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Contemporary Aquatic Entomological Study in East Asia

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—Proceedings of the 3rd International Symposium on Aquatic Entomology in East Asia

17-20 JUNE 2005
NANKAI UNIVERSITY, CHINA

Main Editor **Xinhua WANG**
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Preface

After successful 1st and 2nd meetings hosted by Korean and Japanese colleagues, the 3rd *International Symposium on Aquatic Entomology in East Asia* (AESEA) was held on June 17-20, 2005 at the Oriental Art Building of Nankai University, Tianjin, China. This symposium was co-organized by College of Life Science, Nankai University and Tianjin Zoological Society. It was funded by National Natural Science Foundation of China (NSFC), Nankai University and Tianjin Association for Science and Technique (TAST).

77 participators from 8 countries (China, Japan, Korea, Mongolia, Russia, Thailand, U. S. A. and Vietnam) attended the symposium. The representatives shared the recent research progress of aquatic entomology in East Asia. 60 papers were received. Altogether 24 oral presentations and 29 poster presentations were presented during the symposium. The scientific intercourse fields on aquatic entomology include morphology, taxonomy, fauna, zoogeography, cytotaxonomy, ecology, behavior and environmental biology etc.

Over 30 colleagues from China participated the symposium, representing China Agricultural University, Nanjing Agricultural University, Nanjing Normal University, Nankai University, South China Agricultural University, Yangtze University, Shaanxi Normal University, Nanjing Xiaozhuang Normal College, Institute of Applied Ecology (Chinese Academy of Sciences), Institute of Hydrobiology (Chinese Academy of Sciences) and Jilin Environmental Monitoring Center.

One day field workshop on aquatic insect collection was arranged in Songshan National Nature Conservation (Yanqing County, Beijing).

The issue about Aquatic Entomology Society of East Asia（AESEA）collaborating with North American Benthological Society (NABS) was discussed. The next (4th) symposium is scheduled to be held in Thailand, 2008.

The 3rd symposium is the largest AESEA symposium in the history, which has most representatives. I believe it would enhance the international cooperation among aquatic entomologist and promote further development on this discipline in East Asia.

I would like to thank all the participants for their contribution during the symposium. Special thanks are also due to all members of my organizing committee for their self-giving and untiring co-organizer of the symposium. Particular gratitude is due to Dr. Bae and Dr. Uchida for offering much encouragement, experience and help. Financial support from National Natural Science Foundation of China (NSFC), Nankai University and Tianjin Association for Science and Technique (TAST) are gratefully acknowledged.

Xinhua WANG

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Aquatic insect fauna of Bach Ma National Park in Thua Thien – Hue Province, Vietnam

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Abstract An intensive field survey on the aquatic insect fauna of Bach Ma National Park (Do Quyen, Ngu Ho, and Nam Dong streams) in Thua Thien-Hue Province, central Vietnam, was conducted in January 2005. As a result, a total of 143 aquatic insect species (most of them unidentified) belonging to 119 genera, 65 families and 9 orders were recognized: Ephemeroptera (37 species) and Odonata (23 species) were the most species-rich groups of aquatic insects, followed by Coleoptera (19 species), Hemiptera (19 species), Trichoptera (18 species), Plecoptera (17 species), Diptera (8 species), Lepidoptera (1 species), and Megaloptera (1 species). This is the first comprehensive faunistic investigation of aquatic insects conducted in central Vietnam.

Key words aquatic insects, fauna, tropical stream, Bach Ma National Park, Vietnam

Introduction

Bach Ma National Park (BMNP) is located in central Vietnam, approximately 700 km south from Hanoi (16°05'-16°16'N, 107°43'-107°53'E) (Fig. 1). This park, which was established in 1991 (Cao, 1998), is a part of the Annamite mountain range and an important component of the last green transect from Vietnam-Laos border to the South China Sea. The climate in BMNP is tropical with distinctive seasons caused by monsoon winds. It has a hot and dry season from May to August and typhoons occasionally across the area from June to November. The area is one of the wettest places in Vietnam, which has approximately 8000 mm precipitation per year. Two main types of forests are present in the area: tropical evergreen monsoon forest in the lower elevation area and subtropical evergreen monsoon forest in the area over 900 m in altitude.

