PROCEEDING

INTERNATIONAL CONFERENCE ON SUSTAINABLE AGRICULTURE AND NATURAL RESORCES MANAGEMENT

"DRIVING SUSTAINABLE AGRICULTURE THROUGH DEVELOPING GREEN GROWTH STRATEGIES"

May 23, 2017 Medan

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ICoSAaNRM 2017

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Preface

First of all, thanks to Allah SWT, for giving us of bless and grace, the entitled " International Conference on Sustainable Agriculture and Natural Resources Management (ICoSAaNRM)" can be finished.

ICoSAaNRM 2017 organized by Agriculture Faculty of University of Muhammadiyah Sumatera Utara (UMSU). ICoSAaNRM provide an international forum for sharing knowledge, information, experience and research result as well as there view of pregress and discussion on the theme "Driving Sustainable Agriculture Through Developing Green Growth Strategies.

We would also like to express our heartiest to thank to University of Muhammadiyah Sumatera Utara, steering committees, member of organizing committee, Keynote speakers, HGKNI, Presenters, Reviewers, Moderators, and participants for support to success of this conference.

Thank you

Medan, May 23, 2017

ICoSAaNRM Committee 2017

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Speech of Steering Committee

Assalamu'alaikum Wr. Wb.
Good morning everyone,

Thank you to the master of time for giving me a great honour to deliver welcome speech.
First of all, I would like to thank to Allah subhanallahu wata'ala for giving us health and opportunity so that we can gather in this place.
It is my pleasure to welcome you all to the opening of International Conference on Sustainable Agriculture and Natural Resources Management.

The honorable Co Rector University of Muhammadiyah Sumatera Utara : Dr. M. Arifin Gultom, S.H., M.Hum.
The honorable our keynote speakers: Prof. Chayapol Khatikarn (Thailand); Dr. Ariya Kunothai (France); Prof. Edison Purba, PhD (Indonesia); Deden Derajat Matra, PhD (Japan); Suriana Tarigan, PhD (German); Ir. Alridiwirsah,M.M (Indonesia).

The honorable: Dean of Agriculture Faculty of University of Islam Sumatera Utara, Dean of Agriculture Faculty of University of Pembangunan Pancabudi, Dean of Agriculture Faculty of STIPAP, Dean of Agriculture Faculty of Sekolah Tinggi Penyuluhan Pertanian, Dean of Agriculture Faculty of University of Al-washliyah, Dean of Agriculture Faculty of University of Al-Muslim, Dean of Agriculture Faculty of University of Malikussaleh, Dean of Agriculture Faculty of University of Amir Hamzah, Dean of Agriculture Faculty of Langsa, Dean of Agriculture Faculty of University of Sisingamangaraja.

The honorable all presenters and all participants, and special thank to all the committees, Ir. Asritanarni Munar,M.P; Hadriman Khair, S.P., M.Sc; and the entire committees that i can't mention one by one.

This conference frienship with University of Muhammadiyah Sumatera Utara and Himpunan Gerakan Kewirausahaan Nasional Indonesia and Marisa.Muchsin, MBA from Thailand as a moderator.

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This is the first one of a new International Conference in Agriculture Faculty, University of Muhammadiyah Sumatera Utara.
We are grateful to be able to hold this conference.
We only prepare within 14 days for this conference.
We apologize if there is a shortage.

The conference adopts a timely theme "Driving Sustainable Agriculture Through Developing Green Growth Strategies".
On behalf of the committee, I welcome you all and thank you very much for your coming.

In closing, I hope your participation will bring some benefits, I hope that all of you will enjoy the conference, and i wish our keynote speakers abroad will have a very pleasent stay in our city.

Thank you.

Wabillahi Taufik Walhidayah
Assalamu'alaikum Wr. Wb

Aisar Novita, S.P.,M.P
Chairman of Organizing Committee ICoSAaNRM 2017

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Welcome Speech

on

International Conference;

Sustainable Agriculture And Natural Resources Management

Medan, May 23, 2017

BISMILLAHIRROHMANIRROHIM

Assalamualaikum Warohmatullohi Wabarokatuh

Alhamdulillahi Rabbil'alamin, Wassamu'ala Asyrafil Ambia-l Walmursali.

