

中国海蟹类区系特点的初步研究*

沈嘉瑞 刘瑞玉

(中国科学院动物研究所) (中国科学院海洋研究所)

我国幅员广大,地处温带与亚热带之间,海岸线长达万余公里。各海沿岸的潮间带与近海海底的性质多种多样,特别是南海沿岸,除泥、沙滩和岩岸之外,又有热带特有的珊瑚礁和紅树林等特殊生境,极利于生物栖息繁育,因此动植物的品种甚为丰富,甲壳动物中的蟹类区系亦不例外。

自19世纪中叶到20世纪40年代之间,欧美各国动物学者对印度太平洋的蟹类区系曾写过许多专著,其中有不少也提到了一些中国种类,如: Dana (1852)^[16], Milne-Edwards (1861, 1869)^[46,47], Miers (1886)^[45], de Man (1887, 1892)^[36,38], Monod (1930)^[49], Ortmann (1892, 1894)^[51,53], Henderson (1893)^[26], Koelbel (1899)^[29], Doflein (1902)^[17], Rathbun (1906)^[62], Stimpson (1907)^[102], Parisi (1914, 1916, 1918)^[56-58], Tesch (1917)^[101], Kemp (1918)^[28], Balss (1922, 1922a)^[8,9] 和 Leene (1938)^[33] 等等(详见参考文献)。还有少数英、美和日本等国动物学者,对中国蟹类也发表过零星的专门报导,如 Gordon (1931)^[22], Rathbun (1931)^[69], Urita (1926)^[110] 和 Sakai (1944)^[75] 等。我国学者对本国蟹类的调查研究开始于1928年,如沈嘉瑞于1930—1948年^[76-95]曾发表了20篇研究报告,伍献文(1930, 1934, 1935)^[113-115]作过厦门蟹类的检索表,并先后发表了我国溪蟹科的四个新种,张璽与刘永彬(1932)^[103]作过胶州湾蟹类的调查,董聿茂(1956)^[1]作过浙江舟山蟹类的初步调查,王韞明等(1962)^[2]作了江苏连云港沿岸蟹类的初步调查。解放以来,中国科学院动物研究所和海洋研究所在全国各海区进行了连续十余年的系统调查,搜集了大量材料,发现了许多新的分布记录,使我们有可能对中国海的蟹类进行系统研究。由于对这些标本的分类研究尚未完全结束,目前仅能对中国海蟹类区系的特点,作一初步探讨。

据我们现有的调查资料和文献记载,在中国海已发现的蟹类将近500种,其中除近岸带常见的暖水性地方种(endemic species)和极少数的北太平洋温带种之外,绝大多数是广泛分布于印度西太平洋的热带性种类。还有许多是太平洋热带区如马来群岛、菲律宾、澳洲、檀香山、日本和朝鲜等地很常见的种类;但能分布到太平洋东岸者为数极少。这些暖水性蟹类在中国海及其邻近海区的分布情况,受黑潮暖流(Kuroshio current)的影响很大。许多热带性种类从南海或菲律宾东岸,借助于黑潮暖流而向北分布,沿台湾海岸向东北经琉球群岛而到达日本的九州、四国和本州的南部,其中有些则随着黑潮的支流——对马暖流(Tsushima current)而进入日本海,并扩展到日本本州的北岸,甚至有少数种类还能到达日本北海道或南库页岛的南端。因此,中国和日本以及朝鲜的海产蟹类区系,显然有

* 中国科学院海洋研究所调查研究报告第228号;本文曾于1962年6月及9月先后在青岛由中国海洋湖沼学会和中国科学院海洋研究所共同召开的海洋动植物区系学术讨论会以及由太平洋西部渔业研究委员会第七次全体会召开太平洋西部动物区系和藻类区系学术讨论会上宣读,会后略有补充修改。

极为密切的关系。但是,由于西北太平洋受到大陆气候条件或亲潮寒流(Oyashio current)的影响,在中国、日本和朝鲜各海区的蟹类区系之間,或在中国南北各海区的蟹类区系之間,都有着不同程度的差异。

蟹类是海洋无脊椎动物最重要的类羣之一,它們不但在潮間带和陆棚区浅海的底栖动物区系組成中占相当大的比例,而且有些种的数量特别大,很早以来就已成为重要的漁业捕捞对象。特别是螯蛄科(或梭子蟹科,Portunidae)的一些大形种类,如 *Portunus trituberculatus*, *P. sanguinolentus*, *P. pelagicus*, *Scylla serrata*, *Charybdis cruscata*, *Ch. japonica* 等,在我国大陆附近浅海区的漁业中占有一定的地位,尤其在我国的黄海和东海北部,单单 *P. trituberculatus* 一种的年产量就超过了一万吨,而在南方海区,虽然其总产量不比北方大,但有經濟价值的种类却十分多,可供食用的蟹类最少在 20 种以上。因此,分析我国各海区蟹类的分布規律,并与相邻各海区进行比較,无論对整个太平洋西部海洋动物区系的研究,或对漁业的发展都有重要的意义。

