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# MUD CRAB CULTURE

BY

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# CERTIFICATE

## SRI Y.N.COLLEGE

## NARSAPUR

## DEPARTMENT OF AQUACULTURE

CERTIFIED THAT THIS A BONIFIED REPORT OF PROJECT WORK ENTITLED IDENTIFICATION OF SOME MUD CRAB CULTURE IN BIYAPUTHIPPA BY U. CHANDINI, T. CHAYA VENKATA SAI. AND U. INDIRA PRASANNA OF BSC(FINAL) DURING THE ACADEMIC YEAR 2019-2020

SIGNATURE OF THE

HEAD OF THE DEPARTMENT

# DECLARATION

We here by declare that this project work entitled Mud Crab Culture had be carried out by U. Chandini, T. Chaya Venkat Sai and U. Indira Prasanna. This work has not been submitted by any other student of aquaculture related disciples in the college.

U. Chandini

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# ACKNOWLEGMENT

We have the honour and pleasure to express our deep sense Of gratitude to **DR.N.H.K.DURGA PRASAD,** head of the Department of Aquaculture, **SRI.Y.N.COLLEGE** for suggesting the Problem, valuable guidance for and encouragement throughout the course of this project work.

Our grateful thanks to **DR.N.H.K.DURGA PRASAD M.sc, M.Phill, Ph.D** Head of the Department of Aquaculture for Consolation and discussion about our project work.

I specially thank my lectures **DR. T.V. SATYA NARAYANA** and **MRS. G. SUNITHA** for their constant encouragement.

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# INTRODUCTION

" HABITS DIE HARD" is a gradually fading proverb. The present day seenario al over the world is to change one"s habits as fast as possible to sust the prevailing conditions lest the survival is difficult. It is beleved beyond all reasonable doubts , that the biological habits of all living beings are of contrdled by the environmental factors of the habitat in which they are living . Of late to meet the demands of ever inceasing population through exploration , there is every train to increase production through exploration of natural resources.

Man has made remarkable progress in various fields of science and Technology. They would have not been possible had he not explorted natural resources. To meet the incfeasing meals of buroycoming population every effort is being make by Scientists, Technologists and researchers to produce more goods and services with the help of technology

Water is one of the four elements which Aristotle has defined together with air, fire and earth as constituents of the universe. Erth the only planet having the vitual reasource, which is very important pre-requisite for numerous day to day activities of man like Agriculture, Industry, forestry, Aquaculture, Politics, Domestic tranquility and Foreign affairs.

India has along coastal line of over 800 K.M. with a variety of Natural ecosugstems and vast exclusive economic zone of about 2 million square kilometers of impounded surface water with high potency for fisheries. The various Island water resources are rivers

streams , lakes estuaries brackin waters and backwaters. Of all these estuaries and coastal habitats are nost dynamic and at the same time highly productive enviroons of the quatic systems of the World. Coastal areas in the country are home to some of the richest, most diverse and fragile natural resources. Coastal habits such as managrooves serve to protect coasts, prevent soil erosion and migrate the effects of natural disrters like, cyclones, tycoons and tidal waves . the such coastal habitat of India are used for (mud crab culture) fishers especially mud crab culture by a number of Farmers.

The necessity of developing new sources of animal facts and proteins demand better utilization of all available food resources which despite their nutritional value and relative abundance, remain unolur developed. Improved utilization of fishery resources would not only increase food production, but also would, do much to raise good protein content of the diet for the population. Since the oceans are being increasingly considered to be the treasure of future supplies of protein for the ever growing population

Aquaculture practice in our country supplies the protein to common people through fish culture, prawn culture. Fish and prawn culture practice by farmers easity takenover. But Crab – culture practice is no so easy as like fish and prawn culture.

Mud crab is highly popular due to its great demand in the export market. The commercial scale mud crab culture is developing fast along the coastal areas of Andhra Pradesh and other maritime states of India.

