



DA-6412: Purpose for capital improvement and relocation of the 6.077-acre Pukalani farm and adding a water storage tank, packing station, walk-in cooler, land clearing and fencing. DC-6413 was approved in tandem to fund the purchase of a tractor and tiller.

**LOAN REQUEST & PURPOSE:**

<u>AMOUNT</u>	<u>CLASS D</u>
\$100,000	Axis Deer Emergency Loan

This request will allow emergency loan funds to be used by Maui Dragon Fruit to purchase fencing materials and labor to install an 8-foot fence around 7-acres of fee simple farmland in Pukalani, Maui.

**TERMS:**

<u>Amount</u>	Class D – Emergency Operating Loan
Amount:	\$100,000
Term:	10 years
Interest:	3.0%

Repayment: Monthly principal, and interest payments of \$956 will be required till maturity.

**SECURITY:**

This request will be secured by the following:

- First Position UCC blanket security interest and financing statement in accounts receivable, livestock, inventory, and farm equipment.

**GUARANTORS:**

Crystal Schmitt  
Lawrence Schmitt

**FINANCIAL CONDITION:**

SEE EXHIBIT A (CONFIDENTIAL)

**REPAYMENT ABILITY:**

SEE EXHIBIT A (CONFIDENTIAL)

**INSURANCE:**

Liability Insurance.

**BACKGROUND:**

Crystal Ying Schmitt was born in the People's Republic of China. She attended Tsinghua University graduating with a Bachelor of Science degree in Mechanical Engineering in 1991. She also earned an MBA in Business Administration in 2002. While working, she took an Executive Accounting Program and passed the CPA exam.

Lawrence Schmitt (spouse) was born in New York but grew up in Connecticut. He graduated in 1989 from the prestigious Rensselaer Polytechnic Institute with a Bachelor of Science degree in Mechanical Engineering then attended the University of Hawaii and earned a master's degree in mechanical engineering in 2001.

Crystal moved to Maui in 2004 and was followed by Lawrence in 2007. They married and had two daughters. Crystal initially worked as an engineer for Maui Marriot, Outrigger and then as Director of Engineering at the grand Wailea Hotel. During her free time, she would assist her mother on the vegetable farm started in 2001. Crystal would market the farm's produce to her fellow employees and to chefs at the hotels. Eventually she and Lawrence began farming full time raising baby salad greens and over time grew the business.

Maui Dragon Fruit Farm, LLC operates in 2 location on Maui. The 6.077-acre fee simple Pukalani Farm grows organic vegetables and leafy greens while the 27.528-acre fee simple Lahaina Farm grows dragon fruit, papayas, banana, and various exotic fruits. In 2018, the Lahaina farm suffered substantial damage from the Lahaina brush fires that destroyed dragon fruit crops along with irrigation and county water supply lines. The farm continues to have water issues due to a DLNR stream closure feeding the irrigation reservoir but the farm continues to successfully grow dragon fruits, banana, papayas, and exotic fruits.

The Lahaina farm includes an agri-tourism venture called Paradise Eco-Adventures, LLC (PA), that is owned by Crystal and Lawrence Schmitt as 50% / 50% member partners. The venue's revenue is used to supplements the farm's overall cash flow. During the Covid-19 pandemic however, the lack of Maui tourism forced the venture to close at a loss. Fortunately, the Pukalani and Lahaina farms with the help of federal, state and county stimulus helped the farm survive the pandemic.

During a 12/13/2022 loan servicing report inspection, Crystal reported severe axis deer damage at their Pukalani farm. The farm grows a variety of vegetables and herbs in upcountry Pukalani on Maui. The farm operates on 6.077-acres of farmland growing organic vegetables. Crystal said, during recent years the axis deer have become an increasing threat to the farm's operation. In 2022, drought conditions caused the deer to enter the farm and create substantial damage to their crops. The deer come in herds especially at night and by morning can destroy all the crops. The farm erected a 5-foot fence around the whole farm, but the deer has since started to jump over the fence in desperation as drought conditions worsened. In 2022 alone, the farm estimates crop damage to be at least \$65,000. For a while, the farm had to stop planting since it became hopeless for the crops to survive with the repeated attacks. Recently, they have extended the fence as a temporary fix to stop the deer from entering the farm, but now they acknowledge, it is time for a more long-term solution. The farm is requesting emergency axis deer funding to build a more substantial fence that will ensure the farm can operate year-round in all conditions.

**SUMMARY:**

Maui Dragon Fruit Farm, LLC's organic vegetable farm in Pukalani has been struggling with the axis deer infestation for the past few years. The deer have been roaming around the farm in the fallow areas between the farm and their neighbors' properties. The deer population increased throughout 2021 and exploded during the summer drought in 2022. They have tried to clear the fallow land and fence the boundaries between the neighbors, but the heavy brush limits the amount of fencing they are capable of installing with their limited funds. They installed a 5-foot fence but found it was not effective in stopping the larger deer from jumping the fence and eating the leafy vegetables. Crystal and Lawrence believe robust broader fencing is an important investment that will allow them to bring more food to market.

**TURNDOWNS:**

This Axis Deer Emergency Loan Program request for \$100,000 does not require a commercial loan denial.

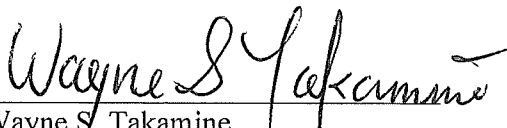
**RECOMMENDATIONS:**

Approval of this request is recommended due to the farm's financially responsible relationship with SALD, proven financial management, and knowledge of organic farming and marketing. Secondary sources of repayment offered includes a first position UCC blanket security and the personal guarantee with each farm member possessing an excellent credit history and credit score to support this emergency loan request.

Date

JAN 13 2023


Recommended by:

  
Wayne S. Takamine  
Business Loan Officer I

Date

JAN 13 2023

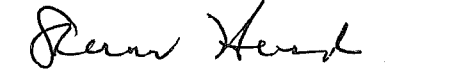
Reviewed and concurred by:

  
Morris Atta  
Acting Division Administrator

Date

1/17/23

Approved for Submission

  
Sharon Hurd  
Chairperson, Board of Agriculture



**OTHER STATE  
AGRICULTURAL  
LOANS:**

Approved	Amount	Balance	Status
8/12/2020	\$ 479,870	\$ 479,870	Current

Currently interest only, monthly. Monthly P&I payments of \$4,211 will begin on 11/01/2023.

**LOAN REQUEST  
& PURPOSE:**

<u>Amount</u>	<u>Class C - Direct Operating Loan</u>
\$ 50,000	Purchase Plants
5,000	Chemicals and fertilizers
21,000	Pots and growing media
46,000	Labor-repotting costs
10,000	Water storage tank and plumbing
<u>6,000</u>	<u>Misc. growing costs</u>
\$138,000	Total Request

The purpose of the request is to cover operating costs through the first 6 months of 2023. PFP's projections suggest the company will become cash flow positive by mid-2023.

**TERMS:**

Amount: \$138,000  
 Term: (10) Ten years  
 Interest rate: 3.75%, fixed  
 Repayment: Annual interest only payment of \$5,175 due on 01/01/2024. Thereafter, monthly principal and interest payments of One Thousand Five Hundred Seven and 49/100 (\$1,507.49) due on the first of each month until loan maturity.

**COLLATERAL:**

The Class-C loan will be secured by the following:

- A 2<sup>nd</sup> UCC security interest in crops, accounts receivable, greenhouses, and farm equipment.

