

## Study on Freshwater Fish Fauna of the Mid-Western Region of Saudi Arabia

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**ABSTRACT.** Eight localities were chosen for this study, three in the lowlands of Tihama and five in the high lands of Hijaz Mountains. In these localities four species of fishes were found, *Aphinus dispar*, *Cyprinion acinaces*, *Garra buetikeri* and *Cyprinion mhalensis*. The first two were found in the low lands while the other two were in the high lands of Hijaz.

### Introduction

Fish live in virtually all kinds of aquatic habitats and have developed a wide variety of form and function. Freshwater habitats have a fragile nature, which in the last few decades in developing regions is subjective to intensive environmental pressures affecting fish habitats and populations.

Freshwater fishes from different parts of Arabia have been described by Boulenger<sup>[1]</sup>, Trewavas<sup>[2]</sup>, Fowler and Steinitz<sup>[3]</sup> and Balieto and Spano<sup>[4]</sup>. The most comprehensive work on freshwater fishes from Saudi Arabia and Arabian Peninsula, was carried out by Al-Kahem and Behnke<sup>[5]</sup> and Krupp<sup>[6]</sup>, Banister and Clarke<sup>[7]</sup>. In addition. Ross<sup>[8]</sup> has listed one secondary freshwater species, ten marine species found in drainage system and seven introduced species from seven oases in the Eastern Province of Saudi Arabia.

Al-Kahem and Behnke<sup>[5]</sup>, Krupp *et al.*<sup>[9]</sup>, Maitland and Campbell<sup>[10]</sup> have emphasized the importance of further studies on freshwater fishes, their habitats and their distribution before extinction caused by human activities. This will provide baseline data for a long-term monitoring of ecological changes and thus for a meaningful assessment of human impact, which is a prerequisite to the implementation of conservation policy.

Many freshwater fishes distributed throughout the Mid-Western Region of Saudi Arabia, drought and human activities affecting surface water in the area suggest that it is necessary to undertake this study.

## Materials and Methods

### a) Fish Samples

During field studies on the ecology of some freshwater habitats in the Mid-Western of Saudi Arabia by Al-Ghamdi *et al.*<sup>[11]</sup>, a total of 279 fish specimens were collected by different types of net and line. Collected fishes were preserved in 10% formalin solution and were additionally injected with formalin for future taxonomic studies. Fish identification has been checked by Dr. F. Krupp, during his participation in a symposium on Red Sea Marine Environment organized by Faculty of Marine Science, K.A.A.U., Jeddah, Saudi Arabia in 1994.

### b) Study Area

The Mid-Western Region of Saudi Arabia extends from the Red Sea including the low lands of Tihama Plateau and the high lands of Sarawat Mountains, which differ very much in their climatic and environmental conditions. It contains a large number of Wadis which can be very steep and narrow or very wide and flat. Most of the Wadis are rich in surface water all year round, some other Wadis contain surface water for few months after rainy season or may become dry for several seasons. Many dams have been constructed in the area which may alter the ecological conditions and possibly enhance the freshwater animals including fish.

Eight habitats, which had surface water at the time of this study, were chosen three in the low lands and five in the high lands (Map 1). The areas studied in the low lands are: Al-Hakak, Al-Khawar and Al-Ahsabah, and the studied areas in the high lands are: Al-Kharrar, Wadi Bowa, Zahran, Al-Habaka and Al-Ganabain.

## Results

Four species of freshwater fishes were identified from eight localities studied in the low lands of Tihama and the highlands of Hijaz Mountains.

The studied localities had different types of habitats, perennial streams, intermittent streams of reservoir of dam. Three of them in the low lands and five in the high lands (Tables 1 & 2). The high lands of Hijaz differ very much from the low lands in the temperatures, salinity, etc. which play a major role as limiting factors.

*Aphinus dispar* and *Cyprinion acinaces* were found in the localities of the low lands and were not found in high lands during this study. *A. dispar* was collected from three localities (Al-Hakak, Al-Khawar and Al-Ahsabah), while *C. acinaces* were collected only from Al-Hakak.

*Garra buettikeri* and *Cyprinion mhalensis* were collected from the high lands localities only. *G. buettikeri* was found in Al-Kharrar, Al-Ganabain, Wadi Bowa and Al-Habaka, while *C. mhalensis* was collected from Al-Kharrar, Al-Ganabain and Zahran (Table 1 & 2).

