Mini review on value chain of brachyuran crab aquaculture and capture

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Abstract

Crabs are decapod crustaceans living in oceans, freshwater and on land. They are omnivorous scavengers and carnivores. Many of them are edible with tremendous aquaculture potentials. Crabbing in recent years increased rapidly due to nutritive value, and their need for local and international market. Different kinds of gears used for capture are sometimes baited with edible stuff. Catch could be demobilized by tying chela to the body in readiness for the market. Live crabs caught for fattening are handled with care to avoid cracking and other form of cannibalism. Good yield could be obtained by adding appropriate nutritional value to those in captivity. Handling and processing roles might consider methods that could deliver wholesome crab meat. Shelf life could be extended generally by rehydration and temperature reduction. An unbroken cold chain would enhance keeping quality and taste of both processed and unprocessed catch.

Keywords: Edible crab, Cultivation, Capture, Value addition, Review

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Introduction

Many brachyuran crabs with rich diverse species and recognizable potentials are endemic to African continent. The crabs are mostly omnivorous scavengers, but some are opportunistic carnivores feeding on plant materials and preying on prawn and fish, and on dead animals (Pers. Obs.). High economic value and potentials of export commodity, gave rise to escalation of crabbing. They are expected to become important foreign exchange earners if properly harnessed (Adeogun *et al.,* 2011). As high valued commodity, they are exported to international markets in China, Korea, Taiwan, Malaysia, Singapore, Canada and Switzerland. Crab fattening and trading are treated as profitable venture and subsistence of many coastal people (Mahmud and Mamun, 2013). The freshwater species are endowed with relatively low fecundity and poor dispersal ability that do not help their diversification (Yeo *et al.,* 2008). The marine crabs release thousands of planktonic larvae in contrast to small number of offspring in the freshwater crabs (Anon, 2013a). However comparative and measurable variables (Fig. 1) in the male and female (Anon, 2013b) could be revealed in the relationships between their morphometric and dimorphic characteristics (Akpaniteaku *et al.,* 2018). Despite their distribution range throughout the tropical and warm temperate zones of the globe, they are a strangely neglected component of inland aquatic ecosystem (Dobson, 2004). Harnessing of the resource, processing and cooperation among different stakeholders would enhance capture and crab aquaculture.

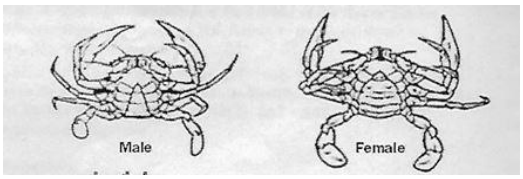

Figure 1: Marine crab (*Scylla* spp.)
Source: Anon (2013b)

Crabbing

Crabs constitute important nutritional resource for many mammals, fishes and birds especially heron (Pers. Obs.). They are mainly captured for consumption in many parts of the world both at subsistence level (Dobson *et al.,* 2007) and as part of commercial fisheries (Sachs and Cumberlidge, 1991). They are considered a summertime delicacy; and abundant in every bay and inlet along pacific coast (Moravec, 2018). Many are found in around freshwater (Fig. 2) but generally dependent on wet terrestrial environment for survival, for example, cave dwellers, forest dwellers and tree-climbing crabs. The juvenile stages of most so called terrestrial crabs occur in water though endemic to their respective zoogeographical regions (Yeo *et al.,* 2008). Freshwater crabs that inhabit muddy burrow could be enticed from the shelter with polyethylene materials tied to the tip of sliced bamboo. They could also be attracted to sliced rib with bait (Akpaniteaku, 2013). Crabbing with crab pot (square trap) would require a

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dip net for scooping errant crabs. During the operation, thick crabbing gloves, culling stick to assist in removing them from the net, and container for storing catch are necessary. Large square trap could be made out of chicken wire with entrances to enable the crab access bait. The entrance could be constructed in such a way that allows crabs to get trapped after accessing the bait (Moravec, 2018).

Figure 2: a) Freshwater crab (*Potamon ebonyicum*) Source: Akpaniteaku *et al.* (2018). b) Crab (*Scylla* spp.) Source: Anon (2013b).

