



BETWEEN

Jeffersonville • Vermont



John Hayden (NESARE)

Hand Pollinating in China



Native Bee Tree Fruit Pollinators

- Who are they?
- How effective are they?
- Are they in trouble or can we continue to take them for granted?
- Can we enhance their populations through management?



Or

Should we rely on honeybees for pollination?

**Weather dependent
Rental prices rising
Bees stressed
Beekeepers struggling**



What about stone fruit?

Native Bees Who Are They?



Bees

Anatomy

Pollen Transport



Apidae
Bumblebees
Carpenter bees



Megachilidae

Mason bees



Andrenidae and Colletidae

(Miner Bees and Polyester Bees)



Halictidae

(Sweat Bees)



Solitary Bees

Nesting Habits

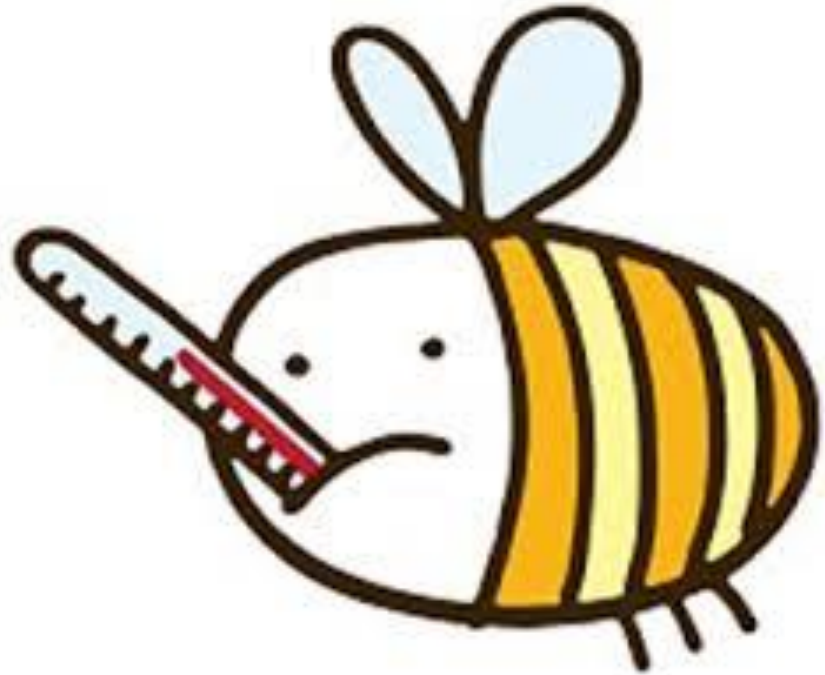
- **Ground Nesting**
Most, about 70%, of North American bee species dig nests in bare or sparsely vegetated soil.
- **Cavity or Wood Nesting**
The other 30% nest in logs, stems, twigs or galls in dead, hollow or soft-pithy plants like raspberries, sumac and elderberry.
- **Ensure access to ground and wood nest sites near, say 300 feet maximum, prime foraging areas.**



Drawing of mining bee credit: Steve Buchanan, Bee Basics: An Introduction to Our Native Bees
By Beatriz Moisset and Stephen Buchmann.



Why are they in trouble?



Pesticides
Disease and Parasites
Habitat Loss
Climate change

Some bumble bee species fine, some not so fine

male



worker



queen



common eastern bumble bee
Bombus impatiens



Bombus affinis



newly emerged worker



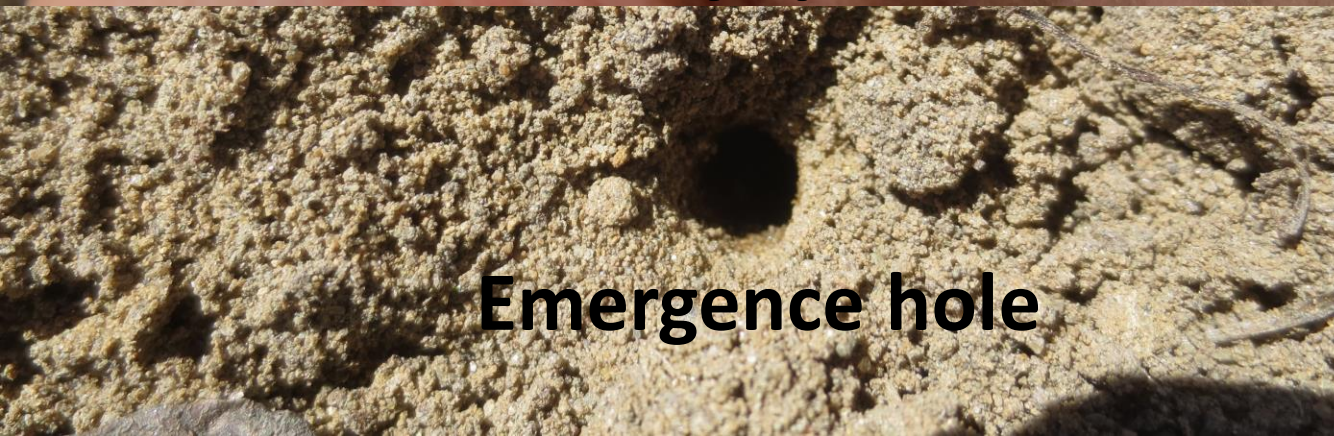
Ground nesting bees

NESARE research project





**Introducing cocoons into
sand filled bucket
in sandy spot**



Emergence hole



Creating a sandy nesting patch in a silty loam soil

