Study suggests toads can detect coming earthquakes

Jill Lawless, Associated Press, 3-31-10

LONDON -- When it comes to predicting earthquakes, toads - warts and all - may be an asset.

British researchers said Wednesday that they observed a mass exodus of toads from a breeding site in Italy five days before a major tremor struck, suggesting the amphibians may be able to sense environmental changes, imperceptible to humans, that foretell a coming quake.

Since ancient times, anecdotes and folklore have linked unusual animal behavior to cataclysmic events like earthquakes, but hard evidence has been scarce. A new study by researchers from the Open University is one of the first to document animal behavior before, during and after an earthquake.

The scientists were studying the common toad - bufo bufo - at a breeding colony in central Italy when they noticed a sharp decline in the number of animals at the site. Days later, a 6.3-magnitude earthquake hit, killing hundreds of people and badly damaging the town of L'Aquila.

Researcher Rachel Grant said the findings suggested "that toads are able to detect pre-seismic cues such as the release of gases and charged particles, and use these as a form of earthquake early warning system."

Initially puzzled by the toads' disappearance in the middle of the breeding season, the scientists tracked the population in the days that followed. They found that 96 percent of males - who vastly outnumber females at breeding spots - abandoned the site, 46 miles (74 kilometers) from the quake's epicenter, five days before it struck on April 6, 2009.

The number of toads at the site fell to zero three days before the quake, according to the study, published in the Zoological Society of London's Journal of Zoology.

"A day after the earthquake, they all started coming back," said Grant, the report's lead author. "The numbers were still lower than normal and remained low until after the last aftershock."

She said one possibility is that the animals sensed a change in the amount of radon gas emitted by the Earth because of the buildup of pressure prior to a quake.

Scientists also have surmised that animals may be able to detect minor tremors imperceptible to humans, or that they sense electrical signals emitted by rocks under stress before an earthquake.

Grant said the sense may be the result of millions of years of evolution, a trigger that tells the toads to move to safer ground.

"An earthquake could wipe out a population in that area," she said. "A landslide or flood could wipe out virtually 100 percent of the males, and quite a lot of the females."

Several countries have sought to use changes in nature - mostly animal behavior - as an early warning sign, without much success.

The city of Tokyo spent years in the 1990s researching whether catfish behavior could be used to predict

earthquakes, but abandoned the study as inconclusive.

Roger Musson, a seismologist with the British Geological Survey, said the problem studies like the Italian toad research lay in proving the connection between the animal behavior and the quake.

"What happens is somebody observes some strange animal behavior then there is an earthquake, so they link the two," said Musson. "There are probably plenty of cases in which there is strange animal behavior and no earthquake."

He said the new study was "another bit of data in the large pile that has been accumulating over the years. But it's not in any shape or form a breakthrough."