

Freshwater Redclaw Crayfish Aquaponics

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Aquaculture interests

- accelerate cohort production
- develop a nutritional, cost effective diet
- evaluate Redclaw aquaponics
- review commercial potential



Biology: Redclaw Crayfish

Cherax quadricarinatus (Parastacidae)

- Tropical, endemic to northeastern Australia
- Weight to 1-1/2 pounds and up to 12 inches in length
- Preferred temperature range is 23°C to 31°C; will perish <10°C and >36°C
- Female broods for 6-10 weeks; 300-1000 eggs/brood with 3-5 broods per breeding period
- Breeding when temperatures >25°C



Why an Aquaculture Candidate?

- **Breeds easily, without early larval stage complications**
- **Tolerates high stocking densities.**
- **Requires low protein diet, not reliant on fishmeal.**
- **Flesh texture and flavor compares favorably with other crustaceans.**
- **Reaches commercial size grow-out in nine months.**
- **Survives well out of water for transport to market.**

Why an Aquaculture Candidate? continued

- **Tolerant of low dissolved oxygen, wide daily pH changes, low alkalinity, high nutrient loads.**
- **Tolerates saline water up to 5‰ indefinitely and up to 15‰ for several days. Means of enhancing flavor, purging and cleaning before sending to market.**
- **Redclaws have about 30% of body weight as tail meat (more than native crayfish at ca. 10-15% of body wt)**
- **Market position as a high value crustacean.**

Aquaculture Production: current

Redclaw “colossal” sized crayfish aquaculture has been established for more than 25 years in Australia.

