

BIISC
23 E. Kawili St.
Hilo, HI 96720
(808) 933-3340
biisc@hawaii.edu
www.biisc.org



LATE

RE: SB3097 Relating to Rat Lungworm Disease

Aloha,

I am writing on behalf of the Big Island Invasive Species Committee to express the Committee's support for SB3097, allocating resources for research into angiostrongylosis (rat lungworm disease) to the UH-Hilo team.

The rat lungworm parasite is a serious threat to both our health and our economy. Primarily carried through the activity of two common invasive species, rats and slugs, the parasite has caused debilitating illness, pain, and even death for some of our community members, making it a priority for public health.

We are very concerned by the potential from transmission of the parasite in catchment water. Not only are many of our island's residents on catchment, with no alternative water source, many of our farmers depend on catchment to irrigate their crops. As the semi-slug continues to expand its range on the Big Island, more of our agricultural regions are at risk from invasion, threatening the safety and viability of Big Island agriculture.

We have seen the work being done at College of Pharmacy to investigate rat lungworm and are very impressed with the efforts of Dr. Sue Jarvi and her team. BIISC has committed to working with the Rat Lungworm working group on outreach and education efforts in any way that we can. We depend on this working group to provide us with the information, education and materials we need to promote a message of safety and health in our community, and so we ask that the necessary funding be put in place to ensure that this effort is maximized.

Mahalo for your consideration,

Franny Kinslow Brewer
Communications Director

LATE

SB-3097-SD-1

Submitted on: 2/20/2018 10:48:03 AM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Susan I Jarvi	Individual	Support	No

Comments:

Testimony Presented Before the Committee on Ways and Means

Wednesday 2/21/18

SB3097 - Relating to RAT LUNGWORM DISEASE

Chair Dela Cruz, Vice Chair Keith-Agaran and members of the Committee,

My name is Dr. Susan Jarvi and I am a Professor in the Department of Pharmaceutical Sciences at the University of Hawaii at Hilo, Daniel K. Inouye College of Pharmacy. My lab has been the lead in rat lungworm education and research for the past 6 years in the state. I am speaking as a concerned individual in strong support of SB3097 Relating to Rat Lungworm Disease (RLWD).

Hawaii is the epicenter RLWD (angiostrongyliasis) in the United States, and is among the most serious threats to human health of all diseases carried by wildlife in Hawaii. Most infections are presumed to be due to the ingestion of infected slugs or snails on fresh produce or possibly from untreated catchment water (see Howe and Jarvi ,2017; Jarvi et al., 2018 for review). The nematode reproduces in rats and develops in slugs and snails. Although most human cases have originated in east Hawaii Island, there have been cases reported on all of the major Hawaiian Islands, including a recent outbreak on Maui. Why so many cases originate on Hawaii Island is unclear and a better understanding of disease transmission, basic biology, diagnostics, treatment, and long term effects is needed. Thus, funding is requested to address these issues.

My lab recently completed a study to isolate adult RLW from the hearts and lungs of rats to develop a blood-based diagnostic and also to estimate infection rates in rats trapped in the Hilo area (Jarvi et al., 2017). Of 545 rats captured, 94% of them were

positive for RLW parasites. This is the highest reported rate in the country and likely the world. Hawaii has likely been exporting RLW with rats jumping on and off ships. During this experiment we observed that older black rats appear to have a mechanism to limit development of larvae to reproducing adults. This was not seen in the young black rats or the Polynesian rats of any age. This means that in the management of rats, killing large numbers of black rats might result in more young black rats moving into that vacated area, which might actually increase transmission. Another option is to determine the effectiveness of deworming rats to reduce transmission. With adequate funding, this could be done in collaboration with USDA-APHIS and others.

Funding is also needed to determine which approved vegetable washes or solutions are most effective at killing larvae so people can better wash their produce, and continue to eat local and fresh produce safely. East Hawaii has the highest use of catchment water in the state. We need to know if the infective stage of the larvae can be detected in catchment water and the best practices for treating catchment water. We have already demonstrated that infective stage RLW larvae can live in rainwater for many weeks. We also would like to test the effectiveness of UV light as used in catchment systems on killing RLW parasites. Lastly, we are testing multiple anti-parasitic drugs on different stages of RLW larvae that develop in humans. All of these studies require an assay to be able to determine that the larvae are truly dead and therefore not infective. We have worked out a differential staining method that appears to distinguish live from dead larvae but we now need to validate this assay in rats. We received \$16,000 in contingency funding from the Hawaii County Council to pay a technician for 2 months and buy supplies and rats to run this trial with USDA-APHIS. Additional funding is requested to then run the other three studies.

