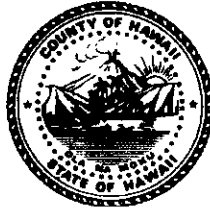


Harry Kim
Mayor



Wil Okabe
Managing Director

Barbara J. Kossow
Deputy Managing Director

County of Hawai'i
Office of the Mayor

25 Aupuni Street, Suite 2603 • Hilo, Hawai'i 96720 • (808) 961-8211 • Fax (808) 961-6553
KONA. 74-5044 Ane Keohokalole Hwy, Bldg. C • Kailua-Kona, Hawai'i 96740
(808) 323-4444 • Fax (808) 323-4440

March 20, 2017

Rep. Angus L.K. McKelvey, Chair
Committee on Higher Education
Hawai'i State Capitol
Honolulu, HI 96813

Dear Chair McKelvey and Members:

RE: SB 272 SD 2 HD 1
Relating to Rat Lungworm Disease

SB 272, SD2, HD1 says that rat lungworm disease has stricken more than 70 people in the State, claiming lives and causing grave disabilities. While primarily affecting the Big Island, it has now been identified on Maui as well.

Although the disease is not well known, it has devastating effects on its victims. One can only hope that we can get a handle on this disease before it destroys more lives.

Fortunately, our University is willing and able to assist with research and education, but substantial funding is needed to support its efforts. We certainly believe that such an investment of state dollars is warranted.

Please approve funding for SB 272, SD2, HD1.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Harry Kim".

Harry Kim
Mayor



UNIVERSITY OF HAWAII SYSTEM

Legislative Testimony

Testimony Presented Before the
House Committee on Higher Education
March 21, 2017 at 2:02 p.m.

by
Donald O. Straney
Chancellor, University of Hawai'i at Hilo

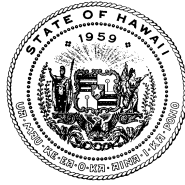
SB 272 SD2 HD1 – RELATING TO RAT LUNGWORM DISEASE

Chair McKelvey, Vice Chair Hashem, and Members of the Committee:

My name is Donald Straney, Chancellor of the University of Hawai'i at Hilo and I support the intent of SB 272 SD2 HD1 to fund programs, studies and activities to prevent and eradicate rat lungworm disease.

UH Hilo views the proposal as a positive solution to address a critical health issue in the state.

Thank you for the opportunity to testify on SB 272 SD2 HD1. Aloha.



STATE OF HAWAII
DEPARTMENT OF HEALTH
P. O. Box 3378
Honolulu, HI 96801-3378
doh.testimony@doh.hawaii.gov

**Testimony COMMENTING on S.B. 272, S.D. 2, H.D. 1
RELATING TO RAT LUNGWORM DISEASE
REPRESENTATIVE ANGUS L.K. McKELVEY, CHAIR
HOUSE COMMITTEE ON HIGHER EDUCATION**

Hearing Date: March 21, 2017

Room Number: 309

1 **Fiscal Implications:** The Department of Health appreciates the intent of S.B. 272, S.D. 2, H.D.
2 1, but defers to the priorities set forth in the Executive Biennium Budget.

3 **Department Testimony:** This measure seeks to appropriate funds in the 2017–18 and 2018–19
4 fiscal period (2 years) to the University of Hawaii at Hilo for programs, studies, and activities
5 related to the prevention and eradication of rat lungworm disease. This measure also provides
6 that the University of Hawaii at Hilo shall collaborate with the Department of Health,
7 Department of Land and Natural Resources, Department of Agriculture, and the Governor’s Joint
8 Rat Lungworm Task Force, to create a statewide plan for the prevention and eradication of rat
9 lungworm disease.

10 The Department of Health concurs with and supports the consensus of the Joint Rat Lungworm
11 Task Force, which is that outreach and education are essential priorities in addressing the risk of
12 angiostrongyliasis in Hawaii’s communities.

13 In addition to educational activities conducted during the investigation of reported cases of
14 angiostrongyliasis illness, DOH efforts, in conjunction with partners, have included statewide
15 school garden food safety workshops and the distribution of flyers to at-risk communities as well
16 as commercial food establishments. We welcome the opportunity to continue our work with
17 partners to improve public health education and prevention of this serious disease.

18 Thank you for the opportunity to testify.

DAVID Y. IGE
GOVERNOR OF
HAWAII



SUZANNE D. CASE
CHAIRPERSON
BOARD OF LAND AND NATURAL RESOURCES
COMMISSION ON WATER RESOURCE MANAGEMENT

KEKOA KALUHIWA
FIRST DEPUTY

JEFFREY T. PEARSON, P.E.
DEPUTY DIRECTOR - WATER

AQUATIC RESOURCES
BOATING AND OCEAN RECREATION
BUREAU OF CONVEYANCES
COMMISSION ON WATER RESOURCE MANAGEMENT
CONSERVATION AND COASTAL LANDS
CONSERVATION AND RESOURCES ENFORCEMENT
ENGINEERING
FORESTRY AND WILDLIFE
HISTORIC PRESERVATION
KAHOOLAWE ISLAND RESERVE COMMISSION
LAND
STATE PARKS

STATE OF HAWAII
DEPARTMENT OF LAND AND NATURAL RESOURCES

POST OFFICE BOX 621
HONOLULU, HAWAII 96809

Testimony of
SUZANNE D. CASE
Chairperson

Before the House Committee on
HIGHER EDUCATION

Tuesday, March 21, 2017
2:02 PM
State Capitol, Conference Room 309

In consideration of
SENATE BILL 272, SENATE DRAFT 2, HOUSE DRAFT 1
RELATING TO RAT LUNGWORM DISEASE

Senate Bill 272, Senate Draft 2, House Draft 1 proposes to appropriate funds to support research, control, and outreach activities relating to rat lungworm disease. **The Department of Land and Natural Resources (Department) supports this measure provided that its passage does not replace or adversely impact priorities indicated in the Executive Budget request.**

The Department recognizes the threat of rat lungworm disease and the lack of information on statewide distribution of the parasite *Angiostrongylus cantonensis* and its hosts. The Department also notes that the Hawaii Invasive Species Council (HISC), which is administered by the Department, received proposals for research and education regarding this disease in Fiscal Year (FY)16 and FY17 but was unable to identify adequate resources to support all of these efforts. In FY17 the HISC is providing partial funding support to a project developing outreach programs and materials regarding rat lungworm disease under the direction of the University of Hawaii at Hilo. Additional funding support for a more comprehensive research, control, and outreach program, as described in this measure, would be strongly beneficial. The Department supports this measure, provided that the appropriations described therein do not impact appropriations to the HISC or other priorities indicated in the Executive Budget request.

The Department notes that Senate Draft 1 streamlined funding to the University of Hawaii at Hilo for the implementation of tasks described in the measure, and is supportive of this approach.

Thank you for the opportunity to comment on this measure.

DAVID Y. IGE
Governor

SHAN S. TSUTSUI
Lt. Governor



State of Hawaii
DEPARTMENT OF AGRICULTURE
1428 South King Street
Honolulu, Hawaii 96814-2512
Phone: (808) 973-9600 FAX: (808) 973-9613

SCOTT E. ENRIGHT
Chairperson, Board of Agriculture

PHYLLIS SHIMABUKURO-GEISER
Deputy to the Chairperson

**TESTIMONY OF SCOTT E. ENRIGHT
CHAIRPERSON, BOARD OF AGRICULTURE**

BEFORE THE HOUSE COMMITTEE ON HIGHER EDUCATION

**MARCH 21, 2017
2:02 P.M.
CONFERENCE ROOM 309**

**SENATE BILL NO. 272 SD2 HD1
RELATING TO RAT LUNGWORM DISEASE**

Chairperson McKelvey and Members of the Committee:

Thank for the opportunity to testify on Senate Bill No. 272 SD2 HD1, relating to rat lungworm disease. The Department supports the intent of this measure provided it does not impact the Department's priorities submitted in the Executive Budget.

Rat lungworm disease is a serious and relatively new pathogen to plague the consumption of fresh produce grown in the islands. There is a great need to conduct research into the biology of the carriers of the disease, the ways in which it can be spread, outreach to the public in understanding the condition, and methods that can be employed to control and/or contain it.

