

Super silk

Video transcript for spider silk video presented by Chris Packham

Spiders evolved 350 million years ago. One third of all of the creatures we know of on the planet are spiders.

Here in the UK we have 645 different species. The name spider comes from the Latinised Greek for spinner, because what they are famous for is this stuff, silk, but why is it so good? And how is it produced? Well it starts life as a watery fluid deep in the body of this animal.

And it's passed through some microscopic tubes which remove the water and turn this complex of proteins and amino acids into a beta sheet conformation, and that means basically that there are lots of hydrogen bonds and it's this that makes it so strong.

Now it passes through the body until it gets to some really strong muscular valves, called spigots and it's extruded from these, and then twisted into a cable like this by the spinnerets; the tiny little organs you can see on the backside of the spider.

There are seven different types of silk. There's egg sac silk, which they use to wrap their eggs in, and then there's swathing silk, the stuff they use to wrap their prey in. Then there's drag line silk, well this is the strongest of all, it's the stuff that the spiders actually hang on, and then there's attaching silk, that's what they hang their webs to any substrate with, and then you've got non-sticky silk, sticky silk and the sticky stuff that makes the sticky silk sticky.

And then it's incredibly thin. Finer than a human hair, and yet strength five times stronger than steel, in fact it's almost as strong as the strongest man-made substance, Kevlar®, the stuff we make bullet-proof vests from.

But here's a fact for you: if we could get a spider to spin some silk as thick as this pen it would allegedly stop a 747 air liner in flight. Now you might think that I read that on the back of a bubblegum wrapper in the 60's, but I didn't, it's a fact.