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Chironomid fauna (Diptera: Chironomidae) in the Hosomidani valley, western Chugoku Mountains, Japan

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Abstract: The Hosomidani riparian forest, located around the origin of the Ohta River basin, is one of the most nature-rich districts in Japan. We investigated chironomid fauna in the Hosomidani valley as an indicator taxon to evaluate the species diversity of freshwater benthic macroinvertebrates. On 23 August and 2 November, 2005, chironomid larvae were collected in the main stream of the Hosomidani River, small streamlets flowing into the main stream and the floodplain marsh along the Hosomidani River, and were reared to adults in the laboratory to identify species. A total of 52 species was collected and of which 17 were newly recorded in the Ohta River basin. Thirty-five species were collected in the main stream and of which 14 were also found in the streamlets. On the other hand, 12 out of 16 species collected in the floodplain marshes were not found in the main stream and streamlets. *Polypedilum* (*Tripodura*) *caudocula* was only found in the floodplain and this is the second record next to the description of this species in 1991. These results indicate that the high species diversity of chironomids in the Hosomidani valley is supported by the presence of the floodplain.

Key words: Chironomidae, diversity, stream, riparian forest, conservation

Introduction

The Hosomidani riparian forest is located around the origin of the Ohta River, which runs through Hiroshima Prefecture, in Western Chugoku Mountains Quasi-National Park, Japan. The Hosomidani valley is one of the most nature-rich districts in Japan (Inoue et al. 2005), although it has been becoming a social concern as to conservation due to plans of constructing a large scale

traffic road. However, the faunal assessment had so far not been conducted enough, especially freshwater benthic macroinvertebrates.

Chironomidae are the most widely distributed, frequently the most abundant insects in freshwater ecosystems (Pinder 1986; Armitage et al. 1995), and the most species-rich group in lotic macroinvertebrate communities (Armitage et al. 1995). Chironomid species diversity and assemblage structure have been considered to be one of the most useful indicators of various environmental factors, e.g. water quality (Wilson and Bright 1973; Sæther 1979; Wilson 1987; Kawai et al. 1989), catchment urbanization (Roy et al. 2003) and past environmental change (Walker et al. 1991; Armitage et al. 1995). In our previous study, a total of 216 species was recorded throughout the Ohta River basin, although chironomid fauna in the Hosomidani valley remained unknown (Inoue 2005). Therefore, we investigated chironomid fauna in the Hosomidani valley as an indicator taxon to evaluate the species diversity of freshwater benthic macroinvertebrates.

Methods

On 23 August and 2 November, 2005, chironomid larvae were collected qualitatively at the three habitat types found in the Hosomidani valley (34°34′ N, 132°07′ E; 900–950 m a.s.l.) (Fig. 1); the main stream of the Hosomidani River, small streamlets flowing into the main stream and the floodplain marsh along the Hosomidani River (Fig. 2). In the main stream and streamlets, all materials attached to and trapped in the substrate

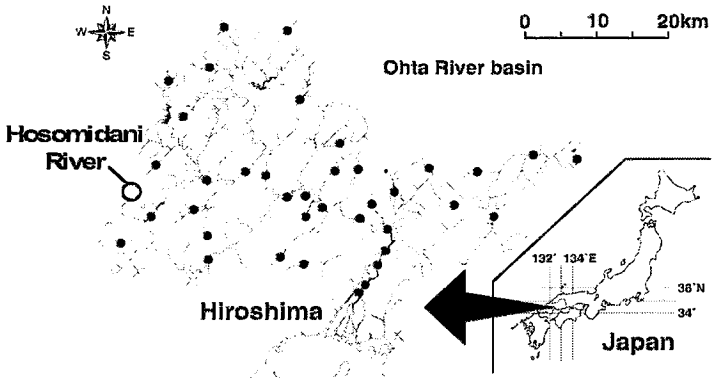

Fig. 1 Map of the Ohta River Basin showing the location of the Hosomidani valley. Open circle: study site in the Hosomidani River; solid circles: study sites in Inoue (2005).

