Hydrobiologia **285**: 75–84, 1994.
A. Sasekumar, N. Marshall & D. J. Macintosh (eds), Ecology and Conservation of Southeast Asian Marine and Freshwater Environments including Wetlands.

An annotated checklist of mangrove brachyuran crabs from Malaysia and Singapore

Cheryl G. S. Tan & Peter K. L. Ng
Department of Zoology, National University of Singapore, Kent Ridge, Singapore 0511, Republic of Singapore

Key words: mangrove crabs, Peninsular Malaysia, Singapore, checklist

Abstract

The mangrove brachyuran fauna of Singapore and Malaysia is generally regarded as well studied. This is not the case. Over a hundred brachyuran species are now known from mangroves in Peninsular and East Malaysia, a substantial part of the known fauna in these waters. In Singapore, for example, of the approximately 350 brachyurans known, 76 (*i.e. ca* 22%) are mangal species. The systematics of several groups remain very unsatisfactory. The taxonomy of the Sesarminae, the largest subfamily of the Grapsidae and the dominant group in most mangroves, is still very unstable, with the identities of many ecologically important genera and species still unclear. A revision is still unavailable. Until recently, representatives of the families Hymenosomatidae and Leucosiidae were unknown from mangroves. Detailed collections and studies have resulted in the discovery of new genera and species from areas as purportedly well explored as Singapore. The Sarawak mangrove brachyuran crab fauna is based almost entirely on one paper written 40 years ago whilst that of Sabah is almost unknown. Although the state of mangal brachyuran systematics in Malaysia and Singapore is still in an exploratory phase, the mangroves in these two countries are relatively well-known compared to those of the surrounding regions. The present annotated checklist of mangal brachyuran species is intended to guide future systematic work in these countries, as well as to assist ecologists and other mangrove biologists. This is especially in view of the important role of crabs in mangroves.

Introduction

Mangroves are one of the main brachyuran crab habitats in Southeast Asia, with a species diversity as high as, if not higher than coral reefs. This fact, however, is usually not apparent or well known as the mangrove brachyuran fauna is less well studied compared to coral reefs. The definition of mangrove used in this paper follows that in Macnae (1968). The role of crabs in mangroves has been emphasised in recent years, especially in view of the commercially valuable species found there, and others which affect the overall mangrove ecology (see Davie, 1982; Jones, 1984). In this present paper, the systematic problems associated with mangrove brachyura are reviewed and the state of their overall taxonomy is discussed.

The present checklist of brachyurans associated with the mangrove forests in Singapore and Malaysia (East and West) expands and updates a preliminary list prepared by D. H. Murphy (see Chou *et al.*, 1980) of the Singapore fauna. The compilation of this list is intended to help focus future taxonomic work on the group, as well as assist mangrove biologists and ecologists. Many of the species listed here were originally described from Singapore and Malaysia (here marked with an asterisk, '*', and a ' + ' sign respectively). Given the ecological importance of mangrove crabs, the maintenance of high crab species diversity is integral to the health of the mangroves.

Materials and methods

The present revised checklist is based on the available literature, as well as the authors' collections over the years. Opportunity is taken here not only to update records and nomenclature, but also to correct some errors present in the earlier report. As far as possible, the most recently published and/or accepted nomenclature for the various families in question is used, although the status and validity of many of these taxa remain unclear.

One of the difficulties of compiling the checklist was that of defining the limits of the mangrove habitat. Several of the taxa listed here cannot be regarded as true mangal species, being normally found in other habitats. In many cases, however, since there is some overlap of their habitats, these species might be encountered. These will be referred to here as peripheral mangal species (PMS). On the other hand, there are several species that are commonly found not only in mangroves but also in many other similar habitats. These have been classified under the broad category of non-obligate mangal species (NMS). A third category, associated mangal species (AMS), includes those species which are associated with driftwood, barnacles and clumps of mussels (*Perna viridis*). Obligate mangal species (OMS) form the last category. The classification of the species is based on the available literature as well as the authors' collecting experiences over the years.

The majority of the species studied here are deposited in the Zoological Reference Collection (ZRC), Department of Zoology, National University of Singapore. Specimens and some unpublished data concerning Peninsular Malaysia and Sarawak were also kindly presented by Dr A. Sasekumar (University of Malaya) and Dr Charles Leh (Sarawak Museum) respectively.

