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Potential impacts of a western Pacific grapsid crab on intertidal communities of the northwestern Atlantic Ocean

V.A. Gerard, R.M. Cerrato* & A.A. Larson
Marine Sciences Research Center, State University of New York, Stony Brook, NY 11794-5000, USA;
**Author for correspondence*

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Abstract

Population density and size distribution, salinity tolerance, and feeding activity were examined in a western Pacific grapsid crab, *Hemigrapsus sanguineus*, that was recently introduced to the mid-Atlantic coast of North America. Seasonal abundance on a boulder/cobble shore (Crane Neck Pt.) in central Long Island Sound, New York, USA, during 1997–1998, ranged from 7 to 10 crabs m^{-2} averaged over the entire intertidal zone. Crabs occurred throughout the intertidal during summer and fall, but appeared to move from high to low elevations during winter. In laboratory experiments, *H. sanguineus* tolerated salinity down to 10 ppt for 7 d, but showed significant preference for 20 or 27 ppt over 10 ppt. The crabs readily consumed juvenile snails (*Littorina littorea*) and mussels (*Mytilus edulis*), as well as other common species of macroalgae and invertebrates occurring at Crane Neck Pt. High feeding rates and the ability to consume littorine snails up to 13 mm in height and mussels up to 20 mm in length suggest that this nonindigenous species has the potential to significantly affect the structure of rocky intertidal communities in the northwestern Atlantic Ocean; however, rigorous field studies are needed to accurately determine the impact of this recent introduction.

Introduction

Biological invasions by marine organisms, as a result of human activities, are now frequent occurrences on a global scale. In a number of cases, introduced species have had significant impacts on biological communities in their new range (Carlton 1989; Cohen and Carlton 1998; Ruiz et al. 1997). Despite the high taxonomic diversity of invading species, which range from microbes to fishes, the 1980s and 1990s may be remembered as the years of the crab invasions. The European green crab, *Carcinus maenas*, was accidentally introduced to the Pacific coast of North America and to South Africa (Roux et al. 1990; Cohen et al. 1995; Jamieson et al. 1998). The Chinese mitten crab, *Eriocheir sinensis*, arrived in California (Cohen and Carlton 1997). *Hemigrapsus penicillatus*, a northwest Pacific native, was introduced to Europe (Noël et al. 1997). The Indo-Pacific portunid, *Charybdis hellerii*, appeared in Cuba, Colombia, Venezuela, Florida, and Brazil (LeMaitre 1995; Tavares and de Mendonca 1996). And a western Pacific grapsid crab, *Hemigrapsus sanguineus* de Haan, invaded the Atlantic coast of the USA (Williams and McDermott 1990; McDermott 1991). *H. sanguineus* was first found in New Jersey in 1988, appeared in Long Island Sound around 1993, and now ranges from Massachusetts to North Carolina, often as the most abundant crab species in rocky intertidal habitats (Lohrer and Whitlatch 1997; Epifanio et al. 1998; McDermott 1998a).

Life-history characteristics of *H. sanguineus* help to explain its extremely rapid expansion in its new

Atlantic range. The reproductive output of this species is impressive: mature females may have two or more broods annually, with a mean clutch size of 15,000 and a maximum of at least 50,000 eggs per crab (Fukui 1988; McDermott 1998b). Planktonic larval stages, which last for about a month under optimal temperature and salinity conditions (Epifanio et al. 1998), provide a mechanism for dispersal. Growth and maturation are rapid: newly settled juveniles have a mean carapace width (CW) around 2 mm and reach 20 mm in about two years (Fukui, 1988). The crabs become reproductively mature at this age and, although growth is slower in mature crabs, they can reach a maximum CW of ~40 mm, corresponding to a maximum lifespan of around eight years.

Hemigrapsus sanguineus has the potential to cause significant changes in the inshore marine and estuarine communities of the southern New England and mid-Atlantic coast. Its primary habitat in Japan is in crevices among boulders on rocky intertidal shores (Fukui 1988), an abundant habitat in the northern portion of its new Atlantic range. Like many grapsid crabs, *H. sanguineus* is an opportunistic omnivore, consuming a wide variety of plant and animal foods in the field and in captivity (Fukui 1988; McDermott 1991, 1998b; Takahashi and Matsuura 1994; Lohrer and Whitlatch 1997). The goals of the present study were (1) to determine the current population characteristics of *H. sanguineus* on the north shore of Long Island, (2) to examine its ability to tolerate low salinities and, therefore, to invade the upper reaches of Atlantic coast estuaries, and (3) to make preliminary observations about its predation on local species.