A physical inventory conducted by the company on 10/30/2022 confirmed 72,536 plants in 4" pots and 7,890 plants in 2" pots.

Loan to Value:  $\frac{\$478,000 \text{ (Class D)} + \$138,000 \text{ (Proposed)}}{\$517,899 \text{ (Net Fixed Assets at 9/30/23)}} = 119\%$

The best forms of collateral to secure a loan with a high degree of credit risk is real property, cash, and/or the personal guarantee of individuals in solid financial standing.

The License Agreement with W.H. Shipman, Limited stipulates in the event PFP default in the payment of license fees and assessments, fail to observe or perform any of the covenants and agreements in the License, the Licensor may become wholly vested and own all of the right, title, and interest which PFP had in the said property, if any, including tools, equipment, and other personal property remaining on the property.

**FINANCIAL  
CONDITION:**

SEE EXHIBIT A (CONFIDENTIAL)

**REPAYMENT  
ABILITY:**

SEE EXHIBIT A (CONFIDENTIAL)

**INSURANCE:**

Liability insurance with SALD listed as certificate holder. Hazard insurance on the greenhouses.

**BACKGROUND:**

Subsequent to the Kapoho eruption of 2018 which wiped out many of the area's orchid farms, PFP was formed in an attempt to revitalize the orchid industry by starting up an Orchid Park.

PFP entered into a 20-year license agreement W.H. Shipman, Limited (Licensor) on 01/29/2020. Terms were favorable for the 6.7-acre parcel zoned agricultural located in the Keaau rock quarry. DOA's emergency loan of \$479,000 and a \$500,000 Big Island Resource and Conservation Council grant were the primary sources of capital used to start operations.



The original plan was to construct 4 acres of greenhouses with a training and packing facility. With reduced access to capital, the plan for building 8 greenhouse modules of 19,320 s.f. each fell to 3. The current inflationary environment led PFP to incur cost overruns which required tapping into operating funds set aside to cover capital expenditures.

**CREDIT HISTORY:**

Gordon Inouye's history with SALD dates back more than 20 years when he served as Chief Financial Officer and Secretary of Floral Resources Hawaii, Inc. (FRHI). He shared ownership with brother Vernon Inouye who was President. FRHI filed for voluntary Chapter 7 bankruptcy protection in 01/19/2021 in the District of Hawaii. The debtor listed an address of c/o Vernon B. Inouye 215 Paukaa Drive, Hilo and was represented by attorney Sally A. Kimura. FRHI listed assets of \$817 and debts up to \$1,166,644. The filing's largest creditor was listed as Adrienne M. Lamson with an outstanding balance of \$185,000.

On 6/17/2021, Dean Matsukawa, former SALD Administrator, approved a workout on one of FRHI's loans with Gordon. Terms called for monthly payments of \$655 for 84 months. Since approval of a workout loan does not bring the status current, said account is more than 385 days past due with a delinquent amount of \$26,838. A \$655 payment is due for 01/01/2023. FRHI had another operating loan with SALD which at one point fell more than 33 months past due. Said loan was paid-off early by Vernon Inouye on 11/27/2020.

Gordon was also President and majority shareholder of Puna Orchids, Inc. (POI). POI was incorporated in 1985 and operated as a grower/retailer of potted blooming orchids. The company had 2 loans with SALD which fell delinquent as a result of the economic recession in 2008. As the economy weakened, POI's profitability and overall financial condition declined. A reduction in operating cash led to lesser inventory being held, employee lay-offs, and improper plant care. At one point, loan delinquency was in excess of 36 months. In 08/2017, both loans were cash settled after liquidation of the company's fee simple real estate assets. The deficiency balance was waived by Scott Enright, former Chairperson.

**TURNDOWNS:**

PFP's loan request was denied by Bank of Hawaii and First Hawaiian Bank based on:

- Cash flow trend inconsistent.
- Value/Type of collateral is not sufficient.
- Insufficient balance sheet to support Borrower.
- Unable to substantiate the ability to repay.

**ADDITIONAL BACKGROUND:**

SALD Business Loan Officer Gareth Mendonsa prepared the loan analysis and recommendation on January 24, 2023 and recommended denial of this loan request. PFP submitted additional information to the Department on January 22, 2023 addressing the concerns previously raised by Gareth. It is unclear whether all of the information and/or justifications provided by PFP were fully addressed and incorporated in the current iteration of this submittal. The Department is bringing this matter before the Board of Agriculture to provide an opportunity for PFP to present and defend its loan request despite Gareth's recommendation for denial.

**REQUESTED ACTION:**

The Department makes no recommendation regarding the request for approval of the loan to PFP and instead requests that the Board consider all of the information provided in this submittal together with any and all additional information provided by PFP, and make a determination based on the merits of all current information, whether to approve the loan.

Date

1/24/23

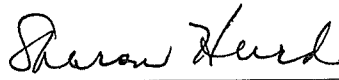


Morris Atta  
Acting Agricultural Loan Administrator

Date

1/25/23

Approved for Submission:



Sharon Hurd  
Chairperson, Board of Agriculture

STATE OF HAWAII  
DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESOURCE MANAGEMENT DIVISION  
HONOLULU, HAWAII

January 31, 2023

Board of Agriculture  
Honolulu, Hawaii

Subject: REQUEST TO APPROVE RENTAL OFFSET, GENERAL LEASE NO. S-3144; FORREST CALLAHAN AND TIFFANY PARKER, LESSEE; TMK (4) 1-9-002:045, HANAPEPE, ISLAND OF KAUAI, HAWAII

Authority: Section 166E-6, Hawaii Revised Statutes (HRS), and Section 4-158-2(a)(3), Hawaii Administrative Rules (HAR)

Lessee: Forrest Callahan and Tiffany Parker

Land Area: 6.730 gross acres

Tax Map Key: (4) 1-9-002:045 (Exhibit "A")

Lease Term: 35 years, 6/1/2021 through 5/31/2056

Land Status: Encumbered by Governor's Executive Order No. 4244, dated October 10, 2002, to the Department of Agriculture for agriculture purposes

Annual Base Rental: \$5,001.00 per year

Character of Use: Diversified agriculture

BACKGROUND:

In 2008, Governor's Executive Order No. 4244 transferred the subject land parcel to the Department of Agriculture (DOA) for management purposes. The Agricultural Resource Management Division requested and received the Board's approval to dispose of the property and by way of sealed bids the subject property was awarded to the successful bidder, Forrest Callahan and Tiffany Parker. A thirty-five (35) year lease was issued commencing June 1, 2021 through May 31, 2056.

Forrest Callahan and Tiffany Parker submitted expense receipts for equipment and services rendered to ready the land for planting of crops according to their Plan of Utilization and Development and Conservation Plan. In addition to clearing the premises of large overgrown trees and other invasive plants, which is ongoing, the Lessee removed numerous (over 30)

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abandoned and derelict vehicles and equipment from the premises. The Lessee is continuing to work with local law enforcement, DLNR Land Division and DOCARE to remove homeless encampments at which various illegal activities are being conducted. The work to ready the premises for planting is ongoing.

Pursuant to 4-158-2(a)(3), HAR, and the Lease, the Board may permit the Lessee to offset the cost of land clearance and improvements against not more than two (2) years of base annual rental. The Lessee is requesting a rental offset of two years of base annual lease rent totaling \$10,002.00, although their costs exceed this amount thus far.

