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Native and non-native ornamental aquarium fishes of Bangladesh

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ABSTRACT

The study was conducted in Dhaka, Bangladesh. It was carried out for twelve (12) months from March 2018 to February 2019 to prepare a complete update checklist of native and non-native aquarium fishes of Bangladesh. During the current study, 270 varieties (230 freshwater, 36 marine, and 4 brackish water) belong to 149 species (109 freshwater 73%, 36 marine 24% and 4 brackish water 3%) of 38 families under 10 orders and 6 crossbreeds' varieties were recorded. Considering the number of species maximum 83 (55.70%) was found under the order Perciformes followed by Cypriniformes 24 (16.10%), Characiformes 18 (12.08%), Siluriformes 11 (7.38%), Osteoglossiformes 05 (3.35%), Atheriniformes 03 (2.01%), Lepisosteiformes 02 (1.34%), Polypteriformes 01 (0.6%), Myliobatiformes 01 (0.67%) and Cyprinodontiformes 01 (0.67%). The top five popular species were guppy (13.16%) followed by goldfish (12.39%), molly (8.54%), angelfish (6.23%), platy (5.93%). The number of fish species' increasing tendency was 5.96 times in the last 15 years, and 3.31 times in the last ten years. Local farms and aquarists' breeders bred 76 varieties under 23 species due to its high demand and profitability. Pricing varied on varieties, species, size and breeding status (local or abroad), availability, and ranged from BDT 40.00-80,000.00 per pair. According to the findings, aquarium fisheries are highly profitable and will be a potential sector in Bangladesh.

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1. Introduction

Localized in South Asia, having spidery webs like rivers, low-lying lands, and immense potential of aquatic biodiversity resources, it is inevitable that fish plays an integral part in the people's daily lives in Bangladesh. Aquarium fishes are attractive colorful fishes of various characteristics, which are kept as pets in confined space of an aquarium or a garden pool for fun and fancy (Chakravartty et al., 2012). These living jewels need not always have bright colors, as sometimes their peculiar characteristics such as body color, morphology, mode of taking food, etc. may also add to their

attractiveness (Selvarasu & Sankaran, 2010). An aquarium is an enclosed body of water containing a mixture of selected and unselected captive living aquatic organisms. It is essentially unstable, and to obtain stability must be carefully designed and managed (Suxena 2003).

Ahmed (1956) recorded three import fish species, which were- Gourami (Trichogaster pectoralis) from Singapore in 1952, Goldfish (Carassius auratus) from West Pakistan in 1953, and Tilapia (Oreochromis mossambicus) from Thailand in 1954. But now, this business is widespread all over the country (Akhter,1995). The business of ornamental fish is now very popular globally and a rapidly growing venture in Bangladesh (Galib and Mohsin, 2010). Nowadays, farmers and investors are very interested in moving their business to more diversified fields such as crocodile culture, pearl culture, aquarium fish trades, etc. (Mostafizur et al., 2009). The study area was selected in Dhaka city because it is considered the hub of aquarium fish trade in Bangladesh. However, previous studies were done long ago, such as 22 varieties by Arif et al. (2018), 29 varieties by Alam et al. (2016), 17 varieties under 12 species by Galib et al. (2013), 25 species by Faruk (2012), 79 varieties under 46 species by Galib and Mohsin (2011), 30 species by Mostafizur et al. (2009), 12 species by Mohsin et al. (2007) and 25 species by Rahman (2005). The present study was conducted following some specific objectives- to know the types, availability, breeding status, and price.

2. Material and methods

The study was conducted at the Katabon aquarium fish market, Tajmahal road, Mohammadpur, Hatipool road, and Kachukhet, Mirpur in Dhaka city period of twelve (12) months from March 2018 to February 2019. Frequent field visits were made during the study period to study area for collection of primary data. The primary data were collected by a survey divided into their sub-divisions, such as eye observation, farm walk, and interview with a questionnaire. Forty different aquarium shops and 40 respondents of aquarium shopkeepers, 20 respondents of aquarium hobbyists, and 5 respondents of aquarium fish breeders were interviewed during the survey. Primary data and the fish species' identification for creating the checklist were cross-checked with secondary data such as journals, books, authentic online databases, online ornamental fish shops, and other published documents. A taxonomic study was used to prepare the checklist of aquarium fish. The availability of ornamental aquarium fish was determined by counting the numbers of individual species and varieties. Numeric data were analyzed using Microsoft Excel 2016. Textual data were formed with the help of Microsoft Word 2016.

3. Results and Discussion

The checklist consists of 270 aquarium fish varieties under 149 species, 115 genera and excluding 6 cross breeds (Table1).

Table 1: Checklist of aquarium fish in Bangladesh, according to their systematic position

Order	Family	Scientific name	Common name (English)	Habitat	Availability	Breeding status (Non-native fish)	Native and Non-native status	Price range (BDT/pair)
Cypriniformes	Apteronotidae	*Apteronotus albifrons*	Black ghost knife fish	FW	R	I	NN	850-1100
	Cyprinidae	*Balantiocheilos melanopte*	Silver shark	FW	C	I	NN	150-250
		Puntigrus tetrazona	Green tiger barb	FW	VR	I	NN	220-260
		Puntigrus tetrazona	Tiger barb	FW	VC	LB and I	NN	60-120
		Puntigrus tetrazona	Golden tiger barb	FW	R	I	NN	150-220