Methods and materials

Field site and sampling

Population density and size frequency were determined for *Hemigrapsus sanguineus* at Crane Neck Point, New York, USA, on the north shore of Long Island approximately 100 km east of New York City. The site is exposed to moderate wave action and tidal currents; the intertidal and subtidal substrata consist primarily of boulders and cobbles. Maximum tidal flux is 300 cm. The intertidal community is visibly predominated by perwinkle snails (*Littorina littorea*), acorn barnacles (*Semibalanus balanoides*), and blue mussels (*Mytilus edulis*). There is a mid-intertidal band of brown seaweed (*Fucus spiralis*) and a low macroalgal zone of crustose red algae (*Hildenbrandia rubra*) with patches of Irish moss (*Chondrus crispus*) and knotted wrack (*Ascophyllum nodosum*).

The *H. sanguineus* population was sampled on 20–21 September 1997, 31 January, 25–26 April, and 24–25 June 1998, along 30 m horizontal transects at four tidal elevations. The low intertidal transect (−10 cm MLLW) was in the macroalgal zone. The mid-intertidal transect (60 cm MLLW) was at the lower end of the mussel-dominated zone. The high intertidal transect (170 cm MLLW) was near the upper end of the littorines in boulders covered with the cyanobacterium (*Calothrix* sp.) and the highest transect (270 cm MLLW) was in an area of relatively bare substrata. Six quadrat sites were sampled along each transect. The sites were 5 m apart and were randomly located 0–5 m above or below the transect. At each quadrat site, flexible plastic edging was used to form a wall around a circular 1 m^{-2} area, and all crabs were collected from within the quadrat. Carapace width (CW) and gender were determined for each crab, and ovigerous females were noted.

Laboratory experiments on salinity tolerance and feeding activity

Laboratory studies of *H. sanguineus* were conducted during February–April 1997. Crabs collected during late fall of 1996, were held in running seawater at 16–20 °C and fed pelletized fish food, *Mytilus edulis*, and the green alga, *Ulva lactuca*. Prior to experiments, crabs were acclimated to 23–25 °C for at least 2 wk. Crabs used in feeding experiments were starved for 2–7 d.

Salinity tolerance of *H. sanguineus* was determined by following survivorship for 7 d at 27, 20, and 10 ppt. Twenty crabs, 20–35 mm in CW, were held in 30-liter plastic containers with 5 cm depth of water at each salinity. Crabs held at 10 ppt were preacclimated to 20 ppt for 2 d. Preference for different salinities was determined by placing crabs (20–35 mm CW) in three 40-liter aquaria, each containing two shallow plastic dishes, 25 cm in diameter, with water at two different salinities (27 vs. 20 ppt, 27 vs. 10 ppt, or 20 vs. 10 ppt). The dishes were half filled with and surrounded by sand to allow crabs to move freely in and out. Low irradiance (<10 μmol photons m^{-2} s^{-1}) was provided by fluorescent lamps. Thirty crabs were randomly distributed, 10 to each aquarium, and the number in each dish of water was counted after 30 min. The crabs were then removed, randomly redistributed among the aquaria, and the procedure was repeated six times.

Feeding rates of individual crabs (24–27 mm CW) were determined over 3-day periods by offering 10 small *Littorina littorea* (8–12 mm shell height), 10 small *Mytilus edulis* (9–15 mm shell length), or 2.5 g fresh wt of *Ulva lactuca* (control dishes with no crabs had no change in algal weight). Relatively constant numbers of prey were maintained by periodically replacing consumed littorines, mussels, or algae. Experiments were run in plastic dishes with 1 liter of seawater at ambient salinity (27–28 ppt) to give a depth of 2 cm. Dishes were covered with nylon screen, and seawater was replaced daily. Low irradiance was provided on a 12 : 12 h LD cycle by fluorescent lamps. To determine the maximum size of *L. littorea* and *M. edulis* that *H. sanguineus* was capable of eating, individual male crabs (21–33 mm CW) were offered individual prey of different sizes: snails = 8–24 mm shell height, mussels = 9–25 mm length. Each crab was allowed 24 h to consume the prey item.

