Lizard illness makes it the 'canary in the coal mine' for chemical exposure

January 5 2015

The well-known shingle back or sleepy lizard suffers a high prevalence of anemia associated with agricultural chemical exposure, research contributed to by the University of Sydney reveals.

The finding suggests the lizard could provide advance warning of the impact of agricultural chemicals, in the same way canaries in coal mines once warned of dangerously high levels noxious gases.

"Many Australians are familiar with this South Australian lizard whose head resembles its tail," said Associate Professor David Phalen, from the University's Faculty of Veterinary Science and an author on the findings, published in *Royal Society Open Science* on 24 December.

"The fact this species is being affected by chemicals means other wildlife, livestock and even humans sharing the same environment may be affected. It suggests the health of other reptiles may also indicate the overall health of the environment."

The research was led by Anita Smyth at CSIRO (now at the University of Adelaide). Elizabeth Smee, a Masters student in Wildlife Health and Population Management at the University of led the sample collection and data analysis.

Among the many chemicals continually released by humans into agricultural environments are fertilisers, weed killers, insecticides and poisons to kill mice, rats and foxes. Despite their widespread use the

impact these chemicals have separately, or in combination, on wildlife remains little known.

The study focused on sleepy lizards because of their potential as a sentinel of environmental health. They occur throughout southern Australia, in areas touched by livestock grazing or cereal cultivation and live 20 to 50 years, with young born annually.

"Our study explored the health of two wild populations of sleepy lizards from unimproved rangelands and the nearby 'intensively managed,' fragmented landscapes of southern Australia's cereal croplands. We looked at their physical condition and took blood samples," said Professor Phalen.

"Fifty six percent of the sleepy lizards inhabiting an intensively managed cropping area were experiencing a significant anemia as opposed to the unexposed (control) group of lizards which showed no evidence of anemia.

It appeared this was the result of exposure to one or more chemicals which caused damage to the lizards' red blood cells causing them to be destroyed prematurely.

"The overall impact was difficult to determine but is likely to have interfered with reproduction and may have caused some animals to die."

Adult sleepy lizards in croplands south of the Murray River barrier were found to have reduced body condition which was believed to be the result of their anemia.

The lizards were exposed to multiple agricultural chemicals. The chemical thought most likely to be the cause of the anemia was zinc phosphide which is used to kill mice.

Another unexpected finding was that some lizards in the control group were exhibiting a high white blood cell count but were not anemic. These findings suggest these animals were experiencing a chronic infectious disease which could result in an increased death rate and population reduction .

"If we do not closely monitor the health of our wildlife we will not know what damage we are doing," said Professor Phalen.

"We plan on continuing this work to identify the specific chemicals poisoning these lizards and to monitor their ability to recover."

More information: "The use of body condition and haematology to detect widespread threatening processes in sleepy lizards (Tiliqua rugosa) in two agricultural environments." DOI: 10.1098/rsos.140257Published 24 December 2014

Provided by University of Sydney