Page 211 to 217

Volume 1 • Issue 5 • 2017

Research Article

Innovative Techniques in Agriculture

ISSN: 2575-5196

Influence of Planting Date on Growth and Allelopathic of Sesame on Subsequent Crops

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Received: August 11, 2017; **Published:** September 13, 2017

Abstract

Experiment to Influence of planting date on growth and allelopathic of sesame on subsequent crops. The month of planting affects the growth and yield of sesame CM-07 and CM-53. Sesame is planted in June, with the best growth and maximum yield. Different from planting in November. Growth and low productivity. Efflorescence showed sesame is grown in October-December early flowering is 32 days from planting to flowering so. The sesame seeds are planted in June-July is 37 days from planting to flowering. After harvesting sesame and incorporation of sesame soil left for one month and then plant corn, sorghum and sunflower. The plots are planted sesame seeds before planting the crop yield has less volume than in plots that did not have sesame seeds before planting. The sunflower is a plant that has been most influenced by Sesame. Sesame is grown in June, containing allelopathic than in other months. Sesame is grown in November the lowest allelopathic.

Keywords: *Allelopathic; Planting date; Efflorescence*

Abbreviations: CM-07: Black sesame shattering resistance and CM-53: White sesame shattering resistance

Volume 1 Issue 5 September 2017

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Introduction

Cropping system shares a large 2 system is Mono Cropping and Multiple Cropping may crop once or more than 1 time in the types of plants that grow more than 1 time in the kinds of plants that grow more than one type of composite form. Planting is different crops. (Intercropping) crop margins season (Relay Cropping) Crops Rotation crop mix (Mixed Cropping) and cropping sequence (Sequential Cropping) is cropping up in various forms received. Coupled with the development of the various factors involved, such as maintaining soil fertility, soil structure, and nutrient selection of suitable plants. Factors including the Allelopathy, which is another factor that is vital to the development of the crop (Hanvongsa, 1999). The allelopathy has allelopathic compounds, which means that the plant is well. Microorganisms drive out to certain substances affects the growth of plants is another. Passengers may inhibit or encourage, directly or indirectly, any delay or accelerate the direct or indirect. But the plant is not harmful (Molish, 1973) Allelopathic substances that accumulate in the soil may be due to

the release from the roots and stems of plants directly. Or from the decomposition of crop residues remaining residues in the soil. As a result, either to inhibit or stimulate the growth of plants that is cultivated or planted close together after the next (Rice, 1984: Waller, 1987).

The compounds that inhibit or stimulate the growth of plants depends on the concentration of substances dissolved in the soil. Allelopathic effect of which is classified as one of the factors related to the environment that influences the division of the plant, including cultivated crops allelopathic occurs. In addition, the plants also affect weeds (Rice, 1979). Effect on seed germination and growing plants. Including crop yields. In the cropping system allelopathy has been studied between plant and plant to find ways to utilize the improvement in cropping systems to increase productivity and lower costs of harm to the environment. Sesame oil is important to Thailand. High potential for market competition and farmers planted crops in cropping system. The production of sesame in Thailand it is not enough for the needs of both domestic and international markets. The demand is increasing every year. Due to low yield and quality one of the limitations is the lack of understanding about technology (Kerdphol, 2001). Varieties and season planting have a great impact on the growth and yield of sesame (Maneekaw, 1996; Tiangtrong, 1998). Although the recommended planting season is generally early in the rainy season (February-April) and the rainy season (July-August), but also the right time to plant vary from each local area. (Sakunruk and Wasana, 2001) Also allelopathic in sesame can affect the growth of crops. The research of Premasthira (1988) found that white sesame inhibited the growth of both grain and grass Rice giant mimosa. It will enable the length and root length decreased.

The problem, therefore, this research has objectives to study the growth characteristics of CM-07 and CM-53, when planting with different times and study the allelopathy effects of sesame on later planted cropping systems includes evaluates allelopathic effects of sesame seeds grown during different periods of time.

