A review of 700 soil samples collected in the Armidale district between 1989 - 1999

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This paper reports on a summary of soil test data taken from 693 sites in the Armidale district over a 10 year period (1989 – 1999). The Armidale district is situated on the Northern Tablelands of New South Wales and covers the Central and Southern part of this region. The three main soil types of the Northern Tablelands are derived from granites, the meta sedimentary and the basalts. According to Spencer and Barrow (1963) granite, meta sedimentary and basalt derived soils cover 44%, 34% and 22% of the Northern Tablelands respectively, with 90 % of these soils deficient in phosphorus.

These soil test results indicate that about 82% of the three soil types have a pH ($CaCl_2$) of less than 5.0. Eighty nine percent of all three soil types are deficient in phosphorus, that is less than 20 ppm (Bray No 1).

Methods

Results of almost 700 soil tests held by NSW Agriculture, from samples taken from the years 1989 to 1999 were collated into a data base. The majority of samples were 0 - 7.5 cm in depth and analysed at the one laboratory.

Results were classified according to soil type and categorised into commonly used pH ($CaCl_2$) classes. The pH results were divided into groups according to soil type and are summarised in Table 1. Similarily, phosphorus levels (Bray No 1), were divided into three increments; low (0-10 ppm), medium (10-20 ppm) and high (>20 ppm) categories. The results can be seen in Table 2.

Results

Soil test results grouped according to their parent material; basalt (364 samples), granite (151 samples) and sedimentary (178 samples).

Table 1. Soil pH ($CaCl_2$) for the three main soil types found in the Armidale district.

pH ($CaCl_2$)	Granite	Sedimentary	Basalt
< 4.50	34 %	22 %	26 %
4.51 - 5.0	50 %	61 %	52 %
5.01 - 5.5	13 %	14 %	17 %
5.51 - 6.0	3 %	2 %	3 %
> 6.01		1 %	2 %

Table 2. Soil phosphorus levels (Bray No 1) grouped according to soil type

Phosphorus (Bray)	Granite	Sedimentary	Basalt
0 - 10 ppm	59 %	57 %	58 %
10 - 20 ppm	30 %	34 %	29 %
>20ppm	11 %	9 %	13 %

Conclusions

These results represent the largest readily available collection of known soil test data from the Armidale district. We acknowledge that the reason for taking these samples could lead to some bias in the interpretation. This may be due to the fact that many soil tests have been undertaken because of a perceived plant or soil fertility problem. In relation to phosphorus the results may be influenced by the time of year and seasonal conditions at the time of sampling.

These results are supported by the previous findings of Spencer and Barrow (1963) and Crocker and Holford (1988). Both previous surveys found that 90 % of sites on all soil types (basalt, trap and granite) responded to phosphorus. From this review 89% of granite soils, 91% of sedimentary soils and 87 % of basalt soils are deficient in phosphorus, when deficiency is considered to be less than 20 ppm (Bray No. 1).

Holford and Crocker (1988) suggested that the majority of Tablelands soils are moderately to very acid. In terms of pH, this review indicates that a large proportion of soils sampled, 84% (granite), 83% (sedimentary) and 78% (basalt) are under pH ($CaCl_2$) 5.0 and can be regarded as acid.

Further soil analysis would give a more complete picture of trends in pH and phosphorus levels over time. Such a project would provide a useful indication of phosphorus and pH trends and provide better guidelines for fertiliser and lime requirements.

Acknowledgments

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References

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