China

Singapor

Ecador

Mexico

Spain

Indonesia

Israel

Morocco

Panama

Belize

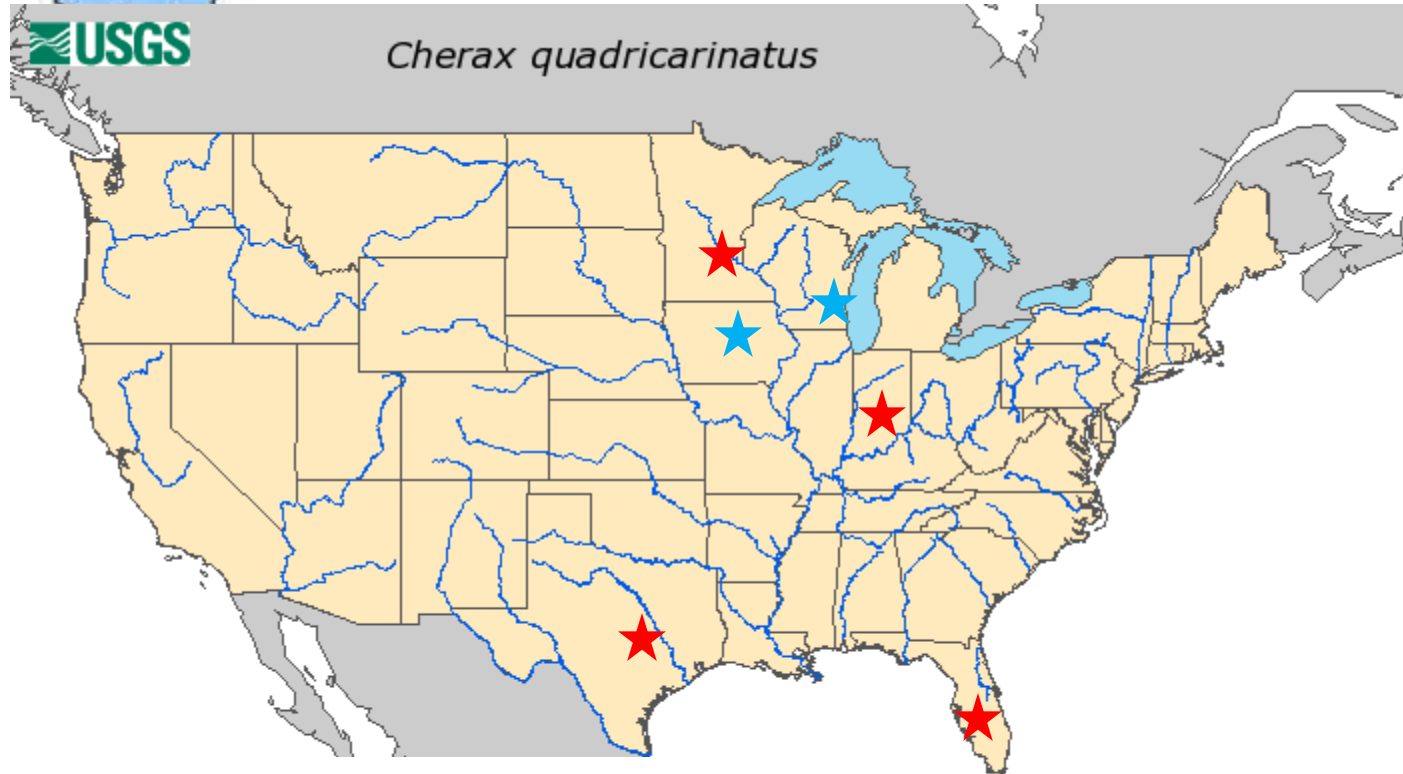


Texas, Florida, Minnesota, Iowa, and Indiana of the United States.

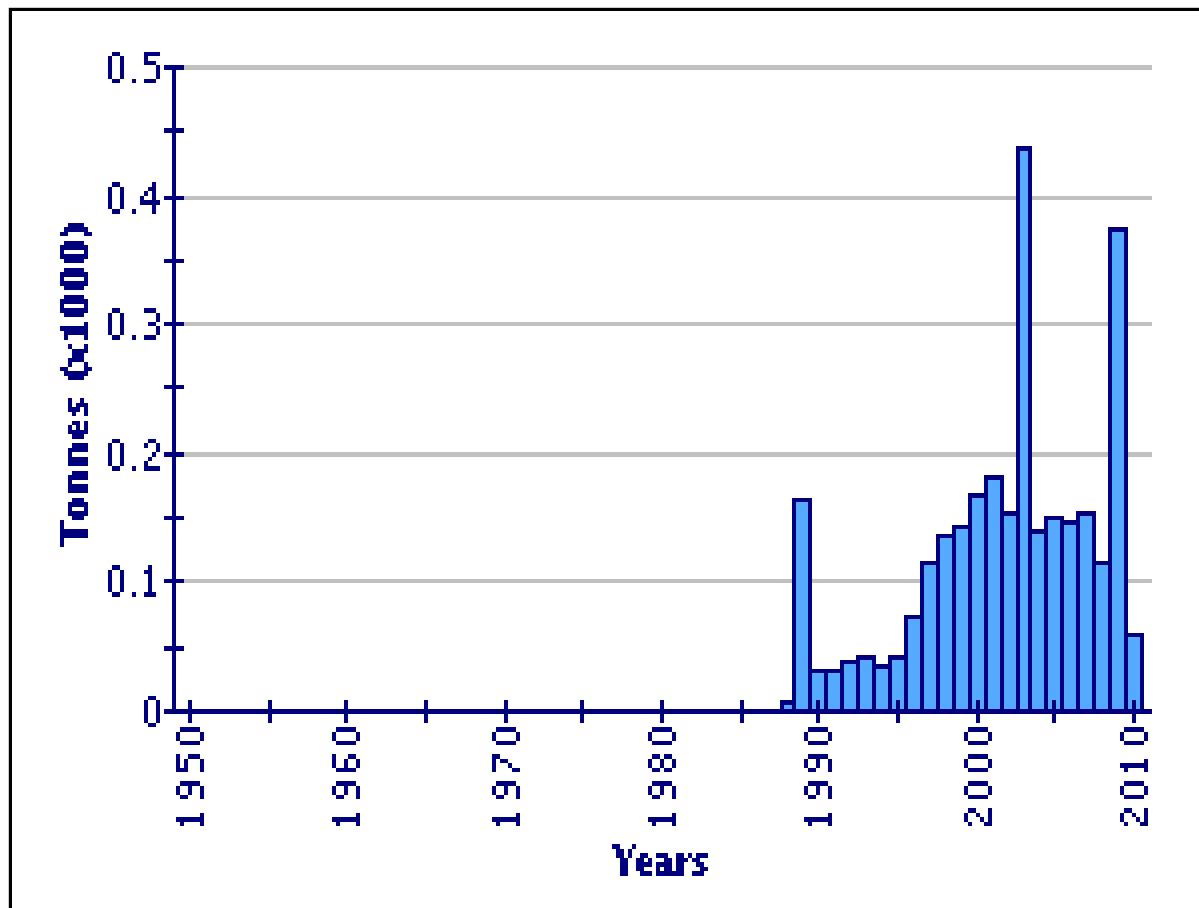
Map



- ★ Commercial use
- ★ Research only



Total production is still quite small. This is despite many projections that it would become a significant aquaculture species worldwide, and possibly a rival of the giant freshwater prawn (*Macrobrachium rosenbergii*) production of 200,000 tons/yr (FAO 2012).