Crab rings are effective in water, and should be operated from a boat or pier. They lay flat in the water, creating basket that funnels crab to the bottom. Minimum size requirement for crabs are specified for every aquatic environment, and measuring device is essential on the boat. Fresh bait would attract them into the ring. Soaking time of 20 to 45 minutes may be required, and the trap can be pulled up evenly to prevent catch from crawling out. Harnesses should be used instead of line. Line would be secured to the ring by 3-way and 4-way harnesses to keep the trap level and prevent escape. Where space is problematic, collapsible traps should be operated from a small boat (Moravec, 2018). Capture rate is strongly affected by such factors as seasonality. Notwithstanding domestic and export demands need to be increased by promoting awareness of their nutritive value (Adeogun *et al.*, 2011).

Crab Aquaculture

Demand for crab meat increased rapidly and created great potential for development of the aquaculture (Ihwan *et al.*, 2015). As opportunistic feeders and scavengers, they would use the tip of walking legs which are highly sensitive to touch to locate food (Fielder and Heasman, 1978). They readily eat meat including live invertebrate, as well as variety of vegetable matter (Dobson, 2004). Some investigations on cultivability gave insights to early life history, which could be extrapolated to field conditions. Substrate and density effects on survival and growth of the juvenile would help to assess saturation of the culture substrates. High survival

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rate could be possible in the juveniles that were cultured with artificial substrate at low to intermediate density (Daly *et al.,* 2009). And high rates of survival of the juveniles due to abundance of shelter would allow newly molted individuals to evade cannibalism (Zmora *et al.,* 2005). The stocking density is expected to be low during the unfavorable condition compared to when it is favorable for fattening (Ferdoushi, 2015). Seed multiplication should be carefully handled because size of berried female might not reflect the number of eggs especially in freshwater crabs. The disparity in population of the male and female could be resolved by fixing their density during culture (Akpaniteaku, 2014). Some aquaculturists would change pond water as integral part of the fattening process. Ponds with water exchange facility are found to have higher production capacity than those without the facility. High price and crab availability would influence decision of most fatteners during festive period. Crab fattening mainly involves feeding and daily monitoring of behavior; and fatteners could feed at 5 to 10% body weight (Ferdoushi, 2015).

Handling and processing

Processing and handling begins with capture, going through a number of intermediaries such as crabbers, fatteners, middlemen, depot owners and exporters to the foreign countries. The crabbers are most disadvantaged for not selling at actual market price to the middlemen (Mahmud and Mamun, 2013) probably because of timing and lack of processing facility (Pers. Obs.). It is difficult to determine pain in animals, and very difficult to state categorically that pain is experienced by decapods. The idea that fish experience pain has broader acceptance than does the idea of decapod pain (Elwood, 2012). When attempting to pick up marine or freshwater crab, it is advisable to move quickly from the back (Grubert and Phelan, 2007; Akpaniteaku and Okoye, 2018). Different holding methods are adopted in the two major groups of crab because of their body structure, anterior spiny edge of the carapace (shell) in the marine and non-spiny edge in the freshwater species (Pers. Obs.). Placing index finger on the top of the carapace and holding the last pair of legs for the marine crabs (Elwood, 2012), and holding the claws carefully to the body for the freshwater crab (Akpaniteaku and Okoye, 2018). Declawing crabs is more stressful than induced autotomy (discarding of body part by crab under threat) of claws. The induced autotomy would cause smaller wound to the body and lower mortality rate than declawing (Patterson *et al.,* 2007). The crabs come in all forms and sizes with shelf life heavily dependent on proper storage. Refrigerated crab should be stored in airtight container to ensure a long shelf life. Professor (2014) was of the opinion that cooked crab meat, could last as long as 2 to 4 months if stored in the freezer. The quality would keep at

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its best during the period but diminishes thereafter. At frozen temperature of 0^0c, the meat can stay safe indefinitely to eat. At storage condition ranging from 2 hours at room temperature to 3 months when frozen, cooked crabs would last for various length of time (Professor, 2014).

Conclusion

Brachyuran crabs are edible decapods with wide distribution range across marine and freshwater environments. Crabbing could be done with both simple and fabricated gears. Storage of catch in the rural area should be done in wet cool and protected environment. Live crabs reserved for future use should be checked often to avoid water pollution and suffocation. The water must be changed every other day until the crabs are disposed. Catch processing for the international market must go through cold chain to preserve the taste and protect them from bacterial activity. Crabbers should use cube or flake ice during their operation to ensure timely process of cold chain. At all levels of handling, gradual reduction of temperature should be practiced to ensure good quality product.

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