SUGGESTIONS FOR CULTIVATING MUNGBEANS

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INTRODUCTION

The mungbean is a grain legume of the genus *Vigna*. It is grown widely in tropical and subtropical regions. The seeds contain around 23% protein. Their sprouts are highly valued in the Asian countries, and are rich in Vitamins E and B.

Tests on different varieties of mungbean were carried out at Bubia and Gusap in 1978. This article gives suggestions for cultivating mungbeans, based on the results of these tests.

VARIETIES

There are two types of mungbean:

1. Green grams *(Vigna radiata)*. Green gram plants grow upright, from 70 to 110 cm tall, and the pods are concentrated in the upper branches. The seeds are about 0.7 mm long, and are usually green or yellow. Some varieties have brown or black seeds.

2. Black grams *(Vigna mungo)*. Black gram plants do not grow very tall, and form bushes with long viney branches. The pods are scattered throughout the plant and this makes harvesting more difficult. The seeds are about 0.4 mm long and are either black, or very dark green.

A good crop of mungbean (Vigna radiata) *at Bubia.*

Varieties suggested for planting in the Markham and Ramu Valleys are: the green gram varieties NG7560, NG7561, NG7562, Green Gram; and the black gram variety CPI30100. The characteristics of each variety are shown in Table 1.

SOIL AND CLIMATE

Mungbeans will grow on a wide range of soils, from heavy clay

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TABLE 1. MUNGBEAN VARIETIES

Variety	Type	Type of growth	Height of plant	Type of seed	Suggested rate of sowing (kg/ha)	Days to flower	Days to harvest	Trial results	
								Population at harvest	Grain yield (g/m^2)
NG7560	Green	Upright	70-90 cm	Shiny, green, 40-50 g per 1,000	16-18	32	45-95	313,000	75
NG7561	Green	Upright	100-110 cm	Green, 40-50 g per 1,000	18-20	32	64-96	327,000	66
NG7562	Green	Upright	90-100 cm	Large, yellow, 50-60 g per 1,000	18-20	32	65-97	301,000	56
Green Gram	Green	Upright	100-110 cm	Large, green, 50-60 g per 1,000	18-20	32	64-97	275,000	50
CPI30100	Black	Viney	-	Small, black 30-40 g per 1,000	14-16	32	72-104	288,000	95

to light sandy soils. Like other pulse crops, they do not do well in swampy or waterlogged areas. However, they are more tolerant to drought than other legumes. Provided there is enough water during the pod development stage, mungbeans can be grown all the year round.

Overseas findings have shown that mungbeans can be grown at altitudes of up to 1800 m. Altitudes above 2000 m are usually too cold for mungbean production.

INOCULATION

Mungbeans will form nodules very easily in the presence of cowpea inoculum. This can be obtained from seed companies in Australia, or from C.S.I.R.O., Cunningham Laboratory, Queensland.

The results of the trials at Bubia have shown that mungbeans can still nodulate without inoculum treatment. You do not need to inoculate on land where well nodulated crops of mungbean have been grown previously.

For more information about inoculation, see HARVEST Volume 5 (4): 236-238.

SOWING RATES

From the trials at Bubia and Gusap, we found that to obtain the best yields, a plant population of 250,000 to 350,000 plants per hectare is needed. Suggested seeding rates for the five varieties are given in Table 1.

Row spacings of 50 or 70 cm can be used, depending on the method of weeding. If mechanical weeding is planned, then 70 cm spacing is suggested. The wider row spacing makes it easier for farmers to move around between their plants for weeding and harvesting. If pre-emergent herbicides are used for weeding, then we would advise farmers to leave 50 cm between rows.

SOWING DATES

In the Markham and Ramu Valleys, where no irrigation is possible suggested times of planting are as follows: Erap, Marambung - late December to early January, Sasiang, Leron, Mutsing - late January to early February, Kaiapit, Gusap, Dumpu - mid February to early March.

In other parts of Papua New Guinea, we suggest that you sow the seeds during the rainy season so that the crop will be ready for harvesting in the dry season. You should allow 3-3½ months from sowing to harvesting. It is important to plant so that there will be enough moisture during the flowering and pod forming stages (two months from planting).

During wet weather, mungbean seeds will germinate in the pods, so the crop should not be planted to mature early in the wet season.

LAND PREPARATION

Land should be ploughed or dug over before sowing the seeds. Medium to heavy soils will require a fine harrowing. The seed beds should be cleared of any remains of previous crops. If the area tends to get waterlogged, dig drains (barets) around the garden.

Planting depth should be not more than 5 cm in lighter soils, and 7 cm in heavy soils.

FERTILIZERS

Mungbeans, like other legumes, can convert free nitrogen in the soil into useful compounds, providing the roots are well nodulated.

If mungbeans are to be grown on new land, or land previously used for a cereal crop, a starter nitrogen is needed. Use two bags of ammonium sulphate per hectare (about 20 kg nitrogen per hectare).

Some overseas studies have reported an improvement in yield after application of phosphate, zinc and sulphur fertilizers to soils deficient in those nutrients. No work has been done on this in Papua New Guinea.

