Textile innovations such as Wicking Windows and TransDry that reduce cotton's natural absorbency and make it quicker drying are helping the fibre win greater market share in the sports apparel sector.

# Attempts to add functionality pay off for cotton

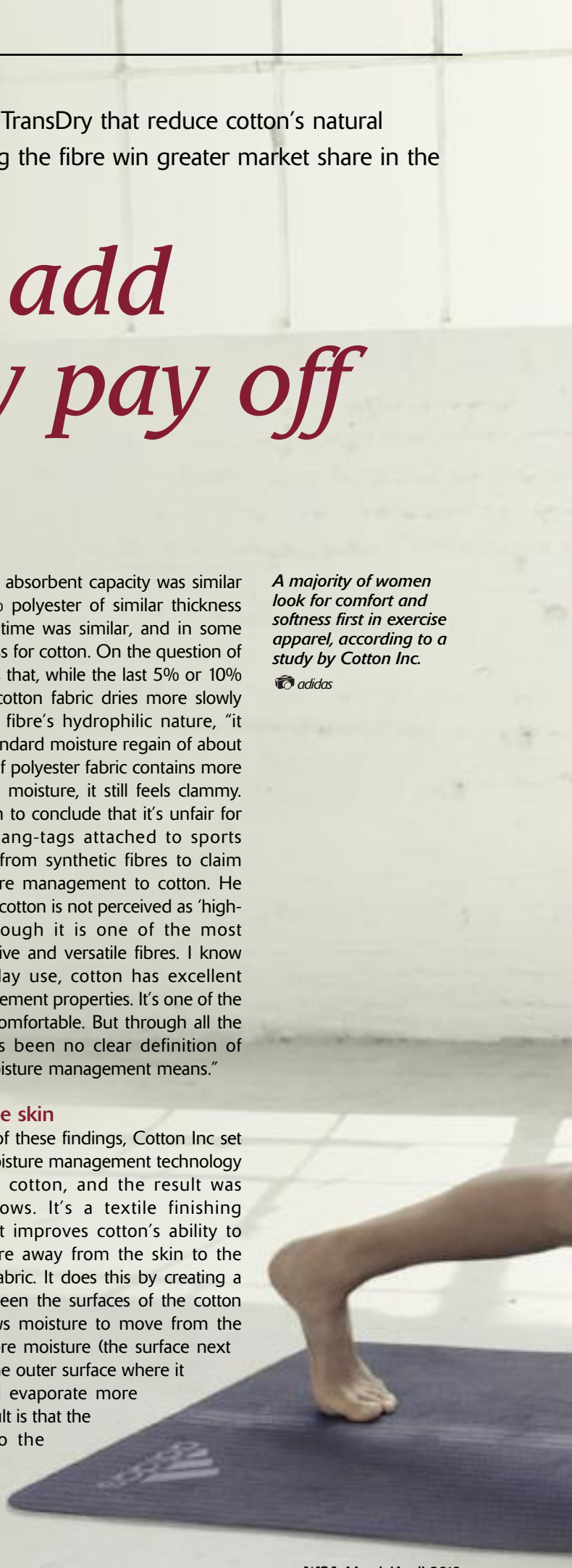
Consumer studies show that while women and men who take part in sports and outdoor activities often use clothing made from synthetic fibres, the qualities they are looking for, in many cases, are those of cotton. So says Cotton Incorporated, the North Carolina-based promotion organisation that works to increase demand for cotton through promotion and through research.

Cotton Inc says it cannot accept that most amateur participants in sport require the boost in performance that recent developments with synthetic fibres promise. For the majority of us, who can only dream of competing at elite levels, comfort should be at the top of our list of demands of the sports apparel we choose, it claims. And surveys it has carried out suggest that this is true. In one exercise in recent years, 62% of women taking part said that comfort and softness were the features they looked for first in exercise clothing.

The organisation decided it could increase cotton's popularity in this market if it could reduce the fibre's natural capacity to absorb moisture. Cotton Inc's manager for textile chemistry research, Edward Lamm, has said that technology that could do this would allow apparel manufacturers to take advantage of "cotton's natural wicking capabilities". His colleague and director, Bill Rearick says that synthetic fabric that wicks absorbs less water than cotton, but that this is mostly because of their thin construction rather than their underlying hydrophobic nature. Tests that he has carried out using the Gravimetric Absorbency Test System suggests that the drying rate is essentially the same for "all fabrics that wick". When Cotton Inc's fabric development team created a thinner cotton fabric, a single jersey knit from 30/1s yarn, Mr Rearick says the absorbent capacity was similar to that of 100% polyester of similar thickness and the drying time was similar, and in some cases, slightly less for cotton. On the question of comfort, he says that, while the last 5% or 10% of moisture in cotton fabric dries more slowly because of the fibre's hydrophilic nature, "it feels dry at a standard moisture regain of about 7.5%", whereas if polyester fabric contains more than 2% or 3% moisture, it still feels clammy. This has led him to conclude that it's unfair for many of the hang-tags attached to sports clothing made from synthetic fibres to claim superior moisture management to cotton. He adds: "Basically, cotton is not perceived as 'high-tech", even though it is one of the most chemically reactive and versatile fibres. I know that for everyday use, cotton has excellent moisture management properties. It's one of the reasons it's so comfortable. But through all the hype, there has been no clear definition of exactly what moisture management means."

