

# MVS spinning: A new spin on textile processing

By Dr Geoff Naylor, Cotton Textile Unit, CSIRO Textile and Fibre Technology and Australian Cotton CRC

Without doubt, one of the most significant bottlenecks affecting productivity levels in textile processing is spinning.

A new spinning technology, Murata Vortex Spinning (MVS), developed by Murata Machinery Ltd in Japan, is providing what many experts believe is a quantum leap forward in greatly reducing this bottleneck. First demonstrated in 1997, it has since made rapid progress into the cotton spinning market for both high quality knitting and weaving yarns.

High quality cotton, as produced in Australia, is traditionally spun using the ring spinning system at a typical speed of 20 metres per minute. This produces high quality fine yarns with excellent mechanical properties and a soft smooth feel.

The other technology commonly used in cotton processing, the open end spinning system, has a productivity in the region of 150 metres per minute and is more suited to coarser yarns. By comparison the new MVS system has a productivity of 400 metres per minute and can produce fine yarns of high quality similar to that of a ring spun yarn. So this new spinning technology is creating a lot of interest.

Late last year there were 265 frames of MVS technology already in operation and another 54 on order. The US has installed 229 frames with the remaining frames spread across South East Asia and Western Europe. This year, Australia will have the third largest installation of MVS frames in the world (30) with both Rocklea Spinning Mills (6) and Leading Spinning (24) making major investments in this technology. The Cotton Textile Unit at CSIRO in Geelong is also investing in MVS technology.

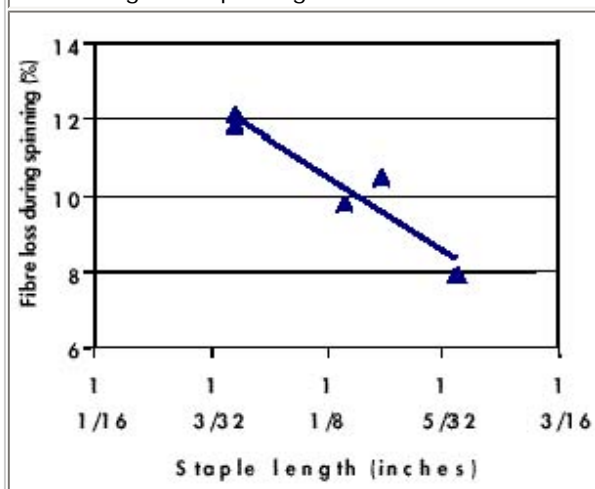
The article by my CSIRO colleague Dr Stuart Gordon (see page 28) describes a trial, sponsored by the CRDC, to examine the performance of Australian cotton in the new MVS spinning system. Lint samples with different length characteristics were obtained by 'piggy-backing' on existing CRDC-funded ginning trials, being coordinated by researchers at the National Centre for Engineering in Agriculture in Toowoomba. From one module from the 2000 season, five different lint samples were obtained by varying ginning (heat) and storage (moisture) conditions.

After ginning, samples which had been stored in higher moisture conditions tended to have better length characteristics but contained a little more trash than the other samples, including those stored and ginned under more conventional settings.



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FIGURE 1: Effect of staple length on the fibre loss during MVS spinning



Two key findings are worth noting from the trials of the MVS system.

First, lint samples with shorter average fibre length and higher short fibre content lead to a significant fibre loss during spinning — which would be commercially unacceptable.

Secondly, after a test to simulate wear, the appearance retention of the knitted fabric sample made from the longer staple fibre was superior.

So the MVS system is geared to the high quality end of the cotton market — preferring longer, high quality cotton grades over shorter fibres.

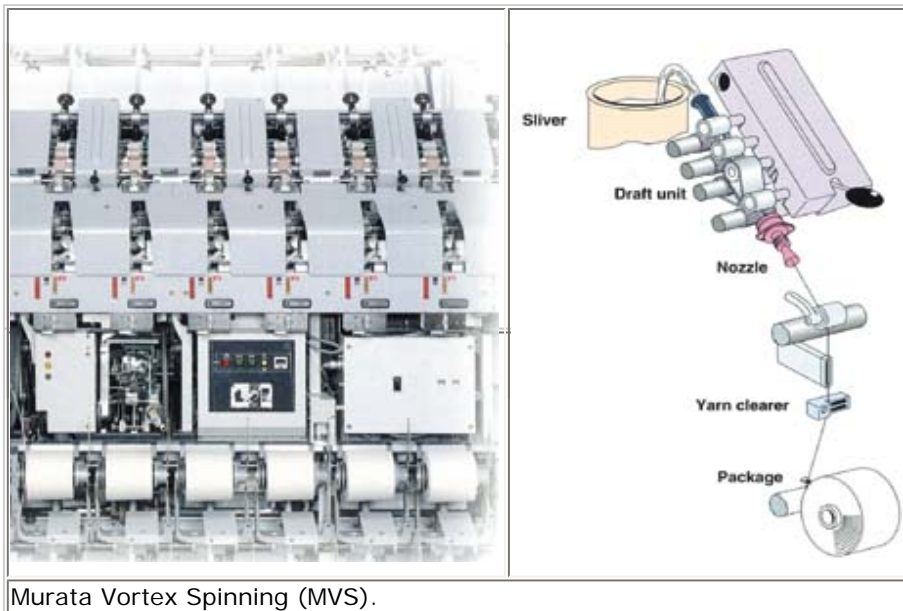
It's unclear precisely how Australian cotton compares to overseas growths with respect to their relative performance in MVS spinning. Australian cottons are generally of high quality and are sought after by overseas mills. Research is now targeted on further reducing nep and short fibre content, which are common concerns throughout the world in mechanically-harvested cotton.

It is likely that as well as the short fibre, neps will also be removed by the MVS's 'air-combing' system. This means that although yarn quality will not be affected, a higher level of both short fibre and neps would lead to more waste, thereby directly affecting the mills' bottom line.

In an effort to determine how the Australian cotton industry can take full advantage of the new opportunities opened up by MVS, the Cotton Textile Unit at CSIRO in Geelong, in conjunction with the Australian Cotton CRC and the Australian Cotton Shippers Association is planning ongoing research in this area. This will include a comprehensive fibre quality survey of key overseas mills, to obtain firm and comparative numbers on Australia's fibre quality, and further carefully controlled processing trials both at the CSIRO in Geelong and hopefully in key commercial mills.

I encourage anyone interested in this new technology to turn to the accompanying article by Dr Stuart Gordon in this issue of The Australian Cottongrower.

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Murata Vortex Spinning (MVS).



Cotton slivers entering the Murata Vortex Spinner.