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THE EFFECTIVENESS OF SOIL TILLAGE IN REDUCING WHITE GRUB POPULATION IN PEANUT PLANTATION

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Abstract

White grub attacks in Indonesia lead to the decrease of productivity of peanuts from 2.5 - 3.0 tonnes/Ha into 1.33 tonnes/Ha. Various control techniques that rely on chemical control is not successful in reducing the population of white grub. Soil tillage before planting is expected to provide an effective control technique. Research was conducted by collecting soil sample in 10 plots of cultivated land (9 m^2 per plot), with three replicates. Soil samples were taken one day before and after first soil tillage and one day after second soil tillage by digging three holes in each plot diagonally (deep 20 cm, width 20 cm, and length 20 cm). Conventional soil tillage was conducted by one plowing, with a disk plow, followed by a leveling disk harrow. White grub eggs or larvae were counted. Soil tillage is unreliable to control the white grub in the absence of other control techniques. White grub population was not significantly reduced after the first and the second soil tillage. The white grub population tended to increase with the increase of vegetation density that provides organic material

Keywords: *soil tillage, white grub, peanut*

INTRODUCTION

Peanut production in Indonesia in 2015 with harvested area of 454,063 Ha, reached 605,449 tons. Its productivity only reached 1,333 tons / Ha (BPS, 2017). The results of peanut research on fertile land are able to reach 2.5 up to 3.0 tons / ha of dry pods, but difficult to achieve on a wide scale of business. One of the problems is related to white grub attack (*Lepidiota stigma* larvae). This pest attacks the plant at the root. These pests are not only attack peanuts and soybeans but also other crops of beans. The white grub attack in Gunung Kidul district, DIY at the end of December 2008 reached 94 ha, located in ten sub-districts and at the beginning of 2009 has expanded to 146 ha in 14 districts. The attack has caused a lot of destruction of crops that are very harmful to farmers and endanger the availability of food (Government of Gunung Kidul District, 2009).

During this time the white grub pest is controlled mechanically by cultivating the soil and picking up the white grub larvae and eggs that appears during the processing of the soil tillage. Another way is to use a systemic insecticide, sprinkled into the soil around the crop. Although synthetic insecticides are faster, easier and cheaper in their use, their effectiveness is still lower when compared to mechanical means (Poerwanto & Solichah, 2010). In addition, insecticides in the soil will be difficult to decompose and increase environmental pollution, especially in ground water (Noegrahati, 1987).

Based on this, a more appropriate way of white grub pest control is needed. One of them by soil tillage on the land infected by white grub. More information regarding to the effect of soil tillage to the white grub population is needed for constructing integrated pest management.

METHODS

Ten plots with the size of each plot was 300x300 cm, with three replications was set up for peanut cultivation. Distance between experimental plots was 50 cm and between blocks was 100 cm. Observation of the white grub population was conducted a day before and after first soil tillage and a day after second soil tillage. Second soil tillage was conducted a week after the first soil tillage.

Conventional soil tillage was conducted by one plowing, with a disk plow, followed by a leveling disk harrow.

The soil samples were taken by digging 3 holes per plot diagonally 20 cm deep, 20 cm wide, 20 cm long. Soil excavated in the filter by using a rough filter to separate the soil with eggs or white grub larvae. Further, eggs or larvae were found to be identified and be counted.

Paired t-test was performed to observe the effect of soil tillage at 95% level. (Gomez and Gomez, 1984). Data analysis was performed using SPSS 10.0.5 (SPSS, 1999).

