A Comparative Study of Insect Community at Streamside zones at the Daejeon and Yudeung Streams

Heon-Myoung Lim², Youngho Cho³, Young-jun Park², Yong-Gu Han³, Sang-Ho Nam³*

대전천과 유등천의 하천변 곤충군집 비교 연구

임헌명²·조영호³·박영준²·한용구³·남상호³*

ABSTRACT

This study was conducted to identify the impact of river improvement efforts by studying terrestrial insects inhabiting at streamside locations at the Daejeon and Yudeung streams. Seven surveys were conducted from April to October on 2008 and the results were analyzed. Totally 428 species of 110 families belonging to 11 orders of insects were investigated during the course of the present study. The insects identified at the Daejeon stream belonged to 335 species, 99 families and 11 orders, while those at the Yudeung stream were of 350 species, with 98 families and 11 orders. At the Daejeon stream, D-1 and D-2 points were the sites where the most species (178 species) were identified, while at the Yudeung stream, the Y-1 point was the site where the most species (179 species) emerged. In a cluster analysis based on a similarity index, Group A (without river improvement works) and Group B (downtown passing area with river improvement works) were created. Within Group A, survey points were classified as the Daejeon stream group (the A-1 Group) and the Yudeung stream group (the A-2 Group). It was found that the emergence patterns of insects were related to regional characteristics of the streams.

KEY WORDS: TERRESTRIAL INSET, RIVER IMPROVEMENT, SIMILARITY INDEX

요 약

본 연구는 대전천과 유등천의 하천변에 서식하는 육상곤충을 이용해 하천정비공사가 인근 생물에 끼치는 영향을 알아보기 위한 것으로 2008년 4월부터 10월까지 총 7회에 걸쳐 조사를 수행하고 그 결과를 분석하였다. 조사기간 동안 출현한 곤충은 총 10목 110과 428종으로 대전천에서 조사된 곤충은 11목 99과 335종, 유등천에서 조사된 곤충은 11목 98과 350종이었다. 대전천은 D-1지점과 D-2지점에서 178종이 출현하여 가장 많은 종수가 확인되었고, 유등천은 Y-1지점에서 179종이 출현하여 가장 많은 종수가 확인되었다. 유사도 지수를 근거로 각 지점별 클러스터 분석을 실시해 본 결과, 하천정비공사가 진행되지 않은 지역(A그룹)과 하천정비공사가 진행된 도심관통 지역(B그룹)으로 그룹화 되었다. 또한 A그룹에서도 각 조사지점이 대전천(A-1그룹)과 유등천(A-2그룹)으로 나뉘어 하천의 지역적 차별성에 따른 곤충의 출현이 상대적임을 알 수 있었다.
INTRODUCTION

Streamside areas serve to purify contaminants in streams while also serving as a form of shelter and habitat for various living things. They also stabilize the banks, have a recreation function, and provide a visual greenery resource(Ahn and Song, 2003). However, continuous river improvement works change streams, banks and streamside areas until eventually they do not perform their intended functions properly(Son, 1998). In particular, urban streams running through densely populated areas can sustain damage to the habitats of living things when they undergo river straightening projects or when bicycle paths, riverbed roads, parking lots, or athletic facilities which cover the rivers are constructed so as to utilize urban space at riversides. With the recent introduction of the concept of close-to-nature river improvements, many river improvement projects are being planned or are in progress. However, due to the insufficient information pertaining to stream ecosystems, stream landscape architecture or stream landscapes tend to be over-emphasized in favor of the preservation of the stream ecosystem(Namgung, 1999; Shoichiro et al., 2004). Much time and effort are required to restore a close-to-nature stream if the ecosystem is changed because of river improvement projects. Thus, more objective evaluations and expert opinions are required. In addition, river improvement projects should be performed with caution and care(Berit and Matthias, 2008).

As the importance of the environmental concept of streams has been emphasized, interest in close-to-nature streams is increasing, and studies focusing on birds, fish, and benthic macro-invertebrate related to stream decontamination efforts are actively being performed as part of the overall stream eco-system recovery project(Kim et al., 2002; Park, 2004; Cho, 1994; Cho, 2006). However, studies of terrestrial insects, which represent the greatest percentage in Arthropoda in the animal kingdom, show that they are a direct source of food for birds, amphibians and small mammals and that they play an important role in ecosystems as a primary consumer. Such studies are, however, somewhat rare, with the exception of a few, such as those by Jung and Yeo (1996), and Jung(1997)(Bae et al., 2002). In a study on insects in relation to city development in Daejeon, 779 species, 149 families and 18 orders of terrestrial insects were identified(Nam and Kim, 1999). Additionally, as the Daejeon stream and Yudeung stream are city streams that penetrate dense urban areas as well as natural eco-streams, which have a direct influence on the natural eco-system at the same time(Lee et al., 1999), the habitats of terrestrial insects and their neighborhood ecosystems can be identified indirectly by comparing the downtown stream and eco-stream sections.

The Daejeon stream belongs to the Geum River system, the third tributary of the Geum River, and the first tributary stream of the Yudeung stream. It originates at Mt. Manin which is on the boundary of the neighborhood of Haso-dong, in the eastern part of the city of Daejeon, and the rural areas of Boksoo township and Chubu township in Geunsan province. It flows to the west and penetrates a very densely populated downtown area. It consists of a Province Grade I Stream(with a stream channel length of 26.29 km, a total stream length of 7.7 km, and a basin area of 89.31㎢) at the upper stream of Okgyegyo(bridge), Okgye-dong, Jung-gu, and a Province Grade II Stream(with a stream channel length of 18.59 km, a total stream length of 14.7 km, and a basin area of 49.14㎢) at the lower stream(Cho, 2006). Although a natural recreational forest and well-preserved woods are located at the upper stream area, there is some concern that the lower stream will be contaminated by waste water from households and that the forest will be damaged by the growing of rice and other crops. From the midstream to the lower stream areas, a monotonous ecosystem is expected due to heavy contamination by artificial structures and a uniformed natural landscape such as densely built houses, factories, riverbed roads, bicycle roads and grassy fields. The Yudeung stream, which belongs to the Geum River system, is the second tributary of the Geum River and the first tributary of the Gap stream. It originates at Mt. Indae located in Samga-ri, Jinsan township in Geumsan province and at the base of Mt. Wolbong. It flows to the north, merges with a tributary stream to the west at Jinsan township and