Taxonomy

The annotated list of taxonomic comments provided here is preliminary. Many aspects remain unresolved. A good example of this is the unstable state of sesarmine systematics, with the separation of the various genera and subgenera, as proposed by Serène & Soh (1970), being often difficult and subjective. The information from the unpublished theses in the Department of Zoology, National University of Singapore by S. Harminto and N. Sivasothi has been included here to make the present report complete.

1. The sesarmine genus *Episesarma* de Man, 1895, is synonymous with *Neoepisesarma* Serène & Soh, 1970, with the former having priority. Serène & Soh (1970) established their genus as a replacement for de Man's (1895) taxon, but Holthuis (1978) provides details of why their action is unjustified. All species referred by Serène & Soh (1970) to *Neoepisesarma* must now be transferred to *Episesarma* instead. The gender of the genus *Episesarma* is neuter.

2. The sesarmine genus *Chiromantes* Gistel, 1848, should be spelt without the second 'h'. Most literature, including Serène & Soh's (1970) revision incorrectly spells it as '*Chiromanthes*'. The name was originally proposed as a replacement name for *Pachysoma* de Haan, 1833.

3. Serène & Soh (1970) established *Selatium* as a subgenus of their new genus *Neoepisesarma*. The subgenus is sufficiently different from *Episesarma* (= *Neoepisesarma*, see above) to regard it as a full genus, as was used by Tan & Ng (1988). The two genera are distinct in many respects, not only morphologically but also ecologically and ethologically (N. Sivasothi, unpublished data).

4. The genus *Nanosesarma* Tweedie, 1950, was partially revised by Serène & Soh (1970), with several new subgenera described. The status of

this genus is not satisfactory and a thorough revision is now in progress (P. Davie, pers. comm.). The various subgenera of Serène & Soh (1970) are here regarded as distinct genera.

5. The crab described as *Varuna yui* (Grapsidae, Grapsinae) by Hwang & Takeda (1986) is externally similar to *V. litterata* (Fabricius, 1793). Males of *V. litterata* however, differ markedly in the form of the first male pleopod from those of *V. yui*. The second author has seen the type specimens of *Cancer litteratus* Fabricius, 1793. Studies of the specimens from the region in the ZRC by Peter Davie (Queensland Museum) and the second author have shown that all the Sundaic *Varuna* are *V. yui* and not *V. litterata* (unpublished data). It would appear that *V. yui* is more common in the continental shelf waters while *V. litterata* prefers habitats facing the open ocean.

6. The family Xanthidae MacLeay, 1838, has been thoroughly revised in recent years, and the modern arrangement differs from that adopted by Balss (1957), which is followed by many authors. There is, however, sufficient evidence (see Guinot, 1978, 1979; Ng, 1987) that the family should be split into several separate families (Xanthidae s. str., Carpiliidae, Panopeidae, Pilumnidae, Menippidae etc.) instead, and tentatively grouped in one superfamily. Guinot's (1978) classification is followed in this checklist, although superfamily rank is not used here.

7. The Rhizopinae Stimpson, 1858, is here regarded as a subfamily of the family Pilumnidae (see Ng, 1987). In the older system of Balss (1957) and other authors, the Rhizopinae are classified under the Goneplacidae. The weight of existing evidence however, suggests that the Goneplacidae sensu Balss (1957) (and aut.) is a heterogeneous assemblage and must be divided into several smaller groups (see Guinot, 1978; Ng, 1987).

8. The higher classification of the Ocypodidae is still not completely clear. Carcinologists at present divide the Ocypodidae into three, four or five subfamilies. Most of the modern workers (e.g. Lewinsohn, 1977; Serène, 1968) recognise three subfamilies – Ocypodinae, Dotillinae and Macrophthalminae, a system first established by Alcock (1900). Serène (1974) resurrected the subfamily Camptandriinae Stimpson, 1858, justifying the taxon because of its peculiar highly recurved first male pleopod. The subfamily had previously been synonymised under the Macrophthalminae. The Camptandriinae is certainly a valid taxon, sharing several apparently synapomorphic features, and there are good grounds for recognising it as a separate family (see Harminto & Ng, 1991).

