Survey of the species of ornamental fish available in pet trade markets in Basrah province

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Abstract

This study represents the first attempt to evaluate exotic ornamental fish species in Shops specializing in ornamental fish. This study was carried out in the province of Basrah between 2023 and 2024. The visits were made to Shops specializing in ornamental fish spread throughout Basrah province. The species present were documented and classified based on their respective families. The study recorded 46 species of ornamental fish belonging to 20 families, including five marine species, exotic fish and no local species. However, the study recognized certain species that are hazardous to the environment if infiltrated, and the study did not record species that threatened humans during the study period. However, there is a need to improve the monitoring and management of dangerous species, as some of them are among the most popular aquarium fish traded worldwide. In addition to the plans and efforts made by the government through the management of its institutions. Researchers and hobbyists should be involved, along with state institutions, because of the importance of their role in the successful monitoring and management of fish introductions. If new fish species need to be imported in the future, a risk assessment should be adopted to assist in making recommendations to guide management decisions. Exotic fish often cause harm to fish stocks, environmental damage, and sometimes a threat to humans. Therefore, the ornamental fish trade must impose trade restrictions and legislation to regulate this trade. To reduce the negative effects resulting from the entrance of non-native species.

Keywords :ornamental fish, exotic fish, Basrah, aquarium fish.

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Introduction

The ornamental fish trade has experienced significant growth and notable transformations since the late 1950s. Several countries, such as Southeast Asian nations (Singapore, Thailand, Hong Kong, and Indonesia), possess a well-established business for cultivating decorative fish. Presently, 90% of ornamental fish are reared in freshwater ponds. Nevertheless, the circumstances vary significantly for marine species, as they are frequently captured using unsuitable techniques for their natural habitat. An estimated 3,000 distinct genera, species, and native species inhabit the Amazon River and its tributaries. According to the Monticini (2020), it accounts for around 7-10% of the trade in freshwater ornamental fish. According to Wabnitz *et al.* (2003), the global ornamental fish trade employs over two million individuals. The proliferation of ornamental fish farming and aquaculture has occurred in numerous nations worldwide, driven mainly by the economic significance of this practice. This is widely recognized as a significant factor in introducing certain species into the ecosystem (Chavez *et al.*, 2006).

According to Saba *et al.* (2021), certain ornamental fish species can present significant risks to local fish communities and the aquatic environment when they invade the natural habitat. This invasion can have adverse effects on food availability and spatial distribution. Conducting a risk assessment is essential as an initial measure to evaluate the potential dangers foreign species pose to the native environment and the biodiversity of species (Strecker *et al.*, 2011). According to the Laith, *et al.* (2021) the aquarium fish sector in Iraq is practically uncontrolled given the presence of threatened species, species potentially harmful to humans and species capable of establishing non-indigenous populations, if released into the wild. This study aims to analyze the many species of ornamental fish observed in pet trade outlets throughout the Basrah province**.**

Materials and Methods

Basrah is situated in the southern region of Iraq and is regarded as the second most densely populated city. Various ornamental fish stores have been strategically selected in different places to gain knowledge about the species there. This study was undertaken from 2023 to 2024. Wherein a baseline survey was conducted on all pet stores in Basrah that were identified, accessible and possessed aquarium fish tanks. The observation and documentation of all species present have been conducted by recording common and scientific names. Unidentifiable species were gathered and transferred to the laboratory for categorization. The species were identified using a mix of keys and publications derived from prior studies. FishBase and Eschmeyer's Catalog of Fishes were utilized to determine data about order, family, species, and potential risks to human health.

Results and Discussion

In the Basrah province, 35 stores specializing in the sale of ornamental fish were visited, resulting in the documentation of 46 distinct species of ornamental fish from 20 families, namely Cichlidae, Cyprinidae, Pangasiidae, Poeciliidae, Notopteridae,

Serrasalmidae, Belontiidae, Scatophagidae, Siluridae, Loricariidae, Monodactylidae, Characidae, Apteronotidae, Mochokidae, Polypteridae, Auchenipteridae, Osphronemidae. Five marine fish species belonging to 3 families, namely Acanthuridae, Pomacentridae, Chaetodontidae were documented. All documented species consisted of non-native fish. Furthermore, the parrotfish is classified as a hybrid species Table (1).