Order	Family	Scientific name	Common name (English)	Habitat	Availability	Breeding status (Non-native fish)	Native and Non-native status	Price range (BDT/pair)
		Puntigrus tetrazona	Albino tiger barb	FW	R	I	NN	180-250
		Sahyadria denisonii	Denison barb	FW	VR	I	NN	1100-1300
		Barbonymus schwanenfeldii	Tinfoil barb	FW	R	I	NN	220-380
		Pethia nigrofasciata	Ruby barb	FW	VR	I	NN	400-450
		Puntius titteya	Cherry barb	FW	VR	I	NN	160-180
		Pethia conchonius	Rosy barb	FW	C	LB and I	N	120-180
		Danio rerio	Zebra danio	FW	C	LB and I	NN	80-120
		Devario sondhii	Fireline devario	FW	VR	I	NN	350-400
		Danio nigrofasciatus	Spotted danio	FW	VC	LB and I	NN	90-120
		Carassius auratus	Black moor	FW	VC	LB and I	NN	80-450
		Carassius auratus	Bubble eye	FW	VR	I	NN	400-2000
		Carassius auratus	Calico	FW	C	LB and I	NN	80-300
		Carassius auratus	Celestine Eye	FW	R	I	NN	120-450
		Carassius auratus	Comet	FW	VC	LB and I	NN	80-350
		Carassius auratus	Fantail	FW	VC	LB and I	NN	80-750
		Carassius auratus	Veiltail	FW	C	LB and I	NN	180-450
		Carassius auratus	Lionhead	FW	C	LB and I	NN	120-550
		Carassius auratus	Oranda	FW	VC	LB and I	NN	200-450
		Carassius auratus	Redcap	FW	VC	LB and I	NN	150-450
		Carassius auratus	Ryukin	FW	C	LB and I	NN	250-650
		Carassius auratus	Pearl scale	FW	C	LB and I	NN	600-1500
		Carassius auratus	Shubunkin	FW	C	LB and I	NN	180-500
		Cyprinus carpio	Assorted koi carp	FW	VC	LB and I	NN	120-5000
		Cyprinus carpio	Tiger koi carp	FW	C	LB and I	NN	120-2000
		Trigonostigma heteromorpha	Harlequinr rasbora	FW	VR	I	NN	250-450
		Danio margaritatus	Galaxy rasbora	FW	VR	I	NN	800-1200
		Trigonostigma hengeli	Glowlight rasbora	FW	R	I	NN	250-450
		Epalzeorhynchos frenatus	Albino shark	FW	R	I	NN	180-220
		Epalzeorhynchos frenatus	Rainbow shark	FW	VC	I	NN	120-140
		Myxocyprinus asiaticus	High fin shark	FW	VR	I	NN	3000-3500
		Puntius denison	Roseline shark	FW	VR	I	NN	800-1200
	Botiidae	*Acantopsis choirorhynchos*	Horse-face loach	FW	VR	I	NN	250-450
		Chromobotia macracanthus	Clown loach	FW	R	I	NN	600-650
		Botia lohachata	Y-loach	FW	R	I	N	180-350
		Botia kubotai	Burmese Border loach	FW	C	I	NN	250-550
		Botia dario	Bengal loach	FW	C	I	N	120-220
Siluriformes	Callichthyidae	*Corydoras aeneus*	Cory cat	FW	R	I	NN	400-450
		Corydoras panda	Panda corydoras	FW	R	I	NN	200-250
		Corydoras julii	Leopard corydoras	FW	R	I	NN	250-350
	Clariidae	*Clarias batrachus*	Albino catfish	FW	R	I	NN	120-150
	Pimelodidae	*Phractocephalus hemioliopterus*	Redtail catfish	FW	R	I	NN	1800-5000
		Pseudoplatystoma tigrinum	Tiger Shovelnose	FW	R	I	NN	800-1000
	Loricariidae	*Hypostomus plecostomus*	Suckermouth catfish	FW	VC	I	NN	60-320
		Otocinclus vittatus	Dwarf suckers	FW	R	I	NN	400-550
	Pangasidae	*Pangasius hypophthalmus*	Tiger shark	FW	C	LB and I	NN	180-220
		Pangasius hypophthalmus	White tiger shark	FW	C	LB and I	NN	180-220
	Siluridae	*Kryptopterus bicirrh*	Glass catfish	FW	R	I	NN	850-1600
	Schilbeidae	*Phractocephalus hemioliopterus*	Red-tailed catfish	FW	R	I	NN	650-950
Characiformes	Characidae	*Aphyocharax anisitsi*	Bloodfin tetra	FW	C	I	NN	450-650
		Gymnocorymbus ternetzi	Black skirt tetra	FW	R	I	NN	160-250
		Hemigrammus bleheri	Rummy nose tetra	FW	C	I	NN	200-220
		Hyphessobrycon megalopterus	Phantom tetra	FW	C	I	NN	130-150