9. The two ocypodid subfamilies, Dotillinae Stimpson, 1858, and Scopimerinae Alcock, 1900, consist of the same genera and are thus synonymous (Manning & Holthuis, 1981). Dotillinae, being the senior name, has priority and is thus used instead of Scopimerinae in this checklist.

10. *Shenius anomalum* (Shen, 1935) occupies a very peculiar position in the Dotillinae. Its external features and gonopod structures, as well as its larvae are very unusual (S. Harminto, unpublished data). It should probably be separated into a new subfamily, or even family.

11. The fiddler crabs of the genus *Uca* sensu lato have undergone extensive revision in the past few decades, the most recent, and certainly the most comprehensive was by Crane (1975). There are, however, still many practical problems with the use of many of the subgenera proposed. There are also serious taxonomic and nomenclatural problems in this system especially since Bott (1973a, b) had earlier split *Uca* into ten genera based solely on the gonopod tip structure. In this paper, the authors prefer to adopt Von Hagen's (1976) suggestion that only one broad genus, without subgenera, be recognised for the time being.

12. The camptandriine genus *Leipocten* Kemp, 1915, is a junior synonym of *Baruna* Stebbing, 1904. Four distinct species are now known (Dai & Song, 1986; Harminto & Ng, 1991). The mangrove species known locally as *Leipocten sordidulum* Kemp, 1915, by most authors after Kemp (1915) is in fact, a separate species, *Baruna mangromurphia* Harminto & Ng, 1991. The true *L. sordidulum* is a junior synonym of *B. socialis*

Stebbing, 1904, and occurs in India and northern Peninsular Malaysia in non-mangrove habitats. Dai & Song (1986) described a new species, *L. trigranulum* which possessed first male pleopods very similar to that of *B. mangromurphia*. The carapace features of the males seem to differ and until direct comparison can be made of the two species, both taxa are regarded as valid.

13. The camptandriine genera *Cleistostoma* de Haan, 1833, and *Paracleistostoma* de Man, 1895, have been revised by Manning & Holthuis (1981), and have been separated into several smaller genera. The most significant change for a local species is for *Paracleistostoma microcheirum* Tweedie, 1937, which has been transferred to a monotypic genus *Ilyogynis* Manning & Holthuis, 1981. Unpublished studies by S. Harminto, have also revealed the presence of a *Paracleistostoma* species not previously known from Peninsular Malaysia – *P. wardi* (Rathbun, 1910). This species was, until then, only known from Australia.

14. One of the more serious and pressing problems of mangrove brachyuran taxonomy is the identity of the commercially important mud crab, *Scylla serrata* (Forskål, 1755) (type locality Jidda, Red Sea). The number of species within the genus *Scylla* has been the subject of much discussion and study and it is not known whether the mangrove species is the true *Scylla serrata*. Pending a definite revision of the genus, the specific name *serrata* is used for the mangrove species. A detailed study is clearly necessary, especially if their fisheries is to be properly managed.

15. A new genus and species of obligate mangrove leucosiid, *Praosia punctata*, apparently allied to the genera *Nursia* and *Ebalia* was recently described. Due to the existing confusion concerning the definition, size and composition of the various leucosiid subfamilies, with the possible exception of the Ebaliinae and the Cryptocneminae (see Manning & Holthuis, 1981), *Praosia punctata* has not been classified under any subfamily (Tan & Ng, 1992).

16. Specimens of *Ebalia malefactrix*, Kemp 1915, from Peninsular Malaysia, were placed in the genus *Nursia* Leach, 1817, by Tweedie in 1937 (unpublished data, M. W. F. Tweedie, pers. comm.). Other Malaysian specimens were also determined as *N. malefactrix* by Serène in 1970 (unpublished data). As the taxonomy of the genus *Ebalia* is still very unclear, and to avoid confusion, the species *malefactrix* is retained within the genus *Ebalia*.

Discussion

Although the contributions by Tweedie, Serène and Johnson to mangrove brachyuran taxonomy of Singapore, West and East Malaysia have been significant, mangrove brachyuran crab taxonomy in Singapore and Malaysia remains unstable as is true for mangrove fauna in general. Compared to other regions in Southeast Asia however, the mangroves of Malaysia and Singapore are relatively well-explored. New species are still being discovered, and regional studies have shown that much of the fauna remains poorly known.