Wa'alaalihi Washshbihi Ajma'in

Gratitute to Allah subhanallahu wata'ala, The One Almighty God, for giving us health and opportunity so that we can gather in this seminar, shalawat and greetings to our prophet Muhammad SAW.
It is my pleasure to welcome you all to the opening of International Conference on Sustainable Agriculture and Natural Resources Management.

The honorable Rector University of Muhammadiyah Sumatera Utara : Dr. Agussani, M.AP and Co Rector: Dr. M. Arifin Gultom, S.H., M.Hum. Our keynote speakers: Prof. Chayapol Khatikarn (Thailand); Dr. Ariya Kunothai (France); Prof. Edison Purba, PhD (Indonesia); Deden Derajat Matra, PhD (Japan); Suriana Tarigan, PhD (German).
The honorable all presenters and all participants, and audience.

Thank you for participating in the International Conference on sustainable Agriculture and Natural Resources Management with adopts a timely theme "Driving Sustainable Agriculture Through Developing Green Growth Strategies", held by UMSU Agriculture Faculty.

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Agriculture Faculty of Uiversity of Muhammadiyah Sumatera Utara is one of the eight faculties in UMSU. Our faculty has 2070 college students. Which at all times always innovate to move forward and develop following the progress of science and technology.

Agriculture is a very interesting thing to be discussed. Not just for farmer, observers, government and academia. Therefore, we gathered in this seminar to discuss the strategy of sustainable agriculture and natural resources management.

At this conference, we will get a lot of important information. With this, I, hope this will bring some benefits. So In closing, wabillahitaufik walhidayah wassalamu'alaikum wr wb.

Wabillahi Taufik Walhidayah
Assalamu'alaikum Wr. Wb

Dean of Agriculture Faculty UMSU

Ir. Alridiwirsah, M.M

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Growth and Production of *Zea mays* on Weed Management and Land Preparation in Three Different Places in Sumatera Utara

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ABSTRACT

Loss of corn crop yields due to competition with weeds approximately 40-50%. To overcome the negative impacts, it is necessary to prepare land such as no tillage which is one of the alternatives in the preparation of land for corn crops. This study aims to evaluate growth and production of *zea mays* on weed management and land preparation in three different places in sumatera utara. This study was conducted in Deli Serdang area, Karo area dan Simalungun area, Sumatera Utara. The research used Randomized block design non factorial with 10 treatments and repeated 3 times. The treatments were: T1 (soil tillage, 21 and 42 day after planting (DAP) with Paraquat application); T2 ((soil tillage, 21 and 42 day after planting (DAP) with Mesotrion + Atrazin (Calaris) application); T3 (soil tillage, 21 and 42 DAP with weeded); T4 (soil tillage, 14 DAP weeded); T5 (soil tillage, no weed controlled); T6 (no soil tillage, 21 and 42 DAP paraquat application); T7 (no soil tillage, 21 and 42 DAP calaris application); T8 (no soil tillage, 21 and 42 DAP weeded); T9 (no soil tillage 14 DAP weeded); T10 (no soil tillage and no weed controlled). The result indicated that soil tillage and weed control in three different palces in Sumatera Utara showed significant effect on the growth and production variable such as leaf area where soil tillage 21 and 42 DAP with paraquat application was the highest in Deli Serdang and Karo area , 100 seeds weight where Simalungun area was the highest, and showed significant effect on variable production per plant in Karo area where paraquat and calaris application was the highest among other treatments. Therefore, weed management and land preparation are important to increase growth and production corn crop.

Key words: *zea mays, weed, land, tillage.*

Introduction

The presence of weeds on corn crops decreases yield and seed quality. The critical period of corn crops competes with weeds occurs on days 20 and 45, then also the critical periods of maize occur on days 80 to 150. The yield decrease depends on the type of weeds, density, duration of competition, and allelopathic compounds issued by weeds. Allelopathy is a chemical released by weeds against the staple crops causing the morphology of its leaves, which is filled with brown and white patches, stunted small plants, abnormally long roots. Physically weeds compete with plants in terms of spatial use, light and chemically in terms of utilization of water, nutrients, essential gases in the allelopathic process. Competition may take place when the components or substances needed by weeds or cultivated plants are at a limited

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number, located adjacent and together required (Sembodo, 2010; Clay and Aquilar, 1998; Moenandir, 2010).