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		Aphyocharax rathbuni	Rathbuni bloodfin tetra	FW	R	I	NN	600-700
		Paracheirodon innesi	Neon tetra	FW	C	LB and I	NN	100-150
		Phenacogrammus interruptus	Congo tetra	FW	VR	I	NN	700-800
		Hyphessobrycon columbianus	Columbian tetra	FW	R	I	NN	180-320
		Hyphessobrycon amandae	Ember tetra	FW	R	I	NN	150-180
		Hyphessobrycon amandae	Red ember tetra	FW	R	I	NN	160-250
		Hemigrammus rodwayi	Gold tetra	FW	R	I	NN	80-120
		Hemigrammus rodwayi	Gold light tetra	FW	R	I	NN	120-180
		Hyphessobrycon pulchripinnis	Lemon tetra	FW	R	I	NN	90-120
		Hasemania nana	Silver tip tetra	FW	R	I	NN	220-320
		Paracheirodon axelrodi	Cardinal tetra	FW	R	I	NN	180-250
		Moenkhausia sanctaefilomenae	Red eye tetra	FW	R	I	NN	150-180
		Metynnis hypsauchen	Silver dollar	FW	VC	I	NN	150-650
		Carnegiella strigata	Marbled hatcher fish	FW	R	I	NN	450-680
		Piaractus brachypomus	Pirapitinga	FW	VR	I	NN	600-800
		Pygocentrus nattereri	Red piranha	FW	VR	I	NN	400-1600
Osteoglossiformes	Osteoglossidae	*Osteoglossum bicirrhosum*	Silver arowana	FW	VR	I	NN	1500-8500
		Scleropages formosus	Golden or Asian arowana	FW	R	I	NN	20000-80000
		Osteoglossum ferreirai	Black arowana	FW	VR	I	NN	18000-40000
	Notopteridae	*Chitala ornata*	Clown knife fish	FW	VR	I	NN	650-850
	Mormyridae	*Gnathonemus petersii*	Elephant nose	FW	R	I	NN	950-2000
Atheriniformes	Melanotaeniidae	*Melanotaenia praecox*	Dwarf rainbowfish	FW	VR	I	NN	1500-2100
		Iriatherina werneri	Threadfin rainbowfish	FW	VR	I	NN	1600-2200
		Melanotaenia boesemani	Boeseman's rainbowfish	FW	VR	I	NN	1300-2300
Lepisosteiformes	Lepisosteidae	*Lepisosteus oculatus*	Spotted gar	FW	R	I	NN	500-800
		Atractosteus spatula	Alligator gar	FW	C	I	NN	250-600
Polypteriformes	Polypteridae	*Erpetoichthys calabaricus*	Reedfish	FW	VR	I	NN	650-800
Perciformes	Ambassidae	*Parambassis ranga*	Glass fish	FW	R	I	N	120-180
	Belontiidae	*Betta splendens*	Veiltail betta	FW	C	LB and I	NN	350-400
		Betta splendens	Delta tail betta fish	FW	VR	I	NN	600-700
		Betta splendens	Yellow butter fly betta	FW	VR	I	NN	1400-1600
		Betta splenden	Feather tail betta	FW	VR	I	NN	1600-1800
		Betta splendens	Placket betta	FW	R	I	NN	1100-1200
		Betta splendens	Comtail betta	FW	VR	I	NN	1300-1400
		Betta splendens	Rose-tail betta	FW	R	I	NN	1250-1400
		Betta splendens	Double tail betta	FW	R	I	NN	1000-1200
		Betta splendens	Half-tail betta	FW	VR	I	NN	1300-1400
		Betta splendens	Full-tail betta	FW	VC	LB and I	NN	1000-1200
		Betta splendens	Half-moon tail betta	FW	VR	I	NN	1250-1350
		Betta splendens	Full-moon tail betta	FW	VR	I	NN	1100-1200
		Betta splendens	Crown tail betta	FW	VC	LB and I	NN	450-550
		Betta splendens	Koi half-moon betta	FW	VR	I	NN	2200-2400
		Betta splendens	Spade betta	FW	VR	I	NN	1250-1400
	Channidae	*Channa bleheri*	Rainbow Snakehead	FW	VR	I	NN	5500-6000
	Badidae	*Dario dario*	Scarlet badis	FW	VR	I	NN	350-550
	Cichlidae	*Aequidens pulcher*	Blue acara	FW	VR	I	NN	220-3500

Order	Family	Scientific name	Common name (English)	Habitat	Availability	Breeding status (Non-native fish)	Native and Non-native status	Price range (BDT/pair)
		Maylandia lombardoi	Lombardoi mbuna cichlid	FW	VR	I	NN	600-800
		Maylandia lombardoi	Kenyi cichlid	FW	VR	I	NN	950-1450
		Cyphotilapia frontosa	Humphead cichlid	FW	R	I	NN	600-1200
		Trichromis salvini	Yellow belly cichlid	FW	VR	I	NN	550-1250
		Mikrogeophagus ramirezi	Ram Cichlid	FW	C	LB and I	NN	950--1500
		Pseudotropheus crabro	Bumblebee Mouth brooder	FW	VR	I	NN	1000-1800
		Pseudotropheus demasoni	Demasoni	FW	VR	I	NN	1800-2500
		Haplochromis nyererei	Nyererei	FW	VR	I	NN	1500-2200
		Sciaenochromis ahli	Electric blue cichlid	FW	VR	I	NN	950-1250
		Placidochromis electra	Deepwater hap	FW	VR	I	NN	1500-2000
		Placidochromis milomo	Super VC-10 hap	FW	VR	I	NN	800-1500
		Maylandia greshakei	Ice blue cichlid	FW	VR	I	NN	1100-1900
		Maylandia estherae	Orange zebra cichlid	FW	VR	I	NN	400-1200
		Nimbochromis venustus	Venustus hap	FW	VR	I	NN	850-1150
		Nimbochromis venustus	Venustus cichlid	FW	VR	I	NN	750-1000
		Cyrtocara moorii	Blue dolphin cichlid	FW	C	LB and I	NN	1200-2000
		Geophagus sp.	Earth-eater	FW	VR	I	NN	1600-2000
		Julidochromis transcriptus	Julies	FW	VR	I	NN	1200-1800
		Aulonocara sp.	Sunshine peacock	FW	R	I	NN	350-1250
		Labeotropheus fuelleborni	Five color cichlid	FW	VR	I	NN	350-850
		Heros Efasciatus	Red spot severum	FW	R	I	NN	650-850
		Astronotus ocellatus	Golden oscar	FW	VR	I	NN	800-2500
		Astronotus ocellatus	Red oscar	FW	C	LB and I	NN	700-2000
		Astronotus ocellatus	Longfin oscar	FW	VR	I	NN	1200-4000
		Astronotus ocellatus	Albino tiger oscar	FW	C	LB and I	NN	700-2000
		Astronotus ocellatus	Albino red oscar	FW	C	LB and I	NN	700-2000
		Astronotus ocellatus	Albino oscar	FW	R	I	NN	700-2000
		Boulenger moori	Blue dolphin cichlid	FW	VR	I	NN	1200-1800
		Cichlasoma citrinellum x C. synspilum	Blood red parrot	FW	VR	I	NN	650-3000
		Cichlasoma citrinellum x C. synspilum	Green parrot	FW	VR	I	NN	800-3600
		Cichlasoma citrinellum x C. synspilum	Red heart shape parrot	FW	VR	I	NN	1000-4000
		Cichlasoma citrinellum x C. synspilum	Red love parrot	FW	C	LB and I	NN	450-2500
		Cichlasoma citrinellum x C. synspilum	Yellow love parrot	FW	C	LB and I	NN	450-2600
		Cichlasoma citrinellum x C. synspilum	White parrot	FW	VR	I	NN	550-2500
		Melanochromis auratus	Golden mbuna	FW	C	LB and I	NN	300-500
		Pterophyllum scalare	Black angel	FW	VC	LB and I	NN	50-550
		Pterophyllum scalare	Marble angel	FW	C	LB and I	NN	50-550
		Pterophyllum scalare	Sunset angel	FW	C	LB and I	NN	80-750
		Pterophyllum scalare	Koi angel	FW	C	LB and I	NN	80-700
		Pterophyllum scalare	Leopard angel	FW	R	I	NN	130-850
		Pterophyllum scalare	Veil-tail angel	FW	C	LB and I	NN	120-650
		Pterophyllum scalare	Blue angel	FW	R	I	NN	180-850
		Pterophyllum scalare	Zebra angel	FW	VC	LB and I	NN	60-600
		Pterophyllum scalare	Gold angel	FW	R	I	NN	100-800
		Pterophyllum scalare	Altum angel	FW	R	I	NN	120-750
		Pterophyllum scalare	Silver angel	FW	C	LB and I	NN	80-650
		Pterophyllum scalare	Albino angel	FW	VC	LB and I	NN	100-700
		Symphysodon discus	Brown discus	FW	VR	I	NN	1500-6000