RESULT AND DISCUSSION

Prior to soil tillage, all plots are found in the white grub infestation. All of them are larvae of *Lepidiota stigma*. Egg is not observed in all plots. This shows that the field has been infected with the white grub population evenly. After the soil tillage all plots are still infested by white grub larvae (Table 1.). In average, the population decreases up to 32.96%. Only on the fourth plot is free of white grub population (0). Soil tillage is recommended to be conducted not just for increasing the porosity of the soil, but also for reducing the population of white grub by destructing its larvae and eggs (Gupta & Gavkare, 2014). The white grub population is getting higher with the increase of plots number. In plots one to five white grub populations are only 0.33 larvae / 400 cm2. Whereas in the sixth to tenth plots the population increases, and the highest is in the plot ten (5.33 larvae / 400 cm2). Allegedly the irrigation channel next to the tenth plot causes the soil more moist and stimulate overgrown vegetation (weeds). The amount of vegetation will provide abundant organic material that will invite the presence of white grub. White grub is more like a sandy environment and contains lots of organic matter. In addition, the beetles also prefer to lay eggs on soils rich of organic matter (Harjaka, *et al.*, 2011).

After the second soil tillage, white grub populations tend to increase. However the increase of white grub population is not significant. Population reduction due to the first soil tillage is rapidly followed by the invasion of new population from nearby area. Soil tillage is able to reduce in site white grub population, however it is not able to avoid its invasion. The same result was observed by Oliviera *et al.*, (2000), that the conventional soil tillage was not able to decrease the population of white grub. Timing and system of soil tillage were crucial in management of white grub, and they cannot be generalized for all plantation and soil condition. This suggests that the effectiveness of soil tillage is low for decreasing white grub populations. The low decline of white grub population indicates that soil tillage is unreliable to control the white grub in the absence of other control techniques.

Tabel 1. White grub population before soil tillage, and after first and second soil tillage

Plot number	Grub population/400 cm^2										Average
	1	2	3	4	5	6	7	8	9	10	
Before soil tillage	0.33	0.33	0.33	0.33	0.33	0.67	2.67	3.33	4.33	5.33	**1.79p**
After first soil tillage	0.33	0.33	0.33	0.00	0.33	0.67	1.67	2.00	3.00	3.33	**1.20p**
After second soil tillage	0.67	0.00	0.33	0.00	0.33	1.00	2.00	2.33	3.00	2.67	**1.23p**

Note: Numbers followed by the same letters are not significantly different (t-test, α:5%)

CONCLUSION

The white grub population will be higher with the increase of vegetation density that provides organic material. Soil tillage is not effective to decrease white grub populations.

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REFERENCES

BPS. 2017. Tanaman kacang tanah per provinsi. https://data.go.id/dataset/tanaman-kacang-tanah-per-provinsi. Accessed at 6 Agustus 2017.

Gomez, K. A and Gomez, A. A. 1984. Statistical Procedures for Agricultural Research, 2nd edition John Wiley and Sons, New York, 680 PP.

Gupta, S and Gavkare, O. 2014. White grub, brahmina coriacea, a potential threat to potato. Journal of Industrial Pollution Control 30(2). 357-359

Harjaka, T., Martono, E., Witjaksono, Sunarminto, BH. 2011. Potensi jamur *Metarhizium anisopliae* untuk pengendalian uret perusak akar tebu. Seminar Pesnab IV. Jakarta 15 Oktober 2011. P: 91-102

Noegrahati, s. 1987. Dinamika dan AnaLisis Residu Pestisida di Lingkungan symposium Nasional pestisida pertanian di Indonesia. 8-10 Januari 1987 'Yogyakarta- 15 hal'.

Oliveira, LJ., Campo, CBH., Garcia, MA. 2000. Effect of soil management on the white grub population and damage in soybean. Pesq. agropec. bras. 35 (5). 887-894

Poerwanto, ME., Solichah, C. 2010. Perilaku uret pada campuran kompos dengan limbah tanaman tembakau. Prosiding seminar nasional ketahanan pangan & energi 2010. Fakultas Pertanian UPNVYK

SPSS Inc. 1999. SPSS® for Windows™ Version 10.0.5. Chicago: SPSS Inc.White.

Editorial Policy and Manuscript Writing Style

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All manuscript should be typed on one side of A4 (210 mm x 297 mm) good quality paper and be double spaced, except for indented quotations.

To assure anonymous review, authors should not identify themselves directly or indirectly in their papers.

A cover page should include the title of the paper, the author's name, title and affiliation, mailing address, phone and fax number, email address, any acknowledgements and a footnote indicating whether the author would be willing to share the data.

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