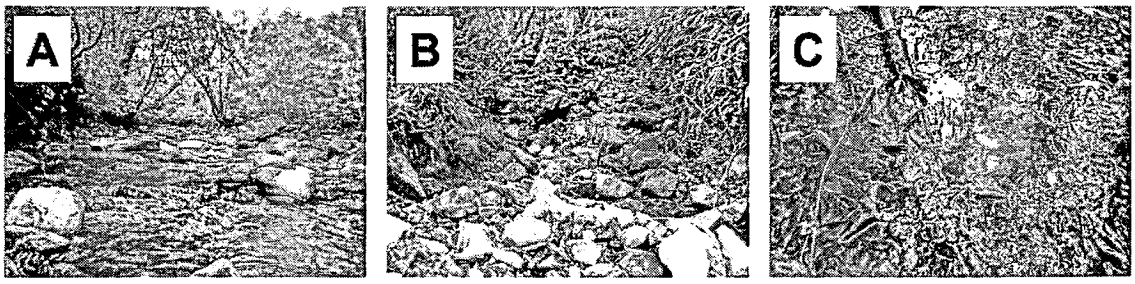

Fig. 2 The three habitat types found in the Hosomidani valley. A: the main stream of the Hosomidani River; B: streamlets flowing into the main stream; C: floodplain marsh along the mainstream.

stones, e.g. moss, mud and litter which would be food for larvae, were collected and sieved with 250 μm mesh net. In the floodplain marsh, litter and mud were collected without sieving. After transportation to our laboratory with gentle cooling, these samples were put into a container with adequate amount of water. The containers were covered with nylon net and aerated at room temperature (10–25 °C). All emerging adults were collected every other day for at least a month and for two months at the longest, until the emergence ceased.

Only male adults were used for identification because of the difficulty in accurate identification of females and immature stages (Inoue et al. 2004). Male adults were preserved as dried specimens and mounted on microscopic slides with gum chloral under a binocular dissecting microscope following Sasa et al. (1980). They were identified to species using mainly the taxonomical keys of Wiederholm (1989), Sasa and Kikuchi (1995) and Langton and Pinder (2007).

Results and Discussion

A total of 53 species was collected in the Hosomidani valley and of which 17 species were newly recorded in the Ohta River basin (Table 1). Thus, a total of 233 species has so far been recorded from the Ohta River basin and of which 22.7% of the total number of species was found in the Hosomidani (Inoue 2005).

Thirty-five out of the 53 species collected in the Hosomidani valley were collected in the main stream and of which 14 species were also found in the streamlets. On the other hand, we collected 16 species in the floodplain marshes and of which 12 species were found only in the floodplain. For example, *Larsia miyagasensis* was collected only in the main stream, whereas *Polypedilum* (*Tripodura*) *caudocula*, the second record next to the description in 1991, was found only in the floodplain. Five Tanypodinae species collected in the floodplain were not collected both in the main stream and streamlets, and of which 4 species were newly recorded in the Ohta River basin. On the other hand, Orthocladiinae species were not collected in the floodplain, whereas 10 and 7 species were collected in the main stream and streamlets, respectively. These results indicate that the chironomid fauna in the floodplain marsh along the Hosomidani River is unique and completely different from the main stream and even from the other streams in the Ohta River basin. Thus, the

high species diversity of chironomids in the Hosomidani valley is supported by the presence of the floodplain which may be vulnerable to construction of a large scale traffic road.

Table 1. The list of chironomid species collected in the Hosomidani, Hiroshima, Japan.

