Seasonal Changes in Sex Ratio, Maturation, and Size Composition of Fresh Water Snail, *Sinotaia quadrata histrica*, in Lake Kasumigaura

*Narisato Hirai, Norihisa Tatarazako, Masaaki Koshio, Kiyoshi Kawabe, Fujio Shiraishi, Youichi Hayakawa and Masatoshi Morita*

National Institute of Environmental Studies, Onogawa 16-2, Tsukuba 305-8506, Japan

(Received June 30, 2004; accepted October 15, 2004)

**Key words:** snail, sex ratio, gonad-somatic index, estrogen activity

*Sinotaia quadrata histrica* is a fresh water viviparous snail distributing from the Kanto region to Kyushu Island, Japan. About 7000 snails were collected in Lake Kasumigaura (L. Nishiura and L. Kitaura) in 2001 and 2002, and the sex ratio, maturity in terms of the gonad-somatic index (GSI) and operculum diameter were determined. The total female proportion was 55.2% in 2001, 53.0% in 2002 in L. Nishiura, and that of L. Kitaura was 60.4% in 2002. Comparing the season, the female proportion was the highest during early summer in both 2001 (59.6%, July in L. Nishiura) and 2002 (61.6%, June in L. Nishiura, 65.8%, July in L. Kitaura). The GSI of females in L. Nishiura significantly increased from April to May and significantly decreased from June to August. The GSI of males was higher in spring, but significantly lower from June to August. The mean female operculum diameter was consistently larger than that of males for each month and year, and a particularly significant difference was found between females and males from April to August 2001, and from April to September 2002. The number of resting zones on the operculum correlates with the operculum diameter and the female proportion was larger in the snails, which have a high number of resting zones, suggesting a sex-dependent difference in age composition. This study estimated that the sex ratio and seasonal maturation of *S. quadrata histrica* and the sex-dependent difference in age composition might contribute to the population structure in L. Kasumigaura.

*E-mail: hirai.narisato@nies.go.jp*