

## EFFECT OF TWO COMMON LIMING MATERIALS ON THE GROWTH, NODULATION AND YIELD OF COWPEA (*VIGNA UNGUICULATA*)

The secondary nutrients like calcium and magnesium play a vital role in the growth and yield of pulse crops. Calcium is an important secondary nutrient in the functioning of nodules in atmospheric nitrogen fixation in pulses. Nodulation by rhizobium is inhibited due to lack of adequate quantities of calcium in soils and this in turn may lead to impairment of nitrogen fixation.

A field trial was conducted in the moderately fertile sandy loam rice fallow of Rice Research Station, Pattambi during January–April 1977-78 to find out the effect of different liming materials on the growth and yield of cowpea under irrigated conditions. The experiment was laid out in Randomised block design with four replications. The treatments consisted of two levels of dolomite (400 kg/ha and 800 kg/ha) and two levels of quick lime (250 kg/ha and 500 kg/ha.) The dolomite used for this experiment contained  $\text{CaCO}_3$ ,  $\text{Mg CO}_3$  and inert matter at 75.20 per cent 18.70 per cent and 6.10 per cent respectively. The quick lime used had 87 per cent purity. Cowpea variety New Era was chosen as the experimental material. The seeds were sown by dibbling in lines at a spacing of 30 cm between rows and 20 cm between plants in plots of size 9.9m x 2m at the rate of two seeds per hole. Dolomite and lime were applied fifteen days before sowing. The pH of the soil before the application of liming materials was 5.9. Fertilisers were applied at the time of sowing to supply N, P, K at the rate of 20:30:10 kg/ha. Observations on plant height, number of leaves per plant, number of nodules per plant and dry weight of nodules were recorded when 50 per cent of the plants came to flowering stage. These observations were recorded from 10 randomly selected plants in each plot. Data on yield were recorded as obtained from four harvests. The results obtained are recorded in Table-1.

The maximum grain yield was recorded when the dolomite was applied at 400 kg/ha. Higher doses of dolomite or lime did not bring about substantial increase in grain yield. However, these differences in grain yield were not significant. The plant height showed substantial increase due to application of dolomite at 400 kg/ha, while the number of leaves recorded a decreasing trend.

The maximum number of root nodules were produced when the dolomite was applied at 800 kg/ha and this was closely followed by lime at 250 kg/ha and dolomite at 400 kg/ha, with the untreated control recording the least. This clearly indicates the good response to liming materials for improving nodulation in cowpea. The dry weight of nodules was maximum when lime was applied at 250 kg/ha and the higher doses failed to increase the nodule weight further. The number of nodules of cowpea seems to have a direct bearing on the grain yield. In the present study, the treatments which produced maximum root nodules per plant, viz., dolomite 800 kg/ha, lime 250 kg/ha and dolomite 400 kg/ha, recorded

the maximum grain yield. According to Lowther and Loneragan (1968), calcium requirement for root infection or nodule initiation in legumes is greater than its requirement for host plant growth. Singh and Mandal (1975) reported an increase of 0.14 ton of grain in black gram when lime at the rate of 3.7 t/ha was applied in addition to NPK fertilisers.

The present study clearly revealed that dolomite is a superior liming material for enhancing grain yield in cowpea. At both levels of dolomite, the grain yields were higher than yields obtained under corresponding levels of lime. This is perhaps explicable on the basis of the advantage that dolomite contains the secondary nutrient magnesium in addition to calcium,

സംഗ്രഹം

വൻപയറിൽ പയറുൽപ്പാദനത്തിലും മൂലാർബുങ്ങളുടെ നിരമ്മാണത്തിലും സാധാരണയായി ഉപയോഗിച്ചുവരുന്ന രണ്ടു കൂത്തായ വസ്തുക്കളായ ഡോളമൈറ്റ്, കൂത്തായ എനീവയിൽ കൂടുതൽ നല്ലത് ഏതെന്ന് മനസ്സിലാക്കുവാനായി ഒരു പരീക്ഷണം പട്ടാമ്പി നെല്ലുഗവേഷണ കേന്ദ്രത്തിൽ 1977-78 ജനുവരി-ഏപ്രിൽ മാസം നടത്തുകയുണ്ടായി. ഡോളമൈറ്റ് 400 കി. ഗ്രാം/ഹെക്ടർ എന്ന അളവിൽ കൊടുത്തപ്പോഴാണ് ഏറ്റവും കൂടുതൽ പയർ ലഭിച്ചത്. എന്നാൽ മൂലാർബുങ്ങൾ കൂടുതലായി ഉണ്ടായി കണ്ടത് ഡോളമൈറ്റ് 800 കി. ഗ്രാം/ഹെക്ടർ എന്ന അളവിൽ ചേർത്തപ്പോഴായിരുന്നു. ഈ പരീക്ഷണത്തിൽനിന്നും കൂത്തായ കൂടിയ അളവിൽ ചേർക്കുന്നതുകൊണ്ട് പയറുൽപ്പാദനത്തിൽ കൂടുതലായി പങ്കൊന്നും വഹിക്കുന്നില്ലെന്നും ഡോളമൈറ്റ് കൂത്തായത്തേക്കാൾ മികച്ച ഒരു വസ്തുവാണെന്നും കാണുകയുണ്ടായി.

Table 1  
Plant growth attributes and grain yield of cowpea

Treatments	Plant height (cm)	Leaves per plant	Number of nodules per plant	Oven dry weight of nodules/plant (mg)	Grain yield (kg/ha)
Control	80.50	17.50	17.10	118.70	374.00
Lime-250 kg/ha	91.70	16.30	25.50	167.00	530.00
Lime-500 kg/ha	94.90	18.00	20.90	124.00	474.00
Dolomite-400kg/ha	103.00	14.90	24.90	139.00	594.00
Dolomite-800kg/ha	85.80	14.10	25.60	147.20	535.00
CD (p-0.05)	—	—	1.44	31.7	

### References

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