

Bats and Hummingbird Feeders Study

Information and Instructions

Thanks for your interest in participating in our ongoing study of the use of hummingbird (HB) feeders by nectar-feeding bats in the Tucson region (and beyond). Here we provide you with some basic information about the study, HB feeders, and instructions on how to report your observations.

Background on the Study

Data collected from this study will be used by scientists to better understand the lesser long-nosed bat, a species listed as endangered under the federal Endangered Species Act until 2018. It will also be used by the Town of Marana and the City of Tucson in development of their Habitat Conservation Plans. By gathering data on where bats are feeding, when they arrive and leave the Tucson Basin, and tracking a few bats with radio transmitters, we can gain a better understanding of their foraging habitat, how they travel from their roosts to foraging sites, and the locations of their roosts. This will allow us to plan more effective conservation strategies and minimize any impacts we might be having on this species.

Background on the Lesser Long-nosed Bat

Lesser long-nosed bats, *Leptonycteris yerbabuenae* are migratory and spend their winters in Mexico, returning to Arizona as early as the second week in April. Pregnant females congregate at maternity roosts, give birth, and raise their young throughout the summer. Males form separate, smaller colonies. Nectar and pollen from the flowers of saguaro and organ pipe cactus are the core of the bats' diet in early summer. Later in the summer, as they move up in elevation, they feed on agave. Their spring migration from central Mexico northward is thought to follow the sequential blooming of certain flowers from south to north. Bats have also been observed using hummingbird feeders near residential homes. Hummingbird feeder monitoring has been on-going in the Tucson Basin since 2006.

What We've Learned So Far

Thanks to our citizen-scientist volunteers, we were able to capture and put radio transmitters on lesser long-nosed bats for a duration of three to four days each. During this time the AZ Game & Fish Department identified new information on movement corridors, and was able to follow bats as they returned to two significant day roosts that were previously unknown for this species. In addition, the AZ Game & Fish Department located specific foraging patches within the urban and ex-urban interface of the Tucson basin. The character of these activity areas ranged from high density urban core to low density rural conditions. Movement distances from day roosts to foraging patches exceeded 40 km (25 miles) for a one-way flight. This species was deemed stable enough to be removed from the federal Endangered Species List in 2018, in part due to the information on long-term population trends collected by the participants of this study.

Feeders and Sugar Water

Feeder type and placement

Bats will visit most types of feeders but not those with bee guards. Please remove guards at night (and replace in the morning if you get bees at your feeder). Bats usually hover to feed so perches are unnecessary. If you have multiple feeders, you may notice bats prefer one to another. There's a section on the end of the season summary form to record these observations.

Sugar water and feeder cleaning

Use the same solution as for hummingbirds: 1 part cane sugar to 4 parts water. Don't add food coloring or dye as it is unhealthy for the birds, and perhaps also for the bats. Boiling the solution will help retard fermentation. Leave sugar water in a feeder no longer than 48 hours during hot weather. Clean the feeder every time you change the sugar water. Use hot water and a bottle brush. Do not use soap. If necessary, use a little vinegar in the hot water to get rid of mold, or a tiny amount of Clorox. Be sure to rinse the feeder thoroughly.

Data Collection Instructions

Data can be collected in hard copy form or entered onto the website (preferred). Please let us know if you need additional forms. We are interested in two kinds of information – (1) occasional daily/nightly reports and (2) a seasonal summary report. Forms for recording this information can be found on the website. Please keep copies of your data input sheets so you have a record to refer to when filling out the End of Season Summary Report.

1. Monitor the feeder 2-3 times a week (more if you want to, of course), beginning in June and continuing until the bats leave. If you are not able to monitor your feeder regularly we are still interested in less frequent observations. We are also interested in negative data -- if no bats visit your feeders all season, we'd still like to hear about it in the summary report.
2. Avoid monitoring on windy nights, as fluid level may drop because of the wind, and bat activity is usually lower. On the night you monitor, check the level of fluid just as it gets dark and the hummingbirds go to bed. Record the date and time on the data sheet.
3. If you usually stay up late, check the feeder again before you go to bed, but not before midnight. If you are an early riser, check when you get up in the morning, but before the hummingbirds start drinking. Record the time you checked, and whether the level didn't drop, dropped a little, a lot, or the feeder was drained. The bats usually don't leave their roost until at least a half hour after sunset and can travel 20 miles to feed so it may take some time before they come to the feeders. That's why checking only a couple hours after dark may be too early. If you have lots of hummingbirds, they may lower the level of the fluid if you check too late in the morning- you won't be able to tell if any bats visited. So, if you go to bed before midnight and get up after the hummingbirds are already drinking, use your best judgment and pick a time to check that you think will give the

best data.

4. When you're sure you have bats visiting your feeder, please try to determine what time they first arrive in the evening. You don't want to light up your feeder like daylight, but the bats may still come if the feeder is in enough light for you to see whether they're there. Some people have said the bats still come to relatively lit-up areas, but others have found that the bats come only after the lights have been turned out. Sit somewhere where you're comfortable and not too far (about 6 ft) from the feeder (they don't generally mind human presence or quiet talking) and start watching shortly after sunset until you see one appear. It may only stay at the feeder for about a second so vigilance is important. Record the date, time, and any other observations on the data form. It's only necessary to watch for time of first arrival once when they begin appearing, then once in late August or early September, and once again in late September or early October or whenever you notice numbers are dropping off. We don't have a good idea yet how long they stick around, it may be only a few weeks, or it may be a few months.
5. If you notice bats roosting at your house or in your trees or saguaros, please let us know. We're also interested in insectivorous bats in urban areas.

How To Distinguish Between Lesser Long-nosed Bats (*Leptonycteris yerbabuena*) and Mexican Long-tongued Bats (*Choeronycteris mexicana*)

It is not difficult to tell these two bats apart. The easiest way is to check the bat's back end. "Lepto" lacks a broad tail membrane between its hind legs and its legs are 'free' with an open space between them. "Choero" has a broad tail membrane and its legs are not 'free.' This difference is sometimes described as 'pants' (Lepto) vs. 'skirt' (Choero). Other distinguishing features include: Lepto has a shorter, heavier snout whereas Choero has a longer, thinner snout; Lepto has a gently sloping forehead whereas Choero has a steeper forehead; and Lepto has larger eyes and rounded ears whereas Choero has smaller eyes and more pointed ears. Adults of the two species also differ in color: fawn brown in Lepto and gray in Choero. But young Leptos (the most common visitors to feeders) are also gray.

Photographing Bats

Digital photos are usually the best way to identify your bat visitors. The best clue is presence (Mexican long-tongued bat) or absence (lesser long-nosed bat) of a tail membrane (a broad membrane between the hind legs).

Still cameras (digital or 35mm)

You will need supplemental light, either by using flash or by lighting up the feeder. We want to minimize disturbance to the bats. If you have a feeder that is lit up by lights inside or outside of the house during normal night-time activities, the bats likely have become habituated to it. Increasing the amount of light for a short time to take pictures is unlikely to disturb them, but

monitoring their response is important. If your bats don't like lit-up areas, it might be less disturbing to take a few pictures using flash. The United States Fish and Wildlife Service has given us permission to take flash pictures with the following restrictions. To minimize disturbance, avoid taking many pictures within a short period of time. Don't take pictures on consecutive nights. It is important to have species identification only when bats first show up, at the height of the season, and at the end of the season. If you get pictures that show the identifying characteristics of the two species, please note the date, and email them to Ted Fleming (ted@sonaura.net) or send prints to Ted at 6211 N Cmo. de Corozal, Tucson 85704. Also, check the website for photo submission online.