一、中国海蟹类区系的特点

我国海产蟹类区系的特点是以热带和亚热带性成分占绝对优势。种数較多的有扇蟹科(Xanthidae),方蟹科(Grapsidae),沙蟹科(Ocypodidae),玉蟹科(Leucosiidae),螯蛄科(Portunidae)和长脚蟹科(Goneplacidae)等。其中尤以扇蟹科的种类为最多,它們在潮間带珊瑚礁中占压倒的优势地位,这一科的代表,在南海整个海产蟹类中,竟占总种数的 1/4 左右,是任何其他类羣所无法相比的。至于各海区蟹类的种数,則显然是随着緯度的增加自南向北而逐漸减少的,南海种类最多,根据文献記載及我們最近的資料,共約 450 种;东海次之,約 230 种;黄海最少,仅約 90 种。从下列各科在各海区的种属的数目不难看出这种自南向北递減的情况,如:玉蟹科在南海約有 47 种(16 属),东海减少到 19 种(11 属),黄海則仅有 6 种(3 属);螯蛄科在南海約有 55 种(10 属),东海有 26 种(9 属),黄海仅 4 种(3 属);扇蟹科在南海約有 100 种(35 属),东海約有 48 种(13 属),而黄海仅有 9 种(8 属);沙蟹科在南海約有 48 种(13 属),东海 33 种(11 属),黄海 14 种(8 属);方蟹科在南海約有 64 种(20 属),东海 43 种(15 属),黄海 17 种(7 属)。从目前情况看,随着南海調查研究工作的深入,可能还会发现更多的种类,特别是栖息在西沙和南沙諸島珊瑚礁之間的种类。

a) 南海蟹类区系的成分較为单纯,几乎完全是热带及亚热带性質,即使在其北部也找不到真正北温带的冷水种,起源于温带而已适应于亚热带环境的种类也极为罕見。在南海已发现的 450 种左右的蟹类中,栖息于潮間带和陆棚浅海区的种类有很大的不同,在潮間带常見的,主要是扇蟹科、方蟹科和沙蟹科的成員,其他各科的代表很少;在潮下带浅海中,主要是玉蟹科、螯蛄科、长脚蟹科(Goneplacidae),蜘蛛蟹科(Maiidae)的种类,此外如綿蟹科(Dromiidae),关公蟹科(Dorippidae),馒头蟹科(Calappidae),黎明蟹科(Matutidae)等的某些种类,也常常大量出現。从种类組成看来,潮間带的环境条件变化較大,在此栖息的种类較多,占总种数的大半;陆棚浅海区,特别是平底区,虽然其总面积比潮間带为大,但环境条件比較单纯,因而种类較少。

生活于潮間带珊瑚礁环境中者,主要是扇蟹科的种类,常見的如: *Carpilius* (2 种), *Atergatis* (6 种), *Zozymus* (1 种), *Platypodia* (1 种), *Carpilodes* (9 种), *Actaea* (約

15 种), *Etisus* (4 种), *Chlorodopsis* (3 种), *Chlorodiella* (3 种), *Trapezia* (4 种), *Tetralia* (1 种), *Euxanthus* (1 种) 和 *Eriphia* (3 种) 等属或其近缘属的种类, 地蟹科 (Gecarcoidae) 的 *Gecarcoidea* (*G. lalandi*) 和 *Cardisoma* (*C. hirtipes*, *C. carnifex*), 螯蛄科的 *Thalamita* 和 *Charybdis* 的某些种类 (有些是栖息在岩石缝隙中的)。

在岩石环境中, 主要是方蟹科中行动极为迅速的 *Grapsus grapsus tenuicrustatus*, *G. strigosus*, *G. longitarsus*, *Geograpsus grayi*, *G. crinipes*, *Plagusia depressa tuberculata*, *Percnon planissimum* 和 *P. abbreviatum* 等种最占优势。

在泥滩上生活的, 完全是另一类型的代表, 如: 沙蟹科的 *Uca* (*U. marionis nitidus*, *U. lacteus*, *U. gaimardi* 等共约 10 种), *Macrophthalmus* (*M. pacificus*, *M. japonicus* 等约 10 种), 和 *Ilyoplax* 等属, 方蟹科的 *Varuna* (*V. litterata*), *Sesarma* [*S. intermedia*, *S. (Parasesarma) plicata*, *S. (Parasesarma) picta*, *S. (Chiromantes) bidens* 等约 20 种], *Helice* (*H. tridens* 的 6—7 个亚种), *Metaplax* (*M. sheni*, *M. takahasii* 等 6 种) 等属, 种类很多, 特别是在半咸水地区红树林的泥滩生境中, 得到大量发展。

