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Radiography as Taxonomical Instrument to Compare Between Some Fish Species of Three Local Families Cyprinidae and Cichlidae and Mastacembelidae

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Abstract
The current study is an attempt to use the technology of radiography to diagnose three species of Iraqi local fish , Cyprinidae and Cichlidae and Mastacembelidae and to compare and distinguish between these three families by using the technology of radiography of the skeleton of each species and utilizing this technology for classification and diagnosis studies of fish.
Keywords: Diagnosis , Local fish , Osteology , Radiography , Skeleton

Introduction

The technology of radiography via x-rays is regarded as one of world-wide technologies that is used in many scientific, research and applied fields especially the medical specializations . Chief of them, Osteology. As to Ichthyology , the radiography is utilized to detest by x-rays of radio waves of metals in fish bodies of age groups with different patterns and way of nutrition. This technology is used in identifying the ratio of weight increases of fish which is deemed to be the first indicator of growth increase in fish (2).

In this study the researcher tries to identify some diagnosis differences between some fish species of three local families through using the technology of radiography of diagnosis via radiography of bones and identifying on bonus patterns as well as studying different fins of fish and the shape of head to come to optional diagnostic differences between those three fish species.

The radiography by x –rays gives an indicator on the ways of digestion in some fish species since it is possible to use the powder of glittering or shining material of metallic essence with the fodder given to fish and figuring out their path in the digestive canal as an indicator of radio proof through which one can trace or identify (3).The technology of radiography by x –rays can also be used in estimating the real weight of fish by applying specialized equation for this technology through which we can identify the weight of fish (1).

It is possible to employ the radiography by x-rays of fish samples represented by dead bodies or it is possible to figure out the radio flash resulted from fish bodies whether they are alive or dead after injecting by radiant material out of the resulted flashing that can estimate physiological function according to the objective of this study (4).

Radiography falls under diagnosing of some pathogenic transmitted inside the fish bodies with different developing phases including complicated inflection virus , or widespread inflection clarified by (5) J.Maoa et al .

The used ordinary radiography in well –known medical fields can identify between all types of fish or diagnosing the skeleton whether ossificated or osteomalacial gristle since gristle fish has a little response to the radiography because of their gristly structure. These bodies can be diagnosed by x-rays directly or indirectly or by swallowing them by other animals or even human beings.as illustrated (6).These radiographies can detect the main osteoid and tissue distortion of fish bodies .These distortions give an indicator on the causative of these distortions such as chemical pollution , radiant and bactericide…etc especially in the fins (See Jawad (7) and (8). Radiography can also detect the deformation of fish such as deformation of spinal column and head shape (9) and (10).

Methodology

Three fish species of three local families have been supplied for the purpose of exposing to radiography after cleaning them and some biological measurements have been taken for these fish –the radiography device of Korean origin has been used (Carestream vita fhex).

Results and Discussion

These fish species of three local families have been used in this study. It is represented by Cyprindae. The sample of this study was *Cyprinus carpio* the length of the sample was (40.5) cm the weight was (1190) gm as shown in figure (1).The other family was Cichlidae, the sample was *Coptodon zillii*, the length was (29.5) cm the weight was (610) gm as shown in figure (2) , third family was Mastacembelidae, the sample was *Mastacembelus mastacembelus* , the length was (43) cm , the weight was (160) gm as shown in figure (3).