Fertilizer can be applied in either of the following ways:

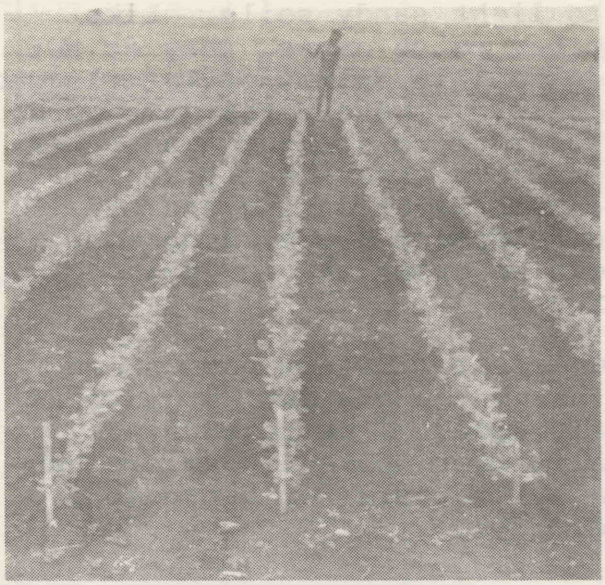
1. Spread fertilizer over the soil surface evenly, then work it into the soil by raking, tilling or ploughing. Seeds can be sown after the fertilizer application.

2. Place fertilizer in the row of seeds, either beside or underneath the seeds. Cover it with soil. Take care that the seeds do not come into contact with the chemical.

WEEDS

Mungbeans do not compete well with weeds and it is important to control weeds until plants are large enough to shade the ground, about 20-30 days after sowing. Once the ground is well shaded, weeds do not grow as easily.

Weeding can be done using a hand hoe. No formal work has been done on herbicide use on mungbeans in Papua New Guinea. However, tests in Queensland suggested that effective control of grass type weeds is possible by using trifluralin (Treflan). Treflan should be applied and ploughed into the soil just before planting. The recommended rate in Queensland is 1.0 to 1.5 litres of the product per hectare, with higher rates for heavier soils.



Fifteen day-old mungbean seedlings at Rumion. Inter-row weeding using a hand hoe.

PESTS

The two main pests seen in the trial plantings were the green vegetable bug *(Nezara viridula)* and the leaf chewing ladybird *(Henosopilachna signatipennis)*. Green vegetable bugs can be a big problem at the pod filling stage.

Both insects can be controlled by accephate (Orthene) at 0.5 kg a.i./hectare, or methomyl (Lannate) at 0.3 kg a.i./hectare. Spray for Green vegetable bugs from the flowering stage, until the grains are hardened.

Leaf chewing insects can be easily controlled by 0.1% carbaryl. A weekly application should be enough to control the damage.

DISEASES

All green gram varieties can be affected by a suspected virus disease. The main symptom (sign) of the disease is yellow - pale green mottling of leaves. The affected plants may have two or three leaves showing the symptoms, while the others appear healthy.

Farmers should pull out any diseased plants, and burn them.

Typical symptoms of the suspected virus disease - the leaves are mottled. The light areas are yellow.

HARVESTING

The mungbean crop matures unevenly. Plants will continue to produce pods as long as there is enough moisture in the soil. Because of this, more than one harvest is required.

The simplest way of harvesting is by hand. The farmer picks the ripe pods every second week, making sure that all ripe pods are harvested.

*Harvesting matured pods of green grams (*Vigna radiata*) at Bubia. The viney black gram (* Vigna mungo*) is in the foreground.*

Mechanical harvesting is difficult. Mungbean can be artificially defoliated and dried off by spraying with paraqaut (gramoxone) at 2-3 litres of the product, per hectare, when most of the pods are matured. This method was tried on three blocks at Bubia in 1979 with some success. The work load was reduced, and a yield of about 0.9 tonne/hectare was obtained. The disadvantage of this method is that immature seeds are mixed in with good seeds. However, it is probably the best method of harvesting a large planting.

FURTHER RESEARCH

The information given above is a set of suggestions only. Before definite recommendations can be made, further research needs to be done.

Variety trials and studies on population density need to be held at different places and on different types of soil.

New cultivars will be obtained from overseas institutions, especially Queensland University, C.S.I.R.O. Cunningham Laboratory in Queensland, and the Asian Vegetable and Development Centre (A.V.R.D.C.) in Taiwan. These cultivars will be tested for growing in Papua New Guinea.

Formal trials on the use of herbicides in controlling weeds in the Markham Valley need to be carried out.

Intercropping trials will be carried out.

Seed multiplication blocks will be set up every year to ensure that enough fresh seeds are available for the farmers.

USES OF MUNGBEANS

Both green grams and black grams can be eaten as beans or as bean sprouts.

The split beans are often used in making soups. Matured, dried beans can be ground into flour for making nutritious biscuits, cakes and bread. The dried beans can also be processed into protein concentrates for livestock feeds.

Beansprouts are easy to prepare, as follows:

Soak some fresh dry clean beans overnight in tap water. The next day throw the water away and place the swollen beans in a container. Cover with a damp cloth and store the container in a dark place. After 2 or 3 days, the beans should develop white tender shoots, called sprouts. Remove the sprouting seeds from the container and rinse them well. Get rid of the seed coats by rubbing the sprouts between the palms of your hands. The sprouts are now ready for use.

One kilogram of matured seeds will produce 2.3 kg of beansprouts.

CONCLUSION

Small farmers and Community Schools are encouraged to grow mungbean as a good nutritious crop for home consumption. A lot of interest in the crop has been shown by local farmers, community schools and various institutions throughout the country. This enables us to continue with the trials at Bubia and in the Markham and Upper Ramu Valleys.

If you need any information or advice about growing mungbeans in your area, you should write to: The Agricultural Research Centre, Bubia, P.O. Box 348, Lae.