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Palaeozoogeography of Shallow Marine Ostracoda from Holocene Sediments-Southern Iraq

By

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تم في هذا البحث دراسة الجغرافية القديمة لترسبات الهولوسين البحرية في جنوب العراق بالاعتماد على دراسة توزيعات ثلاثة عشر نوع من الاوستراكودا البحرية الضحلة، وبالاستناد إلى دراسة أنظمة الانتشار والتوزيع الجغرافي لهذه الاستراكودا البحرية القاعية في أواخر حقب الحياة الحديث ضمن القطاع الحياتي الاستوائي للمحيط الهندي وغرب الهادي، أمكن استنباط خطوط الهجرة الممكنة والمحتملة لهذه الأنواع من مركز التخلق النوعي المفترض في هذه الدراسة وهو قطاع شرق الهند باتجاه الخليج العربي وصولاً إلى المنطقة قيد الدراسة .

Key Words: Holocene, Palaeozoogeography Benthic ostracoda, Southern Iraq.

ABSTRACT

The Holocene palaeozoogeography of southern Iraq (Southern Mesopotamian Basin) have been studied according to the distribution of thirteen species of shallow marine ostracoda belonging to twelve genera.

Their distributary patterns have indicated the possible and probable migratory routes of ostracoda during the Late cenozoic from the center of speciation (East Indian Province) towards Arabian Gulf and Southern Iraq within the tropical Indo-Pacific bio - provionce.

INTRODUCTION

Southern Mesopotamian Basin attracted the attention of many Archeologists and Geographers since the eighteenth century, but there are very few studies dealing with Quaternary stratigraphy, depositional environments, neotectionc activities, palaeontology, dating and sea level fluctuations, in comparison with other deltaic areas.

Besides, no detailed study has been carried out on shallow marine ostracoda during the Holocene and their distribution in Southern Iraq.

The objective of the present work is to determine and clarity the possible and probable migratory routes of benthic marine ostracoda towards the studied area through the Tropical - Indo - West Pacific bio - province.

The area choicen for inverstigation is limited by the coordinates 30° 25¯ N and 31° 55¯ N

to 47° 10¯ E and 48° 15¯ E (Fig. 1) .

Materials and Methods :

The samples used in this study was collected from the State Establishment of Geological survey and mining - Baghdad, as a part of their program to study the Quaternary of the Mesopotamian Basin.

Sixty - five core samples from fourteen boreholes, covering the studied area (Fig. 1) and penetrating the Quaternary sediments. The marine Holocene sediments in the studied area consist of alternating sand, silt clay, clayey sand and silty oclay reaching maximum thickness of 20 m. (Fig. 2).

The samples prepared by washing on 0.063 mm. sieve, and the weight of each sample is 50 gm.

All specimens are stored in the Department of Geology, College of Science, Unviersity of Baghdad, Iraq.

Results and Discussions :

The bulk of the Hologcene shallow marine ostracod taxa encountered in the opresent study (thirteen specties belonging to twelve genera) are assigned typically to the indo-West Pacific bio-province in its tropical part, which in the same time assigned to the Arabian Province (Fig. 3)

The species identified during the present study are as follows:

Alocopocythere reticulata (Hartmann) Bate, 1971, Fig. 4 :

It is previously recorded from Iraq (Khor Al-Zubair) - Recent , [3], Kuwait - Recebt, [4], Abu Dhabi - Recent, [5], Arabian Gulf - Recent, [6], Red Sea - Recent, [7], India - Recent, [8], [9], [10], [11], [12], and [13], Burma - Quaternary and Recent, [14], and Australia - Recent, [15].

***Carinocythereis indica* Jain, 1978, Fig. 5:**

It is previously recorded from Kuwait - Recent, [16] and [17], Arabian Gulf - Recent, [6], India - Recent, [8], [9], [10], [12] and [13].

***Chrysocythere Keiji* Jain, 1978, Fig. 6:**

It is previously recorded from Kuwait - Recent, [4] and [16], Arabian Gulf - Recent, [6], and India - Recent, [8], [9], [10], and [13].

***Cushmanidea guhai* Jain, 1978, Fig. 7 :**

It is previously recorded from Iraq (Khor Al-Zubair) - Recent, [3], Kuwait - Recent, [4], and [16], Arabian Gulf - Recent, [6], and India - Recent, [8] and [9].

***Haplecytheridea Keyseri* Jain, 1978, Fig. 8.**

It is previously recorded from Iraq (Khor Al-Zubair)- Recent, [3], and India-Recent, [8], and [10].

***Hemicytheridea paiki* Jain, 1978, Fig. 9.**

It is previously recorded from Kuwait - Recent. [4], [16], [17], and [19], Arabian Gulf-Recent, [6], and India - Recent, [8], [9], [10] and [13].

***Hemicytheridea reticulita* Kingma, 1948, Fig. 10.**

It is previously recorded from India - Recent [13], Chian-Cenozioc, [20] Quaternary, [21] and [22], and Malayan region - Pliocene, [23], L Quaternary [24], Recent [25].

***Hemikrithe peterseni* Jain, 1978, Fig. 11.**

It is previously recorded form Kuwait - Recent [4] and [16], Arabian Gulf= Recent [6], India - Recent [8], [9], [10] and [13] and Malayan region - [18] and [25].

***Keijella Karwarensis* (Bhatia & Kumar) Whatly & Qanhong, 1988, Fig. 12:**

It is previously recorded from Kuwait - Recent [16] Arabian Gulf- Recent [6], India - Recent [10], [11] and [13], and Malayan region - Revent [18].

***Krithe papillosa* (Bosquet) Kei J, 1955, Fig. 13:**

(According to Al-Jumaily) [26] K. Kroemmelbeini

Jain, 1978 assigned as a synonym to K. papillosa), it is previously recorded from Iraq (Khor Al-Zubair) - Recent, [3]; Kuwait - Recent, [4] and [16]; Turkey - Miocene [27], Arabian Gulf- Recent [6]; India - Miocene [28], [29], and [30], Recent [8], [30], Recent [8], [9] and [10]; France-Sweden - Recent, [32].

***Leguminocytheris papuensis* (Brady) Jain, 1978, Fig. 14:**

It is previously recorded from Kuwait - Recent [4]; India - Recent, [8] and [13]; and Malayan region - Pliocene, [23], Recent, [25].

***Neomonoceratina iniqua* (Brady) Whathey & Quanhong, 1987, Fig. 15 :**

Ith is previously recorded from Iraq (Khor Al-Zubair) - Recent, [3]; Kuwait - Recent, [4] and [6]; Arabian Gulf-Recent [6]; India- Oligocene - Recent, [9], Pliocene - Pleistocene [33], Recent [8], [10], [11], [12], [13], [34], [35], and [36]. China - Quaternary [22], [37] and [38]; Recent, [39], [40], [41] and [42]; Taiwan - Pliocene - Pleistocene, [43]; Malayan region - Pliocene -Pleistocene, [23], Recent, [18], [25] and [44]; and Japan-M. Miocene, L. Pliocene-Pleistocene, [45], Pleistocene [46], [47], [48], [49] and [50]., Quaternary [51], and [52], Recent, [53], [54], [55], and [56].