Tweedie (1950) listed only 46 species of mangal brachyuran fauna from Labuan and Sarawak, the majority being sesarmines. This is the only paper on Sarawak mangrove crabs published, although Tai & Manning (1984) described a new *Potamocypoda* from streams near a mangrove in Sarawak. The mangrove brachyura of Sabah is almost unknown, with no known detailed study ever made. The shortage of recent taxonomic literature for the mangrove brachyuran fauna of Singapore and Malaysia is not a reflection of the taxonomic stability for species inhabiting mangrove areas. It is, however, an indication of the need for more taxonomic work than is now being done in the two countries.

The keys to the various taxa of crabs from the mangrove are few and often fall into either of two categories: those that add to the complexity of the problem rather than serve to ease the situation, and those that may be helpful but are outdated. An example of the former would be the compilation by Lovett (1981). Portions of keys were compiled apparently 'piecemeal' from different authors, including taxa not found here and obvious errors, and many important keys in supposedly 'less well known' publications were omitted. Such superficial keys more often than not prove to be misleading rather than useful and usually hamper the work of identification of the fauna concerned. Some provisional keys to the brachyuran fauna of the mangroves of the Indo-Pacific were written by the late R. Serène in 1972. These, however, remain unpublished.

Although the mangrove habitat has a great abundance of molluscs, such as *Anadara granosa* and *Glauconome rugosus*, no pinnotherids, often closely associated with bivalves, have been reported thus far from mangroves in Singapore and Malaysia. As many species of pinnotherids are symbionts of mangrove bivalves, they are almost certainly present in these waters. Unidentified species (*Pinnotheres* spp.) have however been obtained by the second author from *Anadara granosa* and *Anomia* sp. Special efforts to obtain mangrove pinnotherids will have to be made.

In recent years, a number of new species have been discovered, particularly from the families Hymenosomatidae (false spider crabs) and Leucosiidae (pebble crabs) from Singapore mangroves. The known mangrove leucosiids of Malaysia are based almost entirely on recent collections (unpublished data) from Johor and Penang (*Ebalia malefactrix*). One hymenosomatid (*Elamenopsis mangalis)* is known from Johor, Malaysia (C. T. N. Chuang, pers. comm.). Many members of these families are cryptic, being of similar coloration to their surroundings and usually partially buried in mud or vegetation, making their detection and collection difficult. Thus, intensive collections must be made for members of such cryptic families previously undetected so as to facilitate a complete documentation of the mangrove species.

The significance of the mangrove crab fauna cannot be overstated as Davie (1984) succinctly puts it, '... these animals are by far the most conspicuous and appealing component of the invertebrate fauna'. In Singapore and Malaysia, the mangrove grapsids, of which some 90% are sesarmines, comprise about 53% of the total mangrove crab fauna, making the Grapsidae the largest family found in Singaporean and Malaysian mangroves. The Ocypodidae, the next largest family, makes up about 30%.

Many of these crabs are economically and ecologically important. Primary food species include the mud crab, *Scylla serrata* and the larger sesarmines of the genus *Episesarma.* A species with commercial potential is the mangrove stone crab, *Myomenippe hardwicki*, a relative of the commercially valuable American stone crab, *Menippe mercenaria* (see Williams, 1984). *Myomenippe hardwicki* is common in Malaysian and Singapore mangroves and their large chelae (claws) in particular are meaty and tasty but as yet, this species is not harvested.

Many species, in particular the sesarmines and ocypodids, are important in mangrove energetics, being involved in nutrient cycling within the ecosystem. Members of the different families exhibit such varied feeding habits as scavenging, detrital-feeding, plankton-feeding and herbivory. Previously, the role of sesarmine crabs as 'trophic vectors' was only considered from the aspect of litter consumption (see Macnae, 1968; Robertson, 1986). Watson (1928) identified crabs as one of the most serious enemies to Malayan mangrove plantations, with particular reference to *Episesarma* feeding on mangrove propagules. The degradation of leaf litter mainly by grapsid crabs and other organisms provides detritus which may be utilised by detritivores or decomposed by bacteria and fungi (Robertson, 1986). Recently, it was found that active predation by crabs on intact mangrove foliage occurs, by the tree-climbing sesarmine crabs such as *Episesarma versicolor*, *E. chengtongense* and *E. singaporense* (Sivasothi *et al.*, 1993). Prior to this, it was thought that crab herbivory was restricted to leaf litter, propagules and flowers. This discovery has important implications with regards to the contribution of crabs to the overall energetics of the mangrove ecosystem. Secondary production in the mangrove forest is beneficial to the surrounding habitats as it has already been established that the elements of animal production in the forest are not only exported to the adjoining sea, but also consumed by marine fish visiting the forest at high tide

(Sasekumar, 1980). In the light of all the above, serious consideration must be given to the conservation of the mangrove habitat and its diverse fauna.

