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RESEARCH ARTICLE

STUDIES ON MORPHOLOGICAL AND OESTEOLOGICAL ABNORMALITIES IN SOME ORNAMENTAL FISHES IN EGYPT

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ABSTRACT

Present study was aimed to investigate and determine the morphological and osteological malformations in ornamental fishes in Egypt. Morphological abnormalities were photographed with a digital camera and X- ray system. In present study, out of 250 ornamental fishes produced only 25 individuals with percent of 10% were found to have different types of abnormality, including; lordosis, scoliosis, absence of eyes, absence of tail, black tail and multiple type deformities. The exact cause of abnormalities could not be definitively determined, the possible etiologies was discussed.

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INTRODUCTION

Deformations in fish are moderately all around depicted with a higher recurrence of event revealed in incubation facility delivered people than wild (Sennar, 1980; Hosoya and Kawamura, 1998 and Ma *et al*., 2014). Disfigurements in fishes are referred to be brought about subsequently of ecological contaminants, shortage of supplements, oxygen inadequacy, sudden changes in temperature, water ebb and flow, transformation, inbreeding, parasitic pervasion, technician injury, and assault from predators (Tave *et al*., 2011, Malekpouri *et al*., 2015; Sajeevan and Anna-Mercy, 2016). Up to this point little consideration has been paid to intrinsic injuries on elaborate fishes, variations from the norm related with both new water and marine fish species (Olatunji-Akioye *et al*., 2010, Dutta *et al*., 2011, Jaward and Mamry 2012, Ma *et al*., 2014, Sajan *et al*., 2014 and Malekpouri *et al*., 2015). Peculiarities because of hereditary changes result from transformations or recombination of DNA these adjustments are heritable unless they are deadly. Irregularities brought about by epigenetic components (temperature, saltiness, broke up oxygen, count calories, radiation, concoction contamination created during the development of embryo (Berra and Au, 1981).

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Spinal deformations are as often as possible experienced in seriously raised fish. The distortion may influence on an individual scale bringing about lessened development and survival (Kitajima *et al*., 1981; Dasulas *et al*., 1991 and Chatain, 1994). Hereditary components, harm during embryonic advancement, harms, illnesses, harm because of ecological elements and wholesome insufficiencies are a few conceivable reasons for deformities in fish (Schaperclaus, 1992). There are a few signs that hypervitaminosis-A may bring about spinal distortions (Hilton, 1983). Spinal deformations have additionally been related with swim bladder brokenness (Daoulas *et al*., 1991; Chatain, 1994). Additionally presentation to toxicants has been accounted for to result spinal distortions (Mehrle *et al*., 1981). The present study was aimed to investigate the incidence and etiological causes of morphological abnormalities in Veiltail gold, Zebra cichlid and spinal deformities in Xiphophorus maculate, Poecilia reticulates and Pseudotropheus zebera in Egypt.

MATERIALS AND METHODS

Fish

A total number of 50 Veil tail, 50 Zebra cichlid, 50 Xiphophorus maculates (platy), 50 poecilia reticulate (Guppies) and 50 Pseudotropheus zebra (Zebra cichlid) were collected from Friday fish market Sayda Aishia, Cairo, Egypt and transported to the laboratory of department of hydrobiology, National Research Center in large plastic bags with chlorine free tap water with oxygen. Clinical examination was carried out on the alive fish in glass aquaria supplied with aerated chlorine-free tap water. Fish were subjected to external examination for lesions such as tail malformations, absence of tail, absence of eyes and black tail. All fishes examined according to Amlacker (1970). Fishes suffered from spinal deformities subjected for X- ray system.

RESULTS

In the present study, out of 250 ornamental fish only 25 individuals (10%) were found to have any type of abnormality (malformations and osteological deformities). These abnormal fishes were grown up to an average length of 8.30 ± 0.16 cm in compared to normal specimen (10.40 ± 0.45 cm), before they were sampled for the study (2-4 month of age). Length and weight of fishes were measured.