There is a good scope for its culture in the brackish water areas of India, because the female crabs at their breeding season produce ripe gonads **(the ripen gonads containing female crabs are fetching very high price in local, regional, and international market)**, and crab meat are of great export value and highly reliashed by foreigners.

The early larval development of S. serrata has five zoea larval stages and one megalopa larval stage. The 1$^{st}$ zoea and 5$^{th}$ zoea measure 1&3.5 respectively and stalked compound eyes are visible in all stages excepting 1$^{st}$ zoea. The planktonic megalopa stage is attained in a period of 20 days with an interval of about 3days for two successive stages.

The megalopa is seen with 5pairs of functional pleopods which help in balancing. The Juvenile crabs typically sheltered under loose slabs of sand stone and other rocks, or within clumps of mangrove roots, shaded by mangrove trees.

# TYPES OF MUD CRABS:-

## LARGER SPECIES

- The larger species is locally known as 'Green Mud Crab'.
- It grows to a maximum size of 22cm carapace width and 2kg in weight.
- These are the free living and distinguished by the polygonal markings present appendages.

## SMALLER SPECIES

- The smaller species is known as 'Red claw'.
- This grows to a maximum size of 12.7cm carapace width and 1.2kg in weight.
- This is without polygonal markings and has a burrowing habit.

Both species have good demand in the domestic as well as in the foreign market.

# GLOBAL DISTRIBUTION PATTERNS

- Analysis of the genetic population of S. serrata revealed that there are three distinct genetic stocks located in the Western Indian Ocean (WIO); Eastern Australia and the Pacific Ocean; and Northwestern Australia. The most widely distributed species of mud crab, S. serrata, is found as far west as South Africa, east to Tahiti, French Polynesia, as far north as Okinawa, Japan, and south to Sydney, Australia.

- The widespread distribution of Scylla spp. is assisted by a planktonic larval stage of several weeks duration that supports good gene flow between nearby populations. At a regional level, the genetic structure of S. serrata has been linked to hydrological circulation, supporting the theory that mud crab spawning migrations away from the coast assist gene dispersal, particularly along areas of coastal shelf.

# LIFE HISTORY

While mud crab megalopae appear not to be selective among estuarine habitats (seagrass, mud or sand), crablets (juvenile mud crabs) strongly select for a seagrass habitat, indicating that living within seagrass beds likely increases their survival. This supports the theory that mud crabs settle out of the plankton in the nearshore region of the coastal shelf and it is the crablets that colonize the estuaries. Crablets have also been reported to shelter in a variety of inshore habitats including reed beds, areas of aquatic macrophytes, under stones and within the mud and sandy sediments. An interesting aspect of the maturation of mud crabs is their apparently step-wise maturation process, where they pass through an apparent physiological maturation, before becoming functionally mature. In S. serrata, the first stage of maturation for a male occurs from CW 90–110 mm, while from CW 140–160 mm males develop their characteristic “large-claw” and mating scars on their sternum and front walking legs become apparent. A sudden change in the chela height to CW ratio has also been linked to functional maturation of males in S. paramamosain. The absence of mating scars does not confirm that a male is immature, as these can be lost between moults. In immature Scylla spp., a chitinous protrusion from the

sternite engages the abdomen, preventing it from opening, so that abdominal disengagement is required before either males or females can mate. In female mud crabs, the characteristic U shape of their abdominal flap, together with a well-developed fringe of setae around it, is a more obvious sign of maturation, together with their heavily pigmented abdomen and highly setose pleopods. Copulation typically follows the change of the abdomen from the more triangular immature female to the more rounded, broad form. Typically, males guard mature females, cradling them prior to their moult. The male carries the female underneath him using three pairs of walking legs. The male can successfully mate and transfer spermatophores (packets of sperm) into the female's spermathecum once she has moulted and is soft shelled. During copulation, which may last 7–18 hours, the male turns the female upside down. The female stays in the protection of the male until her shell is fully hardened, which may be several days. The subsequent development of the ovary can be seen by depressing and pushing forwards the first abdominal segment next to the carapace on female crabs. Ovaries change colour as they mature, progressing from transparent through to yellow and finally dark orange, although a more accurate description of the maturation process can be obtained through microscopic examination. A mature female mud crab produces from 1 to 6 million eggs, with the larger species producing larger numbers of eggs, and larger individuals typically carrying more eggs. Females retain sperm after mating so that 2 or even 3 egg masses can be produced without the further intervention of a male. As males can sense when mature females are ready to moult and so be receptive to mating, it is estimated that over 95 percent of all hard-shelled mature females have been mated and will become ovigerous. Once eggs have been spawned and an egg mass

