Riding on the success of athleisure and on the growing popularity of natural fibres in active sportswear, the luxury fibre is making a discreet comeback in functional fabrics.

Silk, the forgotten performance fibre

Among all the fibres that are used to make clothing, few have the ability to naturally thermoregulate the body, keeping it warm in cold weather and cool in warm conditions. This characteristic is one of the reasons why wool has become such a big player in performance sportswear. Silk also possesses this prized property, a fact that is often forgotten. Like most natural fibres, it absorbs moisture, making it comfortable to wear in all climates, and its low conductivity will keep warm air close to the body when it's cold out. Silk is also one of the strongest natural fibres. But its main claim to fame is its natural sheen, due to the filament's triangular cross section, and its smooth and soft texture.

Silk's combination of luxurious aesthetics and functional attributes makes it truly unique, a gold standard in textiles that synthetics have long sought to imitate. Though rare and expensive, it is a classic fibre for cold weather underwear. Now, the soft and high-end yarn is being adopted for performance fabrics, and is beginning to make regular appearances in blends with other fibres.

Along with other natural fibres, such as wool and even cotton to a certain extent, silk is emerging as an alternative resource for brands looking to bridge the gap between function and fashion. The growing athleisure market has boosted demand for fabrics blending natural and manmade fibres, seen as a way to offer the best of both worlds, adding a softer hand and higher moisture absorption to the wicking, fast drying and ease-of-care characteristics of synthetics. In this arena, silk however is not alone—Modal, Tencel and kapok also combine



The adidas Futurecraft Biofabric prototype shoe features an upper made from 100% Biosteel, a fibre developed by AMSilk, a Munich-based supplier of synthetic silk biopolymers. The biotech silk is 15% lighter in weight than conventional synthetic fibres.

adidas

performance properties with smooth, silky hand feels. But the exclusive nature of silk gives it bonus points in fashion-oriented collections.

Athleisure appeal

The natural fibre's unique aesthetic is driving its return in upscale functional fabrics, though it remains a minority player due to its higher cost. Italian knitter Maglificio Ripa has recently introduced several high-end blends, with either silk or cashmere. At Performance Days, the company presented a fine-gauge ribbed knit made in viscose, silk and elastane (85% viscose, 10% silk, 5% elastane) and weighing 125 g/sqm. "Silk is an ideal first layer fibre. The blend we have developed gives the fabric real performance properties while offering a very elegant look," says sales manager, Fabio Cescon. He is intent on introducing new blends to Maglificio Ripa's ranges, specifically exploring different combinations of natural and synthetic fibres.

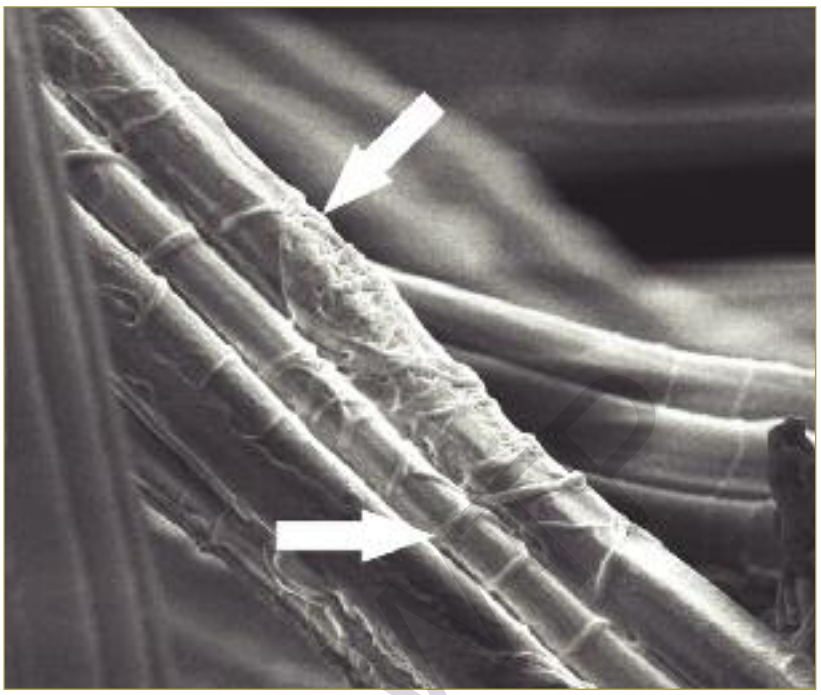
The premium fibre has been used to create a novel fleece fabric by Taiwanese manufacturer GAC, also seen at Performance Days. The company says it chose the fibre for its "superior comfort and thermal properties" in addition to its luxurious look and soft hand feel. The fleece contains just 10% silk and 90% polyester.

