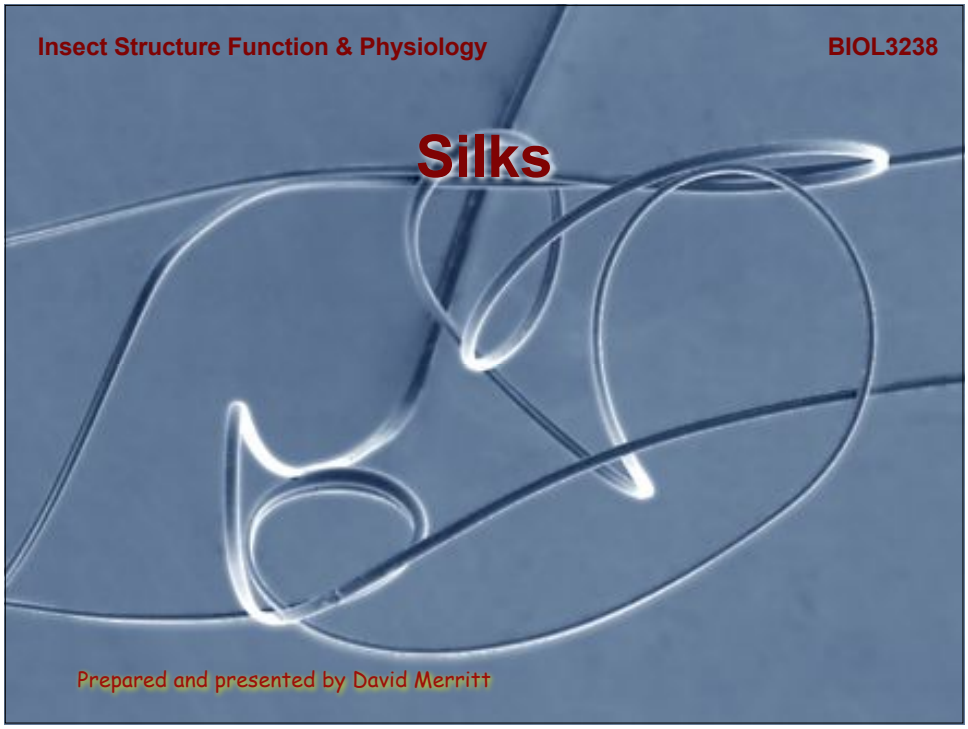

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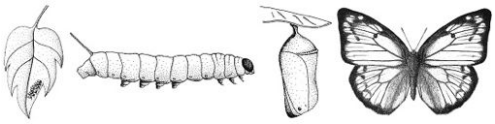


Objectives

- Know the structure and origin of insect silks
- Be aware of the diversity of biological uses of insect silks
- Know the structure and function of the silk production system in lepidopteran larvae

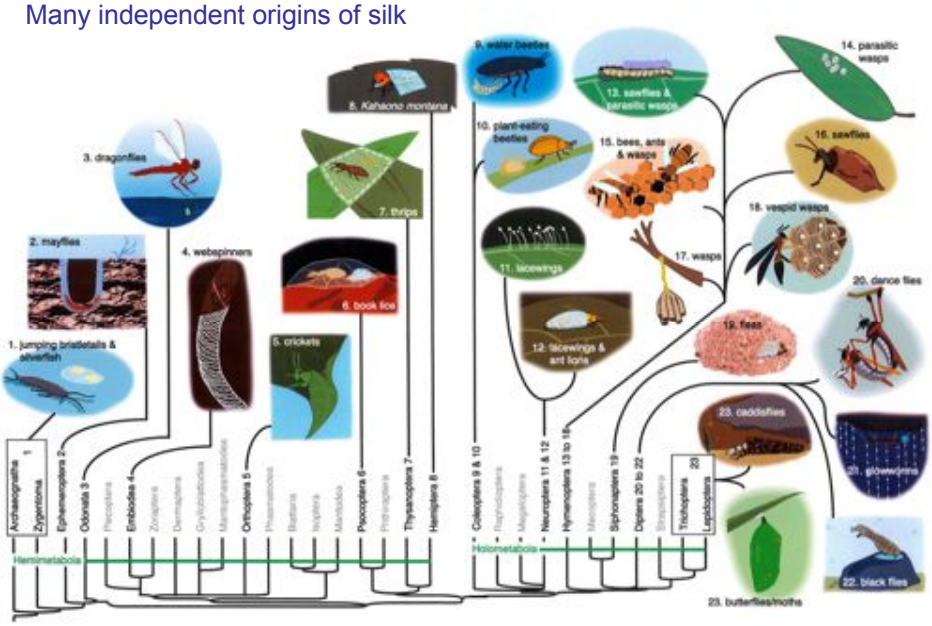
What is silk?