在沙滩上, 主要是沙蟹科的 *Ocyroide* (*O. cordimana*, *O. ceratophthalma*, *O. simpsoni*), *Scopimera* (*S. globosa*, *S. bitympana*, *S. longidactyla* 等), 和尚蟹科 (Mictyridae) 的 *Mictyris longicarpus* 等为最常见。

生活于陆棚浅海平底区者, 则以玉蟹科的 *Leucosia* (*L. rhomboidalis*, *L. unidentata*, *L. vittata*, *L. haematosticta* 等十多种), *Arcania* (*A. undecimspinosa*, *A. heptacantha*, *A. quinquespinosa* 等 6 种), *Philyra* (*Ph. heterograna* 等), *Iphiculus* (*I. spongiosus*), *Pariphiculus* (*P. marianae*, *P. coronatus* 等 3 种), *Myra* (*M. fugax* 等 4 种) 和 *Actaeomorpha* (*A. morum*); 菱蟹科 (Parthenopidae) 的 *Lambrus* (*L. validus* 等 6 种), 蜘蛛蟹科的 *Naxioides* (*N. hystrix*), *Doclea* (*D. ovis*, *D. canalifera*), 螯蛄科的 *Portunus* (*P. pelagicus*, *P. sanguinolentus*, *P. (Hellenus) hastatoides*, *P. (Amphitrite) argentatus*, *P. (Amphitrite) gladiator*, *P. (Lupocycloporus) gracilimanus* 等 11 种), *Charybdis* (*Ch. cruciata*, *Ch. japonica*, *Ch. truncata* 等约 10 种), *Lupocyclus* (*L. rotundatus*, *L. philippinensis* 等 3 种); 长脚蟹科的 *Carcinoplax* (*C. longimanus*, *C. vestitus*), *Eucrater* (*E. crenata* 等 4 种), *Ceratoplax* (*C. sagamiensis*), *Typhlocarcinus* (*T. nudus*, *T. villosus*), *Xenophthalmodes* (*X. morsei*), *Camatopsis* (*C. rubida*), *Scalopidia* (*S. spinosipes*), 豆蟹科 (Pinnotheridae) 的 *Xenophthalmus* (*X. pinnotheroides*, *X. obscurus*), *Chasmocarcinopsis* (*Ch. gelasimoides*) 等属为最常见, 且有些种的数量很大。上述各科属的代表, 大部分都是印度西太平洋热带区广泛分布的种。

在潮间带生活的典型热带种; 大部分仅仅分布于海南岛和台湾以及西沙群岛等珊瑚岛群, 只有少数分布到海南岛和台湾北部以及附近的大陆沿岸。例如: Xanthidae 的 *Euxanthus exculptus**, *Carpilius convexus*, *Zozymus aeneus*, *Daira perlata*, *Eriphia laevimana*, *Etisus* (*Etisodes*) *dentatus*, *Pilumnus vespertilio*, *Tetralia glaberrima*, *Trapezia cymodoce*, *Tr. dentata*, *Tr. areolata*, *Tr. digitalis* 等, Portunidae 的 *Thalamita admete*, *Th. caeruleipes*, *Th. picta*, *Portunus granulatus*, *P. orbitospinis*, Gecarcoidae 的 *Cardisoma hirtipes*, *C. carnifex*, *Gecarcoidea lalandii* 等许多种, 都仅仅发现在海南岛和

台湾南部以南和西沙群岛等海区的典型热带种(其中带*者,仅发现在西沙群岛或台湾南端)。

台湾南端和西沙群岛在地理上所处的纬度虽然不同,但区系的成分却很相似,似应同属于典型的热带区。不过值得指出的是,台湾南部有上述的3种地蟹科的代表,并有歪尾类的椰子蟹(*Birgus latro*),但西沙群岛仅有1种 *Gecarcoidea lalandii*,而无其他的两种 *Cardisoma* 和 *Birgus latro*,这大概是由于台湾南部受暖流影响较大之故。

南海还有一部分很常见的种类,其分布范围仅能到达福建一带,不再北进,如: Leucosiidae 的 *Arcania erinacea*, *Ebalia sagittifera*, Dorippidae 的 *Dorippe facchino*, *D. astuta*, Matutidae 的 *Matuta lunaris*, *M. banksii*, Maiidae 的 *Doclea ovis*, *D. canalifera*, Portunidae 的 *Charybdis merguensis*, *Ch. lucifer*, *Ch. affinis*, *Ch. anisodon*, *Ch. acuta*, *Ch. truncata*, *Ch. vadorum*, *Thalamita sima*, Mictyridae 的 *Mictyris longicarpus*, Ocypodidae 的 *Cleistostoma dotilliforme*, *Ocypode cordimana*, *O. ceratophthalma*, *Dotilla wichmani*, *Macrophthalmus tomentosus*, *M. pacificus*, *Uca pacificus*, *U. forcipatus*, *Tmethypocoelis ceratophora*, Grapsidae 的 *Helice tridens leachi* 和 *Sesarma tangi* 等。

