

considerable variations among ACM 9 (44.19) Co 22 (39.94) and ARC 10550 (37.65). Varieties Co 13 and Triveni were on par with ARC 10550 (Table 3).

The plant vigour, height and weight were significantly low in all the five test varieties. The mean plant height recorded in various test varieties was comparatively low (Table 4). Similarly, in all the test varieties, the mean plant weight, root length and weight were considerably very low when compared to the check plants at 'O' level. On an average, 50 per cent reduction in plant weight, 8-10 cm reduction in root length and 3-5 gm loss in root weight were recorded in all the test entries (Table 5, 6 and 7). The higher population level of WBPH caused a significant reduction in the plant height, weight, root length and weight in all the test varieties. But among the five varieties tested, Triveni had the ability to compensate for the damage caused by higher WBPH population. This was clearly evidenced from the less reduction in the mean plant weight 36.5 gm as against 56.51 gm in the uninfested plant.

Based on the results of the study, it is clearly evident that tolerance is an ideal component in any pest management programme. Thus, the resistant/moderately resistant varieties were able to

support/tolerate the different levels of population as evidenced by a higher plant height and weight. This also coincides with the higher root length and root weight of ARC 10550 (16.68 cm and 10.20 gm Table 6 & 7) as against (10.25 cm and 7.73 gm) in ACM 9. The overall results showed that a population of 25 WBPH/plant was sufficient to cause a considerable reduction in plant height, weight, root length and weight in all the varieties.

REFERENCES

- GUNATHILAGARAJ, K., CHELLIAH, S., HEINRICHS, E.A. and KHUSH, G.S. (1983). Techniques to evaluate varietal resistance to the white backed planthopper in rice. *Oryza* 20 : 47-50.
- HEADLEY, J.C. (1972). Defining the economic threshold. In *Pest Control Strategies for the Future*. National Academy of Sciences, Washington, D.C., pp. 101-118.
- Ho, D.T., HEINRICHS, E.A. and MEDRANO, F. (1982). Tolerance of the rice variety Triveni to the brown planthopper *Nilaparvata lugens*. *Environ. Entomol.*, 11 : 598-602.
- NALINI, R. and GUNATHILAGARAJ, K. (1994). Measure of tolerance level in rice (*Oryza sativa*) accessions resistant to white backed planthopper (*Sogatella furcifera*). *Indian J. Agric. Sci.* 64 583-587.
- VAIDYA, G.R. and KALODE, M.B. (1981). Studies on biology and varietal resistance of white backed planthopper *Sogatella furcifera* (Horvath) on rice. *Indian J. Plant Prot.*, 10 3-12.

(Received: March 1989 Revised: January 1996)

Madras Agric. J., 83(1): 24-26 January 1996
<https://doi.org/10.29321/MAJ.10.A00958>

EFFECT OF AMENDMENTS ON SOIL PROPERTIES AND YIELD PARAMETERS UNDER MAIZE - BLACK GRAM CROPPING SEQUENCE IN SOILS WITH SURFACE CRUSTING

M. SHANMUGAM, R. RATHNASAMY and N. NADARAJAN

Department of Soil Science and Agricultural Chemistry
 Agricultural College and Research Institute
 Tamil Nadu Agricultural University
 Coimbatore 641 003.

ABSTRACT

Trials were conducted for ameliorating the red lateritic soils of Vamban with organic and inorganic amendments under maize - black gram cropping sequence. The results revealed that application of pressmud (5 t/ha) significantly increased the grain yield of maize. While soil pH was significantly increased due to pressmud (5 t/ha) and lime (2 t and 4 t/ha), soil hardness was only marginally influenced. Application of amendments did not influence soil available nitrogen and phosphorus, but FYM (5 t/ha) significantly increased the soil available potassium. There was indications of the residual effect of amendments on the subsequent crop.

KEY WORDS : Amendments, Soils, Surface Crusting, Soil Properties Yield

Soil crusting is a major factor causing poor seedling emergence of several crops. In semi-arid

tropics, millets are generally grown in soils of poor physical structure, for example, Alfisols, which are

Table 1. Influence of amendments on soil properties and yield of maize*

Treatment	Emergence (%)	Plant height (cm)	Root length (cm)	Grain yield (kg/ha)	Soil hardness kg/sq in.	Soil pH	Available Nutrients kg/ha		
							N	P	K
Gypsum 2 t/ha	80.4	146.3	22.0	3500	2.6	5.3	153	13.6	147
Gypsum 4 t/ha	79.2	144.8	23.6	3333	2.8	5.4	150	13.8	133
Lime 2 t/ha	76.5	146.3	23.6	3333	2.8	5.9	160	12.5	147
Lime 4 t/ha	77.6	156.8	23.4	3083	2.6	6.0	151	13.0	143
Rice husk 5 t/ha	80.4	159.2	24.5	2667	3.0	5.5	141	14.8	150
Pressmud 5 t/ha	81.0	161.7	25.4	3416	2.6	6.1	170	13.1	150
FYM 5 t/ha	72.1	152.5	21.8	2350	3.1	5.2	144	12.6	193
Control	71.3	120.3	20.4	2000	3.0	5.2	160	9.56	140
CD	8.6	19.8	3.0	316	0.6	0.3	54	2.0	31

* Mean of three replications

prone to form crusts (Hoogmoed, 1983). Compaction from rain drops and the subsequent drying of the compacted surface soil results in a soil crust (Cary and Evans, 1974). Soil crust impedes the emergence of young seedlings even when other factors like availability of moisture, oxygen, soil temperature and planting depth are not limiting. The crust poses a serious problem to small seeded crops and inhibits emergence of even large seeds as corn which normally have strong emergence force (Awadhwal and Thiersten, 1985). Soil crusting is a severe problem in weekly aggregated soils. Improvement in soil structure and stability of aggregates can be achieved by using gypsum, calcium carbonate and organic amendments. With a view to find out the effects of such amendments on the seedling emergence and soil characteristics under a maize based cropping sequence in red lateritic soils of Pudukkottai, this study was taken up.

