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EFFECTS OF SEVERAL TYPES OF ROTATED CROPS ON SOIL CHEMICAL PROPERTIES IN PINEAPPLE CULTIVATION IN LAMPUNG, INDONESIA

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ABSTRACT

A field research was conducted in pineapple estate to evaluate several cover which used as crop rotation on selected soil chemical properties (pH, C, N,P,K, Exch Al). The treatments were as follows :bare condition, cassava (*Manihot esculenta* Crantz), roselle (*Hibiscus sabdarifa*), king grass (*Pennisetum purpureum*) and butterfly pea (*Centrosema pubescens*), and observed six month after planting. The results showed that all the treatment could be used as rotation, even the land was in bare condition. The treatments did not change the soil chemical significantly, excepts for K and Exch Al which was highest in cassava treatment.

Keywords : pineapple, crop rotation, cassava, king grass, tropical soil

INTRODUCTION

Pineapple has a long crop cycle which could be 15-30 months. In estate scale, the length of the cycle is not included land preparation which could take around 4-6 months. During the land preparation, the land was generally planted with cover crop or keep fallow. Both following and crop rotation in pineapple cultivation could reduce the pineapple pest and disease (Petty et al. 2002;. Rohrbach and Johnson, 2003; Koon-Hui et al. 2003), and improvement the soil condition (Purwito et al. 2012; Phillips et al . 1995).

Since 1998, PT GGP has tried several cover crop which used as crop rotation with pineapple, such as *Calopogonium mucunoides*, *Centrosema pubescens*, *Peuraria javanica*, *Sesbania grandiflora*, *Pennisetum purpureum*, *Sesamun indicum*, *Cassava*, *Mucuna*, *Kenaf*, etc. Many literatures has been published about the effects of cover crops on soil condition (Ernst and Siri-Prieto,2009; Ramos et al.2010), however, it is rare when relating to pineapple cultivation especially in estate scale.

The objective of this research is to evaluate the effects of several cover crop used as crop rotation in pineapple estate on the soil chemical properties in PT GGP, Central Lampung.

MATERIAL AND METHODS

The research was done in PT. GGP from January 2011 until August 2011. The treatment was arranged in block design with 5 treatments and 3 replications. The rotated crops used as treatments were bare, cassava, Roselle, king grass and butterfly pea. The plot areas were 5 m x 9 m.

The land which was prior planted with pineapple was plowing by disclow twice, and followed by ridging with the distance between ridge was 55 cm. The soil was analyzed before planting and six month after planting. The chemical properties analyzed using

standard procedure for soil analysis (Balai Penelitian Tanah 2005). The soil chemical which analyzed were pH, C-organic, N,P,K, and Exch Al.

The selected chemical soil properties were shown in Table 1, while the soil fraction consists of 53,8% clay, silt 4,1% silt, and 42,1% sand.

Table 1. Selected soil chemical properties prior to planting

pH	C	N	P	K	Ca	Mg	Na	Al-dd	H-dd
H ₂ O	%		Ppm					me/100gr	
4,37	1,19	0,12	22,22	258,57	176,36	33,02	35,41	1,66	0,46

RESULTS AND DISCUSSION

The effects of cover crop on the soil chemical properties after six months were shown in Table 1. The pH in all treatments were lower compared to bare condition, however, it is slightly increased compared to initial. The pH value is still suitable for pineapple, where the optimum pH for pineapple in PT. GGP was considered around 4.3-4.8. In relation to pH, the Exch Al value was high in cassava, and the value of Exch Al decreased in king grass treatment, while for bare and Roselle, the Exch Al value increased. The content of N was increased significantly in Roselle treatment, while for other treatment slightly increased or decreased. The content for P and K decreased significantly in all treatment, with the lowest value of K was found in king grass. The soil K content was highest in cassava treatment. The value of organic carbon in all treatment did not change significantly

Table 2. Effects of cover crop on the soil chemical properties

Treatment	pH	C	N	P	K	Exch Al
		%	%	ppm	ppm	me/100g
Initial	4,37	1,19	0,12	22,22	258,57	1,66
Bare	4,48	1,19	0,14	11,31	134,75	1,90
Cassava	4,37	1,17	0,11	15,41	176,79	2,37
King grass	4,39	1,17	0,12	12,15	93,42	1,35
Butterfly pea	4,43	1,14	0,12	11,77	175,91	1,71
Roselle	4,39	1,19	0,15	19,84	167,10	1,88

From the view point of pineapple requirement, all the treatment could be used as rotation, even the land was in bare condition. However, some additional treatment must be done for certain treatments. Additional organic matter must be added to the bare treatment, while in cassava treatment, more lime was needed to overcome the high of Exch Al which was reached 2,37 meq/100 g. The nutrient status of cassava in soil was also higher than king grass, however, the king grass has lower value of Exch Al. At the present time, these two crops were the main crops for rotation system in PT.GGP.

CONCLUSION

Several crops which were used as rotated crops in pineapple estate did not change selected soil chemical properties, such as pH, C organic, and N. The value of K content was decreased significantly in all treatments, and the Exch AI was found highest in cassava treatment. From the view point of pineapple requirement, all the treatment could be used as rotation, even the land was in bare condition

REFERENCES

- Balai Penelitian Tanah (2005). Petunjuk Teknis Analisis Kimia Tanah, Tanaman, Air dan Pupuk. Badan Litbang Pertanian Departemen Pertanian. Bogor. pp.1-40.
- Ernst, O. and G. Siri-Prieto (2009). Impact of perennial pasture and tillage systems on carbon input and soil quality indicators. *Soil & Tillage Research* 105 : 260–268.
- Koon-Hui, Wang , B.S. Sipes , D. P. Schmitt (2003). Enhancement of *Rotylenchulus reniformis* suppressiveness by *Crotalaria juncea* amendment in pineapple soils. *Agriculture, Ecosystems and Environment* No. 94 : 197–203.
- Petty, J.G., G.R. Stirling, and D.P. Bartholomew (2002). Pest of Pineapple. In :Tropical Fruit Pest and Pollinator (eds. J.E. Pena, J.L. Sharp, and M. Wysokl). CAB Internastional.pp.157-195.
- Phillips,V.D., Wei Liu, R.A. Merriam, and R.L.Bain (1995). Short-Rotation Forestry as An Alternative Land Use in Hawaii. *Biomass and Bioenergy* Vol. 8, No. 4. pp. 235-244.
- Purwito, Afandi, and Sarno (2012). Changes in Soil Organic Carbon after Cover Crops in Pineapple Fields in Indonesia. *Pineapple News* No. 19. Pp:36-38.
- Ramos, M.E., E. Benitez, P.A. Gracia, and A.B. Robles (2010). Cover crops under different managements vs. frequent tillage in almond orchards in semiarid conditions: Effects on soil quality. *Applied Soil Ecology* Vol. 44 No. 1. pp. 6-14
- Rohrbach, K.G. and M. W. Johnson.(2003). Pests, Diseases and Weeds. In *The Pineapple: Botany, production and Uses* (eds. D.P. Bartholomew, R.E. Paull and K.G. Rohrbach), CAB International, pp. 221-230.