The department supports the intent of SB272 provided it is funded at a level in which research can be conducted and carried out to achieve implementation of prevention measures. It is especially critical that Integrated Pest Management practices can be identified that minimize the use of chemicals and employ a variety of management techniques that will provide long term control of the pathogen. Outreach is an especially critical component of any IPM tactics. The more that the public understands the hazards of the disease, the less of a public health issue it will become. As noted in the bill, the medical expenses associated with contracting the disease can run into the millions. Research dollars spent in developing long term and effective



Page 2

management programs are minor compared to the expected medical bill associated with those who contract the illness.

Thank you for the opportunity to testify on this measure.



7370 Kuamo'o Road • Kapa'a • Hawaii • 96746 • 808-821-1490 • www.kauaiisc.org

March 20, 2017

Testimony of Bill Lucey – Kauai Invasive Species Committee

Supporting SB 272 SD2 HD1

House Committee on Higher Education

Chair: Rep. Angus L.K. McKelvey & Vice Chair: Rep. Mark J. Hashem

Tuesday, March 21, 2017, 2:02, Room 309

The Kauai Invasive Species committee **supports** SB 272 SD2 HD1 which would allocate funding to the University of Hawaii at Hilo for programs, studies, and activities related to the prevention and eradication of rat lungworm disease.

The Kauai Invasive Species Committee is currently supporting a CTHAR led project looking at the prevalence of rat lung worm disease across the landscape of Kauai. This project will only tell us where the disease may be concentrated. There is a larger need to identify methods for prevention and ultimately eradication of this human pathogen which this bill addresses. As invasive species managers we rely on a steady flow of new research to inform our decisions so that we can attain the best use of our resources to help solve these problems for the public.

Sincerely,

Bill Lucey
Project Manager
Kauai Invasive Species Committee
RCUH – PCSU - University of Hawaii



Coordinated through The Kohala Center

TESTIMONY

House Committee on Higher Education
March 21, 2017, 2:02 p.m.

Island Networks & Organizations

- Farm to Keiki (Preschool)
- FoodCorps Hawai'i
- Grow Some Good
- Hawai'i Island School Garden Network/The Kohala Center
- 'Iolani School
- Ka Ohana O Na Pua
- Kaua'i School Garden Network/Malama Kaua'i
- Kōkua Hawai'i Foundation ('ĀINA In Schools)
- Maui School Garden Network
- Moloka'i School Garden Network/Sustainable Moloka'i
- O'ahu Farm to School Network

State Agencies

- Hawai'i Department of Agriculture: Farm to School Program
- Hawai'i Department of Education: Hawai'i Child Nutrition Programs
- Hawai'i Department of Education: School Food Services Branch
- Hawai'i Department of Health: Healthy Hawai'i Initiative
- UH CTAHR Master Gardeners

SB272 SD2 HD1: RELATING TO RAT LUNGWORM DISEASE

Chair McKelvey, Vice Chair Hashem, and Members of the Committee,

The Hawai'i Farm to School and School Garden Hui **supports SB272 SD2 HD1.**

Rat Lungworm Disease (RLWD) is an issue that can no longer be ignored in Hawai'i. There is a desperate need for funding, research, monitoring/control, and educational outreach dedicated to this disastrously debilitating disease, so that there are ZERO cases going forward.

The Hawai'i Farm to School and School Garden Hui stands ready to assist with educational outreach to Hawai'i's students and schools.

We have created a School Garden Safety Manual, which includes information on RLWD, and are holding workshops around the state to bring this information to educators. The manual is available online via The Kohala Center's website under Farm to School Resources (link to School Garden Safety Manual: https://drive.google.com/file/d/0B_Qw59RHMj_QR3dZQ3o5UXYxWWc/view).

Formed in 2010, the Hawai'i Farm to School and School Garden Hui is a statewide network comprised of five island-level networks, active organizations, and representatives of the Hawai'i Departments of Agriculture, Education, and Health. Our mission is to strengthen Hawai'i's statewide farm to school and school garden movement.

Please pass this bill to enable the ERADICATION of RLWD in Hawai'i.

Thank you very much.

Sincerely,

Lydi Morgan Bernal
Coordinator
Hawai'i Farm to School and School Garden Hui
schoolgardenhui@kohalacenter.org
www.hawaiischoolgardenhui.org

Testimony Presented Before the
Committee on Higher Education
Tuesday March 21, 2017 2:00 pm

SB 272 SD2 / HB 474 - RELATING TO RAT LUNGWORM DISEASE

Chair McKelvey and Vice Chair Hashem and members of the Committee on Higher Education,

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 5 years in the state.

I am speaking as a concerned individual in strong support of SB 272 SD2 / HB 474 Relating to Rat Lungworm Disease (RLWD).

Hawaii is the epicenter for rat lungworm disease (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. 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. Why so many cases originate on Hawaii Island is unclear. Thus, funding is needed to address this grave issue.

Rat lungworm is a preventable disease, but only if one is informed about it. A significant component of this bill is geared toward prevention through education. My lab (largely through the efforts of Kay Howe) has been the first in the US, and in the world, to develop and implement curriculum to educate our keiki, who can then educate their `ohana on how to best prevent RLWD. While this RLWD curriculum currently only involves 5 schools on Hawaii Island, funding is needed to develop this into a statewide program available for all keiki (especially those in schools with school garden programs). Funding is needed for tracking the spread of highly infected slugs throughout the islands and pinpoint areas of high transmission which could then be targeted for control. We could also run experiments necessary to evaluate the possibility of using rat baits containing anti-parasitic drugs to deworm rats and break the disease cycle.

Funding is also needed to determine which approved vegetable washes 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 as we have found that infective stage RLW larvae can live in rainwater for many weeks.

RLWD has already caused multiple deaths; many victims suffer long-term disability.

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.

Our research group has already built a strong research and education foundation with which to carry out these studies – with relatively very little funding. We are poised to provide the research and educational efforts needed to truly begin to prevent rat lungworm disease in Hawaii and elsewhere. The state of Hawaii needs to take immediate action. Please support SB 272 SD2 / HB 474 with full, necessary funding.

From: Kathleen Howe

Regarding: SB 272 – Relating to Rat Lungworm Disease

Aloha Chairman McKelvey and members of the House Higher Education Committee,

My name is Kathleen Howe, I am a member of the Hawaii Island Rat Lungworm Working Group at the University of Hawaii, Daniel K. Inouye College of Pharmacy. I am testifying in support of SB 272. I have been researching and conducting education outreach on the rat lungworm since 2011. I have been passionate about the disease this parasite causes since 2008, when my son was hospitalized with rat lungworm disease. He spent 3 months in a coma, and four months in the hospital. I have spent the past 8 years helping him to recover. He will always have neurological disabilities because of his infection.

Annual cases of rat lungworm disease continue to be reported and serious cases have resulted in death and permanent disability in Hawaii. There is an urgent need for more research to aid in better understanding the possible disease transmission pathways so infections be prevented. Host control of both rats, and slugs and snails is key if we are to reduce parasite populations in areas of high infection.

In 2009 the *Increased Food Security and Food Self-sufficiency Strategy* was prepared by state agencies with the objective of increasing the amount of locally grown food consumed by Hawaii's residents. The public has shown avid interest in supporting local food production and proof of support can be seen in the growing number of farmers' markets, grocery stores, and restaurants selling locally grown produce and products. As the interest in the local food movement has grown so has the support for school garden projects. Each of the main Hawaiian Islands now has a school garden hui and there are an estimated 200 school and youth gardens in the State of Hawaii, with almost 70 of these located on Hawaii Island. To further promote healthy diets and local agriculture, in 2015 the Hawaii Farm to School Bill, a program intended to introduce students to healthier eating habits by introducing them to new vegetables and fruits that are procured from local farmers, was signed into law. While public support of the local food movement has grown, efforts to control the spread of the rat lungworm parasite and its hosts, and to educate the general public of risks and disease prevention has not followed a similar trend.