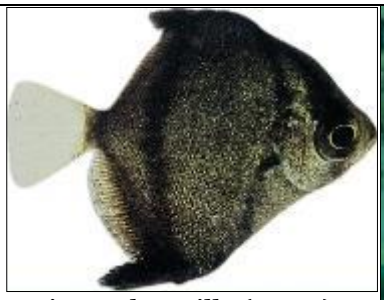
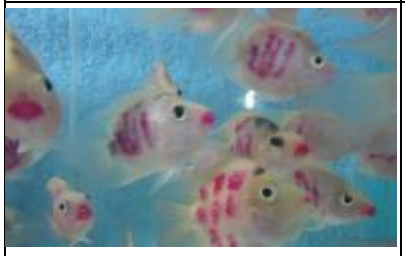
Table 1: presents a compilation of fish obtained from ornamental fish markets in Basrah, along with their respective families.

No.	The scientific name	Local name	Family
1	*Aequidens rivulatus*	Green Terror	Cichlidae
2	*Astronotus ocellatus*	Oscar	Cichlidae
3	*Herichthys cyanoguttatus*	Texas	Cichlidae
4	*hybrid*	parrot	Cichlidae
5	*Labidochromis caeruleus*	Yellow cichlid	Cichlidae
6	*Maylandia callainos*	Cobalt blue cichlid	Cichlidae
7	*Pterophyllum scalare*	angel	Cichlidae
8	*Symphysodon aequifasciatus*	Disex	Cichlidae
9	*Balantiochelus Melanopterus*	Silver shark	Cyprinidae
10	*Barbonymus altus*	Red tailed tinfoil	Cyprinidae
11	*Barbus tetrazona*	Red tiger barb	Cyprinidae
12	*Carassius auratus*	Goldfish	Cyprinidae
13	*Carassius auratus auratus*	Goldfish/Oranda	Cyprinidae
14	*Danio rerio*	Zebrafish	Cyprinidae
15	*Epalzeorhynchos frenatum*	red fin shark	Cyprinidae
16	*Puntius conchonius*	Rosy Barb	Cyprinidae
17	*Puntius tetrazona*	Tiger barb	Cyprinidae
18	*Pangasianodon hypophthalmus*	Shark	Pangasiidae
19	*Poecilia latipinna*	Molly	Poeciliidae

20	*Poecilia reticulata*	Guppy	Poeciliidae
21	*Poecilia sphenops*	Molly	Poeciliidae
22	*Poecilia velifera*	Yucatán Molly	Poeciliidae
23	*Xiphophorus helleri*	Swordtail	Poeciliidae
24	*Xiphophorus maculatus*	Platy	Poeciliidae
25	*Chitala ornate*	Clown Knife	Notopteridae
26	*Metynnis argenteus*	Dollar	Serrasalmidae
27	*Betta splendens*	fighter	Belontiidae
28	*Trichopodus trichopterus*	Gourami	Belontiidae
29	*Scatophagus argus*	Silver scat	Scatophagidae
30	*Kryptopterus bicirrhis*	Class (glass) fish	Siluridae
31	*Pterygoplichthys pardalis*	Sweeper fish	Loricariidae
32	*Pseudacanthicus sp.*	Sweeper	Loricariidae
33	*Monodactylus argenteus*	Mono	Monodactylidae
34	*Monodactylus sebae*	unavailable	Monodactylidae
35	Gymnocorymbus ternetzi	Black Widow	Characidae
36	Hemmigrammus pulcher	Prettty tetra	Characidae
37	*Apteronotus albifrons*	Black ghost knifefish	Apteronotidae
38	*Synodontis petricola*	Cuckoo Catfish	Mochokidae
39	*Polypterus senegalus*	Senegal bichir	Polypteridae
40	*Parauchenipterus fisheri*	Fisher's Woodcat	Auchenipteridae
41	*Betta splendens*	Siamese fighting fish	Osphronemidae
42	*Paracanthurus hepatus*	Blue Tang	Acanthuridae
43	*Naso lituratus*	Indian Naso	Acanthuridae
44	*Amphiprion ocellaris*	Common clownfish	Pomacentridae
45	*Premnas biaculeatus*	Maroon clownfish	Pomacentridae

46	*Chaetodon collare*	Redtail Butterflyfish	Chaetodontidae

While Fig. (1) displays images depicting 42 distinct species of decorative fish that are available in the markets of Basrah province.

