

Pollination & Pollinators - Bob Allen


<http://homepage.mac.com/bugbob/pollination/>

Pollen Transfer Methods

- Water
- Wind
- “Helpers” = Vectors

Summary of Pollination History

Highly-evolved plant groups are pollinated by highly-evolved insect groups: Co-evolution

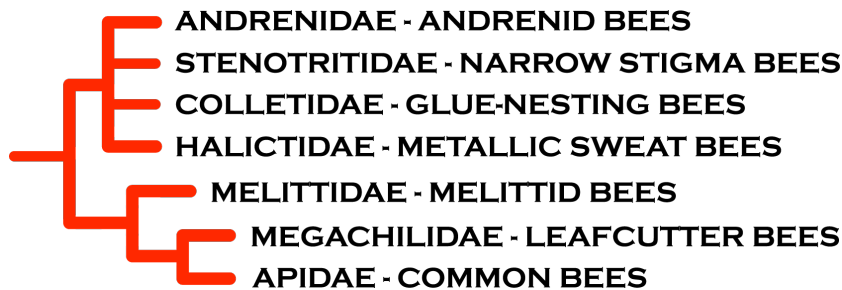
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9. Birds
 8. Bees
 7. Flowering plants & advanced insects *radiate*
 6. Butterflies/Moths, Ants/Wasps
 5. Flowering Plants - *true flowers, primarily beetle-pollinated*
 4. Mammals
 3. Advanced insects: Beetles & Flies - carnivorous & scavengers
 2. Insects
 1. Cycads & Conifers - *wind pollinated*

Local Pollen Vectors

- Beetles
- Flies
- Butterflies & Moths
- Ants, Wasps, & Bees
- Birds

General groups of local pollinators

- **Beetles:** flat or bowl-shaped flowers that face upward; white, whitish, and pale yellow colors; strong odor of fruit or thick “perfume”.
- **Pollinating Flies:** shallow or tubular flowers; flowers that face upward or outward; various colors; and a sweet scent, strong fruity odor, or thick “perfume” released in the daytime.
- **Butterflies & Day-flying Moths:** long narrow tubular flowers or nectar spurs; flowers that face upward; bright colors such as blue, yellow, or red; and a sweet scent given off in daytime.
- **Night-flying Sphinx Moths:** long narrow tubular flowers or nectar spurs; flowers that face outward or upward; pale colors that reflect moonlight such as white and greenish-yellow; strong sweet scent given off at night.
- **Other Night-Flying Moths:** tubular flowers face out/down; pale colors; sweet scent at night
- **Day-flying Sphinx moths** (snowberry & bumblebee clearwing): similar flowers but also those that are pink and that give off a scent during the day.
- **Ants:** small, flat, bowl-shaped or shallowly tubular flowers that face upward and often give off a sweet scent in the daytime.
- **Wasps:** flat, bowl-shaped, or short-tubular flowers that face upward or outward and give off a sweet scent in the daytime.
- **Bees:** flat, bowl-shaped, or broadly tubular flowers; most colors but generally not pure red; sweet odors in the daytime.
 - **Short-tongued bees** are andrenid (Andrenidae), narrow stigma (Stenotritidae - in Australia only), glue-nesting (Colletidae), metallic sweat (Halictidae), and melittid (Melittidae).
 - **Long-tongued bees** are leaf-cutter (Megachilidae) and common (Apidae [Anthophoridae]).
 - **Heaths, Nightshades, and Shooting Stars:** Buzz-pollinated by native bees (decouple wing muscles).



- **Hummingbirds:** prefer bright red or magenta flowers but also visit orange, yellow, blue, and white; excellent eyesight, visually locate flowers in daytime; poor olfaction, most flowers have no scent; flowers tubular & hang down (monkey flowers) or have a long nectar spur (larkspurs).

What Pollinates That Flower?

Overall shape

- Flat or bowl-shaped flowers: beetles, some flies, ants, wasps, bees
- Short tubular flowers: some flies, ants, wasps, short-tongued bees
- Long narrow tubular fls or nectar spurs: butterflies, moths, long-tongued bees, hummingbirds

Physical orientation

- Flowers that face upward: beetles, butterflies, sphinx moths, flies, ants, bees, wasps
- Flowers that face outward: sphinx moths, small moths, hummingbirds, some flies & bees
- Flowers that face downward: moths, hummingbirds, bumble & carpenter bees

Flower colors

- White, dull whitish, pale yellow: beetles
- Blue, yellow, red; butterflies & day-flying moths
- White or yellow-green, open at night: night-flying moths
- Various colors but rarely red: bees
- Bright red or magenta: hummingbirds

Scent

- Strong odor of fruit or thick “perfume”: beetles, some flies
- Dead animal: carrion-eating flies & beetles
- Sweet scent in daytime: butterflies, day-flying moths, some flies, ants, wasps, bees
- Strong sweet scent at night, dusk, or dawn: sphinx moths
- No odor: birds

Pollination of Some Local Wildflowers

- Sunflowers such as Telegraph weed, *Heterotheca grandiflora*
- Rothrock Lobelia, *Lobelia dunnii* var. *serrata*
- Blue-Curls: Woolly, *Trichostema lanatum*; Vinegar weed, *T. lanceolatum*; Mountain, *T. parishii*
- Chaparral Yucca, *Hesperoyucca whipplei* & So Cal yucca moth, *Tegeticula maculata extranea*
- Orchids: Stream Orchid,, *Epipactis gigantea*, & Darwin’s Orchid, *Angraecum sesquipedale*
- Buzz (“saltshaker”) pollination: Manzanitas, Nightshades, & Shooting Stars: native bees, especially bumblebees

Summary

- Vector-pollination is quite old
- Promote native pollinators in your yard
- Classic example of Co-evolution
- Increase your enjoyment of the outdoors, look for pollinators!

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