(or sponge) produced, the time to hatching and the release of larvae is temperature dependent, with a shorter time to release at higher temperatures within the animals natural temperature range, and longer times at lower temperatures. Once released, the longevity of each larval stage is similarly temperature dependent, with survival rates linked to both temperature and salinity. As a result, the length of time of the five zoeal stages and the one megalopa larval stage found in the plankton can vary considerably before settlement to the first crablet stage (C1). In the tropical and subtropical parts of their distribution, recruitment can occur throughout the year, while towards the temperature limits of their distribution it is more seasonal, linked to water temperature. As the crablets grow, they can moult up to 15 times in the case of S. serrata to reach their legal size of 150 mm in India; however, moulting is done everymonth, for this moulting process, dolemite is given to pond water 120kg/hectare. The differential shape of the male and female abdomen can be used to determine the sex of S. serrata over 3 cm CW. However, most reach 15 to 20 cm CW. As the crabs grow, the intermoult period gradually increases.

# CRAB FATTENING

After moulting, crab musculature takes some time to grow to fill its new shell, so the crab is referred to as “empty”, “thin” or a “water crab”. If such a crab is cooked, it will appear to have little meat and lots of water in it, a most disappointing experience for a consumer. Mud crab fattening refers to the process where by, “empty crabs”’ identified at harvest (either from the wild or from farm stock), are held and fed for a period, often of only a few weeks, until they are full of meat and ready to market.

# PENS, TANKS AND CAGES FOR CRABS FATTERING

Various structures, including cages, floating cages, ponds or tanks can be utilized to hold mud crabs for relatively short periods of time for fattening. As long as the mud crabs are held in water of suitable quality, fed regularly and precautions are taken to minimize disease, crabs for fattening can be reasonably high densities. Fattening operations may be constructed within an existing pond or pen, a tidal river or creek. More sophisticated systems can be operated in flow through or recirculating land-based aquaculture facilities.

# SILVICULTURE AND CANAL SYSTEMS

In many Asian and Indo-Pacific nations, significant areas of mangrove forests have been damaged, removed or degraded over the decades. To counter this, large areas of new mangrove forests have been planted in many countries, including Indonesia, the Philippines and Viet Nam. In addition to the lumber they will produce in time, these new forests are often constructed around canal systems to ensure adequate circulation and drainage. Such systems have also provided an opportunity for low-intensity culture of mud crabs, both in canals and within the new mangrove forests themselves. Areas of the forest may be fenced to minimize escape of mud crabs stocked into the area, or if a communal approach is taken to the culture of crabs within the forest, there may be no structures to retain stock. This is because it is assumed that the community will share the benefits of stocking the area with crabs.

# CELLULAR SYSTEMS

Some investment has been made in developing cellular systems to culture mud crabs, following research and development that identified their potential. In cellular systems, crabs are held individually in containers (or "cells") to mitigate against the risk of cannibalism and in an attempt to provide optimal conditions for growth. While such systems have been developed, their primary use has been in the culture of soft-shell crabs. In these systems, small mud crabs (80–120 g) are held in isolation until they moult, at which point they are either chilled or frozen before their new outer shell can harden. Typically, crabs are only held in the system for a few weeks until they moult. Systems have been built with a variety of technological systems incorporated into them to minimize labour and maximize automation. Probably the most sophisticated system designed to date includes cameras linked to a computer system that regularly scans cells to see if one or two crabs are in each cell. Two crabs in a scan means the crab has moulted, leaving an empty shell and a soft-shell crab that needs to be harvested. This system also includes a sophisticated water recirculation system. Crabs for such systems are obtained either from wild harvest or farmed crabs. The capital-intensive nature of such systems appears to have made their use for the whole grow-out process prohibitive at this time. Farmers have focused on softshell production to maximize the return on their investment, using a high throughput of stock.

