

THE PERFORMANCE OF SOME IMPROVED PEANUTS VARIETIES GROWN IN PEAT SOIL IN ACEH PROVINCE

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ABSTRACT

Peanut is one of major commodities in Aceh province, especially in the districts of Pidie, West Aceh Barat, Aceh Jaya, Nagan Raya, Southwest Aceh, and South Aceh. In Aceh, the total area of peatlands covers 144,000 ha spread in Aceh Jaya, West Aceh, Nagan Raya, South Aceh, and Aceh Singkil. Farmers have been growing peanuts in peatlands since a long time ago; however, its productivity is still very low (0.45 t/ha) while the productivity of peanuts grown in mineral soil is higher (1-1.2 t/ha). The objective of this study was to find out the adaptability of five peanut varieties grown in peatlands with <100 cm in depth by using specific peanut cultivation technology for peatlands in Alue Penyaring village, Merbo sub-district, West Aceh district. A randomized block with four replications was applied on five peanut varieties i.e. Domba, Gajah, Jerapah, Bison and Local Naga Uambang varieties. Each genotype was grown in 5 m x 10 m plot size with plant spacing of 35 cm x 15 cm and 1 seed/hole. The yields of dry pods of these five varieties ranged from 1.36 t – 1.77 t/ha. This indicates that all tested varieties are able to adapt to peaty soil.

Keywords: peanuts, variety, peatlands.

I. INTRODUCTION

Peanut is one of the major commodities in Aceh province, especially in the districts of Pidie, West Aceh, Aceh Jaya, Nagan Raya, Southwest Aceh, and South Aceh. The cultivation of peanuts is frequently performed on the wetlands even though it can also be done in the moorlands. Peanuts may grow well at the altitude of 500 meter above the sea level. However, they can grow better in the fertile soil so that the gynophores can get into the ground which is rich in soil nutrients such as Ca, N, P and K. The appropriate pH of the soil is 5 – 6.3. If the pH level is too high, the amount of N in the air released by bacteria will be reduced. In contrast, if the pH is too low, land restoration is necessary to conduct through lime application in order to improve the plants' growing ability and to increase the production (Marzuki 2007).

Peatlands are potential for farming activities even though it serves some issues in increasing plants' productivity, particularly for peanut plants. The total area of peatlands in Indonesia covers 16.500.000 ha which are spread in Sumatera, Borneo, Sulawesi and Irian Jaya. Particularly in Aceh, the total area of peatlands covers 144.000 spread in Aceh Jaya, West Aceh, Nagan Raya, South Aceh, and Aceh Singkil. The issues that are frequently arisen

in peatlands are low pH of soil (4-5), unbalanced soil mineral, high amount of toxic substances such as Al, Fe, and low availability of nutrient contents for the plants. Such conditions may lead to low productivity. Therefore, land restoration should be carried out through the use of sufficient lime. Farmers have been growing peanuts in peaty lands for a long time; however, its productivity is still very low (0.45 t/ha) compared to those grown in mineral soil (1-1.2 t/ha)

In Aceh, 20% of the total area of peatlands in Aceh is located in Meulaboh District. Agricultural development on peaty soil is largely determined by the natural fertility of the soil and the farming management system. Farming cultivation which is conducted by farmers in this kind of soil ranges from low to medium compared to that which is managed by the private sectors or large companies. (Subagyo *et al.* 1996). Another issue faced by peanut farmers is the difficulty in obtaining good-quality peanut seeds which are resistant to pests and diseases in the market. As a result, the farmers still grow the previous peanut variety (local variety) which has poor quality with low productivity. The aim of this study was to find out the performance of cultivation technology on some peanut varieties in peaty soil.

II. MATERIALS AND METHODS

The study was conducted in the experimental farm of Agriculture Faculty in Teuku Umar University. It was started from Januari to December 2012. The study used Randomized Block Design with five treatments and four replications. Five peanut varieties observed in this study were Jerapah, Bison, Domba, Gajah and Naga Umbang (local variety). The technology package of peanut cultivation is described in Table 1.

Table 1. Peanut Cultivation Technology in Peatlands.

No	Technology Components	Description
1	Type of Land	Peaty moorlands
2	Land cultivation	Twice hoeing and once plowing to smooten
3	Plots	5 m x 10 m in size with conduits between plots
4	Source of Seeds	From Indonesian Legumes and Tuber Crops Research Institute (ILETRI) for 4 varieties, and from the local market for the local variety
5	Seed needs	100 – 125 kg/ha of pods with the growing ability >90 %
6	Planting method	A dibble with 4-5 cm in depth
7	Plant spacing	35 cm x 15 cm, 1 seed/hole
8	Types, methods and fertilizer application of Urea,TSP,KCl	75 kg/ha; 100 kg/ha; and 100 kg/ha. Half doses of Urea and KCl were applied at the time of planting, and the rest was applied at the age of 3-4 Days After Planting (DAP). Meanwhile, TSP was entirely applied at the time of planting.
	Lime Application	Conducted 1 week before planting as much as 2 tons/ha
	Manure/Compost	2000 Kg/ha, applied 1 week before planting
9	Maintenance	
	▪ Bed Raising	Applied at the second time of fertilization/weeding
	▪ Pest and Disease Control	
	- Dithane - M45, Curacron 500 EC, Marshall, Padan and citowet (gluten)	At the recommended dose, sprayed when there was pest/disease attacks

10	Harvesting	When the pods were 75% ripe
11	Post-harvest	Drying the pods for 5-6 days
12	Seed storing	In a dry and watertight room

The observed variables in this study were plant height, number of branches, number of empty pods, number of filled pods, number of gynophores which failed to become pods, and the weight of dry pods. These variables were observed on 10 sample plants of each treatment and each replication. The results of dry pods were observed in the harvest plots. At last, the data obtained would be analyzed statistically to determine the differences of each treatment.

