



Oscar (*Astronotus ocellatus* Agassiz, 1831) Üretimi

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Özet

Türkiye’ de son yıllarda akvaryum balığı yetiştiriciliğinde hızlı bir artış olmuştur. Oscar olarak bilinen *Astronotus ocellatus* balığı eşsiz görüntüsü ve hareketleri, kavgacı davranışları ve renklerinden dolayı akuarislerin ilgi odağı olmuştur. Bu araştırmada, *Astronotus ocellatus* balığının morfolojisi, biyolojik özellikleri ve üretimi hakkında bilgi verilmeye çalışılmıştır.

Anahtar kelimeler: *Astronotus ocellatus*, Oscar, biyoloji, morfoloji, üretim

Oscar (*Astronotus ocellatus* Agassiz, 1831) Rearing

Abstract

In recent years, there has been an increase in the rearing of aquarium fish in Turkey. *Astronotus ocellatus* which is known Oscar fish has become center of interest for the aquarists because of its unique appearance and movement, fighting behaviour and their colors. In this research, it has been tried to give information about *Astronotus ocellatus*'s morphology, its biological properties and rearing.

Keywords: *Astronotus ocellatus*, Oscar, biology, morphology, rearing

INTRODUCTION

Aquarium keeping is amongst the most popular of hobbies with millions of enthusiasts worldwide [1]. Ornamental fishes are often referred as living jewels due to their color, shape and behavior. They are peaceful, generally tiny, attractively colored and could be accommodated in confined spaces [2]. Ornamental fish farming is an important primary industry. The production and trade of ornamental fish is a profitable alternative in the aquaculture sector [3]. Together all countries of the European Union are the largest market for ornamental fish; however, the United States (US) is the single largest importer of ornamental fish in the world [1]. Interest in aquarium as popular in Turkey has been increased in the 1980s and after this period, most of the aquarium fish has been imported [4].

Kinds of family Cichlidae are among the most popular freshwater fish kept in the aquarium. This family is both large and diverse. At least 1.650 species have been

scientifically described, making it one of the largest vertebrate families. New species are discovered annually, and many species remain undescribed. The actual number of species is therefore unknown, with estimates varying between 2.000 and 3.000 [5]. *Astronotus ocellatus*, known as Oscar, is one of the most popular from cichlid fish due to its unique beauty and colorfulness. But, knowledge about its aquaculture is limited [6].

Taxonomy of Oscar Fish

The Oscar was formally described in 1831 as *Lobotes ocellatus* by the famous 19th century zoologist and founder of Harvard University's Museum of Comparative Zoology, Jean Louis Rodolphe Agassiz., as he mistakenly believed the species was marine; later work assigned the species to the genus *Astronotus* [7]. Give below is detailed scientific classification of this fish (Table 1).

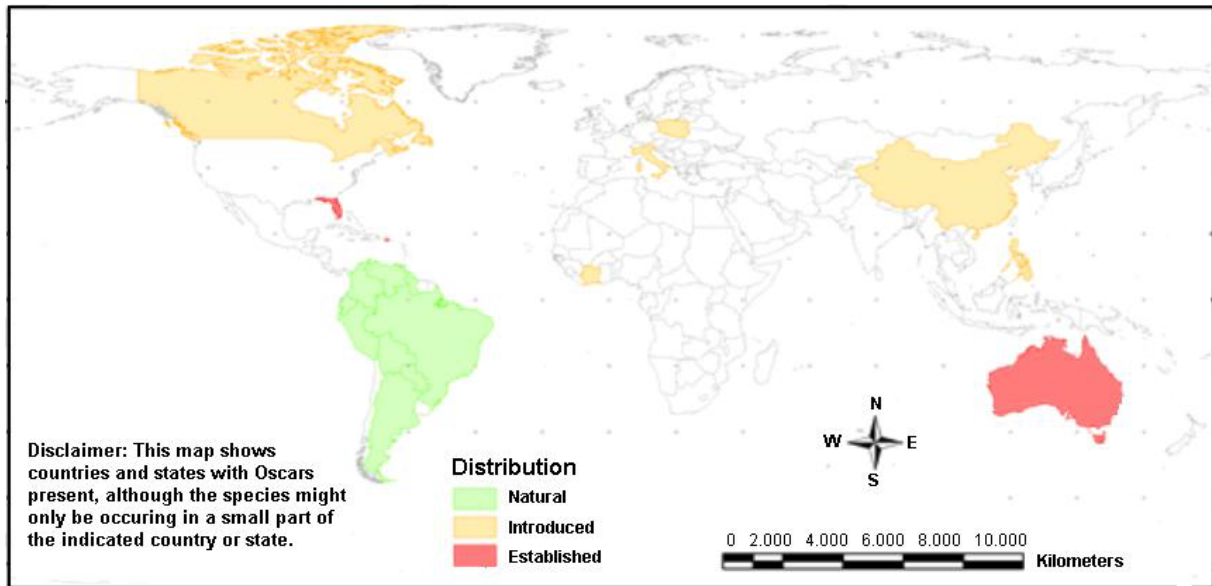


Figure 1. World wide distribution of Oscar [10]

