

● feature

SOIL CLASSIFICATION IN THE N.Z. SOIL BUREAU

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It is now 5 years since the background to the Soil Bureau's policy of adopting the U.S. Soil Taxonomy for a trial period was explained in the pages of *N.Z. Soil News* (Miller 1978). The aim of the present article is to outline our findings at the conclusion of the trial and to explain the Soil Bureau's future commitment to the system. It also seeks to explain why Soil Taxonomy has not been adopted as a basis for making and interpreting soil surveys in New Zealand, and why a new project has been initiated to revise the N.Z. Soil Classification.

Since the trial period began in 1977 the Soil Bureau has made a very large commitment to Soil Taxonomy and probably it has been investigated more rigorously than in any other country outside North America. We have benefited by becoming familiar with a system that has become part of the international language of soil science, and the experience has taught us much about the requirements of modern soil classification schemes.

Soil Taxonomy has been applied in a large number of soil surveys covering a wide range of landscapes in New Zealand and the South Pacific Islands. Field investigations have been supported by laboratory determinations of physical, chemical and mineralogical properties to an extent that is apparently seldom realised in the U.S., and new laboratory methods developed and tested. Other work has critically reviewed the categories of Soil Taxonomy as bases for soil interpretations, and the application of the soil moisture and temperature regimes in New Zealand. These investigations are to be documented in a volume of papers covering every aspect of the application of Soil Taxonomy in New Zealand and the South Pacific.

The preparation of the flow-diagram keys for Soil Taxonomy (Thomas et al. 1979-82) was initiated by Soil Bureau staff to assist understanding of the complex definitions and keys. Their usefulness has been widely recognised both here and overseas, and further volumes to complete the cover of soil orders are in progress.

The results of our investigations have shown that Soil Taxonomy makes inadequate provision for important classes of N.Z. soils. The system was developed mainly to accommodate the soils of the U.S. and the need to modify the system for wider use, particularly in Tropical countries, has been acknowledged by the establishment of international technical committees charged with making proposals for the revision of particular soil orders or other subject areas. Its principal author, Guy Smith, was soon to express his own dissatisfaction with the classification of soils in volcanic ash as Andepts by compiling the 1978 proposal for the new order of Andisols. More recently, it has been officially recognised

that there is a need for further revision of the Inceptisols, and an additional committee has been set up to review the classification of Spodosols.

Andepts apart, Inceptisols include the most widespread soils of New Zealand. The need for modifications to accommodate N.Z. soils was recognised by Guy Smith in proposals for amendment first submitted in 1978 when, after his study of a wide range of soils, he noted that some were clearly misclassified by existing definitions. These proposals and others await the necessary documentation before they can be reviewed by the newly established Soil Taxonomy Policy Committee in the U.S. responsible for all changes to the system above soil series level.

While we welcome the recent development of comprehensive systems and procedures for processing amendments, there seems little prospect of changes being introduced with the speed necessary to meet our pressing operational needs. Thus, until such time as critical modifications are officially introduced in the Inceptisols and other orders there remain serious problems in applying the system to the full range of N.Z. soils. It is for these reasons, and others that will be detailed elsewhere, that Soil Taxonomy has not been adopted as the principal means of soil classification within the Soil Bureau. It will, however, continue to be used as a basis for international communication and reference, and as a tool for soil correlation.

We shall continue to make a substantial contribution to the international development of Soil Taxonomy, principally through the International Committee on the Classification of Andisols (ICOMAND). In addition, a New Zealand Soil Taxonomy Technical Committee has been established this year to encourage the investigation and documentation of problems relating to the application of the system to N.Z. soils, and to co-ordinate proposals for amendments.

Against this background, work has begun on a revised national system of soil classification which, while retaining as far as possible the concepts and common names of the N.Z. Genetic Classification, aims to construct a multi-categoric system using specific soil properties to define class limits. An initial review of principles has been completed and subsequent wider discussion will provide a basis for the framework of the classification. Starting with the existing classes, a two-pronged approach is intended with examination of the integrity of soil groups, and soil series. As gaps in our understanding are identified, individuals with appropriate expertise will be consulted and where necessary seminars and workshops arranged. The classification will advance as a succession of versions, with each version tested by judging the utility of proposed classes in the light of the agreed classification principles.

In summary, our experience with Soil Taxonomy has shown that, at its present stage of development, it has serious shortcomings as a basis for making and interpreting soil surveys in New Zealand. It has the capacity to change to make better provision for international needs, but the pace of its evolution has proved slow. We shall continue to contribute to its development and make use of its strengths as a correlation and reference system. A revised national soil classification that introduces modern definitional concepts into the framework of the N.Z. Genetic System is seen as a way of developing an operational scheme that retains continuity with previous work.

REFERENCES

Miller, R.B. (1978): Soil Taxonomy. *N.Z. Soil News* 26. 176-9.

Thomas, R.F., Blakemore, L.C. and Kinloch, D.I. (1979-82): Flow-diagram
Keys for "Soil Taxonomy". *N.Z. Soil Bureau Scientific Report* 39 A-G.