Conclusion

Any plan for the conservation of the mangrove habitats in Singapore and Malaysia must incorporate taxonomic studies on the brachyuran fauna. Little can be done in preparing usable keys for the mangal brachyuran fauna and habitats until adequate attempts are made at stabilising the alpha-taxonomy of these taxa.

Acknowledgements

The authors wish to thank Professors L. B. Holthuis, Y. Nakasone and D. A. Jones for their helpful comments on the manuscript, Mr S. Harminto and Mr N. Sivasothi for kindly consenting to the use of materials from their theses, Mr Michael Tweedie, Mr Kelvin Lim, Ms Eunice Low, Mr Dennis Ng, Miss C. T. N. Chuang and friends at the Reef Ecology laboratory for their encouragement and support in the course of writing this paper, Mr Peter Davie from the Queensland Museum for most interesting conversations on some aspects of grapsid taxonomy, Mrs C. M. Yang for her kind permission to examine the specimens in the ZRC, and Dr A. Sasekumar for kindly referring many of the mangrove specimens to the authors for study. The authors would also like to acknowledge Dr Chou Loke Ming and the Reef Ecology Study Team, Department of Zoology, National University of Singapore, which collected specimens under the 'ASEAN-Australia Marine Science Project: Living Coastal Resources'. Research was made possible by a grant RP900360 from the National University of Singapore.

References

Alcock, A., 1900. Materials for the carcinological fauna of India, The Brachyura Catometopa or Grapsoidea. J. Asiat. Soc. Beng. 69: 279–486.

Balss, H., 1957. Decapoda. VII. Systematik. In H. G. Bronns, Klassen & Ordnungen des Tierreichs 5: 1505–1672.

Bott, R., 1973a. Die typus-art der gattung *Uca* Leach, 1814 (Decapoda: Ocypodidae). Senckenbergiana biol. 54: 315–325.

Bott, R., 1973b. Die verwandtschaftlichen Beziehungen der *Uca*-Arten (Decapoda: Ocypodidae). Senckenbergiana biol. 54: 315–325.

Chou, L. M., S. H. Ho, H. W. Khoo, T. J. Lam, D. H. Murphy & W. H. Tan, 1980. The present state of mangrove ecosystems in Singapore and the impact of pollution. South China Sea Fisheries Development and Coordinating Programme, Food and Agriculture Organization of the United Nations, United Nations Environment Program, Singapore, 76 pp.

Crane, J., 1975. Ocypodidae: genus *Uca*. Fiddler crabs of the world, Princeton University Press, New Jersey, 736 pp.

Dai, A-Y. & Y-Z. Song, 1986. Intertidal crabs from the Beibu Gulf of Guangxi. Trans. Chin. Crust. Soc., Beijing: 54–62.

Davie, P. J. F., 1982. A preliminary checklist of brachyura (Crustacea: Decapoda) associated with Australian mangrove forests. Operculum 5: 204–207.

Davie, P. J. F., 1984. The biogeography of littoral crabs (Crustacea: Decapoda; Brachyura) associated with tidal wetlands in tropical and sub-tropical Australia. In K. N. Bardsley, J. D. S. Davie & C. D. Woodroffe (eds), Coasts and tidal wetlands of the Australian monsoon region, Australian National University North Australia Research Unit mangrove Monograph 1, Darwin: 259–275.

Davie, P. J. F., 1992. Revision of *Sarmatium* Dana (Crustacea: Brachyura: Sesarminae) with descriptions of three new species. Mem. Qld. Mus. 32: 79–97.

Guinot, D., 1978. Principes déune classification evolutive des Crustacés Decapodés Bracyuores. Bull. Biol. Fr. Belg. 112: 211–292.

