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ABSTRACT
A survey of macroinvertebrates inhabiting the freshwater habitats of St. Kitts and Nevis was conducted during June 1996, May 1997, and January 2000. Qualitative collections were made by sweeping a dip net through the water column and by hand examination of rocks, plants, and debris submerged in both flowing and standing bodies of freshwater across these islands. These collections yielded at least 90 species, 57 from St. Kitts and 61 from Nevis. Many of the species encountered are being reported for the first time from these islands. Dominant taxa collected included several species of gastropods, decapod crustaceans, odonates, hemipterans, and coleopterans. Generally the macroinvertebrate fauna of St. Kitts and Nevis is sparse, most likely due to their oceanic origins and disturbances of their freshwater environments.

Key words: Freshwater invertebrates, St. Kitts, Nevis, Lesser Antilles.

INTRODUCTION

St. Kitts and Nevis are small Caribbean islands in the Leeward Islands of the Lesser Antilles. St. Kitts is volcanic in origin, rising 1,157 metres above sea level on Mount Liamuiga, and comprises approximately 177 km^2. Its southeast peninsula is much more arid than the forest-covered volcanic peaks. Aquatic habitats include shallow coastal salt ponds, small inland ponds filled with vascular plants, and mountain streams. Nevis is also volcanic in origin, rising 986 metres above sea level at Nevis Peak, and comprises approximately 94 km^2. This smaller island is distinguished by its central, cone-shaped volcanic peak. No permanently flowing water habitats exist in Nevis; only a few temporary streams flow on a seasonal basis. Much of the land surface is relatively porous and underground lava tubes carry water down the mountain slopes, often emerging as springs near the coasts. Standing water comprises all other freshwater habitats of Nevis. Hutton (1976) states Nevis is covered by rock laid down about two million years ago. The two islands are separated by a strait measuring less than four kilometres between the shores.

A limited amount of information regarding the freshwater invertebrates of the Lesser Antilles and other small Caribbean islands is available. Biodiversity surveys have been conducted on some islands including Barbados (Bass 2003a), St. Vincent (Harrison and Rankin 1975, 1976a, 1976b), St. Lucia (McKillop and Harrison 1980), Antigua (Bass 2005), Grenada (Flint and Sykora 1993; Bass 2004), Tobago (Nieser and Alkins-Koo 1991; Bass 2003b), and Trinidad (Hynes 1971; Alkins *et al*. 1981; Alkins-Koo 1990; Nieser and Alkins-Koo 1991). While some invertebrate groups in the Lesser Antillean region have been studied, such as decapod crustaceans (Chace and Hobbs 1969; Hart 1980), odonates (Donnelly 1970), and trichopterans (Flint 1968, 1996; Botosaneanu 2002; Botosaneanu and Alkins-Koo 1993; Flint *et al*. 1999), many others have yet to be surveyed. A general description of freshwater habitats in Nevis and the common groups of invertebrates that inhabit them were provided by Bass (2000), but a species list was lacking and many details were omitted due to the nature of that publication. No such research from St. Kitts has been published.

The objectives of this investigation include: 1) to determine the species of aquatic macroinvertebrates inhabiting freshwater environments of St. Kitts and Nevis; 2) to note microhabitat preferences of each species; 3) to determine the relative abundance of each species; and 4) to compare the macroinvertebrates of St. Kitts and Nevis to each other and to those of other small Caribbean islands.

MATERIALS AND METHODS

Seventeen sampling sites and fourteen sampling sites were established in various freshwater habitats across St. Kitts and Nevis, respectively. These sites were visited and collections were made during June 1996, May 1997, and January 2000. Water temperature was also recorded from each site at the time of collection. Some of those sites were visited more than once.

