

## COMPARATIVE ECOLOGY OF TWO SPECIES OF BIVALVE CORBICULA FLUMINEA AND CORBICULA FLUMINALIS IN SHATT AL-ARAB

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### ABSTRACT

Some aspects of population dynamics of both corbicula species inhabiting intertidal zone of shatt al-Arab are described. These informations are explained in accordance with the possible occurrence of competition between the two related species.

### INTRODUCTION

The two Asian clams *corbiculafluminalis* (Muller, 1974) and *corbiculafluminalis* (Muller, 1974) are very common species in shatt al-Arab River. The two species are also recorded in Habbanya and Razzaza lake (Zahadin, 1965) and (Britton, 1977).

The genus *corbicula* plays an important role in transforming the energy and removing the suspended organic material from the water column to increase the natural precipitation of organic material (prokopovich, 1969).

It appears that the two species had similar ecological requirements, therefore they might be competition. However an explanation of their coexistence was given in this investigation through the study of dynamic of their populations.

### STUDY AREA

Shatt Al-Arab River is one of the main water bodies in Iraq. It is 139 km long from the point of the confluence of the Tigris and Euphrates Rivers to mouth north of the Arabian Gulf. The River is under tidal effect from the gulf and at low tide a wide strip of substratum on the two sides of the River become exposed. The chosen site for the study was part of this area and situated close to Basrah city.

The intertidal area of shatt al-Arab in general, including the study site, is covered with water plants for most part of the year forming a green mat over its sandy mud substratum. The dominant plants are *Phragmites australis* (Cay.); *Typha domingensis* pers; *Cyperus longus* L.; *Potamogeton schweinfurthii* L.; and *Ceratophyllum demersum*. Another abundant plant is the *Cladophora glomerata* (L.).

Chemico-physical condition of the Shatt al-Arab River had been reported by several workers. A water temperature varies between 10-32 C (Marina, in press). Water salinities showed seasonal variations and differed between the parts of the River. The lower regions had salinities of typical of an estuary and much higher than those of the upper regions. Values recorded at the sampling site were between 0.5 and 1.2‰ (Marian, in press). The hydrogen ion concentration ranged between 7-8 without vertical variations (Al-Saheb, 1989). Dissolved oxygen in the River was invariably near saturation which calcium was always much higher

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than minimum concentration required for gastropod survival (>100 mg-I) (Daud. at al. in press).

## MATERIAL AND METHODS

Monthly sampling were collected from Nov. 1985 to October 1986. On each sampling occasion, fifteen quadrates (1/6 m<sup>2</sup>) were taken from the intertidal area of the River. This position of a replicate was determined randomly' a line transect running perpendicular to the water flow of the River. Individual replicates of each sample were carried in polyphone bags to the laboratory. They sorted by washing through a 0.4mm sieve. The number of clams per replicate was recorded and the length of each individual was recorded to nearest 0.1mm.

## RESULTS AND DISCUSSION

This study concerns with the population dynamic and growth of *C.flurninea* and *C.loin/na/is* as revealed by changes in length of the shell. The shell of each species is thick and distinct. Growth rings usually assist in the assignment of individuals to age grouping. The shell dimensions of *C.flurninea* and *C.flurninalis* from shatt al-Arab are given in Fig 1. Which may assist in any subsequent study of population of the same or of different species.

Monthly mean densities per replicate (0.0625% m<sup>-2</sup>) were calculated from 15 samples. The population of *C.flurninea* was at its maximum in December (21.66 per 1/16 m<sup>-1</sup>). Number then declined sharply until may. This could be due to the death of reproducing animals in early spring. After May mortality was relatively high and accounted for the reduction in number observed in July (2.2 per 1/16 m<sup>-1</sup>). In August again the density of population increased following by sharp in September.

The density fluctuations *C.flun2ina/is* were or less follow the same general pattern of that of *C.fluminea* except that firstly, the mean density was significantly ( $P > 0.01$ ) lower than that of *C.fluniinea*, secondly the two peaks of densities for *C.flzirminalis* were recorded with time lag of one and three month after the peaks of *C.flurninea* respectively. This might be attributed to avoid interference between the two *Corbicula* species.

In recent years (1990-1992), unpublished data indicated that when the salinities were increased in shaft al-Arab (50%), the densities of *C.flwninslis* become significantly ( $P > 0.01$ ) more than the densities of *C.flurninea*. Kado & Murata(1974) reported that *Cjlurninea* is more adaptable to fresh water than *Cf/urn/na/is*.