***Tanella gracilis* Kingma, 1948, Fig. 16:**

It is previously recoded from Kuwait - Recent [16]; Arabian Gulf - Recent, [6]; Gulf of Aden and Red Sea-Recent [8], [9], [10] and [13] China - Recent, [38]; Malayan region - Recent, [25]; Australia - Recent, [2] and [59]; Kenya - Recent, [60]; South Africa - Recent, [61] West Afric - Recent, [62]; and Caribbean region - Recent [63].

The distinct distributary patterns of benthic ostracoda (figs. 4- 16) have been effecteed by both geographic position and morphogy of major basins through the Indian ocean, as well the prevailig oceanic currents during the Late Neogene, Quaternary and Recent (fig. 17), and thus could be used to determine and clarify the probable and possible migratory routes of benthic ostracoda during the late Cenozoic from the center of speciation, East Indian Province, towards Southern Mesopotamian Basin, within Tropical Indo - West - Pacific bio - province (Fig. 18).

However, in comparison of the Holocene shallow marine ostracod assemblages of Southern Iraq with other ostracod assemeblages belonging to any area outside the Indo - West - Pacific bio - province, There are no similarities could be observed even of species level; with two exceptions, the first is of Tanella gracilis Kingma, 1948, which appears to have a relatively wide geographical distribution (Fig. 16), but the passive dispersal through shipping might be cause of such cosmopolitan distribution [62] and [65].

The second exception is of Krithe papillosea (Bosquet) Keij, 1955 (Miocene - Recent), which inhabits shallow marine waters of today in both Indo - West - Pacific bio - province and Eastern Atlantic bio - province (Mediterranean sea) (Fig. 13), this might [66] and Khalaf [67] in addition to the palaeo-currents direction determined by Freas [68] during the Miocene, thus indicating the possibility of faunal migration from the Indian Ocean to the Mediterranean region via the Arabian Gulf during the Miocene time, but unfortunately we can not use this data (basing on one species) to discuss the final closure of Tethys and disconnection between the Mediterranean and the Arabian Gulf.

Although the Gulf of Aqaba is a part of the Arabian Province and the Indo - West - Pacific bio - province, but its Hoilocne ostarcod taxa identified during the present research, neither with any ostracod assemblages recorded in the Indo - West Pacific bio - province, such differences could be attributed to the intermittent connection between the Indian Ocean and the Red Sea (whose reached morphological maturity during Pliocene [70] and [71], through the Gulf of Aden, as a result of the sea- level fluctuation during Quaternary glaciation periods, this was the reason for the draw-back of faunal migration from Indian Ocean to the Red Sea and the Gulf of Aqaba.

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study.

List symbols

the symbols used in Figs. 4 - 16 :

- ▲ Tertiary
- □ Quaternary
- ■ Pleistocee
- △ Holocene
- ● Recent

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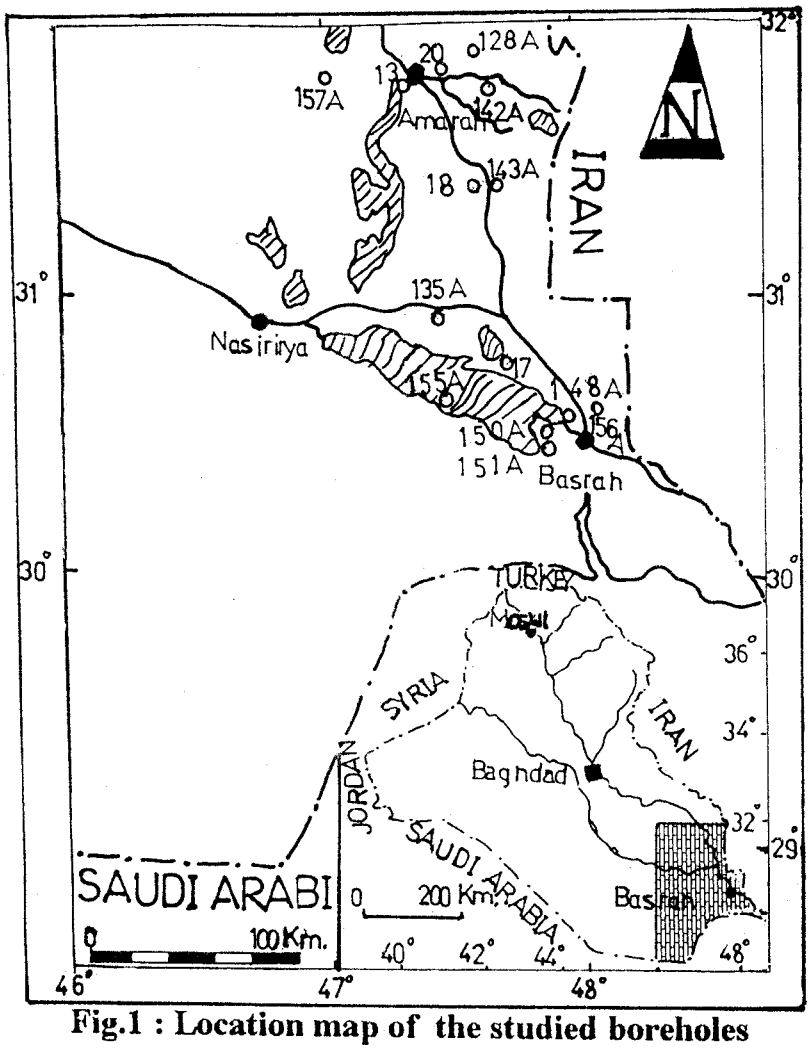

Fig.1 : Location map of the studied boreholes

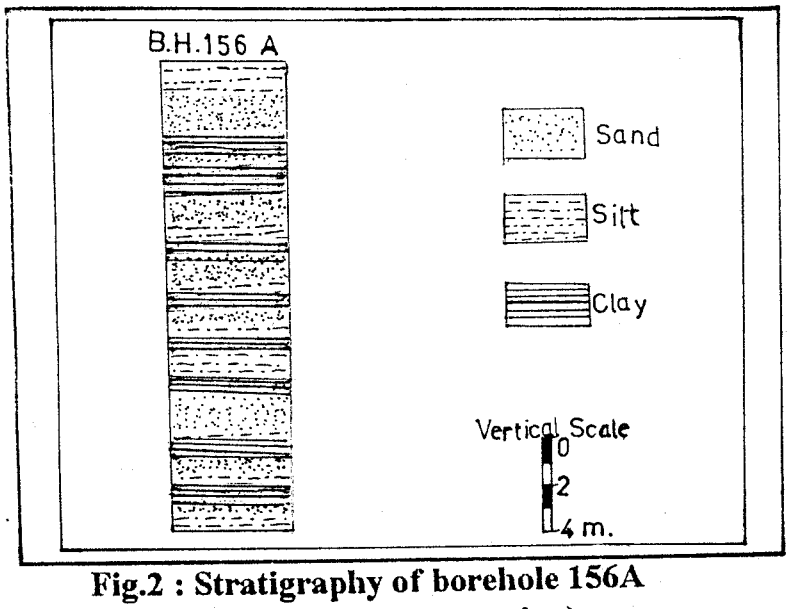

Fig.2 : Stratigraphy of borehole 156A (representative succession)