Table 1. Detailed scientific classification of Oscar [8]

Kingdom	Animalia
Phylum	Chordata
Class	Actinopterygii
Order	Perciformes
Family	Cichlidae
Subfamily	Astronotinae
Genus	Astronotus
Species	<i>A. ocellatus</i>
Binomial name	
<i>Astronotus ocellatus</i> Agassiz, 1831	

Synonyms

Lobotes ocellatus (Agassiz 1831)
Acara ocellatus (Agassiz 1831)
Cychla rubroocellatus (Jardine 1843)
Heros altifrons (Kner 1863)
Astatheros altifrons (Kner 1863)
Cichlasoma altifrons (Kner 1863)
Acara compressus (Cope 1872)
Acara hypostica (Cope 1878)
Astronotus ocellatus zebra (Pellegrin 1904)
Astronotus orbiculatus (Haseman 1911)

Distribution and Ecology of Oscar

Native to South America: Venezuela, Peru, Colombia, Bolivia, Ecuador, Brazil, Guyana, Argentina and Paraguay. Mainly found in mid to upper reaches of rivers and tributaries of the Amazon Basin; from the Orinoco River to Rio Paraguay. Introduced to at least 12 countries and territories including Australia (Cairns and Townsville, north Queensland) and continental USA (Florida) - (reported from 9 other states but not established) and Hawaii (Figure 1) [9].

Oscar is hypoxia tolerant and can survive severe hypoxia (dissolved oxygen < 0.4 mg/l) and even 4 hours of complete anoxia at 28°C [11]. This species does not tolerate cold waters. A lower lethal temperature of 12.9°C

has been reported for specimens under experimental conditions [12, 13]. The critical thermal maximum is not known, although Lowe-McConnell [14] reported water temperature ranges from 23 to 34°C in rivers and pools within the Amazon basin where Oscars occur. pH tolerance range of this fish is not known, though its preferred range appears to be pH 6-8 [15]. The species probably does not tolerate pH below this range as it does not occur in the black water (acidic) rivers in the Amazon basin. Critical salinity tolerance range for the species is unknown. Based on its distribution, in the mid and upper reaches of rivers in the Amazon basin, the species is probably stenohaline [10].

Morphological Characteristics of Oscar Fish

A. ocellatus is a large, somewhat stocky cichlid with an oval shaped body, a large head, large eyes, and a large mouth [7]. Oscar examples have been reported to grow to 45 cm in length and 1.6 kg in weight, though they usually have been seen to grow to about 20-28 cm in length and 0.4 kg in weight. This fish has dorsal fin with 12-14 spines and 19-21 soft rays and anal fin with 3 spines and 15-17 soft rays [16].

The wild-caught forms of the species are typically darkly coloured with yellow-ringed spots or ocellus on the caudal peduncle and on the dorsal fin [17]. These ocellus have been suggested to function to limit fin-nipping by piranha (*Serrasalmus* spp.), which co-occur with *A. ocellatus* in its natural environment [18]. The species is also able to rapidly alter its colouration, a trait which facilitates ritualised territorial and combat behaviours amongst conspecifics [19]. No sexual dimorphism; slender, laterally compressed, oval-shaped body with blunt head, large mouth and protrusible jaws and 7 pre-opercular pores [10].

In the aquarium environment, young Oscars have a different colouration from adults. Young Oscars are striped with white and orange wavy bands and white spots on the head (Figure 2) [20].

Adult Oscars typically drab and cryptic: dark olive-green to gray to chocolate brown in base color with a mottling of some or all of these colors, with scattered red-orange irregular spots along flanks and dorsal fin base. A large black spot surrounded by an orange ring present on either side of the base of the upper caudal peduncle.

Several colour varieties produced by selective breeding for aquarium trade, especially copper/red and black mottled patterns (Figure 3) and even albino forms (Figure 4) [20].