To date there have been no concerted efforts made by any Hawaii county or state agency to control the spread of the rat lungworm parasite in mollusks and rats, nor has there been a public education campaign to encourage residents to control these hosts. The hosts of the rat lungworm are also agricultural pests, some of which are listed among the top 100 worst invasive species in the world and include the rat (*Rattus rattus*) the flatworm, *Platydemous manokwari*, and the snails *Achatina fulica* and *Euglandina rosea*. Without control efforts in place, the rat lungworm parasite and its hosts could pose a direct threat to agricultural production, food safety, and food security in Hawaii.

During dry conditions slugs and snails may be drawn to water sources. Residents, tank

cleaners, and myself have seen slugs and snails on and inside rainwater catchment tanks, and catchment may be a variable of interest when considering the factors that may be causing higher disease incidence on Hawaii Island, which has a high percentage of households that rely on rainwater catchment for their household water supply. My studies at UHH have shown that drowned semi-slugs, one of the most effective carriers of the rat lungworm parasite, can shed many infective stage larvae when drowned. Rainwater catchment use is not only confined to residential use, it is also used for agriculture on Hawaii Island, and it is unknown to what degree agricultural-use catchment water is filtered, if at all. During my research studies at UHH I examined an infected New Guinea flatworm. When the planarian died after several days it rapidly decomposed into a puddle of dirty-looking water which still contained live, infective-stage rat lungworm larvae. The remnants of infected tissue from a decomposed slug, snail, or flatworm could contaminate leafy greens and the microscopic parasites would be missed even if the produce was examined for evidence of the host organism. Knowing the ability of the larvae to survive outside the dead slug, snail, or flatworm host in wet conditions, environmental exposure to the larvae in soils, puddles, etc. may be possible sources of disease transmission.

Continued islands-wide sampling should be done to determine where the “hot-spots” of infection are and where control efforts should be targeted. An education campaign is key to encourage residents to control hosts around their homes. An open and honest discussion about the issues pertaining to rat lungworm can help agencies and educational entities collaborate to develop innovative solutions for this important, community health problem. Please support SB 272 and fund the important work being done at UHH on rat lungworm disease. It is time to get this serious issue under control.

Thomas Lee Travis

930 Tahoe Blvd STE 802-387

Incline Village, Nv 89451

email: ttravis12@mac.com

mobile: (757) 639-7364

Monday, March 20, 2017

Rep. Angus L.K. McKelvey

Chairman, House Committee on Higher Education

Rep. Mark J. Hashem

Vice Chairman

Re: Testimony in support of SB 272 (Relating to Rat Lung Worm (RLW)) for the hearing scheduled at 2:02 on March 21, 2017 .

Aloha,

This letter is in strong support of SB 272.

I am writing for myself and my wife Laura. I am a retired Navy captain that served as Commanding Officer of both a Submarine and a Submarine Squadron and Laura is a retired registered nurse. At the time Laura contacted Rat Lungworm Disease, we owned a small farm on Papaya Farms Road in Lower Puna. Since she has had the disease, we have had to move from our retirement home in Hawaii, both to avoid reinfection with RLW and to reduce medical costs in dealing with RLW complications.

Summary of Lessons Learned:

- **Diagnosis of RLW is difficult and often delayed, causing risk and hardship for the patient. Often the main symptom is extreme headache with no or low fever. It is possible the underlying cause of the headache can cause death.**
- **Costs to treat RLW are similar to other major diseases.**
- **Determining the cause of infection is often difficult and despite claims by the Department of Health, no one other than the UH School of Pharmacy under Dr. Susan Jarvi is looking at each case.**
- **The career of a RLW patient suffering a moderate form of the disease will be interrupted or permanently ended.**
- **The close family or friend who cares for someone experiencing a moderate case will be unable to continue a career for some months to years. Lives will be permanently changed.**

- Some patients experience moderate to severe pain from one to several years after having the disease.
- Semi slugs, an invasive species, apparently are enabling more rapid spread of the disease.
- Animals other than humans also suffer from this parasite.
- UH School of Pharmacy has led the charge in research and understanding the disease, including establishing a post-hospitalization survivor network and including managing survivor expectations.

Background:

My wife Laura developed what experts at Hilo Medical Center classified as a “moderate” case of RLW. Her symptoms began in the Summer of 2015 and she was diagnosed on October, 2015.¹

Diagnosis of RLW followed three visits to the Emergency Room, one visit to urgent care, and three visits to a primary care physician. Hospitalization lasted about two weeks, post-hospitalization emergency room visits totaled five, health care specialists referred to numbered seven, and contact with primary care providers was daily to weekly for several months. The current health care cost (paid by our medical insurance) is over 300,000 dollars.

When we permanently retired to a farm on Papaya Farms Road in lower Puna. I personally designed the catchment and water delivery system to prevent RLW (among other dangers). Laura studied and took precautions to prevent RLW. Our precautions included thoroughly washing vegetables and carefully handling fruit. Our drinking water passed through one, ten, and thirty micron filters, as well as an ultra-violet filter. The system was also treated with chlorine. Because we did take precautions, we do not know how she contacted the parasites.

Although the Department of Health has said they investigate each case to help the survivor determine the cause, we have never been contacted.

After our own careful reconstruction and study, Laura probably got the disease from eating greens in a restaurant or from cleaning filters on the water catchment system. Many experts do not believe RLW can be spread through skin contact, but many anecdotes lead me to believe it is possible.

It appears that dozens of people have RLW and are not diagnosed. The cases diagnosed are more likely to include severe or moderate cases. Research has not established whether the severity of a RLW case is predominately a result of the number of parasites that enter the body or predominately a function of the individual body's response to the invasion of parasites. Although the number of parasites that invade

¹ Laura's symptoms during the duration of the disease included headaches, itchiness, extreme skin sensitivity and burning pain, nerve pain, double vision, loss of balance, impaired short term memory, difficulty in urination. earaches, neck pain, and hair loss.

may be important, it is possible—and in my mind likely—that the severity is determined by the response of the body after the parasites invade. If so, those that develop RLW must take extraordinary precautions to prevent additional contact with the parasites.

Laura's case of RLW has upset and redirected our lives. Personally I have had to resign or suspend support for three community groups and Laura has had to resign from the Puna Medical Center Hospital Board, I have had to spend over 20,000 dollars of personal funds for temporary lodging and travel to Honolulu to support medical care and testing, Subsequently, Laura and I have had to sell our retirement home in Hawaii and move to the Mainland.

Laura still experiences considerable nerve pain as a consequence of the disease. After a year from onset of the disease, she was able to stop use of opioid pain relievers but still requires medication.

In short, this is an awful disease with profound consequences for even those that develop "moderate" cases. I seriously doubt the accuracy of the Department of Health data on the number of cases, I believe there is a strong increase in the numbers as a dangerous invasive species (semi-slugs) spreads the disease over an ever-increasing area. Based on discussions with horse owners, I think some horses may have been killed or ruined by the disease.

Laura and I have found only two reliable sources of information on RLW on the Island of Hawaii. One is Dr. Martel at Hilo Medical Center and the other is Dr. Susan Jarvi and her team at the UH School of Pharmacy.

The time to act is now. Thank you.

/S/ Thomas Lee and Laura Gibson Travis

From: mailinglist@capitol.hawaii.gov
Sent: Sunday, March 19, 2017 11:55 PM
To: HEDtestimony
Cc: steven_jacquier@hotmail.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/19/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

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

Comments: Hawaii's local community health, visitor industry, and agricultural sector will all benefit from the much-needed work SB 272 will facilitate. Please support SB 272. Mahalo.

Please note that testimony submitted less than 24 hours prior to the hearing, improperly identified, or directed to the incorrect office, may not be posted online or distributed to the committee prior to the convening of the public hearing.

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As a speech-language pathologist on the Big Island for the past 4 and a half years, I provided direct care to several Hawaii Island residents who suffered physical and cognitive impairments as a result of eosinophilic meningitis (rat lungworm disease). The care I provide specifically involves evaluation and treatment of cognitive, communication and swallowing disorders. While there currently may not be much research on the cognitive, communication and swallowing symptoms of rat lungworm disease, my professional experience shows me none of these areas are free from the devastation of this disease. Research is needed to determine the long term effects of rat lungworm disease and also to establish the best practices in providing treatment to help people regain their lives and independence after being diagnosed with this disease.

