

BIOMASS AND NITROGEN YIELDS AT DIFFERENT SEED RATES OF TWO GREEN MANURING CROPS

F.I.M. G. W. Sarker, M.M.Zaman, J.U. Chaudhury and T. Chand

*Farm Management Division
Bangladesh Rice Research Institute
Gazipur- 1701, Bangladesh*

Abstract

An experiment was conducted during Boro season, 1985 at the BRRI farm, Gazipur to determine the amount of dry matter and nitrogen yield by different seed rates of sunnhemp (*Crotalaria juncea*) and cowpea (*Vigna unguiculata* (L) Walp). Seeds of sunnhemp were sown at the rate of 15kg, 20kg, and 25kg/ha and cowpea at the rates 30kg, 35kg and 40kg/ha. Sunnhemp at 20kg/ha seed rate produced the highest dry matter biomass (3.26 ton/ha) at 60 DAS. This treatment produced 126.81 kg/ha nitrogen. Cowpea at 40kg/ha seed rate produced the highest dry matter biomass (2.43 t/ha) at 60 DAS and produced 119.31kg/ha nitrogen. Sunnhemp was better than cowpea in dry matter and nitrogen yields.

Key words : Biomass, Nitrogen, Seed rates, Green manure

Green manuring (GM) is a cheap source of nitrogen through which atmospheric nitrogen (N) can be fixed with less than one half the energy used for chemical fixation (Singh, 1984). Green manures are usually fast growing leguminous crops. Through incorporation into the soil, green manures not only supply a substantial amount of N for the use of subsequent crops, but also add sufficient amount of organic matter to the soil. But the total amount of organic matter production and N supplement by a GM is determined by the proliferation of the GM, which is governed

specifically by the plant population per unit area and duration of plant growth (Watanabe, 1984).

Sunnhemp and cowpea are popular fodder and green manure crop in Bangladesh. But few experiments have been conducted on the performance of sunnhemp and cowpea (Zaman, 1983). Therefore, the experiment was undertaken to determine the amount of dry matter and nitrogen yields as influenced by different seed rates of sunnhemp and cowpea.

The experiment was conducted at the BRRI Farm, Gazipur during Boro season, 1985. The

seed rates were: T1=15 kg/ha, T2= 20 kg/ha, T3=25 kg/ha for sunnhemp and T4=30 kg/ha, T5= 35 kg/ha, T6 = 40 kg/ha for cowpea.

A split plot design with three replications was used. Green manure crops were assigned in main plots while the seed rates were in the sub-plots. The green weight and plant population data were recorded at every 30, 45 and 60 days after sowing (DAS) from each plot. All plants from 1 m² area in each plot, were uprooted and roots were washed to remove the soil. One hundred grams of green plant samples were taken from each plot, oven dried for 72 hrs. at 70°C for determining dry

matter yield and samples were analysed for N content.

Dry matter yield of sunnhemp and cowpea increased significantly with the age of plant (Table 1). This finding is in agreement with the findings of Watanabe (1984). The highest dry matter was obtained at 60 DAS at all seed rates. However, at 60 DAS, sunnhemp at the seed rate of 20 kg/ha produced significantly higher dry matter yield (3.26 t/ha) over all other treatments. The lowest dry matter was obtained from cowpea with 30 kg/ha seed rate and with the increasing seed rate, dry matter yield was increased in cowpea, though there was no significant difference in dry matter

Table 1. Dry matter (DM) and nitrogen (N) yield at different seed rates of Sunnhemp & Cowpea.

Crops	Seed rate	Yield (kg/ha)					
		30 DAS		45 DAS		60DAS	
		DM	N	DM	N	DM	N
Sunnhemp	15 kg/ha	0.18 a	6.68 (3.71)	1.74 a	67.34 (3.87)	2.72 b	105.81 (3.89)
Sunnhemp	20 kg/ha	0.24 a	8.90 (3.71)	1.53 ab	59.21 (3.87)	3.26 a	126.81 (3.89)
Sunnhemp	25 kg/ha	0.15 a	5.57 (3.71)	1.38 b	53.41 (3.87)	2.38 bc	92.58 (3.89)
Cowpea	30 kg/ha	0.12 a	4.40 (3.67)	0.43 d	16.86 (3.92)	1.39 d	68.25 (4.91)
Cowpea	35 kg/ha	0.19 a	6.97 (3.67)	0.85 c	33.32 (3.92)	2.14 c	105.07 (4.91)
Cowpea	40 kg/ha	0.20 a	7.34 (3.67)	0.79 c	30.99 (3.92)	2.43 bc	119.31 (4.91)

LSD (5%) = 0.352 CV (%) = 21.00

Treatment means followed by common letter (s) do not significantly differ at 5% level of LSD. Figures in parentheses show the percentage of N content.

production with T5 and T6 (Table 1). It appears that 20 kg/ha seed rate for sunnhemp and 40 kg/ha for cowpea are optimum for higher dry matter production. Nitrogen yield increased with plant age (Table 1). At 60 DAS, 20 kg/ha seed rate of sunnhemp and 40 kg/ha seed rate of cowpea produced the highest amount of nitrogen (126.81 kg/ha and 119.31 kg/ha, respectively). Watanabe (1984) reported that the average N content and yield of green manures are greatly dependent upon the harvesting time. Singh *et al.* (1991) also reported that rice farmers in the tropics can grow green manuring crop during the 45-60 days transition period between dry and wet season and it can supply a substantial portion of the N requirement of rice. Sunnhemp was better both in dry matter and nitrogen yields than that of cowpea. Similar results were found by Sanyaseraju (1952).

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