



Where in the world is the rat lungworm (*Angiostrongylus cantonensis*)?

Standards addressed:

Language Arts, Common Core Math

- Reading History-Integration of knowledge and ideas

Reading for understanding:

Global distribution of *Angiostrongylus cantonensis* the rat lungworm

Hawai'i is not alone when it comes to being home to the rat lungworm *Angiostrongylus cantonensis*. In the USA, the parasite is also established in Puerto Rico (a U.S. territory), Florida, and throughout the Gulf Coast states up to Texas. It has also recently been found in southern Oklahoma and southern Tennessee, and the parasite range is expected to expand with warming climate changes. Where else can this parasite be found? *Angiostrongylus cantonensis* the rat lungworm was first reported in China in 1935 by a scientist named Chen, who lived in a city now called Guangzhou, but was called Canton at the time of discovery, thus the name, *cantonensis*. The parasite was believed to be spread by the movement of either rats or the giant African snail *Achatina fulica*. Both of these hosts were either intentionally or unintentionally transported around the Pacific Islands by human movement of goods and equipment during World War II. This large snail, an effective host of the rat lungworm parasite, was introduced to Hawai'i in 1938. A woman thought they were very beautiful and brought two of the snails into Hawai'i in her suitcase and released them into her garden. Around the same time a man in Maui had these snails mailed to him to use for making medicine. The snails arrived about 20 years before the first cases of rat lungworm disease were diagnosed in

Hawaii. The rat lungworm parasite is now reported to be established in 30 countries around the world, which include:

- China (including Taiwan and Hong Kong)
- Tahiti
- USA
- Cuba
- Brazil
- Ecuador
- St. Kitts
- New Caledonia
- Japan
- Australia
- Vanuatu
- India
- Vietnam, (and probably Laos)
- Costa Rica
- Madagascar (and Mayotte and Reunion Island)
- Egypt
- South Africa
- Nigeria
- Sri Lanka
- Cambodia
- Samoa
- Fiji
- Indonesia
- Jamaica
- Marshall Islands
- Canary Islands (Spain)
- Malaysia

The first human cases of rat lungworm disease (angiostrongyliasis) in Hawai'i were reported on Oahu in 1959 and 1960 in two Filipino men. There surely have been cases since that time in Hawai'i, but a noticeable increase in cases of angiostrongyliasis began around the turn of the millennium (2001), particularly on Hawai'i Island, however recently there has been an increase of human cases on Maui as well. The rat lungworm can be found on all of the main Hawaiian Islands, possibly with the exception of Lana'i. There has been one human case recorded in Louisiana, three cases in Texas, and a recent case in Tennessee, but Hawai'i by far has had the greatest number of cases of angiostrongyliasis (rat lungworm disease).

Student Activities:

Students can work in teams of 2-4.

- Locate the countries where the rat lungworm parasite is found. If your school has an ArcGIS online account students can pin and label the countries. Using research skills, determine the climate of each of the countries.
- Locate the states/territories in the USA where the parasite is found. Pin and determine the climate of each of the areas.
- Make predictions as to where you think the parasite may spread, based on climate and weather conditions.
- Make an argument as to whether the rat lungworm parasite was spread by rats or snails. Support your argument with evidence.

This material is written by Kathleen Howe and produced by the Hawaii Island Rat Lungworm Working Group with funding from the Hawaii Invasive Species Council and support from the Daniel K. Inouye College of Pharmacy. Photo credits: K. Howe, Jarvi Lab.