Guinot, D., 1979. Données nouvelles sur la morphologie, la phylogenèse et la taxonomie des Crustacés Décapodes Brachyoures. Mém. Mus. natn. Hist. nat., Paris, Zool. 112: 1–354.

Harminto, S. & P. K. L. Ng, 1991. A revision of the camptandriin genus *Baruna* Stebbing, 1904 (Crustacea: Brachyura: Decapoda: Ocypodidae), with descriptions of two new species from the Indo-West Pacific. Raffles Bull. Zool. 39: 187–207.

Holthuis, L. B., 1978. A collection of decapod crustacea from Sumba, Lesser Sunda Islands, Indonesia. Zool. Verh., Leiden 162: 18–687.

Hwang, J. & M. Takeda, 1986. A new freshwater crab of the family Grapsidae from Taiwan. Proc. Jap. Soc. Syst. Zool. 33: 11–18.

Jones, D. A., 1984. Crabs of the mangal ecosystem. In F. D. Por & I. Dor (eds), Hydrobiology of the Mangal. The Hague: 89–109.

Lewinsohn, C., 1977. Die Ocypodidae des Roten Meeres (Crustacea, Decapoda, Brachyura). Zool. Verh., Leiden 152: 45–84.

Lovett, D. L., 1981. A guide to the shrimps, prawns, lobsters, and crabs of Malaysia and Singapore. Faculty of Fisheries and Marine Science, Universiti Pertanian Malaysia, Malaysia, 156 pp.

Macnae, W., 1968. A general account of the flora and fauna of mangrove swamps and forests in the Indo-West Pacific region. Adv. Mar. Biol. 6: 73–270.

Manning, R. B. & L. B. Holthuis, 1981. West African Brachyuran crabs (Crustacea: Decapoda). Smithson. Contr. Zool. 306: 1–379.

Ng, P. K. L., 1987. The Indo-Pacific Pilumnidae II. A revision of the genus Rhizopa Stimpson, 1858, and the status of the Rhizopinae Stimpson, 1858 (Crustacea, Decapoda, Brachyura). Indo-Malay. Zool. 4: 69–111.

Robertson, A. I., 1986. Leaf-burying crabs: their influence on energy flow and export from mixed mangrove forests (*Rhizophora* sp.) in northeastern Australia. J. exp. mar. Biol. Ecol. 102: 237–248.

Serène, R., 1968. The brachyura of the Indo-West Pacific Region. Prodromus for a checklist of the non-planktonic marine fauna of Southeast Asia. Singapore Natn. Acad. Sci., Special Publication. 1: 33–112.

Serène, R., 1974. Note on the genera and species of the Camptandriinae Stimpson, 1858 (Decapoda, Brachyura, Ocypodidae). Treubia 28: 59–68.

Serène, R. & C. L. Soh, 1970. New Indo-Pacific genera allied to *Sesarma* Say 1817 (Brachyura, Decapoda, Crustacea). Treubia 27: 387–416.

Sivasothi, N., D. H. Murphy & P. K. L. Ng, 1993. Tree-climbing and herbivory of crabs in the Singapore mangroves. In A. Sasekumar (ed.), Mangrove Fisheries and Connections. Asean-Australia Marine Science Project. Living Coastal Resources (Malaysia), 237 pp.

Tai, A-Y. & R. B. Manning, 1984. A new species of *Potamocypoda* (Crustacea: Brachyura: Ocypodidae) from Malaysia. Proc. biol. Soc. Wash. 97: 615–617.

Tan, L. W. H. & P. K. L. Ng, 1988. A guide to seashore life. Singapore Science Centre, Singapore, 159 pp.

Tan, C. G. S. & P. K. L. Ng, 1993. *Praosia punctata*, a new genus and species of mangrove leucosiid crab (Crustacea: Decapoda: Brachyura) from Singapore, Crustaceana 64(1): 40–47.

Tweedie, M. W. F., 1950. Grapsoid crabs from Labuan and Sarawak. Sarawak Mus. J. 5: 338–369.

Von Hagen, H. O., 1976. Review of 'Fiddler crabs of the world. Ocypodidae: genus *Uca*' by J. Crane, Princeton University Press. Crustaceana 31: 221–224.

