

jan_2021_IOP_Conf._Ser._Earth
_Environ._Sci._681_012015.pdf
by

Submission date: 23-Sep-2022 09:45PM (UTC+0700)

Submission ID: 1907121757

File name: jan_2021_IOP_Conf._Ser._Earth_Environ._Sci._681_012015.pdf (920.5K)

Word count: 4595

Character count: 21847

PAPER • OPEN ACCESS

Attack intensity of sucking pods insect pest (*Riptortus linearis*) in different age of soybean under drought stress conditions

8
To cite this article: M Sarjan *et al* 2021 *IOP Conf. Ser.: Earth Environ. Sci.* **681** 012015

15
View the [article online](#) for updates and enhancements.

You may also like

- 5
- [Assessment of the resistance and performance of pigeon pea \(*Cajanus cajan* L. Huth\) cultivars to selected major insect pests of at Bunda, Malawi](#)
9 M Kamanga, M M Soko, E R Palupi et al.
- 7
- [The relationship of the morphological characteristics of some varieties of soybean on the attack intensity of the pod borer \(*Ptiella zinckenella* Treitschke\) in two different cultivation techniques](#)
B A Patu, M Sarjan, Tarmizi et al.
- [Preliminary study: Introduction pest of long bean flowers in South Sulawesi](#)
S N Aminah, A Nasruddin, T Abdullah et al.



The Electrochemical Society
Advancing solid state & electrochemical science & technology


242nd ECS Meeting

Oct 9 – 13, 2022 • Atlanta, GA, US

Presenting more than 2,400 technical abstracts in 50 symposia



ECS Plenary Lecture featuring
M. Stanley Whittingham,
Binghamton University
Nobel Laureate –
2019 Nobel Prize in Chemistry



Attack intensity of sucking pods insect pest (*Riptortuslinearis*) in different age of soybean under drought stress conditions

M Sarjan¹, B D S Fathiyani² and A Yassi³

¹Faculty of Agriculture, University of Mataram, Jalan Majapahit 62 Mataram

²Official services in the Regional office of Agriculture, West Nusa Tenggara, Province, Jalan Pejanggik 10, Mataram

³Department of Agronomy, Faculty of Agriculture, Universitas Hasanuddin, Makassar, Indonesia

Email : msarjan@unram.ac.id

Abstract. The aims of this investigation are to determine the level of Attack Intensity of Sucking pods Insect Pest in a different age of the soybean plant under drought stress conditions. This Investigation has been carried out in the greenhouse of the Faculty of Agriculture, University of Mataram . The experimental method was used in this investigation in the greenhouse of the Faculty of Agriculture University of Mataram. The Completely Randomized Design (CRD) factorial was used, which were treatments consisting of two factors: Age Factors of Investment Pest (A) consist of before flowering (A1), the time of flowering (A2), and when the pods are filling (A3). While Factor of gk/mdVarieties (V) consists of a variety of Anjasmoro (V1), Grobogan (V2), and Kaba (V3). Parameters measured were: 1) Age of flowering; 2) Plants High; 3) Water Needs; 4) The attack intensity of pests; 5) The number of pods; 6) The number of pods filled; 7) The number of empty pods because of pests; 8) Number of empty pods because of drought; 9) The number of seeds per plant; 10) Weight of 100 seeds; 11) Seeds results per plant; 12).The percentage of yield loss. Data were analyzed by using Analysis Of Variance (ANOVA) at 5 (five) percent significance level. Results showed that: 1) The highest sensitivity was found when pests were invested in soybean pod filling; 2) The pests release time causing the different level attack intensity and causing the different levels of yield loss. The highest yield lost was found when the pests release during pods filling, followed by pest release during flowering, and the lowest yield lost was when its release/invests before flowering.