Results

Population density and size frequency distribution

The mean density of *Hemigrapsus sanguineus* throughout the intertidal zone at Crane Neck Pt. ranged from 7.1 to 10.3 crabs m^{-2}, which was one to two orders of magnitude greater than the density of any other crab (Table 1). *H. sanguineus* occurred throughout the intertidal zone during summer and early fall, but was sparse or absent at high tidal elevations during winter and early spring (Figure 1). The absence of this crab from the highest elevation in June, 1998, was probably due to the movement of sand and pebbles into that zone, filling in crevices and, therefore, eliminating the crabs' preferred habitat. Lower mean density for the entire tidal range, and higher density at the lower elevations, in winter and spring compared to summer and fall suggest that *H. sanguineus* moved from the high to the low intertidal and possibly into the subtidal during winter, returning to higher elevations during summer. Evidence of winter movement to lower intertidal and subtidal elevations was also found in *H. sanguineus* in eastern Long Island Sound and New Jersey (Lohrer and Whitlatch 1997; McDermott 1998a).

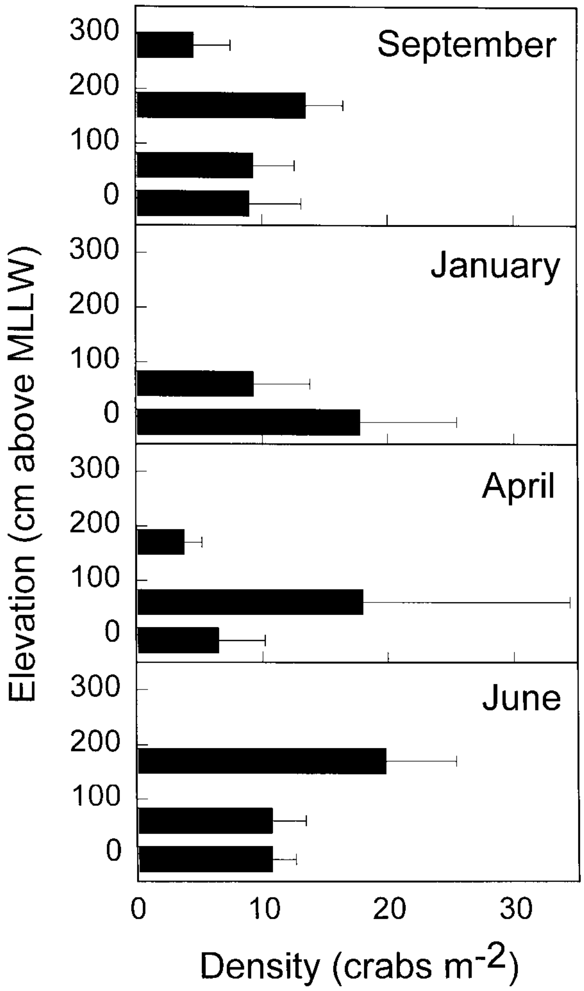

Figure 1. Mean density (±1 SE, $n = 6$) of *Hemigrapsus sanguineus* at four tidal elevations at Crane Neck Pt., NY, during September, 1997, January, April, and June 1998.

Table 1. Population densities (mean crabs $m^{-2} \pm 1$ SE) of *Hemigrapsus sanguineus* and other crabs at Crane Neck Pt., NY, during September, 1997, January, April, and June 1998. Data are combined for all tidal elevations, $n = 24$ quadrats for each season.