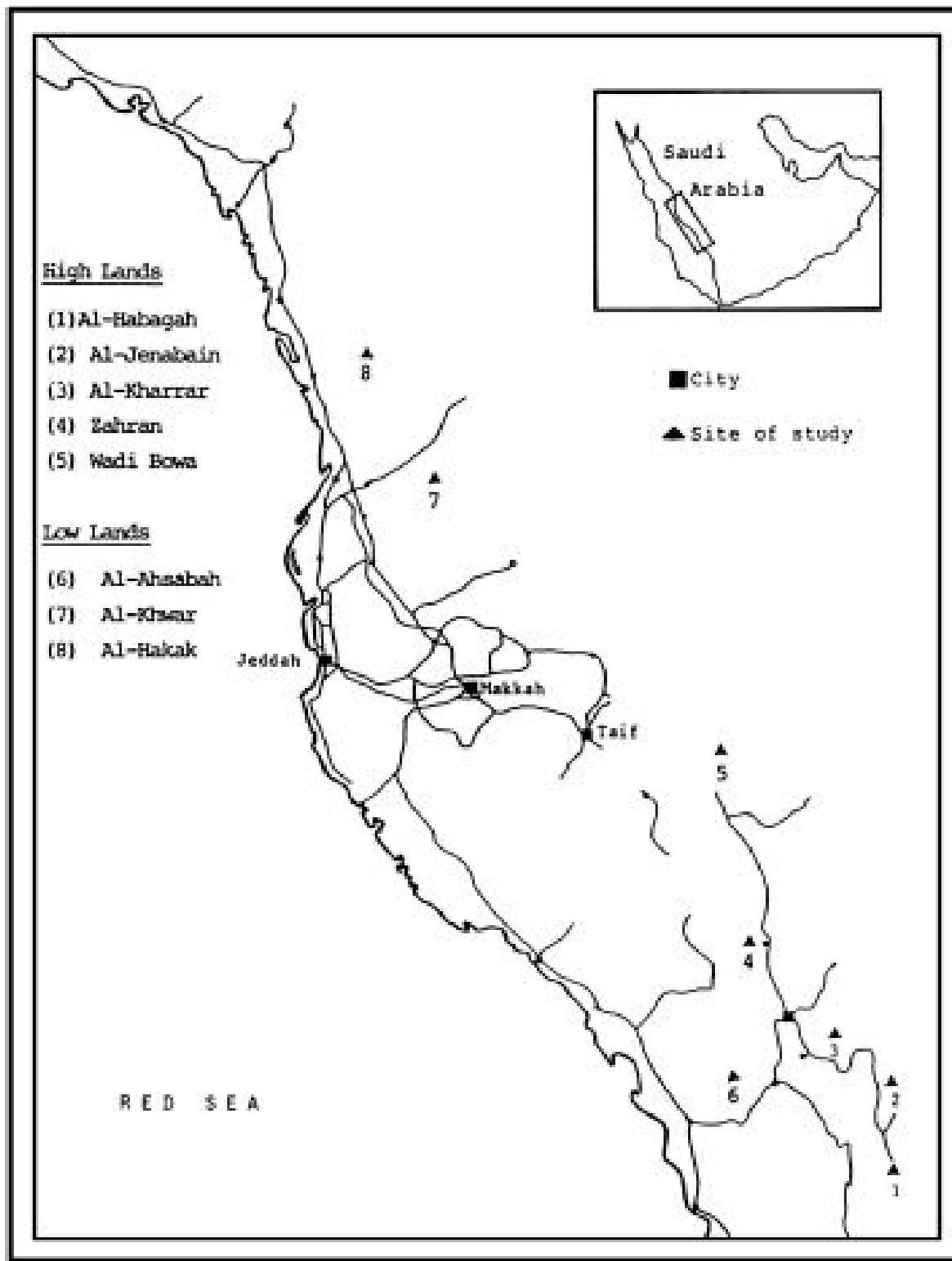


FIG. 1. Map of the study area.

TABLE 1. Name and type of studied habitats.

Sampling localities	Type of habitats	No. of specimens
<b>(A) In the low lands:</b>		
1. Al-Hakak	Perennial stream	52
2. Al-Khawar	Intermittent stream	17
3. Al-Ahsabah	Perennial stream	64
<b>(B) In the high lands:</b>		
4. Wadi Bowa	Intermittent stream	56
5. Zahran	Reservoir of dam	13
6. Al-Kharrar	Intermittent stream	14
7. Al-Habaka	Intermittent stream	26
8. Al-Ganabain	Intermittent stream	37
		279

TABLE 2. Identified fish species and their localities.

