Tereza Kořínková: Cytogenetics and biology of selected representatives of the family Sphaeriidae.

The PhD thesis of Tereza Kořínková is a logical continuation of her diploma thesis in which she dealt with two sibling freshwater bivalve species, *Sphaerium corneum* and *Sphaerium nucleus*. She has now extended the spectrum of spheriid species, and deals, in four main chapters, with their cytogenetics, life-history and feeding strategy.

The Sphaeriidae, comprising three genera of small bivalves, are a chronically difficult group owing to their unresolved taxonomy and extremely small body size combined with a low number of differential characters. One of the genera comprises species of one to a few millimeters adult size. This alone makes it a challenge to isolate and prepare gonadal tissue for hundreds of chromosome plates and to analyse the content of four different compartments of the digestive tract.

As far as I can judge, the studies were done very carefully and yielded lots of novel and valuable results. For example, her karyological study provides data about the karyotypes of 11 species. Ten of them had not been studied before, and these are almost the first Palaearctic sphaeriid species studied so far. I also find it particularly valuable that in several species 2-8 populations were studied, thus providing information about intraspecific variability. Tereza found striking differences in chromosome numbers between different species of the genus *Sphaerium* and discusses the intrageneric systematics. The karyotypes together with estimations of DNA content allowed a thorough discussion of polyploidisation as a possible origin of one or more species. The description of meiosis in two species yielded the first observation in bivalves of a "diffuse stage" and valuable (because apparently rare) and detailed data about the occurrence and meiotic behaviour of B chromosomes. Another thorough study combined 1,5 years of monthly sampling of a population of *Sphaerium corneum* with size classification, dissection, and karyological and histological investigations; this provided extensive information about an apparently very flexible life-history and reproductive strategy in an unstable habitat.

All studies are thorough, the publications well written, the discussions very thoughtful and clear and never too wordy. Most of the work, including all writing, was done by Tereza. The author seems well acquainted with the scientific literature in the field.

As far as I can judge as an outsider, Tereza did not have it easy. Besides the target group being tricky, there was no research group working in this or related fields nearby and hardly anybody to ask for help with getting acquainted with new techniques. Moreover, her research had to be done in her spare time as she had to earn her own living, much of the time by hard manual labour. The latter alone would have caused many to give up or seek easier tasks, but Tereza has shown a remarkable capacity to persist and overcome difficulties. This has not only proven

her determination to do research, but also her ability to work effectively as an independent scientist.

I think that the submitted thesis and her scientific career fulfill all standards to award Tereza Kořínková a PhD degree.

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As I will not be present at the PhD defense, I suggest a few questions that you might ask. Please choose as you think appropriate.

1. Considering the origin of species with high chromosome numbers, I have the impression that you favour palaeopolyploidisation (followed by chromosome rearrangements, diploidisation and genome reduction) as opposed to repeated chromosome fission. Is this true, and if so, on which facts is this based?

2. Why has the *S. corneum* group to be excluded as the potential diploid ancestor of (the supposedly palaeopolyploid) *S. rivicola*? Considering that genome "downsizing" and chromosome rearrangements can have happened since polyploidisation, couldn't ANY genome with an equal or lower number of chromosomes and a smaller DNA content be potential ancestor? Is it the chromosome morphology?

3. You found seasonal differences in the prevailing meiosis stages in a population of *Sphaerium corneum* (Chapter 3): pachytene and diffuse stage in May, postpachytene and metaphase I in June and July. Do the stages of cell division take so long?

4. You consider your study on food utilisation (Chapter 4) as a kind of pilot study which may serve as a base for further detailed examinations. If you had to do your study again on another species, knowing what you know now, how would you change the methods?

5. There is a mistake on page 6 (Introduction), second paragraph: "The recent distribution comprises almost all zoogeographic regions except Palaearctic and Nearctic." I guess you mean the opposite.