	 Picture by Mills (2000)	
Astronotus ocellatus	*Monodactylus sebae*	*Pterophyllum scalare*
		
parrot	*Poecilia sphenops*	*Carassius auratus*
 Picture by DATZ		
Herichthys cyanoguttatus	*Pangasianodon hypophthalmus*	*Poecilia reticulata*

		
Metynnis argenteus	*Chitala ornate*	*Symphysodon aequifasciatus*
		
Scatophagus argus	*Trichopodus trichopterus*	*Betta splendens*
		
Monodactylus argenteus	*Pterygoplichthys pardalis*	*Maylandia callainos*
 Picture by Dr. Joerg Vierke		
Kryptopterus bicirrhis	*Aequidens rivulatus*	*Labidochromis caeruleus*

		
Apteronotus albifrons	*Amphiprion ocellaris*	*Premnas biaculeatus*
		
Chaetodon collare	*Naso lituratus*	*Paracannthurus hepatus*
		
Xiphophorus hellerii	*Xiphophorus maculatus*	*Puntius tetrazona*
		
Parauchenipterus fisheri	*Barbus tetrazona*	*Poecilia velifera*

		
Polypterus senegalus	*Hemmigrammus pulcher*	*Synodontis petricola*
		
Balantiochelus Melanopterus	*Puntius conchonius*	*Danio rerio*
		
Barbonymus altus	*Pseudacanthicus* sp.	*Epalzeorhynchos frenatum*

Figures 1: Pictures of ornamental fish traded in the markets of the city of Basrah.

Discussion

Brazil is widely recognized as a prominent global supplier of ornamental fish, with a notable export volume of 250 species. These fish are lawfully traded in international markets (Monticini, 2020). The present investigation documented 46 species from 20 families that are benign to humans and do not provide any danger. However, a few of them may constitute an environmental risk due to their inherent characteristics. The study did not document indigenous fish species that can be juxtaposed with non-indigenous fish species, and the ornamental fish trade is widely acknowledged as a significant factor contributing to the introduction of some exotic fish. According to Qasim and Jawad (2022) the ornamental fish trade is a major factor in the introduction of certain exotic fish into our ecosystem. Prior research has documented the existence of 16 distinct species of non-native fish throughout the inland waters of Iraq (Coad and Hussain, 2007; Mutlak and Al-Faisal, 2009; Coad, 2010; Al-Saadi *et al.*, 2012; Jawad *et*

al., 2012 ،Khamees *et al*., 2013 ،Al-Faisal *et al*., 2014 ،Mutlak *et al*., 2017). One of these fish is the goldfish *Carassius auratus*, native to East Asia, China, and Japan. It has been recorded in other world regions, and its harmful environmental effects have been reported. The molly fish *Poecilia latipinna*, which belongs to the Poeciliidae family and is native to Mexico, also leaked into Iraqi freshwater due to the ornamental fish trade.

A specific date has yet to be determined for its first recording in Iraq. Coad (2010) believes that the date of 2006 represents the first introduction of this species into Iraq. It has environmental and biological effects and does not cause any danger to humans. It is an endemic fish. As fish formed, *P. latipinna* is numerically dominant in the marsh east of Al-Hammarand ranks second among hunted species (Al-Najjar *et al*., 2019). Jawad and Qasim (2019) also recorded the piranha Neotropical piranha, a fish from the Amazon River in South America. It belongs to the Serrasalmidae family and is a tropical fish. It is found in the open waters of the Tigris River near the capital, Baghdad, Iraq.

Its presence in the Tigris River in the Baghdad capital area was also reported later. This recording indicates introducing a potentially dangerous species into the internal waters of Iraq. Likewise, Qasim and Jawad (2022) recorded the Amazon sailfish, *Pterygoplichthys pardalis*, in the Shatt al-Arab River. Its original locality is the Amazon River in South America. It has spread to the rest of the world through the ornamental fish trade. This fish feeds on anything it finds. It is successful in living and has no problem. They also eat algae stuck to rocks to find food, so ornamental fish breeders use them to clean ponds.

For this purpose, small fish of this type are used, and when they grow, and the aquarium becomes small for them, they also begin to affect other fish in the aquarium. The large fish are removed from the aquarium, and instead of when it is killed, it is released into the rivers. After it is released into the river, it finds ample space to live and an abundance of food, so it multiplies, and its number increases, which is the case that occurred in Iraqi inland waters. The damage caused by this fish is multiple and includes humans, fish resources, and the freshwater environment. Jawad *et al.* (2022) also recorded the Oscar fish *Astronotus ocellatus* in the Tigris River. This fish can invade a wide range of environments (Val *et al*., 2006 and Nico *et al.* 2014;) due to its aggressive and competitive behaviour, and it can adapt to different environmental conditions. Including low pH, low dissolved oxygen concentration (Muusze *et al*., 1998; Almeida-Val *et al*., 2000; Sloman *et al*., 2006), high temperatures (Val et al., 2006), and low temperatures (Shafland and Pestrak, 1982). Its high tolerance to these conditions makes it a successful ornamental fish, but it also greatly threatens the environment (Gozlan, 2009).

