GROWTH ANALYSIS AND PRODUCTIVITY OF SOYBEAN-MAIZE IN INTERCROPPING PATTERN AND SALOME PATTERN

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Abstract. The purpose of this study was to find out how the best use of sunlight efficiency between intercropping and salome cropping systems is to compare the best production of both intercropping and salome cropping systems. The experiment was conducted at the Experimental Garden of Agriculture Faculty, Gadjah Mada University, Banguntapan, Bantul, Yogyakarta, starting on May 2015. The experiment was conducted on a plot of land measuring 4 x 7 m^2. This experiment used a Randomized Randomized Complete Block Design (RCBD) consisting of one treatment factor namely planting system, with 2 treatment levels: intercropping System of Soybean-Maize (S1) and Salome Cropping System (S2). Salome cropping pattern gives better yield of maizecobs than 1: 2 intercropping. Salome cropping pattern decreases the number and weight of freshly ground soybean pods compared to 1: 2 intercropping system.

Keywords: maize, soybean, intercropping, salome

INTRODUCTION

Cropping pattern is divided into two parts namely monoculture cropping system or single cropping and polyculture such as intercropping cropping system. Intercropping is an attempt to plant several types of crops on the land in the same time, arranged in such a way in the rows of plants. Cropping in this way can be done on two or more relatively old plant species, such as maize and peanuts or it could be in some different age crops. To be able to implement intercropping cropping pattern properly, it is necessary to pay attention to several environmental factors that have influence such as water availability, soil fertility, sun rays and pests. Determination of the type of plants to be intercropped and when planting should be adjusted to the available water availability during growth. This is intended to avoid competition (nutrient and water absorption) on an intercropping plot. In the intercropping cropping pattern should be selected and combined between plants that have relatively deep roots and plants that have relatively shallow roots.

In addition to intercropping in an effort to increase the efficiency of the use of sunlight to produce crop production can be done with the use of a polyculture system based on local wisdom Nusa Tenggara Timur region which semi-arid climate (dry) that is "Salome".

A crowded hole or often abbreviated salome is done by inserting some seeds in a hole like maize seeds, cowpea and / or rice nuts, and pumpkin into one planting hole. This salome pattern is similar to the pattern performed on similar agricultural systems in Central America known as Milpa system. In the milpa system, the three types of plants grown in one

planting hole are known as "three sisters" each of which has its own role. Maize certainly acts as a major food crop. Beans are legumes that can block nitrogen from the air through the nodule of the roots to provide for the nitrogen needs of maize and pumpkin. Then gourds that grow on the soil surface act as cover plants that protect the soil from erosion at the beginning of the growing season and inhibit weed growth. That way, dryland farmers not only take the action of crop protection, but also the protection of the soil.

The purpose of this study was to find out how the best use of sunlight efficiency between intercropping and salome cropping systems is to compare the best production of both intercropping and salome cropping systems.

MATERIALS AND METHOD

The experiment was conducted at the Experimental Garden of Agriculture Faculty, Gadjah Mada University, Banguntapan, Bantul, Yogyakarta, starting on May 2015. The experiment was conducted on a plot of land measuring 4 x 7 m^2. This experiment used a Randomized Randomized Complete Block Design (RCBD) consisting of one treatment factor namely planting system, with 2 treatment levels: intercropping System of Soybean-Maize (S1) and Salome Cropping System (S2).

Measurement of growth analysis: Leaf Area Ratio (LAR) Specific Leaf Weight (SLW), Specific Leaf Area (SLA), Leaf Area Index, Root Range Headings, Harvesting Index, Production and Productivity of Each Cropping System.

Data were analyzed statistically using analysis of variance (ANOVA) according to Completely Randomized Block Design at the 5% test level. If the F test indicates a real difference then proceed with Duncan's Multiple Range Test at the 5% test level. To know the relationship between observed variables used correlation and regression analysis.

RESULTS AND DISCUSSION

Maize Results and Growth Analysis

Table 1.

Production of maize on intercropping and salome cropping pattern

Observation Parameters	Cropping Pattern	
	Intercropping	Salome
Fresh weight of the cob	101.84	147.38
Dry weight of the cob	42.46	51.68

The result of variance to fresh weight and dry weight of corncob showed that the treatment of cropping system gave different result (Table 1). Maize planted with Salome cropping system gives fresh weight average 44,72% higher than intercropping system of 1: 2 lines (1 maize line followed by 2 lines of soybean). The analysis of dry weight of cob showed a lower effect between the two cropping systems that is 4.85%, where Salome cropping system produces higher dry weight than intercropping.

Table 2.
Parameter of growth and growth analysis of maize planted on intercropping and Salome cropping system

Observation Parameter	Cropping Pattern	
	Intercropping	Salome
Growth Analysis		
ILD	0.50	0.67
SLA	23.35	31.72
SLW	0.048	0.03
LAR	5.57	148.15
Root canopy ratio	1.25	0.81

In general, maize grown with intercropping cropping 1: 2 results in a higher ground below the salome plant pattern, which is indicated by a canopy root ratio of 1.25. In contrast, maize grown with salome cropping pattern yielded above ground parameters consisting of higher number and higher leaf area than intercropping cropping pattern 1: 2.

Soybean yield and growth analysis

The results of variation on all growth parameters and soybean yields showed that the intercropping cropping system treatment yielded higher yield than salage planting system (Table 3). Soybean crops grown with 1: 2 intercropping cropping system were able to provide a mean fresh weight of 103% higher pods than the salome planting system.

Salome cropping pattern causes soybeans to be just below the corn stand, so the intensity of the light obtained becomes greatly reduced. This is different from soybeans grown in a 1: 2 intercropping pattern. This cropping pattern gives the plant a higher intensity of radiation intensity.

Table 3.
Parameters of yield and growth analysis of soybean crops on intercropping and Salome cropping systems

Observation Parameter	Cropping Pattern	
	Intercropping	Salome
Growth Analysis		
ILD	2.51	0.48
SLA	44.71	25.09
SLW	0.026	0.041
LAR	26.93	13.38
Yield		
Number of pods	48.89	19
Fresh weight of pods	14.58	9.46
Dry weight pods	20.65	2.98

The land productivity achieved in the soybean-maize intercropping system in this experiment is still much lower than the yields of each tested plant species. The low production of maize and soybean crops is likely to be caused by the unfavorable effects of climatic conditions. During the experiment it never rains, therefore the plants experience the water stress that causes the plant to grow dwarf. In addition, the crops suffered severe pest

and disease attacks, where soybean crops suffered from rust and maize attacks.

CONCLUSSION

Salome cropping pattern gives better yield of maizecobs than 1: 2 intercropping. Salome cropping pattern decreases the number and weight of freshly ground soybean pods compared to 1:2 intercropping system.

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