

CUTTING PASTURE SAMPLES WITH A NEW TYPE OF SHEARING HANDPIECE

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ABSTRACT

The use of a pneumatic shearing handpiece for cutting pasture samples is described. The handpiece with its associated compressor is easily transported, and enables quadrats to be cut very rapidly and accurately. It is available commercially in Australia.

INTRODUCTION

A wide variety of mechanical devices have been used by agronomists for cutting pasture samples. A reciprocating-blade action is probably more popular than a rotary action, since the cut material can be more readily separated into its botanical components. Standard sheep shears have been widely used for this purpose in southern Australia (Brown 1954), but they suffer from the serious disadvantage that the mechanical drive shaft from the engine to the handpiece must be short and is by nature rather inflexible.

THE APPARATUS

A pneumatic handpiece has been developed recently in Western Australia*. It is of similar size and weight to the conventional handpiece even though it incorporates a small pneumatic motor (see Plate 1). Compressed air for the motor is



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* The Able Star Shearing handpiece, available from Westwools Pty. Ltd., 22 Swan St., North Fremantle, W.A.

first passed through a moisture trap then an oil fog unit, where a small and adjustable amount of lubricating oil is added. The air is then conveyed to the handpiece via a suitable length (up to 25 m) of compressed air line, which is much longer and more flexible than a mechanical drive shaft. Spent air is exhausted through the handle and over the blades thereby lubricating them and blowing away dust, sand, and other debris. This action serves both to cool the handpiece and to greatly reduce the wear on the cutters and combs.

The manufacturers recommend a compressor which delivers 3.8 — 5.7 l/s (8-12 cu. ft/min) at 35,150 kg/m² (50 lb/in²) but we have found that a 2.8 l/s (6 cu. ft/min) unit with a storage tank is adequate where cutting is not continuous. The total weight of this unit (including framework, petrol motor etc) is only 54 kg (120 lb) so it can be transported to distant experimental sites by light aircraft. At the site the unit is moved from plot to plot on a light collapsible trolley. The compressor for another handpiece in use at this laboratory is mounted on a "Howard" rotary hoe and is driven by belt from its motor.

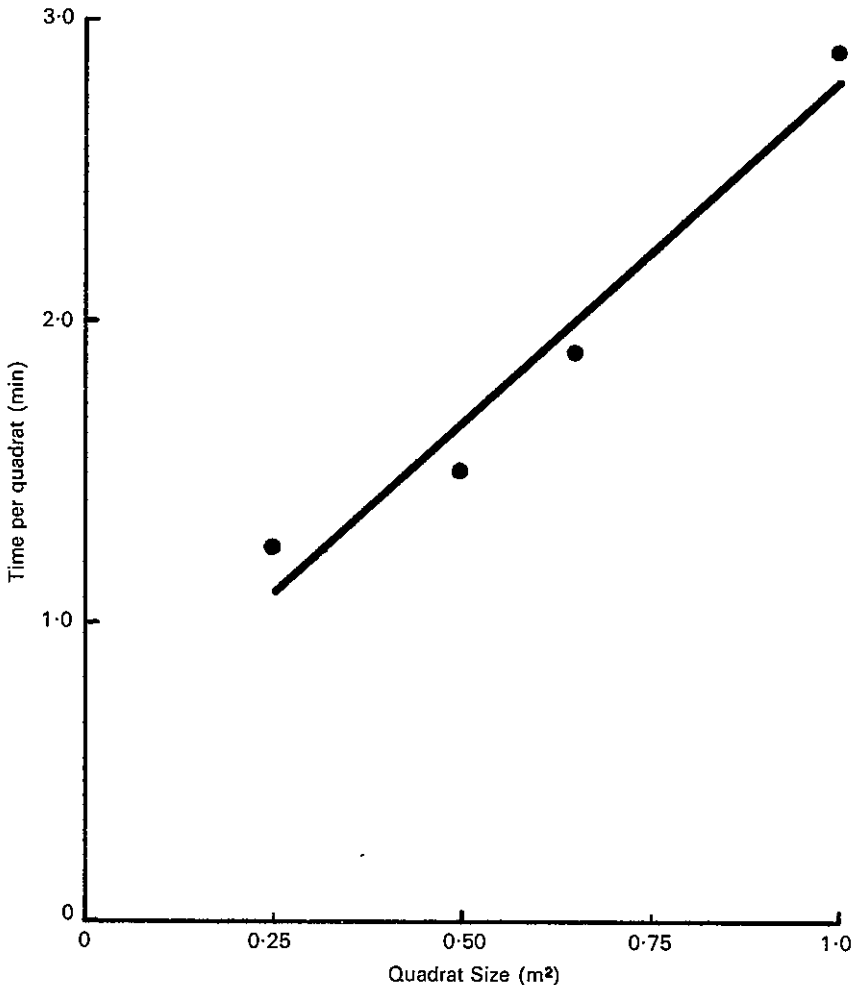


FIGURE 1

The relation between total cutting time and quadrat size for a mature pasture of spear grass. The time includes positioning the 8 quadrats cut of each size, and repositioning the compressor twice.

The handpiece has now been used for two seasons on a wide variety of pastures in northern Queensland. Particular advantages have been found in pastures containing trailing legumes. No difficulty is encountered when harvesting to ground level because potential obstructions are blown gently clear of the blades. Harvesting to a given height is also possible using an elevated quadrat. Cutters and combs of the New Zealand type are used because of their greater width. With these, stems of up to 0.6 cm in diameter can be cut. Oil consumption by the handpiece is very low but, as with all reciprocating-blade cutters, it may be necessary to hand pluck samples for analysis of some trace elements.

The speed of harvesting with the handpiece is shown in Figure 1. The data are from a harvest on a mature pasture of spear grass (*Heteropogon contortus*) which yielded 6,520 kg of dry matter/ha. Experience with the handpiece at this laboratory indicates that it is much faster and less tiring than handshears and has certain advantages over the various hedge trimmers and sickle-bar mowers previously used.

The handpiece, complete with pressure regulator, air filter, and oil fog unit costs approximately \$250. A suitable compressor would cost between \$100 and \$300 depending on the necessity of purchasing a motor.

REFERENCES

- BROWN, D. (1954)—Methods of surveying and measuring vegetation. Bulletin 42. Commonwealth Bureau of Pastures and Field Crops, Hurley, Berkshire, U.K.

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