b). 东海的蟹类区系,基本上也是热带性的,绝大部分的种类与南海所分布者相同,主要来自印度洋和中印半岛;部分是从热带中太平洋群岛, Melanesia 和菲律宾群岛随黑潮暖流而来的暖水种,还有部分是南海、东海及日本的亚热带性成分(如 *Achaeus tuberculata*, *Ceratoplax sagamiensis* 等地方种)以及少数黄海和东海(包括日本)的地方种。从南海来的热带种,分布到浙江沿海如舟山群岛以南或其附近,不能越过长江口而北上者也有多种,如: Dromiidae 的 *Dromia dehaani*, *Conchoecetes artificiosus*, Leucosiidae 的 *Myra fugax*, *Arcania heptacantha*, *A. quinquespinosa*, *Leucosia rhomboidalis*, *L. unidentata*, *L. hematosticta*, *Iphiculus spongiosus*, *Pariphiculus coronatus*, *Randallia eburnea*, *Actaeomorpha morum*, Calappidae 的 *Calappa philargius*, *C. lophos*, Dorippidae 的 *Dorippe dorsipes*, Maiidae 的 *Naxioides hystrix*, Euryalidae 的 *Jonas distincta*, Portunidae 的 *Portunus sanguinolentus*, *P. gracilimanus*, *P. hastatoides*, *P. gladiator*, *P. argentatus*, *Scylla serrata*, *Charybdis cruciata*, *Ch. miles*, *Ch. gordonae*, *Ch. variegata*, *Ch. callianassa*, *Thalamita crenata*, *Libystes edwardsii*, *Lissocarcinus polybioides* 等, Goneplacidae 的 *Carcinoplax longimanus*, *Xenophthalmodes morsei*, *camatopsis rubida*, *Ommatocarcinus macgillivrayi*, Xanthidae 的 *Liagore rubromaculata*, *Xantho reynaudii*, *X. reynaudii cultipes* 以及 Grapsidae 的 *Chasmognathus convexus* 和 *Varuna litterata* 等。

c). 黄海的蟹类区系,仍以热带和亚热带暖水性成分占优势,但其中还有一些北温带种。从东海分布来的暖水种,有些仅仅到达山东半岛南岸,并未进入渤海,例如: Leucosiidae 的 *Arcania globata*, *A. undecimspinosa*, Parthenopidae 的 *Lambrus validus*, Dorippidae 的 *Tymolus japonicus*, Maiidae 的 *Achaeus tuberculata*, Portunidae 的 *Ovalipes punctatus*, *Charybdis bimaculata*, Xanthidae 的 *Menippe convexa*, *Actaea rüPELLI orientalis*, *Parapanope euagora*, Goneplacidae 的 *Typhlocarcinus nudus*, Pinnotheridae 的 *Xenophthalmus pinnotheroides*, Grapsidae 的 *Sesarma haematochier* 和 Ocypodidae 的 *Uca arcuata*, *Macrophthalmus erato* 等等。

还有部分种类是广泛分布于黄、渤海和南海之间的,如: Leucosiidae 的 *Arcania undecimspinosa*, *A. globata*, Matutidae 的 *Matuta planipes*, Calappidae 的 *Orithyia mammillaris*, Portunidae 的 *Portunus trituberculatus*, *Charybdis japonica*, Grapsidae 的 *Eriocheir sinensis*, *E. leptognathus*, *Hemigrapsus penicillatus*, *H. sanguineus*, *Gaetice depressus*, *Sesarma dehaani*, *Helice tridens tientsinensis*, *H. tridans sheni*, Ocypodidae 的 *Scopimera globosa*, *Macrophthalmus japonicus* 等等。

黄海还有少数起源于北温带海的冷水性种,如: Maiidae 的 *Oregonia gracilis*, *Pugettia quadridens*, *P. minor*, Cancridae 的 *Cancer pygmaeus*, *C. gibbosulus*, Pinnotheridae 的 *Pinnixa rathbuni* 等。其中有些种,如: *Cancer pygmaeus* 和 *Oregonia gracilis* 是间断分布于北太平洋温带区东西两岸的 (Amphi-pacific species)。它们在我国、日本和美洲西岸的 California 附近都有分布,但不见于白令海沿岸,而 *Pugettia minor* 和 *Cancer gibbosulus* 则仅分布于黄海和日本,但很少出现于东海及其以南的较暖水域中 (Rathbun 报告厦门产有 *Hyas coarctus* 和 *Pugettia quadridens*, 颇值得怀疑,因为我们连年在东海进行拖网采集,在浙江南部以南,均未采到这两种)。北温带蟹类在黄海的种数虽然不多,但有些种,如 *Oregonia gracilis* 的数量却相当大,特别是在超过 40 米的深水区,这一种蟹与其他冷水性十足类以及其他底栖无脊椎动物常形成一个独立的喜冷水的生物群落,在其分布区中,很少见到其他蟹类。这也是黄海蟹类区系的一个特点。