Species	Habitat type		
	Main stream	Streamlets	Floodplain marshes
Subfamily Tanypodinae			
* *Alotanypus kuroberobustus* (Sasa et Okazawa, 1992)			+
* *Brundiniella yagukiensis* Niitsuma, 2003			+
Larsia miyagasensis Niitsuma, 2001	+		
Macropelopia paranebulosa Fittkau, 1962			+
* *Natarsia tokunagai* (Fittkau, 1962)			+
Nilotanypus dubius (Meigen, 1804)	+		
Paramerina divisa (Walker, 1856)	+	+	
Rheopelopia maculipennis (Zetterstedt, 1838)	+		
Trissopelopia longimana (Staeger, 1839)	+	+	
* *Zavrelimyia monticola* (Tokunaga, 1937)			+
Subfamily Orthocladiinae			
Brillia japonica Tokunaga, 1939	+		
Corynoneura lobata Edwards, 1924	+	+	
Cricotopus metatibialis Tokunaga, 1936	+		
Cricotopus polyannulatus Tokunaga, 1936	+		
* *Eukiefferiella* sp. cf. *amamipubescia* Sasa, 1990		+	
* *Eukiefferiella* sp. cf. *yaraensis* Sasa et Hasegawa, 1988		+	
Neobrillia longistyla Kawai, 1991	+	+	
Orthocladius makabensis Sasa, 1979	+		
Parakiefferiella osaruflava Sasa, 1988	+		
* *Parakiefferiella* sp. cf. *bathophila* (Kieffer, 1912)		+	
Parametriocnemus stylatus (Kieffer, 1924)	+	+	
Synorthocladius tamaparvulus Sasa, 1981	+		
Thienemanniella nipponica Tokunaga, 1936	+	+	
Subfamily Chironominae			
Tribe Chironomini			
* *Demicryptochironomus asamaprimus* Sasa et Hirabayashi, 1991	+		
* *Microtendipes tamaogouti* Sasa, 1983	+	+	
Microtendipes truncatus Kawai et Sasa, 1985	+		
Polypedilum (*Pe.*) *kasumiense* Sasa, 1979			+
Polypedilum (*Po.*) *akisplendens* Kawai, Inoue et Imabayashi, 1998	+	+	
Polypedilum (*Po.*) *pedestre* (Meigen, 1860)	+		
Polypedilum (*Po.*) *takaoense* Sasa, 1980	+	+	
Polypedilum (*Po.*) *tamahosohige* Sasa, 1983	+	+	
Polypedilum (*Po.*) *tamanigrum* Sasa, 1983	+	+	
Polypedilum (*Po.*) *tsukubaense* (Sasa, 1979)		+	+
* *Polypedilum* (*Po.*) sp. *"chuzenudum"* Sasa, 1984			+
* *Polypedilum* (*T.*) *caudocula* Kawai, 1991			+
Polypedilum (*T.*) *unifascium* (Tokunaga, 1938)	+	+	
Polypedilum (*U.*) *pedatum* Townes, 1945		+	+
* *Stenochironomus gibbus* (Fabricius, 1794)			+
* *Stenochironomus okialbus* Sasa, 1990	+		
Tribe Tanytarsini			
Cladotanytarsus vanderwulpi (Edwards, 1929)	+	+	
* *Micropsectra daisenensis* (Tokunaga, 1938)	+		
Micropsectra fossarum (Tokunaga, 1938)			+
Rheotanytarsus rivulophilus Kawai et Sasa, 1985	+		
* *Rheotanytarsus tamaquartus* Sasa, 1980			+
Rheotanytarsus tamaquintus Sasa, 1980	+		
Rheotanytarsus tamasecundus Sasa, 1980	+	+	
Rheotanytarsus tamatertius Sasa, 1980	+		+
Stempellinella tamaseptima (Sasa, 1980)	+		
Tanytarsus tamagotoi Sasa, 1983			+
Tanytarsus tamaoctavus Sasa, 1980			+
Tanytarsus tamaundecimus Sasa, 1980	+		+
* *Tanytarsus* sp. cf. *tamaduodecimus* Sasa, 1983	+		
* *Tanytarsus* sp.	+		
Total 53 species	35	19	17

*New record in the Ohta River Basin.

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