Once rat lungworm disease affects the nervous system, weeks to months in a hospital or skilled nursing facility can be needed in order to regain enough independence to return home. Even after returning home, some suffer not only pain and physical disabilities, but also impairments in their cognition. This can result in the need for supervision and assistance to complete what were previously everyday and independent tasks such as cooking, cleaning, managing finances, and even walking to the store or driving. These disabilities have long term consequences for previously healthy people.

People diagnosed with rat lungworm disease have asked me a lot of unanswered questions including: Did they acquire the disease through food, catchment water, or a different source? How long will the symptoms last? What can they do to alleviate the symptoms? How can they treat their property to eradicate rats and slugs? How can they help others to become aware and prevent the disease from spreading? Many of these people could have prevented themselves from contracting rat lungworm disease if they were aware of the risks and dangers. Funding for outreach, education, and research can help answer these questions and prevent the spread of this disease.

Early identification of the symptoms seems to be another problem. Over the years, I've heard a similar story several times: "I went to my doctor or the emergency room 3-4 times before I was diagnosed with rat lungworm disease." Funding to help early identification is also crucial to saving and improving lives of Hawaii residents and visitors.

As long as residents of Hawaii are still contracting rat lungworm disease without awareness of the risks and dangers, there needs to be more outreach. Additional education, outreach and research is necessary because we are at risk of a more widespread problem as the numbers of cases of rat lungworm disease appear to be growing. Please support SB272 to protect our keiki, our island residents, and also our visitors to Hawaii from this devastating disease which can cause long term physical and cognitive disabilities.

Eveline Koenig MS, CCC-SLP
Speech-Language Pathologist
evekoenig@gmail.com

From: mailinglist@capitol.hawaii.gov
Sent: Sunday, March 19, 2017 10:10 PM
To: HEDtestimony
Cc: 333cory@gmail.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/19/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Cory Harden	Individual	Support	No

Comments: Aloha legislators, Please support this bill. I personally know two people who got rat lungworm. One had to move to the states for medical care. mahalo, Cory Harden

Please note that testimony submitted less than 24 hours prior to the hearing, improperly identified, or directed to the incorrect office, may not be posted online or distributed to the committee prior to the convening of the public hearing.

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From: mailinglist@capitol.hawaii.gov
Sent: Sunday, March 19, 2017 8:39 PM
To: HEDtestimony
Cc: paul@imaximus.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/19/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Paul Sean Fitzgerald	Individual	Comments Only	No

Comments: This is a very dangerous disease for our island , please provide research money for it.

Please note that testimony submitted less than 24 hours prior to the hearing, improperly identified, or directed to the incorrect office, may not be posted online or distributed to the committee prior to the convening of the public hearing.

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In January 2014, I was flown in an air ambulance from the Big Island of Hawaii to Oahu with a severe case of meningitis. I was admitted to the hospital and stayed for weeks, being stabilized while the infectious disease department tried to figure out what caused my meningitis. After several lumbar punctures, the tests finally came back confirming that I had contracted Rat Lungworm. As we began to understand what Rat Lungworm was and what causes it, we quickly narrowed down that I had more than likely digested the parasite while eating lunch at a local restaurant in Hilo.

Since, in Hilo, almost all of the restaurants and super markets buy and sell local lettuce, I realized that it was not hard to be in a high risk area to contract this parasite. What can be done to have safeguards in place to keep this parasite out of our farms and out of our food chain?

I also realized that more people have contracted this disease more than is reported as the only way to confirm meningitis is by having a lumbar puncture, which your family doctor will not be doing in an office. For example, my doctor had been giving me two sets of antibiotics to combat what he diagnosed as a flu like infection. After this treatment failed to make me better, I had to turn myself into the emergency ward and demand a lumbar puncture to confirm what we felt was meningitis. If there was a blood test to test for Rat Lungworm, you would see the actual numbers of Rat Lungworm increase on this island.

In our community, we talk to a lot of people who have the same symptoms as I have, but have not been properly diagnosed or lack health insurance to have seen a doctor. People stay sick for years and do not ever find out what has caused this illness. Since the location of the inflammation in the spinal fluid causes different side effects, it seems like it would be difficult to properly diagnose. If we had an easier way to test people for Rat Lungworm would we have an epidemic?

I have been to seminars at the University of Hilo on the topic of Rat Lungworm. The information that was gained from the University studies and also the Department of Health was minimal, with both agencies concluding their presentation stating they have no funding to do complete or future tests to help with this disease. People's lives are being completely devastated as we wait for a solution. We need our State to step up and protect the citizens and the visitors to our state.

Sincerely,

Theodore Aughe
808-982-6502
Ted.aughe@gmail.com

From: mailinglist@capitol.hawaii.gov
Sent: Sunday, March 19, 2017 4:31 PM
To: HEDtestimony
Cc: shelbyrm@hawaii.edu
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/19/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Shelby Marhoefer	Individual	Support	No

Comments: Please fund UHH for research into Rat Lungworm.

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From: mailinglist@capitol.hawaii.gov
Sent: Sunday, March 19, 2017 11:33 AM
To: HEDtestimony
Cc: helgaonmaui@yahoo.com
Subject: *Submitted testimony for SB272 on Mar 21, 2017 14:02PM*

SB272

Submitted on: 3/19/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Helga Fiederer	Individual	Support	No

Comments:

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Barry and Kris Gitelson
323-9707 Home, 936-2046 cell
alohamagic@aol.com

Aloha,

We are writing as concerned citizens in support of the upcoming SB 272. We consider Rat Lung Worm to be one of the major health problems residents of the Big Island and the state are facing. Personally we know of people who have been effected by this disease that live here and also by visitors who have contracted Rat Lung while visiting. Last year my wife was on the phone with a technical support person on the mainland who told her how she had gotten a confirmed diagnosis on the mainland from a smoothie at a Big Island restaurant. Six months later she was suffering from chronic headaches and could not reduce her pain medication. This is not the kind of publicity the state needs. Come visit paradise, get sick and maybe die from eating at a restaurant. Personally we have both quit eating raw green salads just to be safe.

Money spent on education and hopefully eradication of this insidious disease is tax dollars well spent. Please note that education should extend to restaurants and food service workers as well.

Is this a typo? It was copied from the bill on Hawaii.gov
SECTION 3. This Act shall take effect on July 31, **2150**.

Mahalo,

Barry Gitelson
Kris Gitelson

From: mailinglist@capitol.hawaii.gov
Sent: Sunday, March 19, 2017 6:39 AM
To: HEDtestimony
Cc: joshmason808@gmail.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/19/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Josh Mason	Individual	Support	No

Comments: Rat lung worm is a growing problem both for the health of the people in our community as well as for our economy. A growing number of people are suffering from the devastating effects of this parasite. This alone is reason enough to support addition research. However, the growth rate of infections is now starting to strike fear into both locals and visitors alike, which will have a growing, deleterious effect on one of our most important local economies, agriculture. This issue needs to be attacked head on, and that starts with quality research.

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From: mailinglist@capitol.hawaii.gov
Sent: Saturday, March 18, 2017 9:35 PM
To: HEDtestimony
Cc: Paularitter76@gmail.com
Subject: *Submitted testimony for SB272 on Mar 21, 2017 14:02PM*

SB272

Submitted on: 3/18/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Paula Ritter	Individual	Support	No

Comments:

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From: mailinglist@capitol.hawaii.gov
Sent: Saturday, March 18, 2017 7:30 PM
To: HEDtestimony
Cc: bobarthurs@me.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/18/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
bob Arthurs	Individual	Comments Only	No

Comments: Thank you for addressing this disease that is constantly a concern primarily contracted from the water we all drink. Rats have been identified as the primary carrier and research appears to indicate that 95 percent of all rats tested are carriers. We should hope that this legislative body devotes the same 95 percent effort into mitigating this disease. Respectfully submitted, Bob Arthurs

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From: mailinglist@capitol.hawaii.gov
Sent: Saturday, March 18, 2017 2:42 PM
To: HEDtestimony
Cc: katc31999@gmail.com
Subject: *Submitted testimony for SB272 on Mar 21, 2017 14:02PM*

SB272

Submitted on: 3/18/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Kat Culina	Individual	Support	No

Comments:

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From: mailinglist@capitol.hawaii.gov
Sent: Saturday, March 18, 2017 2:14 PM
To: HEDtestimony
Cc: wahine96779@yahoo.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/18/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Amy Halas	Individual	Support	No

Comments: Rat lungworm disease (RLWD) is a global, emerging tropical disease of growing significance in the Hawaiian Islands, particularly on Hawai'i Island, where the majority of the cases have occurred. The adverse effects and ensuing health complications of RLWD often prove be fatal. For this reason, this bill must pass in order to research this critical public health crisis and find solutions. I support this bill. Please pass Senate Bill 272. Mahalo

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From: mailinglist@capitol.hawaii.gov
Sent: Saturday, March 18, 2017 1:44 PM
To: HEDtestimony
Cc: kris@kimnkris.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/18/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Kris wilhelmsen	Individual	Support	No

Comments: I am a resident of Puna. I grow much of my vegetables. I have known two people that have contracted rat lung disease and it is devastating to them and their families. I urge the senate to approve funding to the UH for further research that might lead to treatment, if not irradiation of this disease.