二、中国、日本和朝鲜蟹类区系特点的比较

a) 中国和日本以及朝鲜的蟹类区系有很多共同的成分。但在中国和日本两国附近纬度相同的海区中,蟹类区系的分布却有很大的不同。这主要是由于两地受黑潮暖流的影响不同之故,黑潮在东海是从西南流向东北的,所以日本本州南岸的纬度虽则相当于中国黄海南部的江苏沿岸,但其蟹类区系成分却与我国东南部和南海大陆沿岸所分布者大体相似。在本州的北部(东岸)由于受到亲潮寒流和日本海北部冷水的影响,因此暖水性成分随着纬度的增高而急剧减少,但同时又出现了一些北温带的冷水种。这样,南来的暖水种与北来的冷水种在本州中部或北部近海相交汇。在日本太平洋沿岸的大多数暖水种,均以相模湾(Sagami Bay)和东京湾(Tokyo Bay)为其最北的分布界限,只有极少数种类能越过东京湾以东的犬吠岬(Inuboe zaki)而向北分布到金华山(Kinkazan)附近。这里的暖水性蟹类区系,虽然包括着相当数量的日本特有种,但很大部分仍然和中国海的相同,即以螯蟬科而论,在中国海已知的 57 种内,有 34 种是与日本共有的,如: *Lissocarcinus arkati* 及 *L. polybioides* 等 4 种, *Lupocyclus* 属的 *L. philippinensis* 等 2 种, *Scylla serrata*, *Portunus* 属的 *P. pelagicus*, *P. sanguinolentus*, *P. argentatus*, *P. granulatus* 等 7 种, *Charybdis* 属的 *Ch. lucifer*, *Ch. miles*, *Ch. variegata*, *Ch. annulata*, *Ch. truncata* 等 8 种, *Thalamita crenata*, *Th. danae*, *Th. prymna* 和 *Th. sima* 等 11 种, *Podophthalmus* 属的 *P. vigil* 等 2 种。

在日本海方面,来自热带或亚热带地区的种类,都停留在日本九州的长崎(Nagasaki)及其附近地区,只有一小部分种类进入日本海,如: Dromiidae 的 *Dromia dehaani*, *Conchoecetes artificiosus*, Dorippidae 的 *Dorippe dorsipes*, Matutidae 的 *Matuta planipes*, *M.*

lunaris, Leucosiidae 的 *Arcania heptacantha*, *A. undecimspinosa*, *Leucosia rhomboidalis*, *L. obtusifrons*, *Philyra platycheira*, *Myra fugax*, Parthenopidae 的 *Lambrus validus*, Maiidae 的 *Menaethius monoceros*, *Micippa philyra*, Portunidae 的 *Portunus gladiator*, *P. hastatoides*, *Charybdis japonica*, *Ch. bimaculata*, Xanthidae 的 *Actaea savignyi*, *Sphaerozius nitidus*, *Xantho distinguendus*, *Medaeus granulosus*, Goneplacidae 的 *Carcinoplax vestitus*, *C. longimanus*, *Eucrate crenata* 和 Grapsidae 的 *Sesarma picta* 等。这些种类在中国各海区也都有分布。

从日本长崎 (Nagasaki) 向北到达对馬海峡和朝鮮海峡附近的还有少数暖水性种类, 如: Raninidae 的 *Ranina ranina*, Leucosiidae 的 *Randallia eburnea*, Portunidae 的 *Scylla serrata*, *Portunus pelagicus*, *P. sanguinolentus*, *Charybdis acuta*, *Thalamita sima*, Grapsidae 的 *Chasmognathus convexus* 和 *Eriocheir japonicus* 等。这些热带性的种类, 除 *Randallia eburnea*, *Scylla serrata* 和 *Chasmognathus convexus* 和 *Eriocheir japonicus* 等之外, 大多数停留在那里, 既未进入日本海, 又未到达我国黄、渤海。因此, 我們认为日本太平洋岸的蟹类区系, 从东京湾到长崎和朝鮮海峡的蟹类区系同中国东海和南海的蟹类区系, 基本上是属于同一地理区划的。