1. Introduction

Soybean is a secondary crop that has many benefits, one of which is a source of protein that has a high value of nutrition, it makes soybean is a priority commodity to be developed after paddy and corn [1]. The demand for soybean increase every year; however, the rise in demand is not compensated with the production, so the needs are not fulfilled. The number of soybean production in Indonesia from 2013 to 2015 tends to increase from 779,992 tons in 2013 to 963,183 tons in 2015. Despite the increase in production, it still cannot meet the consumption needs in Indonesia. This can be seen from the number of Indonesian soybean imports from 2013 to 2015, which raised sharply from 1,785,385 tons to 6,416,821 tons. For this reason, extra efforts are needed to increase national production by accelerating the increase in productivity and expanding the cultivation. The increase of production through



Content from this work may be used under the terms of the Creative Commons Attribution 3.0 licence. Any further distribution of this work must maintain attribution to the author(s) and the title of the work, journal citation and DOI.

accelerating the productivity can be held through the use of superior varieties obtained by assembling new variety with high production rate, drought-tolerant, and resistance to pest attack. Kisman (2008) stated that there were 42 soybean accessions obtained in several regions in West Nusa Tenggara, which could be used as a source of drought-tolerant genes and resistance to pest attack [2]. Increasing the production could be achieved through the expansion of planting areas in a dry land. The potential of dry land in West Nusa Tenggara quite wide reaches up to 626,034.6 ha or approximately 31% of the total area in West Nusa Tenggara. Increasing the productivity of soybean on dry land often has obstacles in the form of abiotic factors, for instance, drought conditions and biotic factors in form of pest attacks such as sucking pod (*Riptortuslinearis*).

The decline of plant product per area due to the drought condition that reaches 50-80% compared in a normal condition. Tropical areas with a dry condition that have a high level of pest attack, especially the main pests (*Riptortuslinearis*) become one of the reasons the low productivity of soybean with 79% damage rate.

In drought stress condition, the experiment has been carried out to determine the level of Attack Intensity of Sucking pods Insect Pest in different age of the soybean plant. Thus, data and information will be obtained about the relationship between the level of plant susceptibility and the yield obtained on soybean that is grown on dry land, which is attacked by *Riptortuslinearis*.

2. Methods

The experimental method was used in this investigation in the greenhouse of the Faculty of Agriculture University of Mataram. The Completely Randomized Design (CRD) factorial was used which were treatments consisting of two factors: Age Factors of Investment Pest (A) consist of before flowering (A1), the time of flowering (A2), and when the pods are filling (A3). While Factor of Varieties (V) consists of a variety of Anjasmoro (V1), Grobogan (V2) and Kaba (V3). Parameters measured were: 1) Age of flowering; 2) Plants High; 3) Water needs; 4) The attack intensity of pests; 5) The number of pods; 6) The number of pods filled; 7) The number of empty pods because of pests; 8) Number of empty pods because of drought; 9) The number of pods per plant; 10) Weight of 100 seeds; 11) Seeds results per plant; 12) The percentage of yield loss. Data were analyzed by using Analysis Of Variance (ANOVA) at 5 (five) percent significance level.

The sucking pod (*Riptortuslinearis*) maintenance is carried out before planting. The mature insect (imago) is taken from the field and placed on breeding media. The pest (*Riptortuslinearis*) infested into the experimental plants was the first generation imago that resulted from rearing. The dried soil sifted and cleaned from dirt. The soil was entered in plastic with a diameter of 20 cm and separated at 25 cm between the pots. The day before planting, the fertilized urea was mixed in the soil, SP-36 a KCL at a dose of 1/3 of the total that is 50-75 kg of urea, 75100 kg SP-36 and 50-75 kg KCl. In each pot, two soybean seeds were planted 2 cm deep.

After one-week planted, the thinning process is carried out by leaving one healthy plant on each pot. Examination, drought stress treatment on soybean starts from 5 weeks after planted (MST) until the harvest stage. Drought stress treatment 60% field capacity carried out by giving water to the pot once a day or once every two days by using weighing method) [2]. Sucking pod infestation was treated with the direct infestation method by using 5 *Riptortuslinearis* on the soybean plant filling phase, then the plant covered with tile and metal frame in a circle with a diameter of 40 cm and a height of 120 cm. To find out the attack level on pods, the intensity formula was used Kisman (2011) [2].

$$I = \{a/(a+b)\} \times 100\%$$

Where: I = intensity of pest attack (%), a = the number of parts of the infected plant, b = number of plant parts that are not infected. The criteria of soybean resistance to sucking pod [2]. Observation variables include a number of pods, number of seeded pods, number of empty pods due to pests, number of empty pods due to drought, number of planting seeds, the weight of 100 seeds, crop yields, trichome density, trichome length, pod skin thickness, plant height, flowering age, intensity of attack,

the resistance to pod sucking pests, and water needs. Data were analyzed by variance analysis (ANOVA) at the 5%. When the treatment showed a significant difference, then analyzed by Honour Significantly Difference (HSD) 5% analysis.

