Species

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First record of *Moniliella suaveolens* and *Moniliella acetoabutens* isolated from *Cyprinus carpio*

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ABSTRACT

The current study aims to identify some of the fungal diseases prevalent in cultured *Cyprinus carpio*. A total of 137 examined cultured *Cyprinus carpio* were collected alive from Nabi Al-Sen farm at Tartous Governorate during the year (2021 & 2022). The fish were microbiologically (fungal) examined, and samples were taken from the affected skin, external wounds, fins, gills, and internal organs (intestine) using multiplication medium Peptone Water and culture medium Poteto Dextrose Agar (PDA). After incubation, the developing fungal species were isolated in order to purify and identify them. The results showed Two species of *Moniliella* isolated for the first time in the world from fish in this study: *Moniliella suaveolens* and *Moniliella acetoabutens*.

Keywords: *Moniliella*, *Cyprinus carpio*, Fungal diseases.

1. INTRODUCTION

The increasing of world population has led to increasing demand for protein, which has generated a growing interest in fish meat as a source of rich protein. Fish farming is of important in meeting a particular part of the need for fish meat. Data published by FAO in 2020 indicate that the total aquaculture production in the world has reached approximately 178.5 million tonnes. The aquaculture industry faces additional challenges due to the emergence of new diseases. The rise in fish diseases within aquaculture is closely related to the presence of many pathogenic microorganisms in the water. Many pathogens such as fungi have been identified in various species of fish, and can produce toxins in fish meat, causing public health risks (Abdel-Aziz and Alhabaty, 2022; Syanya et al., 2023). Fungal diseases of fish have become increasingly important over the past 20 years. It is important to define and isolate the related agent to understand the biological characteristics of fungal disease and diagnose and treat it.

Fungal diseases, in general, are complicated to control or treat once they have taken hold. Prevention is, as always, the best medicine. Increased knowledge of basic biology will help guide treatment and control methods (Özcan and Arserim, 2022). Economic losses associated with diseases are expected to increase due to aquaculture

intensification and development. This indicates the need for extensive research into the pathogenesis of fungal diseases in fish (Owolabi et al., 2023; Terada-Nascimento et al., 2023). The genus *Moniliella* comprised 11 species, of which *M. suaveolens* and *M. acetoabutens*. The genus is not well understood regarding taxonomic placement and ecological status (Thanh et al., 2013). Morphologically, members of the genus can be recognizable by the formation of greyish to olivaceous black colonies, asexual reproduction by multilateral budding, and the formation of hyphae and arthroconidia (Thanh et al., 2012).

2. MATERIALS AND METHODS

Fish

A total of 137 examined cultured *Cyprinus carpio* were collected alive from Nabi Al-Sen farm at Tartous Governorate during the year (2021 & 2022). The samples were collected with an average body weight of (487.5 ± 167.35 gm). The collected fish were transported to the laboratory for the required study, held in well-prepared bags supplied with sufficient amounts of water with continuous air supply.

Clinical examination

The gathered fish were clinically inspected to identify external changes or clinical abnormalities.

Mycological examination

Isolation of the fungus from fishes

Samples were taken from the affected skin, external wounds, fins, gills, and internal organs (intestine) using multiplication medium Peptone Water and culture medium Poteto Dextrose Agar (PDA). The inoculated plates were incubated at 25°C for seven days. After incubation, the developing fungal species were isolated to purify and identify them.

Determination and classification of fungi

Studying the morphological characters of colonies included growth appearance of the cultures, rate of growth, texture and color of the surface and reverse side colonies. A small portion of fungal colony was placed on a glass slide with drop of distilled water, covered with a clean cover slide and examined under the microscope.

3. RESULTS AND DISCUSSION

The current study began to discover fungal diseases affecting *Cyprinus carpio*. The fish were collected from Nabi Al-Sen farm based on clinical signs during the period (2021 & 2022), and the fish samples showed mild to severe infection. The clinical signs of the affected fish were the presence of ulcers with white edges all over the body of the fish, which was one of the clear signs with lacerations in the caudal, dorsal, and pectoral fins, and the presence of dark spots on the skin and bleeding throughout the body. Some fish suffered from bulging eyes (unilateral or bilateral) and some lesions and ulcers with a black surface were observed, especially on the surface of the gills and the ventral side of the body (Figure 1).