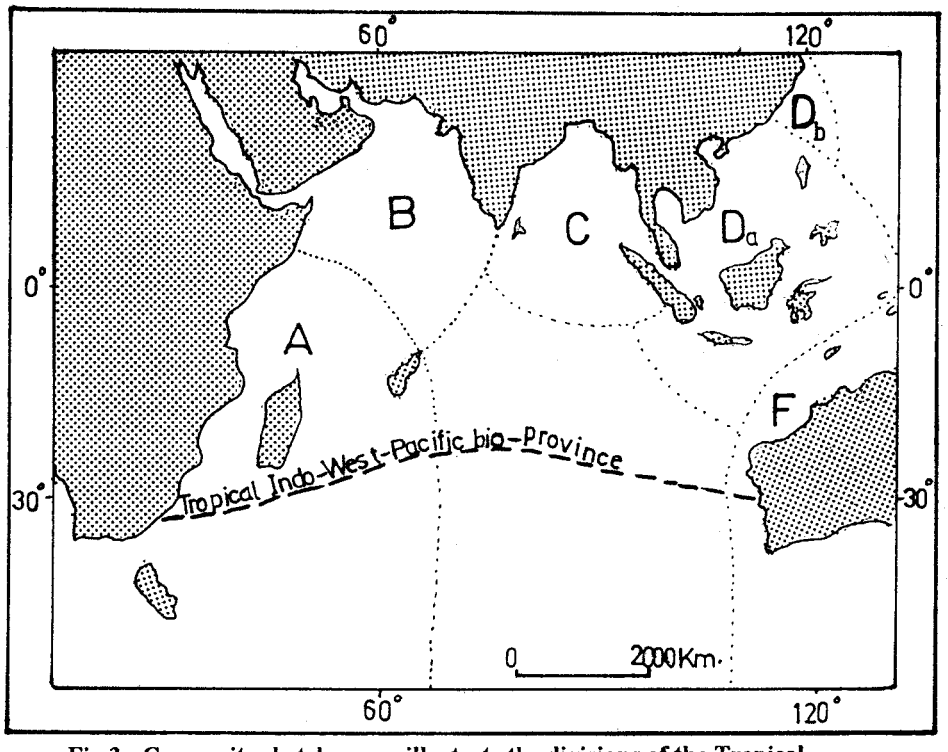

Fig.3 : Composite sketch - map illustrate the divisions of the Tropical-Indo - West - Pacific bio - province : A-East Aftrican Province ,B-Arabian Province ,C-Bengalian Province , Da - East Indian Province , Db-Khymerian Province , F-Australian Province after Briggs in Cox and Moore [1] ,and Titterton and Whatley [2] .

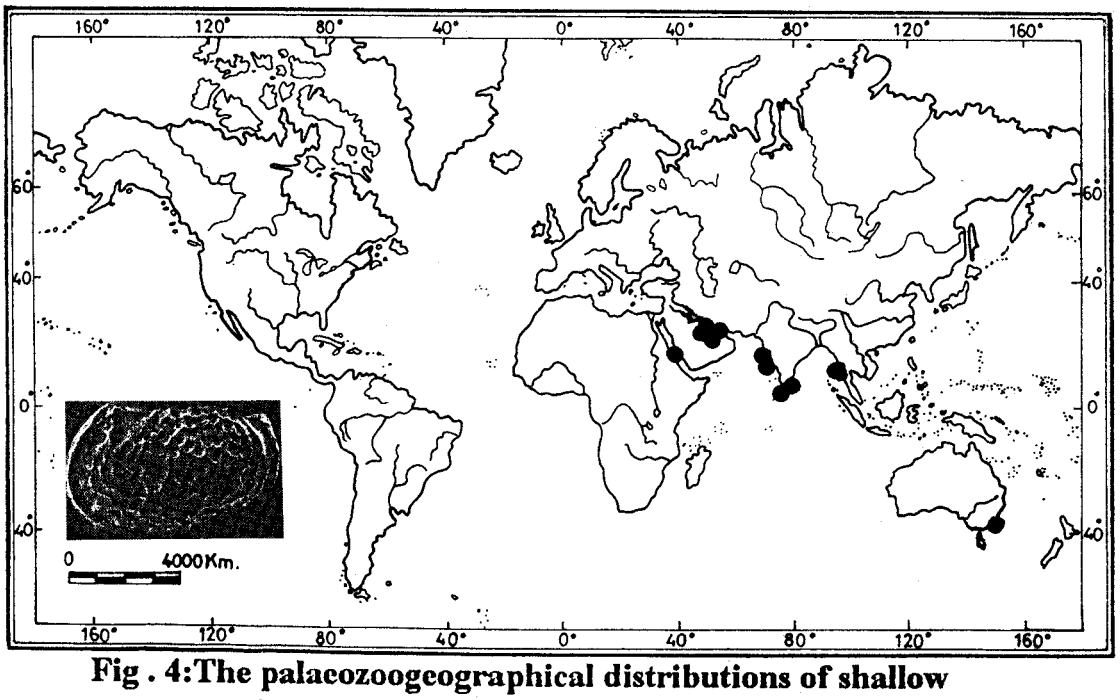

Fig . 4:The palaeozoogeographical distributions of shallow marine ostracod Alocopocythere reticulata (Hartmann) Bate , 1971.