日本的冷水性蟹类种类很少, 它們大多分布于本洲北部及北海道附近海区, 少数种如 *Oregonia gracilis*, *Cancer amphioetus* 和 *Pinnixa rathbuni* 等也分布到黄海, 其他如 *Hyas*, *Chionoecetes*, *Telmessus*, *Erimacrus*, *Chorilia* 和 *Pisoides* 等属的 8 个种都不出现于中国沿岸。

b) 朝鮮半島的蟹类区系含有多方面的成分, 既有热带暖水性成分, 又有来自北太平洋冷水性的成分。分布在朝鮮海峡者已如上述, 分布在朝鮮东岸者种数不多, 除来自北方冷水性的种类之外, 一般都是中国, 朝鮮和日本附近的地方种, 朝鮮西岸的种类較东岸为多, 大都与我国黄渤海所产者相同, 惟有少数种, 如: *Matuta lunaris* 等, 并未出现在我国的黄海南部, 而 *Charybdis bimaculata*, *Uca arcuata* 等种, 虽然分布到黄海, 但不进入渤海, 另外一些种类, 如 *Orithya mammillaris*, *Eriocheir sinensis* 和 *E. leptognathus* 均以朝鮮西岸为其最北的分布界限, 未曾到达朝鮮海峡或日本海; 至于 *Eriocheir japonicus* 大概从我国珠江口或广东西部近海經台湾而分布到日本海附近的沿岸地带, 并未到达朝鮮西岸或黄、渤海中。又日本海的冷水性种类如: Maiidae 的 *Chionoecetes opilio elongatus* 能分布到对馬島附近, 而 Atelecyclidae 的 *Erimacrus isenbeckii* 能出日本海而分布到长崎附近, 但均未再向西分布, 或越过朝鮮济州島而进入黄海。

c) 仅仅分布于中国、朝鮮和日本附近海区的种类, 数目很多, 約有 100 种上下, 应是这一海区的地方种, 例如: Dromiidae 的 *Petalomera granulata*, Dorippidae 的 *Dorippe japonica*, Leucosiidae 的 *Arcania globata*, Portunidae 的 *Portunus trituberculatus*, Xanthidae 的 *Actaea rüppellii orientalis*, Ocypodidae 的 *Cleistostoma dilatatum*, *Paracleistostoma cristatum*, *Ocypode stimpsoni*, *Macrophthalmus dilatatus*, Grapsidae 的 *Helice tridens tridens* 等均分布于中国各海和日本沿岸。又如: Dromiidae 的 *Petalomera japonica*, Maiidae 的 *Pugettia quadridens*, *P. minor*, Cancridae 的 *Cancer gibbosulus*, Pinnotheridae 的 *Pinnixa tumida*, *P. rathbuni*, *Pinnotheres sinensis*, *Asthenognathus inaequipes*, Grapsidae

的 *Acmaeopleura balssi* 等种,仅分布于黄海和日本附近海区,而 Homolidae 的 *Latreillia phalangium*, Dorippidae 的 *Ethusa izukensis*, Leucosiidae 的 *Leucosia vittata*, *Philyra heterograna*, *Ph. tuberculosa*, *Ph. pisum*, Raninidae 的 *Lyreidus politus*, Maiidae 的 *Pugetia incisa*, Euryalidae 的 *Jonas diatincta*, Portunidae 的 *Charybdis acuta*, Xanthidae 的 *Heteropilumnus ciliatus*, *Actaea bocki*, Grapsidae 的 *Eriocheir japonicus* 和 Ocypodidae 的 *Macrophthalmus dilatatus* 等等,都是分布于东海或南海及日本附近海区的种类。此外,分布范围局限于中国各海的种数较少,约有 30 多种,例如仅仅分布于黄海的有: Leucosiidae 的 *Nursia sinica*, Maiidae 的 *Hyastenus pleione*, Ocypodidae 的 *Ilyoplax pingi*, *I. dentimerosa* 等,仅见于东海的有: Goneplacidae 的 *Litoecheira amoyensis*, *Anomalifrons ligh-tana*, *Ser fukiensis*, Ocypodidae 的 *Ilyoplax ningpoensis*, *I. stapletoni*, *Dotilla wichmanii*, Grapsidae 的 *Metaplax sheni*, *M. takahashii* 等种,仅见于南海的有: Ocypodidae 的 *Camp-tandrium anomalum*, *C. elongatum*, *Ilyoplax formosensis*, *I. tansuiensis*, *Ilyoplax tenella*, Grapsidae 的 *Eriocheir rectus* 等种,仅分布于黄海到南海之间的有 Calappidae 的 *Orithyia mammilaris*, Grapsidae 的 *Eriocheir sinensis*, 仅分布于黄海和东海的有 *Eriocheir leptog-nathus*, 这些都是中国各海区的地方种。

从上述情况可以看出,中国、朝鲜和日本蟹类区系之间的亲缘关系是极为密切的。但是,日本沿岸的地方种较多,约有 100 种左右。这也可以说明中国和日本的海蟹区系仍有明显的差异。

三、結 語

1. 在中国海蟹类区系的组成中,以热带性成分占了绝对优势,起源于北温带海区的种类极少,即使在黄海冷水团所控制的区域,也只有 10 种左右,仅占黄海区总种数的 1/10,其中除 *Oregonia gracilis* 在北太平洋分布较广外,其他都分布到日本北部附近水域。这些种类一般都能适应于温度条件变化较大的环境,和典型北温带种的性质不尽相同,如与虾类和歪尾类相比,其冷水性种类显然较少,故黄海的蟹类区系,基本上暖水性成分占绝对优势。