RECOMMENDATIONS:

Staff recommends that the Board of Agriculture approve the Lessee's request for a rental offset of up to two years of base annual lease rent from 6/1/2022 through 5/31/2024, in accordance with the terms and conditions of General Lease No. S-3144 and Section 4-158-2(a)(3), HAR, and such other terms and conditions as may be prescribed by the Chairperson to best serve the interests of the State.

All related documents are subject to the review and approval as to form by the Department of the Attorney General, and such other terms and conditions as may be prescribed by the Chairperson to best serve the interests of the State.

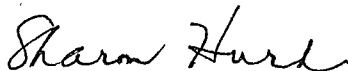
Respectfully submitted,



\_\_\_\_\_  
BRIAN KAU, P.E.  
Administrator and Chief Engineer  
Agricultural Resource Management Division

Attachments - Exhibit "A"

APPROVED FOR SUBMISSION:



\_\_\_\_\_  
SHARON HURD  
Chairperson, Board of Agriculture



STATE OF HAWAII  
DEPARTMENT OF AGRICULTURE  
AGRICULTURAL RESOURCE MANAGEMENT DIVISION  
HONOLULU, HAWAII

January 31, 2023

Board of Agriculture  
Honolulu, Hawaii

Subject: REQUEST FOR APPROVAL TO SUBLEASE BETWEEN THE HAMAKUA AGRICULTURAL COOPERATIVE, LESSEE/SUBLESSOR, AND LESILI SEKONA, SUBLESSEE; GENERAL LEASE NO. S-5553, TMK: (3) 4-3-003:003, LOT NO. 27, PAAUILO, HAMAKUA, ISLAND OF HAWAII, HAWAII

Authority: Section 166E-6 Hawaii Revised Statutes, (HRS), and Section 4-158-19(a)(6), Hawaii Administrative Rules (HAR)

Lessee/Sublessor: Hamakua Agricultural Cooperative

Sublessee: Lesili Sekona

Land Area: Approximately 5.450 acres

Tax Map Key: 3<sup>rd</sup> Div/4-3-003:003 (por) (Exhibit "A")

Land Status: The Hamakua lands were transferred to the Department of Agriculture by Governor's Executive Order No. 4250, dated October 22, 2008, pursuant to Act 90, SLH 2003

Lease Term: 35-years, June 30, 1998, through June 29, 2033

Sub-Lease Term: February 1, 2023 through June 29, 2033

Annual Base Rent: \$1,302.66/year, until June 29, 2028 (Re-opening Date)

Character of Use: General Agricultural Purposes in accordance with a Plan of Utilization and Development approved by the Department

REMARKS:

Lesili Sekona is an original member of the Hamakua Agricultural Cooperative since June 1998. He grew up in Tonga where he learned Tongan farming techniques working alongside his father. As a sole proprietor, he currently sub-leases Lot No. 3, under General Lease S-5553, consisting of 5.55 acres, located in Paauilo. Mr. Sekona has also been unofficially farming on Lot 27, under General Lease S-5553. He utilizes both properties to cultivate popular Polynesian and Pacific Island staples, such as, Tongan yams, tapioca (cassava), taro, white pineapple, and banana.

B-4

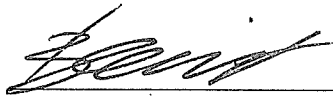
A recent review of our records indicated that a sub-lease for Lot 27 needed to be formalized, which this submittal accomplishes. This request has no financial implications to the HDOA as it is strictly an approval for a sublease. The master lessee (Hamakua Agricultural Cooperative) is responsible for the remittance to the HDOA.

Lesli Sekona is a sub-lessee in good standing. He qualifies as a bona fide farmer with more than 2 years of full-time farming experience and meets the application and eligibility requirements in accordance with sections 4-158-1 and 27, HAR.

RECOMMENDATION:

That the Board of Agriculture approve the Sublease between the Hamakua Agricultural Cooperative, Lessee/Sublessor, and Lesli Sekona, Sublessee, for Lot No. 27 in Paauilo, under General Lease S-5553, through the expiration date of June 29, 2033, and further subject to the review and approval as to form of the consent document by the Department of the Attorney General, and such other terms and conditions as may be prescribed by the Chairperson to best serve the interests of the State.

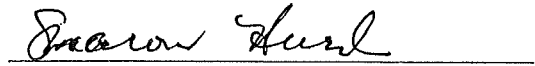
Respectfully submitted,



\_\_\_\_\_  
BRIAN KAU, P.E.  
Administrator and Chief Engineer,  
Agricultural Resource Management Division

Attachments - Exhibit "A"

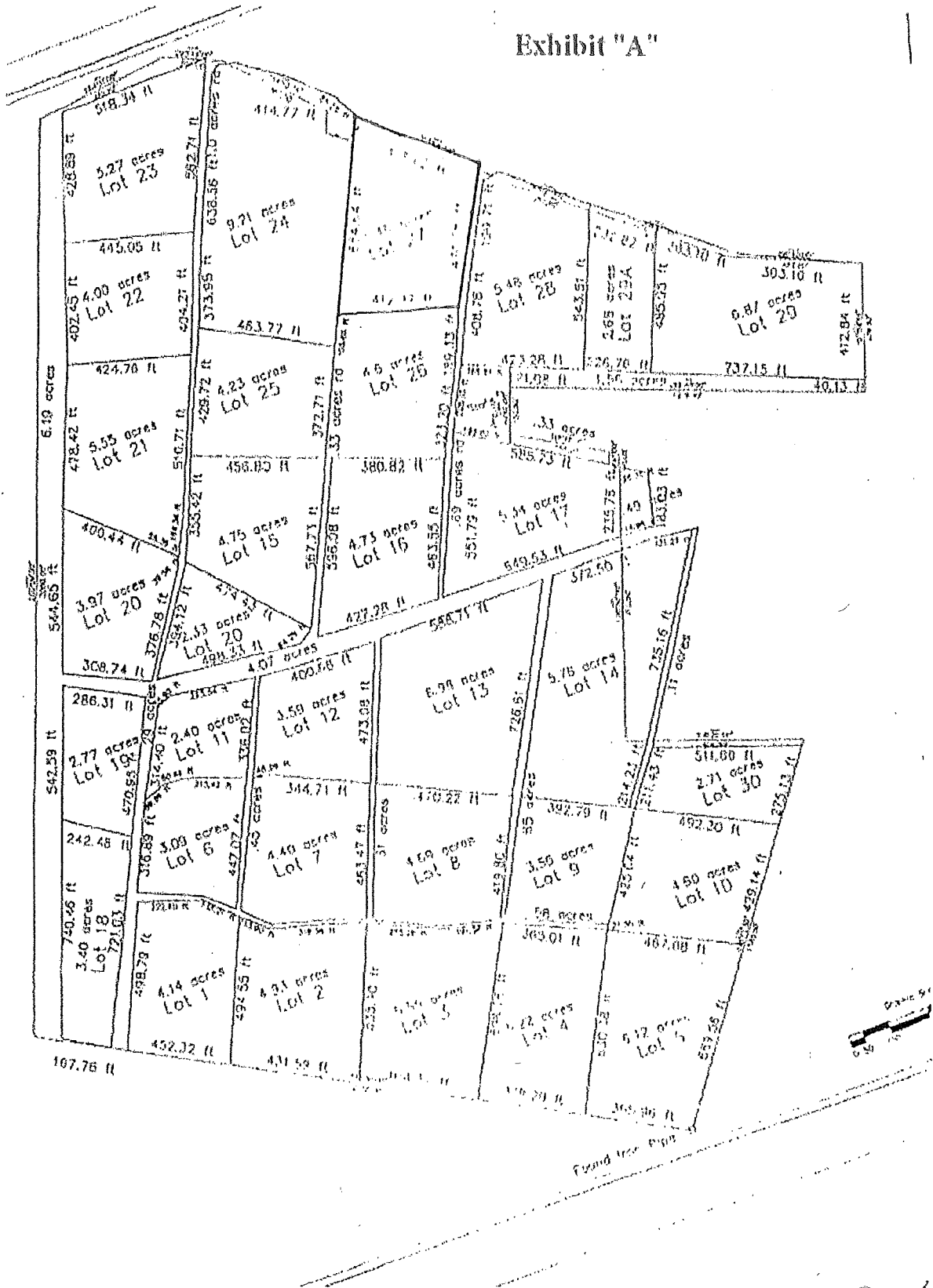
APPROVED FOR SUBMISSION:



\_\_\_\_\_  
Sharon Hurd  
Chairperson, Board of Agriculture



Exhibit "A"



B-6

State of Hawaii  
Department of Agriculture  
Plant Industry Division  
Plant Quarantine Branch  
Honolulu, Hawaii

January 31, 2023

Board of Agriculture  
Honolulu, Hawaii

**Subject:** Request for Preliminary Review and Approval of the Petition from Ms. Carol Cozzi-Schmarr, Seahorse Hawaii Foundation, to Initiate Administrative Rule Making and Rule Amendment to Chapter 4-71, Hawaii Administrative Rules, to Change the Placement of Mysid Shrimp, *Mysidopsis bahia*, From the List of Restricted Animals (Part A) to the List of Restricted Animals (Part B) for commercial aquaculture and live feed for seahorses.

**I. Background:**

On December 27, 2022, the Office of the Chairperson received a petition from Ms. Carol Cozzi-Schmarr, Seahorse Hawaii Foundation, requesting the Hawaii Board of Agriculture (Board) change the list placement of Mysid Shrimp, *Mysidopsis (Americamysis) bahia*, from the List of Restricted Animals, Part A (RA List) to the List of Restricted Animals, Part B, (RB List) for private use to feed seahorses by the Seahorse Hawaii Foundation and for commercial aquaculture at the Ocean Rider Seahorse Farm. Ms. Cozzi-Schmarr's petition is included as Appendix A.

**PQB NOTES:** *The genus of Mysid Shrimp has been changed from "Mysidopsis" to "Americamysis". The proposed change to the RB List indicated below reflects this change in nomenclature.*

**PQB NOTES:** *The Seahorse Hawaii Foundation shares the same physical address and facilities with the Ocean Rider Seahorse Farm. Ms. Cozzi-Schmarr is the President of the Seahorse Hawaii Foundation and owner of Ocean Rider Seahorse Farm.*

Pursuant to §4-1-23, Hawaii Administrative Rules (HAR), the Board had 30 days to approve or deny the petition (if it met the criteria for submission, which it did). Thus, if the Board failed to approve or deny the petition within the 30-day timeframe, it would result in the initiation of rulemaking proceedings. To assist in managing the 30-day timeframe, at the Board's October 11, 2022 meeting, the Board delegated authority to the Chairperson to deny petitions with a notification requirement of the denial at a future

meeting. A denial letter signed by the Chairperson was issued to Ms. Cozzi-Schmarr within the 30-day timeframe.

The denial of a petition does not prevent the Board from acting on its own motion upon any matter disclosed in the petition. It is the Plant Quarantine Branch's (PQB) understanding that generally, the Board would like full advisory review prior to taking formal action, so prior petitions have been denied on procedural grounds. The Board may deny a petition without advisory review.

Mysid Shrimp, *Mysidopsis bahia*, is currently on the RA List and is available for research by universities and government agencies, exhibition in municipal zoos and government-affiliated aquariums, and for other institutions for medical and scientific purposes as determined by the Board. Placement on the RB List would make the Mysid Shrimp eligible for government use, or private and commercial use, including for research, zoological parks, or aquaculture production, as well as the uses for items on the RA List.

The Seahorse Hawaii Foundation is requesting the change in the placement of the Mysid Shrimp, *Mysidopsis bahia*, from the RA List to the RB List to allow importation for private use for feeding the Mysid Shrimp to Leafy, and Weedy Sea Dragons (*Phycodurus eques* and *Phyllopteryx taeniolatus*, respectively), and other conservation seahorse species such as *Hippocampus hilonis* and *H. fisheri*. The petition is also requesting the list change to allow for the use of Mysid Shrimp for live feed for the commercial aquaculture of *H. erectus* seahorses for the pet trade and educational tours.

Pursuant to Hawaii Revised Statutes 150A-10, the Advisory Committee on Plants and Animals must advise the Department on developing or revising laws or problems relating to the introduction, confinement, or release of plants, animals, and microorganisms. Provided the Board would like to see the full advisory review of this petition for the change in list placement from the RA List to the RB List of *Mysidopsis bahia*, the PQB will work with the applicant to have their import permit request reviewed at the same time as the proposed changes to the RA List and RB List. After the full advisory review, the matter will be brought back again before the Board. Then, the Board may give its preliminary approval and order the initiation of rulemaking procedures.

II. **Summary of Petitioner's Proposed Changes to the List of Restricted Animals, Part A and the List of Restricted Animals, Part B**

Ms. Cozzi-Schmarr's petition is requesting the following deletion from the RA List in Chapter 4-71, HAR:

§4-71-6.5, HAR, List of Restricted Animals (Part A)

Removes the following text in quotations:

1. "ORDER Mysidacea"
2. "FAMILY Mysidae"
3. Scientific Name: "Mysidopsis bahia"
4. Common Name "shrimp, mysid".

Ms. Cozzi-Schmarr's petition is requesting the following additions to the RB List in Chapter 4-71, HAR:

§4-71-6.5, HAR, List of Restricted Animals (Part B)

Adds the following text in quotations:

1. "ORDER Mysidacea"
2. "FAMILY Mysidae"
3. Scientific Name: "Americamysis bahia"
4. Common Name "shrimp, mysid".

Respectfully Submitted,

*Helmuth Rogg*

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Helmuth Rogg, Ph.D.  
Acting Manager, Plant Quarantine Branch

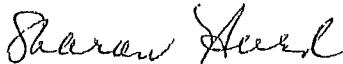
CONCURRED:

*Helmuth Rogg*

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Helmuth Rogg, Ph.D.  
Administrator, Plant Industry Division

APPROVED FOR SUBMISSION:

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Sharon Hurd  
Chairperson, Board of Agriculture



## SEAHORSE HAWAII FOUNDATION

*Saving the Seahorse and Seadragons from extinction through research, propagation and education*

Dear Governor and Chair of Hawaii Department of Agriculture,

This is a request for a rule amendment to HAR section 4-71-6.5 (b) to allow mysid shrimp (*Mysidopsis bahia*) for private use by The Seahorse Hawaii Foundation (SHF) and commercial use by commercial aquaculture by the Seahorse of Hawaii Farm of Ocean Rider (OR) as an approved use or to move the placement of mysid shrimp from the Restricted A list to the Restricted B list.

Attached to this letter is a check for \$2500 for the processing fee for a permit for this rule amendment.

I, Carol Cozzi-Schmarr am the registered agent, petitioner and President of the private Seahorse Hawaii Foundation ( 501 ) c (3) , IRS # 20-5592772 ; 73-1289 Kukuna St, Kailua-Kona Hawaii, 96740, (808)-937-4368.