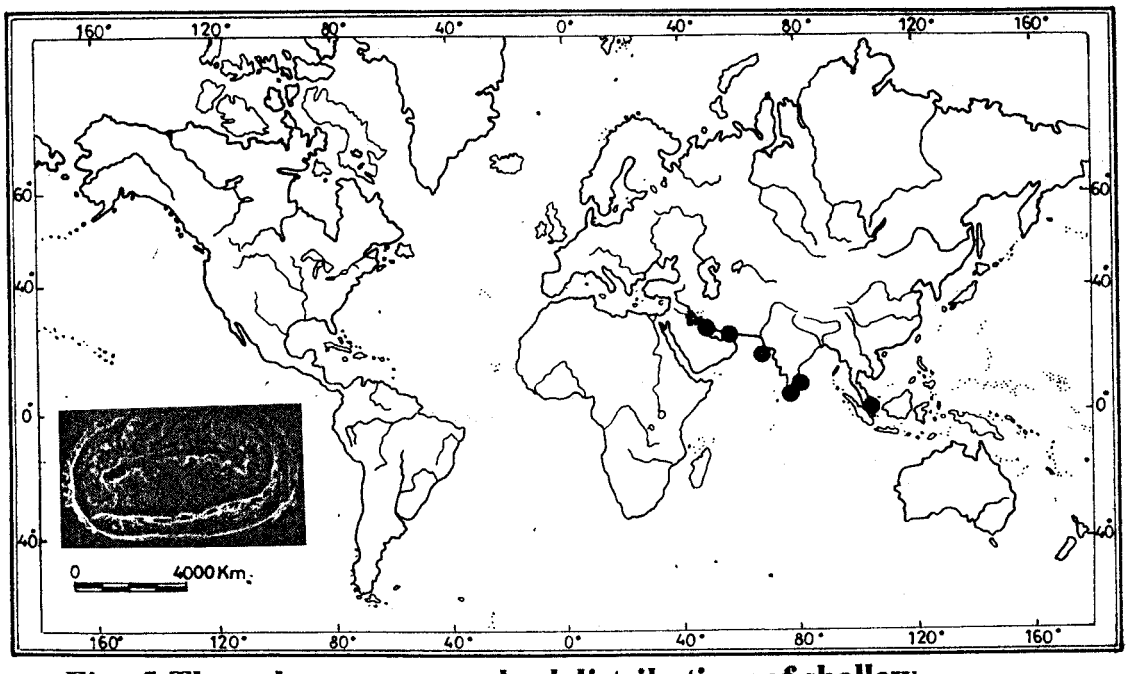

Fig . 5:The palaeozoogeographical distributions of shallow marine-ostracod Carinocythereis indica Jain , 1978 .

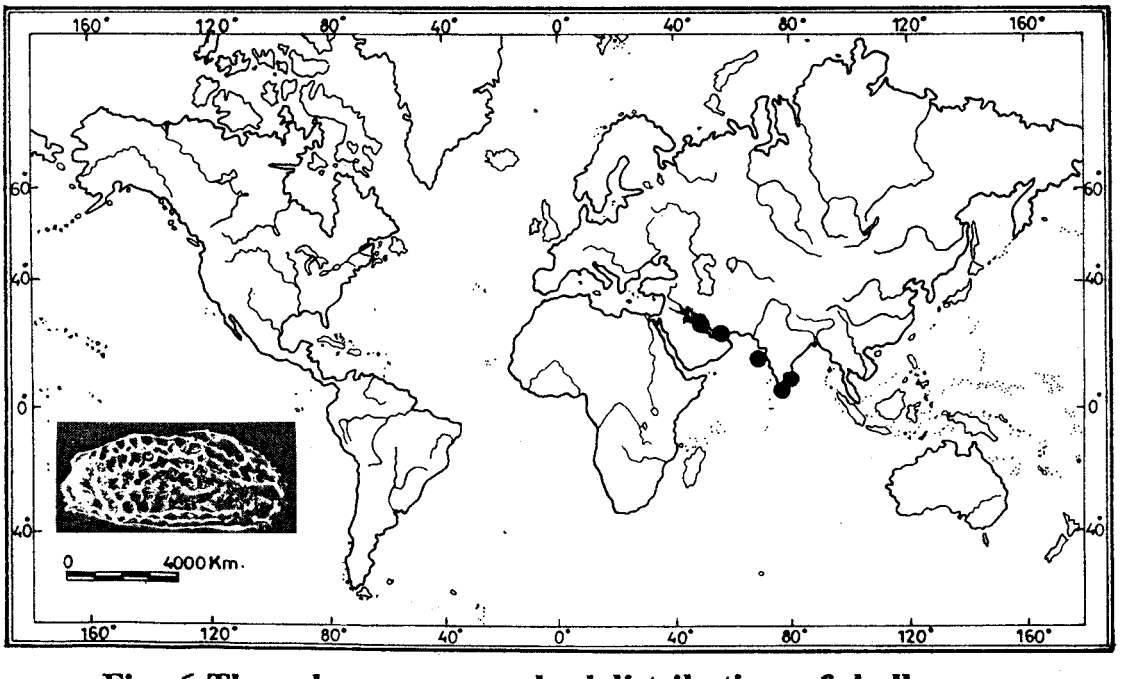

Fig . 6:The palaeozoogeographical distributions of shallow marine-ostracod Chrysocythere keiji Jain 1978 .

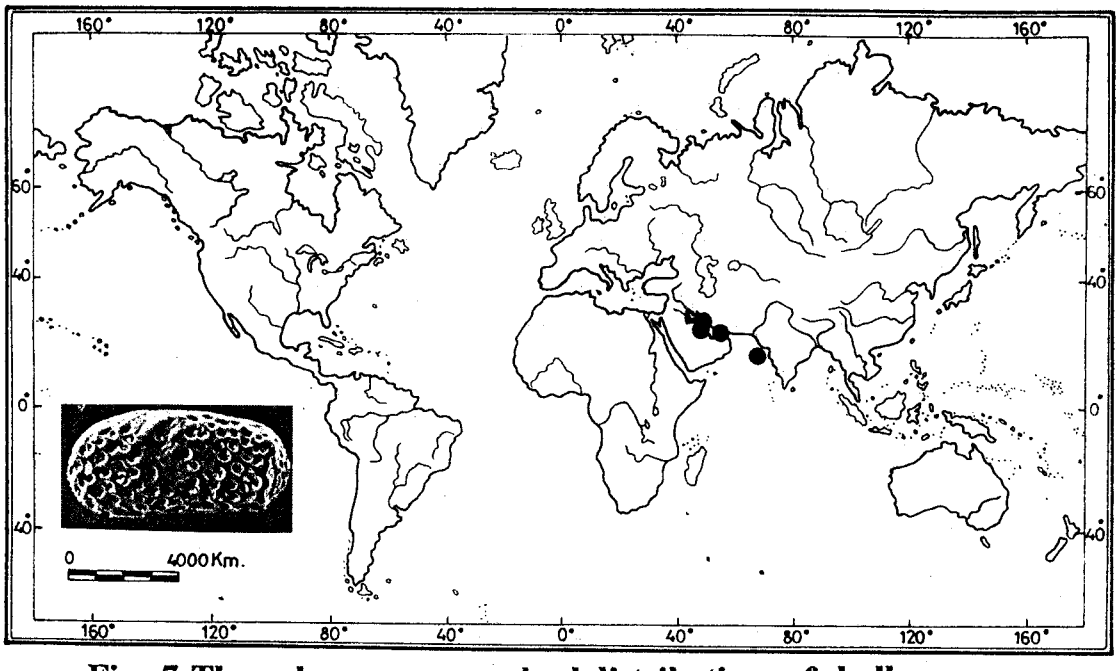

Fig . 7:The palaeozoogeographcal distributions of shallow marine-ostracod Cushmanidea guhai Jain , 1978 .