Global markets are impeded by the lack of:

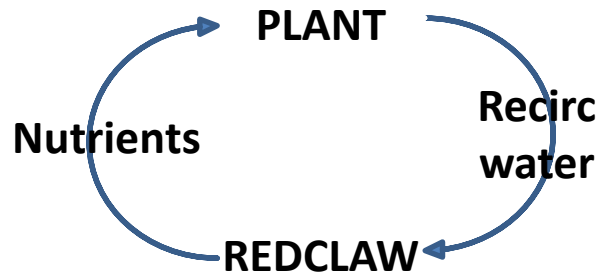
- consistent supply
- a cost effective feed
- compressed culture methods
- adaptation of integrated culture techniques
(e.g., pond-indoor-aquaponics)
- production control in pond culture
- farmer cooperative associations

Production Costs, Pricing, Profit

(based on 2012 FAO economic model)

- **Initial farm establishment inclusive cost \$325,000 (40-1000m² ponds).**
- **Stock weight: 15,760 kg (34,745 lb)**
- **Farm gate price: \$283,680 (\$18.00/kg; \$8.18/lb)**
(Retail tail price tops at \$40.00/pound)
- **Inclusive Production costs: \$121,509 (\$7.71/kg/yr; \$3.50/lb/yr)**
- **Profit: \$162,171**
- **Time to recover initial outlay, 2 years**

Aquaponics System



Volume: 600 liters (158 gal)

**High recirc time:
residence time 20-22 days**

Temp: 25°C (77°F)





