Studies on some microbial diseases affecting Ornamental Koi fish with trial for treatment

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Abstract

The current investigation was aimed to through light on microbial diseases infecting ornamental koi fish with special reference to its control. A total number of 500 koi fish (*Cyprinus carpio*) were collected and subjected to clinical, postmortem, bacteriological and mycotic examinations. *Aeromonas hydrophila* was the most predominant bacterial infection (70%), followed by *Pseudomonas fluorescens* (20%) and *Flavobacterium columnaris* (10%). The infectivity of the isolated bacteria was confirmed by artificial infections. Mycological examination revealed that 250 samples out of 500 koi fish (*Cyprinus carpio*) were positive to fungal isolation 50% (30% moulds and 20% yeasts). The prevalence of isolated moulds were represented as *Cladosporium sphaerospermum* (32%), *Penicillium corylophilum* (20%), *Aspergillus flavus* (16%) and *Mucor* spp(12%) while the prevalence of yeasts (*Candida* spp 16% and *Rhodotorula* spp 4%) . The clinical signs and postmortem alterations associated with infections were described. Among the antibiotics evaluated, Ciprofloxacin appeared to be more effective against the tested bacteria. Water extract of the wormseed plants *Artemisia cina* L. (Sheih Baladi) was tested for antimicrobial activity. The inhibitory zone in the well diffusion varied between (30 and 20 mm) diameter for *Candida* spp, whereas, the inhibitory zones of *Cladosporium sphaerospermum* was (29 and 10 mm) diameter. *Artemisia cina* L had no significant effect against the tested bacteria. Further investigation should be indicated to evaluate the therapeutic potential of *Artemisia.*

Key words:
ornamental koi fish, microbial diseases, Ciprofloxacin, Artemisia cina

Introduction

Cyprinids are the major group of freshwater fishes that have a global significance as a source of food, for sport, for their ornamental appeal, and as experimental models for research **(Hoole *et al.,* 2001)**. Ornamental fish culture is an expanding industry within Egypt and may play a key role in rural development in near future. Also, ornamental fishes are commonly imported in large amounts without any control. Among ornamental cyprinids, koi carp (*Cyprinus carpio*), is cultured in large numbers of fish farms to supply the international aquarium and pond trade as a decorative species in special prepared tanks from parks and gardens.

One of the important problems in fish health is an infectious disease which is caused by bacteria, fungi and virus **(Plumb, 1999)**. Disease outbreaks have long been recognized as a critical factor hampering the development of koi fish culture in many countries. Disease-induced increased mortality and/or reduced growth rates and reproductive performance which have profound impacts on future production **(Austin and Austin, 2007)**. Live imported ornamental fishes are commonly introduced in large amounts without any control and of great risk facing Egyptian fish producers in introduction of new diseases into the established farms. There is a significant gap in the knowledge of microbial koi diseases in Egypt. Among the various diseases, ornamental fishes are vulnerable to a wide variety of bacterial and fungal diseases.

Many of the fungi that affect fishes are considered opportunists, attacking the fishes when they are stressed because of unfavorable environmental conditions, or secondary to bacterial infections, or when they have lost their mucus protection because of trauma or excessive handling **(Quiniou *et al.*, 1998)**. Mycotic infections of fishes by *Ascomycetes* are wide spread in freshwater and represent the most important fungal group affecting wild and cultured fishes. The *Cladosporium* is a dematiaceous (pigmented) mold are responsible for significant infections involving both living and dead fishes. The ability of *Cladosporium* species to cause disease in fish was presented by **(Polglase *et al.*, 1984)** who observed that *Cladosporium sphaerospermum* was found on the skin of Carp and responsible for the mortality in a new earthen pond. Moreover, there are other fungi that have been implicated in fish diseases. Some of the genera involved include *Aspergillus* **(Saleem *et al.,* 2012),** *Rhizomucor* **(Wolf and Smith 1999)** and *Candida* **(Neish and Hughes1980)**. Most of these are multiple case reports or single, and causing systemic disease with high mortality rates in fishes.