This study represents the first attempt to determine the types of ornamental fish found in ornamental fish stores in Basrah province. Further studies are needed to examine more species not recorded in this study. Furthermore, there is a need to improve the monitoring and management of high-risk species, as some are among the most popular ornamental fish traded worldwide. Introducing fish classified as harmful

to humans and the environment must be prohibited, in addition to the current plan and efforts made by the government through the management of its institutions.

Researchers and hobbyists should be involved, along with state institutions, because of the importance of their role in the successful monitoring and management of fish introductions. If new fish species need to be imported in the future, a risk assessment should be adopted to assist in making recommendations to guide management decisions. Alien fish often damage fish wealth, and environmental health and sometimes threaten humans. Therefore, the ornamental fish trade needs to impose trade restrictions and legislation regulating this trade to reduce the negative effects resulting from the introduction of non-native species, raise the level of public awareness, and support environmental conservation efforts. The study plays a significant role in proposing solutions to control the introduction of fish harmful to the environment and their competition with local species. Among these solutions, mention the following:

1. Limiting ornamental fish import and controls must be implemented for their import.
2. The import request for any ornamental fish is supposed to pass through a specialized scientific committee that determines the extent of the species' danger.
3. The relevant committees are responsible for verifying the fish species arriving from outside Iraq. This involves matching the species mentioned in the import papers to the actual contents of the boxes, ensuring their crucial role in the import process.

Conclusion

This study represents the first attempt to determine ornamental fish species found in shops that specialising in ornamental fish. The study recorded 46 species of ornamental fish belonging to 20 families, including five marine species, exotic fish and no local species. However, the study distinguished some species that have harmful environmental effects if leaked, and the study did not record species that threatened humans during the study period. Alien fish often cause harm to fish stocks, environmental damage, and sometimes causing a threat to humans. Therefore, the ornamental fish trade must impose trade restrictions and legislation to regulate this trade. To reduce the negative effects resulting from the introduction of non-native species, raise the level of public awareness, and support environmental conservation efforts

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دراسة استقصائية لأنواع أسماك الزينة الموجودة في أسواق تجارة الحيوانات الأليفة في محافظة البصرة

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المستخلص

تمثل هذه الدراسة المحاولة الأولى لتقييم أنواع أسماك الزينة الغريبة الموجودة في محلات اسماك الزينة. أجريت هذه الدراسة خلال الفترة 2023 و2024 في محافظة البصرة، إذ تم إجراء زيارات إلى محلات اسماك الزينة المنتشرة في المحافظة، وسجلت الأنواع الموجودة فيها وصنفت حسب العوائل التي تعود اليها. إذ تم تسجيل 46 نوعاً من اسماك الزينة تعود إلى 20 عائلة منها خمسة أنواع بحرية جميعها اسماك غريبة ولا يوجد منها أنواع محلية. ميزت الدراسة بعض الأنواع التي لها أثار بيئية ضارة في حالة تسربها. ولم تسجل الدراسة أنواع تسبب تهديداً للبشر خلال فترة الدراسة، لذلك هناك حاجة إلى تحسين مراقبة وإدارة الأنواع الخطرة إذ يعد بعضها من بين أسماك الزينة الأكثر شعبية ويتم تداولها في جميع أنحاء العالم. بالإضافة إلى ذلك تحتاج الخطط الحالية والجهود التي تبذلها الحكومة من خلال إدارة مؤسساتها إلى إشراك الباحثين والهواة، جنبًا إلى جنب مع مؤسسات الدولة نظرًا لأهمية دورهم في المراقبة الناجحة وإدارة إدخال الأسماك. وفي حالة الحاجة إلى استيراد أنواع أسماك جديدة في المستقبل، ينبغي اعتماد تقييم المخاطر للمساعدة في التوصية من اجل توجيه القرارات الإدارية. إذ أن الأسماك الغريبة غالبا ما تسبب أضرار على الثروة السمكية. إضافة إلى أضرار بيئية وبعض الأحيان تسبب تهديداً للبشر. لذلك تحتاج تجارة اسماك الزينة إلى فرض قيود تجارية وتشريعات تنظم هذه التجارة. للحد من الأثار السلبية نتيجة إدخال أنواع غير محلية.

الكلمات المفتاحية: اسماك الزينة، الأسماك المدخلة، البصرة، أحواض الأسماك.

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