

Insects and People -- Entomology 101

Honey Coated and Silky Smooth - Insect Products

Honey Bee Products

Apis mellifera and other species around the world. “Domesticated” for almost 3,000 years

1. Honey;
 - plant nectar, regurgitated gut contents mixed with enzymes and “fanned” to evaporate water (less than 18%).
 - composed of simple sugars and water (38% fructose; 32% glucose; 12% other simple sugars (less than 0.2% protein).
 - mead - honey wine
2. Beeswax
 - produced from wax glands in the abdomen
 - clean burning
 - used as a protective sealant or coating
3. Propolis
 - bee glue; plant resin
4. Royal Jelly
 - mandibular gland secretion; 34% simple sugars
 - nutritive; feed to workers and developing queens (for different periods of time)
5. Bee Venom
 - a mixture of proteins and peptides; used to desensitize individuals allergic to stings and as a treatment for arthritis.

Sericulture - silk production; a fiber collected from silk moth cocoons

1. A 6,000 year old industry of Chinese origin (indoor rearing began ca 1200 BC).
2. The moth is completely domesticated; adults no longer fly; caterpillars eat mulberry leaves.
3. One cocoon yields over 1000 yards of filament; 3000 cocoons yield ca 1 pound of filament; filaments are twisted together to make silk “yarn.”
4. Properties
 - will stretch 20% of length before breaking

- absorbs moisture but does not become damp - “wicks” moisture
- absorbs dyes
- resists mildew
- used where light weight and durability are required (today nylon and rayon are substituted)

5. Production mainly in China, Japan, sections of the old Soviet Union, Brazil, S. Korea, Thailand

Dyes

- red dyes “Kermes” and “Cochineal” from the dried and powdered bodies of scale insects

1. Kermes - old world scale feeding on oak; used as a prized, royal dye by Greeks and Romans
2. Cochineal - new world cactus scale produces a carmine pigment
 - used by Aztecs as a pigment
 - 70,000 scales to produce 1 pound of powdered dye
 - Used as a cosmetic pigment; lab stain
 - now largely replaced by aniline dyes (but still used in many cosmetics)
3. Shellac - A scale that feeds on fig and banan tree branches
 - native to India and Burma
 - production of “stick lac” (heavily infested branches); dried lac is dissolved in methyl hydrate to produce shellac; 150,000 scales needed to yield one pound of dry shellac
 - used as a wood protectant/sealant; replaced mainly by polyurethane

Optic Crosshairs

- from spider “silk”
- a highly unusual protein secreted from spinnerets
- very smooth, exact diameter; tensile strength is like nylon but will stretch twice as far as nylon before it breaks
- used for crosshairs on optical instruments (e.g., bombsights during W.W.II)

Foods

- many insects are raised commercially and preserved or used live as baits in sports fishing
- used as pet foods
 - crickets
 - wireworms
 - fly maggots