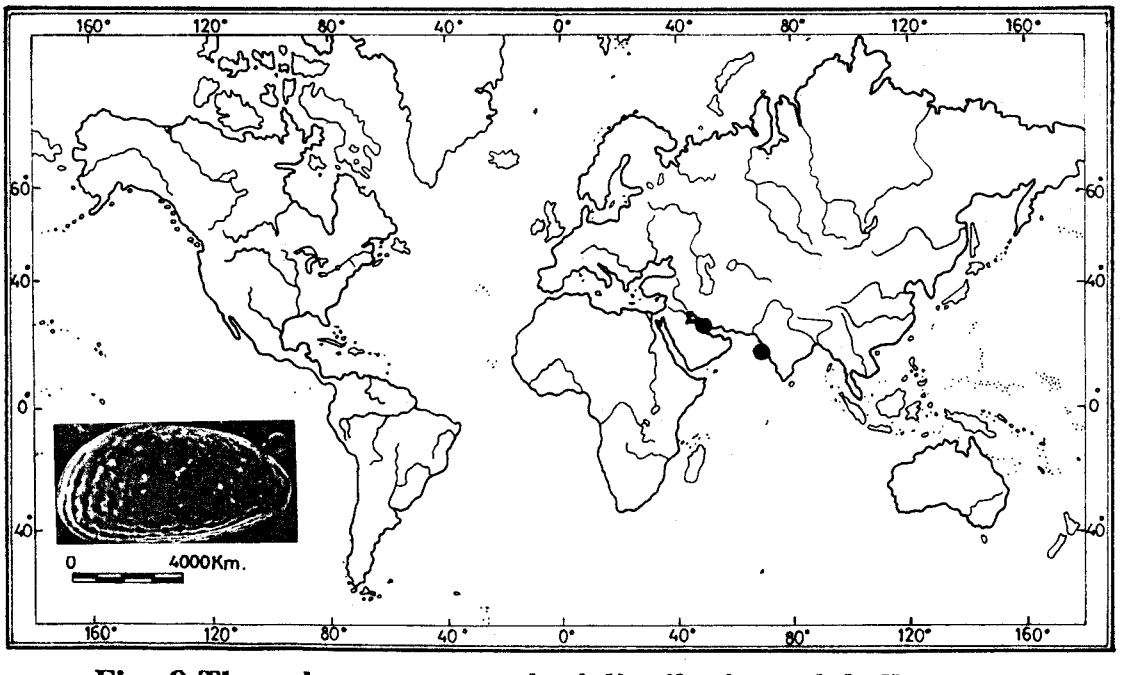

Fig . 8:The palaeozoogeographcal distributions of shallow marine-ostracod Haplocytheridea keyseri Jain , 1978 .

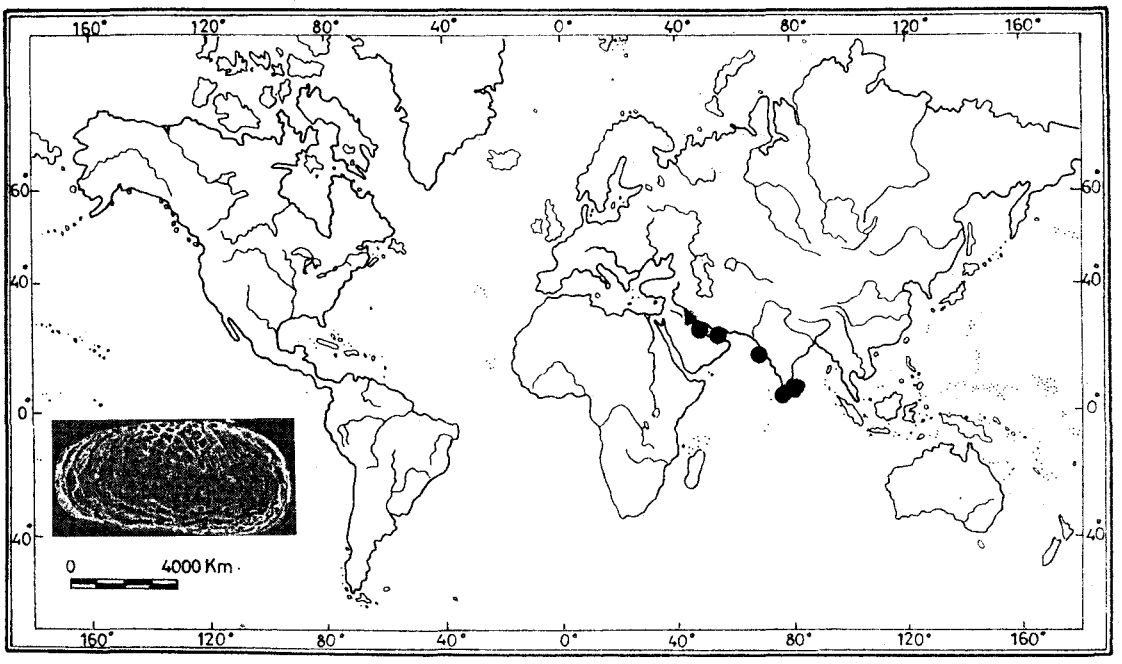

Fig . 9:The palaeozoogeographcal distributions of shallow marine-ostracod Hemicytheridea paiki Jain , 1978 .

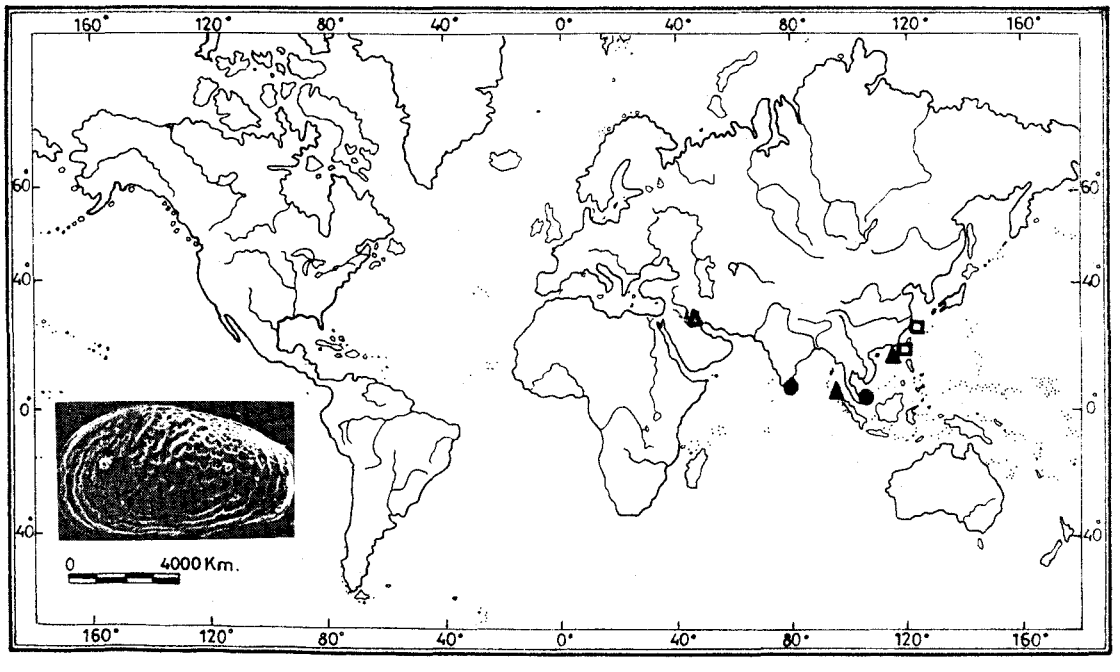

Fig . 10:The palaeozoogeographcal distributions of shallow marine-ostracod Hemicytheridea reticulata Kingma, 1948 .