In fish disease management, synthetic chemicals and antibiotics have been used for the last 30 years with partial success **(Stoskoph, 1993)**. The availability of effective medications is an important part of the aquarium and pond fish hobby/industry. Although pharmaceutical industries have produced a large number of new antimicrobial agents, the emergence of resistant bacterial strains has become a public health problem allover the world. The continuing emergence of pathogenic microorganisms either by mutations or by acquiring new genes from other bacteria, to these molecular targets of macromolecular biosynthesis targets that are resistant to first-line antimicrobials is a cause of increasing concern **(Aoki, 1992, Plumb, 1999; WHO, 1999**and **Udomkusonsri *et al.,* 2007)**.

Since origin of human's life, Egypt has been known to be rich repository of medicinal plants. Nowadays, the application of phytotherapy in fish diseases management symbolize safety and biodegradable in contrast to the synthetic products that are regarded as unsafe to human and environment **(Rios and Recio, 2005)**. The genus *Artemisia* comprises over 400 species, many of which have an aromatic, bitter taste (**Erel *et al.*, 2012**).

Artemisia exhibit anti-oxidation, anti-mutation, anti-carcinogenic, antimicrobial, antihypercholesterolemic, anti-hypertensive, anti-obesity, choleretic, and anti inflammatory properties **(Ekanem *et al.,* 2011; Erel *et al.*, 2012 and Harikrishnan *et al.,* 2012).**

Therefore, the current investigation was planned to through light on microbial diseases infecting koi fish with special reference to its control.

Material and Methods

Naturally infected Fish.

A total number of 500 koi fish (*Cyprinus carpio*) with average body weight 100 ± 10g were collected from different ornamental fish hatcheries, farms and shops in Sharkia Governorate suffering from mortalities in winter season.

Clinical and postmortem examinations.

All of the collected fish were subjected to clinical and postmortem examinations **(Plumb and Bowser 1983)**.

Experimental fish.

A total number of 40 apparently healthy *C. carpio* weighing 100 ± 10g were obtained from commercial fish farm in Sharkia Governorate reared and acclimiated to the laboratory conditions in well aerated glass aquaria supplied with dechlorinated tap water for artificial infections. Fish were fed with commercial fish ration at rate of 2%, divided into two equal volumes daily. At the end of acclimation period, 10 fish were randomly collected and examined to bacteriological, mycological and parasitological examinations to confirm that these fish were free from infection.

Bacteriological examination.

Samples were taken under complete aseptic conditions from the affected lesions of skin, gills and internal organs and inoculated into Tryptic Soya agar and incubated at 22°C according to the procedure described by **Austin and Austin (2007)**.

Mycological examination.

Fish were processed using routine diagnostic techniques. Lesions were
aseptically processed for mycological examination, based on the methods of
Willoughby and Roberts (1994).
Identification of moulds and yeasts was carried out according to **Domsch *et al*., (1980) and Terrence(1971).**

***Artemisia cina*.**

Artemisia cina is a herbal plant with an aromatic odor, leaves are greenish silver gray with a smooth texture.It was obtained from the Plant Research Institute in Agriculture Research Center in Giza **.**

Experimental infection.

Thirty healthy fish were equally divided into three groups. The first group was apparently healthy (control) inoculated with 0.2 ml dose of sterile saline. The second group was injected with *A. hydrophila* 0.2 ml dose of 24 hr. broth culture 5× 10^5 CFU/ml saline, inoculated I/P **Schaperclaus *et al*., (1992).** The fish of the third group was injected with the isolated pathogenic *Ps. fluorescens* 0.2 ml dose of 24 hr. broth culture 10^7 CFU/ml saline, inoculated I/P **(Sultan 2009)** . All fish were kept under strict observation for clinical abnormalities and mortalities for 15 days. At the end of experiment, all fish were sacrificed and re-isolation of the infected agents was performed.

Treatments

1- In Vitro

Determination of minimum inhibitory concentrations (MICs) of wormseed plant (*Artemisia cina*) a gainst isolated bacterial pathogens.