BMNP has long been noted for its rich biological diversity since many endemic species are inhabited. One reason on this rich biological diversity is that BMNP lies at the biogeographic boundary between northern and southern parts of Vietnam where the elements of Annamite

mountains and coastal plain co-exist (Cao, 1998). Although diverse groups of animals and plants have been investigated from BMNP, aquatic insects are virtually unknown but a few occasional reports (e.g., Stark & Sivec, 2005). Therefore, the purpose of this study is to provide basic data on the diversity and distribution of aquatic insects based on a comprehensive investigation in the area for further taxonomic and ecological studies of tropical streams.

Materials and methods

Field investigations were conducted in three streams, Do Quyen stream (Site A, B, and C), Ngu Ho stream (Site D), and Nam Dong stream (Site E and F) in BMNP (Fig. 2) in January 2005. Aquatic insect larvae were collected using Surber net and hand net from various microhabitats such as stream margins, macrophytes, and waterfalls as well as from typical stream microhabitats (riffle, run, and pool). Although adults were collected using sweeping net and light trap to verify species identification, the faunistic data in this study are mainly based on larval material. Larvae and adults were preserved in 80% ethyl alcohol and deposited in the Department of Invertebrate Zoology, Hanoi University of Science, Hanoi. Aquatic insects were identified to species or lowest taxonomic categories based on available reference sources: Ephemeroptera (Nguyen, 2003; Nguyen & Bae, 2003a, 2003b, 2004), Plecoptera (Cao, 2002; Cao & Bae, 2003; Sivec *et al.*, 1988; Sivec & Zwick, 1989; Stark & Sivec, 2005), Trichoptera (Hoang, 2005; Morse *et al.*, 1994; Wiggins, 1998), Hemiptera (Cheng *et al.*, 2001; Merritt & Cummins, 1996), and Odonata (Morse *et al.*, 1994).

Aquatic insect fauna

As a result, a total of 143 aquatic insect species belonging to 119 genera, 65 families, and 9 orders are recognized. In most taxa, however, the larvae as well as the adults are endemic and have not been studied previously. Total number of aquatic insect species collected from BMNP is shown in Table 1 and the taxa are listed in Appendix 1.

Table 1. Number of aquatic insect taxa in Bach Ma National Park, Vietnam.

Orders	Families	Genera	Species
Ephemeroptera	11	25	37
Odonata	11	22	23
Plecoptera	4	11	17
Hemiptera	9	19	19
Trichoptera	13	16	18
Coleoptera	10	19	19
Megaloptera	1	1	1
Lepidoptera	1	1	1
Diptera	5	5	8
Total	**65**	**119**	**143**

Ephemeroptera (37 species) and Odonata (23 species) are the most species rich aquatic insect groups, followed by Coleoptera (19 species), Hemiptera (19 species), Trichoptera (18 species), Plecoptera (17 species), Diptera (8 species), Lepidoptera (1 species), and Megaloptera (1 species). Comparing with the aquatic insect fauna of Tam Dao National Park in northern Vietnam (Nguyen *et al.*, 2001), the number of aquatic insect taxa of BMNP, although this is a result of a single survey in early dry season (January), is almost equivalent to the number of Tom Dao National Park. The Dap Pri stream in southern Vietnam contains a double number of aquatic insect taxa (Hoang and Bae, 2006) than those of BMNP known in this study.

We herein describe the aquatic insect fauna of BMNP according to aquatic insect orders accompanied with habitat characteristics (Figs. 3-14) and close-up photographs (Figs. 15-46).

Ephemeroptera

Thirty-seven species of Ephemeroptera in 11 families were found (Figs. 15-22). Among them, *Polyplocia orientalis* Nguyen & Bae (Fig. 18) and *Paegniodes dao* Nguyen & Bae (Fig. 16) that were recently described from Vietnam were found. The family Baetidae is the most species rich family of Ephemeroptera with ten species, but their species identification is not possible.

Odonata

Odonata is the second most diverse aquatic insect order as 23 species in 11 families are recognized from this study (Figs. 23-26). The family Gomphidae was relatively more diverse, while other families contained relatively smaller number of species.

Plecoptera

Seventeen species in 4 families were found (Figs. 27-30). The larvae of Perlidae (10 species) are abundant from the mountain streams and the adults frequently attracted by light. *Tyloperla khang* Stark & Sivec was recently described from Vietnam.