Watson, J. G., 1928. Mangrove forests of the Malay Peninsula. Malay. Forestry Records 6: 1–275.

Williams, A. B., 1984. Shrimps, lobsters and crabs of the Atlantic Coast of the eastern United States, Maine to Florida. Washington, 550 pp.

Checklist
BRACHYURA

	Status	S'pore	E. M'sia	W. M'sia
Grapsidae				
Grapsinae				
Metopograpsus frontalis Miers, 1880	NMS	X		
Metopograpsus gracilipes de Man, 1891	NMS	X		X
Metopograpsus latifrons (White, 1847)	NMS	X	X	X
Metopograpsus quadridentatus Stimpson, 1858	NMS		X	
Sesarminae				
Beanium andersoni (de Man, 1887)	AMS		X	X
Beanium batavicum (Moreira, 1903)	AMS	X		X
Beanium edamense (de Man, 1887)	AMS		X	
Beanium nunongi (Tweedie, 1950) +	AMS		X	X
Bresidium sediliensis (Tweedie, 1940) +	OMS		X	X
Chiromantes dussumieri (H. Milne Edwards, 1853)	OMS	X		
Chiromantes eumolpe (de Man, 1895)	OMS	X	X	X
Chiromantes fasciatus (Lanchester, 1900)*	OMS	X		X
Chiromantes indiarum (Tweedie, 1940)	OMS	X	X	X
Chiromantes onychophorus (de Man, 1895)	OMS	X		X
Chiromantes semperi Bürger, 1895	OMS	X	X	
Cleistocoeloma lanatum Alcock, 1900	OMS	X		
Cleistocoeloma merguiense de Man, 1888	OMS	X	X	X
Cleistocoeloma suvaense Edmondson, 1951	OMS	X		
Episesarma chengtongense Serène & Soh, 1967*	OMS	X		X
Episesarma mederi H. Milne Edwards 1853	OMS	X	X	X
Episesarma palawanense (Rathbun, 1914)	OMS	X	X	X
Episesarma singaporense (Tweedie, 1936)*	OMS	X		X
Episesarma versicolor (Tweedie 1940)*	OMS	X	X	X
Labuanium politum (de Man, 1888)	OMS?			X
Metaplax crenulata (Gerstaecker, 1856)	OMS	X		X
Metaplax elegans de Man, 1888	OMS	X	X	X
Metaplax sheni Gordon, 1930	OMS	X		
Nanosesarma minutum (de Man, 1887)	AMS	X		
Nanosesarma pontianacense (de Man, 1893)	AMS	X		
Neosarmatium smithii (H. Milne Edwards, 1853)	OMS		X	X
Neosesama gemmiferum (Tweedie, 1936) + /*	OMS	X	X	X
Parasesarma batavianum (de Man, 1890)	OMS	X		X
Parasesarma calypso de Man, 1895	OMS		X	
Parasesarma lanchesteri (Tweedie, 1936)	OMS	X	X	
Parasesarma melissa (de Man, 1887)	OMS	X		X
Parasesarma plicatum (Latreille, 1806)	OMS	X		X
Parasesarma rutilimanum (Tweedie, 1936)*	OMS	X	X	X
Pseudosesarma bocourti (A. Milne Edwards, 1868)	OMS			X
Pseudosesarma crassimanum (de Man, 1887)	OMS			X
Pseudosesarma edwardsii (de Man, 1887)	OMS	X		
Pseudosesarma johorense (Tweedie, 1940) +	OMS	X	X	X
Pseudosesarma laevimanum (Zehntner, 1894)	OMS	X		
Sarmatium striaticarpus Davie, 1992	OMS	X		X
Sarmatium germaini (A. Milne Edwards, 1867)	OMS			X
Selatium brocki (de Man, 1887)	OMS	X	X	X
Sesamoides borneensis (Tweedie, 1950) +	OMS	X	X	

(Continued)