Figure (1) ***Cyprinus carpio***

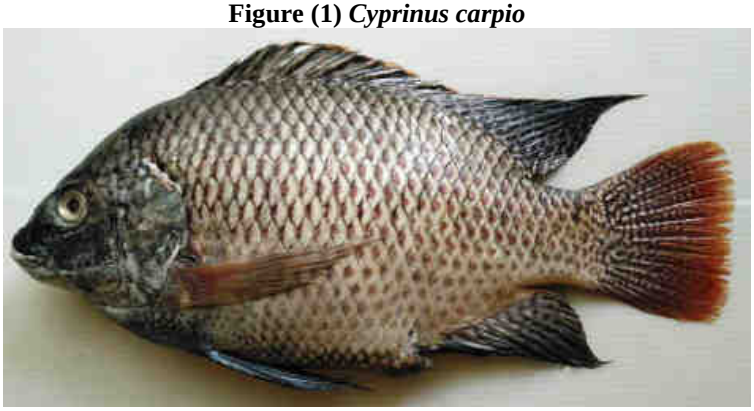

Figure (2) ***Coptodon zillii***

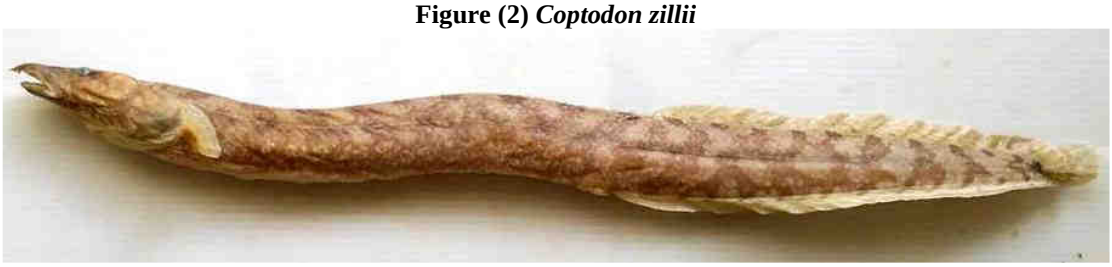

Figure (3) ***Mastacembelus mastacembelus***

The force penetration of x-rays of these fish was (KV.54) and the intensity of these x-rays was (300 MA) and the time of snapshotting was (SC.0.03) the researcher has not found any source that gives any details of used device in their study about the type of used device or the intensity of impressed beams as well as the force penetration of rays to fish bodies.

Gregory (11) says that the full bone fish have internally gristle skull (Endochondral) especially in the back area of (Ranial nerves) .There are four bones of Endochondral within the area of skull osseous mortise. It is also that Basioccipital forms the Nuchal Codylus that connects the spinal column .This inference resulted from Anatomical fish samples.

Greer (12) agrees that the full bone fish participate that superior maxilliary bone that surround the spine cord through its entry to the skull via skull osseous mortise whereas the superaoccipital is an important part of roof of skull (Calvaria) that paved the way to connect Torso muscles above axile (Epxial trunk muscles). It is possibly to extend like crest associated with the muscles. The size of crest is different depending on the muscle mass. It is noted that the most part of skull back part consists of five en Chanro that form the acoustic capsule. The greater part of sideline of Cranuim of different types. The accuracy in diagnosis needs high beam power or certain movements of fish bodies including the head , and preparing the radiography separately to give clarity of the form of bone formation in fish skull of different types as shown in figure (4) , (5)and (6).

