

**Agency for Science and Higher Education
Savska cesta 41/8
10000 Zagreb
Croatia**

March 16, 2008

**Expert Commission of the National Council for Science of the Republic of Croatia for
evaluation of the quality and efficiency of scientific and professional work of the Faculty
of Science, Division of Biology, Zagreb, Croatia**

Re: Evaluation report - Comments and recommendations

We would like to thank the National Council for Science of the Republic of Croatia and the Agency for Science and Higher Education for giving us the opportunity to serve as the Expert commission for the evaluation of the Division of Biology of the Faculty of Science Zagreb. We would also like to express our gratitude to Professor Ivan Habdija the dean of the Faculty of Science and the Professor Biserka Nagy the head of the Division of Biology for their kind hospitality and being well prepared for our visit. This evaluation report is based on the Self Evaluation Report provided by the Division and site visit that took place on January 21th and 22nd, 2008.

Self Evaluation Report

Unfortunately, the Self Evaluation Report was insufficiently and not equally prepared and documented by all of the departments. A large part of the requested information was simply missing and some of the provided information was misleading. We believe that the Agency should consider this fact for future evaluations of research institutions in Croatia and explain better to the institutions how the forms should be filled and why, and then double-check such documents. However, thanks to the fact that the Division and its departments provided us with additional written information and documents during our visit, the above mentioned fact did not significantly influence the preparation of this Report.

General comments

Considering its infrastructure, the research potential and its historical significance the Division is the key institution for the development of natural sciences but also for also for other areas such as biomedical sciences and biotechnology, agronomy and forestry in the Republic of Croatia. Furthermore the Division has national as well as international importance as a resource center regarding biodiversity. Laboratories and classrooms are distributed over four locations which represents one of the major obstacles not only for teaching but also for conducting research activities. The Division covers a wide range of thematic units, with emphasis on plants and animals, notably the development of molecular biology for the different species studied (which lead to the creation of the Department for Molecular Biology, but exist also in other departments), studies in botany and zoology as a prerequisite for research in biodiversity and conservation biology and studies in tumor research. All these themes are important and timely research topics worldwide. Altogether, the division is a self-sustaining entity regarding the critical mass of human resources, laboratories and directions of research. PhD students and post-doctoral fellows appeared very

motivated and dedicated to scientific questions. There are, however, several weak points that may become a serious issue in the future development of this essential institution for Croatian science and higher education.

The organizational structure

The Division of Biology is divided into four departments and each department is further functionally divided into several groups. The immediate impression is that the departments are overfragmented with more than 30 such units (groups), some of which are composed of one professor and 1-2 students.

In spite of the fragmentation into small groups, during our visit as well as based on the list of publications, we concluded that the real operational units are often composed of several groups. Altogether over-fragmentation of the departments appears to be rather a problem than the advantage for the further development of the Division. Interestingly, in spite of the fragmentation among the departments, some research topics are evenly distributed between different departments (e.g. ecotoxicology with professors from 3 different groups in Zoology, Botany and Molecular Biology, tumor biology with 2 groups in Animal Physiology and one in Molecular Biology and conservation biology in Animal Physiology, Zoology and Botany). For some of these topics, there is no obvious links between the departments as judged by the lack of common publications

Altogether, the "on paper" organizational structure and the real operational organization revealed discrepancies from no links to strong interactions. One has a feeling that no attempts were given to organize rationally the research topics with some rare exceptions from this rule. The rational explanation for this could be the fact that the Division is distributed into four different buildings preventing more functional interactions. For that reason we strongly recommend re-grouping of the Division in a common site (Horvatovac) as originally planned. This should be a primary interest not only for the Faculty of Science and the Division of Biology but also for the University of Zagreb. Another possible way to overcome this problem would be to build methodological (infrastructural) platforms ('open and shared lab spaces'). This would, among others, help rationalize the use of equipment, avoiding the duplication of some labs. Such laboratories organized as core *facilities* should enable a less expensive and more efficient work flow. In addition, such organizational re-grouping would facilitate currently inadequate interactions between research groups.