	Status	S'pore	E. M'sia	W. M'sia
Sesarmoides kraussi (de Man, 1887)	OMS			X
Tiomanium indicum (H. Milne Edwards, 1837)	OMS	X	X	X
Varuninae				
Ilyograpsus paludicola (Rathbun, 1909)	OMS	X	X	X
Utica bomeensis de Man, 1895	PMS	X	X	X
Varuna yui Hwang & Takeda, 1986	PMS	X		X
Hymenosomatidae				
Elamenopsis mangalis Ng, 1988*	OMS	X		X
Menippidae				
Epixanthus dentatus (Adams & White, 1848)	OMS	X		X
Myomenippe hardwicki (Gray, 1831)	NMS	X	X	X
Ozius guttatus H. Milne Edwards, 1834	PMS	X		X
Dorippidae				
Nobilum histrio (Nobili, 1903)	PMS			X
Neodorippe callida (Fabricius, 1798)	NMS	X	X	X
Leucosiidae				
Praosia punctata Tan & Ng, 1993*	OMS	X		
Ebaliinae				
Ebalia malefactrix Kemp, 1915	OMS	X		X
Ocypodidae				
Camptandriinae				
Baruna mangromurphia Harminto & Ng, 1991*	AMS	X		X
Camptandrium elongatum Rathbun, 1929	OMS	X		X
Ilyogynis microcheirum (Tweedie, 1937)*	OMS	X	X	
Paracleistostoma depressum (de Man, 1895)	OMS	X		X
Paracleistostoma longimanum Tweedie, 1937*	OMS	X		
Paracleistostoma wardi (Rathbun, 1926)	OMS	X		X
Tylodiplax tetralyphora de Man, 1895	OMS			X
Macrophthalminae				
Macrophthalmus brevis (Herbst, 1804)	NMS		X	
Macrophthalmus erato de Man, 1888	NMS	X		X
Macrophthalmus latreillii (Desmarest, 1822)	NMS	X		
Macrophthalmus tomentosus Souleyet, 1841	NMS			X
Macrophthalmus crinitus Rathbun, 1913	NMS		X	
Ocypodinae				
Ocypode ceratophthalmus Pallas, 1772	PMS	X	X	X
Uca coarctata (H. Milne Edwards, 1852)	OMS		X	
Uca dussumieri H. Milne Edwards, 1852	OMS	X		X
Uca rhizophorae Tweedie, 1950 +	OMS	X	X	
Uca annulipes (H. Milne-Edwards, 1837)	PMS	X		X
Uca spinata Crane, 1975	OMS	X	X	
Uca forcipata (Adams & White, 1848)	OMS	X		X
Uca lactea (de Haan, 1835)	OMS			X
Uca perplexa (H. Milne Edwards, 1837)	OMS	X		X

(Continued)

	Status	S'pore	E. M'sia	W. M'sia
Uca rosea (Tweedie, 1937)*	OMS	X		X
Uca triangularis (A. Milne Edwards 1873)	OMS			X
Uca vocans (Linnaeus, 1758)	PMS	X		X
Dotillinae				
Dotilla wichmanni de Man, 1892	PMS	X		X
Dotilla myctiroides (H. Milne Edwards, 1852)	PMS	X		X
Dotillopsis brevitarsis (de Man, 1888)	OMS			X
Ilyoplax delsmani de Man, 1926	OMS	X	X	X
Ilyoplax lingulata (Rathbun, 1909)	OMS	X		X
Ilyoplax longicarpa Tweedie, 1937 +	OMS			X
Ilyoplax obliqua Tweedie, 1935*	OMS	X		X
Ilyoplax orientalis (de Man, 1888)	OMS		X	
Ilyoplax punctata Tweedie, 1935*	OMS	X		X
Scopimera globosa de Haan, 1835	PMS	X		
Scopimera intermedia Balss, 1934	PMS	X	X	X
Shenius anomalus (Shen, 1935)	OMS	X		X
Pilumnidae				
Pilumninae				
Heteropanope glabra Stimpson, 1858	NMS	X		X
Parapilumnus quadridentatus de Man, 1895	AMS	X	X	X
Rhizopinae				
Luteocarcinus sordidus Ng, 1990 +	OMS			X
Xenophthalmus pinnotheroides White, 1846	OMS			X
Portunidae				
Portunus pelagicus (Linnaeus, 1758)	PMS	X	X	X
Scylla serrata (Forskål, 1755)	NMS	X	X	X
Pinnotheridae				
Pinnotheres sp. A	OMS			X
Pinnotheres sp. B	NMS?			X
Number of species in respective country/region		**76**	**40**	**76**

Total number of species in Singapore and Malaysia = 192 spp.