

Hydroecological study on fresh water copepod in Chino-ike ('Bloody lake'), an ephemeral lake on the top of Mt. Akagi, central Japan

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Chino-ike, located on the top of Mt. Akagi at an elevation of ca. 1400 m, is known as an ephemeral lake in which water only appears from early summer to late autumn. Because of being an ephemeral lake, no fish exists there and its ecosystem is mainly composed of plankton. The representative species of plankton in Chino-ike is *Acanthodiptomus pacificus* (*A. pacificus*). Chino-ike is also called "Blood lake" because its water surface used to turn red due to an outbreak of *A. pacificus* in autumn. This study aims to clarify the ecosystem in Chino-ike with special emphasis on the life cycle of *A. pacificus*.

The survey was conducted in June, October and December of 2018. In 2018, lake water appeared at 0:00 on October 1 and lasted until 10:00 on October 19. The maximum water depth of 98 cm was recorded at 5:00 on October 3 (Y. Funyu, unpublished data). At the time of the survey on October 16, the maximum water depth was 37 cm, when plankton samples was collected at 17 points of 13 locations including those from different depths at specific locations. The number of plankton in a given volume of lake water was counted on the samples in the laboratory. For the surveys in June and December when the lake dried up, surface soil samples were collected at the same locations for counting the number of dormant eggs and individuals of plankton.

On October 16, most of the collected *A. pacificus* was copepodite larva. Higher population density was found at deeper water depths with a maximum density of 477 individuals per litre at 32 cm depth in the center of the lake. From Kadota (1971), it takes at least four months for *A. pacificus* to develop from an egg to a copepodite larva. But the growth of *A. pacificus* in Chino-ike was found to be much faster. Because of short-term persistence of water in 2018, it is estimated that *A. pacificus* in Chino-ike shortened its life cycle and is likely to spend a dry winter in the form of a diapausing larva. From now on, we are elucidating to clarify food habits of *A. pacificus* on the basis of carbon and nitrogen isotopes as well as to find dormant eggs and individuals in the Chino-ike surface soils .

Keywords: Mt. Akagi, ephemeral lake, *Acanthodiptomus pacificus*, aquatic ecology, diapause, carbon and nitrogen isotopes