Spider Webs

A spider web, while created entirely by a spider, is also very reliant on the environment. A web begins with a single thread that is released by the spider from a starting point, with the free end of the thread to catch onto another point of interest. The spider creates a looser thread along this first thread, which hangs down. The spider lowers itself from this looser thread and creates a Y-shape, forming the support structure of the web. From here, the spider will lay out non-sticky frame threads, radius threads, and an auxiliary spiral. The auxiliary spiral is initially made with non-sticky thread, then the spider eats it while laying down sticky thread as reference.

A spider will use this structure to monitor the web for vibrations that indicate when an insect is caught in the web. The vibrations of the web help web-spinning spiders survive by allowing it to find prey through vibrations that act as an extension of it's senses.

Webs are reliant on the environment mainly due to the original creation of the support structure. The very first thread to create a web relies on the placement of objects in the environment where the thread will be anchored, such as branches. The free end of the first thread rely on factors such as wind in order to anchor the loose end.

While webs typically do not have a social component, there have been instances where communal spider webs have existed when massive flooding in Pakistan forced spiders to retreat above the waterline, resulting in trees filled with spider webs.

Orb web building steps — 1 day cycle

Auxiliary not sticky spiral, used by the spider as reference for laying out sticky spirals

Capture sticky spirals

Bridge thread between first two anchor points fixed on phisical objects

Loosing thread

Radius

The spider hangs in the middle

Frame threads providing stability

Anchor threads

The spiders lowers and attaches the last anchor point to form a Y-shape

Silk types and properties

Major-ampullate silk

Structural and drag line silk

High tensile strength, low extensibility, high loss tangent, exhibits super contraction when wetted, higher hysteresis

Minor-ampullate silk

Auxiliary spirl

High modulus and extensibility, moderate tensile strength and toughness

Capture silk

Capture core threads

Extremely extensible and resilient, highly compliant, glue-coated wet fiber

water and sticky glycoprotein nodule

Core thread

Piriform silk

Attachment cement

Low extensibility and high toughness