III. RESULT AND DISCUSSION

3.1. The Vegetative Growth of Plants

The observation result of the number of branches and plant height at the age of 45 Days After Planting (45 DAP) can be seen in Table 2.

Table 2. The average number of branches and plant height at the age of 45 DAP

Varieties	Number of Branches at the age of 45 DAP	Plant Height (cm) at the age of 45 DAP
Jerapah	7,93 ^a	26,2 ^a
Bison	7,38 ^a	22,3 ^{ab}
Gajah	5,95 ^b	26,2 ^a
Domba	5,03 ^b	20,0 ^b
Naga Umbang	7,73 ^a	25,4 ^a
BNT	**	*

Description: ** and * were significantly different at the level of 1 and 5%.

The data above shows that there was a significant difference in the number of branches among those varieties. Furthermore, it can also be seen that the more branches that grew, the more gynophores that would become pods. Each variety had different number of branches, and the least number was found in Gajah and Domba varieties.

The vegetative growth at the maximum age of 45 DAP shows that plant height of each genotype was significantly different in which the shortest height was found in Domba variety of Valencia type.

3.2. Generative Growth

There was no any significant difference found in the number of empty pods and filled pod in the tested varieties (Table 3). The cause of empty pods was likely due to the poor soil condition inspite of lime application at the recommended doses. This indicates that the doses

of lime application should further be studied so that the acidity level of the soil can be reduced to pH 6,0–6,5 and suit the peanut plants.

Table 3. The number of empty pods and filled pods, weight of dry pods and yields of dry pods of some peanut varieties.

Varieties	Number of filled pods/plant	Number of empty pods/plant	Weight of dry pods/plant (g)	Yields of dry pods (t/ha)
Jerapah	10,2 ^a	2,3 ^a	9,8 ^a	1,56 ^a
Bison	12,5 ^a	2,9 ^a	10,9 ^a	1,77 ^a
Gajah	8,8 ^a	3,3 ^a	9,2 ^a	1,68 ^a
Domba	10,8 ^a	3,0 ^a	11,5 ^a	1,46 ^a
Naga Uimbang	8,2 ^a	3,6 ^a	9,2 ^a	1,36 ^a
BNT	Ns	Ns	ns	ns

Description; There was no significant difference among the varieties.

Among all genotypes, the local variety (Naga Uimbang) provided the lowest number of filled pods (Table 2) while Bison had the highest ones. The highest yields was given by Domba variety whereas the others had the similar number of filled pods. The yields of dry pods from all genotypes ranged from 1,36 - 1,77 t/ha. The highest yields of dry pods were found in Bison variety while the lowest ones were in the local variety (Naga Uimbang) with the difference of 300 kg/ha.

Table 4. The number of gynophores grown as filled pods, dry pods and failed to be pods.

Varieties	Number of gynophores turning into filled pods (%)	Number of gynophores turning into empty pods (%)	Number of gynophore which failed to be pods (%)
Jerapah	54,0 ^a	12,8 ^a	33,2 ^b
Bison	52,2 ^a	12,2 ^a	35,6 ^b
Gajah	52,6 ^a	20,3 ^a	27,1 ^b
Domba	31,2 ^b	8,3 ^a	60,8 ^a
Naga Uimbang	36, ⁸ ^{ab}	19,0 ^a	44,2 ^{ab}
BNT	**	Ns	*

Description: **, *: There was a significant difference at the level of 1% and 5%.ns: insignificant.

Domba variety of Valencia type had the lowest potential of gynophores to become filled pods just as Naga Uimbang variety. This was due to the failure of most gynophores (around 44%-60%) to grow as pods (Table 4).

The study shows that the local variety (Naga Uimbang) gave the lowest production while the national improved varieties provided the higher amount of production. Similarly, it also shows that peaty soil can be utilized for peanut plants' cultivation with fairly good productivity. With the appropriate technology inputs and good management, it is believed

that peanuts grown in the peaty soil will be able to give better productivity like those grown in wetlands and moorlands.

IV. CONCLUSION

1. Peanuts can be grown in peatlands with the use of appropriate technology inputs, land amelioration through lime application, good drainage, population of 225-250 thousands of plants/ha, and weed-pest-disease control.
2. Improved peanut varieties such as Jerapah, Bison, Domba and Gajah can adapt well to peaty soil and give the highest production of pods compared to the local variety (Naga Uambang) in the peatlands of West Aceh district.

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