

The ups and downs of getting grumpy bears to have sex

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D'ya think I'm sexy? Credit: Hockadilly, CC BY-SA

There is nothing intrinsic to pandas that makes them bad at breeding. It is true that they only have one menstrual cycle each year, but this is true of many creatures. Animals that have multiple cycles per year, such as humans, cows, dogs and sheep, are the unusual ones.

Pandas are no different in their menstrual cycles from deer, stoats and

badgers. The reason why [pandas](#) are going extinct is nothing to do with these cycles. It is because so much of their natural environment has been destroyed.

There has never been a panda birth in the UK. London Zoo had pandas in the 1970s and 1980s who never managed to produce any offspring. This is the second year in which Edinburgh Zoo has tried. They were fairly confident they had a [fertilised egg](#) last year that implanted, but for reasons unknown the female panda, [Tian Tian, lost the foetus](#).

We have been less successful than others in this respect. The Chinese have become especially good at breeding pandas over the years, but other countries have also succeeded. In Europe both [Vienna](#) and [Madrid](#) Zoos bred a [panda cub](#) last year, for example.

Various American zoos with pandas have produced as many as ten pairs and have been successful about half the time. To help Edinburgh, the zoo is flying over a behavioural specialist from one of the panda centres in China and artificial reproduction experts from [The Institute of Zoo and Wildlife Biology in Berlin](#).

At the laboratory in Edinburgh University, we are supporting the effort by carrying out two main tasks for the zoo. We are going to tell them when Tian Tian, the female panda, is ovulating and then we are going to tell them whether she is pregnant.

The bear necessities

For the first task, I have been spending a lot of time monitoring panda urine. We are looking at the oestrogen levels, which rise near the time of ovulation. Once Tian Tian ovulates and the egg is released, that's the prime time for her to mate.

We are measuring the levels daily at the moment and will move to twice a day once they are close to their peak. We think this is going to happen within the next two weeks.

Getting the urine is not easy. Tian Tian lives alone in a big cage. She has been trained to urinate in a particular place, which is a small den with a concrete floor that is indented to make it easier to collect samples.



Tian Tian in her glamour modelling days. Credit: Welshdan, CC BY-SA

But probably because of the changes in her oestrogen levels, which is making her think about nesting, her normal behaviour patterns have gone askew. Like humans, she normally likes to pee first thing in the morning, but she doesn't seem to be doing that at the moment. She's also not drinking as much as usual, so she's not peeing as much.

And she has started to pee outside her den, on earth and grass. So the keepers are keeping watch on her 24 hours a day over closed-circuit TV cameras. As soon as she's peed, they try to get in to suck it up in a syringe so that it can be sent to my lab for analysis.

Hidden cameras, raging sow

But to make matters more difficult, Tian and Tian and the male panda, Yang Guang, are a bit grumpy. They look cuddly, but the keepers warned me not to put my arms through the bars because they could quite easily take your arm off. This makes it harder to collect those urine samples. If she pees in the wrong place and doesn't move away, the sample soaks into the earth and is lost.

Pandas have to be kept in solitary, otherwise they would fight one another. We are talking about very expensive animals. They cost about £600,000 a year in protection funding to have from China and they have to be returned at the [end of the ten-year term](#), so the zoo has to be very careful not to damage them in any way.

To create the ideal conditions for mating, the zoo has been working on various behavioural techniques. The pandas have swapped cages so that it recreates the conditions in the wild and allows the animals to scent one another.

For fear of causing the animals too much stress, a film crew that has been making a documentary about the mating story has been restricted in its efforts to record footage. For the same reason, we are also checking [stress hormone levels](#). Only when the moment is right will the pandas be put together.

When is a foetus not a foetus?

Once mating has taken place and we move to our second task of measuring whether Tian Tian is pregnant, things are still not straightforward. Pandas come into heat in the springtime because that is when the bamboo is moist and nutritious. But over the summer, when bamboo gets woodier and less nutritious, panda can go through what we call pseudo-pregnancy, where the fertilised egg sits in the uterus.



Yang Guang: eats, shoots and leaves. Credit: Welshdan, CC BY-NC-SA

This lasts anything from six to 12 weeks, and it can be particularly difficult to tell whether the panda is pregnant during this time. Because there is no placenta, you can't test pandas for placental markers in the urine in the way that you do in human pregnancy kits.

It will only be in the autumn that the fertilised egg implants into the

lining of the uterus and starts to develop. The gestation period is then probably about 35 to 40 days, but even then it's very difficult to test for pregnancy in the human way because the panda's body size is tiny compared to the mother. Even when baby pandas are born, they are only about six inches long.

We are going to work on various ideas to see whether we can come up with a pregnancy test. It's too early to go into detail about the techniques that we will use, but it will involve looking at certain different steroids and proteins and making comparisons with samples of pregnant pandas from other zoos around the world.

Once we have established that Tian Tian is pregnant, we will continue checking stress hormone levels, since it is well known that stress in the mother can cause her to abort the baby.

In the meantime, all we do is focus on our daily laboratory results. It won't guarantee a panda cub later this year, but it will certainly give us the best possible chance.

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