A functional term used to describe protein fibres spun by a number of arthropod lineages. Spinning does not involve any sort of rotation or twisting of the fibre but refers to the process of making an insoluble filament from an aqueous protein solution.

Sutherland, Young, Weisman, Hayashi, Merritt (2010) Insect Silk: One Name, Many Materials. *Annual Review of Entomology* 2010 55, 171-188

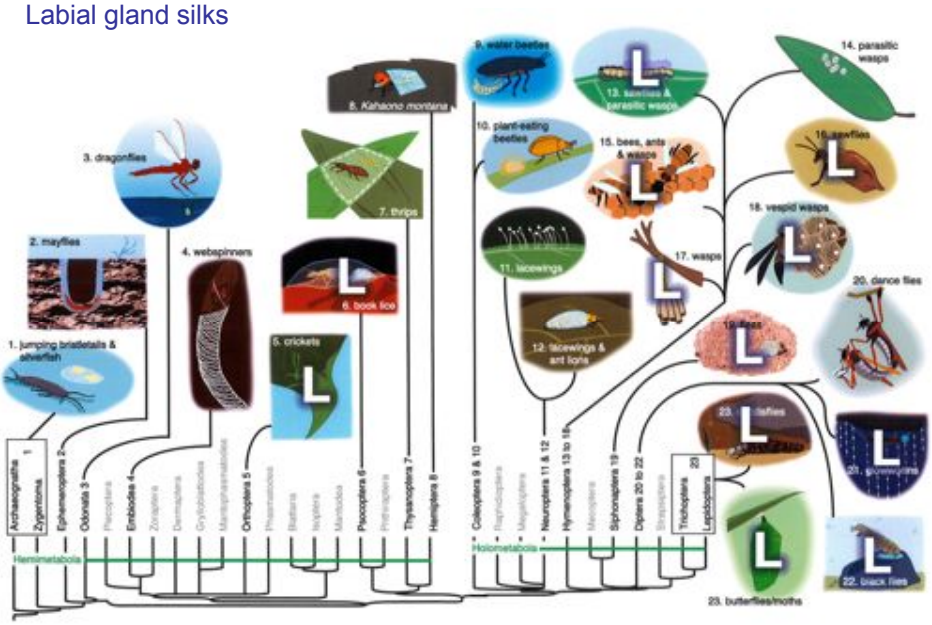
Phylogenetic Survey

Many independent origins of silk



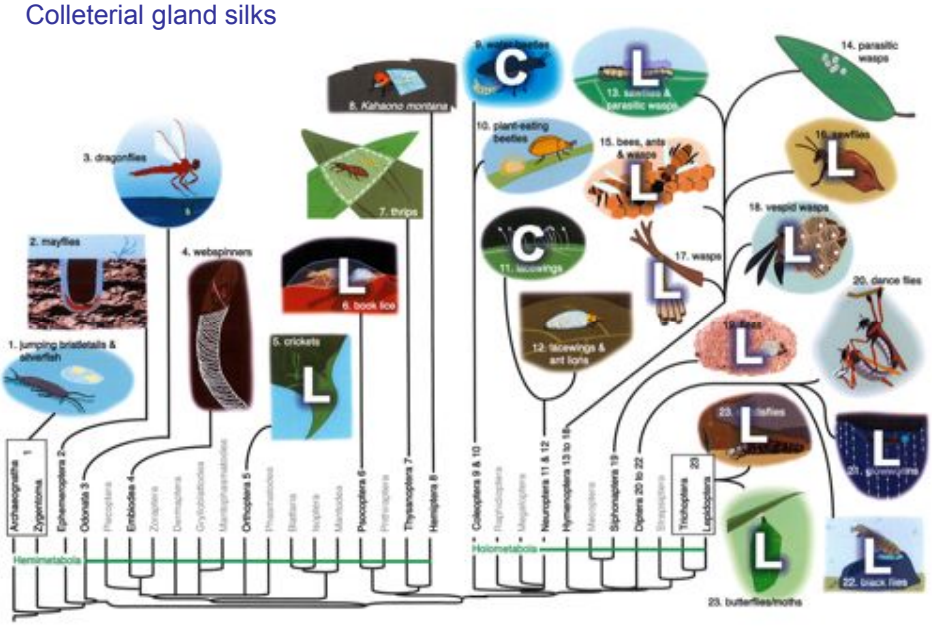
Phylogenetic Survey

Labial gland silks