	Sept	Jan	Apr	June
Hemigrapsus sanguineus	9.1 ± 1.8	7.1 ± 2.7	7.1 ± 4.2	10.3 ± 2.1
Dyspanopeus sayi	0.1 ± 0.1	0.04 ± 0.04	0.04 ± 0.04	0
Carcinus maenas	0.1 ± 0.1	0	0.04 ± 0.04	0
Cancer irroratus	0.04 ± 0.04	0	0	0
Pagurus longicarpus	0.3 ± 0.1	0	0.1 ± 0.1	0.5 ± 0.2

The crabs collected ranged from 1 to 35 mm CW (Figure 2). All of the largest crabs (≥30 mm CW) were found along the lowest transect and were males. The largest females (27–28 mm CW) also occurred in the low intertidal. The high elevations were dominated by 10–15 mm crabs; few crabs >20 mm were found in the high intertidal, and no crabs <8 mm were found at the highest elevation. Increased frequency of crabs with 10–15 mm CW at the lowest tidal elevation in January probably reflected the movement of crabs from the high to the low intertidal, since in both seasons, 10–15 mm crabs made up approximately 50% of the total population. The ratio of males : females for the total population was highest in summer and lowest in winter (Table 2). Ovigerous females, which ranged from 12 to 27 mm CW, were most common in summer. Following summer reproduction, very small crabs became abundant in fall (Figure 2), and immature crabs of indeterminate gender were abundant in the winter (Table 2).

Salinity tolerance and preference

Hemigrapsus sanguineus had 95–100% survivorship for 1 wk at either 10 or 20 ppt salinity. Interestingly, crabs held at 27 ppt, the ambient salinity at Crane Neck Pt., had only 80% survivorship, due to cannibalism on newly molted individuals. Crabs held at lower salinities did not molt, possibly due to salinity stress, and suffered no cannibalism. Salinity preference experiments showed that, despite their ability to survive at low salinities, the crabs clearly preferred 20 or 27 ppt over 10 ppt seawater (Table 3).

Table 2. Population parameters of *Hemigrapsus sanguineus* at Crane Neck Pt., NY, during September, 1997, January, April, and June 1998. Data are combined for all tidal elevations.

	Sept	Jan	Apr	June
Total crabs sampled	223	163	170	246
Males : females	1.7 : 1	1.0 : 1	1.5 : 1	2.7 : 1
% immature	3.1	16.0	1.8	0
% ovigerous females	4.4	0	3.0	46.3

Table 3. Results of salinity preference experiments: mean number of *Hemigrapsus sanguineus* (±1 SE) out of ten selecting each salinity ($n = 7$ observations per experiment).

Experiment	Salinity (ppt)	# crabs	χ^2
I	27	3.4 ± 1.3	0
	20	3.3 ± 2.3	
II	27	6.4 ± 1.3	22.2*
	10	1.4 ± 2.1	
III	20	5.0 ± 1.6	13.8*
	10	1.4 ± 1.4	

*Indicates statistical significance of difference between salinities (chi-square test, $P < 0.05$).

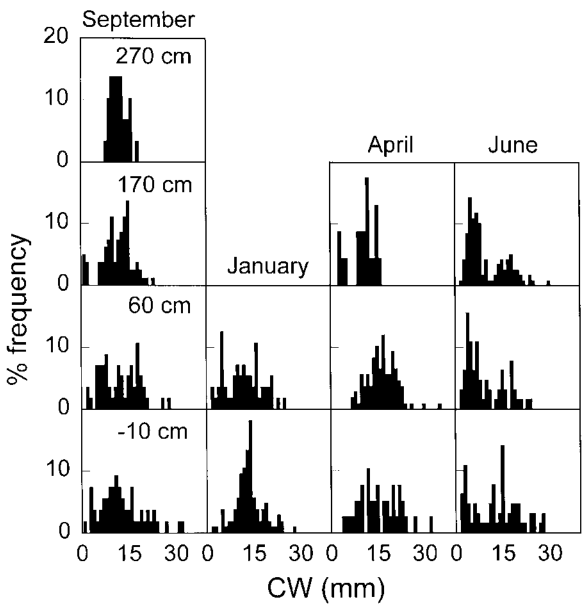

Figure 2. Size frequency distributions of *Hemigrapsus sanguineus* (n = 23–119 crabs) at four tidal elevations at Crane Neck Pt., NY, during September, 1997, January, April, and June, 1998. Missing graphs indicate that no crabs were found at those tidal elevations.