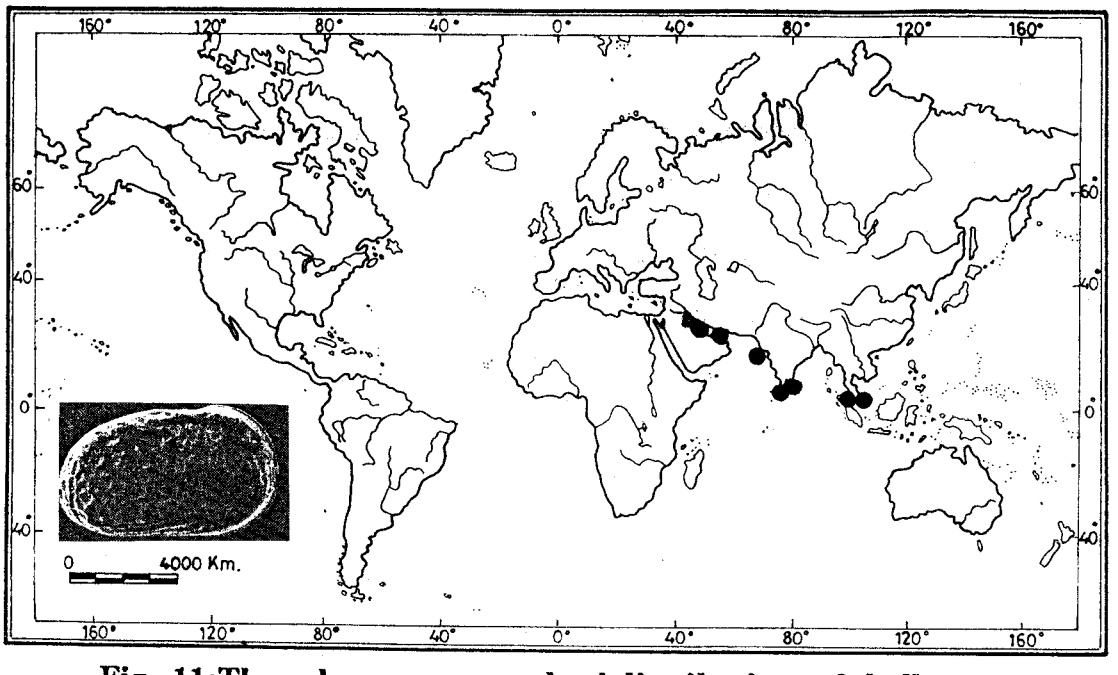

Fig . 11:The palaeozoogeographcal distributions of shallow marine-ostracod Hemikrithe peterseni Jain , 1978 .

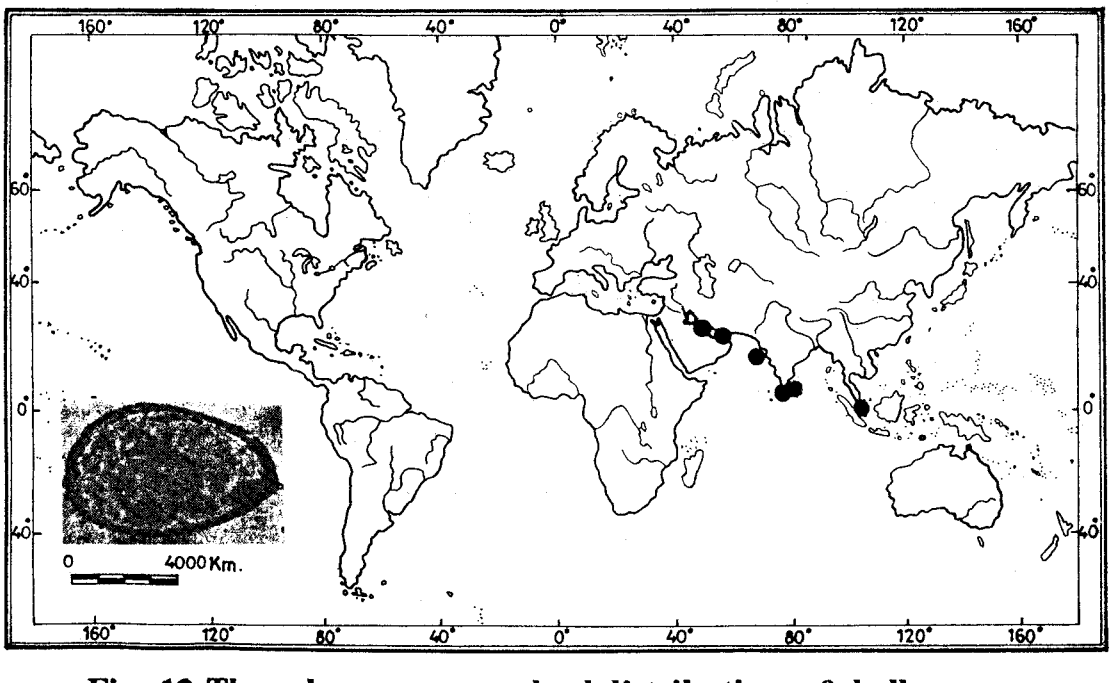

Fig . 12:The palaeozoogeographcal distributions of shallow marine ostracod Keijella karwarensis (Bhatia and Kumar)Whatley and Quanhong, 1988.