Several methods of collecting were employed to ensure as many species as possible were captured. Submerged debris, such as stones, leaves, and wood were carefully examined and inhabitants were picked from the substrate using forceps. A dip net (mesh = 0.5 mm) was swept through aquatic vegetation and the water column to capture macroinvertebrates occupying those microhabitats. The microhabitat from where each specimen occurred was noted. Collecting efforts continued at each site until it appeared no more additional species were encountered. These collecting methods were similar to those used on

other islands so comparisons of the results could be made (Bass 2003a, 2003b, 2004, 2005). Specimen were preserved in 70% ethanol and returned to the laboratory for further identification. Taxa that could not be identified to the species level were separated into morphospecies for subsequent analysis and the taxonomic name to which they could be identified was used. Sorenson's index of similarity (1948) was used to compare these collections in St. Kitts and Nevis with similar endeavors on other small Caribbean islands.

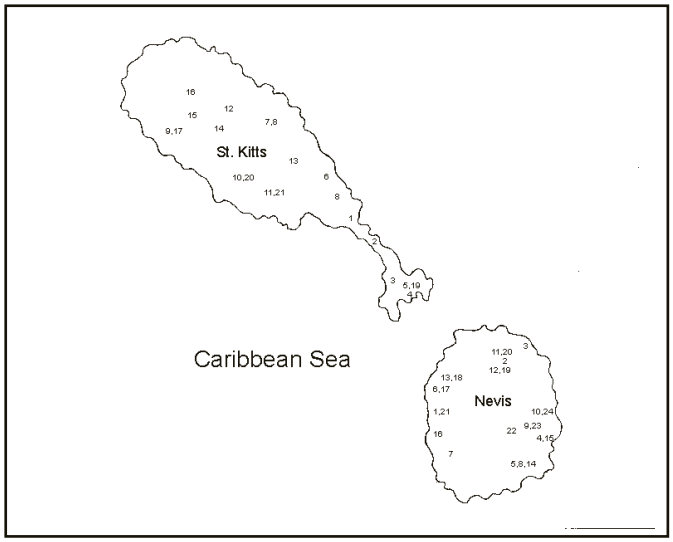

Fig. 1. Map indicating location of collecting sites in St. Kitts and Nevis. Specific locations, dates, and approximate elevations of collections are listed in legend of Table 1.

RESULTS AND DISCUSSION

At least 90 species were recorded from these sister islands – 57 species from St. Kitts and 61 species from Nevis (Table 1). This list is important because it represents the only collections of freshwater invertebrates currently known from these two islands. Insects, especially odonates, hemipterans, and coleopterans, dominated in these collections. Gastropods were also quite common on both islands while decapod crustaceans were frequent occurrences in streams of St. Kitts. Only 27 taxa occurred on both islands.

Porifera

Radiospongilla crateriformis is the only freshwater sponge known to exist on Caribbean islands. This species was initially reported by Bass and Volkmer-Ribeiro (1998) and, in the Caribbean, has been found only on Barbados and Nevis. It was in the form of a light-colored, encrusting growth living on submerged wood debris in Hog Valley Reservoir and Old Spring Hill Pond. All of these sites from where *R. crateriformis* has been reported in the Caribbean basin become dry during periods of extended drought and the sponge survives by forming drought-resistant gemmules until the water returns.

Platyhelminthes

Girardia was the only flatworm encountered, and it was found in only two mountain streams of St. Kitts and a temporary stream of Nevis. The only other reports of this genus in the Lesser Antilles come from Barbados (Bass 2003a) and Grenada (Bass 2004).

Oligochaeta

Only one species of oligochaete, *Allonais paraquayensis*, was collected. This worm existed in the detritus on the bottom of Hog Valley Reservoir in Nevis. This constitutes the first report of *A. paraquayensis* from a Caribbean island (M. Wetzel, personal communication).

Hirudinea

Although *Helobdella triserialis* was collected on both islands, it was limited to standing freshwater environments having dense growths of aquatic vascular plants. Based on observations by Davies (1979), it is hypothesized *H. triserialis* was passively dispersed to St. Kitts and Nevis by egg cocoons attached to macrophytes. It is also possible that aquatic birds carried ingested cocoons between different bodies of water (Davies *et al.* 1982).

