

# Episode 13: Fat-tailed Dwarf Lemurs

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The fat-tailed dwarf lemurs that we have here at the Duke Lemur Center live in the western dry deciduous forests of Madagascar, and the very special thing that they do is hibernate!

“Fat-tailed dwarf lemur” doesn’t sound like the nicest name you could call something, but it’s pretty literal: They actually do store fat in their tails! There are many other species of dwarf lemur living in Madagascar, and all of them actually do store fat in their tails—it’s a little bit confusing. Fat-tailed dwarf lemurs can actually store up to 40% of their entire body weight just in their tail.

Dwarf lemurs of all different kinds hibernate, but the fat-tailed dwarf lemur hibernates inside those tree holes in the western deciduous forests of Madagascar. Other species of dwarf lemurs will find other places to hibernate, even hiding just underground. So we have done research studying all different kinds of dwarf lemurs and finding exactly where they go when they do their hibernation.

Unlike the weather that we have here in North Carolina, Madagascar has a wet season and a dry season. Think of the wet season kind of like “the time of plenty.” There’s lots of food around, and lots of water saturating the ground helping all the plants grow, helping all that food grow for the lemurs. And the dry season is a time when food’s a little more scarce. So in order to deal with that, lots of lemurs have lots of different adaptations that they use. But the dwarf lemurs are particularly special: They hibernate.

In the wet season in Madagascar, fat-tailed dwarf lemurs are going to eat as much as they can. They have all that food available to them, and they are going to eat it all up. They especially like to eat things that are high in sugar, like fruits or nectar from flowers; and things that are high in protein, like little insects. They might even eat a small lizard or something if they get a hold of it. And they’re going to build up all those nutrients and slowly build up all the fat in their tails, so they can get as big as they can—up to 40% of their body weight—by the time they get to the dry season, when food is a little more scarce and other lemurs have a hard time finding it.

Dwarf lemurs are the only species of primate known to hibernate, and our fat-tailed dwarf lemurs here do a form of hibernation called **torpor**, which they do for shorter periods of time. Torpor is when these guys are slowing down all of their metabolic rates. All of the things and the processes that are happening inside their bodies slow way, way down, so they use as little energy as possible. A great example of this is, heart rates drop from over 300 beats per minute down to eight to 10 beats per minute. You can barely detect that they have a heartbeat if you’re not expecting it to come a little bit later than usual. Their breathing rate also drops, and their temperature drops to whatever the ambient temperature is around them—so they don’t have any warming happening in their body.

If you were to just look at a lemur in torpor, it would be a little bit weird. It might not look like the lemur is even still alive. But then, they can rouse within a few hours, and they can get back up, they can move around, they can do other things.

In the wild in Madagascar, [dwarf lemurs] are actually going to go into torpor for so long that it becomes hibernation, and they stay in that state for 10, 12, 14 days. The reason that they don’t stay in for the entire eight months of their hibernation season is, you can’t do all the things that you normally need to do when you are in that torpor-like state. They can’t do things like use the bathroom or even sleep when they are in that state. So they rouse from torpor every couple of weeks or so and they’ll do those little metabolic processes, and then they’ll go back into that hibernation state, over the course of up to eight months in Madagascar. They can last the entire dry season.



Here at the Lemur Center, our lemurs do not stop eating for eight months at a time, but we still do study the torpor they go through. We have a specialized room called a hibernaculum, and inside that room we try to mimic as many of the factors they have in the wild as possible. We'll see what processes are happening inside their bodies. How is their little body able to sustain itself while going through that period of extreme of inactivity?

Maybe one day from all this non-invasive research into what these little dwarf lemurs are doing when they go into this hibernation state, we can learn what is going on in their bodies that isn't happening anymore in our primate bodies. We share a lot of genetic code with our primate relatives of all kinds, even the little dwarf lemurs. If we look at what genes are coded to express in the way that allows them to do this torpor and hibernation, maybe we can find that same combination of genes that's inactive in humans and find a way to maybe activate it. So maybe a long time in the future, we are going to be thanking dwarf lemurs for advances in things like space travel or medical care. All because we learned how they do their hibernation.

In an effort to connect what we're researching here at the Duke Lemur Center with our fat-tailed dwarf lemurs with the work that we have done over in Madagascar on lots of species of dwarf lemurs, we are hoping to set up a Malagasy field research station. There, we and our Malagasy colleagues can study the hibernation behaviors that we see in the wild and here at the Duke Lemur Center. If you'd like to help support our efforts to set up that field research station all the way over in Madagascar, please check out the link [[lemur.duke.edu/donate](http://lemur.duke.edu/donate)] and see how you can donate!