Order	Family	Scientific name	Common name (English)	Habitat	Availability	Breeding status (Non-native fish)	Native and Non-native status	Price range (BDT/pair)
		Symphysodon discus	Turquoise blue discus	FW	C	LB and I	NN	2200-4800
		Symphysodon discus	Blue diamond discus	FW	VR	I	NN	1500-4500
		Symphysodon discus	Red Marlboro discus	FW	VR	I	NN	1500-5000
		Symphysodon discus	Brilliant blue discus	FW	R	I	NN	2200-4800
		Symphysodon discus	Red eagle discus	FW	R	I	NN	1800-5000
		Symphysodon discus	Ghost discus	FW	VR	I	NN	2500-6000
		Symphysodon discus	Pigeon blood discus	FW	C	LB and I	NN	2200-4500
		Symphysodon discus	Red turquoise discus	FW	VR	I	NN	2500-5000
		Symphysodon discus	Marble discus	FW	VR	I	NN	1900-4200
		Symphysodon discus	Tomato discus	FW	VR	I	NN	1400-4000
		Symphysodon discus	Red snake skin discus	FW	VR	I	NN	1500-4500
		Symphysodon discus	Golden pigeon discus	FW	C	LB and I	NN	900-3500
		Symphysodon discus	Red ruby discus	FW	R	I	NN	1500-4000
		Symphysodon discus	Yellow Marlboro discus	FW	R	I	NN	1800-5000
		Symphysodon discus	Red turquiose discus	FW	VR	I	NN	2000-4500
		Symphysodon discus	Red pearl pigeon discus	FW	R	I	NN	1600-4500
		Symphysodon discus	Pigeon blood snake skin discus	FW	VR	I	NN	1500-5500
		Symphysodon discus	Checker board discus	FW	VC	LB and I	NN	750-3500
		Symphysodon discus	Golden pearl discus	FW	VR	I	NN	1300-4500
		Symphysodon discus	White scorpion discus	FW	VR	I	NN	1000-4000
		Symphysodon discus	Red brown discus	FW	R	I	NN	900-3500
		Symphysodon discus	White pigeon redline discus	FW	R	I	NN	800-4000
		Symphysodon discus	Snow white discus	FW	R	I	NN	1200-4500
		Symphysodon discus	Red white diamond	FW	VR	I	NN	1000-3500
		Symphysodon discus	Yellow- white diamond	FW	R	I	NN	1500-4000
		Symphysodon discus	Red melon	FW	C	LB and I	NN	1200-4500
	Gobiidae	*Brachygobius xanthozonu*	Bumblebee goby	FW	VR	I	NN	500-650
	Helostomatidae	*Helostoma temmincki*	Kissing gourami	FW	C	LB and I	NN	180-2000
		Trichogaster pectoralis	Snakeskin gourami	FW	VR	I	NN	80-2000
		Colisa lalia	Dwarf gourami	FW	VR	I	N	200-220
		Colisa sota	Honey gourami	FW	C	LB and I	NN	120-140
		Sphaerichthys osphronemoides	Chocolate gourami	FW	VR	I	NN	1700-2200
		Osphronemus goramy	Giant gourami	FW	VR	I	NN	1500-3500
		Trichogaster leeri	Pearl gourami	FW	C	LB and I	NN	220-380
		Trichogaster trichopterus	Blue gourami	FW	VC	LB and I	NN	180-260
		Trichogaster trichopterus	Golden gourami	FW	C	LB and I	NN	180-280
	Poeciliidae	*Poecilia reticulata*	Multicolor guppy	FW	C	LB and I	NN	40-80
		Poecilia reticulata	Sail fin guppy	FW	C	LB and I	NN	200-300
		Poecilia reticulate	Blue mosaic guppy	FW	C	LB and I	NN	350-500