Gastropoda

Nine species of freshwater snails were collected from St. Kitts and Nevis. The most abundant of these, *Physella mormorata*, occurred in ponds and streams on both islands. It is interesting that *Tropicorbis albicans* was found at several ponds having dense stands of macrophytes in Nevis, but appears to be absent in St. Kitts. Six gastropod species were collected at only one location. Notably absent from these collections is *Melanoides tuberculata*, an introduced species reported on other small islands of the eastern Caribbean basin (Bacon *et al*. 1978; Bass 2003a, 2003b, 2003c, 2004, 2005).

Pelecypoda

Eupera cubensis was found only in Hog Valley Reservoir and was one of the few species previously reported from Nevis (Bass 2000). Its distribution ranges from the southeastern United States through the Caribbean islands (Thorp and Covich 2001). This small clam is intolerant of salt water and presumably may be transported between bodies of water inadvertently attached to damp feathers of waterfowl such as herons, egrets, or coots.

Table 1. List of freshwater macroinvertebrates, including collecting sites, life cycle stages present, relative occurrence, microhabitats, and proposed trophic relationships in St. Kitts and Nevis during June 1996, May 1997, and January 2000. Life cycle: A, adult; J, juvenile; L, larva; N, nymph. Occurrence: *** abundant, ** common, * uncommon.

Taxa	Collection Sites	Life Cycle	Occurrence	Microhabitat	Trophic Relationship[1]
Porifera					
Radiospongilla crateriformis	N12, N20	A	*	Wood debris	Filterer
Platyhelminthes					
Girardia sp.	SK11, SK12, N24	A	*	Detritus	Predator
Oligochaeta					
Allonais paraquayensis	N12	A	*	Detritus	Detritivore
Hirudinea					
Helobdella triserialis	SK7, N9, N12, N23	A	**	Vascular hydrophyte	Predator
Gastropoda					
Ferrissia beaui	N11	A	*	Detritus	Herbivore
Helisoma sp.	SK7, SK18, N15	A	*	Vascular hydrophyte	Detritivore
Marisa cornuarietis	SK11, SK21	A	*	Rock	Herbivore
Neritina punctulata	N13	A	*	Rock	Herbivore
Neritina virginea	SK1	A	*	Rock	Herbivore
Physella mormorata	SK7, SK9, SK11, SK12, SK14, SK15, SK18, SK21, N1, N5, N8, N9, N10, N14, N15, N20, N22, N23, N24	A	***	Detritus	Detritivore
Planorbella (Seminolina) sp.	SK7	A	*	Vascular hydrophyte	Detritivore
Pyrgophorus parvulus	N13	A	*	Detritus	Detritivore
Tropicorbis albicans	N5, N6, N8, N9, N11, N14, N19, N20, N22, N23	A	***	Detritus	Detritivore
Pelecypoda					
Eupera cubensis	N12, N19	A	*	Sediment	Filterer
Branchiopoda					
Artemia franciscana	SK3	A	*	Sediment	Filterer
Ostracoda					
Chlamydotheca unispinosa	N9, N12	J, A	*	Vascular hydrophyte	
Unknown Ostracoda	SK19	A	*	Detritus	
Decapoda					
Atya innocous	SK14, SK15, SK17, SK21	J, A	**	Detritus	Detritivore
Atya sp.	SK10, SK14, SK15, SK20	J	**	Detritus	Detritivore
Macrobrachium crenulatum	SK14, SK17, SK21	A	**	Detritus	Detritivore
Macrobrachium faustinum	SK10, SK17, SK20, N1, N3, N21	J	**	Detritus	Predator
Micratya poeyi	SK10	A	*	Detritus	Predator
Palaemon pandaliformis	SK1, N13, N18	J, A	*	Detritus	Detritivore
Xyphocaris elongata	N21	J	*	Detritus	Detritivore
Unknown Decapoda (crab)	N18	J	*	Detritus	Detritivore
Ephemeroptera					
Americabaetis sp.	SK10, SK11, SK12, SK14, SK15, SK17, SK21	N	***	Detritus	Collector
Caenis sp.	N10, N12, N15, N19	N	**	Detritus	Collector
Callibaetis sp.	SK7, N1, N2, N5, N6, N10, N11, N12, N24	N	***	Detritus	Collector
Leptohyphes sp. (2?)	SK11, SK15	N	*	Detritus	Collector
Odonata					
Aeshna psilus	N10	N	*	Detritus	Predator
Anax concolor	SK19, N13, N17, N20, N22, N23, N24	N	**	Vascular hydrophyte	Predator
Brachymesia furcata	SK16, N19	N	*	Detritus	Predator
Brechmorhoga praecox grenadensis	SK11, SK12, SK13, SK15, SK16, SK21	N	***		Predator
Dythemis sterilis	SK4, SK18, N10, N24	N	*	Detritus	Predator
Enallagma coecum	SK11, SK12	N	*	Detritus	Predator
Erythemis poss. *vesiculosa*	SK18, N15	N	*	Detritus	Predator
Erythrodiplax sp.	SK21, N2, N4, N6, N10, N24	N	***	Vascular hydrophyte	Predator
Ischnura ramburii	SK5, SK7, SK18, SK19, SK21, N1, N5, N9, N11, N13, N14, N15, N17, N19, N20, N21, N23	N	***	Vascular hydrophyte	Predator
Lestes poss. *forficula*	N11, N15, N17, N20, N23	N	***	Vascular hydrophyte	Predator
Miathyria marcella	SK7, SK9, N5, N15, N17	N	**	Vascular hydrophyte	Predator
Orthemis ferruginea	SK5, N4, N19, N20	N	**	Vascular hydrophyte	Predator

