

## **A self propelled windrower for trial plots**

B.J. Benham, C.A. Bluett and M. Hutchings

Victorian Department of Agriculture Animal Research Institute, Werribee Victoria. 3030.

In 1979 funds were granted to the Victorian Department of Agriculture by the Australian Oilseeds Research Committee to design and develop a self-propelled windrower for 8-row rapeseed trial plots. Lack of such a machine has been a serious constraint to rapeseed trials in Victoria as all trials had to be 16-row plots and windrowed by co-operating farmers. It was understood from the start that other research groups in Australia could copy the design once it was complete.

The main factors influencing the design were adequate clearance underneath without dangerous top-heaviness, ease of loading and unloading under its own power on to trailers, ability to cut plots of widely differing plant height

at the correct height for each, and ability to form a windrow of the material from plots of widely differing plant size and density.

The machine is constructed on a rectangular chassis with the wheels mounted on vertical legs at each corner. The motor, gear box, seat and controls, fuel and hydraulic tanks and valves are all mounted on top of this frame. From the front of the frame are pivoted two pairs of arms, on which the cutter bar and reel are mounted. Crop dividers and windrowing guides, formed of steel sheet, are fitted to the cutter bar arms. No sideways conveyors or drapers are employed.

The windrower is 4.61m wide and 2.52 m high, and clearance under the frame 980 mm. The knife cuts 1.5 m of crop and consists of two knives reciprocating in opposite directions without ledger plates or fingers, and driven by a hydraulic motor. Hydraulic cylinders adjust the cutting height from 300 mm to 1080 mm, and the 5-bat reel from 250 mm to 650 mm above the knife. The crop stems are pushed against the knife by the reel, cut, and then formed into a windrow as they pass between the tapered windrowing guides. These guides are 840 mm apart at the rear, and they form a windrow generally about 1 m wide, lying mostly within the 6 middle rows of the 8 standing cut stalks.

Power is provided by a 1200 cc Volkswagen industrial engine. The windrower is driven by its front wheels through a Volkswagen *car* gear box and axles, using chains and sprockets down to the wheels, and steered by the rear wheels. The engine drives a hydraulic pump that provides power for the cutter bar motors and operates the hydraulic cylinders that raise the cutter bar and reel.

Tyres are 5.60-15, 4-ply rating. The rear tyres are filled with water and extra ballast in the form of wheel weights and tractor wafer weights is added to the rear of the windrower to assist steering and prevent forward tipping. The total weight of the machine with ballast and without operator is 952 kg.

The machine windrowed its first trials in 1981, and its performance was very pleasing. Minor modifications have been made to windrowing guides and dividers, and with experience further slight improvements may be possible.

It was found that the windrow formed was very good in nearly all circumstances. It soon settles in the stubble and can be easily picked up by plot harvesters with crop lifters. The machine is extremely gentle compared with commercial windrowers, causing very little shattering even with crops well past ideal windrowing stage. It has also been very successful with both oat and barley plots, forming a windrow that does not fall off the stubble into the pathway. It is thought that by using plot centres of about 1.6 m, and modifying the angle of the windrowing guides, the machine in its present form would probably be suitable for 6-row plots.