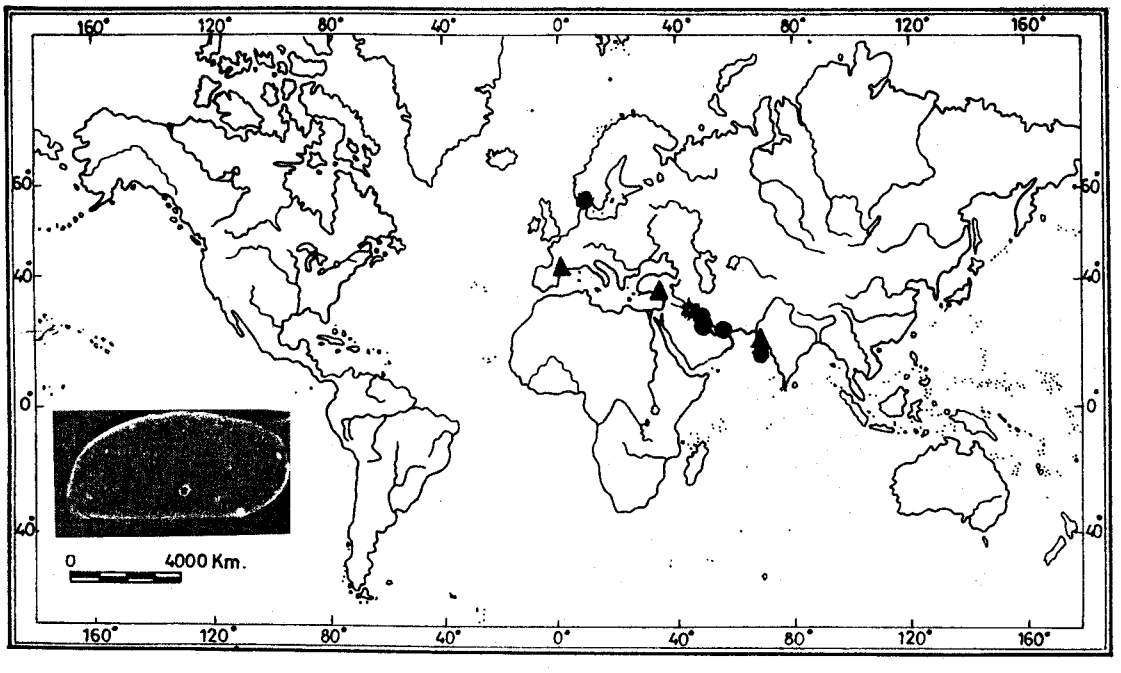

Fig . 13:The palaeozoogeographcal distributions of shallow marine - ostracod krithe papillosa (Bosquet) keij,1955.

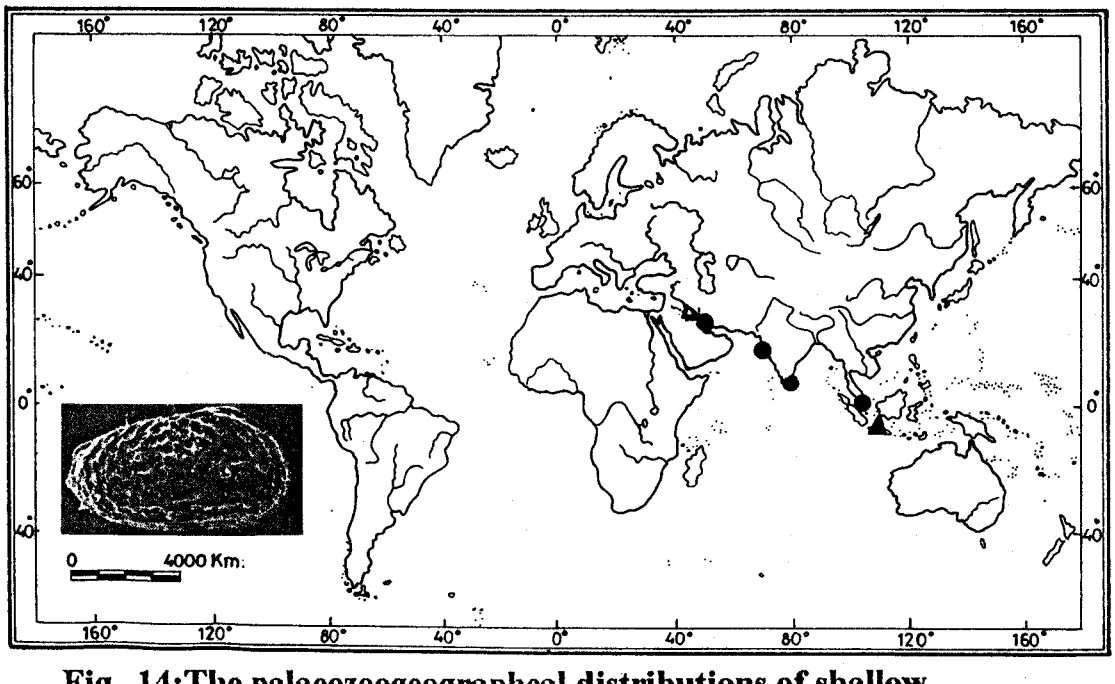

Fig . 14:The palaeozoogeographcal distributions of shallow marine-ostracod Leguminocythereis papuensis (Brady) Jain , 1978.

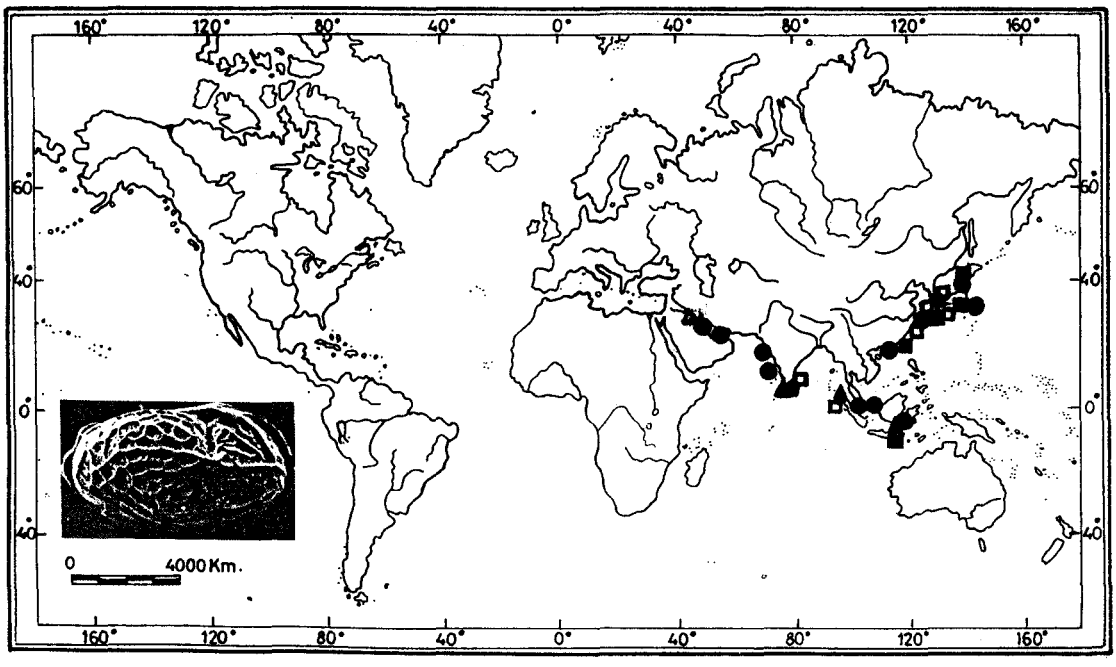

Fig . 15:The palaeozoogeographcal distributions of shallow marine - ostracod Neomonoceratina iniqua (Brady) whatley and Quanhong, 1987.