Order	Family	Scientific name	Common name (English)	Habitat	Availability	Breeding status (Non-native fish)	Native and Non-native status	Price range (BDT/pair)
		Poecilia reticulata	Tuxedo blue dragon half-moon guppy	FW	VR	I	NN	100-200
		Poecilia reticulata	Half black yellow guppy	FW	R	I	NN	180-220
		Poecilia reticulata	Tuxedo white high dorsal guppy	FW	R	I	NN	250-300
		Poecilia reticulata	Half black blue guppy	FW	VR	I	NN	150-220
		Poecilia reticulata	Albino blue tail guppy	FW	VC	LB and I	NN	160-200
		Poecilia reticulata	Blue eagle guppy	FW	VR	I	NN	400-500
		Poecilia reticulata	Red lace guppy	FW	C	LB and I	NN	1000-1200
		Poecilia reticulata	Yellow platinum guppy	FW	R	I	NN	100-250
		Poecilia reticulata	Yellow king cobra guppy	FW	VR	I	NN	250-300
		Poecilia reticulata	Elephant ear guppy	FW	VR	I	NN	900-1000
		Poecilia reticulata	Yellow galaxy guppy	FW	VC	LB and I	NN	250-300
		Poecilia reticulata	Blue neon guppy	FW	R	I	NN	150-200
		Poecilia reticulata	Full pink guppy	FW	VR	I	NN	500-600
		Poecilia reticulata	Purple mosaic guppy	FW	R	I	NN	350-500
		Poecilia reticulata	Blue lace guppy	FW	VC	LB and I	NN	150-220
		Poecilia reticulata	Full black guppy	FW	R	I	NN	200-250
		Poecilia reticulata	Platinum half red sakura guppy	FW	R	I	NN	180-300
		Poecilia reticulata	Full red guppy	FW	R	I	NN	300-400
		Poecilia reticulata	Moscow guppy	FW	VC	LB and I	NN	80-160
		Poecilia sphenops	Balloon molly (Golden)	FW	C	LB and I	NN	120-140
		Poecilia sphenops	Balloon molly (White)	FW	C	LB and I	NN	120-140
		Poecilia sphenops	Black molly	FW	C	LB and I	NN	120-130
		Poecilia sphenops	Orange sailfin molly	FW	C	LB and I	NN	100-160
		Poecilia sphenops	Golden calico sailfin molly	FW	C	LB and I	NN	120-180
		Poecilia sphenops	Golden dust molly	FW	C	LB and I	NN	200-300
		Poecilia sphenops	Silver sailfin molly	FW	VC	LB and I	NN	120-180
		Poecilia sphenops	Mixed color molly	FW	VC	LB and I	NN	120-130
		Poecilia sphenops	Lyre-tail molly	FW	C	LB and I	NN	60-80
		Poecilia sphenops	White molly	FW	VC	LB and I	NN	80-200
		Xiphophorus helleri	Mickey mouse sword tail	FW	C	LB and I	NN	120-180
		Xiphophorus helleri	Koi sword tail	FW	C	LB and I	NN	100-160
		Xiphophorus helleri	Double tail sword tail	FW	C	LB and I	NN	180-250
		Xiphophorus helleri	Hi-fin sword tail	FW	C	LB and I	NN	120-220
		Xiphophorus maculatus	Bumble bee platy	FW	C	LB and I	NN	80-180
		Xiphophorus maculatus	Hi-fin platy	FW	C	LB and I	NN	120-200
		Xiphophorus maculatus	Wagtail platy	FW	C	LB and I	NN	120-150
		Xiphophorus maculatus	Tuxedo platy	FW	C	LB and I	NN	90-160
		Xiphophorus maculatus	Sunset platy	FW	C	LB and I	NN	120-180
Myliobatiformes	Potamotrygonidae	*Potamotrygon motoro*	Ocellate river stingray	FW	VR	I	NN	15000-25000