It was determined according to **Alderman and Smith (2001)** and **Abdel-Hadi *et al.,* (2008)**. Using serial dilutions of water extract of wormseed plant (*A. cina*) added to the Brain Heart Infusion broth containing *A. hydrophila* or *Ps. fluorescens* at concentration of 10^3 CFU/ml and incubated at 25°C. The aqueous extract of wormseed plant by maceration of 250 g of shade dried, of plant materials and mixed with 1 liter of boiled distilled water. The mixture was left for an hour for proper soaking. *A. cina* solution was filtered through four fine layer of gauze. The extract was filtrated through Whatman No. 1. The aqueous extract of *A.cina* was concentrated by using rotary evaporator. The extract was preserved in a brown bottle at 4 °C until further use.

Determination of minimum inhibitory concentrations (MICs) of wormseed plant (*Artemisia cina*) against isolated fungal pathogens.

The agar well diffusion method was used to determine (MICs) of (*Artemisia cina*). The aqueous extract of wormseed plant was displayed as mentioned above **Abdel-Hadi *et al.,* (2008)**. The adequate amounts of autoclaved Sabroud Dextrose Agar (Defico) was dispensed into sterile plates, and allowed to solidify under sterile conditions. The cultures of fungal growth for 24 h were used. Fungal blokes were inoculated on the surface of solid medium in plates. Then 25, 50,100 ,200 ppm of extracts were absorbed onto well under sterile conditions and sterile distal water was added for negative control. Agar plates containing fungal strains were incubated at (25, 37ºC for 72 h). After incubation, all plates were observed for inhibition zones and readings were taken in millimeters. The minimal inhibitory concentration of wormseed plant (MIC) was considered effective when it caused completely inhibition of *Cladosporium sphaerospermum* and *Candida* spp according to **Erel *et al*., (2012)**.

Sensitivity test.

Sensitivity of some recovered pathogenic bacterial isolates (*A. hydrophila* and *Ps. Fluores-*

cens) to different antibiograms was undertaken using the disc diffusion method and estimated according to **Carter and Cole (1990).**

Results

The Gram-negative bacteria isolated from clinically diseased *C. carpio* were *Aeromonas hydrophila, Pseudomonas fluorescens* and *Flavobacterium columnaris* at rate of 70, 20 and 10%, respectively **(Table. 1).**

The clinical and postmortem alterations associated with *A. hydrophila* and *Ps. fluorescens* infections were nearly similar. The infected koi fish showed loss of appetite, hemorrhages allover the body (fins, mouth, eyes, gill cover and urogenital opening), enlargement of abdomen, loss of equilibrium, sluggish swimming at the water surface, increased mucus secretion, skin erosion and ulcer. Some of the infected koi revealed exophthalmia accompanied by hemorrhage or opaqueness of the eye. Gills appeared congested or pale and covered with excessive mucus. The postmortem findings were congestion of the internal organs with yellowish red ascetic fluid. **(Fig. 1,2,3&4)**.

Mycological examination revealed that 250 samples out of 500 koi fish (*Cyprinus carpio*) were positive to fungal isolation 50% (30% moulds and 20% yeasts). The prevalence of isolated moulds are *Cladosporium sphaerospermum* (32%), *Penicillium corylophilum* (20%), *Aspergillus flavus*(16%) and *Mucor* spp (12%) while the prevalence of yeasts(*Candida* spp 16% and *Rhodotorula* spp 4%) **(Table. 2)**.

The isolate of *Cladosporium sphaerospermum* produced darkly pigmented (brown to black) and velvety in appearance colonies. Predominantly spherical to subspherical conidia, conidial chains branched laterally in an irregular pattern and conidiophores relatively unbranched**.**

The isolate of *Penicillium corylophilum* produced grey green conidia colonies, slightly yellow reverse coloration and without soluble pigment. Predominantly biverticillate penicillin (some monoverticillate and some terverticillate penicillin) with predominantly ampliform phialides, metulae were longer than the phialides**.**

The isolate of *Aspergillus flavus* was characterized very rapid rate of growth, maturing in about three days. Surface is greenish-yellow to olive color. Texture is often floccose, especially near the center and overall can be velvety to woolly. Septate hyphae with rather long conidiophores rough texture or even spiny, especially just below the vesicle. Vesicles are spherical to elongate, the vesicle from which the phialides. Conidia are globose to ellipsoidal with smooth to finely roughened walls**.**