Foods and feeding rates

Individual *H. sanguineus* consumed a daily average of 11.5 juvenile *Littorina littorea* (SE = 2.2, $n = 6$), 6.8 juvenile *Mytilus edulis* (SE = 1.4, $n = 4$), or 0.1 gm of *Ulva lactuca* (SE = 0.05, $n = 6$). Both medium (21–24 mm CW) and large (25–33 mm CW) male crabs ate littorines 8–13 mm in shell height and mussels 9–20 mm in length. Larger snails (14–24 mm) and mussels (21–25 mm) were not consumed by crabs in either size range. It is interesting to note that medium size *H. sanguineus* (21–24 mm CW) could break and kill snails up to 13 mm high, while much larger green crabs (*Carcinus maenas*, 50–60 mm CW) could consume only slightly larger *L. littorea*, up to 18 mm shell height (Vermeij 1982).

Prior to use in feeding experiments, captive *Hemigrapsus sanguineus* consumed a variety of other local species of seaweeds and invertebrates, including macroalgae (*Ascophyllum nodosum*, *Fucus spiralis*, and *Chondrus crispus*) and invertebrates (*Semibalanus balanoides*, and the amphipod, *Gammarus* sp.). They also ate newly molted conspecifics. In fact, the only organisms not used as food by captive crabs were mud crabs, *Dyspanopeus sayi*, of similar size (20–27 mm). Individual mud crabs cohabited 8-liter tubs with up to 28 *H. sanguineus* for a week with no mortality. Gut contents of crabs caught at Crane Neck Pt. included fragments of green, brown, and red seaweeds, and fragments of mollusc shell. Although these fragments were too small to be identified to species, they confirmed the use of varied food sources by the crabs in their natural habitat.

Discussion

Population characteristics of Hemigrapsus sanguineus *in Long Island Sound*

Less than a decade after its introduction to Long Island Sound, *Hemigrapsus sanguineus* has become the most abundant intertidal crab at Crane Neck Pt. Similar high crab densities at Old Field Pt. about 2 km to the east (A. Larson, unpublished data) indicate that this nonindigenous species is probably the most abundant crab on many boulder/cobble beaches in central Long Island Sound, as in other areas of the mid-Atlantic coast (Weiss 1997; Lohrer and Whitlatch 1997). Even higher population densities determined at intertidal sites in Japan (up to 100 crabs m^{-2}, Fukui 1988; Saigusa and Kawagoye 1997), however, suggest that the population at Crane Neck Pt. may still be increasing or may be limited by site-specific environmental conditions, such as availability of crevice space.

Aside from a somewhat lower density, *H. sanguineus* in its new geographic range exhibited distribution characteristics similar to those in its native range. At Crane Neck Pt. (Figure 1), as in Japan (Saigusa and Kawagoye 1997), the crabs inhabited a large vertical range in the intertidal, from lower low water to 30 or 40 cm below higher high water. In both areas, population density in the high intertidal peaked during summer and declined during winter, while density in the low intertidal showed the opposite trend (Fukui 1988). Crabs in eastern Long Island Sound also moved down the shore during winter, but unlike the present study, high densities were not found at high elevations during summer (Lohrer and Whitlatch 1997). In contrast to the crab population in Tanabe Bay, Japan, which maintained relatively high densities in the high intertidal year-round, *H. sanguineus* disappeared entirely from the high intertidal at Crane Neck Pt. and at sites in eastern Long Island Sound (Lohrer and Whitlatch 1997) during winter. This difference may be a response to colder winter air temperatures on Long Island (mean daily minimum and maximum in January = $-6\,^{\circ}$C and $2\,^{\circ}$C, respectively) compared to Shirahama ($4\,^{\circ}$C and $16\,^{\circ}$C). In fact, the crabs disappeared entirely from the intertidal at Crane Neck Pt. during the particularly cold winter of 1995–1996 (V. Gerard and J. DiLeo, unpublished data), further suggesting that they move to lower tidal elevations and possibly into the subtidal to escape freezing conditions.