I am requesting a change to the rule HAR section 4-71-6.5 (b) (2) to allow private use by the SHF and the commercial aquaculture facility OR for importation and use of the mysid shrimp as a live feed which is an organism on the Restricted A list.

The SHF has been breeding Leafy and Weed Sea Dragons and Conservation species of exotic seahorses for exhibition, since 2006. We are hosted by the OR Farm, established in 1998, and located within the NELHA facility in Kona. The SHF breeds Sea Dragons and conservation seahorse species in an isolated and enclosed breeding room with its own discharge line which empties into a dispersion pit 800 feet & 14 feet in elevation from the mean high tide mark. The OR Farm focus is on the commercial production of *H. erectus* species of seahorses for the pet trade and educational tours.

This live mysid shrimp is the natural and ONLY food that the Leafy and Weedy Sea Dragons (*Phycodurus eques*, *Phyllopteryx taeniolatus*) eat. It is essential to their survival. They simply die without it. It is also the only food eaten by many species of rare juvenile conservation species of seahorses, including the Hawaiian species *Hippocampus hilonis* and *Hippocampus fisheri*.

The Waikiki Aquarium (WA) imports this food weekly for the feeding of the Weedy and Leafy Sea Dragons on exhibit. We are asking to receive the same permit for importation given to this comparable facility. The only difference between the two facilities is the source of a portion of the funding and the way the used sea water is discharged (SHF does NOT discharge into the ocean but, ironically, the Waikiki Aquarium does). The SHF receives their funding from private grants (family foundations and private donors) whereas the Waikiki Aquarium receives the majority of its funding from the taxpayer via the University of Hawaii, but ALSO from private donors, just like the SHF.



## SEAHORSE HAWAII FOUNDATION

*Saving the Seahorse and Seadragons from extinction through research, propagation and education*

Again, the SHF and OR discharges their used sea water into chlorinated evaporation/dispersion pits that are located in a hot deserted lava field more than 800 ft from the ocean and at a 14 ft elevation above sea level. NO sweater or fresh water goes in to the ocean. In direct contrast the WA discharges used sea water into pipes that empty unto the sea floor, directly in front of the WA in the shallow reef area, below sea level.

In addition, the SHF follows extremely strict bio security measures mandated by the OR farm, such as: ALL visitors and guests must wash up to their elbows before entering. ALL guests must have reservations and must be on a guided tour with 3 escorts. Before visiting, all guests are emailed the bio security protocol that they must agree to before buying a ticket. These protocols and many more have been set up and mandated by the OR Farm host. No guests are allowed into the dragon breeding room.

Additionally, the entire 850 acre NELHA facility has a gated entrance that is closed to the public from 830pm to 6am, and the OR host farm facility is gated, with cameras, perimeter laser beams, 24 hour security guard to prevent any theft.

Clearly the SHF and OR farm have a more bio secure facility yet we have not been granted a permit for the mysids where as the the WA has. There should be no concern for escape or release of the mysid shrimp.

Additionally, the ocean waters of the Pacific (including Hawaii) has this same mysis species. They are not found in abundant numbers as they are in Australia where the Sea Dragons live, but they are here.

Additionally, mysis is routinely used for bio assays in our waste water treatment facilities here in Hawaii and around the world, so there are many populations here. There are also many clean closed populations grown in captivity which can be purchased with ease.

Additionally, the OR farm which hosts the SHF has been approved for and held many penaeid shrimp permits over the years which is far more complicated and risky compared to the mysid shrimp, yet no escape or mishap has ever occurred.

Additionally the OR farm has a perfect track record of no releases of non endemic seahorses or live plankton that we maintained permits for since 1998.



## SEAHORSE HAWAII FOUNDATION

*Saving the Seahorse and Seadragons from extinction through research, propagation and education*

Additionally, the SHF and OR do not sell the dragons or conservation seahorse species to the public. However, like the WA we do trade certain species with other public aquariums. In conclusion, by granting us this permit we are able to help other aquariums exhibit rare species that they would otherwise not have, as the wild stocks of all the genus Hippocampus are CITES listed, depleted and simply not available.

We ask you to please give us the equal opportunity given to the WA so that our institution can continue to breed and exhibit these exotic sea dragons and rare seahorses species so that we can remain a competitive and viable aqua farm and aquarium in the State of Hawaii which is visited by more than 35,000 people annually.

Alternatively, the Board could simply move this species from Restricted A list to the Restricted B list.

Thank you, Carol Cozzi -Schmarr

[Carol.cozzi.schmarr@gmail.com](mailto:Carol.cozzi.schmarr@gmail.com)

[carol@oceanrider.com](mailto:carol@oceanrider.com)

[www.seahorse.com](http://www.seahorse.com)

808-937-4368

1. Reasons for introduction:

The Seahorse Hawaii Foundation 501 C 3 has been breeding Leafy and Weed Sea Dragons and exotic seahorses that are not sold as pets, since 2006. We are hosted at the Seahorses Hawaii Farm of Ocean Rider, established in 1998, which is located within the NELHA facility in Kona. The Seahorse Hawaii Foundation breeds the Dragons in an isolated and enclosed breeding room with its own discharge line which empties into a dispersion pit 800 feet and 12 feet elevation from the mean high water mark.

This live mysids shrimp is the natural and ONLY food that the Leafy and Weedy Sea Dragons (Phycodurus eques, Phyllopteryx taeniolatus) eat. It is essential to their survival. They simply die without it. The Waikiki Aquarium imports this food weekly for the feeding of the Weedy and Leafy Sea Dragons and we are asking to receive the same permit for importation given to this comparable facility. The only difference between the two facilities is the source of some of the funding and the way the used sea water is discharged. The Waikiki Aquarium discharges directly into the ocean whereas we do not.

The Seahorse Hawaii Foundation receives their funding from private grants (family foundations and private donors) whereas the Waikiki Aquarium receives the majority of its funding from the tax payer via the University of Hawaii, but also from private donors, just like the The Seahorse Hawaii Foundation.

2. Person responsible:

Carol Cozzi-Schmarr, 73-1289 Kukuna St, Kailua-Kona, Hawaii, 96740, (808) 937 4368

3. Location:

The Seahorse Hawaii Foundation is hosted at and by the Seahorses Hawaii Farm of Ocean Rider, established in 1998, which is located within the NELHA facility in Kona at 73-4388 Ilikai Place, Kailua-Kona, HI 96740. The Seahorse Hawaii Foundation breeds the Dragons in an isolated and enclosed breeding room within the complex.

4. Method of disposition

The live mysis shrimp will arrive once a week and be poured directly into the sea dragon tank for food. All the shrimp will be eaten within 7 days and will be transposed into feces. There will be no transfer to other areas outside the breeding room.

5. Abstract of the organism and potential impact on the environment including plants, animals, humans

The mysis shrimp (*Americamysis bahia*) is found in all the worlds' oceans including Hawaii. It makes up the majority of the marine planktonic community around the globe that is critical to the survival of most sea life, from planktonic juvenile tuna to Manta Rays, Humpback whales to Seahorses and Seadragons. In some parts of the world, like Southern Australia, which is the only place that Sea Dragons exist, the numbers of mysids are so high they are like clouds in the water. These clouds of mysis are the only food that the Sea Dragons eat. They have adapted, over time, perfectly to eat this food non stop 24 hours a day. They eat nothing else. In order to successfully breed or keep these dragons in captivity it is essential to have a continuous supply of live mysids.



In other parts of the world, like Hawaii, the numbers of mysids shrimp is much lower making them hard to find, but if one were to look hard enough one would find them. I know because I have collected them in sheltered bays on the West side of the Big Island.