Tillage is not able to control the existence of weeds and even control to an increase in weed populations because during soil processing occurs the spread of weed vegetative organs such as stolon, rhizomes and roots are cut off by agricultural tools with the growing population of plants with weeds that directly reduce the yield of plants (Silawibawa *et al.*, 2003). No tillage is a direct planting system without preceding the soil treatment. No tillage requires herbicides for previous weed control. No tillage began to be widely applied to farmers in central Java and Central Java after the rice harvest, farmers use the land by planting various crops. No tillage begins with the application of glyphosate-based herbicides to kill weeds (Mulyadi et *al.*, 2007).

One of the pesticides is herbicide which in terms of time of herbicide can be divided into three namely, pre-planting herbicide, pre-growth herbicide, and post-grown herbicide. Pre-planting herbicides, applied to the land before or at the time the soil is treated but not yet planted. Pre-grew herbicides are given before weeds and plants grow. The effectiveness of herbicides will be maximal if the soil is not lumpy.

Post-grown herbicides are sprayed when weeds and plants have grown together. In these circumstances the herbicide must be completely selective in the sense the word can kill weeds but is safe for cultivated plants. Selectivity can be enhanced by selecting suitable herbicides for plants and in accordance with target weeds (Sasmita, 2005).

Mycorrhizae a form of mutualistic association between fungi with high-level plant roots has a very wide spectrum both in terms of host plants, fungal mechanisms association, effectiveness, microhabitat and spreading. In this phenomenon fungi infect and colonize the roots without causing necrosis as common pathogenic fungal infections occur, and get regular nutrients from the plant. In this case the fungus does not damage or kill its host plants receive mineral nutrients, while the fungus obtains carbon compounds from the result of photosynthesis of its host plants (Hanafiah, *et al.*, 2009).

Materials and Methods

In order to study growth and production of *zea mays* on weed management and land preparation in three different places in Sumatera Utara, an experiment was conducted in Deli Serdang area, Karo area dan Simalungun area, Sumatera Utara. The research used Randomized block design non factorial with 10 treatments and repeated 3 times. The treatments were: T1 (soil tillage (ST), 21 and 42 day after planting (DAP) with Paraquat application); T2 ((soil tillage, 21 and 42 day after planting (DAP) with Mesotrion + Atrazin (Calaris) application); T3 (soil tillage, 21 and 42 DAP with weeded); T4 (soil tillage, 14 DAP weeded); T5 (soil tillage, no weed controlled); T6 (no soil tillage, 21 and 42 DAP paraquat application); T7 (no soil tillage, 21 and 42 DAP calaris application); T8 (no soil tillage, 21 and 42 DAP weeded); T9 (no soil tillage 14 DAP weeded); T10 (no soil tillage and no weed controlled).

Land preparation. Land located cleaned. There were 30 plots, plot size 2 m x 3 m. The number of plants perplot had 55 plants and total plant had 1650 plants.

planting. The planting of corn seeds using tugal with a depth of 3 - 5 cm and spacing of 70 x 20 cm, one planting hole with two corn seeds and before first planted corn seeds in soak approximately 3 minutes to accelerate germination

Harvest. Harvest was done when corn was ripe (90 to 100 days after planting) physiological mature. By looking at its characteristics such as leaves have started yellowing, yellowish brown.

Parameters observed:

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Leaf Area. Measuring the leaf area was using the LAM (Leaf Area Meter), the observations were made by measuring the width of all the perfectly open leaf strands of the sample plants specified on each plot, measurements were made at ages 3, 6 and 9 weeks after planting by taking average of plants.
100 seeds weight. The corn was weighed at the end of the experiment, when the moisture content of the seeds was approximately 15% sampling of seeds was done randomly with some samples of each treatment and average replication.

Results and Discussion

In this research, The result indicated that soil tillage and weed control in three different palces in Sumatera Utara showed significant effect on the growth and production on leaf area where soil tillage 21 and 42 DAP with paraquat application was the highest in Deli Serdang and Karo area (Table 1).

Soil tillage and weed control showed significantly effect increase the leaf area age 9 MST in Deli Serdang and Karo regency that is by using perfect soil 21 and 42 HST paraquat application, Calaris and weeded, it was caused mainly weeds gave plant competition soil tillage was often not able to control the existence of weeds and even lead to an increase in weed populations because during soil tillage of spreading vegetative organs cut by agricultural equipment with the growing population of plants with weeds that directly reduce the plants yield, it is also reported by Indrayanti (2010) that the leaf area decreases when the number of weeds and if there is no weeds around the plant.

