**Report on the 1st International Summer School on “*Comparative and Functional Neuroanatomy and Neurobiology of Invertebrates”* at the White Sea Biological Station of Lomonosov Moscow State University from 28 August to 12 September 2012**

**Faculty**

The members of the faculty came from Austria (Prof. A. Wanninger), Germany (Prof. H.-J. Pflüger, Prof. Th. Stach), UK (Dr. Sw. Ott) and Russia (Dr.Sc. N. M. Biserova, *director of school*, Dr. D.V. Abramochkin, Dr.Sc. L.P. Nezlin, Dr. N. N. Rimskaya-Korsakova, Dr. M. Plyuscheva, Dr.Sc. E.N. Temereva, Prof. A.B. Tzetlin, Dr. E. Vortsepneva).

As Instructors served two PhD-students of the Dept. of Invertebrate Zoology of MSU (P. Belova and and I. Gordeev) and two PhD-students of the Dept. of Human and Animal Physiology (E. Volkova and A. Zakharov).

**Students and auditors**

Students attended the school came from Austria (Vienna), USA (Berkeley, CA), from various departments of MSU and St. Petersburg State University, from Russian Academy of Science and Russian Medical Academy of Science.

**Daily schedule**

The usual daily schedule consisted of lectures in the mornings followed by lunch, with practical lab work beginning after lunch. Depending on the recipe schedule many students worked until midnight or even later. Of course, the schedule was frequently adjusted to practical requirements so that also at mornings time could be spent in the laboratory to follow recipe schedules.

**Lectures and talks**

The participants were exposed to a large diversity of topics that either were concerned with different techniques such as neuroanatomical staining methods, techniques of histology including those of tissue fixation and immunocytochemistry, methods of modern microscopy to questions of modern taxonomy and cladistics. In addition other lectures dealt with topics of evolution or the phylogeny of particular taxa, of developmental biology, of particular neuronal specializations of parasitic animals or with the concepts of neuromodulation. Evening lectures were concerned with the culture and socio-ethology of the Pomores, people living along the White Sea, and with the phenomenon and mechanisms of bird migration.

The students were provided with pdfs of all lectures, and all recipes were given to them in written form, too.

In addition, all students also gave short oral presentations of their own work. All these talks were of high quality and were all very well received by the audience.

**Practical courses**

The practical course was also very diverse, and experiments ranged from various axonal tracing methods of the nervous system of various marine organisms to those of immunocytochemistry of different marine organisms including planctonic larvae. Other experiments demonstrated how fish parasites are gained from freshly caught fish, and how their nervous systems can be examined by using different antibodies. It was also demonstrated how different fixation methods affect the quality of immunocytochemical stainings. In addition physiological experiments were concerned with measuring bioluminescence of annelids, with measuring contraction properties of ascidian muscle, and with recording miniature endplate potentials from crustacean muscle.

For the practical course, each student was equipped with a stereo microscope and the necessary instruments for dissections. For further analysis, a fluorescence microscope and a Nikon laser scanning confocal microscope could be used.

For each physiological experiment there was one functional set-up. Students were divided into groups to allow participation in each of the offered experiments.

**Overall-Assessment**

At the end of the school, students were given a questionnaire in order to find out about their opinion on this summer school.

***Strengths***

In my opinion this first international school at WSBS was a big success. The mixture of scientists/lecturers representing different research fields and coming from different countries, certainly, was one of the strengths of the school.

In addition, all students worked hard and tried to get out as much as possible from this school. There was a very friendly and very lively working atmosphere throughout the whole course time, with many interactions among students but also between students and lecturers. In general, technical facilities were good to excellent, and the station is well capable to host such an international school. Of course, the biggest strength of the school at WSBS is that marine organisms can be obtained fresh from the sea and then maintained in aquaria without any problems. This allowed a great variety of animals to be examined and, thus, the school achieved its goal of providing a true comparative approach for neurobiological and neuroanatomical experiments. In particular, the station is well equipped with optics for students and scientists, and the fluorescence and laser scanning confocal microscope allows usage of latest fluorescent dyes and other modern techniques.

Accommodation was fine. In particular, breakfast, and all other meals were good and plentiful. The use of boats was generous and whenever animals were needed, they were supplied.

***Weakness***

There is room for improvement towards the organization of the school. In my opinion the students should be given more time to pursue their own projects. This implies that during the school each student can only carry out two or three projects. Perhaps, the duration of the school has to be increased to at least 18 working days (time for travel not included).

There is room for improvement as far as the lightning of the student work places is concerned. Lamps should not be fixed to the microscope but either be more flexible on the microscope or completely separate from the microscope. Ideal would be a flexible light guide attached to a cold light source in order to allow better lightning from all sides.

There is also room for improvement as far as solvents and chemicals are concerned. All chemicals required for particular recipes have to be carefully checked and sent to WSBS before the school. Substitute solutions have to be discussed before the school with the respective members of the faculty.

As far as accommodation is concerned there is room for improvement for the sanitary facilities. In my opinion this should be one of the main concerns as they, certainly, are of a “lower” standard.

**General conclusions**

I repeat, in my opinion the school was a memorable event, a great success and a great experience for all participants, students and faculty alike. I definitely recommend making this to a more regular school, perhaps, at 2 or 3 years interval. With the very positive experiences of this first school, I think it should be possible to also attract funding from IBRO for subsequent schools, in particular if lectures on ethical conduct in science and good scientific practice are added.

Berlin, 23 September 2012,

**Hans-Joachim Pflüger**; Freie Universität Berlin; Institute of Biology, Neurobiology.