# GROW-OUT OPERATIONS

## PONDS

Preparation for stocking Prior to stocking, after the previous harvest, ponds should be dried out for several weeks and any repairs undertaken. This assists in ensuring any unwanted species are removed from the pond that may be competitors for feed fed to crabs or predate on crablets. If a layer of sludge is left in the pond after the previous crop, this should be removed for storage and remediation. Turning over the soil in the bottom of the pond, or tilling, can assist in preparing the pond for the next crop. This helps in the breakdown of organic residues and release of nutrients. Tilling can be combined with the addition of lime to pond floors. Liming can be used to improve the pH of pond sediments, accelerate decomposition of organic matter and improve fertilizer response. Some ponds used in crab production may be difficult to drain, and may be restocked after harvest without draining. To eradicate competitors or predators for mud crabs from the pond, the water should be treated. Appropriate treatments permitted for such use should be obtained from aquaculture or farming authorities within the country. Possible treatments include tea seed cake and rotenone. Brackish water or saltwater being used to fill a mud crab pond should be filtered through a small mesh “sock” or “bag” of approximately 120 μm mesh to reduce the risk of other species entering the pond. If other species become established in the pond, they may predate upon introduced mud crab stock, consume their feed and use up oxygen in the water while providing no increase in crop value. As mud crab culture in low salinity water (5–12 ppt) has been linked to low survival of stock and delayed moulting, ponds

should be stocked with brackish to fully saline water (10–35 ppt). The growth of S. serrata crablets in Andhra Pradesh has been demonstrated to be optimal at salinities of 10–25 ppt; however, the optimal salinity regime for an entire crop has yet to be published. While some crabs can grow under a wide salinity range from 5 to >35 ppt, juvenile crabs are often held in brackish water (15–25 ppt) for optimal growth.

## STOCKING FOR MONOCULTURE

A wide range of stocking densities has been trialled for mud crabs. Compared with penaeid shrimp, mud crabs are stocked at relatively low densities (0.5–1.5 crabs/m2) with survival rates as high as 67 percent. These stocking densities reflect both the size of individual mud crabs and their tendency to cannibalistic behaviour. However, stocking at higher rates of 1–3 crabs/m2 has been used with survival from 40 to 60 percent. Stocking mud crabs from 0.5 to 3.0 crabs/m2 is considered semi-intensive, compared with extensive mud crab culture commonly practised in Andhra Pradesh. When farming was solely based on collection of mud crabs from the wild, stocking rates used were as low as 0.1–0.2 crabs/m2 for S. paramamosain, but now with the availability of hatchery produced crablets stocking is commonly 1.0–1.5 crabs/m2with a size range of 1.2–2 cm CW. It has been demonstrated that semi-intensive operation of ponds are more profitable than extensive systems and that stocking size, as well as feed used have a significant effect on the final bodyweight of mud crabs. Survival rates of mud crabs in ponds vary considerably, no doubt reflecting husbandry practices, water quality parameters and the quality of stock, with reports ranging to highs of over 70 percent. The monoculture of mud crabs can be undertaken in rotation with shrimp culture. As mud crabs are

naturally cannibalistic, it is important to try and minimize this. One approach worthy of adoption is to stock ponds with crablets of as near the same size as possible, to minimize the risk of larger crabs feeding on smaller ones.