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From: mailinglist@capitol.hawaii.gov
Sent: Saturday, March 18, 2017 1:42 PM
To: HEDtestimony
Cc: kimberleeannrowe@gmail.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/18/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Kim Rowe	Individual	Comments Only	No

Comments: I have a homestead, a degree from UH in Agriculture. I raise my family veggies and fruit for 5 kids. Recently I dug a huge hole in our yard, there were at least 100 semi-slugs which have taken to crawling on our screens of our house, the sliding screen door that my kids touch! I can wash my veggies and fruit, but we are all coming into contact with the semi-slug daily and my car kills a rat a week! Please fund research and monies for slug bait EVERYWHERE, SLUG BAIT EVERYWHERE...as I have no health insurance and I am afraid of rat-lungworm.

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From: mailinglist@capitol.hawaii.gov
Sent: Saturday, March 18, 2017 12:19 PM
To: HEDtestimony
Cc: Terriyork2@gmail.com
Subject: *Submitted testimony for SB272 on Mar 21, 2017 14:02PM*

SB272

Submitted on: 3/18/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Terri York	Individual	Support	No

Comments:

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From: mailinglist@capitol.hawaii.gov
Sent: Saturday, March 18, 2017 11:47 AM
To: HEDtestimony
Cc: valerie@isomedia.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/18/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Valerie Barnes	Individual	Support	No

Comments: This disease is terrifying. It may be currently only affecting Big Island, but that won't continue - it will spread. We must understand and contain it. Please support this bill.

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To:
Representative Angus McKelvey
Chair of the Senate Higher Education and the Arts committee

Re: SB272

10:57 AM, March 18, 2016

Aloha,

My name is Manabu “Mark” Kimura. I made a documentary film about rat lungworm disease and interviewed several people who have been affected by the disease (available at youtu.be/r88WNCxAjQ8). I am testifying on SB272 relating to rat lungworm disease. I am testifying in support of SB272. I volunteered to interview rat lungworm survivors and film them because when I was working for the College of Continuing Education at UH Hilo organizing public lectures by faculty members, I was amazed to see how many people showed up at the lecture by Dr. Susan Jarvi, who runs Hawaii Island Rat Lungworm Working Group. I kept track of the turnouts of all lectures for 1.5 years, and no other lecture had a tremendous turnout like that one—the large lecture room was completely full. There were so many people concerned about the disease. Since I was a well-known figure among the community at that time, I offered my help and we decided to document people’s voices. While we were visiting rat lungworm disease survivors/victims, I directly interacted with them got to hear their stories. In fact, I learned there are a lot more to this horrific disease as a social issue than official records by the department of health. Please consider watching the documentary film to hear what they have to say.

In conclusion, I am supporting SB272 because it is a real and serious social issue throughout the state of Hawaii and it needs to be addressed today.

Sincerely,

Manabu “Mark” Kimura, Ph.D.
94-608 Lumiaina St, S201
Waipahu, HI 96797
808-313-0533
mk77@cornell.edu

From: mailinglist@capitol.hawaii.gov
Sent: Friday, March 17, 2017 9:49 PM
To: HEDtestimony
Cc: doran_vaughan@yahoo.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/17/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

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

Comments: Please support SB272 which provides funding to UHH for Rat Lungworm Disease Research. This research is extremely important to the health and safety of the citizens of Hawaii as well as visitors to Hawaii. Rat Lungworm Disease threatens citizens and visitors daily with the possibility of permanent health problems and potentially death. Funding this research will enable UHH and Hawaii to identify methods for control of the spread of the disease, diagnosis and treatment of the disease, and education to the public regarding prevention and resources for treatment. Please support SB 272 with funding for research at UHH.

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From: mailinglist@capitol.hawaii.gov
Sent: Friday, March 17, 2017 5:33 PM
To: HEDtestimony
Cc: douglasperrine@yahoo.com
Subject: *Submitted testimony for SB272 on Mar 21, 2017 14:02PM*

SB272

Submitted on: 3/17/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Douglas Perrine	Individual	Support	No

Comments:

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From: mailinglist@capitol.hawaii.gov
Sent: Friday, March 17, 2017 4:20 PM
To: HEDtestimony
Cc: kaulanad@gmail.com
Subject: *Submitted testimony for SB272 on Mar 21, 2017 14:02PM*

SB272

Submitted on: 3/17/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Kaulana Dameg	Individual	Support	No

Comments:

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From: mailinglist@capitol.hawaii.gov
Sent: Monday, March 20, 2017 10:23 AM
To: HEDtestimony
Cc: lydibernal@gmail.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/20/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Lydi Morgan Bernal	Individual	Support	No

Comments: Aloha Kakou Thank you very much for hearing this bill. I am writing in strong support of SB272 SD2, Relating to Rat Lungworm Disease. I have THREE friends who contracted Rat Lungworm Disease (RLWD) within the past 1.5 years, all ages 30-40 years old. Their lives were almost completely destroyed by this disease and they now live with serious physical disabilities because of it. Two friends were a husband and wife couple (now getting divorced) living in Hilo who contracted RLWD from an under-washed head of lettuce purchased from Hilo farmers market. Another friend lives on Maui and contracted RLWD from a salad eaten at a restaurant. How did this happen? UNINFORMED food producers, food service workers, consumers, and health care providers. It's time for Hawaii to shine the light on this issue so that there are ZERO cases going forward. Please pass this bill to enable the ERADICATION of RLWD. Thank you very much!

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From: mailinglist@capitol.hawaii.gov
Sent: Monday, March 20, 2017 12:08 PM
To: HEDtestimony
Cc: keiki@hawaii.edu
Subject: *Submitted testimony for SB272 on Mar 21, 2017 14:02PM*

SB272

Submitted on: 3/20/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Keiki Kawaiaaea	Individual	Support	No

Comments:

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From: mailinglist@capitol.hawaii.gov
Sent: Monday, March 20, 2017 11:40 AM
To: HEDtestimony
Cc: hiivuta@gmail.com
Subject: *Submitted testimony for SB272 on Mar 21, 2017 14:02PM*

SB272

Submitted on: 3/20/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Hiilei Vuta	Individual	Support	No

Comments:

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From: mailinglist@capitol.hawaii.gov
Sent: Monday, March 20, 2017 11:28 AM
To: HEDtestimony
Cc: kalikoamona@gmail.com
Subject: *Submitted testimony for SB272 on Mar 21, 2017 14:02PM*

SB272

Submitted on: 3/20/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Kaliko Amona	Individual	Support	No

Comments:

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My mother was infected with rat lungworm disease on Hawai'i Island more than a decade ago, and she was interviewed as part of a film that served the purpose of spreading awareness about this horrible disease. She is permanently disabled because of this disease, and this happened more than a decade ago. Our lives have been and continue to be profoundly affected by this tragic event of her eating a home-grown salad. I am very proud of her for telling her story. This disease is drastically underreported. I know this as I have been on the ground, talking to people, and not relying on unreliable statistics that the Department of Health shares. Many people have likely gotten this disease, and never knew, and many people that had the disease never reported it because they do not have health insurance.