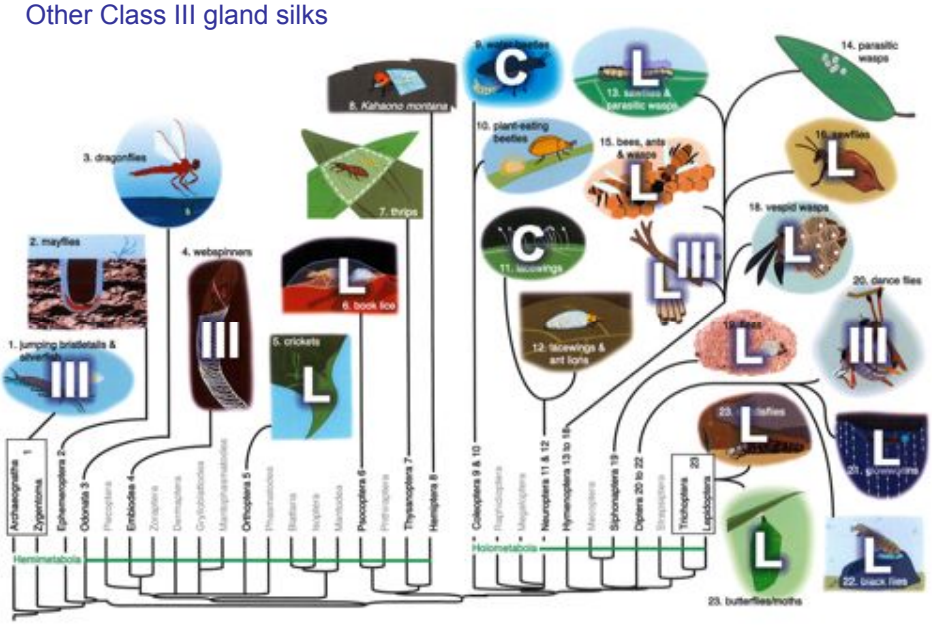
Phylogenetic Survey

Colleterial gland silks



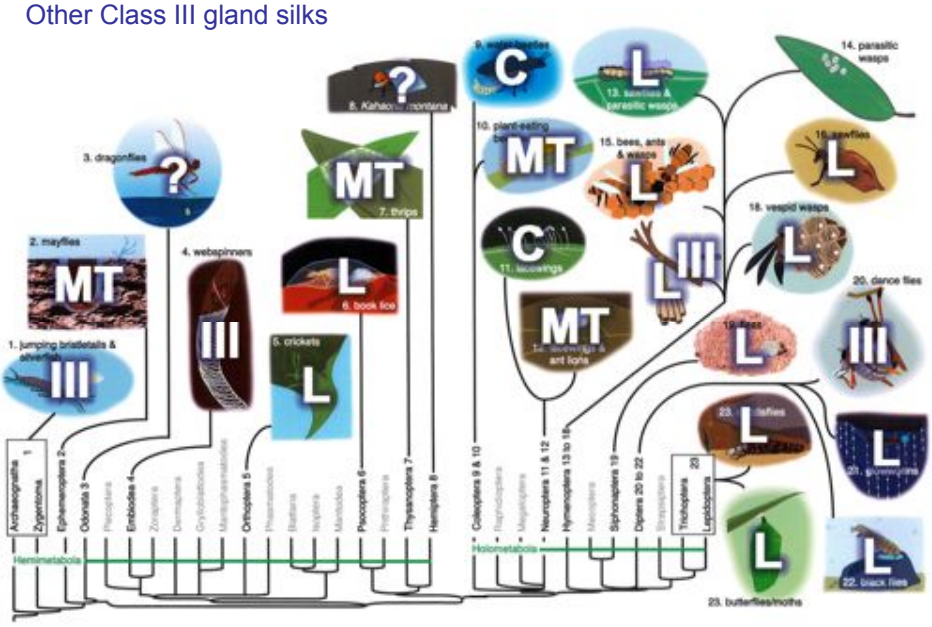
Phylogenetic Survey

Other Class III gland silks



Phylogenetic Survey

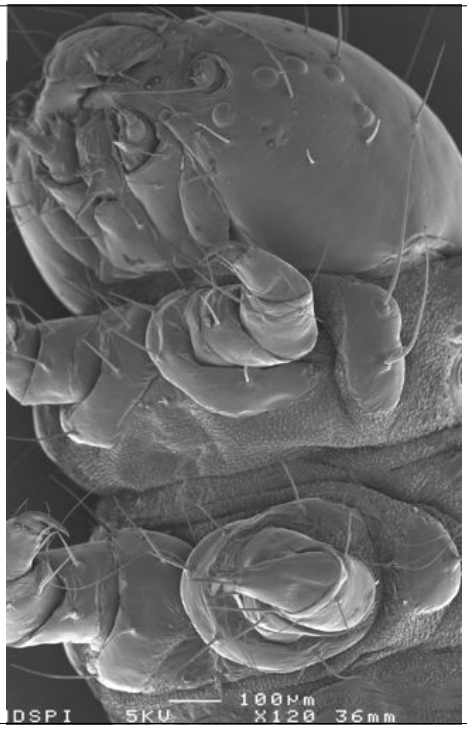
Other Class III gland silks