Figure (4) *Cyprinus carpio* head

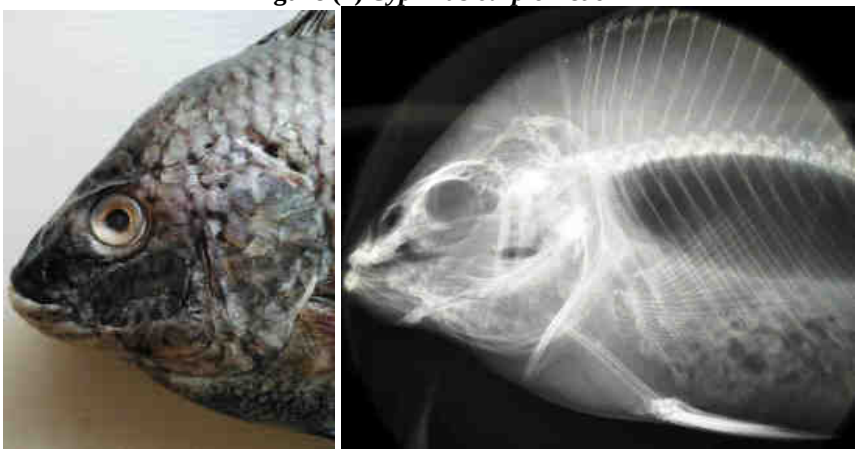

Figure (5) *Coptodon zillii* head

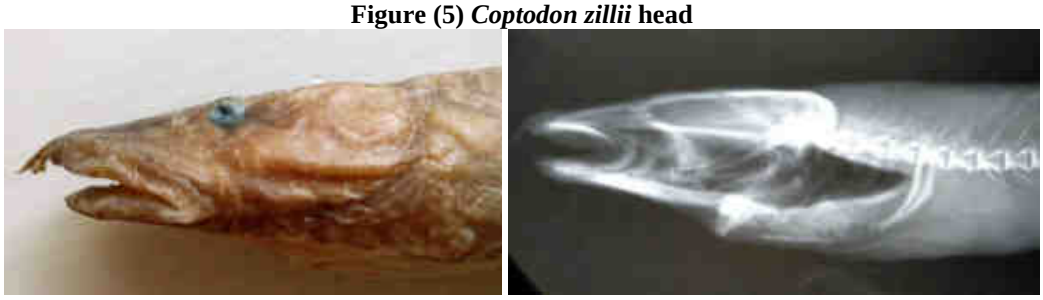

Figure (6) *Mastacembelus mastacembelus* head

The features and types of bones in radiography do not appear in this study anatomically through radiography of fish on the contrary of radiography in the source (7) , the image that is taken clearly and accurately as shown in figure (7).It could be related to the difference in the technology of the used device in photography or due to the intensity of differences rays and beams or it is possible to use the technology of certain preparation of the sample before radiography. Knowing that the source did not mention the intensity of impressed rays and the force penetration of rays of the tissue as well as the types used device figure (7) the intensity and clarity of the source sample.

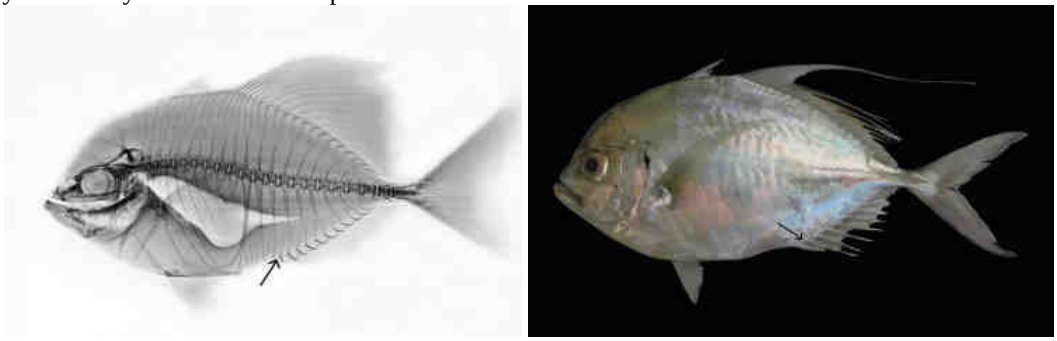

Figure (7) Radiation clarity of the source (7) model

The current study aims at the possibility of employing the radiography to study the tissue and fish bones as well as classified diagnosis between different species of fish by depending on tissue and bone indications or proofs of studied fish .The use of radiography gives an idea of the amount of incurred development in fish bodies especially Ossicles (bones).Although some researchers and scholars keep away from the modern technology which is based on the differential dissection of bones between the species of fish as illustrated by Ricardo Betancur and others (13) who gave true classification of bony fishes (Osseous) without recourse to using modern technology specialized in radiography.

It is found that there are some bone differences between the given samples of fish especially the type of vertebra in the spinal column of the three families of fish as well as the place of styloldeum linkage of vertebra and linkage of fins bones in the skeleton of these types as shown in figures (8), (9),(10).

