

Chapter 2-8

Insects

Abstract

The insect life in Shiga Prefecture features characteristic insects including unique species that have evolved in the aquatic system over the 4 million years of the history of Lake Biwa; 100 species of dragonfly that depend on the rich aquatic system of the lake, representing half of the species of dragonfly known in Japan; a wide diversity of insects that live on the lakeshores; insects characterized by geographical variations in the surrounds of Lake Biwa and a wide variety of chironomids.

Keywords: Dragonfly, Endemic species, Lakeshore insects, Geographical variations, Chironomids

1. Habitat of Some of the Best-known Dragonflies in Japan

The most remarkable characteristic of the insect fauna that inhabit Lake Biwa and its surrounds is the diversity of species of dragonflies. As many as 100 species of dragonfly have been recorded in Shiga Prefecture. Shiga Prefecture alone is the area with the highest number of species in Japan. About 200 species have been recorded in Japan, making Shiga Prefecture home to almost half of that number. The abundance of species of dragonflies in Shiga Prefecture is largely due to the existence of Lake Biwa. Supplied by a large number of feeder rivers, Lake Biwa provides a rich aquatic system. This accounts for the abundance of species of dragonflies that have adapted to life on the lakeshores. Lake Biwa is an area with a wide diversity of dragonflies or expressed differently, “an area with a rich aquatic environment.”



Fig. 2-8-1 *Stylurus oculus*, a typical dragonfly of Lake Biwa (Photo by Shoko Okubo)

2. Stage for the Evolution of Endemic Species

To date, two endemic species; *Ephoron limnobium* and *Apatania biwaensis*, and a nearly endemic relict species; *Aphelocheirus kawamurae*, are known to inhabit the aquatic system of Lake Biwa. The long history of Lake Biwa spanning 4 million years has made the lake a stage for the evolution of these endemic species of insect. *Ephoron limnobium* inhabits the lakeshores and surrounding vegetation. Its nymphs live in the water, mainly on reefs on the lakeshore on the North Basin. *Apatania biwaensis* inhabits areas such as areas of reed growth around the North Basin of Lake Biwa in the surrounds of the mouth of the Ado River and the Ane River as well as the lakeshore. Up to the 1960s, *A. kawamurae* was mainly seen on the lake bottom, but is no longer in evidence and has become a species in danger of extinction.



Fig. 2-8-2 Endemic species of insect of Lake Biwa (Left: *Aphelocheirus kawamurae*, Top right: *Apatania biwaensis*, Bottom right: *Ephoron limnobium*)

3. Insects Unique to Lake Biwa

One of the characteristics of the insects of Lake Biwa is the diversity of insects that inhabit the lakeshores. The lake features expansive areas of reed growth in its surrounds, the likes of which can be seen nowhere else, and an unbroken sandy beach. Here can be found species of plant hoppers, aphids and Hemiptera that feed on reeds as well as their predators, dragonflies and ladybirds, making this a unique ecosystem.

In addition, diverse beetles normally found on sandy seashores inhabit the sandy beaches on the lakeshore. One of these, the *Chaetodera laetescripta*, inhabits only on the sandy beaches of the shores of the North Basin and is a valued species as a population found only in the Lake Biwa-Yodo River System. It is the unique natural environment of Lake Biwa, with features such as areas of reed growth and sandy beaches that has formed these diverse insect fauna that live on and around the lakeshores.

4. Populations Characterized by Numerous Geographical Variations

During the long millennia of its history, Lake Biwa has given birth to insect populations that differ in each of the areas in the surrounds of the lake. *Phelotrupes auratus* feeds on the excreta of large mammals such as deer. This insect is characterized by its beautiful coloring that has a metallic sheen and this color varies markedly depending on the area. Insects with a reddish-brown coloring can be found in the west of Shiga Prefecture while insects with green coloring inhabit the east and south of the prefecture. In addition, in areas such as Wakayama and Nara Prefectures, insects with indigo coloring can be found.

5. Diverse Chironomids

Although resembling mosquitoes, Chironomidae have a short proboscis and are not hematophagous. Of all the flora and fauna that live in and around Lake Biwa, this group of insects features the largest number of species. To date, as many as 171 species have been recorded in and around Lake Biwa. While the *Propsilocerus akamusi* is also known as the "Lake Biwa insect," it is also called a "bothersome bug" by local residents because of its tendency to attach itself to laundry and get into food.

While large numbers of this insect could be found flying on the shores of the South Basin from the 1970s, their numbers have declined from 2000s. This insect feeds on accumulations of fresh minute organisms such as phytoplankton. Increases in the amount of water plants in the South Basin have led to a decrease in the amount of plankton that is the food source for this insect, and, in recent years, it has been surmised that this is the reason for the declining numbers. Changes in chironomids are closely tied to changes in the environment of Lake Biwa.



Fig. 2-8-3 *Propsilocerus akamusi* known as the "Lake Biwa insect"

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Geographical Variations: Differences in the state that demonstrates traits that show that individuals belong to the same species of organism or the same group within a species