Why do more people not know about this horrible disease outside of Puna? Have corruption and special interests played a part? Our experience as a family has been that there has been an extremely poor government response that indicates shameful corruption. Inadequate inspections of the powerful horticultural industry's imports have led to enormous colonies of slugs and snails spreading across the Hawaiian Islands over the last decade or two, and we know that such lax regulations will lead to more diseases becoming established in Hawaii.

People are unknowingly growing their own garden greens throughout Mānoa and Palolo, and across Oahu and all islands, yet the Department of Health has shamefully ignored this problem. Meanwhile, I watched as my neighbor let his kid eat cherry tomatoes straight out of the garden where I have seen slugs.

Rat lungworm disease could happen to anybody in Hawai'i without the proper knowledge, especially those that grow their own food without knowing to take the necessary precautions. I urge you not to let this happen to yourself or your family, you will forever regret it. Please learn about rat lungworm disease and spread awareness, as the state and local governments have not done enough to protect Hawaii's people, but instead have been corrupted by powerful lobbying industries to keep these problems under the radar.

Mahalo to the people working hard to spread awareness and learn more about rat lungworm disease and those that work tirelessly to conduct research so that we can more thoroughly understand this disease that impacts our lives, communities, and agriculture.

Ryan Mudd

Lecturer: Department of Geography

University of Hawai'i at Manoa / Kapi'olani Community College.

rmudd@hawaii.edu



P.O. Box 253, Kunia, Hawai'i 96759
Phone: (808) 848-2074; Fax: (808) 848-1921
e-mail info@hfbf.org; www.hfbf.org

LATE

March 15, 2017

HEARING BEFORE THE
HOUSE COMMITTEE ON HIGHER EDUCATION

TESTIMONY ON SB 272, SD2, HD1
RELATING TO RAT LUNGWORM DISEASE

Room 309
2:02 PM

Aloha Chair McKelevy, Vice Chair Hashem, and Members of the Committee:

I am Randy Cabral, President of the Hawaii Farm Bureau (HFB). Organized since 1948, the HFB is comprised of 1,900 farm family members statewide, and serves as Hawaii's voice of agriculture to protect, advocate and advance the social, economic and educational interests of our diverse agricultural community.

Hawaii Farm Bureau supports SB 272, SD2, HD1, relating to Rat Lungworm Disease.

Providing safe and wholesome food is a priority for the Farm Bureau and its members. Unfortunately, not enough is currently known about Rat Lungworm Disease, or angiostrongyliasis, to fully protect the public. For example, although we know that people in Hawaii can get the disease by eating food contaminated by the larval stage of *A. cantonensis* worms found in raw or undercooked snails or slugs, and we know that people have also become infected by eating raw produce that contains a small infected snail or slug, or part of one, it is *not* known whether even just the slime left by infected snails and slugs is able to cause infection.

This is critical information since the disease can cause a rare type of meningitis (eosinophilic meningitis) that is extremely painful, debilitating, and can be deadly. Because there is no specific treatment for the disease, patients are only given supportive therapy and pain medication.

As more people are encouraged to grow their own food in backyard gardens, and school gardens are becoming more prevalent, the risk of being infected with this disease

increases. Nutritionists advise the public to eat plenty of fresh leafy vegetables. However, without knowing enough about the transmission of rat lungworm disease, this advice may be risky in areas infested by snails and slugs. We need to know if the slime alone can cause the disease, and if washing or other pre-consumption measures will prevent transmission. Backyard gardeners and others who may not practice pest management to effectively control snails and slugs, or those who purchase greens from these sources, may be particularly at risk.

HFB supports funding of the University of Hawaii at Hilo and their collaboration with state agencies to help learn more about the disease and to prevent the spread of it and other food-borne diseases, especially to children through school garden projects.

Thank you for the opportunity to provide testimony on this measure.

LATE

From: mailinglist@capitol.hawaii.gov
Sent: Monday, March 20, 2017 11:31 PM
To: HEDtestimony
Cc: Burdick808@gmail.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

SB272

Submitted on: 3/20/2017
Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Alan B Burdick	Progressive Democrats of Hawaii	Support	No

Comments: PROGRESSIVE DEMOCRATS OF HAWAII support SB 272, to provide funding for rat lungworm research and education. It is truly frightening to learn that some 90% of rats captured and tested show infection for lungworm. This situation is out of control! This measure will be one small step toward bringing this problem under control. Please support this bill. Thank you very much. Alan B. Burdick Chair, Progressive Democrats of Hawaii burdick808@gmail.com

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From: mailinglist@capitol.hawaii.gov
Sent: Monday, March 20, 2017 9:53 PM
To: HEDtestimony
Cc: hilo.rob@gmail.com
Subject: Submitted testimony for SB272 on Mar 21, 2017 14:02PM

LATE

SB272

Submitted on: 3/20/2017

Testimony for HED on Mar 21, 2017 14:02PM in Conference Room 309

Submitted By	Organization	Testifier Position	Present at Hearing
Robert Hollingsworth	Individual	Comments Only	No

Comments: As a private citizen, I would like to weigh in to support the bill providing funding for rat lungworm disease research. I am a researcher with USDA-ARS. I am on the Rat Lungworm Task Force put together by the governor's office. I recently led a survey of the semi-slug pest which is the most important carrier of the rat lungworm nematode. The results of this residential survey show that the semi-slug (*Parmarion martensi*) has now spread throughout the Big Island. This spread of this pest species, which climbs walls, loves plastic, ends up in pet food bowls, inside houses in sinks and on refrigerator doors is likely to increase the number of rat lungworm cases on the Big Island going forward. I know Dr. Susan Jarvi and Kay Howe and have carried out cooperative research with them. I know that they are doing a great job with very limited funds and that they need additional funding to gather critical research data. Three of the 50+ respondents to our survey reported in December 2017 that they are currently sick with rat lungworm disease (2 of the 3 contacted me from the Hilo hospital). I am aware that 3 people in Hawaii island in recent months have found semi-slugs in commercially purchased lettuce and prepared sandwiches. I strongly support the passage of this bill, which will provide funding to Dr. Jarvi's lab. Sincerely, Robert G. Hollingsworth, Ph.D. I am familiar with Dr. Jarvi's research and outreach program. I know the efforts have been severely hampered by lack of funding. I have strong first-hand evidence that the number of official cases of rat lungworm is a vast underestimate of the true number of cases. For this reason, for the good of Hawaii's citizens and their safety, I urge you to fund research into this pressing problem that I am most familiar with as a researcher. Aloha, Robert G. Hollingsworth, March 20, 2017

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Testimony Presented Before the Committee on Higher Education

Tuesday March 21, 2017 2:00 pm

SB 272 SD2 / HB 474 - RELATING TO RAT LUNGWORM DISEASE

Chair McKelvey and Vice Chair Hashem and members of the Committee on Higher Education,

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 5 years in the state. I am speaking as a concerned individual in strong support of SB 272 SD2 / HB 474 Relating to Rat Lungworm Disease (RLWD).

Rat lungworm disease (RLWD) is a global disease. The earliest cases of RLWD in Hawaii were reported in 1959, so this disease has been established for some time. More recently we have seen an increase in the number of cases occurring, many of which originate from east Hawaii Island, however cases have been reported on all main Hawaiian Islands. A couple who recently came to Hana, Maui, to get married were diagnosed with RLWD. The parasite is also detected on the mainland in Florida, Louisiana, Texas, and Oklahoma, and last year three cases of human RLWD acquired in Texas after a flood. It's not just in Hawaii, but why are we seeing such an increase in the number of cases?

My lab has been working on RLWD since 2011, and we are trying to address this question. We've completed a number of research and educational outreach projects with relatively little funding (see attached). We have provided evidence that we have a fairly high infection rate in humans, in slugs and in rats. Last year we screened people from east Hawaii for the presence of antibodies against RLW indicating they had been exposed to the parasite and 30% were positive. We've developed a molecular test to estimate the level of infection in slugs and snails and they have very high infection rates (10's of thousands), especially the semi-slug. The semi-slug was introduced to Puna ~ the turn of the millennium and has since spread across the Island. These slugs are very mobile and good climbers. That might be one reason we are seeing a high number of RLWD cases. The rats are also highly infected. Last month we captured 557 rats from the Hilo area to isolate adult rat lungworms from the hearts and lungs to develop a diagnostic. Nearly 94% of them were infected. High levels of infection! We need to monitor slug infection rates and track movement, we also need to educate the public on the best practices for slug/snail and rat control. While vector control is important we don't think vector control alone will control this disease. To drop rat infection rates, we tried a vaccine, didn't work. How about deworming rats?