MATERIALS AND METHODS

Field trials were conducted during 1987-88 with application of amendments under soils with the problem of soil crusting at NPRC Farm, Vamban, Pudukkottai. The amendments were applied basally and thoroughly incorporated into the soil. The following treatments were imposed:

gypsum 2 t/ha ; gypsum 4 t/ha; lime 2 t/ha; lime 4 t/ha; rice husk 5 t/ha; pressmud 5 t/ha; FYM 5 t/ha, and control

The experiment was conducted following randomised blocks design with three replications. Maize (Co 1) was raised as the test crop. Observations on per cent emergence, root length,

soil hardness, soil pH, available nitrogen, available phosphorus and available potassium were recorded. Soil hardness was recorded using pen-type penetrometer. Under each plot penetrometer readings were recorded in 12 spots and the mean values were taken. For other parameters, standard procedures were employed. Another experiment was conducted in the same field, to study the residual effect of applied amendments over the subsequent crop and on the soil properties. For this the original plots were divided into two equal halves and for one half the same treatments were imposed and for the other half no amendment was added. Black gram (KB 51) was raised as the test crop and observations on soil hardness, per cent emergence and grain yield of black gram were recorded.

RESULTS AND DISCUSSION

The results of the field experiment conducted with maize (Co 1) and amendments are presented in Table 1. The data revealed that application of pressmud (5 t/ha) significantly increased the grain yield of maize. With the application of pressmud, the highest grain yield of 3500 kg/ha was obtained. Soil pH was also significantly increased by application of pressmud (5 t/ha) and lime (2 t and 4 t/ha) soil hardness was marginally influenced by the treatments. Plant height was influenced significantly due to treatments with pressmud (5 t/ha) application standing first in the order. Root growth was not influenced by the application of amendments.

The available nutrients, viz., soil available nitrogen, phosphorus and potassium were also

Table 2. Residual effect of amendments on soil hardness and grain yield of black gram

Treatment	Soil hardness kg/sq in.		Emergence (%)		Grain yield (kg/ha)	
	T	R	T	R	T	R
Gypsum 2 t/ha	2.42	3.08	67.0	62.0	303	355
Gypsum 4 t/ha	2.58	2.92	63.8	56.5	233	352
Lime 2 t/ha	2.67	3.12	62.3	58.0	326	385
Lime 4 t/ha	2.75	2.83	66.0	60.7	418	465
Rice husk 5 t/ha	2.67	2.67	68.9	62.5	392	458
Pressmud 5 t/ha	2.58	2.92	70.2	58.8	390	415
FYM 5 t/ha	3.33	3.17	60.1	53.2	355	342
Control	3.33	3.33	50.3	53.0	230	268
Main plot	CD	0.4	3.5		83	
Sub-plot	CD	0.2	1.4		24	

T = Treated; R = Residual; Mean of three replications

studied for any effect due to the application of amendments. It was found that the amendments did not influence the available nitrogen and phosphorus status of the soil. However application of FYM (5 t/ha) significantly increased the available potassium status of the soil. Significant differences were observed in the the main plots as well as the sub-plots (Table 2). This showed that the grain yield was influenced by the residual effect of the amendments as well as further yield increments could be achieved by further application of amendments. Residual effect was pronounced in the plots which received lime (4 t/ha), rice husk (5 t/ha) and pressmud (5 t/ha) in the previous season. The same significant trend was observed with per cent emergence and soil hardness but these were

only marginal. So it can be concluded that application of pressmud (5 t/ha) or lime (4 t/ha) would be beneficial for obtaining higher yields of crops and the continuous application over a period of time would result in the improvement in soil properties.

REFERENCES

- AWADHWAL, N.K. and THIERSTEIN, G.E. (1983) Development of rolling type soil crust breaker. *Agric. Mechan. Asia. Africa Latin America* 14 : 31-34.
- CARY, J.W. and EVANS, D.D. (1974). Soil crusts. *Technical Bulletin 214. Agricultural Expt. Station, University of Arizona*
- HOOGMOED, W.B. (1983) Some aspects of crust formation on soils in semi-arid regions. *Proceedings of workshop on SAT Alfisols and Related Soils. ICRISAT, Hyderabad, 1984.*

(Received : December 1994 Revised: January 1995)

Madras Agric. J., 83(1): 26-28 January 1996

DEGRADATION OF COIR WASTE AND TAPIOCA PEEL BY EARTHWORMS

P.T.RAMESH and K.GUNATHILAGARAJ
Department of Environmental Sciences
Agricultural College and Research Institute
Tamil Nadu Agricultural University
Coimbatore 641 003

ABSTRACT

Degradation of coirwaste and tapioca peel by earthworms with and without feed was tried under laboratory condition. The rate of degradation was maximum in treatments with earthworms that received cowdung as feed. Degradation was marked by the decrease in organic carbon content, C/N ratio and the subsequent increase in major and minor nutrient contents and microbial activity in both coirwaste and tapioca peel. The hydrogen cyanide (HCN) content in tapioca peel also got reduced to an appreciable level.

KEY WORDS : Coirwaste, Tapioca Peel, Earthworm, Degradation, Nutrients

Knowledge on the association between earthworms and organic wastes has resulted in the use of earthworms for processing the organic wastes to alleviate their disposal problem.