The fungal infection was confirmed by isolating the pathogenic fungus from the infected skin, external wounds of the fish, fins, gills, and internal organs (intestine) using (PDA) medium. The result showed two species belonging to the genus *Moniliella*, namely *M. suaveolens* and *M. acetoabutens*. Fungal species were identified based on the morphological characteristics of the isolates and their examination under a microscope (Figure 2). The percentage of appearance of *Moniliella* fungi was (25.55%) of the samples. There was a variation in the percentages of appearance of this genus during the seasons of the year, as it appeared more in winter compared to spring and fall, with percentages of (80%), (20%), and (11.9%). Respectively, it did not appear in the summer samples (Figure 3).

There was also a discrepancy in the percentages of appearance of the two species, and the most common fungus was *M. acetoabutens* (23.36%), followed by *M. suaveolens* (8.76%). The percentage of each type of *Moniliella* has been calculated during each season of the year, where *M. suaveolens* appeared in the winter higher than in the spring and autumn and did not appear in summer samples, as well. *M. acetoabutens* was more appearing in the winter compared with spring and autumn, as well as not shown in the summer (Table 1) (Figure 4).

Figure 1 Clinical signs of fungal infection

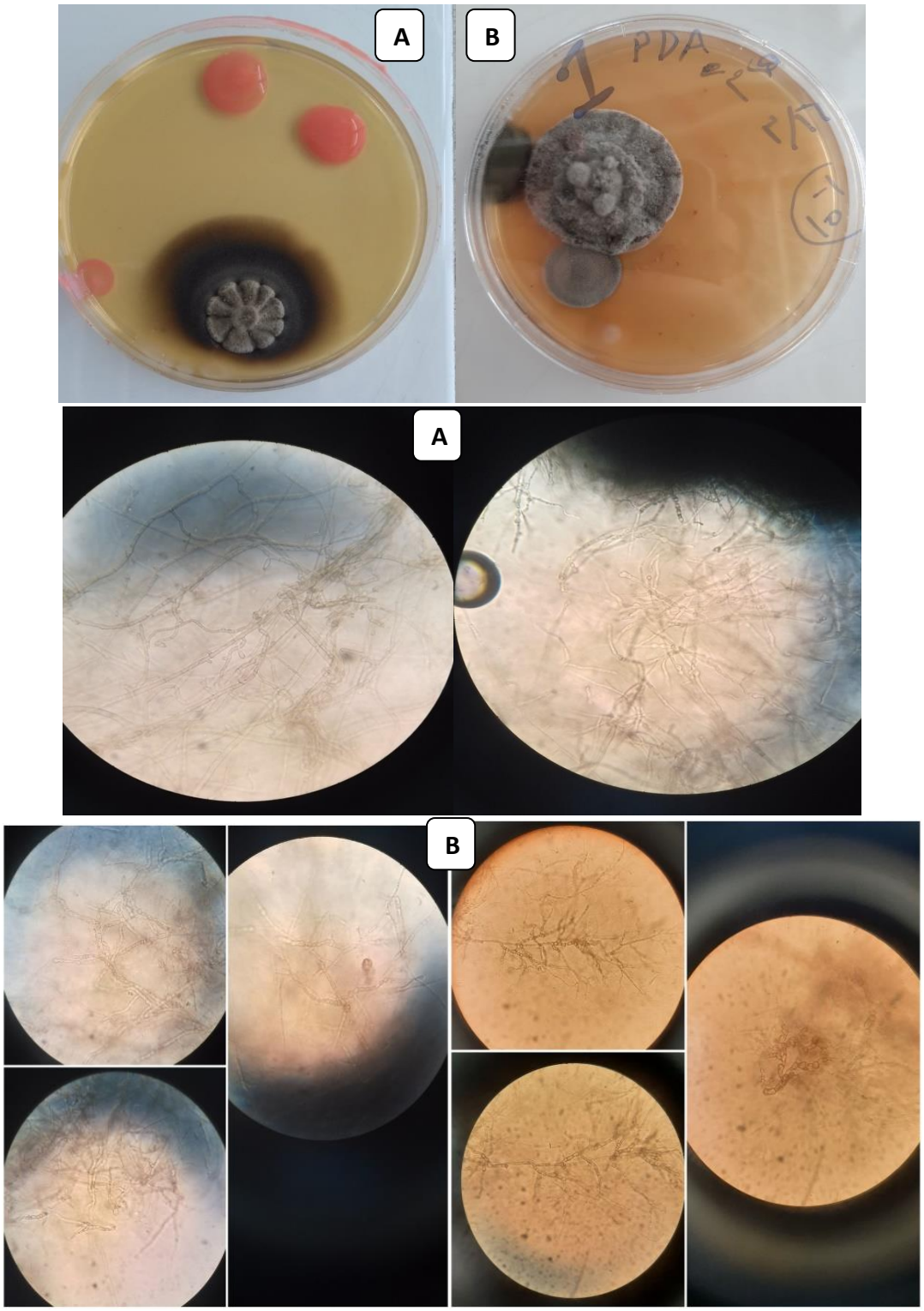

Figure 2 (A) colony of *M. suaveolens* fungus on (PDA) medium, a microscopic preparation of *M. suaveolens* fungus, (B) colony of *M. acetoabutens* fungus on (PDA) medium, a microscopic preparation of *M. acetoabutens* fungus.