Table 1. The average of Leaf Area 9 WAP in Deli Serdang, Karo and Simalungun

Treatment	Deli Serdang	Karo	Simalungun
	---------- cm^2 ----------		
T1 (Soil Tillage 21 dan 42 DAP paraquat application)	22696.07a	2945.56a	8725.85
T2 (ST 21 dan 42 DAP Calaris application)	16831.63bc	3082.46a	9952.90
T3 (ST 21 dan 42 DAP weeded)	21132.54ab	2804.95ab	9119.67
T4 (ST 14 DAP weeded)	15512.03bcd	2952.41a	9126.27
T5 (ST dan no weed control)	16056.15bcd	3094.43a	9882.13
T6 (ST 21 dan 42 DAP paraquat application)	8671.23ef	1845.15c	8303.20
T7 (ST 21 dan 42 DAP Calaris application)	10307.73def	1906.41bc	8036.55
T8 (ST 21 dan 42 DAP weeded)	14260.57cde	2547.89abc	10208.93
T9 (ST 14 DAP weeded)	10646.37def	1927.75bc	9385.07
T10(ST and no weed control)	7157.47f	2015.83bc	10134.91

Means values in a column and row followed by unlike letter (s) are significantly different at 5% level using DMRT (Duncan Multiple Rentang Test).

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Herbicides in corn crops are widely used for land preparation with no tillage system, resulting in a double gain that is time-saving and energy, especially as a substitute for manual weed control (Mawardi, 2005). Herbicides are most appropriate when applied when weeds are present in sensitive stages of pesticides. Generally, the earlier stage of development of Plant Disturbing Organisms, the more susceptible to herbicides, new weeds 2-4 strands more easily controlled with herbicides than weeds that have grown. Unfortunately, weeds development in a field or garden stretching is not simultaneous (Triharso, 1996).

In this research, 100 seeds weight where Simalungun area was the highest, and showed significant effect on variable production per plant in Karo area where paraquat and calaris application was the highest among other treatments (Table 2).

Soil tillage and weed control showed significantly effect the weight of 100 maize seeds in Simalungun District alone, while Karo and Deli Serdang districts have no significant effect on weed control. Soil treatment and weed control significantly affect the weight of 100 seeds. The best 100 seeds in the three districts were found in T1 treatment (OTS 21 & 42 paraquat application). The following 100 seeds are lowest in the 3 districts present in the T10 treatment (TOT and weeds are not controlled). This difference is related to the type and population of weeds in the 3 districts. Besides, the difference in soil fertility from the 3 districts also affects the weight of 100 seeds.

Table 2. The average of 100 seeds weight in Deli Serdang, Karo and Simalungun

Treatment	Deli Serdang	Karo	Simalungun
	---------- g ----------		
T1 (Soil Tillage 21 dan 42 DAP paraquat application)	34.63	30.49	34.67a
T2 (ST 21 dan 42 DAP Calaris application)	32.54	27.32	30.62ab
T3 (ST 21 dan 42 DAP weeded)	33.22	26.29	29.91abc
T4 (ST 14 DAP weeded)	31.62	23.18	29.76abc
T5 (ST dan no weed control)	31.01	22.96	29.61abc
T6 (ST 21 dan 42 DAP paraquat application)	28.54	20.43	25.20bc
T7 (ST 21 dan 42 DAP Calaris application)	29.42	22.30	26.42bc
T8 (ST 21 dan 42 DAP weeded)	30.59	22.68	29.57abc
T9 (ST 14 DAP weeded)	30.53	22.38	27.32bc
T10(ST and no weed control)	28.39	19.93	24.34c

Means values in a column and row followed by unlike letter (s) are significantly different at 5% level using DMRT (Duncan Multiple Rentang Test).

Post-grew herbicide aims to allow weeds that grow after plant growth to be suppressed so that subsequent plant growth is not disturbed. In weed control is known as a critical period of plants to weeds. In corn, the critical period is when corn is between 10-40 days DAP. It means that weeds grow between the critical age will decrease the results of corn. While weeds grow before and after have no significant affect on the results, although it can affect other factors complicate the work in the

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fields and so forth. Therefore, weed control efforts in corn crops are directed at critical periods.

Conclusions

Soil tillage 21 days after planting and paraquat application in Simalungun gave the best results on 100 seeds weight and leaf area in Deli serdang and Karo.

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