Hemiptera

Nineteen species of Hemiptera in 8 families were recognized (Figs. 31-32) and the larvae were found in various habitats of the streams. Gerridae (10 species) was highly abundant and making up a major component of the Hemiptera.

Trichoptera

Eighteen species in 13 families were found from the streams (Figs. 33-38). Members of

Hydropsychidae are common and widely distributed in the streams. Larvae of a species of Odontoceridae (Fig. 37), which is new to Vietnam, inhabited high mountain streams.

Megaloptera

One species, *Neochauliodes* sp (Fig. 39), was found from the lowland streams. The larvae are large in body size (over 25 mm) and frequently found in riffle and run areas of the streams.

Lepidoptera

One species of Pyralidae, *Potamomusa* sp. (Fig. 40), was found from the stream.

Coleoptera

Nineteen species in 10 families occurred from the streams (Figs. 41-44). Larvae of Elmidae and Hydrophilidae showed a wide range in distribution and found in various habitats.

Diptera

Eight species in 5 families were found from the streams (Fig. 45-46), but they were more abundant in the lower streams. Larvae of Chironomidae were the most abundant throughout the BMNP streams.

Acknowledgements

We thank Mr. Huynh Van Keo, Director of Bach Ma National Park, for his kind permission on this investigation in Bach Ma National Park. This work was supported by the Korea Research Foundation Grant (KRF-2005-212-C00002).

References

Cao, T. K. T. and Bae,Y. J. (2003) Nymphs of Two Peltoperlid Stoneflies (Plecoptera: Peltoperlidae) from Vietnam. *Ins. Koreana*, 19(3, 4), 299-302.

Cao, T. K. T. (2002) *Systematics of the Plecoptera (Insecta) in Vietnam.* MSc. Thesis. SeoulWomen's University, Korea.

Cao, V. S. (1998) The system of protected areas in Vietnam. In: Cao, V. S. (ed.) *Environment and Bioresources of Vietnam: Present Situation and Solutions.* The Gioi Publ., Hanoi. pp. 57-128.

Cheng, L., Chang, M. Y. and Polhemus, J. T. (2001) Guide to Aquatic Heteroptera of Singapore & Peninsular Malaysia. Introdcution & key to families. *The Raffles Bulletin of Zoology*, 49(1),

121-127.

Hoang, D. H. (2005) *Systematics of the Trichoptera (Insecta) of Vietnam.* Ph.D Thesis. SeoulWomen's University, Korea.

Merritt, R. W. and Cummins, K. W. (1996) *An Introduction to the Aquatic Insects of North America.* 3rd Ed. Kendall/Hunt Publ., Dubuque, Iowa, USA.

Morse, J., Yang, C. L. and Tian, L. (1994) *Aquatic Insects of China Useful for Monitoring Water Quality.* HoHai University press, Nanjing, China.

Nguyen, V. V. (2003) *Systematics of the Ephemeroptera (Insecta) of Vietnam.* Ph.D Thesis. Seoul Women's University, Korea.

Nguyen, V. V., Hoang, D. H., Cao, T. K. T., Nguyen, X. Q. and Bae, Y. J. (2001) Altitudinal distribution of aquatic insects from Tam Dao National Park in northern Vietnam. In: Y.J. Bae (ed.) *The 21st Century and Aquatic Entomology in East Asia. Proc. of the 1st Symp. AESEA.* Korean Society of Aquatic Entomol., Korea. pp. 123-133.

Nguyen, V. V. and Bae, Y. J. (2003a) A New Euthyplociid Burrowing Mayfly (Ephemeroptera: Euthyplociinae, Polymitarcyidae) from Vietnam. *Korean J. Biol. Sci.*, 7, 279-282.

Nguyen, V. V. and Bae, Y. J. (2003b) The mayfly family Leptophlebiidae (Ephemeroptera) from Vietnam. *Ins. Koreana*, 20(3, 4), 453-466.

Nguyen, V. V. and Bae, Y. J. (2004) Larvae of the Heptageniid Mayfly Genus Epeorus (Ephemeroptera: Heptageniidae) from Vietnam. *Journal of Asia-Pacific Entomol.*, 7(1), 19-28.