3. Results and Discussion

3.1. ANOVA analysis

The analysis of Variance (ANOVA) was used to determine the influence of each treatment factor, to observation variables, then continued by honestly Significantly Difference (HSD) test at 5 %. The result of the ANOVA for the influence of each treatment and its interaction can be seen in the table 1.

Table 1. Summary of ANOVA for each observation variable

Factor s	Time of Flowering DAP	Height of plant (cm)	Water needs (ml)	Attack Intensity (%)					number of pods (pods)	number of pods (pods)	empty pods (pods)	empty pods (drought)	number of seed per plant	yield per plant (gram)	weight of 100 seeds (gram)
				I	II	III	I V	V							
age of pest infestation (A)	S	NS	S	NS	NS	NS	NS	NS	NS	NS		S	S	NS	
Varieties (V)	S	NS	S	NS	NS	S	S	S	S	S	S	S	S	S	
A x V	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	

Explanation:

- A = Age of plant at pest infestation time
- V = Varieties
- U x V = Interaction between Age of plant at pest infestation time and varieties
- S = Significant
- NS = Not Significant

According to the table above, it can be seen that 1) the factor of the age of plant at pest infestation gave the non-significant effect to all variables, except at the age of flowering, number of seeds, and yield per plant, 2). The factor of varieties gave a significant effect to all variables, except the height of plant and attack intensity I and II, and 3) Interaction between factor of age of plant at pest infestation and varieties gave the non-significant effect to all variables.

From the result of ANOVA analyses find each variable shows that there is the effect of treatment either in the aging plant or varieties of soybean, to the yield variable. This is relevant to what Koswanuddin et al. (2011) said that the sucking pod insect pest (*Riptortus linearis*) is the major pest of soybean that can cause yield losses [3]. Therefore, it is necessary to manage the development of population in order to avoid the yield losses of soybean, since the early stage of plant growth until the last stage. According to Irwan (2006) that the optimum growth of soybean will not get a high productivity, when the pest can not be controlled [4].

Based on the above observation, it is clear that varieties play an important role related to plant resistance from the early until the last stage of growth as Yusmani and Suharsono (2005) said that attack intensity of *Riptortus linearis* at growth pods phase cause the pods becoming dry and fall down [5]. Attack of pest In the phase of seed development would cause the empty pods, then produce the dry. In addition, the attack of insect pests at seeds development phase will produce the blackness seeds and finally become decay, while in the phase of pods maturation will cause the wrinkled seeds. Attack of insect pests at the phase of matured pods before harvesting will produce perforated seeds. Because

of these facts, it is needed to use the resistant varieties to avoid or to minimize further damage in pod and seed of soybean.

The time of flowering, plant height and water needs at each treatment highly depends on varieties of soybean. This can be seen from the age of flowering of Grobogan variety that was a week earlier than Anjasmoro and Kaba Variety, which was described by Balitkabi (2008) [6].

Growth and Development of three varieties of soybean tested can be determined from time of flowering, the height of plant and water needs, as can be seen in table 2.

Table 2. Water needs (liter), age of flowering (dap), and Height of plant (cm) under drought conditions.

Factors	Treatments	Water needs (Liter)	Age of flower (DAP)	Plant height (Cm)
Varietas (V)	Anjasmoro	14.03 b	32.11 a	113.78 a
	Grobogan	12.87 b	27.11 b	115.44 a
	Kaba	16.79 a	32.00 a	105.22 a
	Hsd 5%	1.35	0.50	17.08
Age of infestation (A)	Before flowering	15.66 a	30.67 a	102.78 a
	At flowering	13.37 b	30.56 ab	114.11 a
	Pods filled	14.67 ab	30.00 b	117.56 a
	Hsd 5%	1.35	0.50	17.08

Explanation : Numbers are followed by the same letter are not significant at 5% of LSD

3.2. Time of pest infestation on plant and attack intensity of pest

Attack Intensity of Pest at age of infestation gave the not significant effect from first observation until fifth observation. Differentiation also can be seen at the factor of varieties from first until third. Differentiation of Attack Intensity seems to be significant in week 4 and week 5 after pods formation. This probably because at the early pods formation, when the pest has been infested before flowering (A1) and at flowering time (A2), plant has got reserved food from leaf, branch, flower and trunk. While infestation at A3 (pods replenishment), pests were still needed adaptation with host

Attack Intensity of pest at week 4 and 5 after pods formation indicated that there were differences in factor of varieties, but not in factor of age of plant of pest infestation. This was supported by Sab'i (2012) result who stated that Anjasmoro variety is one of the media resistant against pod sucking insectpest, while Grobogan is slightly susceptible, and Kaba has the most susceptible to this pod sucking pest [7].

