Botanal - a versatile field and computing package for assessing yield and botanical composition in grazing experiments

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There is no question about the importance of measuring yield and botanical composition of pastures in grazing experiments. Such information is necessary both to interpret responses in animal production and to document botanical changes such as persistence of legumes and invasion of weeds. The accuracy required in measurements must obviously relate to the experimental objectives, but the main interest is usually in changes over seasons or years, or in comparison between treatments or paddocks.

Labour available for cutting and hand sorting of pasture samples has declined in recent years, whereas access to computing facilities has improved. Furthermore, in some situations sampling with mechanical aids is limited by fallen timber, stony surfaces, steep terrain and waterlogged conditions. This has led to greater interest in rapid, non-destructive techniques for estimating yield and composition, and we have refined some of these into a package called BOTANAL (1,2).

This package involves making field estimates on a number of quadrats per paddock, usually 30-200 depending on circumstances. Botanical composition is usually estimated by dry-weight-rank (3,4) but direct estimation of percentages can be used and is sometimes more appropriate. Simultaneous estimates based on groups of species (e.g. weeds) are possible whilst partitioning of species into fractions such as green and dry is being examined. Yield can be determined by the comparative yield technique (5), rating on a scale such as 1-5, or by direct estimation (6); in both methods estimates are calibrated against a set of cut quadrats. In addition, frequency can be recorded and percentage cover estimated. When sampling is on a grid layout, frequency data can be used in pattern analysis. The association of trees and shrubs can also be determined by plotless sampling using distance measures from the quadrat positions.

Field estimates are recorded directly on to data sheets in the field. The BOTANAL program prints out the results of the various estimations, and allows for averaging over treatments or replicates, or for pooling yields over nominated groups of species. Sample print-outs are displayed on our poster.

Many pastures are not uniform, but contain a mosaic of yield levels often differing in botanical composition. BOTANAL is well suited to extracting this information. As there are many quadrat records it is possible, for example, to document the botanical composition of quadrats grouped according to yield classes, and also the distribution of yield classes contributing to the paddock mean yield.

BOTANAL is available throughout Australia on CSIRONET (Cyber 76) and is currently being revised for use with IBM and Burroughs computers. The main advantages of BOTANAL over alternative sampling procedures are in labour saving, flexibility in methods of input and display of output, and the opportunities which flow from the large number of samples taken.

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