Identified fish species	Locality	No. of specimens
(1) <i>Aphanius dispar</i> (Ruppell, 1828)	1. Al-Hakak (L) 2. Al-Khawar (L) 3. Al-Ahsabah	17 17 64
(2) <i>Garra buettikeri</i> (Krupp, 1983)	1. Al-Kharrar (H) 2. Al-Genabain (H) 3. Wadi Bowa (H) 4. Al-Habaka (H)	3 2 56 26
(3) <i>Cyprinion acinaces</i> (Banister & Clarke, 1977)	1. Al-Kakak (L)	35
(4) <i>Cyprinion mhalensis</i> (Al-Kahem & Behnke, 1983)	1. Al-Kharrar (H) 2. Al-Genabain 3. Zahran	11 35 13

(L: Low land, H: High land)

## Discussion

Krupp<sup>[6]</sup> pointed out that habitats for freshwater fishes is limited in Arabia. Freshwater offer fish as many different possibilities of life as does the sea. It is no wonder then that the fish living in a cool mountain brook are not also found inhabiting a peat-pit in the low lands, the types of habitat available are therefore of considerable interest<sup>[12]</sup>.

Only about ten species have so far been described from Arabia. The situation is mainly to be attributed to the arid climate. Fishes are largely restricted to higher altitudes where precipitation is higher than in the low lands<sup>[6]</sup>.

In this study *Aphanius dispar* and *Cyprinion acinaces* were found in the habitats of the low lands of Tihama, while *G. buettikeri* and *C. mhalensis* were found in the habitats of the high lands of Hijaz Mountains.

*A. dispar* is widely distributed between N.E. Africa and N.W. India living under freshwater, brackish or marine conditions<sup>[8]</sup>. This species appears to be most widely distributed species in Arabia. This distribution is due to its adaptation to extreme temperatures and salinity. Additionally, its feeding habits allow it to colonize extreme habitats<sup>[6,13,14]</sup> characterized this species as an opportunistic omnivore. This species has been introduced for mosquito control in some artificial water bodies in Oman<sup>[13]</sup>.

*C. mhalensis* is known only from the Rub'al Khali basin and *C. acinaces* from western and southern coastal drainage<sup>[5]</sup>. *C. mhalensis* and *C. acinaces* appear to be closely related to each other, probably forming sibling species<sup>[5,6]</sup>. According to Howes<sup>[15]</sup> the endemic Arabian species *C. acinaces* retains the most primitive characters of all species in the genus. *G. buettikeri* occurs in the streamlets of the Eastern Asir range (at an altitude of 1400-2400 m above sea level) which drain towards the Wadi ad-Dawasir. This pattern of distribution is shared by *C. mhalensis* and *Barbus apsensis*<sup>[6]</sup>. *G. buettikeri* shares morphometric characters with *G. tibanica* and with African Garret<sup>[6]</sup>.

*Cyprian* gazes on plant material, and is able to cut filamentous algae, while *Garret* ingests loose organisms and detritus from the surface of the sand and stones, together with inorganic matter. These two modes of feeding are obviously very successful in arid areas<sup>[13]</sup>.

Further work is needed in other parts of the country to complete the picture. Freshwater fish fauna of Saudi Arabia and to correlate the presence of these species and their morphological, anatomical and behavioral adaptability to the surrounding environment. Shulz *et al.*<sup>[16]</sup> have started some work on freshwater fishes of Wadi Turabah, Saudi Arabia which needs to be extended to other parts of Arabia.

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## دراسة على فونا أسماك المياه العذبة في القطاع الغربي الأوسط من المملكة العربية السعودية

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المستخلص . تم اختيار مناطق لهذه الدراسة ، ثلاثة منها في سهل تهامة ،  
 وخمسة منها في جبال الحجاز (السروا ) . ثم جمعت عينا من الأسماك  
 وتم تعريفها . وجد أن هناك أربعة أنواع هي : *Aphinus dispar*; *Cyprinion*  
 *acinaces*; *Garra buettikeri* and *Cyprinion mhalensis* وتبين أن النوعين  
 الأولين ينتشران في سهل تهامة ، بينما النوعين التاليين ينتشران في جبال  
 الحجاز