Pantela flavescens	N2	N	*	Detritus	Predator
Tramea abdominalis	SK19, N5, N10, N11, N12, N15, N20, N23	N	***	Detritus	Predator
Hemiptera					
Belostoma subspinosum	N5, N8	N	*	Vascular hydrophyte	Predator
Buenoa sp.	SK6, SK7, N6, N14	N, A	**	Water column	Predator
Centrocorisa nigripennis ?	N4, N10, N11, N13, N23	N, A	***	Water column	Predator
Limnogonus franciscanus	SK6, SK7, SK18, SK19, N13, N14, N15, N18, N21	N, A	***	Neuston	Predator
Mesovelia mulsanti	SK5, SK7, N1, N2, N4, N5, N6, N8, N9, N11, N12, N13, N14, N15, N17, N18, N20, N21, N22, N23	N, A	***	Neuston	Predator
Microvelia longipes	N4, N7, N18	N, A	*	Neuston	Predator
Microvelia sp.	SK6, SK9, SK12, SK19, SK21, N1, N3, N4, N5, N7, N10, N12, N15, N16, N17, N21, N22, N24	N, A	***	Neuston	Predator
Notonecta indica	SK9, SK10, N2, N5, N8, N15, N19, N20, N22, N24	N, A	***	Vascular hydrophyte	Predator
Pelocoris poeyi	SK7, SK18, N4, N5, N1, N12, N13, N14, N15, N20, N21, N22, N23	N, A	***	Vascular hydrophyte	Predator
Rhagovelia elegans	SK10, SK11, SK12, SK14, SK15, SK17, SK20, SK21	N, A	***	Neuston	Predato
Ranatra galatae	N15, N22	A	*	Vascular hydrophyte	Predator
Saldula sp.	N17	N	*	Detritus	Predator
Trichocorixa reticulata	SK1, SK2, SK3, SK4, SK6, SK8	N, A	***	Detritus	Predator
Trichoptera					
Chimarra (Chimarra) sp.	SK11, SK12, SK13, SK14, SK15, N24	L	**	Detritus	Collector
Smicridea (Smicridea) sp.	SK12, SK14, SK15	L	**	Detritus	Collector
Xiphocentron sp.	SK11	L	*	Detritus	Collector
Lepidoptera					
Petrophila sp.	SK15	L	*	Rock	Herbivore
Coleoptera					
Aleocharinae	SK9, SK15, SK17, SK20, SK21	A	**	Detritus	Predator
Copelatus postcatus	SK9, SK17, N10, N22	A	**	Detritus	Predator
Derallus rudis	N9, N14, N23	A	**	Detritus	Collector
Enochrus pseudochraceus	SK10	A	*	Detritus	Herbivore
Eretes sticticus	SK5	A	*	Detritus	Predator
Helochares femoratus	N9, N15, N16, N17, N19, N22, N23, N24	A	***	Vascular hydrophyte	Collector
Hydrobiomorpha phallica	SK7	A	*	Detritus	Collector
Hydrophilus insularis	SK5, SK7, N2, N5, N6, N13 L,	A	***	Detritus	Predator
Laccobius sp.	SK18	A	*	Vascular hydrophyte	Herbivore
Laccophilus subsignatus	SK5, SK6, SK9, SK12, SK18, SK19, N10, N15, N19, N24	A	***	Detritus	Predator
Megadytes sp.	N4, N11, N20	L	**	Vascular hydrophyte	Predator
Paracymus confusus	N1, N4, N6, N17	A	**	Detritus	Collector
Paracymus nanus	SK13	A	*	Detritus	Collector
Scirtes sp.	N5	A	*	Vascular hydrophyte	Herbivore
Thermonectes bacillaris	N5, N6	L, A	*	Vascular hydrophyte	Predator
Tropisternus lateralis	SK7, SK18, SK19, N1, N4, N5, N6, N9, N10, N11, N12, N14, N15, N17, N20, N21, N22, N23	L, A	***	Detritus	Collector, Predator
Diptera					
Ablabesmyia sp.	N2, N12	L	*	Sediment	Predator
Anopheles sp.	N17	L	*	Water column	Collector
Chironomus sp.	SK5, SK16, SK19, N6, N11	L	**	Sediment	Collector
Coelotanypus sp.	N2, N11	L	*	Sediment	Predator
Corynoneura sp.	SK15	L	*	Sediment	Collector
Cricotopus sp.	SK12, SK15	L	*	Sediment	Collector
Culex sp.	N5	L	*	Water column	Collector
Einfeldia sp.	N12	L	*	Sediment	Collector
Goeldichironomus sp.	SK19	L	*	Sediment	Collector
Mansonia sp.	N5, N9, N14	L	**	Vascular hydrophyte	Collector
Monopelopia ? sp.	N11	L	*	Sediment	Predator
Parachironomus sp.	N11	L	*	Sediment	Collector
Odontomyia sp.	SK20	L	*	Detritus	Collector
Paracricotopus sp.	SK21		*	Sediment	Collector
Simulium sp.	SK11, SK21, N24	L	**	Rocky substrate	Collector
Thienemanniella sp.	SK10, SK12	L	*	Sediment	Collector