Table 1. Showing number and prevalence of Veil tail and Zebra cichlid affected with mal formations (anomalies)

Fish species	No. of examined fish	Absence of eyes	Absence of tail	Mal formation of tail	Black tail	total
Veil tail	50	2 (4%)	4(8%)	-----	----	12%
Zebra cichlid	50	----	5(10%)	3(6%)	1(2%)	18%

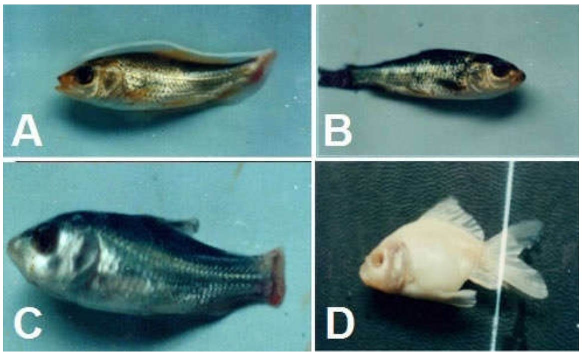


Fig. 1. Showing A. tail mal formation, B. black tail, C. absence of tail, D. absence of eyes

Table 2: Showing distribution of osteological abnormalities in *Xiphophorus maculates, Poecilia Reticulate* and *Pseudotropheus*

fish	No of examined fish	Curvature of spinal cord	Lordiosis	Scoliosis
Xiphophorus maculates (platy)	50	3(6%)	-----	-----
Poecilia reticulata	50	-----	5(10%)	
Pseudotropheus zebra (Zebra cichlid)	50	-----	-----	2(4%)

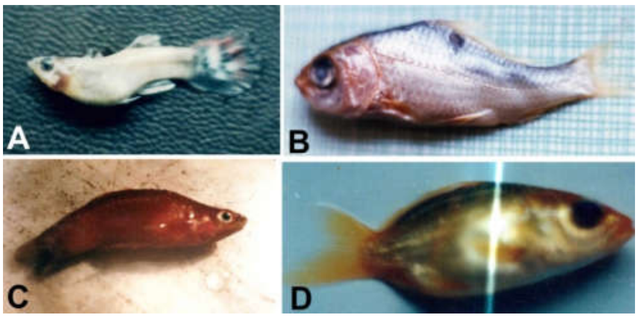
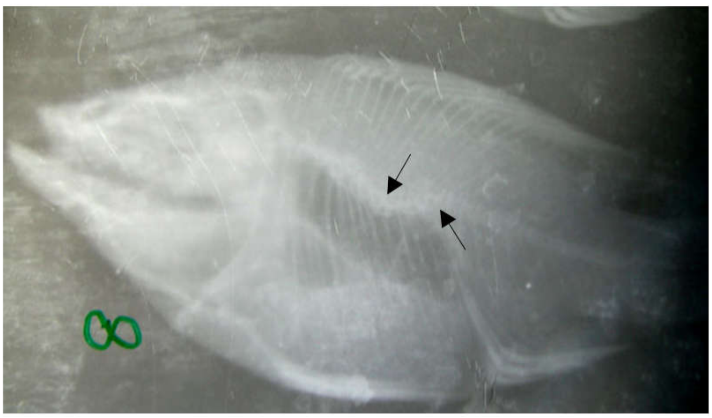


Fig. 2. Showing A. Lordiosis, B. Scoliosis, C. Curvature of spinal cord in *Carassius auratus* and D. Stump-body *Carassius auratus*



Deformities in some ornamental fishes

The anomalies was identified by rapid method of pathoanatomical description (Savvaitova *et al*., 1995). Detection of anomalies based on visually identifiable and examination of internal organs and phenodeviants in the external structure of fishes. Deformities of Veil tail were absence of eyes with percentage 4% and absence of tail with percentage 8%, while deformities of Zebra cichlid were absence of tail with percentage 10% and mal formations of tail with percentage 6% and black tail with percentage 1%. (Table 1). Tail malformation Fig.1, A and absence of tail Fig.1, C, absence of eyes Fig.1, D and black tail Fig.1, B. Fig. 1. The total deformity for Veil tail fish was 12% while total deformities for Zebra cichlid was 30%

Spinal or osteological deformities in some ornamental fishes:

All fishes suffered from osteological abnormalities determined and recorded lordiosis (bending of spinal cord longitudinally showing abnormality in shape of fish), scoliosis (bending of spinal cord vertically) and curvature of spinal cord, present study displayed that curvature of spinal cord recorded in Xiphophorus maculates (platy) with percentage 6%, lordiosis was recorded in Poecilia reticulate with percentage 10% and scoliosis was recorded in Pseudotropheus zebra (Zebra cichlid) with percentage 2% (Table 2) & Fig 2 & Fig. 3 displaying X-ray of Carassius auratus.