Order	Family	Scientific name	Common name (English)	Habitat	Availability	Breeding status (Non-native fish)	Native and Non-native status	Price range (BDT/pair)
Cyprinodontiformes	Aplocheilidae	*Pachypanchax playfairii*	Golden panchax	FW	VR	I	NN	300-400
Perciformes	Scatophagidae	*Scatophagus argus*	Spotted scats	BW	VR	I	NN	180-350
	Monodactylidae	*Monodactylus argenteus*	Malayan angel	BW	VR	I	NN	300-600
	Toxotidae	*Toxotes jaculatrix*	Banded archerfish	BW	VR	I	NN	1500-2100
	Cichlidae	*Etroplus maculatus*	Orange chromides	BW	VR	I	NN	950-1500
Perciformes	Pomacentridae	*Amphiprion clarkia*	Yellowtail clownfish	M	VR	I	NN	2500-5000
		Amphiprion frenatus	Tomato clownfish	M	VR	I	NN	2000-4500
		Amphiprion tricinctus	Maroon clownfish	M	VR	I	NN	3500-6500
		Amphiprion sebae	Sebae clownfish	M	VR	I	NN	3000-7000
		Amphiprion ocellaris	Clown anemonefish	M	VR	I	NN	2000-4500
		Amphiprion akallopisos	Skunk clownfish	M	VR	I	NN	5500-6000
		Chromis viridis	Blue green damselfish	M	VR	I	NN	5000-5500
		Chromis analis	Yellow chromis	M	VR	I	NN	950-1900
		Microspathodon chrysurus	Yellowtail damselfish	M	VR	I	NN	1200-2000
		Pomacentrus coelestis	Neon damselfish	M	VR	I	NN	1550-3200
		Amblyglyphidodon leucogaster	Yellowbelly damselfish	M	VR	I	NN	1050-2100
		Neoglyphidodon crossi	Cross' damsel	M	VR	I	NN	1400-2800
		Chrysiptera parasema	Goldtail demoiselle	M	VR	I	NN	1600-3200
		Pygoplites diacanthus	Regal angelfish	M	VR	I	NN	6500-13000
	Acanthuridae	*Zebrasoma flavescens*	Yellow tang	M	VR	I	NN	2800-5600
		Zebrasoma velifer	Sailfin tang	M	VR	I	NN	7000-14000
		Ctenochaetus strigosus	Spotted surgeon fish	M	VR	I	NN	6500-10500
		Acanthurus xanthopterus	Yellowfin tang	M	VR	I	NN	2500-5200
	Labridae	*Pseudocheilinus hexataenia*	Sixline wrasse	M	VR	I	NN	3000-6000
	Siganidae	*Siganus vulpinus*	Foxface	M	VR	I	NN	6000-12000
	Chaetodontidae	*Chaetodon vagabundus*	Vagabond butterflyfish	M	VR	I	NN	3500-6500
		Chaetodon rafflesii	Latticed butterflyfish	M	VR	I	NN	3000-6000
		Chaetodon trifasciatus	Melon butterflyfish	M	VR	I	NN	5500-10500
	Blenniidae	*Enchelyurus flavipes*	Yellowfin blenny	M	VR	I	NN	2000-4000
		Ecsenius bicolor	Bicolor blenny	M	VR	I	NN	2000-4000
	Gobiidae	*Cryptocentrus cinctus*	Yellow prawn-goby	M	VR	I	NN	1800-3600
	Serranidae	*Pseudanthias dispar*	Dispar Anthias	M	VR	I	NN	4400-8400
	Pomacanthidae	*Centropyge bicolor*	Bicolor angelfish	M	VR	I	NN	4400-7500
		Centropyge tibicen	Keyhole angelfish	M	VR	I	NN	4200-7000
		Centropyge nox	Midnight angelfish	M	VR	I	NN	5200-9500
		Centropyge potteri	Russet angelfish	M	VR	I	NN	3700-6500
		Centropyge eibli	Black tail angelfish	M	VR	I	NN	5500-12000
		Pomacanthus imperator	Emperor angelfish	M	VR	I	NN	7000-15000
		Pomacanthus navarchus	Bluegirdled angelfish	M	VR	I	NN	5500-12000
	Pseudochromidae	*Pictichromis porphyria*	Magenta dottyback	M	VR	I	NN	1500-3500

Order	Family	Scientific name	Common name (English)	Habitat	Availability	Breeding status (Non-native fish)	Native and Non-native status	Price range (BDT/pair)
		Pictichromis paccagnellae	Royal dottyback	M	VR	I	NN	6000-7000

(VC= Very common, C=Common, R=Rear, VR=Very rear, LB=Locally breed and I=Imported, FW= Freshwater, BW= Brackish water, M= Marine, N=Native, NN=Non-native)

The number of fish variety, species, genera, family, and order of aquarium fishes recorded in the present study is higher than in previous studies (Table 2).

Table 2: The number of fish variety, species, genera, family, and order of recorded aquarium fishes mentioned in previous studies and the current study.

Reference	Area	Year	Variety	Species	Genera	Family	Order
Rahman	Dhaka	2005	-	25	-	-	-
Mohsin *et al.*	Rajshahi	2007	-	12	-	-	-
Mostafizur *et al.*	Khulna	2009	-	30	-	-	-
Galib and Mohsin	Dhaka	2011	79	46	42	18	5
Faruk *et al.*	Dhaka	2012	-	25	-	-	-
Galib *et al.*	Jessore	2013	17	12	-	7	3
Alam *et al.*	Barisal	2016	29	-	-	12	6
Arif *et al.*	Sylhet	2018	22	-	-	10	4
Current Study	Dhaka	2019	270	149	115	39	10

Comparing the number of variety and species between different previous studies and the current study is shown in (Figure 1 and Figure 2) below. Table 1 and Figure 1, Figure 2 shows that the number of variety and species is much higher in Dhaka than in other areas (Rajshahi, Khulna, Jessore, Barisal, and Sylhet).