We have completed an antibody-based study to estimate exposure to RLW in 435 volunteers most from east Hawaii Island with our Thailand collaborators (Jarvi et al., ms. In prep). We are currently in the process of isolating proteins from Hawaii isolates of RLW to use as antigen in another diagnostic study. Funding is needed to expand this serological study to include multiple areas on Hawaii Island, as well as statewide. We have successfully detected RLW DNA in the blood of infected rats (Jarvi et al., 2015). We request funding to continue to investigate other avenues for diagnosis of angiostrongyliasis.

RLWD impacts the people of Hawaii and its visitors, it impacts public health as a global emerging infectious disease, it impacts agriculture through the loss of public confidence in locally grown produce, and it puts food self-sufficiency and food security (especially with the Farm to School Bill) for all of Hawaii at risk. RLWD has already caused multiple deaths; many victims suffer long-term disability

Our research group has already built a strong research and educational foundation with which to carry out these studies. We are poised to provide the research and curriculum-based educational efforts needed to truly begin to prevent rat lungworm disease in Hawaii and elsewhere. The state of Hawaii needs to take immediate action. Collaboration between UHH, UHM, DOH, DLNR, DOA and the Task Force is needed to develop a statewide plan for effective control of RLW parasites. Please support SB3097 with full, necessary funding.

References:

Jarvi SI, Howe K, Macomber P. Angiostrongyliasis or Rat Lungworm Disease: A Perspective from Hawaii. 2018. Current Tropical Medicine Reports. <https://doi.org/10.1007/s40475-018-0132-z>

Howe K, and Jarvi SI. 2017. Angiostrongyliasis (Rat Lungworm Disease): Viewpoints from Hawaii Island. ACS Chemical Neuroscience. DOI: 10.1021/acscemneuro.7b00299.

Jarvi, SI. Quarta, S, Jacquier S, Howe K, Bicakci D, DaSalla C, Lovesy N, Snook K, McHugh R, Niebuhr C. 2017. High prevalence of *Angiostrongylus cantonensis* (rat lungworm) on eastern Hawaii Island: a closer look at life cycle traits and patterns of infection in wild rats (*Rattus* spp). PLoS ONE 12(12): e0189458. <https://doi.org/10.1371/journal.pone.0189458>

Jarvi, S.I., Pitt WC, Farias MEM, Shiels L, Severino M, Howe K, Jacquier S, Shiels AB, Amano K, Luiz B, Maher D, Allison M, Holtquist Z, Scheibelhut N. 2015. Detection of *Angiostrongylus cantonensis* in the blood and peripheral tissues of wild Hawaiian rats (*Rattus rattus*) by a quantitative PCR (qPCR) assay. PLOS ONE DOI:10.1371/journal.pone.0123064 April 24, 2015.

Jarvi S.I., Farias, M.E.M., Howe, K., Jacquier, S., Hollingsworth, R. & Pitt, W. 2012. Quantitative PCR estimates *Angiostrongylus cantonensis* infection levels in semi-slugs (*Parmarion martensi*). *Molecular and Biochemical Parasitology* 185: 174-176.

LATE

SB-3097-SD-1

Submitted on: 2/20/2018 11:54:20 AM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Steven Jacquier	Individual	Support	No

Comments:

The voters want this and are fed up with corrupt members of the legislature pulling stunts such as raising the amount but switching the recipient to the incompetent do-nothing flacks at Dept of Health. Enough with the nepotism! This issue warrants serious research by the most competent scientists in the state, with actual peer-reviewed publications and extensive experience in this specific area, and that is Dr. Susan Jarvi and her team.

LATE

SB-3097-SD-1

Submitted on: 2/20/2018 1:05:05 PM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Doran Vaughan	Individual	Support	No

Comments:

Please support SB 3097 which appropriates funds for rat lungworm research at UHH, School of Pharmacy.

LATE

SB-3097-SD-1

Submitted on: 2/20/2018 1:48:50 PM
Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Lisa Kaluna	Individual	Support	No

Comments:

Aloha,

I am writing in support of SB3097 for full funding to be directed to the UH Hilo Daniel K. Inouye College of Pharmacy Rat Lungworm Research Lab under the direction of Dr. Susan Jarvi. To be clear, my support is solely for the funding to go to this institution and no other research, educational, or health institution.