Habitat structure is critical
--The right type
--The right amount



View of Gypsy Pepper arrangement





Sweet Gypsy Hybrid Pepper

Capsicum annuum

**65 day maturity//24" high
Burpee and Company**



Other Possible Commercial Uses

- Aquarium

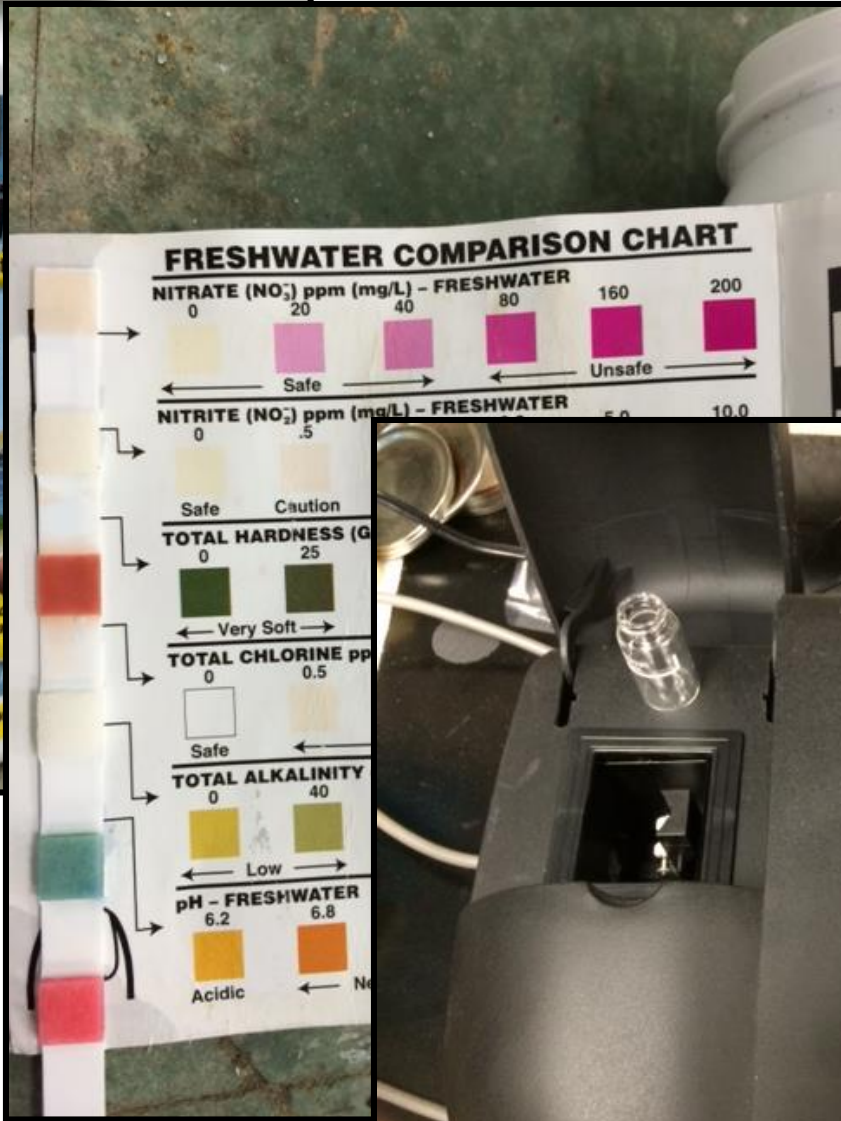


- Dissection specimens
for schools
- Food for high value fish



Dietary Regime
--quality
--quantity





Water Chemistry



Requirements

<i>Dissolved Oxygen</i>	<i>5.0 mg/L or above (can tolerate to 1</i>
<i>mg/L)</i>	
<i>Total Ammonia</i>	<i>0.5 mg/L or less</i>
<i>Nitrite</i>	<i>0.3 mg/L or less</i>
<i>pH</i>	<i>7.5 - 8.0</i>
<i>Alkalinity</i>	<i>>100 mg/L</i>
<i>Total Hardness</i>	<i>>50 mg/L</i>
<i>Chloride</i>	<i>50 mg/L or above</i>

System Components



The image shows the packaging for Coralife Bio-Balls. The background is a dark, underwater scene with various corals and a prominent pink and orange coral in the center. The brand name 'CORALIFE' is printed in white above the coral. Below it, the product name 'BIO-BALLS' is in large, bold, white letters inside a black rectangular box with a red border. Underneath, the text 'TREATS UP TO 225-300 GALLON AQUARIUMS' is written in yellow. Three individual Bio-Balls are shown in the lower right, highlighting their unique geometric, ribbed design. Text on the left describes the product's benefits and provides instructions. A barcode and company information are located in the bottom right corner.

CORALIFE

BIO-BALLS

TREATS UP TO 225-300 GALLON AQUARIUMS

Coralife® Bio-Balls enable aquarists to maintain large biological loads within much smaller filter areas. The unique geometric design of the one-inch diameter Bio-Ball creates a valuable, large surface area.

Approximately 5 gallons of Coralife® Bio-Balls has a surface area of about 107.5 square feet. This increased surface area supports between 225 and 300 gallons of marine life.

Instructions:
Rinse Coralife® Bio-Balls thoroughly before use.

A product of Central Aquatics (Division of Central Garden & Pet Company)
Franklin, WI 53132
888.255.4527
Coralife is a registered trademark of Central Garden & Pet Company
©2013 Central Garden & Pet Company
Item No. 08072 Made in U.S.A.