The fibre has also been spotted in thermal insulation made by Italian company Imbotex in a recycled silk and polypropylene blend. In 2016, the company's Nativa Silk insulation was voted one of the top ten innovations in the warmth category by ispo Textrends. It targets crossover performance and lifestyle end-uses, says company manager Stefania Corniello.

The feel of silk

For those who aspire to offer the feel of silk without using the fibre per se, Swiss chemicals company HeiQ has developed a finish that reproduces the luxury fibre's tactile properties. The HeiQ Real Silk treatment applies a minute amount of the natural raw material to the surface of a fabric. It is based on a patented short polymer fibre technology that forms fine fibres through a coagulation process and was developed by HeiQ's R&D subsidiary located in Geelong, Australia.

Tianhai Athleisure Solutions (TAS), a first-time exhibitor at Performance Days last November, has adopted the finish for its innovative engineered-to-shape jacquard garment concept which the company is calling D2G for design-to-garment. "HeiQ's Real Silk finish gives fabrics a fluid and slippery hand, a more luxurious feel compared to standard synthetics," Hans Bühr, consultant for the company, tells *WSA*. "We initially applied the finish to lace fabrics, but did not achieve a result we found convincing enough. It works much better on solid fabrics, where you can really feel a difference, a 'wow' effect. I call it soie royale [royal silk] because it is a real step above the usual," he says.



Scanning electron microscope image of a polyester filament treated with HeiQ Real Silk.

HeiQ

The luxury performance fibre can also be found in woven fabrics, seen at Schoeller. The Swiss weaver has combined it with cotton and elastane in a two-way stretch fabric weighing 100 g/sqm (50% cotton, 40% silk and 10% elastane). It is available as a single layer fabric with a water-repellent finish. Another item makes the most of the natural fibre's lustrous sheen in a silk-polyamide blend that can be bonded to the company's c_change membrane. "This reference combines the properties of silk with additional functionality for outerwear," says company spokesperson Dagmar Singer. Here again, this reference is designed for crossover urban and sports clothing.

Functional by nature

A traditional fibre for winter underwear, silk is found in a full range at German brand Falke. Unexpectedly, it has also been adopted by synthetic underwear specialist Odlo. The Swiss company introduced its first natural raw materials in 2014, starting with down and wool, adding what it is calling "technical silk" to its performance underwear ranges in 2015. The brand explains that it seeks to merge its "advanced" synthetics with fine natural fibres such as wool and silk to create "functional and modern styles". Its Revolution Technical Silk X-Light underwear contains 14% silk and is made for light sports activities.

Falke combines silk and wool in its ranges designed for mild to cold weather sports in proportions of 70% wool and 30% silk. The natural fibres both provide moisture

COPYRIGHTED



Swiss weaver Schoeller has developed a three-layer laminate with silk, taking advantage of the natural fibre's lustrous sheen. The fabric shown here is a blend of 44% polyamide, 23% cotton, 17% silk, 9% polyurethane and 7% elastane and weighs 235 g/sqm.

Schoeller Textil

management and warmth. The company says its silk-wool products have a temperature-regulating effect and a pleasant feel on the skin thanks to the fine-count silk yarns.

Biotech silks in the starting blocks

As *WSA* reported in its November-December 2015 issue (Beyond Biomimicry), research into spider silk has stepped up recently, though not without bumping into some snags along the way. The North Face Moon Parka that was presented last year in Japan was the first prototype garment made in a synthetic spider silk fibre developed by Japanese company Spiber. The biotech material known as 'Qmonos' (derived from the Japanese term for spider web, 'kumo-no-su') is manufactured via a microbial fermentation process that produces fibroin, the protein found in natural spider silk. The industrial scaling up appears however to be more complicated than expected and the market launch date for the parka, initially planned for 2016, has been pushed back to an unspecified date during this year.

In the interim, adidas has come forward with a different biotech silk, used for shoe uppers produced in its automated Futurecraft factory in Germany. First revealed at the Biofabricate Conference in New York in last November, the fibre is a development of Munich-based AMSilk, a company that has patented a spider silk protein manufacturing process using genetically modified bacteria. The biotech fibres, which it is calling Biosteel, are said to replicate natural silk and, bypassing petrochemical processes, also claim to be fully biodegradable. AMSilk says these fibres are "very robust, anti-bacterial, transport moisture and ensure high wearer comfort".

In its natural or biotech form, the fibre's presence is growing, step by step. The super fine and strong filament is superior in many ways to conventional synthetics, thanks in part to its thermoregulating and moisture management properties but also for its low-bulk in layering systems. It does however have its drawbacks. Silk is not considered a good option for high-aerobic activities, it is not considered easy care, and its high and often fluctuating price dampens its appeal. But in blends, it makes the grade for brands who seek to offer function and fashion with a distinctive, premium touch.



Silk-wool underwear by German brand Falke is made in a blend of 70% wool and 30% silk, offering a combination of warmth, moisture management and softness thanks to the fine count silk yarns.

Falke

COPYRIGHT WTP