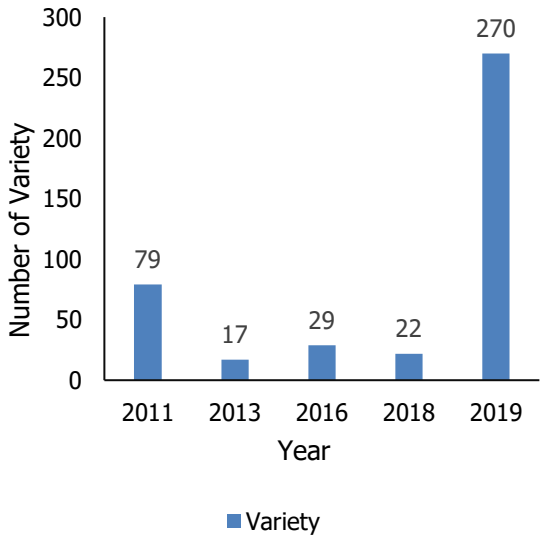

Figure 1: The number of variety of previous studies and the present study

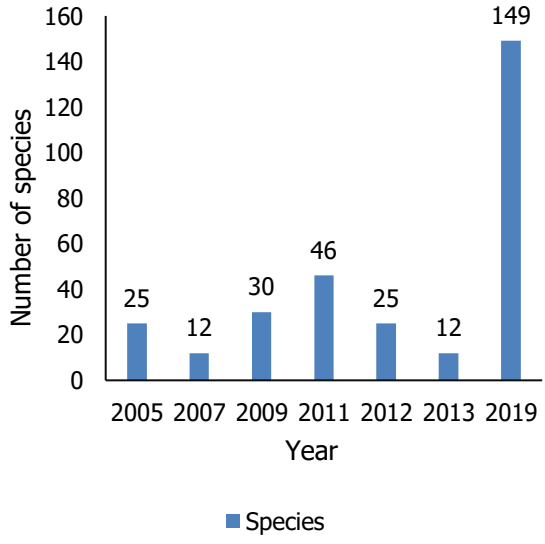

Figure 2: The number of species of previous studies and the present study

Considering the number of species maximum 83 (55.70%) was found under order Perciformes followed by Cypriniformes 24 (16.10%), Characiformes 18 (12.08%), Siluriformes 11 (7.38%), Osteoglossiformes 05 (3.35%), Atheriniformes 03 (2.01%), Lepisosteiformes 02 (1.34%), Polypteriformes 01 (0.6%), Myliobatiformes 01 (0.67%), Cyprinodontiformes 01 (0.67%) (Figure 3)

and only 6 crossbreeds were recorded under Perciformes. Cypriniformes are dominant in Barisal (Alam *et al.*, 2016), and Perciformes is dominant in Sylhet (Arif *et al.* 2018). On the other hand, Cypriniformes is also dominant in Jessore (Galib *et al.*, 2013).

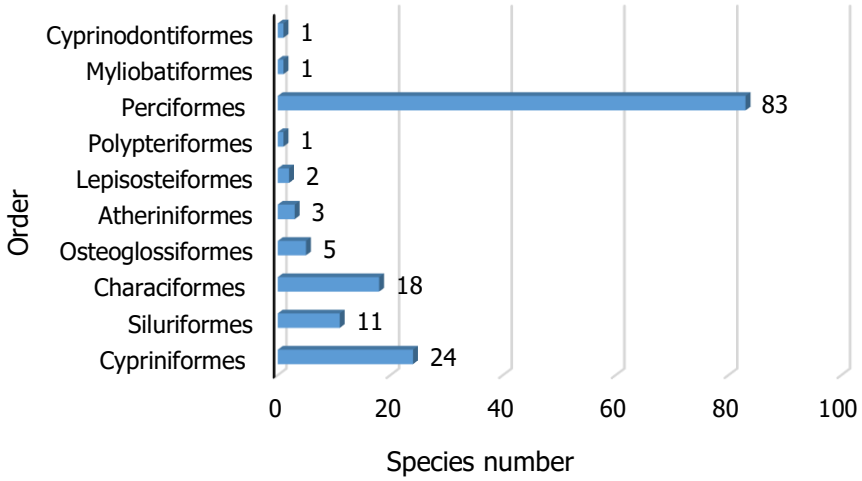

Figure 3: Number of aquarium fish species with in the order

Recorded various aquarium fish species are included within three aquatic environments, such as freshwater, brackish water, and marine water. The number of aquarium fishes (varieties, species, genera, breeds) is given in Table 3. Except for the present study, no marine and brackish water aquarium fish were recorded in the previous studies.

Table 3: Number of recorded fish varieties, species, genera, and crossbreeds of the present study

Aquatic environment	**Number of varieties**	**Number of species**	**Number of genera**	**Number of crossbreeds**
Freshwater	230	109	91	6
Brackish water	4	4	4	0
Marine	36	36	20	0
Total	**270**	**149**	**115**	**6**

During the survey, only 5 native wild fish species were found as an aquarium fish. According to the variety, they are categorized into 4 categories such as very rear, rear, common, and very common. During the study maximum number of varieties were very rear followed by rear, common and very common which is given in (Figure 4).

On the basis of breeding status of the species they are divided into 2 types such as imported, locally breed and imported. During the study major number of species were imported followed by locally breed and imported which is given in (Figure 5). Galib (2010) stated that, artificial breeding techniques of at least 17 varieties of exotic ornamental fishes have been developed by amateur fish breeders.

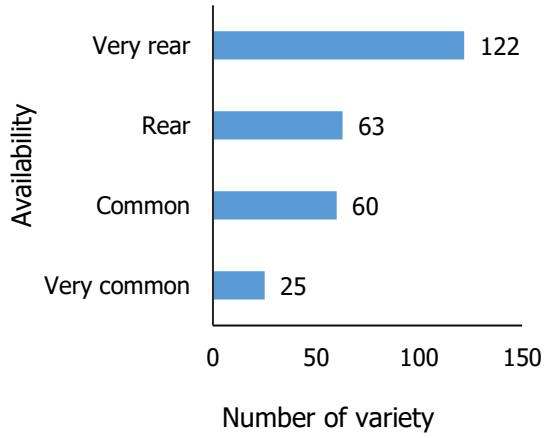

Figure 4: Categories of various aquarium fish variety according to the availability