The isolate of *Mucor* is a rapidly growing fungus which well fill a culture plate in a few days with a woolly growth resembling cotton candy. New growth is white in color but turns a grayish-brown. *Mucor* has broad hyphae which are non-septate. Sporangiophores are long, may be branched and terminate in a round spore-filled sporangia. The sporangia has a thin wall which when mature dissolves to release round or somewhat ellipsoidal sporangiospores**.**

The isolate of *Candida* spp grows rapidly in culture, reaching maturity in as little as three days. Colonies are cream colored, raised and smooth. Colonies taken from Sabouraud-Dextrose Agar will appear as round to oval cells. The yeast cell divides by budding. Some true hyphae may also be formed. Along side of the pseudohyphae, *Candida* spp develops blastoconidia around the area of the 'septa'**.**

The isolate of *Rhodotorula* spp colonies are rapid growing, smooth, glistening or dull, sometimes roughened, soft and mucoid. They are cream to pink, coral red, orange or yellow in color. Blastoconidia that are unicellular, and globose to elongate in shape are observed. These blastoconidia may be encapsulated. Pseudohyphae are absent**.**

Experimental infection.

Experimentally infected koi fish with different pathogenic bacteria (*A. hydrophila* & *Ps. fluorescens*) showed similar clinical signs and postmortem changes to the naturally infected one. The mortality patterns among the artificially infected *C. carpio* by I/P were shown in **(Table. 3)**. Re-isolation of the injected bacterial pathogens was performed from all dead and experimentally diseased fish. On the other hand, no mortality was recorded in the control group.

Treatments

In-vitro antibiograms of *A. hydrophila* and *P. fluorescens* isolates were sensitive to Ciprofloxacin **(Table. 4)**. The water extract of wormseed plant *Artemisia cina* (Sheih Baladi) revealed no effect against both tested pathogenic bacteria.

Determination of MICs of *Artemisia cina* against isolated fungal pathogens.

The results presented in **Table (5)** showed that the inhibitory zone in the well diffusion technique varied between (30 and 20 mm) diameter for *Candida* spp whereas, the inhibitory zones of *Cladosporium sphaerospermum* was (29 and 10 mm) diameter. Tested fungi (*Candida* spp and *Cladosporium sphaerospermum*) were compared to the control. **(Fig. 5, 6).**

Table 1. Prevalence of bacterial infections among the examined Koi fish.

Fish spp.	Total no. of exam. fish	*A. hydrophila*		*Ps. fluorecsence*		*F. columnaris*	
		No.	%	No.	%	No.	%
C. carpio	500	350	70	100	20	50	10

Table (2). Prevalence of fungal infections among the examined Koi fish.

Fungal isolates	Total number of examined fish	Number of positive examined fish	Number of diseased fish	Percentage of infection
Cladsporium sphaerospermum	500	250	80	32
Penicillium corylophilum			50	20
Aspergillus flavus			40	16
Mucor spp			30	12
Candida spp			40	16
Rhodotorula spp.			10	4

Table (3). Pathogencity test of *A. hydrophila* and *Ps. fluorescens* among koi.

Fish group	Bacterial pathogens	Dose & Route of injection	Number of infected fish	Number of dead fish	Mortality %
I	*A. hydrophila*	0.2ml I/P	10	8	80
II	*Ps. Fluorescens*	0.2ml I/P	10	6	60
III	Control (Sterile saline)	0.2ml I/P	10	0	0

Table (4). Sensitivity of some *A. hydrophila* and *Ps. fluorescens* isolates to different antibiograms.