Materials and Methods

This study investigated the allelopathy of sesame in cropping system in the transplanted condition. Sesame is the main crop grown in the first season and three secondary crops, corn, sorghum and sunflower, are planted with the second growing season. The procedures were planned with the following.

In the first year of planting sesame in field of the farmer at Khok Samrong district Lopburi. Sesame planting with the 10th of April 10th of May 10th of June 10th of July 10th of August and 10th of September. The experimental design was RCBD with 4 replications planting sesame seed variety CM-07 and CM-53. Size of plot size 19.5 x 40m. Distance between rows 75 cm. The distance between trees 20 cm. 3 seeds per hole. When sesame was 2 weeks old make a withdrawal of 1 tree per hole, water daily sprinkler system, rid of weed every 1 month. Harvest of seed at 100 days after the harvest already. Sesame plowing into the ground, leaving one month for sesame is fully decomposing. Data collection days to germination, days to 1st flowering, plant high (cm.), branches/plant capsules/plant and grain yield (kg/rai).

In the second year experiment in the same area sesame seeds were planted before that has been plow sesame compares with other plots that did not plant sesame before planting. Prepare the same planting as the first year of planting, the row of the second season must match the same row of the first growing season. Sow the seeds of three test plants at the spacing of planting, sunflower, sorghum and maize together in one main plot. Make all 4 mains plot. Total area of 19.5 x 40m^2. Corn and sunflower the distance between tree 20 cm, the distance between rows 75 cm, 3 seed per hole. Sorghum is sprinkled in rows of rows, 6 meters wide and 10 meters long distance between rows 75 cm. The plot was not planted sesame before use planting area 19.5 x 10m^2 the experimental design was split plot design with 4 replications. Water daily sprinkler system, rid of weed every 1 month. Harvest the seed yield of each test crop according to the harvesting period of plants. Data collection days to germination, days to 1st flowering, plant high (cm.), branches/plant capsules/plant and grain yield (kg/rai). Recording except the guard row randomly collects 10 samples. Data collection corn: seed row/ear, no. seed/row and grain yield (kg/rai) sorghum: seed weight/panicle (g), seed weight total (g) and grain yield (kg/rai) sunflower: Width of disk flower (cm) Weight of disk flower (g) and Seed weight/disk flower (g). Data analysis brings characteristics information about the collection to analyze the variance and compare the mean difference by Duncan's Multiple Range Test (DMRT)

Results and Discussion

The results show of sesame seeds planted in June is the best growth and yield to sesame seed is CM-07 height 112 cm. The branches 4 branches, capsules per plant and yield 109 capsules and 347.13 kg/rai respectively [Table 1]. The white sesame seeds CM-53. 107 cm height, number of branches 4 branches, capsules per plant and yield 101 capsules and 325.54 kg/rai respectively [Table 2] quantity reduce when planting after that. Sesame seeds planted in November, the lowest growth and productivity of sesame seed is the most CM-07 76 cm height, number of branches 3 branches. 65 capsules per plant and yield 198.65 kg/rai, the sesame seed CM-53 72 cm height, number of branches 3 branches. Capsules per plant and yield 63 capsules and 187.62 kg/rai. White sesame varieties CM-53 is affected from effect of planting date more than black sesame varieties CM-07.

The flowering was found that the sesame planted in October-December flowering is the fastest flowering is 32 days from the plantation to flowering, the sesame seeds planted in the June-July period 37 days from planting date, then flowering. The flowering age when grown in October-December flowering is faster than planting in June and July 5 days. After harvesting sesame seeds and sesame plowing into the ground, leaving one month and then plant corn, sorghum, sunflower behind the plots it found plots are planted sesame before had lower yield plots are not planted sesame before. Sunflowers are the most influenced by sesame, with the lowest productivity compared with plots are not planted sesame before, there is a width of disk flower 12.15 cm weight of disk flower 1.43g and seed weight per dish flower 47.5g while plot are not planted sesame before has width of disk flower 15.52 cm weight of disk flower 1,629.4g and seed weight per dish flower 53.8 g (Table 5) corn and sorghum production decreased compared to the plots that do not have sesame before. Corn planted after the sesame planting has seed row/ear 11.58 no. seed/row 21.67 and grain yield 271.58 kg/rai but corn is not planted in plots with sesame seeds before planting has seed row/ear 14.58 no. seed/row 24.17 and grain yield 946.46 kg/rai. Sorghum found plots is planted sesame before to seed weight/panicle 14.82g seed weight total 328.5 g and grain yield 133.48 kg/rai, which is less than plot are not planted sesame before to seed weight/panicle 34.16 g seed weight total and grain yield 765 grams and 310.86 kg/rai respectively. [Tables 3 and 4] which corresponds to Sakunruk and Wasana (2001) reports that, when cultivated Sesame June 20 with the best growth and keep maximum productivity and decreases as the sequence when planted after June.

