

# FUTURE HARVESTING SYSTEMS

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## 1. Existing Systems

The existing harvesting technologies are systems which have been developed and refined over the past 50 plus years. From the humble no cab, single row mechanical harvester to today's six row machines, technologies have allowed greater and greater individual and support equipment capacity, with a steady reduction in harvest labour per bale harvested. These developments have basically been refinements of the spindle picking system, a technology first marketed in the late 1940's. Whilst capital cost has increased significantly, to a large extent this has been offset by capacity increases, the combined effect being a lowering in the real cost per bale harvested over time.

The two cotton harvesting majors – John Deere and Case IH – are undertaking R & D on various new developments, however did not want to reveal the precise nature of the developmental work they are currently undertaking. There has been little work towards technical developments which reduce fibre damage during harvest, and it is believed some R & D is being pursued by one of the majors in this area.

## 2. Israeli Keshet Magneti Cotton Shaker

This is a technology a number of growers would have seen demonstrated over the past two seasons. The technology involves an adaption of the John Deere dryland "bat and brush" front (see slide), creating a shaking action, which removes both seed cotton and bolls from the bush.

Experience to date indicates the system has potential, but is limited by a number of factors:

- weather effects on the bush can lead to an increase in trash
- current demonstration of the technology suffers from the limitation of being attached to a John Deere stripper - these were designed for lower yielding, dryland situations, and stick machine (pre cleaner) and basket capacity is barely adequate for high yield irrigation.

With further development of the system, including the main chassis and stick machine unit, the technology has the ability to reduce harvest costs.

### 3. Developments in Ultra Narrow Row (UNR)

A number of developments have been progressing for harvesting UNR cotton. This has been driven by a relative absence in development for many years, as well as no off the shelf equipment from John Deere or Case NH. Whilst Case NH has been trialing a UNR picker based on the Case 2555 picker, further research and development is required and production prospects are unknown. John Deere are also progressing a UNR picker.

#### 3.1 Cencorp Harvesting system

This is the first attempt from a harvesting manufacturer to develop a system which uses existing tractors as the power train and also does away with module builders and boll buggies.

The system uses a conventional finger front for cotton separation fitted to the front of a front wheel assist tractor. A suction system delivers cotton to a stick machine attached to the front of an enclosed "boll buggy". The boll buggy, a development of the Hesston stack hand, features a compacting system and moving chain floor so that mini modules can be unloaded at the tail drain road.

The system has been through at least three seasons of field trialing. With the current limited size of pre cleaner and boll buggy basket capacity, there are limitations to its suitability for row cropped, high yield UNR cotton in Australia. Cencorp are investigating a higher capacity system. From a systems perspective, harvest cost has considerable potential to be reduced.

#### 3.2 Osprey Manufacturing

In Australia Osprey Manufacturing, based in Toowoomba, have been building UNR finger fronts for the past two seasons. These are adapted for fitment to the John Deere stripper pickers. Their finger fronts are well developed, however Osprey have been undertaking two desktop studies:

- a self propelled stripper harvester with larger precleaner and basket capacity than presently exists with the John Deere machines and
- a harvesting system similar to the Cencorp system described above, but with a six metre front and higher capacity pre cleaning equipment on the "boll buggy", as well as better compaction capacity. The front would fit commercially available front wheel assist tractors.

The latter system would allow six metre wide harvesting, with a capacity to go up and back on a 1000m run before unloading a "mini module" of cotton approximately 2.4 m wide, 2.8 m high and 6.0 m long. Weight would be around 6.5 tonnes depending on yield.

The existing cost structure to operate a UNR picking team is very similar on a capital and operating cost per ha as conventional spindle pickers. With the on board compacting system alluded to above, I believe there is substantial opportunity to reduce this.

#### **4.0 Where may be the future?**

Further developments in the system of spindle pickers with boll buggy and module builder support equipment may lead to higher speeds and increased capacities in a further refinement of systems that have worked for many years. However, breakthroughs that lead to a large reduction in costs with such an approach are unlikely.

The concept of an on board compaction system to make “mini modules” has been discussed by many growers for years. The existing majors have not developed technology in this manner, and it is interesting that smaller companies supporting UNR harvesting equipment have either developed or are considering development in this area. Such an approach has the opportunity to dramatically reduce costs as the boll buggy and module builder support equipment and associated labour becomes superfluous. Bulk handling and transport costs would also be reduced.

Research into harvest technologies that minimise fibre damage are important, however have received limited priority to date. In time, these issues may become more important to both growers and manufacturers.