Antibiotic	symbol	Conc. (mcg)	Susceptible zone (mm)	*A. hydrophila*		*P. fluorescens*	
				Inhibition zone (mm)	Sensitivity reaction	Inhibition zone (mm)	Sensitivity reaction
Ciprofloxacin	CIP	5	≥15	22	S	20	S
Oxytetracycline	OT	30	≥19	21	S	20	S
Trimethoprim + sulphamethoxazol	Sxt	1.25 / 23.75	≥16	21	S	16	S
Gentamycin	GM	10	≥15	16	S	15	S
Ampicllin	AM	10	≥17	17	R	10	R
Kanamycin	K	30	≥18	16	R	17	R

Table (5). Determination of minimum inhibitory concentrations (MICs) of wormseed plant (*Artemisia cina*) against isolated fungal pathogens.

Isolated fungi	Mean zones of inhibition of water extract (mm)			
	25 ppm	50ppm	100ppm	200ppm
Candida spp	No Inhibition zone	20	29	30
Cladosporium sphaerospermum	No Inhibition zone	10	27	29

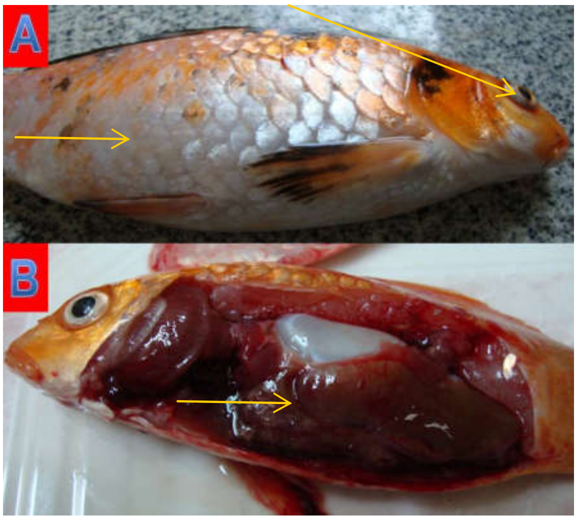

Fig. (1). *C. carpio* naturally infected with *A. hydrophila*. (A) Showing swelling of abdomen and slight exophthalmia. Arrow (B) Show severe congestion of gills and internal organs with bloody ascetic fluid. Arrow

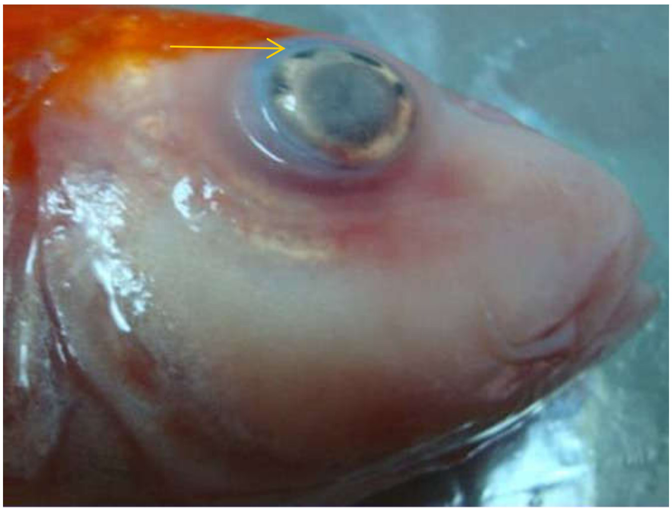

Fig. (2). *C. carpio* naturally infected with *A. hydrophila* showing exophthalmia, hemorrhage and opacity of eyes. Arrow

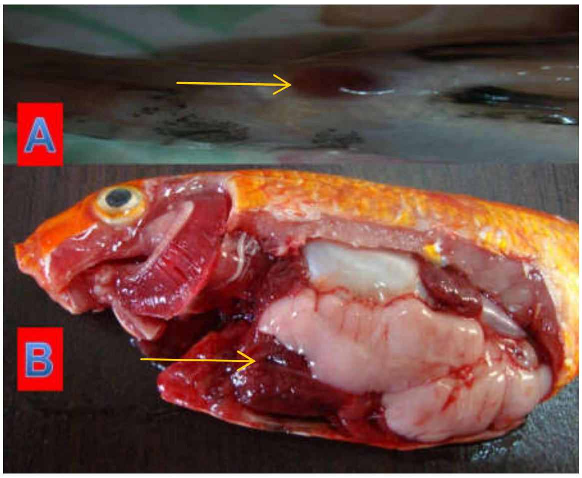

Fig. (3). *C. carpio* naturally infected with *P. fluorescens*. **(A)** Showing inflammation of urogenital opening. **(B)** Showing congestion of internal organs. Arrow