These large numbers of live mysids are usually collected in the wild or cultured in farms and sold across the globe for feeding delicate dragons, and other exotic sea life on display in aquariums around the world.

Here is the information from Wikipedia on the mysid shrimp. Please note we are only requesting the importation of the marine species *Americamysis bahia*.

**Mysida** is an order of small, shrimp-like crustaceans in the malacostracan superorder Peracarida. Their common name opossum shrimps stems from the presence of a brood pouch or "marsupium" in females. The fact that the larvae are reared in this pouch and are not free-swimming characterises the order. The mysid's head bears a pair of stalked eyes and two pairs of antennae. The thorax consists of eight segments each bearing branching limbs, the whole concealed beneath a protective carapace and the abdomen has six segments and usually further small limbs.

Mysids are found throughout the world in both shallow and deep marine waters where they can be benthic or pelagic, but they are also important in some fresh water and brackish ecosystems. Many benthic species make daily vertical migrations into higher parts of the water column. Mysids are filter feeders, omnivores that feed on algae, detritus and zooplankton. Some mysids are cultured in laboratories for experimental purposes and are used as a food source for other cultured marine organisms. They are sensitive to water pollution, so are sometimes used as bioindicators to monitor water quality.

□

## Description

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The head of a mysid bears two pairs of antennae and a pair of large, stalked eyes. The head and first segment (or sometimes the first three segments) of the thorax are fused to form the cephalothorax. The eight thoracic segments are covered by the carapace which is attached only to the first three. The first two thoracic segments bear maxillipeds which are used to filter plankton and organic particulate from the water. The other six pairs of thoracic appendages are biramous (branching) limbs known as pereopods, and are used for swimming, as well as for wafting water towards the maxillipeds for feeding. Unlike true shrimps (Caridea), females have a marsupium beneath the thorax. This brood pouch is enclosed by the large, flexible oostegites, bristly flaps which extend from the basal segments of the pereopods and which form the floor of a chamber roofed by the animal's sternum. This chamber is where the eggs are brooded, development being direct in most cases.<sup>[2]</sup>

The abdomen has six segments, the first five of which bear pleopods, although these may be absent or vestigial in females. The fourth pleopod is longer than the others in males and has a specialized reproductive function.<sup>[2]</sup>

The majority of species are 5–25 mm (0.2–1.0 in) long, and vary in colour from pale and transparent, through to bright orange or brown. They differ from other species within the superorder Peracarida by featuring statocysts on their uropods (located on the last abdominal segment). These help the animal orient itself in the water and are clearly seen as circular vesicles; together with the pouch the statocysts are often used as features that distinguish mysids from other shrimp-like organisms.<sup>[2]</sup>

## Distribution

Mysids have a cosmopolitan distribution and are found in both marine and freshwater environments, the deep sea, estuaries, shallow coastal waters, lakes, rivers and underground waters. They are primarily marine and fewer than ten percent are found in freshwater. There are about 72 freshwater species in total, being predominantly found in the Palaearctic and Neotropical realms. These non-marine mysids occur in four distinct types of habitats; some are estuarine species; some were isolated in the Ponto-Caspian Basin where Paramysis has since radiated enormously (23 species); some are glacial relicts and some are subterranean Tethyan relicts.<sup>[4]</sup>

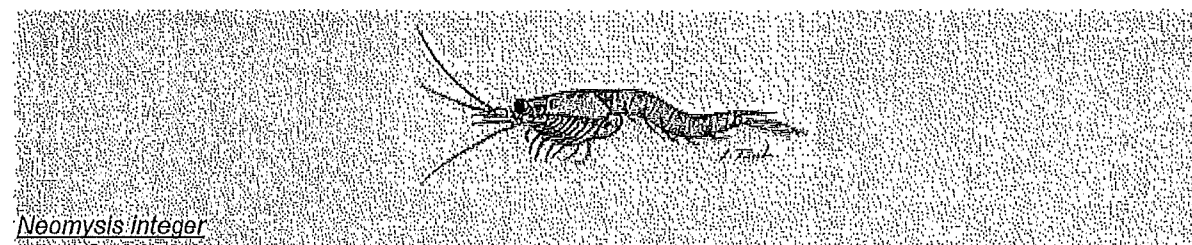
## Behavior



*Mysis relicta*

Some species are benthic (living on the seabed) and others pelagic (living in mid-water), but most are found close to, crawling on or burrowing into the mud or sand. Most marine species are benthic by day but leave the seabed at night to become planktonic. Locomotion is mostly by swimming, the pleopods being used for this purpose. Some mysids live among algae and seagrasses, some are solitary while many form dense swarms. Mysids form an important part of the diet of such fish as shad and flounder.<sup>[2]</sup> In general, they are free-living, but a few species, mostly in the subfamily Heteromysinae, are commensal and are associated with sea anemones and hermit crabs.<sup>[3]</sup> Several taxa have also been described from different freshwater habitats and caves.<sup>[5]</sup> *Mysis relicta* and its close relatives inhabit cold, deep lakes and have a diurnal cycle of vertical migrations.<sup>[6]</sup> The species *Mysidium integrum* has a mutualistic relationship with longfin damselfish, the shrimp providing nutrients for the algae farms the fish feed on and the fish providing protection from predators.<sup>[7][8]</sup>

The majority of Mysida are omnivores, feeding on algae, detritus, and zooplankton. Scavenging and cannibalism are also common, with the adults sometimes preying on their young once they emerge from the marsupium.<sup>[9]</sup> The pelagic and most other species are filter feeders, creating a feeding current with the exopods of their pereopods. This wafts food particles into a ventral food groove along which they are passed before being filtered by setae (bristles) on the second maxillae. Larger planktonic prey can be caught in a trap composed of the endopods of the thoracic appendages.<sup>[2]</sup> Some benthic species, especially members of the subfamily Erythropinae, have been observed feeding on small particles which they collected by grooming the surfaces of their bodies and legs.<sup>[3]</sup>



*Neomysis integer*

Individual mysids are either male or female, and fertilisation is external. The gonads are in the thorax and are tubular in shape. Males have two gonopores in the eighth thoracic segment and a pair of long penises. The female gonopores are in the sixth thoracic segment and the oostegites are

attached to the first to seventh pereopods to form a brood pouch.<sup>[2]</sup> Mating usually takes place at night and lasts only a few minutes.<sup>[3]</sup> During the process, the male inserts his penises into the marsupium and releases sperm. This stimulates the female and the eggs are usually released into the marsupium within an hour. Here they are fertilised and retained, development of the embryos in the brood pouch being direct with the young hatching from the eggs as miniature adults.<sup>[2]</sup> The size of a mysid brood generally correlates with body length and environmental factors such as density and food availability.<sup>[9]</sup> The age at which mysids reach sexual maturity depends on water temperature and food availability.<sup>[9][10][11]</sup> For the species *Mysidopsis bahia*, this is normally at 12 to 20 days.<sup>[11]</sup> The young are released soon afterwards, and although their numbers are usually low, the short reproductive cycle of mysid adults means a new brood can be produced every four to seven days.<sup>[9][11][12]</sup>

## Uses

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Some species of mysids are easy to culture on a large scale in the laboratory as they are highly adaptive, and can tolerate a wide range of conditions. Despite low fecundity, these species have a short reproductive cycle which means they can quickly reproduce in vast numbers.<sup>[9][12]</sup> They can be cultured in static or flow-through systems, the latter having been shown to be able to maintain a higher stocking density than a static system.<sup>[13]</sup> In flow-through systems, juvenile mysids are continuously separated from the adult brood stock in order to reduce mortality due to cannibalism.<sup>[9]</sup> *Artemia* (brine shrimp) juveniles (incubated for 24 hours) are the most common food in mysid cultures, sometimes enriched with highly unsaturated fatty acids to increase their nutritional value.<sup>[9]</sup>

