

Every year, students in the Cotton CRC's Cotton Production Course are asked to write a story for *The Australian Cottongrower* for one of their assignments. This story by David Brown was one of the best for 2004. We hope to publish others in future issues.

The cotton root cutter: An Australian story

By David J. Brown

The cotton root cutter is a great Australian success story that has essentially remained untold. Unlike much of US cotton equipment which was shaped on the drawing boards of university departments, the cotton root cutter in true Aussie tradition had its origins in the farm shed.

It was invented in 1992 by the then 24 year old Bruce Dunstan in a farm workshop on the Breeza Plains. Bruce was at that time a leading hand on the property "Drayton" in the upper Namoi Valley. In the relatively short period of 12 years the cotton root cutter has become a powerful tool in cotton stubble management, currently estimated to be used by 95 per cent of the Australian cotton industry.

SMALL BEGINNINGS

Ironically, when the cotton root cutter was entered into the Ag Quip Inventor of the Year contest in 1993 it failed to win. Today, Dunstan is quietly surprised at how common the root cutter has become, "I half knew that it would take off, it's something you need to do to get rid of trash."

IT STARTED WITH A KINZE

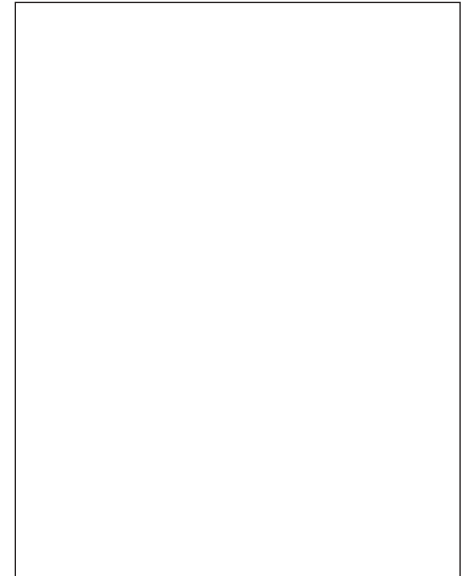
The creation of the root cutter was borne out of the sheer frustration Dunstan

experienced in having to continually service the root knives that were mounted behind the stubble buster. "We were sharpening and changing knives five to six times a day. It was getting monotonous constantly sharpening blades — using knives was a two man job! The operators also carried files to get the extra out of them."

While Bruce was setting up a Kinze planter in the shed he toyed with the idea of using ground driven discs as cutters. Within a couple of hours, two vertical shafts with overlapping planter disc bottoms were mounted on a tool bar and slightly dipped down at the back to engage the ground. Although the bearings of this single row unit collapsed after a few hundred metres the opposing rotation of the discs did a great job in slicing off the roots 75 mm below the ground and the edges were self sharpening as well.

THE 'DRAYTON' PROTOTYPE

Encouraged by this demonstration, Dunstan's innovative boss (the late Ian Hamparsum) engaged Huegels, a Gunnedah engineering firm to make up a single row prototype with above ground block bearings. When this unit was trialed



Bruce Dunstan with his invention, the cotton root cutter.

against knives it was found to cut the roots in a cleaner fashion and not pull the beds about, leaving them in better shape.

JANKE BROS R&D

After the successful testing of the root cutter at "Drayton", the machinery maker

Janke Bros continued its development, but this was to take well over a season. The root cutter was released commercially in 1994, with its discs first of all mounted on

fabricated Holden style in-ground hubs.

But like the first Kinze model, this initial version was prone to overheat and collapse from ingressed soil. After going through several modifications, Janke Bros eventually abandoned using a bottom hub,



Janke produced the first commercial rootcutter.

reverting to above ground bearings as Dunstan had used in his first prototype.

HYDRAULIC ASSISTANCE

In 1996, Janke Bros developed hydraulic assistance to counter the problem of the cutting discs stalling from the resistance of soil or roots. When the rotation of the friction driven top disc stopped, the pressure in its hydraulic circuit increased, activating the hydraulic motor that was mounted on top of its drive shaft. The speed or rpm of the hydraulically driven discs was matched to the ground speed of the root cutter by adjusting the hydraulic flow rate.

HYDRAULIC RELEASE

In 1998, the hydraulically assisted root cutter was further refined by contractor Linden Smith of St George by the addition of hydraulic release. Smith's patented design equipped the disc cutter arms with hydraulic cylinders which allowed them to break away, releasing chokes.

It is the single armed version with hydraulic release on the top disc which is currently marketed as the Scorpion. Barry McFarlane of Tilco, the Toowoomba based manufacturer of this hydraulic release root cutter says that Smith's innovation can improve cutting efficiency by 40 per cent.

THE TRASH SAVIOUR

By following the belief that 'trash is treasure' in light of the declining organic matter in our soils, the cotton root cutter has offered a simple solution to what was often a troublesome task. Murray Schoenfisch, formerly from USQ says that this innovation "has made the task relatively simple and attractive compared to the more expensive and slower pull/mulch operations".

POTENTIALS AND PATENTS

The cotton root cutter has fully realised the potential its inventor Bruce Dunstan foresaw some 12 years ago, with Australia wide acceptance and as an established part of the cotton farm calendar. It is currently produced by four Australian manufacturers and has been exported to Brazil, Sudan and South Africa.

But while Dunstan is pleased that the potential of his invention has been fulfilled, he lives with an element of regret in that he didn't take out a patent at the time — only ever getting \$1500 for his trouble, the proceeds Janke won at shows for his invention.

Today, Bruce Dunstan still continues to design and fabricate in another farm shed just down the road from Breeza at "Long Acres", Carroll.