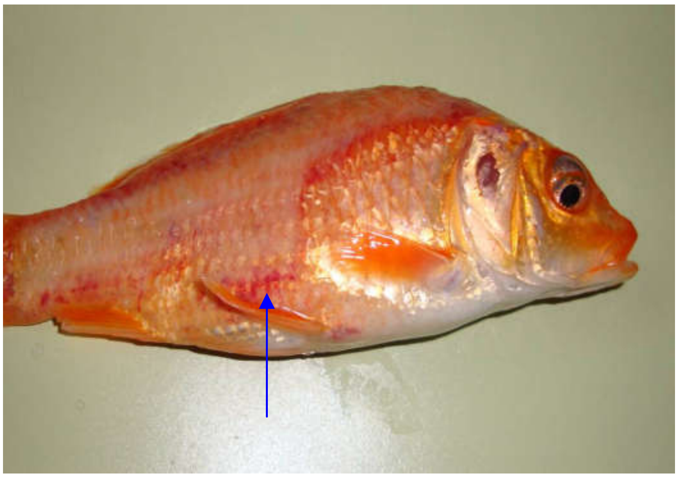

Fig. (4). *C. carpio* naturally infected with *F. columnaris* showing loss of mucus, scales and ulcer surrounded by hemorrhagic zone.Arrow

Fig.(5). Control plate of minimal inhibitory concentration of wormseed plant (*Artemisia cina*) showing growth of *Candida spp* .

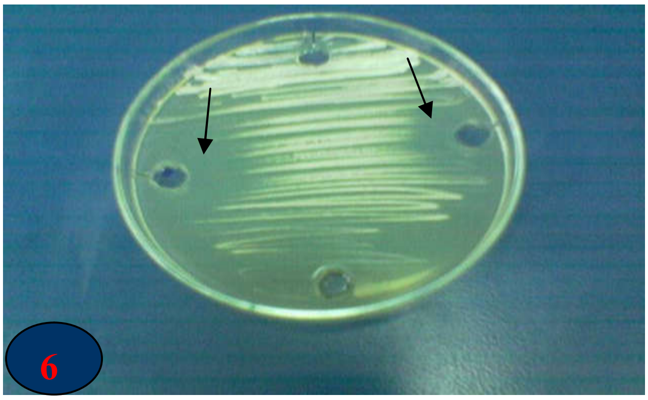

Fig. (6). Tested plate of minimal inhibitory concentration of worm seed plant (*Artemisia cina*) showing the inhibitory zone of *Candida spp* varied between (Arrow 30 and 20 mm) diameter .

Discussion

The global industry in ornamental fishes is unique in that while many countries impose strict requirements on nearly all imported animal and plant products, live ornamental fish are commonly imported in large volumes without similar controls.

Regarding the clinical signs and postmortem examinations of the naturally infected fish showed loss of appetite, sluggish movement, swimming close to the surface of the water, lethargic, no escape reflex, darkening of the skin, easily detached and lose of the scales, ulcer formation , uni- or bilateral exophthalmia, in some cases cloudy change of eye was observed. Internally, congestion of the internal organs and the peritoneal cavity filled with ascetic fluid were observed. Several previous studies **Griffin, (1992), Bucke, (2000), Hoole *et al.,* (2001), Butprom, (2004), Sunarto *et al.,* (2005) and Awad, (2011**) described similar findings. The sluggish movements were probably the result of frayed tail beside hemorrhagic, edematous and ulcerated fin in addition to anorexia. The observed swimming of the affected fish near the surface of the water suggests their extraordinary need for oxygen which could be attributed to coating of the gills with profuse mucus together with congestion and desquamation of epithelial cell covering. **Butprom, (2004)** concluded that ulcerative lesion in Koi carp was primarily caused by multiple infections of several bacteria species, although the possibility of viral involvement must not be ruled out. Toxic metabolites of the isolated bacteria are absorbed from the affected tissues and induce toxemia.