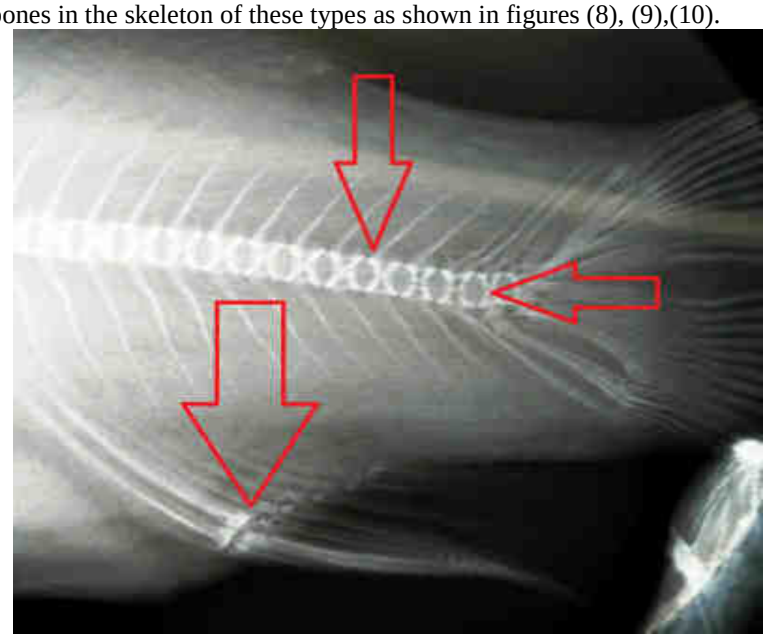

Figure (8) vertebra , Pine bones, fin joint of *Cyprinus carpio*

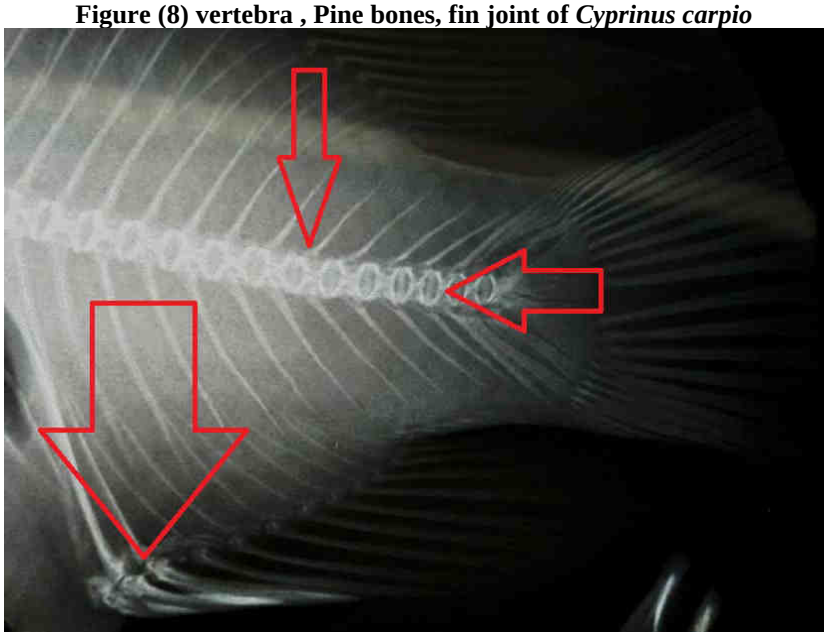

Figure (9) vertebra , Pine bones, fin joint of *Coptodon zillii*

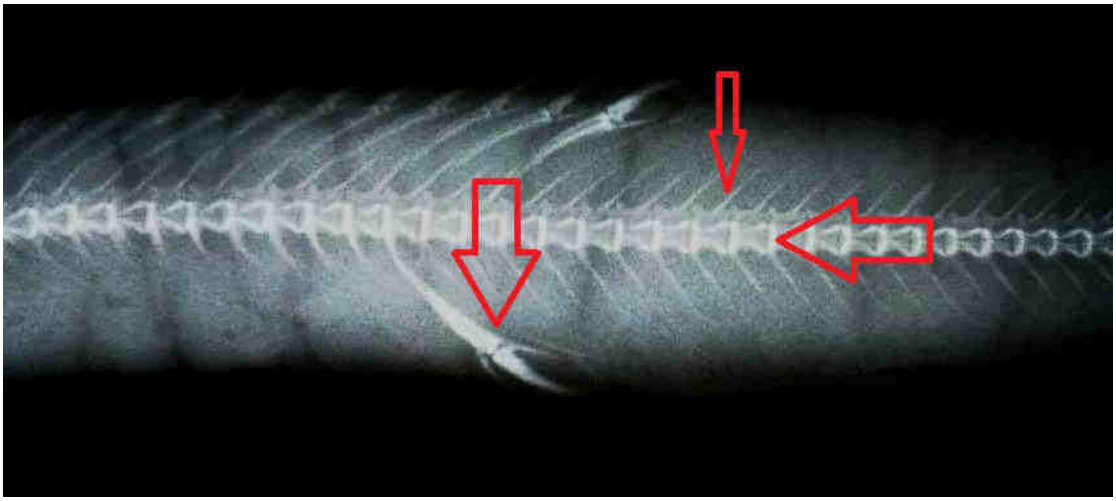

Figure (10) vertebra , Pine bones, fin joint of *Mastacembelus mastacembelus*

Yet , it is found that ichthyologists resort to use the technology of bone pigmentation especially if the fish samples that need to be diagnosed or classified small or very tiny in size as in the method followed by Lewis and others (14) in bone pigmentation even the connective tissues are very small in size. Bearing in mind the most studies that deal with fish bone pigmentation depend on the method that is founded by Potthoff (15) 1984. It is actually this method has been applied successfully in two separate studies to pigment the Iraqi local bone fish as shown in (15) and (16).The researcher has the view that if the sizes of fish and lengths exceed than (30) cm , that means we need to better technology that can give true results in diagnosing fish bones .The researcher stressed the importance of using radiography to diagnose these bones because it has low cost and time. It is also quick technology but the main shortcoming is unavailability of devices as well as the high cost of accurate radiography .The high accuracy of bone diagnosis remains in the first ranking of the method bones comparative anatomy as shown in (17) and (18) within the one type or one family or differentiation or diagnosis between species or families of fish as shown in (19) .

