ADZUKI BEAN VARIETY TESTING IN THE MARKHAM VALLEY

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INTRODUCTION

The Department of Primary Industry has introduced a number of varieties of Adzuki bean into Papua New Guinea. The introductions were made to try to identify a cheap and easily available source of plant protein which villagers can grow in their gardens, and use to improve the protein intake in their diet.

A collection of 20 experimental lines of Adzuki bean is held at Bubia Agricultural Research Centre. All of these were introduced from CSIRO, Brisbane.

This article outlines the results of the trials carried out using the Adzuki bean collection at Bubia.

ADZUKI BEANS

The Adzuki bean (*Vigna angularis*) is a close relative of the mung bean (*Vigna radiata, V. mungo*). Adzuki beans probably came originally from India. They are grown in the tropics either for their green beans or for the dried grains.

Adzuki bean plants are bushy annuals which grow up to 75 cm tall. Most commonly grown varieties have 4 - 10 dark red seeds in each pod. Dried Adzuki bean seeds contain about 25% protein. This is similar to the protein content of other legumes such as mungbean, pigeon pea and cowpea.

Like other pulses, the Adzuki bean grows best in well drained medium soil, with an even distribution of rainfall throughout the growing period. During the time when the pods fill out, sufficient rain is needed to enable the grains to develop fully.

Adzuki bean seeds, and dried pods

Like other *Vigna* species, Adzuki beans will continue to grow as long as there is enough moisture in the soil. Therefore, pods develop and mature at different times. This makes harvesting rather difficult. To ensure that all the pods are picked, at least 3 picking rounds are necessary.

The information in this article first appeared in Bubia Seminar Paper No. 33 (March 1985).

Adzuki beans mature unevenly, and this makes harvesting very difficult.

Using Adzuki beans

The green beans are eaten as a vegetable. The young pods can be chopped up and boiled or fried either alone or with leafy vegetables.

The dried grains can be ground up and used as flour to make cakes, biscuits and bread. Split dried grains make good ingredients for soups and stews. Dried Adzuki bean seeds can also be sprouted and eaten as a salad, fried, or boiled. The dried grains are also used as an animal food.

TRIALS ON ADZUKI BEANS

Twenty introductions of Adzuki bean were assessed in a preliminary trial at Bubia in 1977. The 10 best lines were selected and then tested in formal variety trials in the Markham Valley during the 1978 - 1979 cropping season.

The trials were carried out at 2 sites:

1. Bubia
2. Rumion (middle Markham Valley).

The 10 lines were planted in blocks, with 2 seeds per hole at a spacing of 70 cm between rows and 4 cm between holes. This spacing gives about 357,000 plants per hectare. The plant populations at harvest were always less than this, because of losses from thinning and poor germination.

The results from these variety trials are given in Table 1 and Table 2.

The results show that Adzuki beans can grow successfully in the Markham Valley under favourable conditions. Lines A4, A10 and A19 were the best under the high rainfall conditions at Bubia. Each line yielded over 1.3 tonnes of dried grains/ha.

The grain yields from lines planted at Rumion were low. The plants generally were rather short and did not grow vigorously. The best yield was 0.8 t/ha from line A13.

There are several possible reasons why the two sites gave different yields.

1. Rainfall. During the 1980 growing season, 956 mm of rain fell at Bubia. The rain was spread evenly throughout the growing period of the Adzuki beans. During the pod-filling stage, 218 mm of rain fell.

   At Rumion, about 670 mm of rain fell during the 1980 growing season. The rain was not evenly distributed. In some weeks, no rain fell at all.

2. Soils. At Bubia, the soil is slightly heavy (not very sandy). Heavy soils hold water, which plants can use as they are growing.

   At Rumion, the soil is very light (sandy loam texture). Water drains away very quickly in light soils. Therefore, in the weeks when no rain fell, the soil could not hold enough water for the Adzuki beans to grow well.

3. Cloud cover. The site at Rumion has more low cloud cover throughout the year than Bubia. Low cloud cover means less sunlight. During the growing stage of crops, this can cause reduced height of plants.

Adzuki beans did not grow very well at Rumion, where the soils are light sandy loams, and rainfall is uneven.

This crop is 28 days old. Note that no canopy has formed.