Analysis of population structure of both species of *Carbicu/a* in sail al-Arab as revealed by series of length frequency histograms suggest that at most of the year population comprised four age groups (0-year, 1-year, 2-years, 3-years) with average of shell length for *C.flurninea* and *Cf/urn/na/is* (2mm, 14.3mm, 20.3mm, 26mm) and (1.6mm, 15.8mm, 19mm, 21mm) respectively.

The common feature revealed by the size class distribution of both *Corbiczila* species was the change in number of animal in each size class (Fig. 2). This change was attributed to growth.

In November the dominant age groups *C.fluminalis* population were 1 and 2-year age group while for *C. fluininea* 2 and 3 year age group were dominant. In Junyary. and February. both species showed an increasing number of 0-year age group while the percentage of 3-year age group particularly for *C.fluniinea* was increasing in comparison with proceeding months. From April to June both species showed a considerable growth and may individuals of both species joined the 3-year age group. During the period from July-Agust, the population of both species underwent postreproductive mortalities, it is clear that the number of individuals of 30- year age group was declined.

To analyses the population structure from the competition point of view between the two related species, it could be noted that there is an obvious difference between the percentages of different age groups in certain months during the study period. Morton (1977) states that

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each of *Corbicula* species may possess intrinsically different life cycles. Further more it was found that the growth rate of *C.fluininalis* was faster than that of *C.fluminea*. according very few individuals of *C.Jlurninalis* reached 3-year age group. Britton and Morton (1977) reported the same conclusion. Both populations also showed a continuous breeding which began in February and lasted until October. As sampling program for the percent study designed for one year. it would be difficult to given a complete picture about their life history. However Morton (1977) in plove core Reservoir in Hong Kong reported that life history of *Cordiculafluininea* lasted for about 3-years.

#### REFERENCES

- Al-Saheb. L.M.A. 1989 Life history and production of tow species freshwater Bivalve *Corbicula fluminea* (Muller, 1974) and *Corbiculaflurninalis* (Muller. 1974) in Shaft al-Arab Region. Unpublished M.Sc. thesis. Univ. of Basrah, Iraq.
- Britton. J.C. and Morton, B.S. 1977. *Corbicula* in North America: The evidence and reviewed and evaluated proceeding of the first International *Corbicula* symposium. Fort Worth 1977. Texas Christian Univ. Research Foundation, Fort worth. pp. 249-287.
- Daold, Y.T., Maring, B.A. and shihab. A.F. (in press) Life history and production of the gastropod *Theoduxusjordani* in the shatt al-Arab River.
- Kado, Y. and Murata, H. 1974 Reponses of brackish and fresh water clams *Corbiculajaponica* and *C./eana*, to variations in salinity. *J. Sci. Hiroshima Univ.. SerB.. DivI.* 25: 217-224.
- Marina, B.A.Daold, Y.T. and shihab,A.F. (in press) Population Biology and production of *Melanopsispraernorsa* L. (Gastropoda) in the shatt al-Arab River.
- Morton, B.S. 1977 The population dynamics of *Corbiculaflurninea* (Bivalvia:Corbiculacea) in plover cove Reservoir Hong Kong. *J.Zool. lond.* 181: 21-42.
- Pokopovich, N.P.1969 Deposition of elastic sediments by clams. *J. Sed. Petrology.* 39: 891-901.
- Zhadin, VI. 1965 Mollusks of fresh and brakish water of the U.S.S.R. Academy of Sciences of the Union of Soviet Socialist Republics.

