HORTICULTURE NOTE: NO. 30

CHICKEN MANURE INCREASES AIBIKA YIELD

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ABSTRACT

*The potential of increasing yield and producing better quality aibika (*Abelmoschus manihot*) was tested using different levels of pure chicken manure. Three varieties were used and two methods of application were evaluated. Broadcasting manure was not effective. Incorporating manure into the soil before planting was the best method. Increased yields were recorded for 8 and 12 kg manure per plot. Yields for the first harvest showed that varieties L9 and L39 had maximum yields of 3.85 and 3.59 kg/plot at 8 kg manure per plot (20 m^2). A high yielding variety, L45, produced 9.06 kg/plot at 12 kg manure per plot. On the other hand low yields were obtained for the broadcast method of application despite higher levels of manure used. Variety L9 had 1.78 kg/plot for 24 kg manure, L39 recorded 1.55 kg/plot for 10.70 kg manure and l45 with 2.99 kg/plot for 16 kg manure per plot.*

Key words: chicken manure, aibika yield, rich source of vitamins

INTRODUCTION

Aibika (*Abelmoschus manihot*) is an important leafy vegetable common throughout the Lowlands of Papua New Guinea. Aibika is also grown in the Solomon Islands (Slippery Cabbage), Vanuatu (Island Cabbage), Fiji (Bele), and Tonga (Pele). It is among a list of potential new crop species being considered for introduction into Australia (Fletcher 1993).

The edible portions are a rich source of vitamins, minerals and protein. It is reported that aibika is one of the world's most nutritious leaf vegetables. It contains more nutrients than many introduced vegetables such as head cabbage (Hamilton 1955; Liklik Buk 1977; French and Bridle 1978; Sowei 1993).

The vegetable is very popular with the indigenous population in urban centres such as Port Moresby. Many Small-scale farmers living around the outskirts of the city have limited blocks of land which they continuously cultivate. In this situation, the soil nutrients are depleted and generally the soils contain very low organic matter.

Vegetables are known to remove large quantities of the main nutrients from the soil. Traditionally the accumulation of organic matter after long fallow periods enriches the soil. However with shorter fallow periods, alternative sources of nutrient replenishment is through the use of organic or inorganic fertilizers. Inorganic fertilizers such as NPK or Urea are expensive. For resource-poor-farmers organic fertilizers such as chicken manure offer a cheaper alternative. Since chicken manure is readily available from the poultry industry, a number of trials were conducted at Laloki Agricultural Research Station to investigate its use for aibika production. The results and guidelines are presented in this horticulture note.

TYPES OF CHICKEN MANURE

There are two types of chicken manure available from the poultry industry. Manure from the broiler sheds (meat birds) contain a lot of sawdust which has to be composted before use. Farmers and backyard enthusiasts often report burns to seedlings or plants after the application of this type of manure. There are a number of reasons. The action of the microbes in breaking down the sawdust and manure generate a lot of heat and this may cause burning effect on some plants. Acidity and burns may also result from the sawdust collected from treated timber.

The second type of chicken manure is obtained from layers (egg laying birds). This manure is free from sawdust and is being referred to as pure chicken manure. It is the best type of chicken manure which can be used without prior composting. This is the type of manure which was used for the trials at Laloki and will be discussed in this horticulture note.

METHODS OF APPLICATION

There are two application methods. The first method is by broadcasting manure on the plots. The second involves broadcasting the manure and then ploughing it into the soil. In a backyard plot a garden fork can be used to work the manure into the soil. On large commercial blocks a small power tiller or a rotorvator can be used.

The preferred method is to incorporate the manure into the soil at least one week before planting. In the two trials conducted at Laloki, aibika yield was higher for the plough-in method than the broadcast method. In the frist trial, a second dose of manure was applied by broadcasting at 43 days after planting. However, this probably could not have affected the yield but needs further investigation.

RATES OF CHICKEN MANURE

Pure chicken manure was obtained from Ilimo Egg Farm (formerly Gouna Egg Producers). Samples were sent to the Chemistry Laboratory for analysis. The major nutrients contained in the manure includes 3.00% Nitrogen (N), 1.58% Phosphorus (P) and 1.72% Potassium (K).

Based on this analysis four levels of manure were formulated and tested. The rates for the first trial were 0, 4, 8 and 12 kg manure per 20 m^2 plots. One 8 litre bucket is equivalent to 4 kg of manure. Three aibika varieties were used. The results are given in Table 1. The high yielding variety, L45, showed increased tip yield at higher levels of manure with a maximum of 9.06 kg/plot at 12 kg manure per plot.

Varieties L9 and L39 gave yields of 3.85 and 3.59 kg/plot at 8 kg manure per plot (see Table 1). The second trial was designed to test higher rates of chicken manure (7.1 to 24 kg per plot). However the yields were comparatively low due to a high level of collar rot infestation on the experimental plots (see Table 2). It is also likely that the broadcast method of application may not have been effective.

RESULTS

The effect of chicken manure on aibika yield for the first experiment is presented in Table 1.

Table 1: **Effect of different application rates of chicken manure on the yield of three aibika varieties at Laloki Research Station (First Experiment)**

Variety	Rate of Manure (kg/plot)	Yield * kg/plot	t/ha
L9	0	2.98	4.97
	4	3.05	5.08
	8	3.85	6.42
	12	3.50	5.83
L39	0	3.03	5.05
	4	2.51	4.18
	8	3.59	5.98
	12	3.24	5.40

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L45	0	4.93	8.22
	4	5.80	9.67
	8	5.31	8.85
	12	9.06	15.10

** Yield recorded for three harvests*

The high yielding variety, L45, showed increased tip yield at higher levels of manure. This variety produced a maximum of 15.10 t/ha at 12 kg manure per plot. Varieties L9 and L39 produced yields of 6.42 and 5.98 t/ha at 8 kg manure per plot. In the second experiment higher levels of chicken manure (7.1 to 24 kg per plot) were tested using the same varieties (L9, L39 and L45). The effect of chicken manure on yield is presented in Table 2.

Table 2: **Effect of different application rates of chicken manure on the yield of three Aibika varieties at Laloki Research Station (Second Experiment)**

Variety	Rate of Manure (kg/plot)	Yield * kg/plot	t/ha
L9	7.10	1.59	2.65
	10.70	1.24	2.07
	16.00	1.64	2.73
	24.00	1.78	2.97
L39	7.10	0.86	1.43
	10.70	1.55	2.58
	16.00	1.49	2.48
	24.00	1.44	2.40
L45	7.10	1.45	2.42
	10.70	1.90	3.17
	16.00	2.99	4.98
	24.00	1.58	2.63

** Yield recorded for three harvests*

The yields were comparatively low due to a high level of collar rot infestation on the experimental plots.

CONCLUSIONS

1. The use of chicken manure at 12 kg per plot (6 t/ha) increases aibika yield.

2. For the best results incorporate chicken manure into the soil at least one week before planting.

3. Pure chicken manure can be used with out composting. Manure from broiler farms contain sawdust and should be composted before use.

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