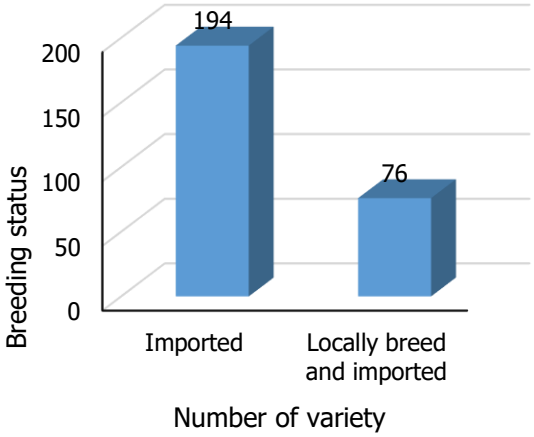

Figure 5: Breeding status of various aquarium fish variety

During the study most popular and highly contributed species in the surveyed shops were guppy (13.16%) followed by goldfish (12.39%), molly (8.54%), tetra (6.54%), angelfish (6.23%), platy (5.93%), gourami (5.48%), swordtail (4.41%), koi carp (3.79%), zebra fish (3.31%), barb (2.83%), suckermouth catfish (2.46%). In previous study according to consumer demand the most demandable aquarium fish species were goldfish, comet fish, koi carp, angle fish, platy, guppy, fighter fish, parrot fish and discus by Faruk *et al.* (2012).

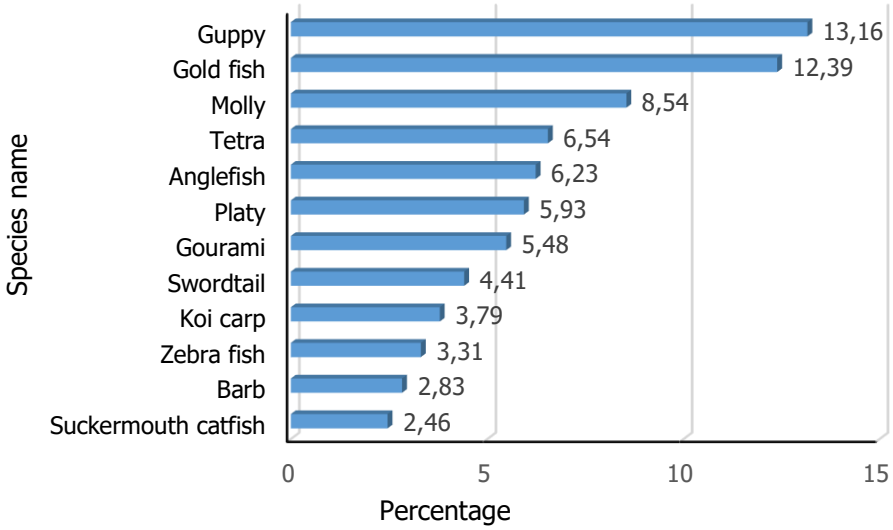

Figure 6: Top twelve popular (common) aquarium fish species

The number of aquarium fish species, aquarium shops, aquarium fish breeders and hobbits have increased immensely due to the profitability for traders and acceptability by the aquarists.

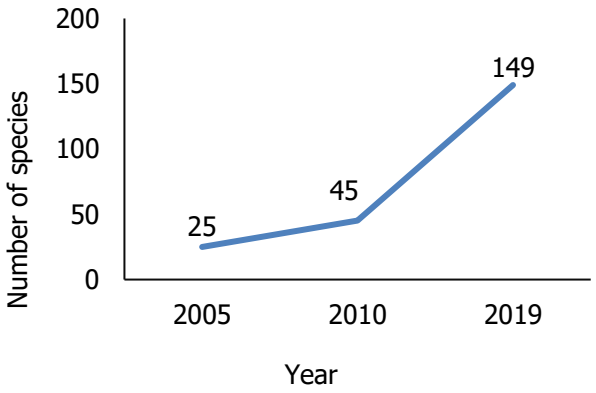

Figure 7: Increasing tendency of number of aquarium fish species over the years

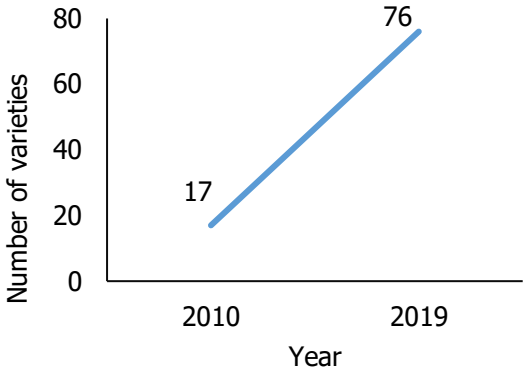

Figure 8: Increasing number of locally breed aquarium fish varieties over the years

During the study period 149 aquarium fish species are recorded which is 5.96 times in last 15 years (Rahman 2005, 25 species) and 3.31 times in last 10 years (Galib 2010, 45 species) (Figure 7). During the study it was recorded that 76 varieties of aquarium fish under 23 order were bred by local aquarium breeders and farms (Figure 8). On the other hand, according to Galib (2010), artificial breeding techniques of at least 17 varieties of exotic ornamental fishes have been developed by amateur fish breeders. According to present findings it is clearly indicated that the number of varieties as well species of native non-native ornamental aquarium fish is highly increased rapidly. Moreover, diversity of the habitat and number of locally breed non-native species are raised as well. It is concluded that the native and non-native ornamental aquarium fish breeding and keeping practice (hobby and business) is becoming a potential sector in Bangladesh.

Conclusion

Conclusion of this study is the provision of different types of feed significantly affect the level of gonadal maturity and fecundity of giant shrimp parent (Macrobrachium rosenbergii). The more effective treatment The more effective treatment in giving different types of feed to the level of gonadal maturity and fecundity of broodstock parent is by feeding squid (Loligo sp.) Giving the best value at the gonad maturity level of 10 tails at the gonad mature speed. 2-6 days and the average fecundity of broodstock parent produced 28,846 ± 4925.35.

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