BUREAU OF SUGAR EXPERIMENT STATIONS

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# THE EFFECT OF TWO DIFFERENT TOFT BASECUTTERS ON RATOON YIELD

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## ABSTRACT

The visual appearance of the cane stubble remaining after harvesting with the Toft angled underslung basecutter usually fitted to 7000 series harvesters is different to that remaining after harvesting with the horizontal leg-driven basecutter fitted to the earlier 6000 series machines. This difference lead many observers to infer a greater level of stubble damage with the 7000. This trial and others in north Queensland could not detect any differences in ratoon yields due to previous harvesting with the two different basecutter types.

## BACKGROUND

The two most common harvesters in use in north Queensland are the Toft 6000 series fitted with horizontal leg-driven basecutters and the newer Toft 7000 series which are usually fitted with an angled underslung basecutter. The 6000 basecutter with blades operating horizontally leaves cleanly cut stubble when operated correctly. Because the 7000 basecutter blades operate at an angle to the ground and direction of harvester travel, a ragged step-cut stubble remains after harvest. The 7000 may cut at faster ground speeds than the 6000 and this also leads to a more ragged stubble.

After the 7000 was released, the industry was concerned that the poorer ground job which resulted after harvesting with the machine could reduce subsequent ratoon crop yield. This trial is one of a limited series being carried out by BSES to investigate this question.

## RESEARCH METHODS

### Site

The trial was set out on the farm of Mr Gus Acquilina at the corner of Flynn and Mourilyan Harbour Roads, Mourilyan. The soil at the site was identified by Murtha (1986) as a Mundoo series brown clay loam (kraznozem). The crop of Q117 was

harvested burnt in 1990 after the first and second ratoon crops had been grown under a green cane trash blanket. Conventional cultivation with a March herbicide spray to control vines was used to grow the third ratoon trial crop harvested in 1991.

**Growing conditions**

The treatments were imposed under dry conditions with the hard soil around the stool providing ideal conditions for the operation of both basecutters. More than 150 mm of rain fell in the 3 week period following the imposition of harvest treatments. This promoted rapid ratoon growth. Dry conditions then followed until late December. Growth was further limited by flood rains during the first quarter of 1991. In summary, growing conditions were poorer than average during the trial period.

**Trial design**

Treatments imposed on 7 September 1990 were:

| | |
|---|---|
| 6000 - | harvested in 1990 with Tully BSES Toft 6000 harvester set optimally by the operator |
| 7000 - | harvested in 1990 with contractor's Toft 7000 harvester set optimally by the operator. |

The trial was set out with four replicates arranged in a replicated complete block design. Each plot was 6 rows wide and 250 m long.

**Measurements**

Harvester ground speed and pour rate were estimated for both harvesters used to impose the treatments.

Cane yield from the full area of each strip in both 1990 and 1991 was calculated from mill bin weights.

Shoot counts were made at 20 x 1.8 m transects located systematically in the centre two rows of each plot on 22 October 1990 (48 days after harvest) and 28 March 1991 (202 days after harvest).

**Statistical analysis**

Paired t tests were used to analyse the shoot count data. An analysis of covariance was used to analyse the 1991 cane yield data. The 1990 (before treatment) cane yield data was used as the covariate and estimate of site variation.

## RESULTS

The wheeled 6000 machine's ground speed was slowed by the rough ground conditions. Ground speed averaged 3.8 km/hr and pour rate while cutting averaged about 46 t/hour. The tracked 7000 machine operated at 6.6 km/hr and a pour rate while cutting of about 80 t/hour.

No significant differences in shoot population or cane yield were detected (Table 1). The covariate analysis reduced the residual sum of squares by a factor of five but significant differences in cane yield could still not be detected.

**Table 1**

**Shoot population (000/ha) and cane yield (t/ha) of Q117 third ratoon harvested previously with two different basecutters**

| | Basecutter | |
|---|---|---|
| | **6000** | **7000** |
| 1990 cane yield | 87.5 | 88.2 |
| 1991 cane yield | 74.2 | 73.5 |
| October shoot population | 63.9 | 70.3 |
| March shoot population | 59.0 | 59.3 |

## DISCUSSION

Other trials in North Queensland have produced similar results to those obtained in this trial. In 1988 at an Innisfail site, shoot counts taken 100 days after harvest showed that there were more shoots in plots cut at a fast ground speed with the Toft 7000 than in hand cut plots or in plots cut with the 7000 at a slow ground speed. Stubble was longer in the fast cut plots (Ridge, personal communication).

Shoot counts taken in early 1990 at an Innisfail trial site showed a nine percent higher shoot population in ratoon strips cut previously with a Toft 7000 compared to strips cut with the flat leg-driven MF 305 basecutter (Matthews, personal communication).

A trial comparing the effect of the same two basecutters as used in this trial over two seasons on the subsequent ratoon yields of Q124 growing on a clay loam at Tully gave inconclusive results (Hurney, personal communication). In 1989, plots cut previously with a Toft 6000 yielded an average of 112.7 t/ha compared to 103.7 t/ha for the plots

cut previously with a Toft 7000. In 1990, the yield difference was reversed with average yields of 106.8 and 114.4 t/ha, respectively.

However a trial in lodged Q124 at the Tully SES showed that subsequent ratoon yields could be reduced when the Toft 7000 underslung basecutter was incorrectly operated (Smith, in prep). Operator competence obviously has an effect on machine performance and may affect subsequent yields. These trials suggest that the design itself has no impact on yield.

## CONCLUSIONS

When set correctly and under good harvesting conditions, the two basecutters produced visually different ground jobs but there was no difference between subsequent ratoon yields. A different result may occur under less ideal harvesting conditions.

## ACKNOWLEDGMENTS

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## REFERENCES

Murtha, G G (1986). Soils of the Tully-Innisfail Area, North Queensland. CSIRO Div. of Soils Div. Rept. No. 82.