## STOCKING FOR MONOSEX MONOCULTURE.

It has been reported that male crabs attain a significantly higher final weight than female crabs. As crabs can usually be sexually differentiated by the time they are at the C4–C6 stage by examination of the shape of their abdominal segments (see Figure 1.5), ponds can be stocked for monosex culture from advanced crablets. Stocking with monosex mud crabs can simplify post-harvest processing and may minimize aggressive behaviour between crabs associated with sexually maturity. Another potential advantage of monosex culture is that at least one study has found that survival of monosex mud crabs was significantly higher than among mixed sex crabs.

## STOCKING FOR POLYCULTURE.

Mud crabs can be polycultured successfully with species including milkfish, grass shrimp, Litopenaeus vannamei, tiger shrimp (Penaeus monodon), Gracilaria spp. and other marine species. Stocking is typically at densities below those used for monoculture of either species. Survival rates for S. serrata grown in polyculture systems have been reported from 27 to 40 percent, with shrimp from as low as 8 percent to a high of 79 percent. In Viet Nam, in extensive shrimp and crab polyculture, crabs are stocked 10–15 days after shrimp are stocked, at 0.01–0.2 crabs/m2. Low survival rates of 15–30 percent have been reported. In polyculture systems in the Philippines, mud crab juveniles may be stocked at 5 000–10

000 per hectare in combination with milkfish fingerlings at 500–2 500 per hectare or shrimp post-larvae at 10 000–20 000 per hectare. In China, polyculture of mud crabs with Penaeus monodon has been undertaken with mud crabs stocked at 7 500 per hectare and shrimp at 9 × 104 per hectare.

# STOCKING OPERATIONS

- Preferably, all stock should arrive at a farm with health checks already completed. Even with a clean bill of health, the quality of crablets (and juvenile stages of other species being stocked for polyculture) must be assessed for quality prior to stocking. To assess the quality of a batch of crablets one should examine the following criteria: Visual health – pick a subsample of crablets and examine for fouling, unusual coloration, damage to legs or claws. Size variation – while crablets in any batch may be at different moult stages, size
- Variation should be minimal. Extreme variation in size indicates batches may have been combined. Too large a variation in size increases the likelihood of losses to cannibalism. Activity – if crablets have been transported to farm at temperatures less than
- Optimal, they may be sluggish. After equilibrating to ambient temperature, they should be actively walking or swimming. On arrival, crablets (or representative samples of each batch) should be counted to ensure the order has been fulfilled. Crablets can be transported to a growout facility with or without water. If packed in water they may be cooled to 22–24 oC to prevent moulting on the way to the farm and to lower oxygen consumption. At the farm, crablets should be put in basins (or similar containers) with a small amount of water

from the pond for which they are intended to acclimatize. Once acclimatized to the temperature of the water and its salinity, they can be released into the pond. For larger ponds, distributing them from several different points around the pond to assist in distributing them evenly around the pond is recommended.

# MONITORING

- As in any farming venture, monitoring various parameters related to the crop will, over time, develop into a knowledge management system that can assist the farmer in decision-making and operating a more profitable enterprise. Parameters that should be monitored include: water quality;
- Feed consumption
- Mud crab growth and survival; and
- Mud crab health.
- While some of the optimal water parameters for mud crab farming can still be considered to be under development, such have been developed for shrimp, another crustacean similarly farmed in subtropical and tropical environments.

# POND OPERATIONS

The oxygen concentration of brackish water or saltwater in ponds should be kept above 3 ppm or preferably at 5 ppm. As mud crabs are currently farmed at densities that can be considered semiintensive, maintaining reasonable levels of oxygen is usually not an issue. However, it is worth having access to paddle wheels or aerators for ponds to counter events that can occur suddenly, lowering oxygen levels, such as algal crashes within the water column.

