

## Relationship Between Texture, Lime Status, pH, EC, Available N and P in the Soils of South Arcot

by

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In the Soil Testing Laboratory, Cuddalore, since inception, over 16000 soil samples received from South Arcot District were tested and fertiliser recommendations given. An attempt is made to study the relationship among the various constituents tested in the laboratory to provide a general idea of the fertilizer combinations suitable for a particular type of soil.

Soil Samples were tested for the following constituents by the method shown against each.

Constituents	Method	
1. Texture	Fell method	Anon. (1951) "Soil Survey Manual U. S. Department of Agriculture Hand Book No. 18 212, 213 (1).
2. Lime status	Effervescence with 10% H cl.	
3. pH	Using a pH meter in 1:2 soil water ratio	Soil Testing in India 1965. (2)
4. EC	Using Elico conductivity bridge in 1:2 soil water ratio	
5. Available N	Alkaline permanganate method	Subbiah, B. V. <i>et al.</i> 1956.
6. Available P	Olsen's method	Olsen 1954.

The data collected were examined against the standards, set up by Parker *et al.* (1951) to find out the relationship among the constituents analysed in the laboratory.

The calculation of standard indices was done as per Parker *et al.* (1951) and the data are given in Table 1. The index values obtained for various soil constituents, as given in Table 1, were utilised for a correlation study. The "r" values and the regression equations obtained for the eleven pairs are given below:

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Particulars	"r" values	Regression equation
Texture - Lime status	0.52*	$Y=0.17x+0.98$
Texture - pH	0.42*	$Y=0.05x+1.34$
Texture - EC	0.87**	$Y=0.11x+1.039$
Texture - Phosphorus	-0.12 NS	
Texture - Nitrogen	0.80**	$T=0.16x+1.145$
Lime status - pH	0.16 NS	
Lime status - N	0.22 NS	
Lime status - P	-0.83**	$Y=1.06x+0.64$
pH - N	0.79**	$Y=0.52x+0.83$
pH - P	-0.6 **	$Y=0.52x+1.37$
P - N	0.19 NS	

\*\* = Significant at 1% level   \* = Significant at 5% level   NS = Not significant

TABLE 1. *Average Index Values*

Soil Type	Mean Index Values					
	Texture	Lime status	pH	EC	Available	
					N	P
Sandy soils	1.98	1.10	1.28	1.06	1.39	2.40
Sandy Loam soils	2.51	1.40	1.46	1.06	1.68	2.18
Loamy soils	3.06	1.56	1.39	1.06	1.59	2.19
Clayey soils	3.61	1.37	1.38	1.09	1.73	2.01
Very low in lime	2.81	1.32	1.35	1.06	1.64	2.17
Medium in lime	3.02	1.79	1.53	1.05	1.50	2.20
High in lime	3.43	2.12	1.78	1.10	1.87	2.68
Neutral in reaction	2.87	1.45	1.34	1.07	1.64	2.18
Medium alkaline	2.77	1.58	1.65	1.05	1.55	2.20
Alkaline	3.67	2.00	2.04	1.05	1.71	1.86
Very low N	2.86	1.47	1.46	1.06	1.53	2.18
Low N	2.94	1.27	1.50	1.05	1.82	1.89
Medium N	2.84	1.30	1.22	1.05	1.89	2.28
High N	3.05	1.59	1.07	1.09	1.99	2.29
Very low P	3.22	1.46	1.46	1.07	1.71	1.83
Low P	2.87	1.47	1.41	1.07	1.61	2.18
Medium P	2.51	1.41	1.38	1.05	1.63	2.49
High P	2.85	1.27	1.32	1.05	1.67	2.62
South Arcot in General	2.88	1.39	1.41	1.06	1.63	2.18

## *Relationship between Texture, Lime Status, pH, EC* 387

A very high value for "r" has been obtained for the pairs, Texture-EC, Texture-Nitrogen, Lime status - phosphorus, pH-Nitrogen and pH-Phosphorus. The relationships between the pairs, Texture - Lime status and texture - pH are also fairly strong. No significant correlation was detected in the relationship between the pairs, Texture - phosphorus, Lime status - pH, Lime status - Nitrogen and Phosphorus - Nitrogen.

The study of the relationship between Texture and each of the other constituents shows that heavier the texture, higher the available N, Lime status, pH and EC. The Lime status was found to be very strongly and negatively correlated with phosphorus. At higher pH (up to 8.7) higher available N was obtained while phosphorus was lower.

Over 16000 soil samples received from South Arcot District were tested and fertilizer recommendations given during the period from 1965-1968. A correlation study among the various constituents showed that available N and salinity increased with the texture becoming more and more heavy. Available P showed a strong negative relationship with lime status.

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