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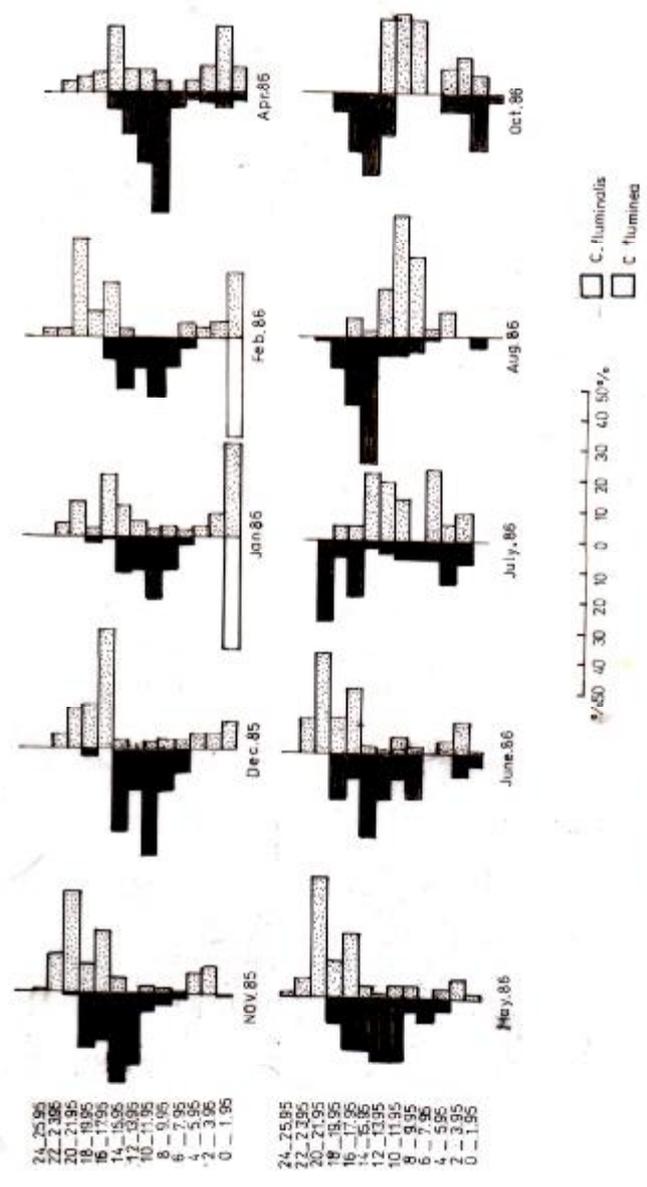


Fig 3: The size class distribution in absolute numbers of the *C. fluminea* and *C. fluminea* in shatt Al-arab

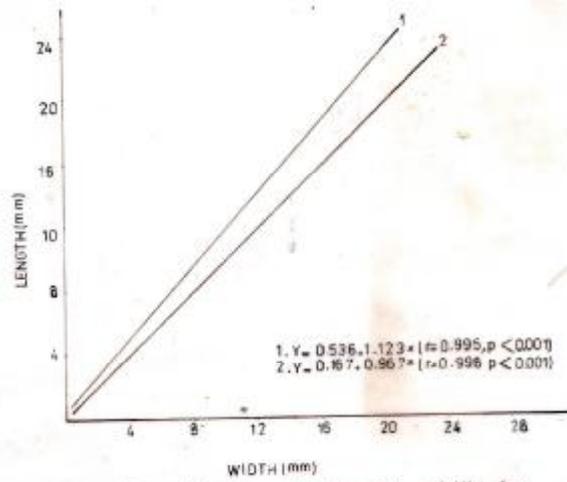


Fig 1: Relationship between length and width for *C. fluminea* and *C. fluminalis*

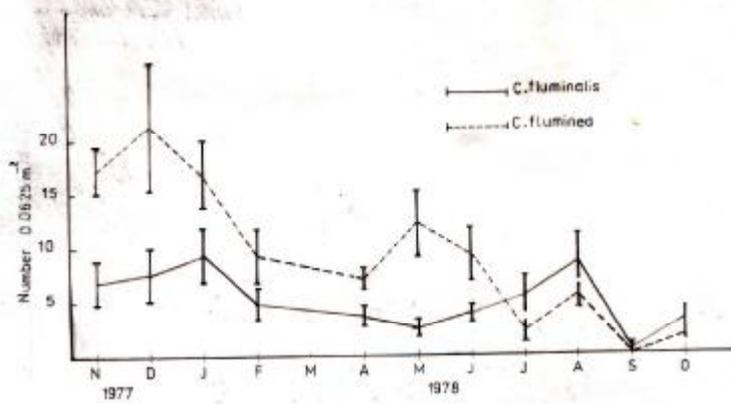


Fig 2 Population density ( $\pm$ SE) of *C. fluminea* and *C. fluminalis* in Shatt Al-Arab

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*Bull. Iraq nat. Hist. Mus.*  
(2000) 9 (2): 31-36