Age of plant of pest infestation indicated to be able to influence the reproduction ability of insect pest because from observation at A1 and A2 on second observation, there were eggs and adult insect found in nets of a cage. This illustrated that insect pest tends to lay their eggs in a certain condition when they had been in the reproductive phase. Existence of insect pest in the phase of flowering might these pest had high breeding ability as can be seen in table 3.

Table 3. Attack Intensity of *Riptortuslinearis* in several varieties of soybean with the different age of plant of pest infestation on the drought stress condition.

Factors	Treatments	Attack intensity (%)					Average
		I	II	III	IV	v	
Varieties (V)	Anjasmoro	0.46 a	1.95 a	2.41 b	1.72 c	1.78 c	1.66 c
	Grobogan	2.82 a	2.61 a	7.07 a	7.96 a	6.58 a	5.41 a
	Kaba	1.33 a	3.04 a	5.00 a	4.08 b	4.19 b	3.53 b
Age of infestation (A)	Before flowering	0.85 a	2.41 a	3.87 a	3.97 a	4.37 a	3.09 a
	at flowering	1.40 a	1.95 a	5.77 a	5.02 a	3.49 a	3.52 a
	Pods filled	2.36 a	3.25 a	4.84 a	4.77 a	4.70 a	3.98 a
	HSD 5%	2.14	1.39	1.78	1.64	1.46	1.14

Explanation

Numbers are followed by the same letter are not significant at 5% of LSD % HSD are not significant at 5% of LSD

According to figure 1 indicated that there is no correlation between age of plant of pest infestation and attack intensity. Existence of pest before flowering(A1), on flowering (A2) and at pods replenishment (A3) still has a potential in decreasing yield of soybean. As can be seen that from the average of attack intensity based on the age of plant of pest infestation was non significant different. The susceptibility of plants against this pest also must be considered by farmers in West Nusa. According to data of varieties distribution (BPSB, 2011) indicated that variety Anjasmoro is the most resistant and the most likely preferred by farmers West Nusa Tenggara compared to two other varieties such as Grobogan and Kaba. The correlation between age of plant of pest infestation and attack intensity, as shown in figure 1:

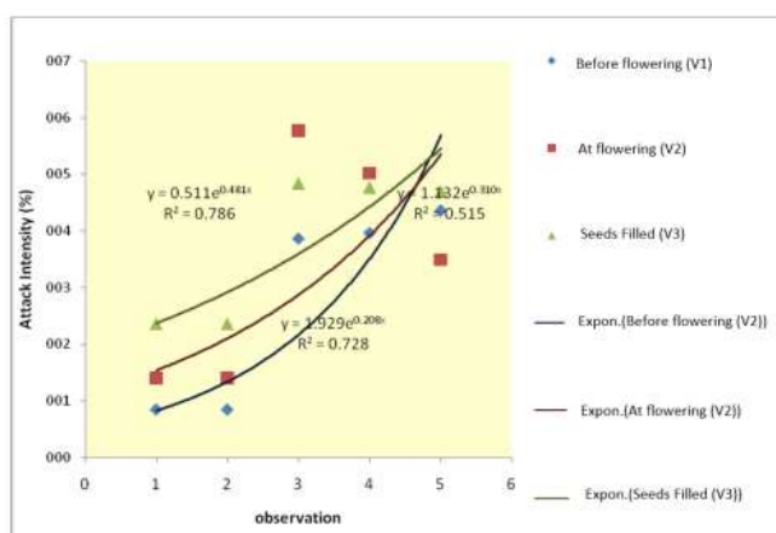


Figure 1. The correlation between age of plant of pest infestation and attack intensity.

3.3. Variable of soybean yield

Table 4. Variable of soybean yield.