Trophic relationship[1]–Trophic relationships of insects based on Merritt and Cummins (1996) and non-insects on Thorp and Covich (2001).

Collecting sites: SK1) Salt Pond, Frigate Bay, St. Kitts (2m), 25 June 1996; SK2) Salt Pond, Friars Bay Estate, St. Kitts (2m), 25 June 1996; SK3) Great Salt Pond, Salt Pond Estate (2m), 25 June 1996; SK4) Fleming Estate Pond, Fleming Estate, St. Kitts (2m), 25 June 1996; SK5) Livestock Pond, Fleming Estate, St. Kitts (4m), 25 June 1996; SK6) Muddy Pond, Frigate Bay, St. Kitts (2m), 25

June 1996; SK7) Ottley's Pond, Ottley's Estate, St. Kitts (130m), 25 June 1996; SK8) Golf Course Pond, Frigate Bay, St. Kitts (7m), 27 June 1996; SK9) Wingfield River, Wingfield Estate, St. Kitts (60m), 27 June 1996; SK10) Stone Fort River, Stone Fort Estate, St. Kitts (120m), 19 May 1997; SK11) West Farm Gut, West Farm Estate, St. Kitts (90m), 19 May 1997; SK12) Phillips River, Catchment Area, St. Kitts (290m), 20 May 1997; SK13) Ogee's River Tributary, Catchment Area, St. Kitts (310m), 20 May 1997; SK14) Frankland's River, Catchment Area, St. Kitts (380m), 22 May 1997; SK15) Wingfield River, Catchment Area, St. Kitts (155m), 22 May 1997; SK16) Dos D'ane Pond, Verchild's Mountain, St. Kitts (945m), 24 May 1997; SK17) Wingfield River, Wingfield Estate, St. Kitts (50m), 6 January 2000; SK18) Ottley's Pond, Ottley's Estate, St. Kitts (130m), 10 January 2000; SK19) Livestock Pond, Fleming Estate, St. Kitts (4m), 10 January 2000; SK20) Stone Fort River, Stone Fort Estate, St. Kitts (120m), 11 January 2000; SK21) West Farm Gut, West Farm Estate, St. Kitts (90m), 11 January 2000; N1) Golf Course Ponds, Four Seasons Resort, Nevis (7m), 26 June 1996; N2) Spring Hill Pond, Spring Hill, Nevis (170m), 26 June 1996; N3) Mount Lily River, Camps, Nevis (25m), 26 June 1996; N4) Fothergill's Estate Pond, Fothergill's Estate, Nevis (175m), 26 June 1996; N5) Pond Hill Pond, Pond Hill, Nevis (250m), 26 June 1996; N6) Nelson Spring, Cotton Ground, Nevis (2m), 26 June 1996; N7) Bath Creek, Bath, Nevis (15m), 21 May 1997; N8) Pond Hill Pond, Pond Hill, Nevis (250m), 21 May 1997; N9) Herbert Heights Pond, Herbert Heights, Nevis (360m), 21 May 1996; N10) New River Spring, New River (Road-To-Nowhere), Nevis (90m), 21 May 1997; N11) Old Spring Hill Pond, Spring Hill, Nevis (170m), 21 May 1997; N12) Hog