Basic knowledge of fish diseases etiology is needed to develop strategies for prophylaxis and control of diseases in aquaculture. Dealing with bacteriological agents isolated from the naturally infected koi carp fish, several bacterial isolates were obtained. The results of this study showed that *A. hydrophila* was the most predominant bacterial species isolated from diseased fish. These results were in agreement with that recorded by **Awad, (2011**). The highest prevalence of aeromonads could be attributed to its presence as a part of intestinal flora of healthy fish **Plumb, (1999**).

Mycological examination of koi fish showed that it was infected with six opportunistic fungal genera, *Cladosporium sphaerospermum*, *Penicillium corylophilum*, *Aspergillus flavus*, *Mucor* spp, *Candida* spp and *Rhodotorula* spp. These fungal species are infectious through contamination of fish feed **Saleem *et al.,* (2012**). Moreover, the fungal load increases significantly during storage and is more pronounced at high moisture levels in fish feed **Jubeen *et al.,* (2012**). The factors which enhance the threat of fungal infection through feeds include environmental temperature (27°C), humidity level greater than 62% and moisture level in the feed above 14%. Poor water quality is one of the most important factors favoring the growth of fungus **Iqbal *et al.,* (2012b**). *Cladosporium sphaerospermum* and *Candida* spp have more indirect effect if poorly stored fish feed is held under subtropical conditions . It is assumed that these ornamental fishes might be infected through contaminated feed offered to them at the pet shop. The infection on sensitive area like gills and eyes of fish become fatal, as the growth of fungal hyphae in eyes may cause partial or complete blindness. In such condition the treatment and cure is impossible and ultimately the fishes die **Srivastava, (2009), Iqbal *et al.,* (2012a**).

Isolation of *Penicillium corylophilum*, *Aspergillus flavus* , *Mucor* spp and *Rhodotorula* spp from koi is comparable to the findings of **Shahbazain *et al.,* (2010), Refai *et al.,* (2010), Fadaeifard *et al.,* (2011)** and **Iqbal and Ramsha, (2013).** However, **Manochehr *et al*., (2014)** has characterized *Penicillium corylophilum*, *Aspergillus flavus* and *Mucor* spp as normal mycoflora. These fungi may not be considered as non-pathogenic but they can better understood as opportunist fungi as many of them possess virulence factors, which enable them to cause disease, especially under predisposing conditions **Iqbal, and Rabia, (2013).** Poor aquarium management increases the chances of fungal infection in ornamental fishes. Even the basic health management practices may be easily ignored due to shortage of trained personals.

Successful control of bacterial diseases of cultured fish is a major management and economic problems for the aquaculture industry **(Plumb, 1999)**. Regarding to the sensitivity of *A. hydrophila* and *Ps. fluorescens* to different antimicrobials, the present study showed that Ciprofloxacin was the drug of choice. Similar results were recorded by **El-Ashram, (2007); El-Refaee *et al.,* (2008) and Awad, (2011)** who mentioned that Ciprofloxacin has proved a world-wide efficacy to control or treat bacterial infections in fish.

Infections caused by bacteria resistant to multiple antimicrobial agents have been a major concern and the most serious threats to successful treatment of microbial diseases during the last two decades (**Plumb, 1999**).Plants produce a diverse range of bioactive molecules, making them rich source of different types of medicines. Among ancient civilizations, Egypt has been known to be rich repository of medicinal plants. Nowadays, the herbal extracts symbolize safety in contrast to the synthetic products that are regarded as unsafe to human and environment. To overcome the increasing resistance of pathogenic microbes, a variety of medicinal plants have been screened worldwide for their antimicrobial properties. Wormseed plants have a powerful biological effect.