M. suaveolens and *M. acetoabutens* has not been isolated previously from lesions in fish, it was isolated for the first time in this study. The recognition of opportunistic infections caused by fungi not previously known as pathogens has increased recently. *Moniliella suaveolens* were isolated in pure culture from histologically typical phaeohyphomycotic granulomas containing dematiaceous fungi in two cats. Cats had several slow-growing black lesions. *M. suaveolens* has not been isolated previously from lesions in animals including

man (Mckenzie et al., 1984). *M. suaveolens* has been recovered from cheese, butter, and margarine, so its growth in the fatty tissue of the subcutis is not surprising. To our knowledge, *M. suaveolens* and *M. acetoabutens* have not been associated previously with disease in fish.

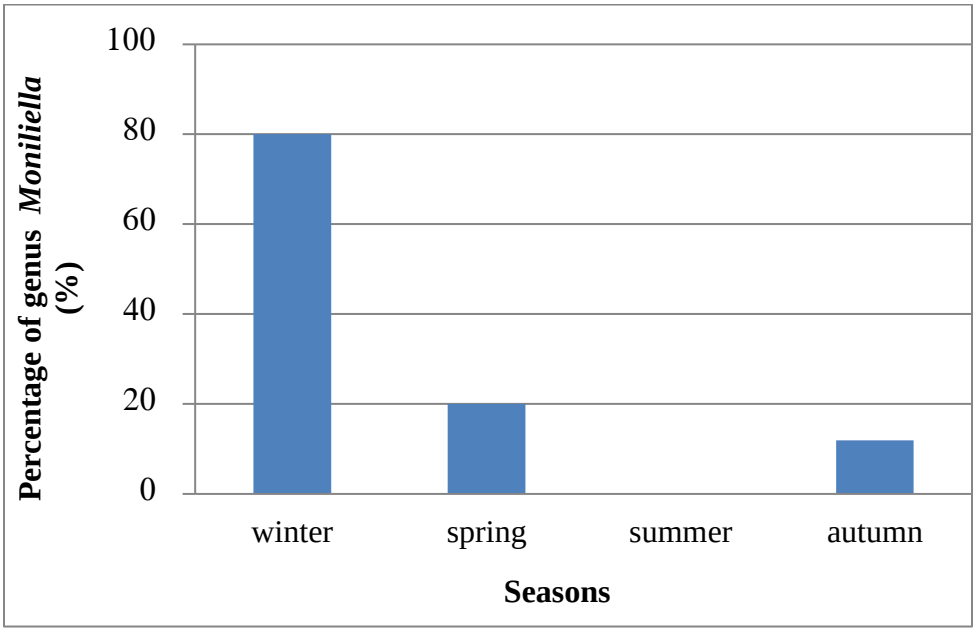

Figure 3 Seasonal changes of the genus *Moniliella* isolated from *C. carpio* during the year's seasons.

Table 1 Percentage of *Moniliella* species isolated from *C. carpio* during the seasons.

Season Fungi	Winter	Spring	Summer	Autumn
M.suaveolens	30%	5%	0%	3.6%
M.acetoabutens	75%	15%	0%	8.33%