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Biofilters



Water Pumps

- Redundant Systems
- Contingency Plans

Air Supply





Lighting Components

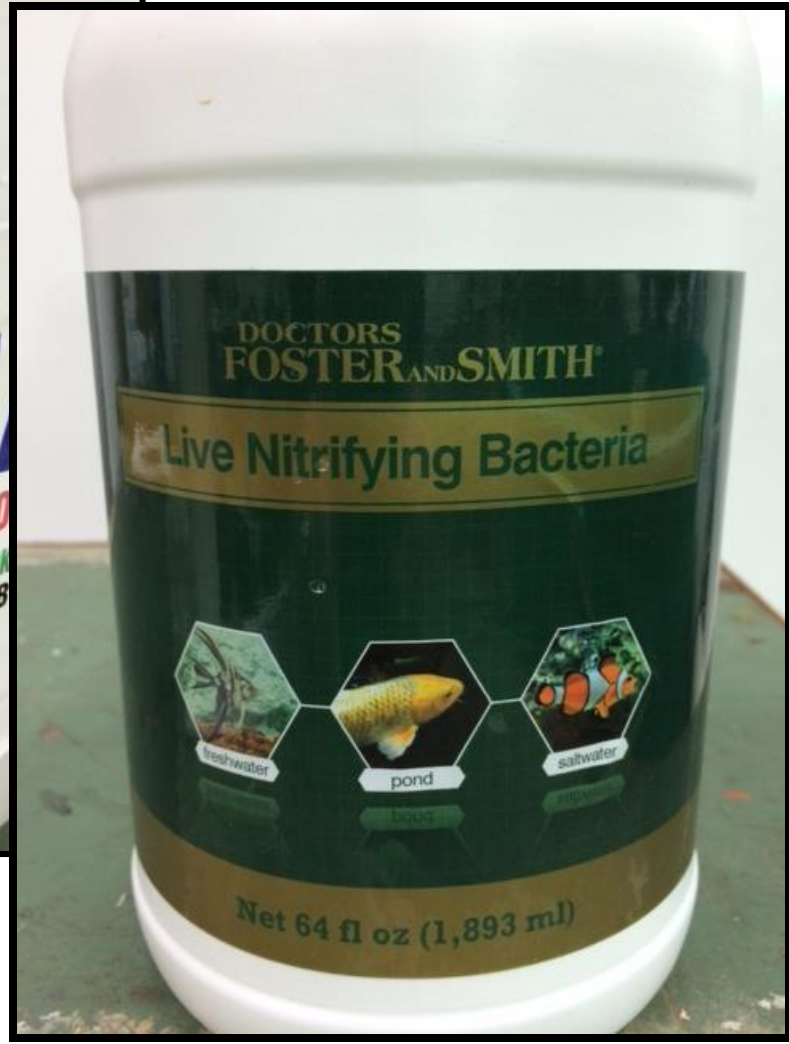
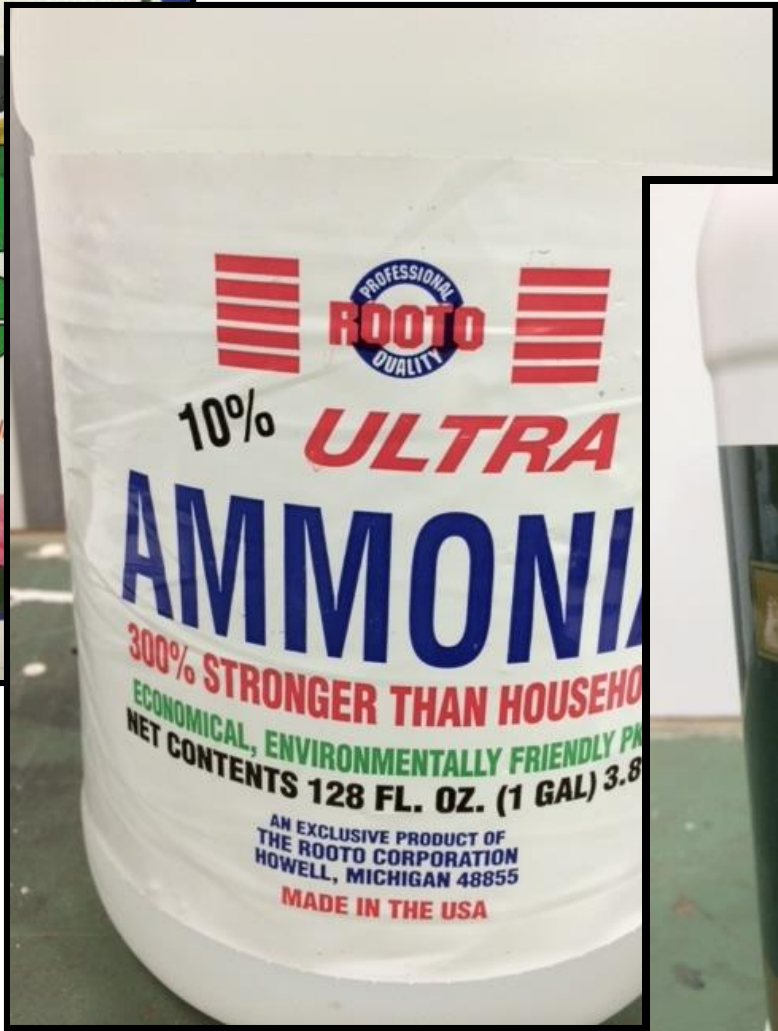


Growth Media

- Starter
- Grow out
- Additives



Growth Media



Attention!

- Redclaw crayfish are considered a possible invasive species in the State of Wisconsin.
- It is illegal to possess, transport, import Redclaws without special permission from the Wisconsin Department of Natural Resources.



Restricted Area

**Authorized
Personnel Only**

Native to Australia, there is concern about the redclaw's potential invasiveness in North America. Escaped individuals in Mexico have established some localized breeding populations in ditches and sloughs. This is highly unlikely in most of the United States due to their intolerance to cold winter temperatures and susceptibility to various North American fungal diseases to which the redclaw has no immunity. Also, although they can reach very large sizes, they are generally considered far less aggressive than most native North American species. Still, there is some concern that their large size may give the redclaw a competitive advantage for food and shelter over the native crayfish. In southern states, e.g. Florida, it is an accepted, but regulated pond-production species.

Agricultural Marketing Resource Center (AgMRC) at Iowa State University in Ames, Iowa, USA.