Sivec, I., Stark, B. P. and Uchida, S. (1988) Synopsis of the World Genera of Perlinae (Plecoptera:Perlidae). *Scopolia* 16, 1-66.

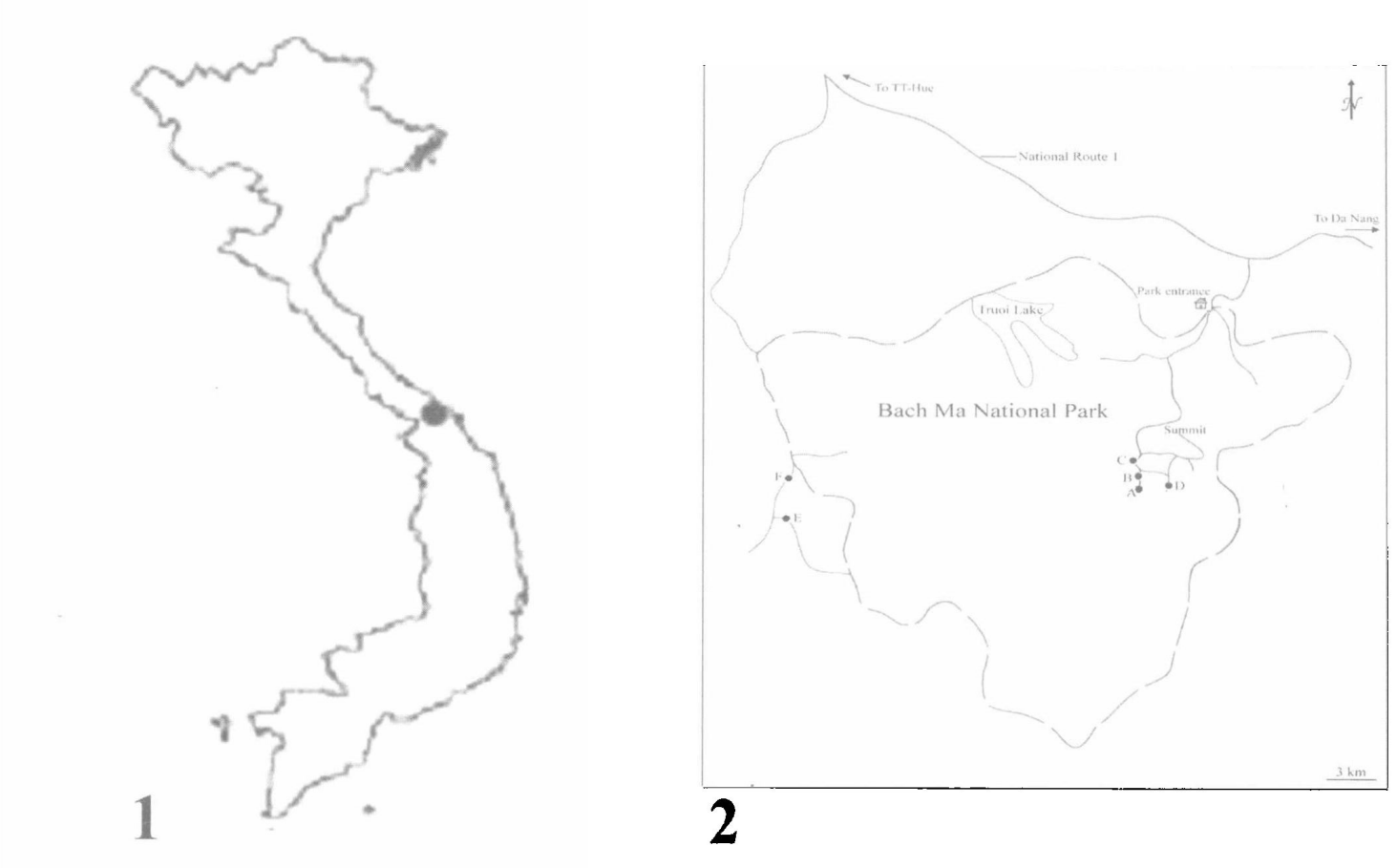
Sivec, I. and Zwick, P. (1989) Addition to the knowledge of genus *Chinoperla* (Plecoptera, Perlidae). *Aquat. Ins.*, 11(1), 11-16.

