

Polyploidy of three freshwater sphaeriacean clams (Mollusca: Corbiculoidea: Sphaeriidae), of Korea

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Introduction

Sphaeriidae belong to the primarily marine Order Veneroida, the most diverse heterodont group. The Veneroida contain 15 superfamilies and more than 50 families, and include three freshwater families: Sphaeriidae, Corbiculidae and Dreissenidae. The bivalve superfamily Corbiculoidea has two families of special interest, Corbiculidae and Pisidiidae, the latter of which is also called Sphaeriidae. They have cosmopolitan and ubiquitous distributions, and are found on every continent except Antarctica, and in almost all freshwater habitats including, rivers, streams, pond, lakes, and even in ephemeral pools. The Corbiculoidea are represented in Korea by six species of Corbiculidae and two species of the Pisidiidae. The Corbiculid clams, particularly in Asia, are an important food source, not only for wildlife, including fish, but also for humans. Sphaeriid clams, on the other hand, are not economically important, other than by providing an important link in various aquatic food chains involving aquatic animals (Parrish & Margraf 1994). In addition, many sphaeriid species are known as the first intermediate hosts of several digenetic trematodes. Natural polyploidy has also been observed in *Argopecten purpuratus* (Alvarez & Lozada 1992), *Sphaerium striatinum* (Lee 1999), in *Lasaea* spp. (ÓFoighil & Thiriot-Quévieux 1999), in *Corbicula* spp. (Park et al. 2000) and in *Pisidium coreanum* (Park et al. 2002). The first Corbiculoidea clam in which polyploidy was detected was *Corbicula (Corbiculina) leana* (Okamoto & Arimoto 1986). The chromosome numbers observed in the Sphaeriacea are all large (over 200 mitotic chromosomes), except for European *S. corneum* (2n=36). The frequently encountered polyploidy in this subfamily suggests that pronounced polyploidization may be prevalent in the Sphaeriinae. Also a range of mitotic chromosomes from 36 to 247 indicates that significant ploidy level variations (2n to 13n) occur in this subfamily. In this study, we present the results of mitotic metaphase chromosome analyses of *Musculium lacustre*, *Sphaerium corneum* and *Sphaerium* sp.

Materials & Methods

The thirty-six specimens of *Musculium lacustre*, *Sphaerium corneum* and *Sphaerium* sp. were collected from a small stream located in Sau-dong, Chunchon-city, Gangweon-do, Korea between April and October 2003, and examined shortly after collection.

Chromosome preparations were obtained from gonadal tissues by the standard air-drying method as follows by Park et al. (2002). Voucher specimens of populations subjected to chromosomal studies have been deposited at the Department of Parasitology, Kwandong University College of Medicine, Korea.

Results

In Korea, polyploidy has been reported to occur in Sphaeriidae, in particular, in *Musculium lacustre*, *Sphaerium corneum* and *Sphaerium* sp. The mitotic chromosome numbers of *M. lacustre* and *S. corneum* are both $2n=190$, and *Sphaerium* sp. has a mitotic chromosome number of $2n=171$. The chromosome types of the three species consisted of metacentric, submetacentric, and telocentric chromosomes as shown in figures. However, these chromosome figures were not sufficient for determining karyotypes, because of their large numbers and small sizes. The longest dimension of the largest metaphase chromosome length in these three species was less than $5.0 \mu\text{m}$. Because of the large number of chromosomes present, *M. lacustre*, *S. corneum* and *S. sp.* are obviously polyploid species. The basic chromosome number of these spheriid polyploids is probably $X=19$. Polyploidy may originate within a single species (autopolyploidy), or may be the result of a fertile hybrid ancestral species.

References

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