2. 蟹类栖息于潮间带者很多,约占总种数的半数以上,这与虾类的分布情况适相反。

3. 中国海的蟹类区系与日本各海所产者极为近似。在中国各海所产的约 500 种蟹类中,几乎有 60% 在日本也有分布,这些是两国共有的成分。

4. 在中国海的蟹类区系中,来自印度洋方面的热带性成分显然较日本区系中为多。如玉蟹科的 *Iphiculus* 和 *Ixa* 等属在南海或东海都有代表,但在日本南岸的温暖海区中尚无记载。即如 *Pariphiculus* 属,在中国海就有 3 种,但日本仅有 1 种。至于北温带的冷水种则日本显然多于中国。

5. 在中国海的蟹类区系中地方性种类显著地较日本南部各海区的为少。日本约有 100 种地方性种类,但中国迄今只发现 30 余种,双方约成 3 与 1 之比。

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PRELIMINARY STUDIES ON THE CHARACTERISTICS OF THE CRAB FAUNA OF CHINA SEAS

C. J. SHEN

(Institute of Zoology, Academia Sinica)

J. Y. LIU

(Institute of Oceanology, Academia Sinica)

(SUMMARY)

There are approximately 500 species of crabs found in China Seas. With the exception of the indigenous warm-water species found along the coasts of China and the North Pacific immigrants found in the Yellow Sea, most of them are tropical and subtropical elements distributed widely in Indo-West Pacific region.

The distribution of the warm-water species in China Seas and the neighboring waters is greatly influenced by the Kuroshio warm current, which brings the tropical elements from the South China Sea or the Philippines, passing by the Taiwan Island and the Loo Choo Archipelagoes more to the Pacific side of Japan than to the coastal waters of China, with only a small portion penetrating into the Japan Sea, in which they extend their distribution as far as the northern shores of Honshu and farther northwards to the southern shores of Hokkaido and Sakhalin. But on account of the continental climatic conditions and the Oyashio cold current from the North Pacific, the hydrological conditions of the North West Pacific again remarkably influenced, and consequently, the composition of the crab fauna in the region between China, Japan and Korea or even in the coastal waters of China is modified to a certain extent.

1. The characteristics of the crab fauna of China Seas

The crab fauna of China Seas is rich in tropical and subtropical elements. Most of the species are found to belong to the families of Xanthidae, Grapsidae, Ocypodidae,

Leucosiidae, Portunidae and Goneplacidae. Among them, the xanthids are the most abundant in species, occurring largely among the coral reefs of the inter-tidal zone of the South China Sea.

The number of species found along the coastal waters of China decreases with the increase of latitudes. According to the present records, there are about 450 species found in the South China Sea, 230 in the East China Sea and only about 90 in the Yellow Sea.

a) In the South China Sea, the crab fauna is simply tropical and subtropical in nature. The species inhabiting the inter-tidal zone are more numerous than those in the sub-littoral; different families are represented in both habitats. Most of the stenothermal tropical species found in the inter-tidal zone may extend their distribution northward to the coral reefs of Hsi-Sha (Paracel) Islands and the southern parts of Hainan and Taiwan, with only some of them extending to northern Hainan and Taiwan as well as to the coastal waters of the continent (for examples, see p. 141).

It is worthy of note that the Hsi-Sha Islands and southern Taiwan, though being situated at different latitudes, have some common coral reef inhabitants, e.g. *Gecarcoidea lalandii*. In southern Taiwan, however, there are found two other tropical crabs, *Cardisoma hirtipes* and *C. carnifex* (Gecarcinidae) and an anomura, the so called coconut crab *Birgus latro* (Coenobitidae), which have so far not been recorded from the Hsi-Sha Islands. This is probably due to the influx of the warm current upon southern Taiwan being much stronger than that upon the Hsi-Sha Islands, although these two places may be considered from a zoogeographical viewpoint as belonging to the same tropical zone.

A good number of the tropical elements, in their northward distribution usually stop along the coasts of Fukien Province as their northern limit (for examples, see p. 142).

b) In the East China Sea, most of the crabs are found to be the same as those of the South China Sea, propagating chiefly from the Indian Ocean and Malay Archipelagoes with some of them from the islands of the tropical Pacific Ocean, such as Melanesia and the Philippines by following the warm current. Besides, there are some endemic subtropical species of the China Seas.

Many of the tropical elements in their northward distribution stop at the Chu San Archipelagoes (northern Chekiang Province), and the neighboring waters as their northern limit (for examples, see p. 142).

c) In the Yellow Sea, the crab fauna prevails with tropical and subtropical elements together with a moderate number of northern temperate elements. Some of the warm-water species of the East China Sea stop in their northward distribution at the southern part of the Yellow Sea or southern Shantung Peninsula, but not entering the Gulf of Pohai (for examples, see p. 142). A number of eurythermal tropical species, however, extend further northward to the Yellow Sea (for examples, see p. 142).