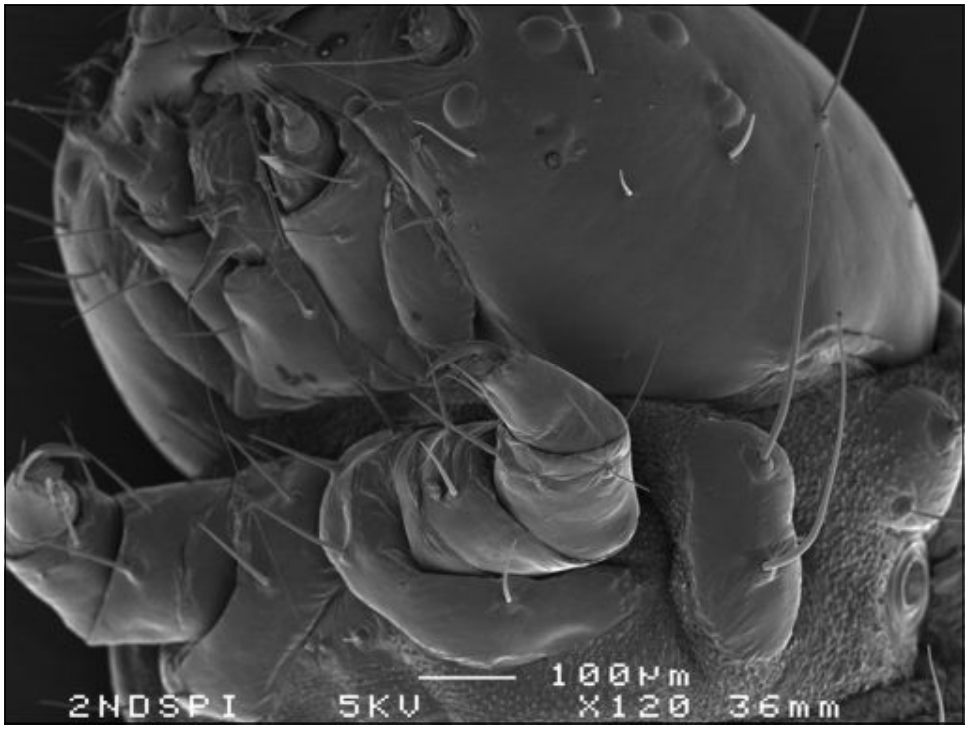
Lepidopteran Silks

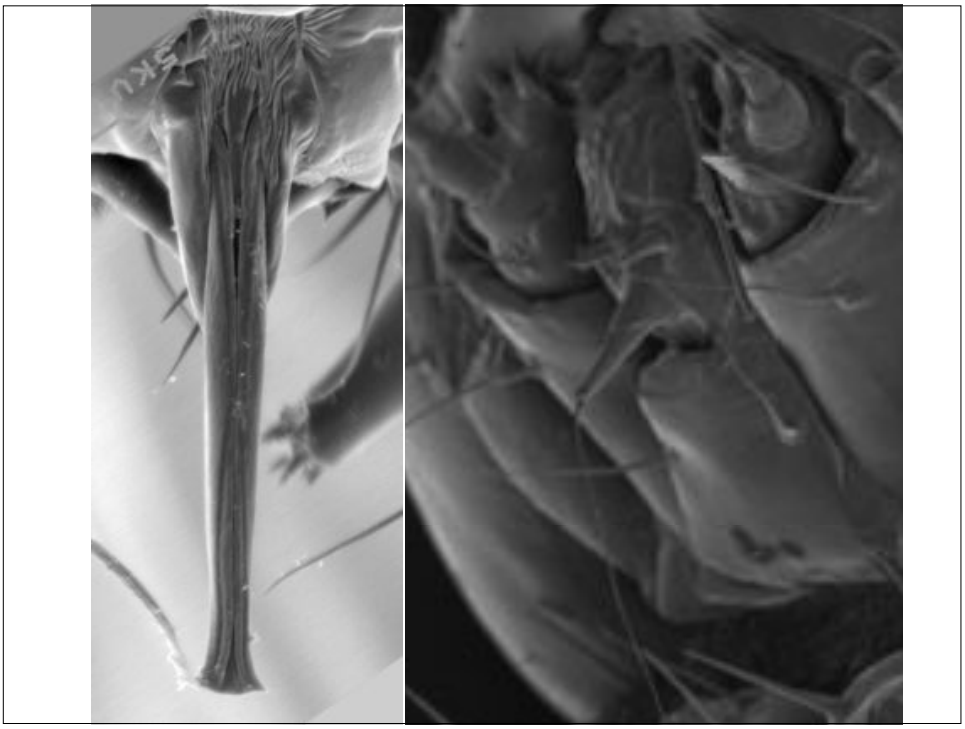
Fundamental to larval biology
Important commercial product from *Bombyx mori*

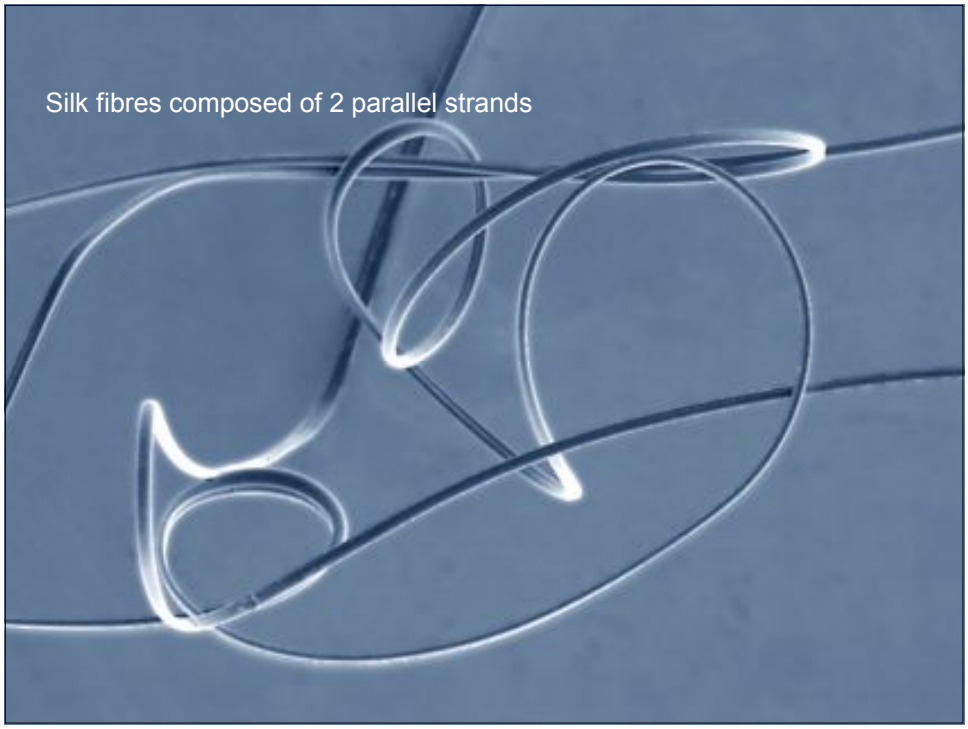
Other species are important pests, for example *Helicoverpa armigera*

