Tetsuo Harada, Expert Opin Environ Biol 2014, 3:2
http://dx.doi.org/10.4172/2325-9655.C1.005

OMICS International
conferenceseries.com SciTechnol

3rd International Conference on
Earth Science & Climate Change
July 28-30, 2014 DoubleTree by Hilton Hotel San Francisco Airport, USA

Species composition of oceanic Halobates at 12°N, 135°E from 2008-2013 and change in life history traits of a water strider, aquarius paludum from 1987-2013 in accordance with global warming

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Due to Neuston-Net samplings at a fixed point of 12°N, 135°E, individual density of the big-sized species, *Halobates micans* was 14,680 indi.km^{-2} in June, 2008 and similar to 9,875 in June of 2013 ($p=0.295$). Densities of the middle-sized species, *H. germanus* and the small-sized species, *H. sericeus* were 5,974 and 3,016, respectively in 2008 which were lower than 11,924 ($p<0.001$) and higher than 0 ($p<0.001$), respectively in 2013. Water and air temperatures around sea surface were 29.07 and 28.54°C in June, 2008, respectively which was significantly lower than 29.20 and 29.47°C in June, 2013. Such small increase in ambient temperatures during the 5 years might lead to higher cannibalism pressure from *H. micans* and *H. germanus* to *H. sericeus*. In the Kochi-Nankoku populations (33°N, 133°E) of a fresh-water strider *Aquarius paludum*, three generations were dominant in 1987-1995. In 2007-2009, the number was increased to four, and further to five in 2010. The number was back to the four in 2012 due to extreme low temperature in November. The number became the five in 2013. In 1995, aestivation in summer population newly occurred in the summer of 2008 to 2011. In 1995, 80% or more of overwintering adults were "flyers" with long-wings and well-developed flight-muscles, whereas, in 2009-2012, 55 or 64% of them were "non-flyers" which consisted of short-winged or mosaic-winged (long forewings and short hind-wings) adults and long-winged with flight-muscles-histolysis. Global warming might change the species composition of oceanic sea skaters. It may increase generation-number, select aestivation strategy and make fall-generation adopt overwintering site nearby water habitats of A. paludum.

Biography

Tetsuo Harada has completed his PhD at the age of 29 years from Osaka City University and Postdoctoral studies from Osaka City University and Kochi University, Schools of Biology. He is the Full-Professor of Graduate School of Integrated Arts and Sciences, Kochi University, and Director of Science Education Section in this School. He has published more than 70 papers in reputed journals and serving as an editorial board member of Japanese Society for Chronobiology.

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