Besides the warm-water species, there are found here some hypothermophilous ones propagated from the temperate region of the North Pacific. The species *Cancer pygmaeus* and *Oregonia gracilis* are the Amphi-Pacific species distributed discontinuously in the waters of North China, Japan and California, but are absent from the Bering Sea. The species *Cancer gibbosulus* and *Pugettia minor* are only known from the Yellow Sea and the surrounding waters of North Japan. In the Yellow Sea, the cold-water crabs are

very few in the number of species, but some of them, e.g. *Oregonia gracilis*, are abundant in the number of individuals at the depth of more than 40 metres. It often forms an independent community with hypothermophilous benthic invertebrates, such as, the anomuran, *Pagurus ochotensis* Brandt, the ophiurid *Ophiura sarsi* Lütken, etc., in which crabs of other kinds are very scarce. This may be considered as one of the characteristics of the crab fauna of the Yellow Sea.

2. Comparison of the crab fauna of China Seas and that of Japan and Korea

a) The crab fauna of southern Honshu is very different from that of the coastal region of Kiangsu Province in the southern part of the Yellow Sea, although these two regions are situated almost at the same latitude, but the fauna of the former region is found to be very similar to that of the northern part of the South China Sea and the southern part of the East China Sea, both of which are situated even further south of the Yellow Sea. These phenomena are chiefly due to the varying influences of the Kuroshio current upon the different regions under discussion.

On the other hand, the crab fauna of the northern Honshu is characterized by a mixture of the cold-waters species propagated from the North Pacific, with the warm-water species migrating into the Japan Sea from the south. Most of the northern cold-water species remain in the Japan Sea, with only a few extending their distribution southwards to some distance. For instance, the species *Chionoecetes opilio elongatus* (Maididae) is found to extend to Tsushima Islands and *Erimacrus isenbeckii* (Ateleyclidae) to Nagasaki. Only a few species, such as *Oregonia gracilis*, *Cancer pygmaeus*, *C. gibbosulus*, *Pugettia quadridens* and *P. minor* may occur at the bottom of the middle Yellow Sea. While the southern warm-water species decreases in number as they migrate northwards along the northern shores of Honshu.

On the Pacific side of Japan, most of the warm-water species usually stop at Sagami Bay or Tokyo Bay as the northern limit of their distribution, with only a few of them passing over Inuboe-zaki off the Tokyo Bay to Kinkazan, and most of the cold water species extending from North Pacific usually stop there as the southern limit of their distribution.

On the west side of Japan, the southern forms usually stop at Nagasaki, with only a small number entering the Japan Sea (for examples, see pp. 143—4).

Another small group of the warm-water species usually stop at Korean Strait and the neighboring islands and do not enter, with only few exceptions (*Randallia eburnea*, *Scylla serrata*, *Chasmognathus convexus*, *Eriocheir japonicus*, etc.), either the Japan Sea or the Gulf of Pohai and Yellow Sea.

Generally speaking, the crab fauna of Japan ranging from Tokyo to Nagasaki and further westwards to the Korean Strait together with that found in the East and the South China Seas is essentially tropical in nature, belonging fundamentally to a common zoogeographical region.

b) The crab fauna of the Chosen Peninsula consists of different kinds of elements. Besides those propagated from the southern tropical waters, there are found present a small number of cold-water species from the North Pacific. The species distributed to the Korean Strait have been mentioned above. The crab fauna of the east coast of the

Peninsula includes some of the cold-water species and some of the local forms of North-West Pacific Ocean; that of the west coast is similar to that of the Gulf of Pohai, except for the species *Matuta lunaris* and *Charybdis bimaculata*, which are not represented in the Gulf of Pohai. The endemic Chinese species *Orithya mammillaris*, *Eriocheir sinensis* and *E. leptognathus* found in the west coast of Korea, do not reach the Korean Strait or enter the Japan Sea. The species of *Eriocheir japonicus* found to be common to South China, Korea and Japan extends its distribution possibly from the estuaries of the Pearl River, South China, passing over Taiwan and Loo Choo to the coastal and neighboring waters of Japan, but it does not reach the west coast of Korea or penetrate into the Yellow Sea or the Gulf of Pohai.

c) The local species of crabs found in China, Chosen and Japan amount to about 100, some of which are widely distributed in the seas of China and Japan, while others are known only from the Yellow Sea and the neighboring waters of Chosen and Japan and still some found to be common to the South and the East China Seas and the neighboring seas of Chosen and Japan. The endemic species of China Seas are not so numerous as those of Japan Seas, approximately in the proportion of 30:100. Some of the endemic species are particular to each of the China Seas, some of the others are widely distributed in the China Seas and still others are confined to the Yellow Sea and East China Sea (for examples, see pp. 144—5).