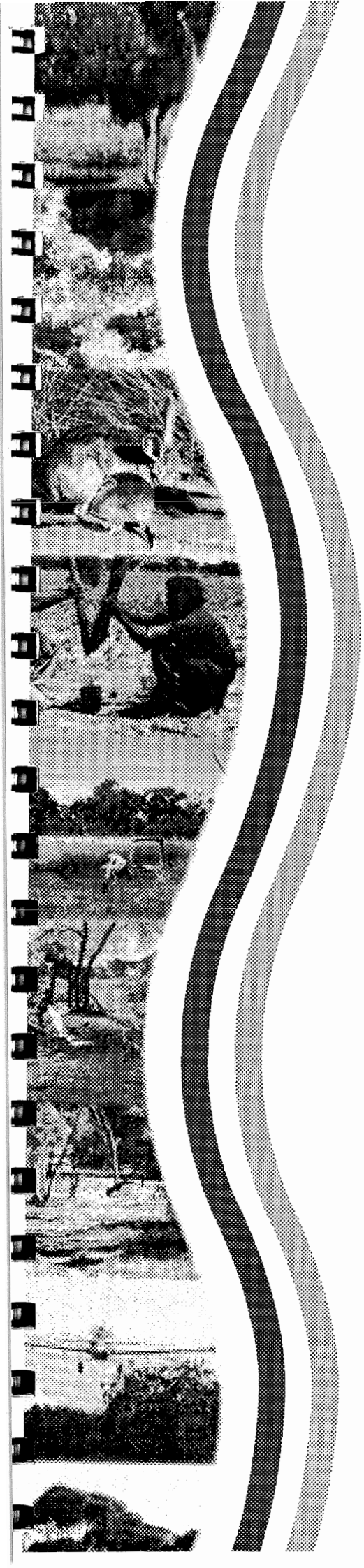
SILCOCK



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HAND-HELD COMPUTERS *ARE* NEEDED FOR RANGELAND MONITORING

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Background

Pasture monitoring continues to be a task which rangeland R,D&E people do not normally enjoy doing regularly. The areas involved are large, the number of trained operators needed is significant and the diversity of species demanding identification is great. Then, without the use of handheld computers for data capture, there is often a great deal of data transcription or manual tallying required in order to calculate means and to summarise botanical composition. This step can be fraught with problems as was noted in the ARS 1992 Cobar Conference working papers (Hart pers. comm.). Hence, getting producers and agency facilitation staff to do quantified pasture monitoring is very challenging and uptake is poor. Systems such as WARMS in Western Australia and GRASSCheck in Queensland have had a fairly low level of uptake outside the home agency.

CURRENT SITUATION

The Botanal program put out by CSIRO Tropical Agriculture (McDonald *et al.* 1996) has gone a long way towards alleviating the problems associated with data collection, but it is still demanding on staff numbers. Also, there is an art to analysing the results and printing them out concisely. Botanal is a quadrat-based sampling system but there are many practitioners who use point-based sampling for plant, soil and animal parameters. TRAPS from Qld Dept of Primary Industries is available for monitoring tree and shrub growth along fixed lines (Back *et al.* 1999). A Windows-based data analysis and graphical output package for the results accompanies this product. WARMS (Watson 1999) has a computerised data capture program but it too is used largely for shrub dynamics, except in the Kimberley region where a grassland monitoring module is added. Currently there is no generally used data capture system for point data that we are aware of.

Other vegetation monitoring systems have developed purpose-built data capture systems on MS-DOS platforms for use in the field, usually for quadrat based sampling methods. These include REMCAP for the *Aristida/Bothriochloa* pasture survey in Central Queensland (Baillie 1993, Silcock *et al.* 1996) and the one using Sharp PC-3000 palmtops for the NSW Rangeland Monitoring Program (Richards pers. comm.). REMCAP ran on Sharp PC-3100s under DOS 3.3 and recorded a wide range of pasture and soil parameters. However, it had no automatic analysis or summarisation functions and this had to be done by desktop computer after downloading the data files.

OUR DATA CAPTURE SYSTEM

We have developed a prototype for using a palmtop computer to capture point-based data such as that from a wheelpoint apparatus (Tidmarsh and Havenga 1955). It allows capture of botanical composition data to a file, with 4 attributes allowed per point. We normally record the nearest annual, perennial and perennial grass species, and a crown strike (potentially). With this system, we produce many more useful data values for the perennial pasture species and overcome having results swamped by small, transient annual species. Arbitrary maximum recording circumferences, say 25cm away from the point, can be used to deduce plant density via the proportion of blank records. This method has application in monitoring systems like GRASSCheck if the boot-tip method is being used. The parameters could just as easily be cover or presence of a disease or surface soil condition.

Our system operates on a HP 200LX palmtop computer running a DOS 5.0 operating system. A set of common values can be mapped to the 10 function keys at the start of each site recording to speed up the field activity, eg. species codes or disease names. The executable that runs the program occupies 153 KBytes and data from 750 points consumes another 40 KB. This is only a fraction of

the 2 or 4 MBytes of RAM present in the machine and far less than what can be stored on the 5 to 20MB storage cards which the computer can hold.

Further refinement is needed and the results still have to be exported to another analysis program such as a spreadsheet or database to calculate relative abundance and basal area. However, where previously the time spent collating the results from written recording sheets used to be as long as the field collection time, processing time is now reduced to about a sixth. Field time is increased by about 10% but transcription errors are eliminated and validity cross-checking is just as comprehensive. A significant hurdle to widespread future use is probably the need to move to a Windows® operating system because manufacturers have ceased making MS-DOS machines. Programs will have to be completely re-written for them because DOS shells are not supported by Windows CE®.

SUMMARY

The time seems right for a significant effort to be put into systems of hand-held computer data capture in the field in order to assist in the structured analysis of natural resource information. Our program can be adapted to a recording a variety of resource information that relates to pastures. People involved in national resource monitoring activities need smarter data collection systems to make the task less onerous and to develop a degree of uniformity in the type of information that is collected nationally. The cost of the computers is not great compared to the cost of labour used with current techniques. Keeping ahead of redundant hardware and operating systems is a bigger problem but the cost of this would be minimised if packages were widely used.

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