Native Bee Species in *Beatriz the Builder Bee* 	**Carpenter Bee (Beatriz)** ***Xylocopa sonorina*** **Family Apidae** 	**Globe Mallow Bee (Gloria)** ***Diadasia diminuta*** **Family Apidae** 	**Cactus Bee (Clara and Chris)** ***Diadasia rinconis*** **Family Apidae** 	**Leafcutter Bee (Linda and Luis)** ***Megachile policaris*** **Family Megachilidae** 	**Sweat Bee (Samantha)** ***Augochlorella pomoniella*** **Family Halictidae** 	**Fairy Bee (Felicia)** ***Perdita minima*** **Family Andrenidae**  Photo: Joseph Wilson
Pages in book	1 and throughout	7, 10, 12, 15-25	10, 12	11, 12	10, 12	10, 12
Size	25 mm	7-9 mm	11 mm	12-15 mm	7-9 mm	2 mm
Color	Females shiny black. Males fuzzy, golden brown with green eyes, called “teddy bear bees.”	Sandy-brown, abdomens striped with pale bands or covered with pale-gold hairs. Pale blue eyes.	Sandy-brown, abdomens striped with pale bands or covered with pale-gold hairs.	Black and furry. Abdominal undersides bright yellow if carrying pollen.	Shiny, metallic green.	Rusty red to orange unlike most *Perdita* species.
Food preferences	Generalists – they eat nectar and pollen from many kinds of flowers. Examples: palo verde, desert willow, ocotillo, devil’s claw.	Specialists. Prefer globe mallow flowers and plants in the sunflower family.	Specialists. Cactus flowers and some sunflowers.	Generalists. Examples: palo verde, cacti, and sunflowers	Generalists. Examples: globe mallows, fairydusters, and clustervines (*Jaquemontia)*	Specialists. Examples: spurges and sandmats (*Euphorbia* and *Chamaesyce)*
Nest site	Woody materials (dead tree trunks, limbs and stumps and structural beams.)	In the ground, prefer sandy soil, often in large aggregations of solitary bees	In the ground, prefer sandy soil, often in large aggregations of solitary bees	Pre-existing holes in wood made by beetles or other insects, in hollow stems, or in rocks. Preferred nest cavities ~ width of a pencil.	Ground nests, usually on bare ground that may be slightly sloping.	Ground nests in sandy soils.
How do they build their nests?	Use mandibles to excavate their own nest tunnels in woody materials. They mix the resulting sawdust plus their saliva to form partitions between each larval nest cell. They tamp these materials down with their head and abdomen.	Dig nests in sandy soil. If the soil is hard, they may moisten it with nectar from their crop and dig with their mandibles and legs, tamping down soil in the tunnels with their head and abdomen.	Like the globe mallow bee. Many ground- nesting bees smooth the brood cell wall and line it with waxy secretions produced by glands in their abdomens. This lining waterproofs the cells, maintains humidity, and keeps fungi from destroying food and developing larvae.	Line with pieces of leaves that they cut with their mandibles, leaving little half-moons holes on the leaves. May use other materials, such as resin, sand, mud, pebbles, wood fragments, and leaf masticate for cell partitions and to seal off the nest tunnel.	The females use their mandibles, legs, and other body parts to dig their nest and make brood cells.	The females use their mandibles, legs, and other body parts to dig their nest and make brood cells.
What do nests look like?	Usually have a single entry hole from which parallel cylindrical, horizontal tunnels are chewed for the brood cells.	A vertical tunnel with lateral tunnels ending in brood cells.	A vertical tunnel with lateral tunnels ending in brood cells.	Horizontal or vertical tunnels depending upon the orientation of entry holes.	A vertical tunnel with lateral tunnels ending in brood cells.	A vertical tunnel with lateral tunnels ending in brood cells.

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Native Bee Species Featured in *Beatriz the Builder Bee*	Carpenter Bee (Beatriz) *Xylocopa sonorina* continued	Globe Mallow Bee (Gloria) *Diadasia diminuta* continued	Cactus Bee (Clara and Chris) *Diadasia rinconis* continued	Leafcutter Bee (Linda and Luis) *Megachile* sp. continued	Sweat Bee (Samantha) *Augochlorella pomoniella* continued	Fairy Bee (Felicia) *Perdita minima* continued
Social structure?	The wood-nesting carpenter bees exhibit sociality called “cooperative breeding.” Mothers and daughters share the nest for 2-3 years with a division of labor: mothers forage and do most reproduction, daughters serve as non-reproductive guards or foragers. When the mothers die, their daughters remain in their nests and take over reproduction.	Solitary. Often nest in large aggregations of solitary bees.	Solitary. Often nest in large aggregations of solitary bees.	Solitary nesters, will nest alongside others if multiple suitable nesting cavities occur. *M. policaris* nests may consist of brood chambers with multiple larvae feeding on one large pollen mass instead of individually partitioned nest cells.	*Augochlorella* spp. may be solitary or primitively social depending on climate. In primitively social *Augochlorella* bees, a fertilized female overwinters, emerges in the spring to construct and provision a nest, and lays mostly female eggs. When her daughters become adults, they take over collecting pollen and nectar, and the foundress female remains in the nest and lays eggs — she is the queen for that season. She may lay up to three generations of eggs before dying. Fertilized females from the last brood overwinter and found the next year’s broods.	Solitary nesters. Will nest in in large aggregations or alone.
How collect pollen?	Leg hairs.	Leg hairs.	Leg hairs.	Hairs on underside of abdomen.	Leg hairs.	Sparse but effective leg hairs.
How spend winter?	First year females and males remain in the nest and overwinter as pre-reproductive adults.	Overwinter as prepupae in cocoons in their natal cells.	Overwinter as prepupae in cocoons in their natal cells.	Overwinter as prepupae in in their natal cells.	Fertilized adult female overwinters and emerges in spring to lay eggs and start new generations.	Overwinter as prepupae in cocoons in their natal cells.
Fun Facts (see *Beatriz the Builder Bee* glossary for more details)	These are gentle giants. Carpenter bee eggs are the largest of any insect at just over ½ inch (15mm.) These bees perform “buzz pollination” for flowers such as tomatoes. They vibrate their wing muscles and release pollen which they spread from flower to flower.	These bees are sometimes called “chimney bees” because they build soil turrets at the entrance to their nests. These could prevent soil and rain from falling into the nest holes, block predators or parasites from entering the nest, or help bees locate their nest amidst many.	Some *Diadasia* have been observed disassembling their turrets after egg-laying, perhaps to plug the brood cells’ entrance tunnel.	Most bees carry pollen in special baskets on their legs, but leafcutter bees’ baskets are on their bellies. If you see a dark bee with a yellow abdomen, it is probably a *Megachile.*	These have a beautiful, metallic green color. They are called sweat bees because they will land on humans and drink their sweat!	These are the worlds’ smallest bees! Many female native bees can use their egg-laying parts as a stinger, but they rarely sting people. Fairy bees are so tiny, they are stingless to humans.

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