Cultured mysids are thought to provide an ideal food source for many marine organisms. They are often fed to cephalopods, fish larvae, and commercial farmed shrimp due to their small size and low cost.<sup>[9][14][15][16]</sup> Their high protein and fat content also makes them a good alternative to live enriched *Artemia* when feeding juveniles (especially those that are difficult to maintain such as young seahorses) and other small fauna.<sup>[15][16]</sup>

Their sensitivity to water quality also makes them suitable for bioassays. *Americamysis bahia* and *Americamysis almyra* are frequently used to test for pesticides and other toxic substances, with *A. bahia* found to be more sensitive during the periods when it is moulting.<sup>[17]</sup>

## Systematics

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The Mysida belong to the superorder Peracarida, which means "near to shrimps". Although in many respects mysids appear similar to some shrimps, the main characteristic separating them from the superorder Eucarida is their lack of free-swimming larvae.<sup>[9]</sup> The order Mysida is extensive and currently includes approximately 160 genera, containing more than 1000 species.<sup>[9]</sup>

Traditionally, Mysida were united with another, externally similar group of pelagic crustaceans, the Lophogastrida, into a broader order Mysidacea, but that classification is generally abandoned at present.<sup>[11][9][19][20][21]</sup> While the previous grouping had good morphological support, molecular studies do not corroborate the monophyly of this group.<sup>[22]</sup> Previously Mysida included two other families, Lepidomysidae and Stygiomysidae, but these have now been placed in a separate order, Stygiomysida.<sup>[22]</sup>

## Classification[edit]

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- Family Mysidae Haworth, 1825<sup>[23]</sup>
  - Subfamily Boreomysinae Holt & Tattersall, 1905
    - 2 genera
  - Subfamily Erythropinae Hansen, 1910



9. ^ Jump up to:<sup>a</sup> <sup>b</sup> <sup>c</sup> <sup>d</sup> <sup>e</sup> <sup>f</sup> <sup>g</sup> <sup>h</sup> <sup>i</sup> <sup>j</sup> <sup>k</sup> <sup>l</sup> <sup>m</sup> <sup>n</sup> <sup>o</sup> <sup>p</sup> <sup>q</sup> <sup>r</sup> <sup>s</sup> <sup>t</sup> <sup>u</sup> <sup>v</sup> <sup>w</sup> <sup>x</sup> <sup>y</sup> <sup>z</sup> Domingues, P. M.; Turk, P. E.; Andrade, J. P.; Lee, P. G. (1999). "Culture of the mysid, *Mysidopsis almyra* (Bowman), (Crustacea: Mysidacea) in a static water system: effects of density and temperature on production, survival and growth". *Aquaculture Research*, **30** (2): 135–143. doi:10.1046/j.1365-2109.1999.00309.x.
10. ^ Sudo, H. (2003). "Effect of temperature on growth, sexual maturity and reproduction of *Acanthomysis robusta* (Crustacea: Mysidacea) reared in the laboratory". *Marine Biology*, **143** (6): 1095–1107. doi:10.1007/s00227-003-1160-2. S2CID 83480469.
11. ^ Jump up to:<sup>a</sup> <sup>b</sup> <sup>c</sup> <sup>d</sup> <sup>e</sup> <sup>f</sup> <sup>g</sup> <sup>h</sup> <sup>i</sup> <sup>j</sup> <sup>k</sup> <sup>l</sup> <sup>m</sup> <sup>n</sup> <sup>o</sup> <sup>p</sup> <sup>q</sup> <sup>r</sup> <sup>s</sup> <sup>t</sup> <sup>u</sup> <sup>v</sup> <sup>w</sup> <sup>x</sup> <sup>y</sup> <sup>z</sup> Culturing *Mysidopsis bahia*. Supplemental Report. EPA 505/8-90-006b. *Environmental Protection Agency*. 1990.
12. ^ Jump up to:<sup>a</sup> <sup>b</sup> <sup>c</sup> <sup>d</sup> <sup>e</sup> <sup>f</sup> <sup>g</sup> <sup>h</sup> <sup>i</sup> <sup>j</sup> <sup>k</sup> <sup>l</sup> <sup>m</sup> <sup>n</sup> <sup>o</sup> <sup>p</sup> <sup>q</sup> <sup>r</sup> <sup>s</sup> <sup>t</sup> <sup>u</sup> <sup>v</sup> <sup>w</sup> <sup>x</sup> <sup>y</sup> <sup>z</sup> Domingues, Pedro M.; Turk, Phillip E.; Andrade, Jose P.; Lee, Phillip G. (1998). "Pilot-scale production of mysid shrimp in a static water system". *Aquaculture International*, **6** (5): 387–402. doi:10.1023/A:1009232921784. S2CID 37703503.
13. ^ Lussier, Suzanne M.; Kuhn, Anne; Chammas, Melissa J.; Sewall, John (1988). "Techniques for the laboratory culture of *Mysidopsis* species (Crustacea: Mysidacea)". *Environmental Toxicology and Chemistry*, **7** (12): 969–977. doi:10.1002/etc.5620071203.
14. ^ Woods, Chris M. C. (2005). "Growth of cultured seahorses (*Hippocampus abdominalis*) in relation to feed ration". *Aquaculture International*, **13** (4): 305–314. doi:10.1007/s10499-004-3100-7. S2CID 42514195.
15. ^ Jump up to:<sup>a</sup> <sup>b</sup> <sup>c</sup> <sup>d</sup> <sup>e</sup> <sup>f</sup> <sup>g</sup> <sup>h</sup> <sup>i</sup> <sup>j</sup> <sup>k</sup> <sup>l</sup> <sup>m</sup> <sup>n</sup> <sup>o</sup> <sup>p</sup> <sup>q</sup> <sup>r</sup> <sup>s</sup> <sup>t</sup> <sup>u</sup> <sup>v</sup> <sup>w</sup> <sup>x</sup> <sup>y</sup> <sup>z</sup> Woods, Chris M. C.; Valentino, Fiamma (2003). "Frozen mysids as an alternative to live *Artemia* in culturing seahorses *Hippocampus abdominalis*" (PDF). *Aquaculture Research*, **34** (9): 757–763. doi:10.1046/j.1365-2109.2003.00882.x.
16. ^ Jump up to:<sup>a</sup> <sup>b</sup> <sup>c</sup> <sup>d</sup> <sup>e</sup> <sup>f</sup> <sup>g</sup> <sup>h</sup> <sup>i</sup> <sup>j</sup> <sup>k</sup> <sup>l</sup> <sup>m</sup> <sup>n</sup> <sup>o</sup> <sup>p</sup> <sup>q</sup> <sup>r</sup> <sup>s</sup> <sup>t</sup> <sup>u</sup> <sup>v</sup> <sup>w</sup> <sup>x</sup> <sup>y</sup> <sup>z</sup> Vidal, E. A. G.; DiMarco, F. P.; Wormuth, J. H.; Lee, P. G. (2002). "Optimizing rearing conditions of hatchling loliginid squid". *Marine Biology*, **140**: 117–127. doi:10.1007/s002270100683. S2CID 85108374.
17. ^ Nimmo, D. R.; Hamaker, T. L. (1982). "Mysids in toxicity testing – a review". *Hydrobiologia*, **93** (1–2): 171–178. doi:10.1007/BF00008110. S2CID 44057913.
18. ^ Brusca, R.; Brusca, G. (2003). Invertebrates. Sunderland, Massachusetts: Sinauer Associates
19. ^ Martin, Joel W.; Davis, George E. (2001). *An Updated Classification of the Recent Crustacea* (PDF). *Natural History Museum of Los Angeles County*.
20. ^ *Peracarida fact sheet - Guide to the marine zooplankton of south eastern Australia* Archived 2011-10-04 at the *Wayback Machine*
21. ^ Anderson, Gary (2010-01-20): *Peracarida Taxa and Literature (Cumacea, Lophogastrida, Mysida, Stygiomysida and Tanaidacea)* Archived 2010-01-24 at the *Wayback Machine*
22. ^ Jump up to:<sup>a</sup> <sup>b</sup> <sup>c</sup> <sup>d</sup> <sup>e</sup> <sup>f</sup> <sup>g</sup> <sup>h</sup> <sup>i</sup> <sup>j</sup> <sup>k</sup> <sup>l</sup> <sup>m</sup> <sup>n</sup> <sup>o</sup> <sup>p</sup> <sup>q</sup> <sup>r</sup> <sup>s</sup> <sup>t</sup> <sup>u</sup> <sup>v</sup> <sup>w</sup> <sup>x</sup> <sup>y</sup> <sup>z</sup> Meland, K.; Willassen, E. (2007). "The disunity of "Mysidacea" (Crustacea)" (PDF). *Molecular Phylogenetics and Evolution*, **44** (3): 1083–1104. doi:10.1016/j.ympev.2007.02.009. PMID 17398121.