Another example for the lack of core facility which could have a long-term negative influence on research and teaching in life sciences is the facility for experimental animals. Nowadays, the requirements for experimental animals are exceptionally high and the reproducibility of the results truly depends upon the conditions in which the animals are bred and maintained. The existing animal facilities are suboptimal for the appropriate and professional housing of laboratory and experimental animals (temperature, humidity, hygiene etc). The Division is advised to contact other life science faculties/institutes in Croatia in order to discuss and plan a joint utilization of such infrastructure. For the time being it is recommended to reduce the laboratory animal numbers to the minimum needed for teaching and research and try to meet the international standards in terms of stocking rates in the mouse cages. On the university level the Division should try to join other institutes and schools working in biomedicine in order to gain the laboratory animal facilities that would allow breeding of laboratory animals under conditions that are nowadays essential for application to international research grants.

Postgraduate / PhD Education – Meeting with the PhD Students

We were impressed by the overall quality of PhD students, in particular with their dedication to scientific questions and the scientific community, their willingness to work hard, their capacity to solve problems by innovative and alternative approaches and their English language abilities. The new generations of scientists should be further nourished by the implementation of a PhD committee (continuous progress reports and support, supervision and quality assurance through external experts) and a literature and or scientific writing seminar obligatory for all students. In a frank discussion some students pointed out that they lack an everyday contact with their mentors to discuss their programs / work and more importantly they emphasized that Journal Clubs and Work in Progress seminars are not organized with some rare exceptions. They also pointed out inadequate cooperation between different research groups and also cooperation among themselves.

SWOT analysis

Strengths:

- The Division covers several timely research and education topics including conservation biology/genetics, ecotoxicology and tumor biology/genetics.
- All research teams visited publish on a regular basis in peer reviewed journals.
- There has been a strong effort to compile existing data and gather new knowledge on the flora and fauna of Croatia combining both traditional methods and modern techniques (field surveys, morphology- and DNA-based taxonomy, digital data bases, genetics, cytology, GIS ...). This descriptive work is of very good quality, covers a wide range of taxonomical groups and is extremely important.
- In this context the reviewers also acknowledge the efforts that have been put into the organization and development of plant collections for education and for raising public awareness on plant diversity and conservation at the Botanical garden
- Finally there is the impressive commitment and talent of the rising generation of scientists.

Weaknesses:

- The major weakness is diversification of the division in terms of locations, number of subgroups and thematic fields; unequal distribution of infrastructure and equipment within the Division.
- Another point is the impact and organization of the professional (consulting) and other nonscientific research grants (requested from industry, various ministries, state offices and local communities) were not clearly presented. This includes the impact of these activities on the Divisions' budget and the distribution and the use of these financial resources for the development of this institution.
- Having mentioned the satisfactory publication activity of the groups it has to be mentioned that some group leaders lack publications in the research fields they are supposed to be actively involved. It was noticed that PhD students also publish unevenly in the different departments.

Opportunities:

- The implementation of technology platforms and intensification of inter-divisional co-operations along common research themes and goals should increase research efficiency and favor the emergence of innovative research topics.

- For the biodiversity studies, the descriptive work is not sufficient and new approaches are now needed to understand the patterns and processes driving diversity, using a hypotheses testing framework.
- The Herbarium space should be reorganized and rationalized according to the needs

Threats:

- We fear a lack and/or loss of corporate identity and (inter-)national visibility and competitiveness of the Division.
- The takeover of biodiversity studies by other groups if more effort is not put into using the existing data and working on patterns and processes.

Concluding remarks and recommendations:

The Division of Biology is, without a doubt, one of the key institutions of the University of Zagreb, not only taking into account its historical role in education and scientific work, but also regarding its present achievements and its future perspectives. However, the Committee has discovered several weaknesses, which represent a serious obstacle to the further successful development of the institution:

1. The Faculty and University management should strive to establish a more efficient organization of scientific work and to define and implement strategic objectives. The present fragmentation is not sustainable and should be harmonized with the strategic development objectives of the Faculty and University.
2. The individual departments (or groups) of the Division of Biology are physically separated, which prevents networking and organizing activities into logical units as well as preventing the rational use of equipment. Therefore, we strongly recommend that the Faculty as well as University management undertakes all actions necessary to solve the above mentioned problem. This primarily refers to the actions that involve the construction and moving all the Division to the originally proposed location of Horvatovac.
3. The management of the Division as well as of the individual departments should attempt to provide better quality of interactions between the scientists but also to stimulate stronger mobility of the personnel.
4. Team and project managers should get involved more actively in education of Ph.D. students and young scientists – joint weekly meetings such as “journal clubs” and “work in progress” represent an indispensable activity for scientific institutions and have been almost completely omitted in the Division.
5. The professional (consulting) projects have to be organized in a more efficient and transparent way. Through the so called “professional projects” the Division performs activities of national interest but the impression is that the decision-making is completely given over to individuals (managers) instead of being systematically approached. The activities of the Division aimed at strengthening the intellectual property rights protection are extremely low and should be organized as soon as possible at the Faculty or University level.

The expert commission recommends for the short term

- (i) to ask the Division of Biology for the implementation of a plan how to share existing research infrastructure and how to plan future investments in a concerted action
- (ii) to bundle existing research activities according to the publication and thematic track record
- (iii) to further support the rising generation of scientists by implementation of PhD committees.

The expert commission strongly recommends for the long term to reduce the number of locations at which the Division operates in research and education.

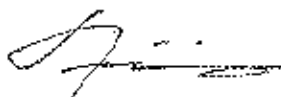
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Form for evaluation of scientific organizations, to be filled by expert commission.
Each of the parameters is assigned a grade ranging from A (excellent) to D
(unsatisfactory).

The form is filled on the basis of analysis of the evaluation form filled by the scientific organization (SO), review of the documents asked by the commission and interviews that commission members conducted during their visit to the SO.

I. General information

Evaluation of SO compared to:	A	B	C	D
Mission and goals		x		
Strategy and implementation of the strategic goals			x	
Compatibility of organization with strategic goals			x	
Compatibility of projects/programs with mission and strategic goals		x		
Infrastructure and equipment			x	
Human potential and staff policy*		x		
Income structure			x	
Academic prestige		x		
Social influence		x		
SWOT analysis			x	
Other similar institutions in Croatia**		x		
Other similar institutions in the EU**			x	
Cooperation with other similar institutions in Croatia			x	
International cooperation			x	
Participation in university teaching (only for research institutes)				
Average duration of writing MA (specialist) theses***		x		
Average duration of writing doctoral theses***		x		
Measures implemented for emancipation of junior scientists			x	
Transfer and commercialization of knowledge			x	
Promotion of science in the public		x		
Total grade		x		

II. Quality and innovativeness of research

Evaluation of quality compared to:	A	B	C	D
Quality of research projects/programs		x		
Significance of contribution to a scientific area		x		
Scientific prestige of project/program managers			x	
Innovativeness of research			x	
Strategy of publishing scientific results*			x	
Strategy of publishing professional results*			x	
Quality of published scientific works		x		
Quality of other relevant research results			x	
Total grade of quality of research			x	

***Explanation:** is judged according to proportion of works published in most prominent scientific (professional) magazines, taking into account specific situation within each scientific discipline

III. SO efficiency

Evaluation of efficiency compared to:	A	B	C	D
Number of defended doctoral theses		x		
Number of defended MA (specialist) theses*		x		
Number of published scientific works		x		
Division of the number of published work among constituent units			x	
Number of published professional works		x		
Number of published scientific books and chapters in scientific books		x		
Other results of the similar rank		x		
Number of recognized Croatian and international patents				x
Total efficiency grade		x		

*During evaluation of efficiency it is essential to take into account the number and structure of the scientific staff and financial means SO has at its disposal for scientific research

* Human potential and staff policy – should be different categories

** Not enough information provided in the self assessment form

*** Not enough information for accurate comparison

Comments and recommendations

Contains:

- a) concrete remarks, description of noted deficiencies and recommendations for improving

*Grade explanation:

A: excellent

B: good

C: satisfactory

D: unsatisfactory

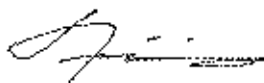
Commission for creating forms for the evaluation of scientific organizations:



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2. Prof. Dr. Med. Vet. Mathias Müller



3. Prof. Dr. Stipan Jonjic