Here's looking at dew: spiders snare water from the air

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A spider clings to a rain filled web. Fog-catching nets which provide precious water in rain-starved parts of the world may be poised for a high-tech upgrade thanks to the spider.

Fog-catching nets which provide precious water in rain-starved parts of the world may be poised for a high-tech upgrade thanks to the spider.

In a paper published in the journal *Nature* on Wednesday, Chinese scientists report on why spider's silk is not only famous for strength but also terrific for collecting water from the air, sparing the creature a hunt for a drink.

The secret, revealed by scanning electron microscope, lies in the silk's tail-shaped protein fibres which change structure in response to water.

Once in contact with humidity, tiny sections of the thread scrunge up into knots, whose randomly arranged nano-fibres provide a roughly, knobbly texture.

In between these "spindle knots" are joints, which are smooth and slender, comprising neatly aligned fibres.

Small droplets then condense randomly on the spider's web. Once they reach a critical size, the droplets slide along the slick-surfaced joints thanks to surface tension.

The droplets then reach the spindle knots, where they coalesce with larger drops.

As a result, the joints are freed up to begin a new cycle of condensation and water collection.

The researchers, led by Lei Jiang of the Chinese Academy of Sciences in Beijing, looked at the silk made by the cribellate spider (Uloborus walckenaerius), which uses a little comb, or cribellum, to separate fibres and spin them into various kinds.

After making their observations, they fabricated fibres aimed at replicating the silk's microscopic structure.

"Our artificial spider silk not only mimics the structure of wet-rebuilt spider silk but also its directional water collection capability," they claim.

The breakthrough will help the development of man-made fibres that will help water collection and could also be used in manufacturing processes to snare airborne droplets, they believe.

Fog collection entails stretching out nets or canvas on poles and using the mesh to catch moisture from the breeze. The runoff is collected in a pipe or a trough on the ground.

The technique, pioneered in the coastal Andes, is being encouraged in poor, dry parts of the world, such as Nepal. It is also being promoted by charities as a useful tool to offset water stress caused by global warming.

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