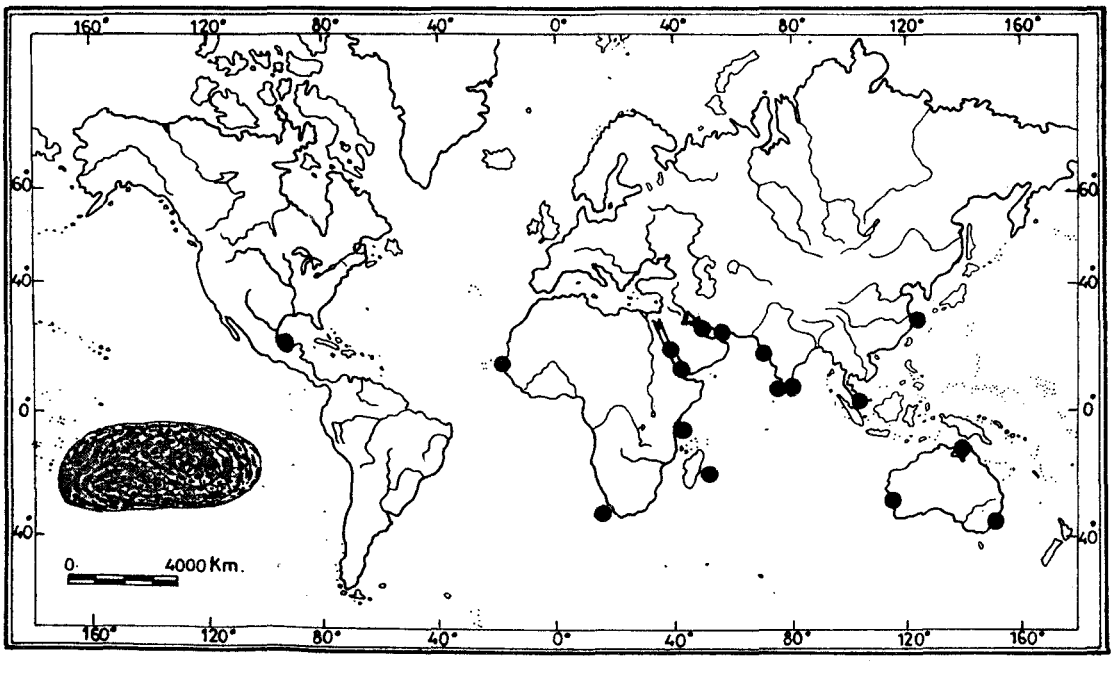

Fig . 16:The palaeozoogeographcal distributions of shallow marine - ostracod Tanella gracilis kingma,1948.

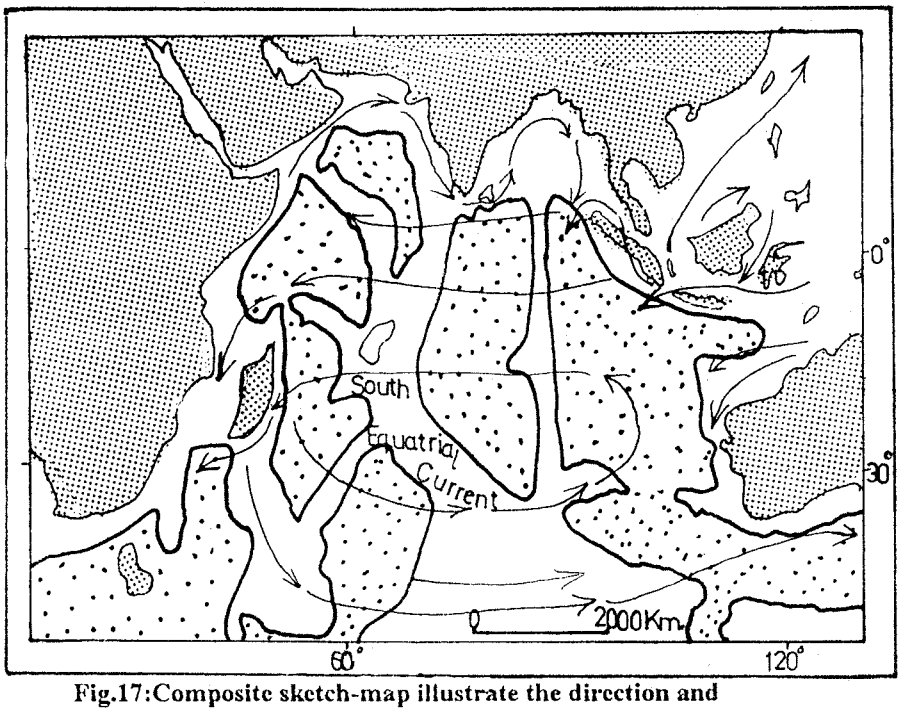

Fig.17:Composite sketch-map illustrate the direction and distribution of surface oceanic currents, after Titterton and whatley[2], and showing the morphology and geographical position of major basins through the Indian Ocean,after Murray [64].

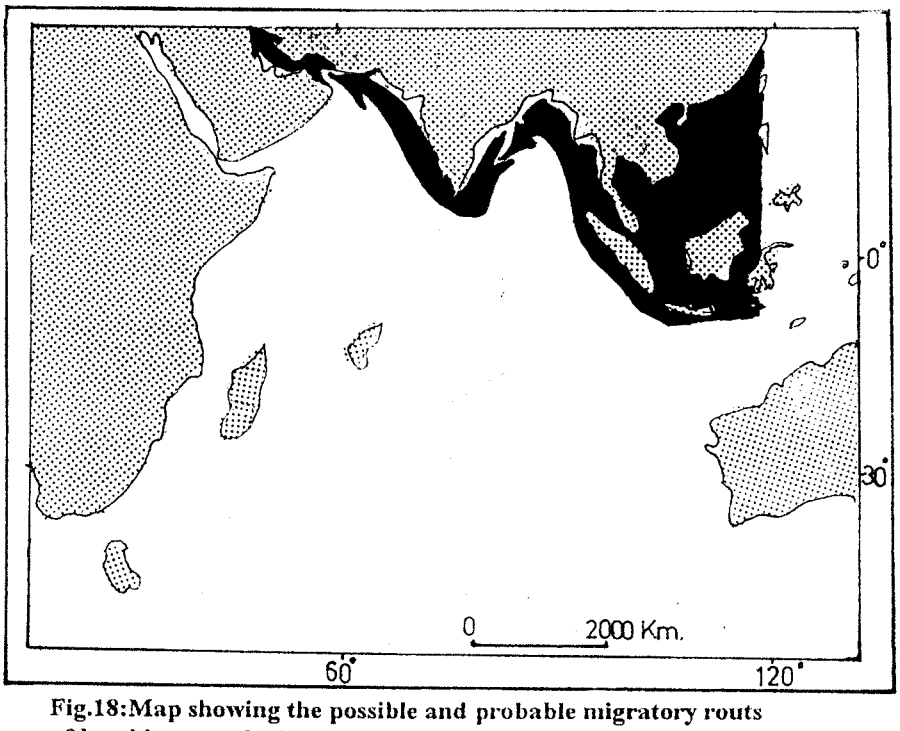

Fig.18:Map showing the possible and probable migratory routs of benthic ostracda during the late Cenozoic from the center of speciation (East Indian Provionce) towards southeren Mesopotamian Basin,within Tropical-Indo-West-Pacific bio-province.