Many people in east Hawaii are also on catchment. We know that slugs and snails climb into catchment tanks. Kay Howe has shown that infective stage larvae can live for weeks outside a slug host in a wet environment. It was shown 50 years ago that rats can get infected by drinking contaminated water. If rats can get infected, humans can too. We tried to see if a 20 micron filter is sufficient to block RLW larvae from entering a household water supply. It isn't, the larvae either go through or around it. Additional research is needed to evaluate catchment system design. **Strong evidence suggests that the increase in RLWD cases in Hawaii County could be related to the introduction of the semi-slug and residential and agricultural catchment use.** We have completed much of the groundwork in some of these studies and are poised to carry out these larger studies outlined in SB272 through collaborative efforts. We appreciate your support of SB 272.

Research and educational studies initiated (and some completed) to date by the Daniel K Inouye College of Pharmacy Rat Lungworm Working Group towards prevention of rat lungworm disease (RLWD). Prevention is key for healthy communities.

Objective 1- Initiated, needs funding: Conduct studies to find out where the RLW 'hotspots' are. We have developed a molecular test to estimate the number of larvae in slugs and snails and are bringing this information to the public. We hope to conduct an island or state-wide survey to determine infection levels in slugs/snails. Pinpointing areas of high infection will allow targeted control measure to be enacted. To date we have collected 198 Cuban and 282 Semi-slugs. Results are being posted on a Googlemap: <http://pharmacy.uhh.hawaii.edu/rlw/> Publication: 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.

Objective 2. Initiated, needs funding: Determine how effective various solutions are at killing RLW larvae. We have tried vinegar, hydrogen peroxide, grapefruit seed extract, neem oil, MMS (miracle mineral solution) and peppermint oil. None were effective in killing (immobilizing) RLW larvae. 15% salt solution and bleach are effective. We need to test commercially available vegetable washes and other solutions, as well as the effects of irradiation. We are optimizing a "death assay" which will allow us to definitively say L3 larvae are dead and therefore non-infective without having to do a rat study.

To kill slugs, instead of stepping on them we recommend putting them in a 'slug-jug' which contains 15% salt solution: 1 1/8 cups sea/ rock salt (or regular salt) in 1/2 gallon water. If it gets really stinky, add a little bleach. Dispose of where you don't want weeds or other plants to grow as salt will kill vegetation.

Objective 3. Initiated, needs funding: Evaluate the possibility of RLW transmission in water. ~ 30,000-60,000 people in the state of Hawaii rely on catchment water for household water; the majority are in the Puna, Ka'u, and Hamakua districts of east Hawaii. 75% of all households in Puna are not on municipal water. Several RLWD victims believe they were infected by catchment water. Nearly 50 years ago Richards and Merritt (1967) demonstrated that rats became infected by drinking RLW L3 contaminated water. **If rats can become infected by RLW contaminated water, humans likely can too.** We have demonstrated: that larvae settle to the bottom of a water column which in a catchment tank is where most intake pipes are located, that whole slugs can shed infective L3 parasites, and that larvae that went through a 20 micron metal sieve and tested positive for RLW lived at least 56 days in rainwater. **Is a 20 micron filter sufficient to keep RLW larvae out of the household water supply?** Our pilot study has shown that larvae go either through or around a 20 micron rope and a 20 micron paper filter. We need to test catchment water and evaluate the best design to minimize the likelihood of slugs/snails crawling into tanks. Collaborators: Hawaii Catchment Company
Richards, C.S., Merritt, J.W. 1967. Studies on *Angiostrongylus cantonensis* in molluscan intermediate hosts. *The Journal of Parasitology*. 53:382-388

Objective 4. Initiated, needs funding. Educate friends, family and the public. Integrate RLW education into public school system. Increase public awareness and curriculum with schools with school garden projects. Keiki can then educate their ohana and friends. The DKICP RLW Working Group has produced and distributed 10,000 copies of "The Mystery of Rat Lungworm Disease" activity book appropriate for 2nd grade students <http://pharmacy.uhh.hawaii.edu/rlw/>. The books cost ~\$2.00/book to print at the UHH Graphics Dept. We have produced and printed 8800 brochures and have distributed > 8,000. We have no funds to continue this effort. We have conducted many public lectures and informational sessions on Hawaii Island and across the state. We have completed a pilot project with five schools with school garden programs to develop management plans to control slugs and snails and

incorporate RLW into their STEM curriculum. We are currently seeking funding to develop curriculum and guidelines that will be available to all Hawaii school garden projects and eventually all Hawaii schools. This is a link to the Arc GIS Online story map of the educational pilot project and its outcomes: <https://uhh.maps.arcgis.com/apps/MapJournal/index.html?appid=5ccc2fa5cf7b441fa2711c5b60e853b6>. This is a link of the video of the educational pilot project workshop held at UHH with participating schools sharing their experiences with the project: <http://naleo.tv/rat-lungworm-disease/> We were awarded \$65,000 of a \$96,000 request to continue this educational project but this is not enough to cover personnel costs.

Collaborators: Na Wai Ola Public Charter School, Kua O Kala Public Charter School, Volcano School of the Arts and Sciences, Laupahoehoe Community Public Charter School, Kanu O Aina Public Charter School. Funding: A congressionally directed award from the DOE to DKICP for development and publication of the activity book and some brochures.

Objective 5. Work with public agencies to help develop educational materials for controlling RWL hosts in agricultural and residential settings. We have experience in developing integrated pest management plans and education materials for the general public. We would like to work with local and state agencies on development and implementation. Funding is needed.

Objectives 6 and 7 required uninfected rats, so we captured and bred wild adult rats to produce uninfected progeny. Collaborator: USDA-APHIS USDA APHIS Wildlife Services, National Wildlife Research Center, Hawaii Field Station, Hilo, Hawaii,

Objective 6. Completed. Pilot study: Determine if RLW DNA can be detected in rat blood. 15 Adult F1 rats were gavaged with either 10 larvae, 50 larvae or none (control). Parasite DNA was detected by qPCR in blood at <1 hr, 1.5 hours, 18 hours, 5 weeks and 6 weeks PI. Conclusion: RLW DNA can be detected in rat blood at certain time points throughout infection. Could it also be detected in human blood? This would be an early diagnostic test in humans but requires funding.

Funding for this study: The Daniel K. Inouye College of Pharmacy, University of Hawaii at Hilo, USDA-APHIS National Wildlife Research Center's National Wildlife Disease Program, University of Hawaii at Hilo Research Council, and a grant from the National Institute of General Medical Sciences, National Institutes of Health, award number: P20GM 103466.

Publication: Detection of *Angiostrongylus cantonensis* in the blood And peripheral tissues of wild Hawaiian rats (*Rattus rattus*) by a quantitative PCR (qPCR) assay. Jarvi et al., PLOS ONE | DOI:10.1371/journal.pone.0123064 April 24, 2015.

Objective 7. Completed. Determine efficacy of a vaccine against *A. costaricensis* to *A. cantonensis*. 21 F1 rats were vaccinated, 20 served as controls. All were subsequently live challenged with ~50 L3 stage RLW larvae. We found no significant differences between vaccinated and unvaccinated rats in spleen weight (p=0.963), spleen length (p=0.830), lung weight (p=0.830) or number of worms collected from the heart and lungs (p=0.882), suggesting the vaccine does not provide adequate protective immunity to guard against infection and development of *A. cantonensis* in wild Hawaiian rats. We are currently further evaluating immunological responses to the vaccine and/or RLW infection.

Collaborator: Antonio Osuna PhD, Director Institute of Biotechnology, University of Granada, Spain. Funding: The Hawaii Community Foundation Medical Research, USDA-APHIS and the Daniel K Inouye College of Pharmacy.

Objective 8. Conduct a pilot study to determine the extent of human rat lungworm (RLW) exposure in east Hawaii Island. Data collected, analysis in progress.