Valley Reservoir, Hog Valley, Nevis (165m), 21 May 1997; N13) Nelson Spring Pond, Cotton Ground, Nevis (2m), 21 May 1997; N14) Pond Hill Pond, Pond Hill, Nevis (250m), 7 January 2000; N15) Fothergill's Estate Pond, Fothergill's Estate, Nevis (175m), 7 January 2000; N16) Boiling Pot, Nevis Museum, Charleston, Nevis (2m), 8 January 2000; N17) Nelson Spring, Cotton Ground, Nevis (2m), 8 January 2000; N18) Nelson Spring Pond, Cotton Ground, Nevis (2m), 8 January 2000; N19) Hog Valley Reservoir, Hog Valley, Nevis (165m), 8 January 2000; N20) Old Spring Hill Pond, Spring Hill, Nevis (170m), 8 January 2000; N21) Golf Course Ponds, Four Seasons Resort, Nevis (7m), 9 January 2000; N22) Zetlands Pond, Zetlands, Nevis (490m), 9 January 2000; N23) Herbert Heights Pond, Herbert Heights, Nevis (360m), 9 January 2000; N24) New River Spring, New River (Road-To-Nowhere), Nevis (90m), 9 January 2000.

Branchiopoda

Artemia franciscana was collected only from a warm, very shallow and somewhat isolated arm of Great Salt Pond on St. Kitts. As implied by the name of the pond, salt water was present, and the presence of *A. franciscana* in that pond indicates its ability to tolerate saline conditions. Horne and Beyenbach (1974) noted the presence of hemoglobin in *Artemia* that allows these beasts to live in aquatic habitats with low oxygen values, which probably occurred in Great Salt Pond. Birds may play a role in brachiopod dispersal as demonstrated by Proctor (1964) when *Artemia* eggs were hatched from feces of ducks.

Ostracoda

Two different ostracods were found during this investigation. *Chlamydotheca unispinosa* was collected from among submerged macrophytes at two ponds in Nevis while an unidentified ostracod was taken from a sediment sample of a pond in St. Kitts.

Decapoda

At least seven species of decapod crustaceans were encountered on these two islands. *Macrobrachium faustinum* and *Palaemon pandaliformis* were the only decapods found on both islands. The atyid shrimps appear to be absent from Nevis due to the lack of running water habitats which they require. One crab was only briefly observed in Nevis, but it escaped before a specific identification could be determined. All of the species collected from St. Kitts and Nevis have been reported from other Caribbean islands (Chace and Hobbs 1969).