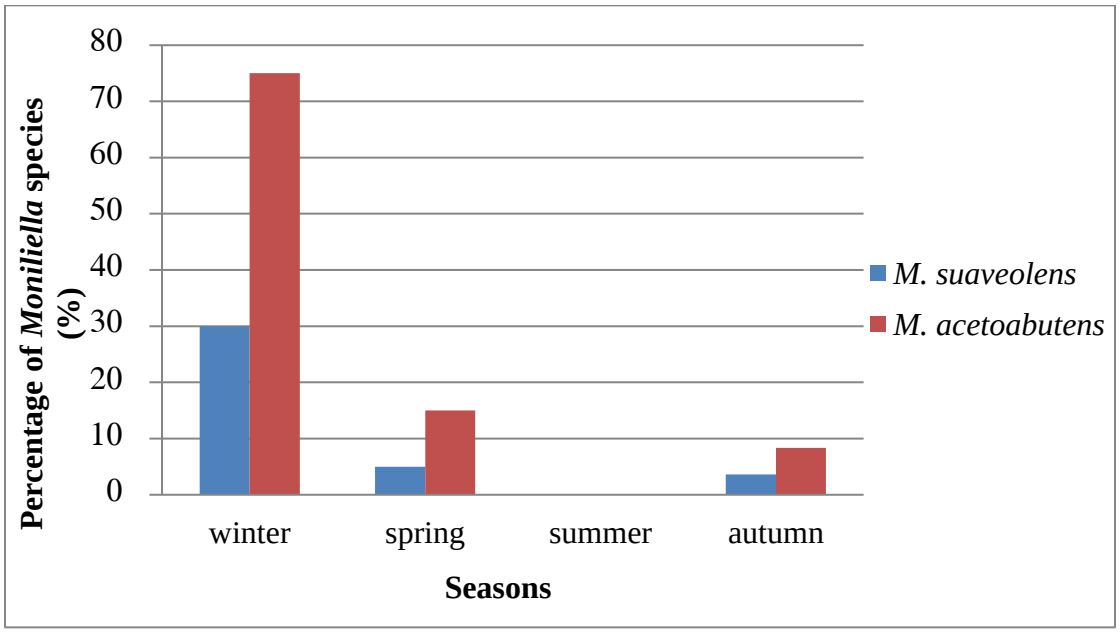

Figure 4 Seasonal changes of the *Moniliella* species isolated from *C. carpio* during the year's seasons.

4. CONCLUSION

The results showed Two species of *Moniliella* isolated for the first time in the world from fish in this study: *Moniliella suaveolens* and *Moniliella acetoabutens*.

Conflicts of interests:

The authors declare that there are no conflicts of interests.

Funding:

The study has not received any external funding.

Ethical approval

The Animal ethical guidelines are followed in the study for experimentation, species collection & identification.

Data and materials availability

All data associated with this study are present in the paper.

REFERENCES

1. Abdel-Aziz NM, Alhabaty S. Influence of two different nanomaterials on *Aspergillus fumigatus* isolated from salted fish. SVU- Int J Vet Sci 2022; 5(1):17-23.
2. Mckenzie RA, Connoln MD, Mcginnis MR, Leelaar R. Subcutaneous Phaeohyphomycosis caused by *Moniliella suaveolens* in Two Cats. Vet Pathol 1984; 21(6):582-586. doi: 10.1177/030098588402100606
3. Owolabi MO, Anifowose OR, Oladosu GA, Owolabi OO. Pathogenicity of *Aspergillus fumigatus* in Experimental Infection of Different Developmental Stages of *Clarias gariepinus*. Asian J Fish Aquat Res 2023; 21(6):22-28. doi: 10.9734/ajfar/2023/v21i6557
4. Özcan F, Arserim NB. Fungal Diseases in Fish. BSJ Agric 2022; 5(1):48–52. doi: 10.47115/bsagriculture.983345
5. Syanya FJ, Litabas JA, Mathia WM, Ntakirutimana R. Nutritional Fish Diseases in Aquaculture: A Human Health Hazard or Mythical Theory: An Overview. European J Nutr Food Saf 2023; 15(8):41-58. doi: 10.9734/EJNFS/2023/v15i81326
6. Terada-Nascimento JS, Dantas-Filho JV, Temponi-Santos BL, Perez-Pedroti V, De-lima-inheiro MM, Garcia-Nunez RY, Mansur-Muniz I, De-Mira ÁB, Guedes EAC, De-Vargas-Schons S. Monitoring of Mycotoxigenic Fungi in Fish Farm Water and Fumonisins in Feeds for Farmed *Colossoma macropomum*. Toxics 2023; 11(9):762. doi: 10.3390/toxics11090762
7. Thanh VN, Hai DA, Hien DD, Takashima M, Lachance M. *Moniliella carnis* sp. nov. and *Moniliella dehoogii* sp. nov., two novel species of black yeasts isolated from meat processing environments. Int J Syst Evol Microbiol 2012; 62(Pt 12):3088-3094. doi: 10.1099/ijs.0.044255-0
8. Thanh VN, Hien DD, Thom TT. *Moniliella byzovii* sp. nov., a chlamydosporeforming black yeast isolated from flowers. Int J Syst Evol Microbiol 2013; 63(Pt 3):1192-1196. doi: 10.1099/ijs.0.049767-0