed by the same uppercase and lowercase letters are not significantly different according to the DMRT test at 5 % significance level

Analysis results on the number of leaves at age 28 and 42 days after planting shows the different results for planting with different planting methods and varieties tested. The planting method using MPHP has the highest average number of leaves, in the observation of 28 days after planting and 42 days after planting (25.62 and 17.34 strands), significantly different from planting without MPHP (23.87 and 15.83 strands). From the six varieties of shallots tested, there were no significant differences in the number of leaves. Observation on 28 days after planting, the least number of leaves found in Katumi varieties (22.86 strands) by planting method without using MPHP and most varieties of Ilocos Philip (27.97 strands) by planting method using MPHP. The same thing was found in the observation of leaf at 42 days after planting, where the least number of leaves was obtained by Katumi varieties (15.21 strands) by planting method without using MPHP and the most was Super Philip varieties (19.03 strands) by planting method using MPHP.

There are differences in plant height, especially in the observation at 28 days after planting, but the different number of leaves in observations at 28 and 42 days after planting caused by plant genetic factors and the response of each variety to the different growing environments (MPHP and without MPHP). Gunadi and Suwandi (1989) in Firmansyah et al., (2014) and Simatupang et al., (2017) stated that plant height and number of leaves are one indicator of plant growth. However, there is no correlation with yield.

Table 2 presents the analysis results of the average age of harvest, the number of tubers, and the wet yield of shallots in two planting methods. There is no difference in the age of harvest both in the treatment of planting methods and between the shallot varieties tested. Planting with MPHP has the highest number of tubers (9.93 tubers/clump), significantly different from planting without MPHP (7.29 tubers/clump). Manjung variety has the highest number of tubers (13.03 tubers/clump), it is not significantly different from the Biru Lancor variety (11.20 bulbs/clump) and Katumi varieties (10.82 tubers/clump) but significantly different from the three other varieties. Tajuk varieties has the smallest number of tubers (6.59 tubers/clump) with MPHP. In contrast, without using MPHP, the Manjung variety has the highest number of tubers (8.01 tubers/clump) not significantly different from the Super Philip variety (7.83 bulbs/clump), but significantly different from the other four varieties and Tajuk varieties have the fewest tubers (6.20 bulbs/clump).

There are significant differences in wet yields in the two treatments tested. The planting method using MPHP gave the highest yield (11.74 t/ha) significantly different from without MPHP (9.36 t/ha). The Super Philip variety gave the heaviest yield (12.92 t/ha) which was not significantly different from Manjung varieties (12.85 t/ha), Ilocos Philip varieties (11.94 t / ha) and Katumi varieties (11.48 t/ha) by planting treatment using MPHP while the Tajuk variety gives the lightest yield (7.89 t/ha) in the treatment method of planting without MPHP.

Table 2. The average age of harvest, number of tubers and shallot yield, on lowland dry land

Treatment		Harvesting age (days after planting)	Number of tubers per clump	Yields (t/ha)
Planting Method	**Variety**			
With black silver plastic mulch (MPHP)	Biru Lancor	61 a	11,20 a	10,77 b
	Katumi	63 a	10,82 a	11,48 a
	Manjung	60 a	13,03 a	12,85 a
	Ilocos Philip	62 a	8,84 b	11,94 a
	Super Philip	60 a	9,07 b	12,92 a
	Tajuk	60 a	6,59 c	10,47 b
	Average	61 A	9,93 A	11,74 A
Without black silver plastic mulch (MPHP)	Biru Lancor	60 a	7,03 c	8,03 c
	Katumi	62 a	7,64 c	8,80 c
	Manjung	60 a	8,01 b	10,13 b
	Ilocos Philip	60 a	7,05 c	10,55 b
	Super Philip	61 a	7,83 b	10,76 b
	Tajuk	60 a	6,20 c	7,89 c
	Average	60 A	7,29 B	9,36 B

Note: The numbers in the same column, followed by the same uppercase and lowercase letters are not significantly different according to the DMRT test at 5 % significance level.

The difference in the number of tubers per clump and wet crop yields of each variety is due to plant genetic factors and their interactions with the conditions of the environment in which they grow, especially the effect of using MPHP. Without MPHP, competition occurs to obtain nutrients between the shallots and weeds. In this study, weeding was done three times for shallot planting without MPHP, whereas using MPHP weeding was only done one time on the weeds that grow in the planting hole. Sumarni et al., (2012); Edi and Hernita (2017), stated that the number of shallot cloves (tillers) was determined more by plant genetic factors than fertilization factors. Shallot production shows differences between varieties. It is indicated that each variety has different growth and adaptability in the lowland agroecosystem. Sartono (2010) stated that shallot production, in addition to external factors, is also influenced by internal factors, namely genetic of each plant.

CONCLUSIONS

- Planting with MPHP provides better growth and yield of shallots than planting without MPHP, especially from the observation of the number of leaves at age

28 and 42 days after planting, the number of tubers per clump, and the gross weight of shallots yield.

- The highest yield was obtained in the cultivation method using MPHP, which is 11.74 t/ha, whereas without MPHP the yield is 9.36 t/ha. There is a difference of 2.38 t/ha yield or an increase of 20.27%.
- Four varieties of shallots gave the best results, namely Super Philip (12.92 t/ha), Manjung (12.85 t/ha), Ilocos Philip (11.94 t/ha), and Katumi (11.48 t/ha) by cultivation method using MPHP. While in the cultivation method without MPHP, three varieties that are relatively had better yielding, namely Super Philip (10.76 t/ha), Ilocos Philip (10.55 t/ha), and Manjung (10.13 t/ha).
- There are four varieties of shallot, namely Super Philip, Manjung, Ilocos Philip and Katumi as alternative varieties of shallot to be grown by planting using MPHP in the lowlands of Jambi.

ACKNOWLEDGMENT

The Jambi Provincial Department of Agriculture and the Jambi City Department of Fisheries and Forestry have facilitated this research activity.

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