DISCUSSION

Hatchlings of a few freshwater fish delivered through initiated rearing display morphological variations from the norm that antagonistically influence their survival rate (Sahoo *et al*., 2007; Bogli-One *et al*., 2013). Accessible proof proposes that variations from the norm are actuated during the embryonic and post-embryonic times of life (Al-Harbi, 2001). In present review, we depict diverse variations from the norm have been recorded in ornamental fishes in Egypt. Various obsessive changes have been initiated in fish by unacceptable conditions, for example, supplements, vacillation of temperature, toxicities or mechanical injury, the most widely recognized clinical signs are cataract, exophthalmoses, fines disintegration greasy liver and skin discharge (Roberts and Bullock, 1989). Hereditary causes likewise play a part in enlistment of oddities in hostage reared fish, for example, stump body and opercular distortions and ophthalmic imperfections (Ghittino, 1989). Myxosoma species may influence fish and encourages on ligament of the hub skeleton of contaminated fish and the primary clinical sign is normally the dark tail (Hoffman and Putz, 1969) Occurrence of vertebral disfigurements are more typical in early stages when contrasted with grown-ups, which might be credited to that distorted fish at early stages were more prompts mortality (Amitabh and Firoz, 2010). Vertebral disfigurements like lordosis and scoliosis was recorded in S. denisonii by the nearness of inordinate internal arch and unusual sidelong ebb and flow separately. As per Boglione *et al*., (1993), scoliosis is the sidelong bowing of the vertebral pivot, it is the most effortlessly discernable anomaly in live fishes. S. denisonii with scoliosis had two ebbs and flows in the vertebral segment at the post dorsal district, one beneath the dorsal balance area and second at the caudal peduncle locale. In present review, vertebral deformations were more influenced for the most part at the back portion of the vertebral segment. Comparative sorts of vertebral disfigurements were accounted for in Fundulus heteroclitus (L., 1766) (Gabriel, 1944). As of late, wild got example of S. denisonii from Waterway Valapattanam, Kerala was additionally recorded with vertebral distortion (Sajan *et al*., 2014). Spinal deformations were observed to be related with the nonattendance of a practical swim-bladder (Chatain, 1994 ; Andrades *et al*.,1996). In the present review, disfigured fish had typical twofold chambered swim-bladder like Cyprinus carpio L., 1758 (Al-Harbi, 2001) and Labeo rohita (Dutta *et al*., 2013). Variance in water temperature is thought to be one of the reasons for the spinal distortions, in light of the fact that by the sudden change in water temperature may prompt irregular muscle development and spinal deformation (Al-Hassan, 1982, Wang and Tsai, 2000, Davidson *et al*., 2011). Low broke down oxygen content in the water during bringing forth and formative stages may likewise in charge of vertebral disfigurement (Al-Hassan, 1982).

In present review, normal length and weight frequently unusual fish have been observed to be generously lower than that of typical fishes, might be because of their powerlessness to bolster ordinarily and contend with the ordinary ones for sustenance (Al-Harbi, 2001). Frischkenecht *et al*., (1994) revealed that vitamin-C insufficiency in the eating regimen likewise prompts vertebral disfigurements. In conclusion, a hereditary premise has additionally been proposed for spinal distortions (Fagbuaro, 2009; Arbuatti *et al*., 2013). A portion of the distorted example of ornamental fishes had numerous disfigurements, for example, spinal deformation (lordiosis) and nonappearance of eyes in one fish, comparable reports by Tave *et al*., (1982) in Oreochromis aureus. fish disfigurements have been likewise come about because of nutritious lacks, troublesome abiotic variables, raising conditions and hereditary elements (Wang and Tsai, 2000, Fagbuaro, 2009; Amitabh and Firoz, 2010, Arbuatti *et al*., 2013). In any case, prior reviews revealed that the conceivable aetiologies and instruments capable are not surely knew (Gavaia *et al*., 2002).

Conclusion

It was concluded that the present review does not meant to talk about the reasons for the variations from the norm, however just to single out the way that such deformations are recorded in some ornamental fishes in Egypt. Despite the fact that the correct reason for disfigurement was not decided, ominous abiotic conditions, improper sustenance, hereditary imperfections, interruption of early formative process or a mix of these elements could all have been included in the abnormalities and distortions in fancy fishes. Consequently, more research is required for precisely recognizing the elements cause such deformations.

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