Ephemeroptera

A total of four mayfly genera were collected from these two islands, although several of these occurred at more than one site. Three were limited to St. Kitts and three were found only in Nevis, while only one, *Callibaetis*, occurred on both islands. All four of these genera are widespread throughout the Lesser Antilles.

Odonata

Most of the fourteen species of odonates found were present on both St. Kitts and Nevis. Only two species and three species were limited to St. Kitts and Nevis, respectively. The most common odonate collected, the damselfly *Ischnura ramburii*, has been reported primarily in ponds on several other eastern Caribbean islands (Donnelly 1970; Harrison and Rankin, 1976b; Bass 2003a, 2003b, 2004, 2005). All of these odonates are predators that inhabit submerged vegetation and detritus.

Hemiptera

Hemipterans are one of the most frequently encountered aquatic groups of insects in the Caribbean region (Bass 2003a, 2003b, 2004, 2005). Both adults and nymphs are predators in these environments. Eight species were collected in St. Kitts and 11 species were taken from Nevis with six of those taxa being common to both islands. Some of the most common species found include the backswimmer, *Notonecta indica*, and creeping water bug, *Pelecoris poeyi.* The water boatman, *Trichocorixa reticulata,* was limited in distribution to the coastal brackish water ponds in St. Kitts where it occurred in high densities. Other frequently collected hemipterans included the water striders *Limnogonus franciscanus, Mesovelia mulsanti, Microvelia,* and *Rhagovelia elegans*. As on other small eastern Caribbean islands, these water striders had both winged and wingless adults composing the populations. This

phenomenon of wing polymorphism and its advantages to hemipterans living in isolated habitats has been well documented (Roff 1990; Schuh and Slater 1995; Thorp and Covich 2001; Bass 2003c).

Trichoptera

Trichopteran larvae are widespread across the Caribbean islands, especially in flowing water habitats (Flint 1968, 1996; Flint and Sykora 1993, Flint *et al.* 1999; Botosaneanu 2002). Although St. Kitts appears to have suitable environments to support many more species, such as in Grenada and Dominica, only three genera were encountered. It is necessary to collect adults via light-trapping, as did Flint (1968, 1996), Flint and Sykora (1993), Flint *et al.* (1999), and Botosaneanu (2002), to collect higher numbers of species, and that method was not used in this study. Therefore, it is expected more species of caddisflies will be reported from St. Kitts, and possibly Nevis, in the future. The reduced number of trichopterans on Nevis is largely due to the limited amount of flowing waters, the preferred habitat for many species of caddisfly larvae.

Lepidoptera

Larvae of *Petrophila* were collected only once. This was in the upper sections of the Wingfield River during May 1997. These larvae are widespread in mountain streams of other small eastern Caribbean islands, including Tobago (Bass 2003b) and Grenada (Bass 2004), so it is surprising this species was not collected in other streams of St. Kitts.

Coleoptera

Sixteen species of aquatic beetles were collected from St. Kitts and Nevis. Although these insects are capable of flight and presumably could exist on both islands, it is interesting to note that most of these species were found only on one island. The most commonly encountered species were the water scavenger beetle, *Tropisternus lateralis,* and the predacious diving beetle, *Laccophilus subsignatus*.

Diptera

Sixteen species of aquatic dipteran larvae were also collected from these two islands. However, nine of these taxa were encountered once with only *Chironomus* being found in more than three collections. *Chironomus* has been reported from several eastern Caribbean islands (Bass 2003a, 2003b, 2004, 2005). It is important to note that the majority of dipterans on these islands belong to a single family of midges, the Chironomidae. It is suspected this family is more common and widespread than currently reported, but midges are very small and much sediment must be carefully examined to adequately determine their abundances and distributions. Helson *et al.* (2006) reports densities of larval chironomids exceeding 100 individuals/m^2 in similar streams of Trinidad.