Stark, B. P. and Sivec, I. (2005) New species of *Tyloperla* (Plecoptera: Perlidae) from Vietnam and Thailand. *Illiesia*, 1(1), 1-7.

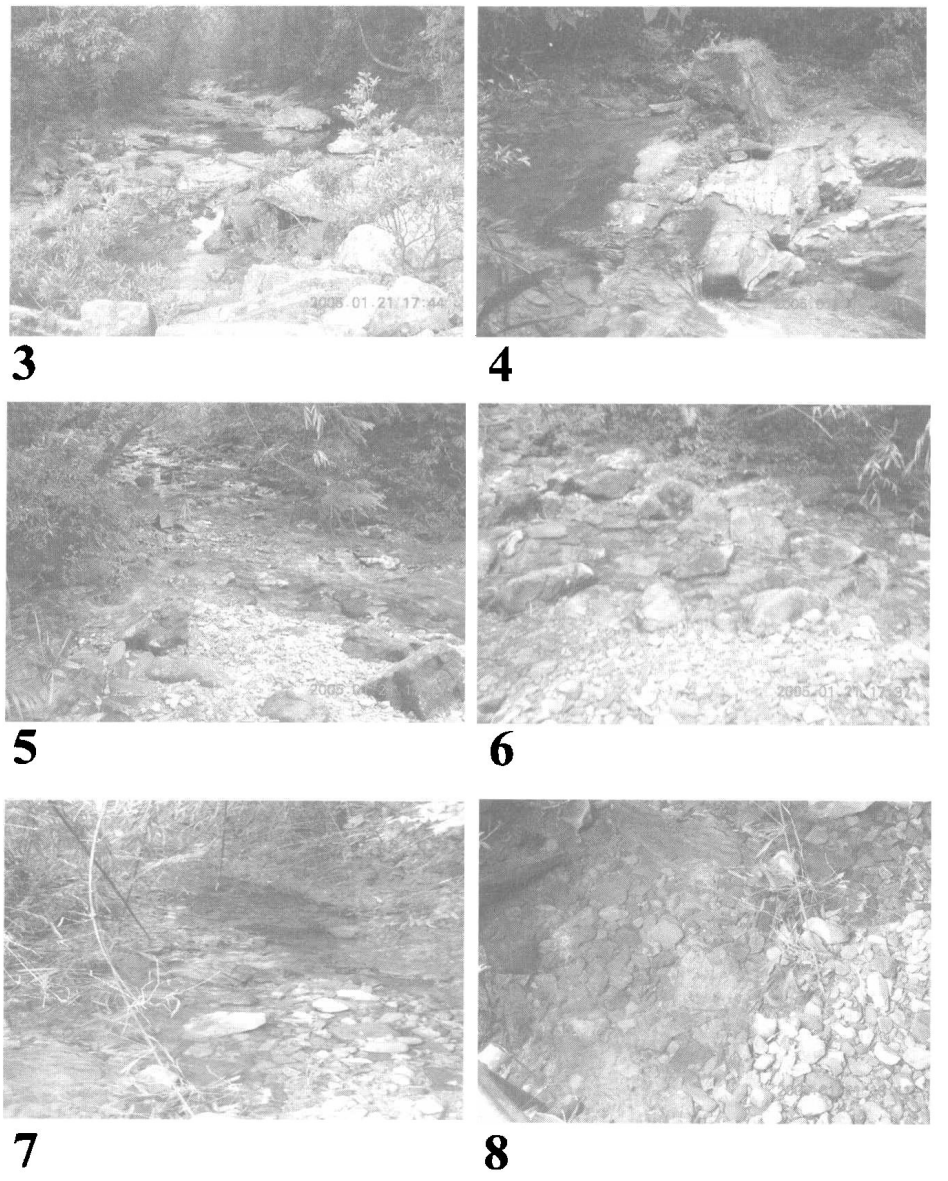
Wiggins, G. B. (1998) *Larvae of the North American Caddisfly Genera (Trichoptera).* University of Toronto Press, Toronto.

www.bachma.vnn.vn

www.wing-wbsj.or.jp/~vietnam/source_book/sb_pdf/Bach_Ma.pdf



Figs. 1-2 Location of Bach Ma National Park and study sites. 1, location of Bach Ma National Park; 2, study sites.