The presence of large individuals (30–35 mm CW) at Crane Neck Pt. indicates that initial recruitment of *H. sanguineus* occurred five to six years prior to the present study, i.e., around 1992, assuming growth rates similar to those of Japanese populations (Fukui 1988). If crabs in the North Atlantic become mature after two years as in Japan, locally produced larvae should have appeared in Long Island Sound during 1994. The larval stages of *H. sanguineus* were the sixth most abundant crab larvae in plankton samples collected from Long Island Sound during summer 1995 (S. Morgan, personal communication). At Crane Neck Pt. and other areas of the mid-Atlantic coast, as in Japan, ovigerous females were most abundant during summer and small, newly recruited crabs in the fall (Table 2; Figure 2; Fukui 1988; Lohrer and Whitlatch 1997; McDermott 1998b). It is interesting that size distributions were similar in the low and mid-intertidal at Crane Neck Pt., but that neither the smallest nor the largest crabs were found at high elevations. The greater susceptibility of small crabs to desiccation compared to large crabs, which was demonstrated in a number of crab species, including *Hemigrapsus edwardsi* (Grant and McDonald 1979; Pellegrino 1984), might explain the absence of small crabs in the high intertidal. The absence of large *H. sanguineus* in the high intertidal was similarly noted by Saigusa and Kawagoye (1997) in Ushimado, Japan, although in that case it was specifically mature females that were found only at lower elevations. Whether habitat preference or competition among large and medium crabs play a role in this distribution is not known.

Potential spread and impact of Hemigrapsus sanguineus *in the western North Atlantic*

Hemigrapsus sanguineus is characterized by broad environmental tolerance which should ultimately result in a wide geographic distribution of this nonindigenous species on the Atlantic coast of North America. Its native range extends from Sakhalin Island, Russia, in the north to Hong Kong in the south (Sakai 1976). Across this range, *H. sanguineus* experiences water temperatures below 0 °C in winter in the north and up to 28 °C in summer in the south, with air temperatures of −15 °C to 33 °C. Corresponding temperatures on the Atlantic coast extend from the Canadian maritimes to Florida. Although its typical habitat – boulder/cobble beach – is uncommon along the southern Atlantic coast of the US, the occurrence of *H. sanguineus* on sand/pebble beaches (Lohrer and Whitlatch 1997), in mussel beds, on rock jetties, and on wooden bulkheads and pilings in Long Island Sound (A. Larson and V. Gerard, personal observation) indicates that this species is able to utilize more widely available habitats.

The success of *H. sanguineus* in central Long Island Sound, where salinity averages 27–29 ppt, and its occurrence in western Long Island Sound (McDermott 1998; V. Gerard, personal observation), where salinity can be as low as 22 ppt, demonstrates its tolerance of estuarine conditions. Epifanio et al. (1998) found that zoeal stages of this species developed successfully at salinities down to 15 ppt, although megalopae seemed to be less tolerant of low salinity. Results of our laboratory experiments showed that adult crabs tolerate salinities down to 20 ppt with little effect. The significant preference of experimental crabs for 20 over 10 ppt suggest a possible salinity threshhold in this range. Watanabe (1982) found a physiological threshhold for *H. sanguineus* between 15 and 22 ppt salinity. From 22 to 53 ppt, crabs were able to maintain hemolymph concentrations isoosmotic or slightly hyperosmotic to the medium. At 15 ppt, the hemolymph remained strongly hyperosmotic for two weeks. Based on its tolerance of low salinities and on its ability to utilize a wide range of natural and artificial habitats, *H. sanguineus* has the potential to invade large portions of many Atlantic coast estuaries.

Predation by *Hemigrapsus sanguineus* on several species important to the structure of Atlantic rocky intertidal commmunities provides the strongest evidence to date that the invading crab has the potential for significant ecological impact in its new range. *Littorina* spp. and *Mytilus edulis* were readily consumed in the present study, and made up a significant proportion of gut contents in field-collected crabs from eastern Long Island Sound (Lohrer and Whitlatch 1997). These hard-shelled invertebrates have a size refuge from predation by *H. sanguineus*, since only small individuals were consumed, even by fairly large crabs. Newly recruited littorines and mussels, however, require approximately 4–12 months to reach sizes that are too large to be eaten (Ekaratne and Crisp 1982; Hilbish 1986; Rodhouse et al. 1986; Gardner and Thomas 1987; Richardson et al. 1991), and juveniles would be susceptible during those early growth periods. Given its high density in the intertidal at Crane Neck Pt., *H. sanguineus* could limit recruitment of littorines and mussels, if the crabs are efficient at preying on juveniles in the field. Recent studies showed that, although feeding rates of *H. sanguineus* on small littorines and mussels decrease during emersion and with increasing habitat complexity (e.g., dishes with cobbles, seaweed, or clumps of adult mussels compared to the bare plastic dishes used in the present study), the Asian crabs are capable of locating and consuming prey under a wide variety of environmental conditions (R. Cerrato and V. Gerard, unpublished data). Controlled experimental studies in the field or in mesocosms are needed, however, to accurately determine predation rates under natural densities and conditions.