## Away from the skin

On the base of these findings, Cotton Inc set out to create moisture management technology specifically for cotton, and the result was Wicking Windows. It's a textile finishing technology that improves cotton's ability to transfer moisture away from the skin to the outside of the fabric. It does this by creating a differential between the surfaces of the cotton fabric that allows moisture to move from the surface with more moisture (the surface next to the skin) to the outer surface where it can spread and evaporate more quickly. The result is that the surface next to the body is drier and has less surface cling.



*A majority of women look for comfort and softness first in exercise apparel, according to a study by Cotton Inc.*

adidas



Cotton fabric treated with the technology can dry up to 40% faster than untreated fabric, Cotton Inc claims, meaning not just greater comfort for a wearer who is sweating, but also less energy consumption in drying a garment after washing. The finish is invisible, odour-free, durable and has no effect on cotton's soft hand.

Sports brands that were quick to use Wicking Windows in their collections include Champion, who launched a line of cotton athletic wear that it has called Double Dry. It includes a sports bra, tanks, T-shirts and shorts for women, as well as shorts and T-shirts for men. And Izod has begun offering a knit shirt of 100% cotton treated with the technology.

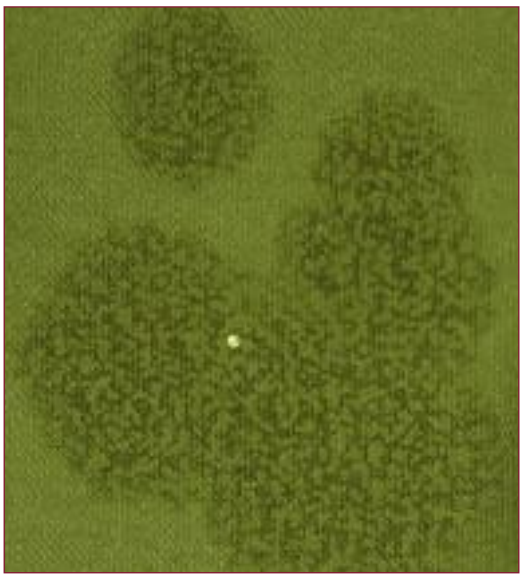
While Cotton Inc has continued to encourage fabric mills, garment manufacturers and sports brands to continue using Wicking Windows, it has continued to develop its moisture management ideas, leading to a new technology called TransDry. Still focused on moving moisture away from the body and to the outside of the fabric, TransDry allows users of cotton to combine treated and untreated cotton yarns in a wide range of fabric constructions, engineering fabric to match the desired level of performance in the end product.

## Logical progression

Cotton Inc's director of industry public relations, James Pruden, explains that what TransDry does is take the idea of cotton with moisture management to the next level, that is, to the yarn level. "It's a logical progression; you can alternate the technology in the warp and weft, which means you can make it very product specific," he says. Using a sample of a jacquard fabric that is 88% cotton treated with TransDry and 12% Spandex, he shows moisture spreading along each line in the material, while the fabric between the lines stays dry. Baselayer garments or apparel for activities such as yoga will be particularly suitable applications for this product, he believes. Reinforcing the point about consumer comfort from the earlier study, he adds: "Cotton in yogawear is very appealing to women because it's soft, natural and comfortable. Add in performance attributes like the ones we can show here and we know a lot of consumers will be interested. We do a lot of market research and we know there is a lot of interest in this question; it is a key concern."

Mr Pruden insists that these initiatives are already paying off because cotton's share in the sports market is going up. He explains that there is always a boost when warmer weather kicks in, but that in 2009, unusually, cotton sustained the increase in the fourth quarter. "We don't normally see that, but we did last year," he says.

As the Champion and Izod examples show, Wicking Windows has already begun to make



*Wicking Windows is a finish that transports moisture away from the skin, making cotton much faster drying.*

*WTP*

an impression on the market, even though some brands insist on using a proprietary name for the technology, Mr Pruden points out. In 2008, Chinese sports brand Li Ning made what he calls "a lovely athletic shirt" (which he has seen recently on sale in a Li Ning store in Beijing) incorporating the finish. He says Cotton Inc is close to being able to announce similar successes for TransDry. While the advances in technology have helped, he also makes the point that apparel brands and their direct suppliers are often reticent to move too quickly to try something new out of fear that the costs will be too high. The chances are, then, that as time goes on the popularity of technology-enhanced cotton will keep increasing.

## From the manufacturer's point of view

Taiwanese textile technology provider Formosa Taffeta is one of the partners that has worked with Cotton Inc to produce Wicking Windows, in this case specifically for woven fabrics.

Company administrator Julie Tien explains that although the idea has been around for about three years now, she finds that many people are still surprised when she demonstrates how it works. She pours a drop of water onto a fabric sample; the liquid beads up at first and is then absorbed into the fabric.

Ms Tien explains that the side that will come into contact with the skin has been treated with the technology while the other side is untreated. The next-to-skin side will become wet, she says, but the moisture will wick through very quickly to the other side. The drops of water she has spilled form a pattern on the sample, a bit like a fingerprint, rather than the traditional damp patch you might expect to see develop on a piece of cotton. The pattern shows the fabric has been treated, she says.

Formosa Taffeta began its work with Wicking Windows at the start of 2009 but, in the course of last year, Ms Tien says important sports and outdoor brands, including Patagonia, adidas, Puma and Nike, have expressed great interest. New Balance has taken its interest further, albeit only for the Taiwanese market, making a Wicking Windows-enabled children's T-shirt available for sale through its outlets in branches of the Mitsukoshi department store.