Through the photography these samples in this study , it is found that the appearance of swim bladder in radiography in the two species (*Cyprinus carpio*) and (*Coptodon zillii*). It appears that they are totally different in terms of types , and size which paves the way to identify the diagnostic differences of fish tissues and internal members that may help enforce the diagnostic studies between families of fish by using radiography without any damage by available samples or models and comparing between these different types as shown in figures (11) and (12).

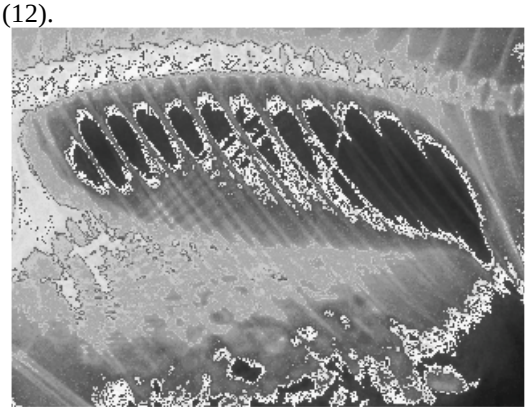

Figure (12) *Coptodon zillii* Swim bladder

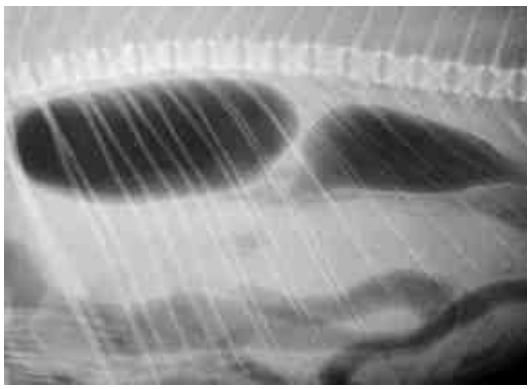

Figure (11) *Cyprinus carpio* Swim bladder

It is noticed that the bowels of *Coptodon zillii* in figure (8) has begun in decaying due to the long storage of fish before selling as shown in figure (7) .It is noted that the bowels are cohesive and have good features in radiography due to the fact that the model (*Cyprinus Carpio*) was alive and can be freezed before radiography in three days .It is found that the appearance of another study of radiography of fish bodies so it is possible to utilize to know the appropriateness of fish after storage for long time .

To sum up, radiography of fish bodies was very useful and helpful in diagnosing the three local families in terms of form , type of bones including vertebra , bones connection and the difference of the type of swim bladder that can be very clear through radiography in spite of the fact that the relative weaknesses of the study in diagnosing the head bones of these species .However ,they give clear idea of these differences in the type of head bones or the size of mouth cavity between these different types and the radiography examination of fish can be regarded as an examination method or evaluation of fresh fish and frozen fish without recourse to

traditional method of anatomy .

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