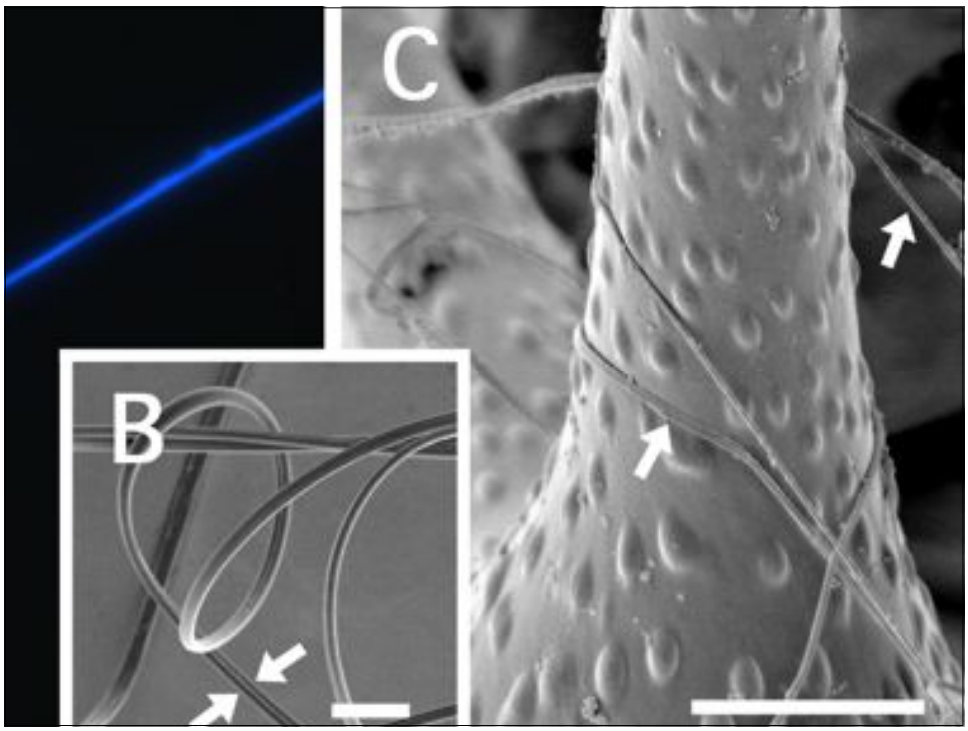


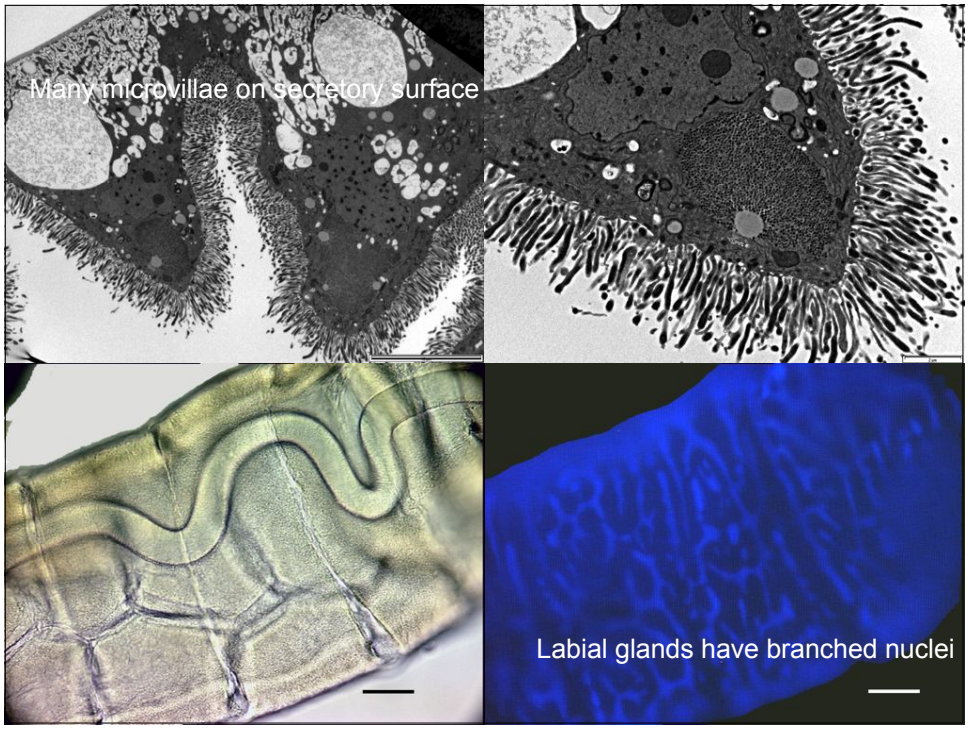
Sorensen GS, Cribb BW, Merritt D, Johnson M-L and Zalucki MP (2006) Structure and ultrastructure of the silk glands and spinneret of *Helicoverpa armigera* (Hubner) (Lepidoptera: Noctuidae). Arthropod Structure & Development 35:3-13.