Strong predation pressure by *H. sanguineus* on juvenile stages of snails and mussels might ultimately limit population abundance or affect distribution, as seen in *Littorina rudis* and *Mytilus edulis* preyed upon by *Carcinus maenas* in Europe (Elner and Raffaelli 1980; Janke 1990), and in other marine invertebrates (Osman and Whitlatch 1995 1996; Roegner and Mann 1995; Gosselin and Qian 1997). Although the impact would probably not be noticeable until existing adults die off, a significant reduction in the recruitment and density of littorines and/or mussels would have a profound effect on community structure at Crane Neck Pt. and most other rocky intertidal areas of the southern New England and mid-Atlantic coasts. *L. littorea*, itself an introduced species in the western Atlantic, strongly affects the distribution and abundance of other organisms in these communities (Lubchenco 1983; Petraitis 1983, 1987; Brenchley and Carlton 1983; Bertness 1984, Janke 1990). *M. edulis* is a dominant space competitor in the same systems (Menge 1976; Lubchenco and Menge 1978; Petraitis 1987; Janke 1990).

Hemigrapsus sanguineus has the potential to affect intertidal and nearshore communities of the western North Atlantic in several ways in addition to its predatory activities. Upon discovering their introduction and dispersal in New Jersey, McDermott (1991) predicted that of *H. sanguineus* might compete with native xanthid mud crabs. In fact, *Dyspanopeus sayi*, which was common under intertidal boulders at Crane Neck Pt., has almost completely disappeared at that site (Table 1), although it still occurs subtidally (V. Gerard, personal observation). As *D. sayi* and *H. sanguineus* cohabited small tubs for up to a week with no mortality, competition for habitat seems a more likely cause of this change than predation, at least on adult mud crabs. This does not preclude the possibility of predation on juvenile mud crabs, since Lohrer and Whitlatch (1997) found that 5% of *H. sanguineus* had crab remains in their gut contents. In addition to predation and competition, *H. sanguineus* may provide a new food resource for larger predators along the Atlantic coast. McDermott (1998a) cited the successful use of *H. sanguineus* as bait for tautog (*Tautoga onitis*) in Long Island Sound, and a preliminary trial of *H. sanguineus* as fishing bait in Great South Bay, NY, showed this species to be comparable to commercially sold green crabs and fiddler crabs (R. Accardo, personal communication). We predict, therefore, that *H. sanguineus* will act as prey for finfishes that forage in nearshore rocky habitats, including tautog, cunner (*Tautogolabrus adspersus*), striped bass (*Morone saxatilis*), and black sea bass (*Centropristis striatus*). Green crabs (*Carcinus maenas*, another nonindigenous species) and native rock crabs (*Cancer irroratus* and *C. borealis*) that are known to prey on smaller crabs (Ojeda and Dearborn 1991; Stehlik 1993), and herring and black-backed gulls (*Larus argentatus* and *L. marinus*) that are known predators of intertidal crabs (Good 1992; Dumas and Witman 1993) are also potential predators of *H. sanguineus*.

The rocky intertidal communities of the east coast of North America were significantly and permanently affected by the introduction of *Littorina littorea* during the 1800s (Brenchley and Carlton, 1983; Bertness 1984). The recent introduction of a western Pacific grapsid crab has the potential for just as great an effect. In less than a decade, *Hemigrapsis sanguineus* has become the most abundant crab in the rocky intertidal at Crane Neck Pt. and other sites along the southern New England and mid-Atlantic coast. In contrast to *L. littorea*, *H. sanguineus* is a highly mobile, opportunistic omnivore. We predict that the full effect of this new invader will not become evident until it reaches maximum population density, and until older individuals of its prey species begin to die off. The initial stages of this introduction have already passed, at least in Long Island Sound, and it is not too soon to begin more in-depth studies of this crab in North America. Ultimately, *H. sanguineus* may play a key role in structuring rocky intertidal communities of the western North Atlantic.

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