Because of the extremely small size and delicate nature of the *Americamysis bahia*, they would die immediately upon exposure to fresh water or land or air so there is no concern about being released onto land or fresh water.

There is no danger to humans as this animal would die immediately if exposed to air and cannot not walk, crawl or stink or bite.

There is no escaping from our facility as the breeding room is isolated and enclosed with no exposure to the air, wind, or sea, or visitors of any kind. Additionally the animal will be eaten quickly so they will not be held in out door tanks exposed to the outside environment.

Additionally the distance from the dragon tank to the ocean is very far ( over 1000 ft) and there is NO drainage of any kind going directly or indirectly into the ocean,. The actual drain from the dragon tank goes to an isolated chlorine evaporation pit.

In general we adhere to a strict bio security protocol that prevents escape or contamination. These include a strict hand washing policy and strict no entrance policy to restricted areas.

Additionally ,the Ocean Rider Seahorse farm which hosts the Seahorse Hawaii Foundation has been approved for and held many penaeid shrimp permits over the years which is far more complicated and risky compared to the mysid shrimp permit.

## **CURRICULUM VITAE for CAROL COZZI-SCHMARR**

### **PROFESSIONAL EXPERIENCE**

March 1998 – Present:

Founder/President/Owner/General Manager for Seahorse Hawaii Farm of Ocean Rider Inc., a commercial scale captive-breeding seahorse center. Responsible for conceptualization, funding, research and development, operation and marketing.

September 2006- Present

President/ Founder/Manager for Seahorse Hawaii Foundation, 501 C 3 focusing on education, research and marine conservation for seahorses and seadragons.

June 1998 –Dec 1998:

Consultant for CARTAQUA (privately owned Columbian company), a large-scale, commercial shrimp hatchery in Cartagena, Colombia. Responsibilities include system design and operation of maturation (breeding center), broodstock genetic and grow out program, larvae rearing and live feeds. Production levels of 100 million nauplii per month, 10,000 disease resistant broodstock per year, 30 million post larvae per month and all supporting feeds. Additional work includes the design of the salt water system, technical training and organization of personnel, coordination of production with sales, administrative organization and coordination of the marketing of broodstock, nauplii and postlarvae.

January - May 1998:

Consultant for Shrimp Improvement (a division of Avian Farms), a Shrimp Genetics Selective Breeding Center at Plantation Key, Florida. Responsibilities included design and organization of facility, hiring, training and organization of personnel, establishment of administrative operations, coordination of production with marketing, sales and shipping. Facility requirements included design and operation of the salt water system, genetics program, production of broodstock, nauplii, postlarvae and live feeds.

January 1994 – October 1997:

Production Manager for Cosechas Marinas (privately owned Costa Rican company), a large-scale, commercial shrimp hatchery in Quepos, Costa Rica. Responsibilities included design, organization, operation and management of the facility. Systems within the facility include salt water system, broodstock farm, maturation, larval rearing, and live feeds. Additional work included the training and management of staff of 45 employees, establishment, management, and coordination of administrative operations, marketing, sales and production. Production of 300 million nauplii per month, 60 million post larvae per month and 15,000 genetically improved broodstock per year.

May 1993 –December 1993:

Project Manager for PACT (a division of Maruha Fisheries of Tokoyo, Japan), a specific pathogen free genetically improved broodstock farm in Kahuku, Oahu. Responsibilities included design, operation and management of the broodstock farm and maturation, budget management and the coordination of sales and shipping of broodstock and nauplii. Production of 35,000 genetically improved broodstock per year and 50 million nauplii per month.

May 1992-May 1993:

State Fisheries Technician III for Anuenue Fisheries Center, Department of Land and Natural Resources, Honolulu, Hawaii. Responsibilities included research and development of previously non-cultured marine fishes. Working directly under Dr. Jim Brock

March 1991 – April 1992:

Aquarium Biologist for Waikiki Aquarium, Honolulu, Hawaii. Responsibilities included the management of several marine exhibits, production of live feeds, research and development on the captive propagation of several exotic fish and coral species, collection of live specimens.

March 1991 – January 1990

Research Associate for The Specific Pathogen Free Shrimp Genetics Program for the U.S. Shrimp Consortium at Aquaculture Development Program at Anuenue Fisheries Research Station, Honolulu, Hawaii. Responsibilities included maintenance and research of pure genetic lines.

May 1987 – March 1990:

Production Manager for Larfico S.A., Ayanque, Ecuador (a division of First Federal Republics, N.Y., N.Y.), a large scale commercial shrimp hatchery. Responsibilities included design, operation and management of sea water system, maturation, larval rearing and live feeds. Responsible for coordination of production with sales and marketing, management of administrative and maintenance operations. Production of 60 million nauplii per month and 30 million post larvae per month. Staff of 75 employees.

Sept. 1985 – April 1987:

Production Manager for MacroBio, S.A., Ayanque, Ecuador, (a division of Caterpillar International), a large scale commercial shrimp hatchery. Responsibilities included management of larval rearing, algae, maturation, broodstock farm, and training of staff. Production of 20 million post larvae per month, 50 million nauplii per month and 10,000 broodstock per year. Staff of 45 employees.

Sept. 1981 – August 1984:

Hatchery Manager for Orca Sea Farms (an American owned corporation), Molokai, Hawaii, a small scale shrimp hatchery and farm. Responsibilities included larval, algal, artemia, maturation and broodstock production.

May 1984 – August 1984:

Research Associate for Texas A&M University Shrimp Mariculture Project, Galveston, Texas. Responsibilities included larval and algal research and production, and management of training courses.

## **EDUCATION**

Bachelor of Arts and Science Degree with major in Environmental Biology from the University of Colorado, Boulder, Colorado. Spring 1982.

Master Graduate Studies in Marine Mariculture at San Diego University, San Diego, California. 1982 – 1984.