Island biogeography theory (MacArthur and Wilson 1967) predicts St. Kitts would possess more species than Nevis because St. Kitts is a considerably larger island. However, Nevis has a slightly greater species richness. There are several possible explanations regarding this anomaly. Much of the size difference between the two islands lies with the arid southeastern peninsula of St. Kitts where little freshwater exists. If the area of the peninsula is subtracted, then the remaining mountainous region of St. Kitts is almost the same as the area of Nevis. In addition, there is more development on St. Kitts and this may have negatively impacted freshwater habitats.

Sorenson's similarity index indicates a faunal similarity of 0.46 between St. Kitts and Nevis (Tables 2-3). This is quite high, especially as compared to pair values of other small Caribbean islands (Bass 2003c). However, due to the very close proximity of these two islands, it is likely dispersal between St. Kitts and Nevis occurs in some groups so this result is possible (MacArthur and Wilson 1967). Another nearby island, Antigua, also shares somewhat higher values with St. Kitts and Nevis as well. Generally, as distance increased between the island pairs being compared, similarity values decreased. An interesting exception was Barbados which showed similarity values of 0.17 and 0.18 with St. Kitts and Nevis, respectively. All three islands have similar pond habitats and there is much overlap in species assemblages of those ponds.

Hurricane Lenny, a stochastic event, slowly moved across St. Kitts and Nevis 23-25 November, 1999. Wind

Table 2. Sorensen's index of similarity values comparing the freshwater macroinvertebrate fauna of St. Kitts to that of other small Caribbean islands, including approximate distances to those islands from St. Kitts and approximate island sizes. 0.00 = 0% common taxa and 1.00 = 100% common taxa.

Island	Approximate Distance (km)	Approximate Size (km^2)	Similarity Value
Nevis	4	94	0.46
Saba	49	13	0.02
Montserrat	75	83	0.20
Antigua	93	280	0.18
Dominica	218	751	0.13
St. Lucia	400	616	0.10
Barbados	551	430	0.17
Grenada	575	346	0.10
Tobago	700	300	0.12
Cayman Brac	1,813	37	0.00
Little Cayman	1,840	26	0.07
Grand Cayman	1,956	197	0.01
Guanaja	2,467	69	0.03

Table 3. Sorensen's index of similarity values comparing the freshwater macroinvertebrate fauna of Nevis to that of other small Caribbean islands, including approximate distances to those islands from Nevis and approximate island sizes. 0.00 = 0% common taxa and 1.00 = 100% common taxa.

Island	Approximate Distance (km)	Approximate Size (km^2)	Similarity Value
St. Kitts	4	177	0.46
Montserrat	53	83	0.11
Antigua	70	280	0.25
Saba	80	13	0.03
Dominica	200	751	0.11
St. Lucia	382	616	0.10
Barbados	538	430	0.18
Grenada	560	346	0.09
Tobago	685	300	0.10
Cayman Brac	1,844	37	0.01
Little Cayman	1,871	26	0.11
Grand Cayman	1,982	197	0.01
Guanaja	2,493	69	0.05

speeds measured approximately 215 km/hour and 30 cm of rain fell at R. L. Bradshaw Airport during that period (K. Orchard, personal communication). Large amounts of plant debris washed into streams and stream channels were scoured as a result of the heavy rainfall during that brief period. Evidence of this high discharge and a greatly reduced stream invertebrate fauna from that disturbance was observed in January 2000, six weeks after the hurricane passed. It was also observed that ponds on both islands held larger volumes of water than was present during previous visits, but their invertebrate populations appeared mostly unaffected. Hurricanes are also known to act as a mechanism to transport and re-distribute populations of invertebrates. It is suspected the occurrence of past storms may explain the presence of the sponge, *Radiospongilla crateriformis*, in Barbados and Nevis (Bass and Volkmer-Ribeiro 1998).

Both St. Kitts and Nevis are oceanic islands so their freshwater macroinvertebrate faunas had to colonize these islands from elsewhere. These immigrants must have suitable dispersal mechanisms and be able to tolerate unfavorable conditions encountered while crossing ocean waters (Bass 2003c). No endemic freshwater invertebrates that may have evolved in isolation on St. Kitts or Nevis have been discovered. However, as further investigations are conducted on these sister islands, additional species may be found and some of these might be unique to those islands.

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