- Use ELISA and Dot-blot to test for antibodies against RLW in 435 human volunteers.
- Blood collection conducted by Puna Community Medical Center and Clinical Labs of Hawaii.
- Testing was conducted in the Jarvi Lab at the UHH DKI College of Pharmacy.

Collaborators: -Praphathip Eamsobhana PhD, Department of Parasitology, Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand, Puna Community Medical Center, Clinical Labs of Hawaii. Funding: The Hawaii Community Foundation Medical Research and the Daniel K Inouye College of Pharmacy.

Objective 9, Isolation of the 31 kDa protein from *Angiostrongylus cantonensis* from Hawaii and comparative diagnosis efficacy with the Thailand 31 kDa *A. cantonensis* protein. Study initiated. Collect adult rat lungworms from heart and lungs of rats to use a starting material to develop a reliable test. We processed 557 rats and have collected 20.15 grams of worms. Worms will be sent to CDC for protein isolation. Infection rate in rats was 93.7 %. Funded by Hawaii Community Foundation. Collaborators: CDC, USDA-APHIS, Hawaii Island DOH Vector Control.

Links to informative documentaries, interviews, a website and a petition site produced or associated with the Hawaii Island Rat Lungworm Working Group:

- We created a 54-minute documentary video of RLWD victims, Mark Kimura videographer: <https://www.facebook.com/lowerpuna/posts/486483071518532>
- RLWD wash your veggies, Mark Kimura videographer <https://www.youtube.com/watch?v=PZ2t6CnBFEQ>
- Watch "Safeguarding Hawai'i Island School Gardens Against Rat Lungworm Disease," a forum held at UH-Hilo May 2016, on our video on demand <http://naleo.tv/rat-lungworm-disease/>
- <http://www.bigislandvideonews.com/2015/04/02/video-rat-lungworm-disease-concerns-renewed/>
- <http://hawaiipublicradio.org/post/researchers-look-more-funding-rat-lung-worm-disease> HPR Wayne Yoshioka
- <http://www.lava1053.com/episode/island-issues-03-29-2015/> Lava 105.3 Sherry Bracken
- This is a link to a Beyond the Fear: a Documentary about RLWD produced by Mariful Films: https://www.youtube.com/watch?v=_cybPTbX-4
- We also launched an online petition:
- <http://www.thepetitionsite.com/529/190/532/demand-action-to-stop-rat-lungworm-disease-in-hawaii-now/>
- For more information please see the RLW Working Group website: <http://pharmacy.uhh.hawaii.edu/rlw/> includes link to 2011 Rat Lungworm Forum held at DKICP, online educational resources, FAQ's and other interesting information.

Or Contact Dr. Sue Jarvi, Professor, Department of Pharmaceutical Sciences, Daniel K Inouye College of Pharmacy, University of Hawaii at Hilo, Hilo HI. 808 932 7701, jarvi@hawaii.edu

LATE

Testimony Presented Before the
House Committee on Higher Education
Tuesday, March 21, 2017 2:00 pm

By

Carolyn Ma, Pharm D.

DEAN

UH Hilo - Daniel K. Inouye College of Pharmacy (DKICP)

SB 272, SD2, HD1 - RELATING TO RAT LUNGWORM DISEASE

Chair McKelvey, Vce Chair Hashem and members of the committee:

My name is Carolyn Ma, and I am the Dean for the Daniel K. Inouye College of Pharmacy (DKICP). The college finds this an interesting proposal and fully supports the intent of the bill to help fund programs, studies and activities to prevent and eradicate rat lungworm disease. Thank you for the opportunity to testify.

Late Testimony

Aloha Chairman McKelvey, Vice chairman Hashem, and members of the Higher Education Committee. Mahalo for scheduling this hearing. My name is Kathleen Howe, I am a member of the Hawaii Island Rat Lungworm Working Group out of the Daniel K. Inouye College of Pharmacy and I am in support of SB 272, which provides funding to UHH for research and education on rat lungworm disease.

Eight years ago today my son was still in a coma at Hilo Medical Center, a coma caused from a very serious case of rat lungworm disease. It is still difficult for me to reflect on that terrible time. The disease was like none I had ever witnessed before, the damage caused by the parasite was thorough. I have spent eight long, painful, expensive, and exhausting years helping my son recover and to this day he is still unable to have the life and employment he had before he was infected. Before my son got sick I was a teacher in Hawaii and worked in schools with agriculture and sustainability foci, however I had never heard of rat lungworm disease. I am a passionate supporter of locally grown food and food security for Hawaii. I am a teacher who has used the school garden as an avenue for place-based, project-based learning. I have had students who have had incredible opportunities offered to them because they loved the school garden. That I had never heard of a disease that one could contract by eating fresh-grown produce and could cause so much damage was unconscionable. I was outraged that I did not know about the disease, which put my students at risk. But at the time, not one scrap of evident information was available from the State of Hawaii on rat lungworm disease, how it was contracted, or how to prevent it. It is only recently, and only because of the quality information coming from the University of Hawaii at Hilo, that this is changing.

Because my son did not die I became a hotline for rat lungworm disease and was contacted by a number of friends or family members of victims. Most people I spoke with did not know how they were infected. I began to ask the question; where is the research, where is the education on rat lungworm disease in Hawaii? In 2011, after meeting Dr. Susan Jarvi at the 2nd International Rat Lungworm Workshop in Honolulu, I aligned myself with the University of Hawaii at Hilo and the Jarvi Lab to begin to provide answers to these questions. I was a UHH student from January 2012, and recently graduated in December 2016 with a Masters of Science in Tropical Conservation Biology and Environmental Science. My graduate work concentrated on two important issues. The first was to examine the potential for rat lungworm disease transmission in water, as we have a great deal of rainwater catchment use on Hawaii Island where cases of rat lungworm disease are highest. The second was to identify five partner K-12 schools on Hawaii Island and collaboratively begin to develop an integrated pest management plan for slugs and snails and accompanying curriculum for school garden projects. At this time, I am still aligned with the university, working on rat lungworm disease.

The importance of universities as research institutions cannot be understated. It is in the university setting where many of the great advancements in the fields benefitting society are made. Through research we acquire new knowledge and examine existing information by engaging in the scientific process. This process involves formulating questions and designing experiments and studies that incorporate systematic observation and data collection. We conduct statistical analysis of the data to determine the significance of the study results. With

hard evidence we can then accept, modify, or reject our hypotheses. While the end result of a study may not align with an answer we had hoped for, each study provides a significant and important component for the next study, and through these steps we hope to eventually arrive at success. To not try is the only way to fail. During my time with UHH I have been privileged to have participated in a number of studies relating to the rat lungworm parasite and rat lungworm disease, and we have made significant progress in better understanding the parasite, the parasite's hosts, and the disease by employing this process.

The decision to return to school and take on the burden of student debt, especially at my age, was difficult. But I recognize the importance of the many school garden and agriculture programs in Hawaii and I am propelled by a desire to make sure our keiki are safe. I am currently working with my partner school teachers and students to craft the integrated pest management plan for control of invasive slugs and snails for school garden and agriculture programs that will be available throughout the State of Hawaii. Along with the management plan there will be accompanying STEM curriculum that will ensure that we will grow a generation of well-informed residents who understand this food-borne illness and how to prevent it. In the process we are engaging students in hands-on, place-based learning, promoting critical thinking and the application of the scientific process. Through this engagement we are introducing students to concepts and values of higher education, and opening the doors and windows that expand their understanding of the world and the potential it holds for them.

Over the past five years, the Jarvi Lab has provided meaningful opportunities for student involvement in research and many of these students have gone on to veterinarian and medical studies. For a student to have the opportunity to be involved in this type of research can significantly help with placements in advanced educational studies and employment. Funding, as any student can tell you, is immensely helpful for success. Funding of SB 272 will allow for the hire of undergraduate, graduate, and PhD students at UHH to assist in the work on the problem of rat lungworm disease and is a win win for all involved. We have an established network of support with other organizations and agencies and are in an excellent position to make substantial progress on this important and disconcerting issue. I respectfully ask you to consider of the significant body of research and education outreach already accomplished by UHH on rat lungworm disease and fully fund SB 272 so that this excellent work can continue. Mahalo.