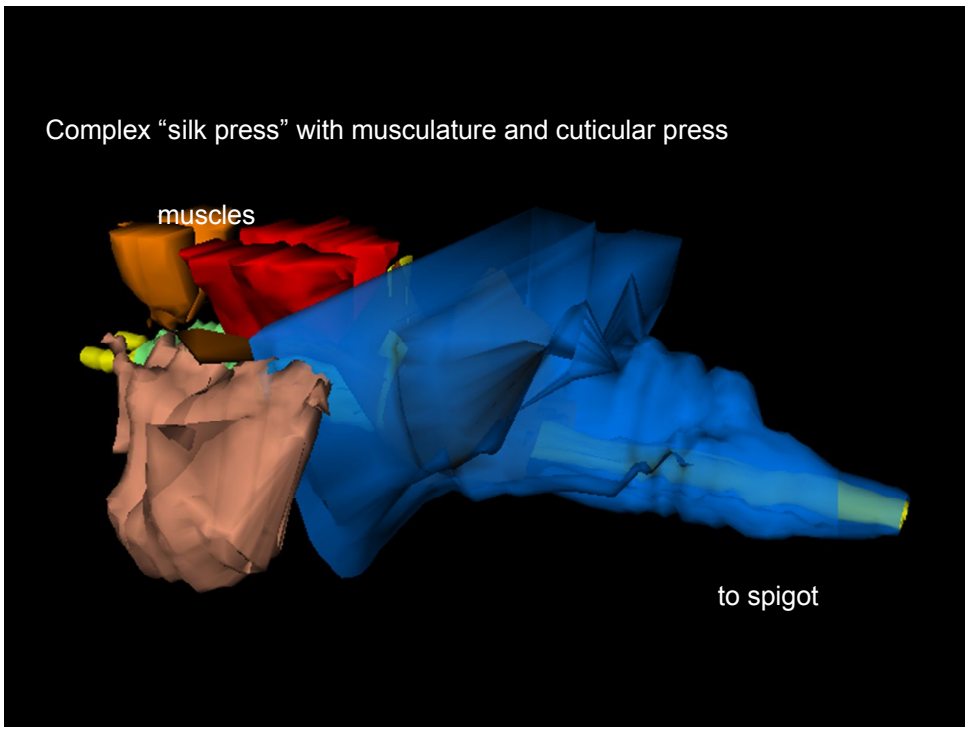

100µm
2NDSPI 5KV X120 36mm




Silk fibres composed of 2 parallel strands

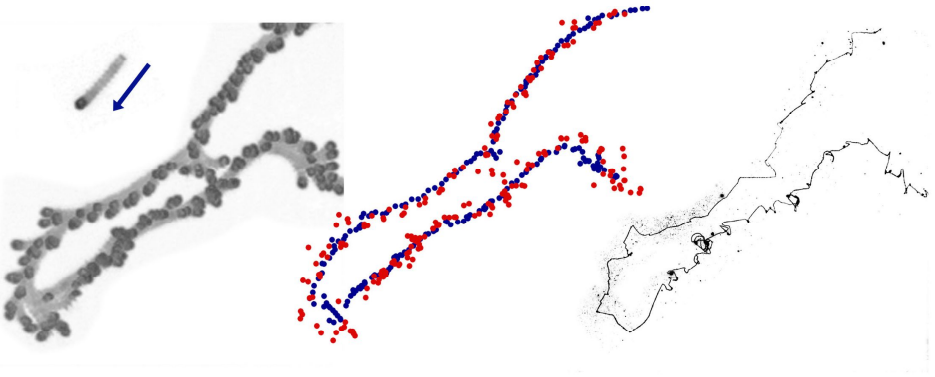

C
B


Many microvillae on secretory surface
Labial glands have branched nuclei

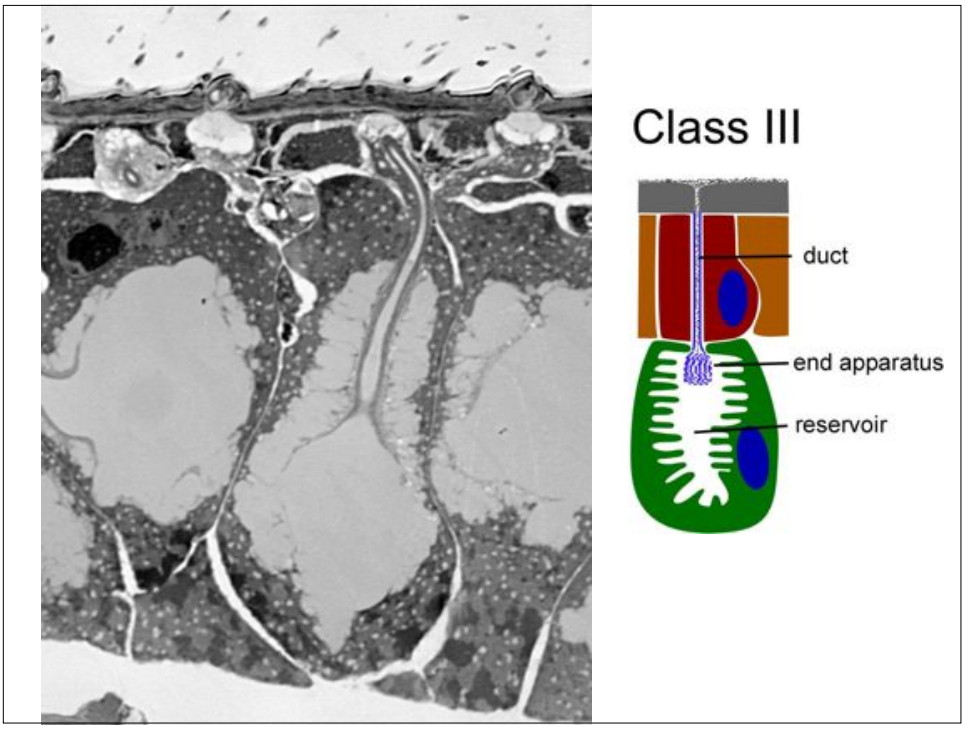

Complex “silk press” with musculature and cuticular press
muscles
to spigot

Glands

Silk trail correlated to head movements in 1st instar *H. armigera*



Johnson ML, Merritt DJ, Cribb BW, Trent C and Zalucki MP (2006) Hidden trails: visualizing arthropod silk. *Entomologia Experimentalis et Applicata* 121:271-274.


Class III
duct
end apparatus
reservoir