Factors	Number of pods (pods)	Number of pods Filled (ods)p	Empty Pods of pest (pods)	Number of pods drought (pods)	Number of Seeds (Seeds)	yield per plant (gram)	weight of 100 seeds (gram)	Percentage of results loss (%)
Varieties (V)	Anjasmoro (v1)	120.5	33.0	2.0	85.5	51.6	6.4	12.3
	Grobogan (v2)	48.11	16.0	3.3	28.7	29.6	5.1	17.3
	KABA (V3)	79.11	14.7	3.4	60.8	23.6	2.5	11.1
	(LSD 5%)	25.43	5.84	1.0	20.3	5.05	1.1	1.72
Age of plant (u1)	Before flowering (u1)	87.44	24.6	3.1	59.6	39.5	5.7	14.4
			7	1	7	6	4	2

After infestation (A)	At flowering (u2)	21.0	2.3	52.1	34.6	a	4.3	a	12.8	54.41
	Pods filled (u3)	75.44	18.1	3.3	63.4	1	7	7	6	
		84.89	1	3	4	a	8	b	9	2
										58.88

numbers are followed by the same letter are not significant at 5% of LSD

As can be seen from table 4 above indicated that HSD 5% shows there is an effect of pest attack, to number of pods, number of filled pods, number of empty pods of pest, number of empty pods of drought, where Anjasmoro variety had the highest number of pods about 120.56, and Grobogan variety had the lowest one about 48.11 pods. It is also shown that the effect of variety more dominant than age of plant of pest infestation. This is supported by Fathin (2011), who said that pod sucking insect pest (*Riptortuslinearis*) causes empty seeds and pods, fall pods, rotten seeds, blackness, wrinkle seed skin and a brown spot on seed skin. The crisis period of soybean plant against pods sucking pest is at the seed filling phase [8].

3.4. Yield losses because of insect pest in drought stress condition

Result of soybean tested in this investigation illustrated that variety of Anjasmoro had the highest number of seeds per plant, followed by Grobogan and Kaba respectively. At the age of plant of pest infestation, it is showed that the highest number of seeds filled is at before flowering compared to the others such as at flowering and pods filling stage. This would affect all the processes of soybean productivity and total yield of soybean directly. As Asandi (2009) explained that pest is one of constrain in increasing soybean productivity, and it is known that pod sucking insect pest is a major pest that can decrease soybean yield up to a 79% [9]. Therefore, it is needed to explore the genetic resources of soybean that resistant against this insect pest and drought stress condition, especially in relation to the development of soybean in dry land such in West Nusa Tenggara.

Table 5. Percentage of yield losses because of pest and drought.

Factors	Treatment	Yield per plant (gram)	Weight of 100 seeds (gram)	Percentage of Yield (%)
Varieties (V)	Anjasmoro (v1)	6.45 a	12.32 b	54.51 a
	Grobogan (v2)	5.17 a	17.37 a	46.32 a
	Kaba (V3)	2.59 b	11.11 b	54.57 a
	HSD 5%	1.18	1.72	8.73
Age of infestation (A)	Before flowering	5.74 a	14.42 a	42.11 b
	At flowering	4.37 ab	12.86 a	54.41 b
	Seed filling	4.09 b	13.52 a	58.88 a
	HSD 5%	1.18	1.72	8.73

Explanation

Number followed by the same letter are not significantly different at LSD 5%

Analyses of percentage of yield losses showed that the factor of age of plant of pest infestation had a significant effect of yielding losses of soybean, while the factor of variety and its interaction seems to be not significant. Treatment before flowering (A1) and at flowering (A2) had a lower percentage of yield losses, and it has not a significant effect. However, the yield losses in those both treatments were significant compared to seed filling treatment (A3) up to 58,88% as can be seen from figure 2 as follows :

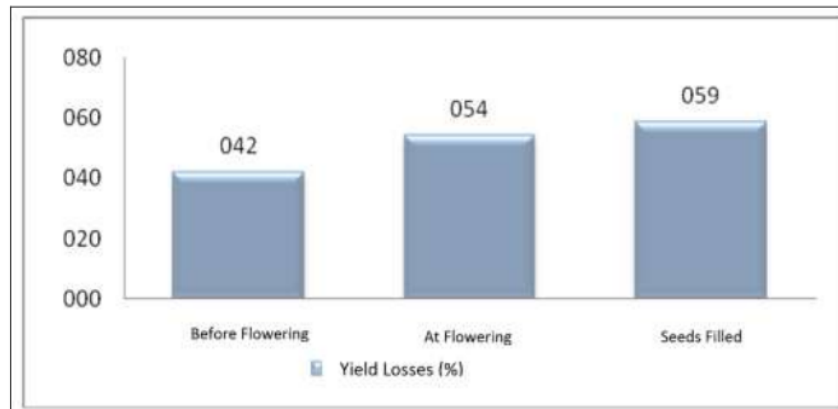


Figure 2. Percentage of yield Losses because of pest attack based on age of plant of pest Infestation.