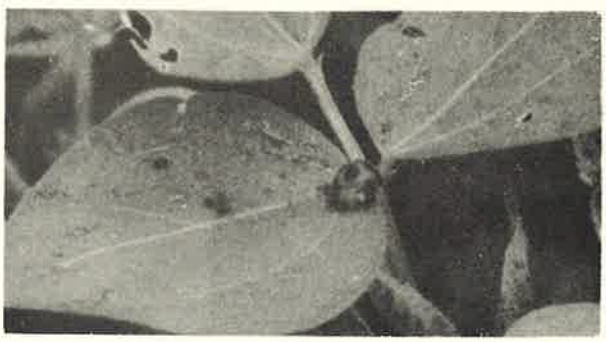
Adzuki beans grew better at Bubia, in medium clay loam soils, and with rainfall throughout the growing period.

This crop is 35 days old and is at the 50% flowering stage. Note the thick canopy.

Pests and diseases

The most important insect pests seen during the variety trials were beanfly, pod-borers, leaf-chewing ladybirds, and green vegetable bugs. These can cause large losses in yield if control methods are not taken. For control measures, see Technical Report 83/4 - Recommendations for the Control of Pests, and Entomology Bulletin No. 28.

No important diseases were observed during the trials.



The leaf chewing ladybird, Henosepilachna signatipennis, *on Adzuki bean leaves.*

TABLE 1. RESULTS FROM VARIETY TESTING AT BUBIA

Line	Days to 50% Flowering	Height (cm)		Days to harvest		Plant Population ('000/ha)	Dried grain yield (kg/ha)
		Plant	Lowest pod	First	Last		
A4	33	60	8	71	107	225	1597
A19	35	49	6	74	107	295	1402
A10	35	49	6	74	107	277	1378
A18	35	53	6	74	107	313	1289
A13	35	56	7	74	107	298	1285
A3	35	47	6	74	107	300	1268
A9	35	45	6	74	107	288	1267
A8	35	48	6	74	107	286	1216
A16	35	55	5	74	107	280	1174

TABLE 2. RESULTS FROM VARIETY TESTING AT RUMION

Line	Days to 50% Flowering	Height (cm)		Days to harvest		Plant population ('000/ha)	Dried grain yield (kg/ha)
		Plant	Lowest pod	First	Last		
A13	32	46	4	70	87	250	758
A18	31	39	5	70	87	297	686
A4	28	54	6	64	87	225	685
A3	32	40	3	70	87	270	666
A9	32	40	4	70	87	253	619
A12	32	40	4	70	87	246	552
A10	32	41	4	70	87	251	534
A19	32	41	3	70	87	246	472
A8	32	37	4	70	87	260	369
A16	32	40	4	70	87	248	192

TABLE 3. LINES AND SUGGESTIONS FOR PLANTING

Soil conditions	Suggested lines	Seeds/ha (kg)	Population/ha ('000)	Spacing		Yield (t/ha)
				row	within row	
Light alluvial soils	A13 or A18, A4, A3	25 - 30	357 - 400	70cm x 4cm		0.7-0.8
Medium - slightly heavy soils	A4 or A19, A10	25 - 30	357 - 400	70cm x 4cm		1.3-1.6

CONCLUSIONS

Adzuki beans are an ideal pulse crop to grow in areas which have a short rainy season. It takes from 70-74 days from planting to first harvesting, compared with 110 days for early maturing varieties of soya bean *(Glycine max)*. Line A4 takes only 64 days to mature at Rumion.

Adzuki beans will grow in light sandy loam soils, if there is enough rain throughout the growing season. To produce good sized grains, water is needed especially at the stage of pod filling.

However, Adzuki beans will grow best in medium to slightly heavy soils, with good drainage. Good rainfall is needed throughout the growing season especially at the pod filling stage.

Avoid growing Adzuki beans at places where low cloud cover is common during the growing period.

Because they mature unevenly, the lines of Adzuki beans tested are not suitable for commercial production. However, the Adzuki bean is an ideal pulse crop for subsistence gardens. Its uneven maturing habit is an advantage for rural farmers who do not have storage facilities. It is also a good rotation crop with staple root and tuber crops and green leafy vegetables.

For farmers who are interested in growing Adzuki bean for home consumption, the suggestions for planting are given in Table 3. You can buy small quantities of Adzuki bean seed from Bubia Agricultural Research Centre (address below). The cost is 50 toea per kilogram.

FURTHER INFORMATION

For further information and for small quantities of Adzuki bean seed, write to:

The Officer-in-Charge
Bubia Agriculture Research Centre
P O Box 1639
LAE

Telephone: 424933

FURTHER READING

Masamdu, R.T.M. (1984). The beanfly. Entomology Bulletin No. 28. *Harvest* 10 (1): 29-31.

Thistleton, B.M. (1983). Recommendations for the Control of pests 1983. *Technical Report* 83/4. D.P.I., Konedobu.