# FEEDS MUD CRABS

Feed mud crabs can be successfully raised on a variety of diets including low-value/trash fish slaughter wastes, fish wastes , horse mussels, brown mussels, brackish water snails, shrimp heads, golden snails (Pomacea canaliculata), telescope snails (Telescopium telescopium), small bivalves (Potamorcorbula spp.), animal hides, entrails, kitchen leftovers and formulated shrimp feeds. Development of formulated feeds for mud crabs is likely to become increasingly important as trash fish and other wild resources come under increasing pressure for use as feed for various types of aquaculture and for human consumption. It has been shown that S. serrata gain weight faster and moult more frequently on diets containing higher protein (up to 55 percent of diet) and lipid (up to 15 percent of diet) levels. The same study demonstrated formulated feeds can produce feed conversion rations (FCR) of 1.2 to 2.1:1 for juvenile crabs. Related work also demonstrated that by increasing the protein content of mud crab feeds from 25 to 45 percent there was also a progressive increase in the protein content of crabs. From a feed formulation perspective, the levels of protein and lipid for incorporation would need to be based on economic outcomes, taking into account the cost of various formulations and the net value of the growth they support. A range of plant and terrestrial animal-based ingredients can be efficiently digested by mud crabs, which have digestibility coefficients not significantly different from fishmeal. This ability to digest plant sources of carbohydrate is supported by work that demonstrated mud crabs have amylase and cellulase in their digestive system.

# PACKING AND TRANSPORTATION

## PACKING

For local, domestic markets, mud crabs can be packed in plastic crates or containers of various descriptions. However, for export markets involving airfreight, wax-lined cardboard boxes, with ventilation holes at each end of the box, are commonly used. The design of such boxes has to be one approved for use by the airline companies. Of common use in Southeast Asia are boxes designed to hold approximately 14s kg of crabs, packed in two layers. They are clearly marked with “up” arrows to indicate which way up they should be stacked. Boxes used, the standard of processing facility, treatment of mud crabs prior to packing and their condition on arrival in a country may be defined by that country’s export quality specifications. As such, there may be some variation as to how crabs are packed and managed for different markets. As there can be many grades of mud crabs packed separately, boxes should be made up prior to a packing session commencing. Staff should wear protective clothing and footwear that is easily washable, e.g. aprons and boots. To assist in absorbing moisture, layers of paper are put in the bottom of the box, between the two layers of crab and on top of the crabs. Improved absorption can be achieved through the use of an absorbent pad or pads, made especially for such packing procedures, which are placed on the inner bottom of the box. Crabs should be packed so that claws are not facing the outer edge of the box, with head and claws tilted towards the top of the box. This minimizes the risk of mud crabs becoming partially untied during transit and pushing their claws through box walls, potentially damaging freight handlers. Each box should be clearly identified as

to the grade of crab, the packer's number (to ensure the accountability of the packer), receival number (for traceability), date and total net weight of mud crabs packed. Prior to shipment, boxes should be stacked neatly on pallets or similar. Boxes should not be stacked so high that lower boxes may be damaged by the weight of boxes and crabs above them. Four or five boxes high is usually acceptable for adequately constructed airfreight boxes. At the end of a processing day, all equipment, floors and walls need to be appropriately cleaned, sanitized, tidied away and left to dry. The cool-room or processing shed should be closed when not in use in order to maintain temperature and keep out vermin or insects. Gentle handling has been found not to create stress in mud crabs, so if daily sorting is necessary for crabs held in temporary holding facilities, this need not be avoided.

## TRANSPORTATION

The best processing of mud crabs can be ruined by poor procedures and practices during the transportation process to market. The more steps there are in the transportation process, the more difficult it is to manage. If packed mud crabs are exposed to very high or low temperatures, they can be stressed and even die, if exposed to temperatures outside their preferred range for too long. Sudden changes in temperature can stress mud crabs, causing significant fluctuations in soluble protein and sugars. Temperature monitors can be packed in boxes that will measure temperature variation over time. Such information can assist in discussions with freight companies, airlines, wholesalers and retailers; identifying where in the supply chain temperature stress has occurred. Other problems such as rough handling may be more difficult to identify,

but the use of alternative freight companies or airlines, if available for particular destinations, may assist in defining where improvements need to be made and what interventions may be required.