Principally, the different responses of plant against certain insect pests depending on biophysical and biochemical factors. Biophysical factors like morphological, anatomy and color of plant would become a major factor that influences the resistance of variety. Plant will be preferred or not by pest, depending on how is the role of each factor or its combinations to influence insect behavior [10].

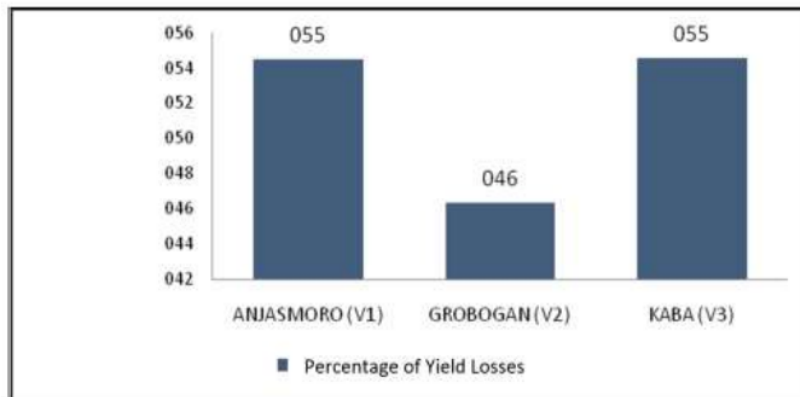


Figure 3. Percentage of yield losses because of pest attack based on varieties.

Analyses of Percentage of Yield losses based on Varieties indicated that there was no significant difference to percentage of yield losses, the highest yield losses was in a variety of KABA 54,57% similar to Anjasmoro, 54,51% and Grobogan, 46,32%, respectively.

3.5. The best time in Pest Control

According to observation result explained that pest infestation before flowering seems to have chances for insect pests to attack other plant organs such as trunk and leaf. This is because of the characteristic of this insect pest (*Riptortus linearis*) as the oligophagous insect that able to attack many crops, other than soybean as the main host [11].

Existence of pest before the flowering phase also will give the insect a big chance to do reproductive activities to produce the next generation that consequently will disturb the process of production of soybean. The new generation of insect pest will then attack the generative phase of

soybean which is very susceptible to this pod sucking insect pest. From this reexplanation, it is necessary to consider that controlling this pest would be better before the flowering phase to avoid the development of the next generation of this insect pest. Pest control at this phase would not influence the process of flowering and pod formation. It is also claimed that this insect pest *Riptortus linearis* are not quite interested in flower, they are more interested in leaf before pods formation.

1

4. Conclusion

Based on the observation and discussion that have been carried out in this study, there are two conclusions obtained as follows:

4.1. Age of plant of pest infestation that has the potential to decrease the highest yield of soybean is at the pods filling phase.

4.2. Age of plant of pest infestation would influence the attack intensity of *Riptortus linearis*, and it could bring a different level of yield losses, the highest was at pods filling, followed by at flowering and the lowest at before flowering phase

1

Recommendations. There are several recommendations based on observations, discussions, and conclusions:

- Further research is needed with more varied varieties of soybeans and stresses level
- For developing soybean in dryland, it is recommended to conduct field research using resistant varieties such as Anjasmoro.
- In the field, It is needed to consider that the best time to control the pod sucking insect pest of soybean(*Riptortus linearis*) is before the flowering phase.