Sesame seeds are planted in October, the flowering period of 6 days faster with shorter 8 day height. Number of pods per ton and decreased yield of Kerdphol (2002), reported that tropical crops like Sesame, hot and sunny. Optimum temperature for growth of approximately 27-30 degrees Celsius. Don't like the cold. If, the temperature is lower than 20°c. Germination is slow or possibly halt the growth, but if the temperature is higher than 40 degrees Celsius, it will make it difficult to create stick-pollination as pods. Usually in the rainy season, there will be sufficient moisture for growing season cultivated sesame. But if grown in the dry season, although like the hot weather and withstand drought well enough. If the output is high, like irrigation water in because of the water, not too much will affect the growth of sesame. Sesame seeds planted in June, there are allelopathic more planted in other months the sesame seeds planted in November substance allelopathic lowest.

Since June sesame has maturation have branches. The high and the number of pods per plant as much as possible. So it is the production of out more planted in other months Especially in November. Which has the highly retarded the lowest. The yield of crops grown after sesame cultivation in June produced the lowest. The November yield. The allelopathic created with many factors, such as light, nutrient deficiencies, lack of water, the temperature Allelopathic agent plant age, heredity, prey and predators. (Einhellig, 1987), and Premasthira and Zungsonthiporn (1995) extract from Sphenoclea zeylanica Gaertn with methanol and then tested for seedlings of rice found when the vegetable fields it contains lung age highly retarded to increase.

Sowing data	Days to germination	Days to 1st flowering	Plant High (cm.)	Branches/ plant	Capsules/ plant	Grain yield (kg/rai)
10 May	5a	36a	91b	3a	93b	304.25b
10 June	4a	37a	112a	4a	109a	347.13a
10 July	4a	37a	104a	4a	98a	321.45a
10 Aug	4a	36a	98b	4a	95b	310.73b
10 Sep	5a	34b	76c	3a	65c	198.65c
LSD 0.05	0.41	0.36	1.4	1.7	3.74	16.72
C.V. (%)	1.8	1.8	5.9	1.9	6.7	5.3

Means in the same column followed by the same letters are not significantly by DMRT.

Table 1: *Influence of planting date on growth and grain yield of sesame cv. CM-07.*

Sowing data	Days to germination	Days to 1st flowering	Plant High (cm.)	Branches/ plant	Capsules/ plant	Grain yield (kg/rai)
10 May	5a	36a	90b	3a	89b	287.56b
10 June	4a	37a	107a	4a	101a	325.54a
10 July	4a	37a	98a	4a	92b	295.43b
10 Aug	4a	36a	91b	4a	89b	289.14b
10 Sep	5a	34b	72c	3a	63c	187.62c
LSD 0.05	0.41	0.36	1.9	1.7	5.61	18.37
C.V. (%)	1.8	1.8	6.2	1.9	7.4	6.7

Means in the same column followed by the same letters are not significantly by DMRT.

