

Water and Bees

Tutorial for CCBA, May 11, 2023

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Bees require access to water.

Bees use water to dilute finished honey and dissolve hardened crystals

Bees cool the hive through evaporation.

Bees spread a thin layer of water over open comb and draw circulating air over the water to evaporate it. This is same principle as the “swamp coolers” used throughout the west.





Water demand peaks in the summer, when bees are working hard to cool the hive during heat waves.

Access to water is needed and require year round.

County beekeeping regulations require apiaries to have a water source.

Conflicts over bees foraging at water sources is the number one complaint that are called into the County Ag department.





My default water source is a heavy "horse bucket" with some scoops of Azolla Fern to provide a self-repairing landing spot. I always include a wood ramp so birds, mice and lizards can escape if they fall in.

Azolla fern is native to our county, worldwide in distribution, and often sold as a live plant in pet stores. It doesn't winter well in the North County, and frequently needs to be restarted in the spring time.







An old beach towel laid over the side of any water bucket will get the bees working the water as it wicks up and saturates the towel.

Bees love a "wicking towel". The wick can empty a bucket quickly (which is why I go with the Azolla fern after getting the bees started). A couple of handfuls of wine bottle corks are a fern substitute.





Bees are drawn to outdoor pools, fountains and horse troughs for water foraging.

Bees develop strong loyalty to particular water sources.

If the beekeeper seeks to prevent and de-escalate conflicts over water foraging, the beekeeper should proactively train his bees to use a non-conflicted watering station.





Bees want a safe sipping spot.

An oozing or dripping film of water with places to land and stand is preferred to open and deep water with vertical sides.

Bees will tumble into pools, and “swim” with increasing anxiety. This leads to stings and conflicts at pools.



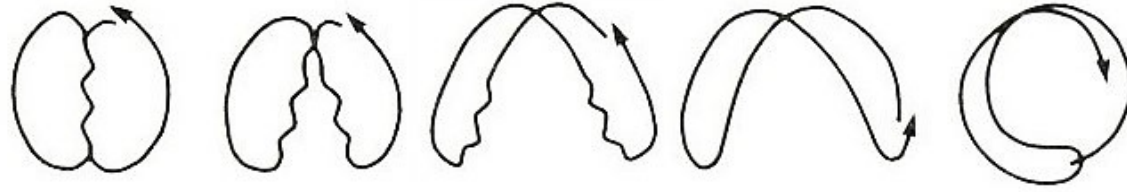


Bees communicate water locations to nestmates in their foraging dance.

This means water with a "taste" or "odor" is preferred to plain water, as it is easier for the bees to recruit other bees.

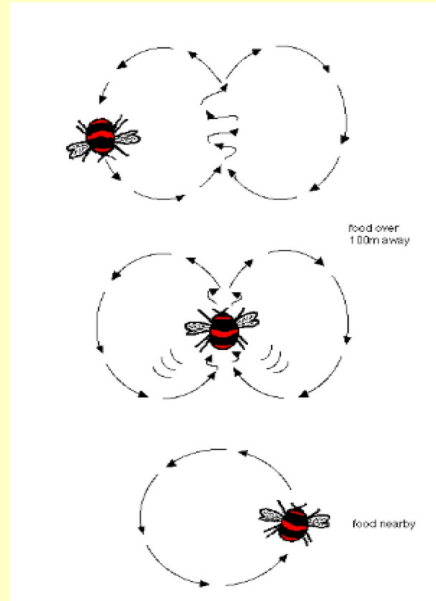
Bees mark water sources with their "Nasonov" gland as a marker attractant. And the Nasonov analogs (Lemongrass, Lemonverbena, etc) will draw bees to a dedicated water source.





Dance - Types

- Tail-Waggle – greater than 100 m
- Transition: Round - Waggle – 25m to 100m
- Round – Food source within 10m



The bees foraging dance is more precise at distances greater than 50 feet. At 50 feet (or so) the “dance” changes from a circle to the classic “figure 8” dance with distance and directional vector.

Water sources that are at this distance or greater ****will**** be recruited more strongly than ones that right next to the colony.

Seasonality of salt foraging in honey bees (*Apis mellifera*)

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RESEARCH ARTICLE

Salt preferences of honey bee water foragers

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Most mineral nutrition for bees comes from pollen (which can be high in mineral "ash"). Mineral nutrition is key for raising brood, and hence is high in the spring brood explosion (when pollen is naturally super-abundant).

Bees can taste and discriminate between certain minerals (including sensory pads on their feet, as well as tongues and antennae). They use these tastes to find and evaluate pollen.

Consequently, research has shown bees are strongly attracted to moderate concentrations of Sodium and Magnesium, and tend to be aversive to Potassium and Phosphorous. The mineral attraction changes with the season (and is likely correlated with the pollen "hunger" of the bees).





Pools that are "chlorinated" tend to attract bees because of the minerals and the ease with which the water "odor" can be communicated to nestmates.

Water is heavy for bees to transport, and they exercise strong selection for closer (rather than farther) sources that meet their safe, undisturbed criteria.





Water collection and recruitment is an occupational speciality among the foragers. They remember and are loyal to scouted locations. This means the water source must be reliable, and the locations first discovered are "grandfathered" into their foraging map.

Water sources should never run dry, and effort to "train" the forager bees should be made before the winter covers are pulled off neighborhood pools.