References

- [1] Darmawan T, Zahroh T, Merindasya M, Masfaridah R, Hartanti D, Arum S, Nurhatika S, Muhibuddin A, Surtiningsih T and Arifiyanto A 2017 Manganese (Mn) stress toward hyperaccumulators plants combination (HPC) using *Jatropha curcas* and lamtoro gung (*L. leucocephala*) in mycorrhizal addition on soybean (*Glycine max*) seedling stage *AIP Conference Proceedings* vol 1854
- [2] Kisman, Sarjan M and Nikmatullah A 2011 Usulan Penelitian Perakitan Varietas Unggul Kedelai Toleran Kekeringan dan Tahan terhadap Hama Perusak Polong Menggunakan Sumberdaya Genetik Lokal dan Bioteknologi
- [3] Koswanudin, Samudra and Darwiati W 2011 Pengaruh Ekstrak Daun Suren (*Toona sureni*) terhadap Perkembangan Hama Pengisap Polong (*Riptortus linearis*) dan Predator *Coccinella* sp.pada Tanaman Kedelai *Pei Bandung*
- [4] Irwan 2006 Budidaya Tanaman Kedelai *Univ. Padjajaran*
- [5] Prayogo Y 2005 Optimalisasi Pengendalian Hama Pengisap Polong Kedelai (*Riptortus linearis*) Dengan Cendawan Entomopatogen *Verticillium lecanii* *J. Litbang Pertan.* **24** 123–30
- [6] Balitkabi 2008 *Deskripsi Varietas Unggul Kedelai* (Malang)
- [7] Sab'i I 2012 *Ketahanan Morfologi Beberapa varietas unggul kedelai terhadap hama penghisap polong (*Riptortus linearis*) Pada Kondisi Cekaman Kekeringan* (Universitas Mataram)
- [8] Fathin 2011 Hama Dan Penyakit Tanaman Kacang Hijau (*Vigna radiata* (L.)) serta pengendaliannya
- [9] Asandi 2009 Identifikasi Ketahanan Sumber Daya Genetik Kedelai terhadap Hama Pengisap Polong *Balai Besar Penelit. dan Pengemb. Bioteknol. dan Sumberd. Genet. Pertan.*
- [10] Lihawa M 2010 Survey Penggerek Batang Jagung dan Kompleks Musuh Alaminya di Provinsi Gorontalo *J. Perlindungan Tanam. Indones.* **16** 82–7
- [11] Triharsono 2004 *Dasar-Dasar Perlindungan Tanaman* (Yogyakarta: Universitas Gadjah Mada)

ORIGINALITY REPORT

30%
SIMILARITY INDEX

11%
INTERNET SOURCES

28%
PUBLICATIONS

7%
STUDENT PAPERS

PRIMARY SOURCES

- 1** Muhammad Sarjan. "Influence of attack intensity of Sucking Pod (*Riptorus Linearis*), to the Yield of Superior Soybean Varieties in Drought Stress Condition", IOP Conference Series: Earth and Environmental Science, 2020
Publication **20%**
- 2** Submitted to Eastern Institute of Technology
Student Paper **4%**
- 3** repository.ubaya.ac.id
Internet Source **1%**
- 4** d-nb.info
Internet Source **1%**
- 5** repository.tukenya.ac.ke
Internet Source **1%**
- 6** jglobal.jst.go.jp
Internet Source **1%**
- 7** Hao Zhang, Yiqun Zhang, Pengfei Zhang. "Optimal Guidance Law for Intercepting the Active Defense Aircraft with Terminal Angle **1%**

Constraint", Journal of Physics: Conference Series, 2021

Publication

8	eprints.untirta.ac.id Internet Source	1 %
9	S Supriyadi, K Khumaedi, T M Mukromin, M Yani, F Setiawan. "Identification of subsurface layer in UNNES reservoir basin", Journal of Physics: Conference Series, 2020 Publication	<1 %
10	D Diptaningsari, A A Rivaie. "Comparison study of growth and yield of three soybean varieties on acid upland soil of South Lampung", IOP Conference Series: Earth and Environmental Science, 2021 Publication	<1 %
11	Submitted to BPP College of Professional Studies Limited Student Paper	<1 %
12	docshare.tips Internet Source	<1 %
13	A Majid, S Soeparjono, E S Hani, R Soedrajad, T A Prayitno. "The role of rhizobacteria to control rhizoctonia disease and to improvement plant growth of soybean on sub-optimal dry land", IOP Conference Series: Earth and Environmental Science, 2021 Publication	<1 %

14 Siti Aisyah, Chairani Hanum, Revandy Iskandar M Damanik. "Gogo rice agronomic patterns on water supply variables and light intensity", IOP Conference Series: Earth and Environmental Science, 2021
Publication <1 %

15 qspace.qu.edu.qa
Internet Source <1 %

16 repository.futminna.edu.ng:8080
Internet Source <1 %

Exclude quotes On

Exclude matches < 5 words

Exclude bibliography On