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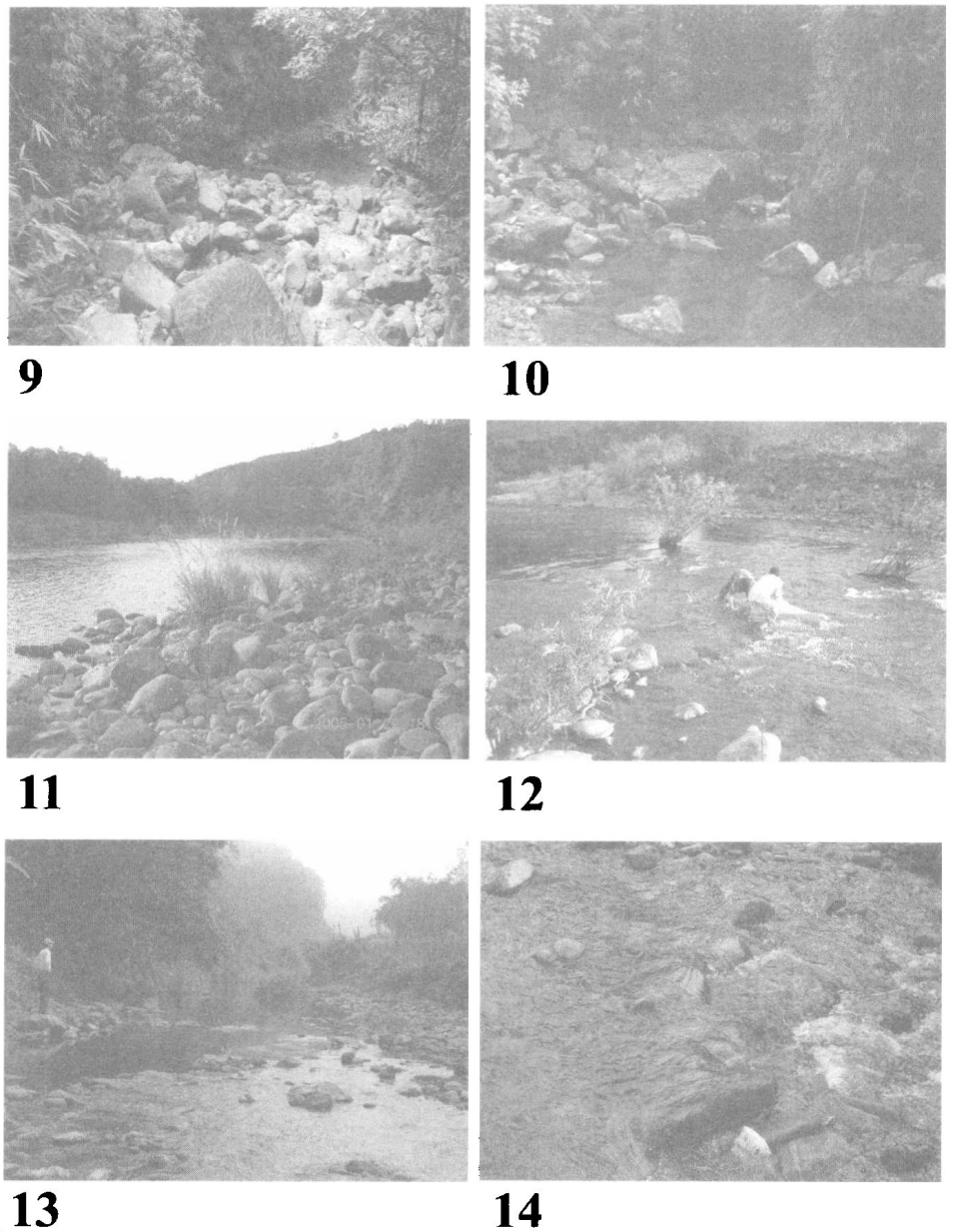

Figs. 9-14 Habitats. 9-10: Ngu Ho stream, site D. 9, macrohabitat; 10, microhabitat. 11-14: Nam Dong stream. 11-12: Site E. 11, macrohabitat; 12, microhabitat. 13-14: Site F. 13, macrohabitat; 14, microhabitat.