My husband was born and raised in the Puna district. 90% of our family and closest friends live in East Hawaii. EVERYONE we know that lives here, knows someone who contracted a very severe case of RLWD. People are scared and they are taking drastic measures to try and protect themselves and their families. Self diagnosing and subsequent self medicating with drugs from local farm supply stores is more common than you can imagine (no we don't advocate for this, but we regularly hear stories). As Hawaii State Legislatures, if do not personally know a victim of RLWD (a severe case), please take the time to find and talk with someone about their experience and how it has altered their life before you cast your vote on this bill. While there are many mild and moderate cases that do fully recover, the devastation people face who contract a very severe case is horrific. We cannot let our people and our community suffer like this. Please, do not wait until this disease comes knocking on your doorstep. Please vote in support for full funding Rat Lungworm Research at the UH Hilo Daniel K. Inouye College of Pharmacy.

Thank you for your time and consideration,

Lisa M. Kaluna

LATE

SB-3097-SD-1

Submitted on: 2/20/2018 7:16:18 PM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Rob Guzman	Individual	Support	No

Comments:

Quite simply, we need more research into rat lung worm disease. Having seen the effects of it on a friend who is permanently disabled, I am aware of how awful the disease can be. Having made international news in the past year, due to cases on Maui, it is important that the legislature address this disease before it further impacts residents, visitors, and our economy.

Robert Guzman, MPH

LATE

SB-3097-SD-1

Submitted on: 2/20/2018 11:57:47 PM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
rogelio marasigan	Individual	Support	No

Comments:

I would like to support Dr. Susan Jarvi and her research team. I personally volunteered my time at the UH-Hilo Pharmacy laboratory. Steven Jacquier is kind enough to open it doors to any students or public inquirers. I have observed the earnest effort the team puts forth in rat lung worm research. I also carried out work with the team zealously. I found that rat lungworm is an alarming disease and since has spread more through out the island from when I last worked with the team during my undergraduate year in 2013. Please support this team in their endeavors, their diligent work not only consists in lab but also reaching out to the community i.e. elementary school, high school, and Hawaii Community College lectures providing graphic books and brochures supplemented with education material on rat lungworm.

LATE

SB-3097-SD-1

Submitted on: 2/21/2018 7:04:22 AM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
M. Kathleen Howe	Individual	Support	No

Comments:

I support SB 3097. Research is needed to provide answers to this complex and pressing problem. The University of Hawaii at Hilo leads the nation in research on angiostrongyliasis and funding for research should be directed to UHH.

LATE

SB-3097-SD-1

Submitted on: 2/21/2018 9:45:49 AM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Jade Miyashiro	Individual	Support	No

Comments:

There needs to be more done about the rat lung worm/semi slug problem. Giving money to the Dept of Health has done nothing. All they've done is outreach, when the money needs to be going into research for a cure or a test. Something that will be able to help people.

LATE

SB-3097-SD-1

Submitted on: 2/21/2018 9:51:01 AM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Franny Brewer	Individual	Support	No

Comments:

This bill is critical to public health on our island. For the sake of all of our residents and visitors, please pass this critical measure!

LATE

SB-3097-SD-1

Submitted on: 2/21/2018 9:52:48 AM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Kawehi Lopez	Individual	Support	No

Comments:

I support this bill because my home is being plagued by the semi slug and rat lung worm disease is negatively affecting many people's lives on the Big Island. I have seen first-hand how this disease changes a person's life and no one should have to go through the pain and agony that RLWD causes individuals and their families. Furthermore, many Hawai'i Island agricultural operations are suffering because people simply choose to not eat locally grown food. We need more research to be done that will help the people of the Big Island and the rest of the State. Considering the amount of people that live on water catchment systems here on Hawai'i Island it is imperative that research be conducted to minimize the risk of contracting RLWD through those systems.

LATE

SB-3097-SD-1

Submitted on: 2/21/2018 9:57:52 AM

Testimony for WAM on 2/21/2018 10:10:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Molly Murphy	Individual	Support	No

Comments:

Outreach by the Department of Health is inefficient, especially when they are using the money for Denge outreach. I don't want bottles of free bug spray, I want answers! As a resident of Puna, this matter is of extreme importance to me. The University of Hawaii had real answers.... until they ran out of money! How long does the larva live in a water catchment, what water filters will keep the larva from my home, how long do I wash my veggies for, what soap do I use, how long will my in-home filters last, is washing alone enough to ensure my food is RLW bacteria free, is it coming from my water catchment tank? The public outreach campaign by the Department of Health telling the public that washing your produce is enough is a lawsuit waiting to happen. I want to see real research testing the DoH's theory of washing for 3 to 5 minutes is enough. Also, why isn't the DoH researching here in Puna where most of the cases have occurred. Mahalo!