# HEALTH MANAGEMENT

## MUD CRAB DISEASES

While some diseases such as white spot syndrome virus (WSSV) and Taura syndrome virus (TSV) often have little affect on mud crabs, they are known to be effective carriers and potentially viral reservoirs of these diseases. While the presence of WSSR in mud crabs can be assessed using polymerase chain reaction (PCR) testing, it has only rarely been reported that the virus can cause mortalities in them. In fact, the farming of mud crab in areas where shrimp farming has been devastated by WSSV has been recommended as an alternative farming opportunity.

## HEALTH MANAGEMENT

The development of a health management programme is a recommended strategy to minimize the risks of disease affecting any particular farm. Such a programme should be farm-specific and tailored to address key procedures and practices. A health management programme should address all key operational issues such as: pond or pen management

;•health monitoring;

•water quality management;

•feed management

;•husbandry practices;

•record-keeping;

•source of stock.

The source of stock has become a significant issue for international aquaculture. Stock of many aquaculture species has been translocated between countries and even continents, with some of these moves resulting in the transfer of diseases with that stock. The benefits of translocating stock need to be balanced against the risks involved. Importing stock should only be undertaken with appropriate safeguards, such as adequate health checking and quarantine procedures, in place to minimize the risk of introducing disease, as recommended in Article 9 of the Aquaculture Development section of the FAO Code of Conduct for Responsible Fisheries (the Code). The four species of Scylla each have different geographic distributions, habitat and environment preferences. These should be seriously considered before any attempt is made to distribute them outside of their natural distribution, as inappropriate conditions for farming will lead to stress and increase the risk of disease.

## DISEASE MANAGEMENT AND TREATMENT IN MUD CRAB FARMING

A limited number of treatments have been developed to assist mud crab farming operations. Much of the work in disease management has been directed to hatchery operations to improve mud crab larval survival, where the control of both bacterial and fungal infections has been critical. Improved pond management is the other area where substantial improvements can be made. While

prophylactic treatments, such as antibiotics for bacteria, or fungicides for fungi, have been used successfully to improve survival in mud crab larval systems, more progress has been made by the development of improved culture systems that reduce the risk of such infections in the first place. The use of any chemical to treat a disease must be within government regulations controlling their use and under the supervision of trained staff. In ponds, the use of quicklime as part of preparation prior to filling and stocking to disinfect ponds and reduce the incidence of disease has also led to improved survival, faster growth and more synchronous moulting of mud crabs. A significant opportunity to reduce the incidence of disease on a farm is through strict control of sourcing broodstock and crablets. Avoid broodstock from areas known to have problems with parasites or disease. Already, attempts are being made to domesticate mud crab broodstock. Once this has been undertaken successfully, and stock with high health or disease-free status produced, stocking from this source, rather than wild broodstock or crablets, will further reduce the risk of disease on a farm. Some diseases, for example Hematodinium, appear to be related to the conditions under which crabs are kept. As optimal conditions for different Scylla spp. become better known, extreme conditions should be avoided, as they increase stress on stock and make them more susceptible to disease. Towards the edge of some mud crabs' distribution, this might mean that one rather than two crops a year may be produced, linked to favourable weather conditions. Alternatively, innovations can be developed to ameliorate conditions to support farms operating outside of ideal conditions, as has happened with overwintering of mud crabs in areas of China.

# CONCLUSION

With all the utmost responsibility of exclusive involvement, We sincerely would like to end up here to conclude and submit our assessment of project assignment under the topic “MUD CRAB CULTURE” from Aquuaculture department to us its an enormous encouragement and support to accomplish our task of exaggeration and inspirational accuracy of playing a vital role of our to persuade the unidentified localities of the world to make them to attain a greater innovative achievement. we here to conclude our project working assignment with lots of blithe and with ritual submission of spirit.

Thanking You


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