Table 2: *Influence of planting date on growth and grain yield of sesame cv. CM-53.*

No. Row	A1			A2		
	Seed row/ear	No. seed/row	Grain Yield Kg/rai	Seed row/ear	No. seed/row	Grain Yield Kg/rai
1	11a	15c	203.17e	15a	29a	849.27b
2	12a	20b	203.17e	16a	29a	1239.37a
3	11a	22b	316.95c	14a	24b	881.78b
4	7b	8d	20.32g	13a	23b	922.41b
5	12a	25a	390.10b	15a	23b	1011.81b
6	13a	24a	552.63a	16a	22b	1113.40a
7	12a	21b	272.25d	14a	21b	1072.76a
8	11a	25a	377.90b	14a	23b	853.33b
9	12a	24a	251.94d	15a	29a	853.33b
10	12a	23a	231.62e	13a	23b	711.11c
11	14a	29a	321.02c	16a	23b	1093.08a
12	12a	24a	117.84f	14a	21b	755.81c
Mean	11.58	21.67	271.58	14.58	24.17	946.46

A1: Plots are planted sesame before A2: Plots are not planted sesame before.

Means in the same column followed by the same letters are not significantly by DMRT.

Table 3: *Allelopathic Effect of Sesame on Corn Grain Yield.*

No. Row	A1			A2		
	Seed Weight/ panicle (g)	Seed Weight Total (g)	Grain Yield (Kg/rai)	Seed Weight/ panicle (g)	Seed Weight Total (g)	Grain Yield (Kg/rai)
1	18.89a	340b	138.16b	34.09b	750b	304.76b
2	17.5a	385a	156.44a	32.5b	650c	264.13c
3	15.24a	320b	130.03b	40.5a	810b	329.14b
4	16.32a	310b	125.97b	47.95a	1,055a	428.70a
5	17.39a	400a	162.54a	38.75b	775b	314.92b
6	13.63b	300b	121.90b	34.09b	750b	304.76b
7	15.00a	450a	182.86a	26.5c	530c	215.37c
8	9.60c	270c	109.71c	35.5b	710b	288.51b
9	10.43b	240c	97.52c	40.53a	770b	312.89b
10	14.21b	270c	109.71c	47.22a	850b	345.40a
Mean	14.82	328.5	133.48	34.16	765	310.86

A1: Plots are planted sesame before A2: Plots are not planted sesame before.

Means in the same column followed by the same letters are not significantly by DMRT.

Table 4: *Allelopathic Effect of Sesame on Sorghum Grain Yield.*

No. Row	A1			A2		
	Width of disk flower (cm)	Weight of disk flower (g)	Seed weight/ disk flower (g)	Width of disk flower (cm)	Weight of disk flower (g)	Seed weight/ disk flower (g)
1	12.58a	1.45a	47.6a	14.56b	1,045c	47.62b
2	11.38b	1.41a	45.7b	15.53b	1,012c	45.71b
3	13.24a	1.37b	48.5a	14.08b	1,049c	71.43a
4	12.77a	1.42a	49.6a	15.53b	710 d	47.9b
5	11.37b	1.48a	46.2b	17.75a	3,300a	90.48a
6	12.15a	1.38b	48.2a	13.29c	1,037c	38.09c
7	13.07a	1.55a	47.4a	13.93c	1,024c	46.19b
8	12.15a	1.37b	46.3b	15.25b	2,017b	49.29b
9	11.45b	1.45a	48.2a	14.87b	1,900b	49.09b
10	11.37b	1.37b	47.3a	20.36a	3,200a	52.19b
Mean	12.15	1.43	47.5	15.52	1,629.4	53.8

A1: Plots are planted sesame before A2: Plots are not planted sesame before.

Means in the same column followed by the same letters are not significantly by DMRT.

Table 5: *Allelopathic Effect of Sesame on Sunflower Grain Yield.*

Conclusion

Black sesame shattering resistance varieties CM-07 and white sesame shattering resistance CM-53 look close growth both days of germination, flowering and plant height, number of branches per plant and number of pods per plant, the growth and High yield in June. The November growth and yields are low. Planting corn, sorghum, sunflower, behind sesame cultivation decrease the growth and

yield. Sesame seeds planted in June there are highly retarded more planted in another month. The sesame planting months November contains highly retarded the lowest.

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