Figure 2. Young Oscar [16]



Figure 3. Normal Oscar [16]



Figure 4. Albino Oscar [16]

Feeding of Oscar Fish

Oscar fish are omnivorous though predominantly carnivorous. They mainly feed on aquatic and terrestrial insects, crustaceans, small fish [21,22], other small invertebrates (molluscs) [23], small vertebrates, e.g., lizards [10], fruits, benthic algae and water plants [21]. Almost everything that falls into the water would be eaten by Oscars [24].

Captive Oscars may be fed prepared fish food designed for large carnivorous fish. Feeding live foods may increase the rate of growth but also may cause endoparasites. Poultry and/or mammalian flesh, including beefheart, should not be fed long term as these fatty foods will contribute to fatty liver disease. Since these fish eat fruit in the wild, items such as melons, oranges, and other fruits can also be used as a type of food. With live fish such as goldfish and rosy red feeder minnows should not be fed. These contain an enzyme (thiaminase) within their flesh which binds vitamin B1, leading to deficiency [24]. The

species also has an absolute requirement for vitamin C, and develops health problems in its absence [25].

Reproduction Oscar and Larval Rearing

A. ocellatus exhibits external fertilization and parental care [26]. Oscar maturation is reached in approximately one year and individuals may be reproductively active for up to 9-10 years [27]. They reach maturity at about 12 cm length and have relatively high fecundity [28]. Although the Oscars are widely regarded as sexually monomorphic [17], males have been suggested to grow more quickly and are noted to possess dark blotches on the base of the dorsal fin [18]. Spawning is temperature dependant and may be restricted to warmer months (>25°C) in higher latitudes within its native or introduced range [27]. They are territorial and dominance hierarchies are established through agonistic displays [29].

Pairs are known to select and clean generally flattened horizontal or vertical surfaces on which to lay their 1.000 to 3.000 eggs (Figure 5) [18] and the number of eggs positively correlated with female body size [29]. The eggs adhere to a substrate and spread in a single layer. They are demersal, adherent and fragile to touch, with a slight ovoid shape, a large yolk sphere and a small perivitelline space. The fertilized eggs have a yellowish colouration and, when unfertilized, they are opaque white. Eggs hatch in 3-4 days and larva has a large yolk sac that within 4-5 days of hatching was completely absorbed [26]. Both parents continue to guard fry for several weeks [30].



Figure 5. Egg laying of Oscar

Fish larvae fed with live feed in the wild or cultured have higher survival rate than those fed with artificial feeds [31]. After Oscar fish larvae consume yolk sac within 4-5 days, it can be fed by granulated feed, but first feeding of a fish larva is very crucial for its subsequent growth and survival. Most of the fish larvae show deformed growth and inability to swim and prey the feed if they don't initiate successful first feeding soon after the mouth opening [32]. Therefore, live feed, which include zooplanktons, is very important to first feeding. These are the rotifers, copepods, cladoceras and other larval and adult forms of some invertebrates [33].

Aquarium Requirements for Oscar Fish

Oscar can grow to about 45 cm in length and 1.6 kilograms in weight. Therefore, aquariums should be large enough that fish can live comfortably. About 200 L fish aquarium is minimal for a pair of 15 cm Oscar fish, but 250-500 L aquarium is much better [16].

Oscar produce rather very waste from excrement and respiration. Another source of waste is uneaten food. These

waste products collect in the tanks and contaminate the water. Therefore, aquarium filter can remove physical and soluble chemical waste products from aquaria, simplifying maintenance. Furthermore, aquarium filters are necessary to support life as aquaria are relatively small, closed volumes of water compared to the natural environment of most fish [18,34,35].

Selection of the appropriate light for Oscars is important to exhibit their natural behavior and in terms of their reproduction. As Oscar would prefer low intensity fluorescent bulbs, avoid the use of bright lighting in the aquarium. In addition, in the aquarium decoration, dark tones are usually preferred [36].

Either the male or female Oscar fish can become aggressive after and before spawning. Therefore, large rocks, clay flowerpots, or large diameter PVC pipe should be provided as refuges. Aquarium plants should not be preferred due to aggressive of these fish, because the later time, they can remove plants. Moreover, bottom of aquarium should be placed in the flat rocks for spawning of this fishes [37].

CONCLUSIONS

Oscar (*A. ocellatus*) is a fish which demanded and admirable by most aquarist in the world. Oscar is one of the most loved species of aquarium fish due to the different behaviors from other fish of their, their beautiful appearance and their sympathetic versus people. Because of these reasons, knowledge of this fish rearing has importance for a lot of aquarist.

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