

WILCO SPOT CULTIVATOR

INTRODUCTION

Concerns about the site impacts and quality of the result of some tractor based site preparation operations (Hall, 1994) has lead to increasing use of excavators for mechanical site preparation.

The WILCO spot cultivator (Figure 1) has been developed over the last 18 months. It is mounted on a twenty tonne excavator and is comprised of a ripper, mounding rake and slash rake with the option of fitting a fertiliser application hopper in the moulder frame. The ripper tine can be adjusted for length up to 1.25 m, or removed from the frame so the moulder can be used by itself. The unit weighs 1.12 tonnes and can be fitted to a range of excavators



Figure 1 - Wilco spot cultivator mounted on excavator boom

The unit works in the following cycle; push away from the base machine sweeping slash off the spot, pull towards the machine creating a rip and mounding at the same time, slew to the next spot and repeat. Three spots are made from each machine position, then the excavator walks forward the required spacing distance and makes three more spots. In some cases another movement of the moulder rake is required away from the machine to complete the building of the mound.

RESULTS

Production

Several studies of the machine over a range of sites have given production results of between 2.5 and 3 spots per minute. The hectare rate is strongly affected by the number of spots per hectare required (Table 1).

Table 1 - Machine hours / hectare (Mhh)

Spacing	Stocking	Spots per minute	
		2.5	3.0
3 x 3	1110 /ha	7.4 Mhh	5.3 Mhh
3 x 4	830 / ha	5.5 Mhh	4.0 Mhh
3 x 5	660 / ha	4.4 Mhh	3.1 Mhh

Cost

The cost per hectare can be calculated using the data in Table 1 and an hourly rate for the excavator of \$125 per productive machine hour (Riddle, 1994).

Quality

As the excavator creates three cultivated rows per pass across the site it creates less soil disturbance and compaction than tractor based cultivation operations.

Where specifications for the mounds of a plantable 400 mm mound over a 750 mm rip depth were set, the specification were met in over 90 % of the spots. This compares favourably with tractor based ripping-mounding operations.

Spacing of individual spots was found to vary by 10-15 % from the specification but the overall stocking was being reached consistently.

The width and length profiles of a typical mound are shown in figures 2 and 3, creating 1.3 m³ of cultivated soil per mound.

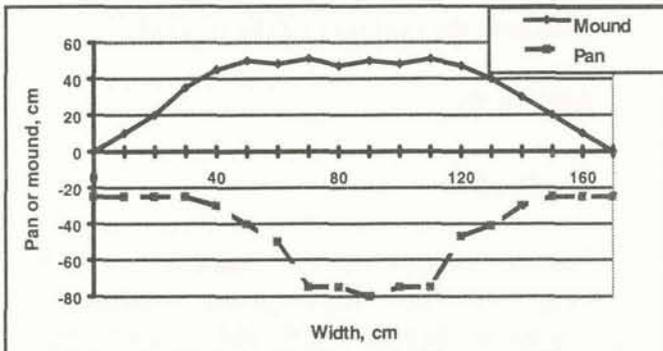


Figure 2 - Width profile

The effect of the ripper on breaking up the hard pan can be clearly seen, centred under the mound.

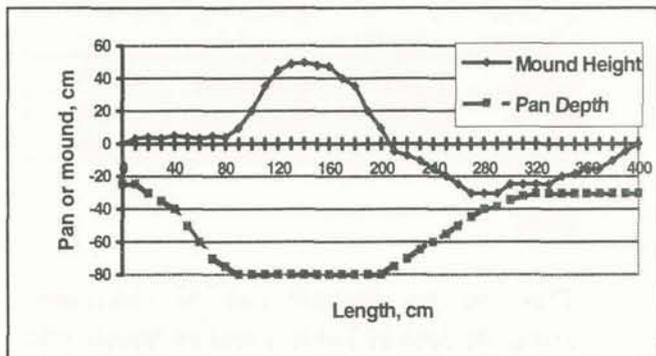


Figure 3 - Length profile

CONCLUSIONS

The WILCO spot cultivator is a versatile unit which can be used to create spot mounding, spot ripping-mounding, and slash clearing with and without fertiliser application.

The machine creates large (up to 500 mm high) mounds over rips of up to 800 mm in depth. Each spot mound has a cultivated volume of approximately 1.3 m³.

Production rates are 2.5 - 3.0 spots per minute, with cost per hectare directly related to the number of spots per hectare required.

REFERENCES

Riddle A. C. (1994): "Business Management for Logging". New Zealand Logging Industry Research Organisation.

Hall P. (1995): "A Comparison of Continuous Ripping Mounding with Spot Ripping Mounding". LIRO Report Vol. 20 No. 5.

The costs stated were derived using the procedure shown in the LIRO Business Management for Logging Handbook. They are indicative and do not necessarily represent actual costs for this operation.

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