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Opinion

SILK PRODUCING SPIDER LACK SPINNERETS AND FIBRILLOGENESIS

Alan Marshall*

Department of Zoological Science, University of Bordeaux, Bordeaux, France

INTRODUCTION

Air-breathing arthropods with eight legs, chelicerae that can typically inject venom, and spinnerets that project silk are known as spiders. They are the largest group of arthropods and have the seventh-highest species diversity of any group of living things. A protein fibre called "spider silk" is spun by spiders. Spiders utilise their silk to weave webs and other objects that serve as catch-all nets for other creatures, as nests or cocoons for their young, or as wrappings for prey. They can also levitate, float in the air, or glide away from predators using their silk. For various purposes, the majority of spiders alter the consistency and stickiness of their silk.

The typical body segments of spiders are fused into two tagmata, the cephalothorax or prosoma and the opisthosoma, or abdomen, and are connected by a small, cylindrical pedicel. However, since there is no proof at this time from either palaeontology or embryology that spiders ever had a separate thorax-like division, there is some debate over the validity of the term cephalothorax, which refers to the fusion of the Spiders, do not have antennas like insects do. Spiders have the most centralised neural systems of all arthropods, with the exception of the most primitive group, the mesothelae, as all of their ganglia are merged into one mass in the cephalothorax [1]. Spiders have hydraulic pressure to extend their limbs rather than extensor muscles, which are present in the majority of arthropods. Their abdomens contain modified appendages called spinnerets that may produce silk from as many as six different types of glands. Spider webs come in a wide range of sizes, shapes, and stickiness levels. Each and every variety of spider produces silk, and a single spider can make up to seven distinct varieties of silk for various purposes. In contrast, an individual typically only generates one kind of silk in insect silks [2]. Spider silks have a variety of ecological applications, each with characteristics that are appropriate for the silk's intended use.

Scientists are currently investigating the use of spider venom in medicine and as non-polluting pesticides, even though certain species' venom is harmful to humans. To see if these organisms can be employed as silk producers, spider silk genes have been put into mammals and plants. Spider silk offers a mix of lightness, strength, and elasticity that is superior to that of manufactured materials. Chelicerates, which include spiders, are arthropods [3]. As arthropods, they have segmented bodies with jointed limbs that are all covered in a cuticle comprised of proteins and chitin, as well as segmented heads that fuse together during embryonic development. Being chelicerates, they have two tagmata, or groups of segments, on their bodies. The front tagma, known as the cephalothorax or prosoma, is a complete fusion of the segments that in an insect would form two separate tagmata, the head and thorax, and the rear tagma is known as the abdomen or opisthosoma [4]. In spiders, the pedicel, a little cylindrical portion, connects the cephalothorax and abdomen. The arachnids are one chelicerate category that includes both spiders and scorpions. Chelicerae are the three portions of a scorpion that are used for eating. The production of tiny fibrils, which are typically found in collagen fibres of connective tissue, is known as fibrillogenesis.

A short, cylindrical pedicel connects the cephalothorax and abdomen in spiders, allowing the abdomen to move independently while making silk. The majority of spiders can use their fangs to inject venom into their prey from venom glands located in the roots of their chelicerae, which is unique among chelicerates. Some Liphistiidae spiders, as well as those from the families Uloboridae and Holarchaeidae, lack venom glands and instead use silk to kill their prey. Spiders, like the majority of arachnids, including scorpions, have two sets of filters to keep solids out and a tiny gut that can only handle liquid food. They employ one of two external digesting systems [5]. Some predators inject their prey with digestive enzymes from the midgut and then suck the prey's liquified tissues into the gut, finally leaving the prey's empty husk behind. The basic central nervous system of an arthropod consists of two nerve cords that run below the gut, each with paired ganglia serving as local control centres; the brain is created by joining the ganglia for the head segments that are located in front of and behind the mouth, encircling the oesophagus.

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***Corresponding author:** Alan Marshall, Department of Zoological Science, University of Bordeaux, Bordeaux, France, E-mail: marshallalan4568@ub.fr

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