The present investigation showed that *Artemisia* revealed no effect on the tested bacteria. A comparison of the current investigation with those of previous studies showed that the locality of the plant, plant species, the extraction procedure and the solvent are playing role in the antimicrobial activity of the medicinal plants. **Ekanem *et al.,* (2011)** noticed that the minimum inhibitory concentrations of ethanolic extract of *Artemisia annua* was 25 mg/mL against *Aeromonas* and *Pseudomonas* bacteria of farmed catfish. **Ruikar *et al.,* (2009)** found that only methanol extract of *Artemisia pallens* showed the activity against *Bacillus cereus*. **Ramezani *et al.,* (2004)** also reported that Iranian *A. scoparia* extract showed an inhibition zone (13.6 mm) against *S. aureus* but not against *Ps. aeruginosa*. **Erel et al., (2012**) found that it was not active against all of the tested microorganisms. Methanolic extracts of the plants showed an effect only on *Ps. Aeruginosa* and *E. coli* strains and no significant effect on *S. aureus*. *A. santonicum* and *A. scoparia* were the most active plants against *Candida spp.* with 20-mm and 30-mm diameter zones and *Cladosporium sphaerospermum* with 29-mm and 10-mm diameter zones respectively ,similar results were recorded by **Erel *et al.,* (2012). Harikrishnan *et al.,* (2012)** suggested that diet enriched with *A. capillaris* extract at concentration of 1.0% or 2.0% level could potentially modulated the innate immune system in *Paralichthys olivaceus* fish against *E. tarda* infection.

Abdel-Hadi *et al.,* (2008) concluded that wormseed plants in the rate of 0.5 ml/l of 25% solution gave the best estimates of fertility, hatchability and survivability% among the examined eggs and larvae of carp species and recommended for practical application in carp hatcheries for the control of saprolegniasis and to replace the currently used chemicals; malachite green and formalin with their environmental and public health hazards.

It could be concluded that microbial agents cause a significant losses among koi fish. The morphological changes associated with microbial infections will decrease the marketing value. Ciprofloxacin is the drug of choice against bacterial infection. Further investigation is indicated to evaluate the therapeutic potential of *Artemisia* on aquatic organism diseases using different solvents, different parts of the plant, different methods of extractions and other plant species. All ornamental fishes entering Egypt should be subjected to quarantine measurement and inspected on arrival to avoid of introduction of disease.

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دراسات على بعض الأمراض الميكروبية التى تصيب سمكة الزينة الكوى ومحاولة علاجها

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الملخص العربى

تهدف هذه الدراسه الى القاء الضوء علي الأمراض الميكروبية الاكثر شيوعا المسببه لنفوق ونقص انتاجيه اسماك الكوي. تم إجراء هذه الدراسة علي عدد ٥٠٠ سمكة مريضة من أسماك الكوي. تم تصنيف انواع البكتريا التي تم عزلها كالاتي: ايروموناس هيدروفيلا (٧٠%)، سيدوموناس فلوريسينس (٣٥%) وفلافوبكتريا كولمنارز (١٠%) وكان عدد الفطريات ٢٥٠ عينة من ٥٠٠ أسماك الكوي كانت ايجابية للمعزولات الفطرية ٥٠ ٪ (٣٠٪ من العفن ٢٠٪ من الخمائر) . المعزولات هي الكلادوسبوريم سفيروسبريم (٤٠٪) ، البنسليوم كريلوفويم (٣٠٪) اسبرجليس فلافس (٢٦٪) و الميكور (١٢٪)، في حين وقوع الخمائر (الكانديدا ١٦٪ و الرداتوريا ٤٪). وقد وصفت العلامات الظاهرية والصفة التشريحية المرتبطة بالعدوى . وقد تم اجراء تجربة لحساب الحد الادنى للتركيز المثبط لمستخلص الشيح البلدي للبكتريا والفطريات المعزولة. تم عمل عدوى صناعية للبكتريا المعزوله من الأسماك المصابه طبيعيا بالحقن البريتونى. تم وصف العلامات الإكلينيكية والصفة التشريحية للأسماك المصابة. كان السيبروفلوكساسين هو المضاد الحيوى القوى والفعال المضاد للبكتريا الممرضه. أثبتت الدراسة ان المستخلص المائي للشيح البلدى ليس له تأثير فى منع نمو البكتيريا ولكن ذو تأثير فعال مع الفطريات.