

Evaluation of the Research and Professional Activity of the Institutes of the Czech Academy of Sciences (CAS) for the period 2010–2014

Final Report on the Evaluation of the Institute

Name of the Institute: Institute of Vertebrate Biology of the CAS, v. v. i., Brno

Fields, in which the Institute registered its teams:

Biological sciences including biotechnology and agricultural sciences

Observer representing the Academy Council of the CAS: Vladimír Mareček

Observer representing the Institute: Josef Bryja, substitute observer Pavel Jurajda

Commission No. 7: Biological sciences including biotechnology and agricultural sciences

Chair: Emeritus Professor Erick Vandamme

Date(s) of the visit of the Institute: November 2 - November 11, 2015

Programme of the visit of the Institute: see attached Minutes from the visit

Evaluated research teams

No. 1 - Institute of Vertebrate Biology

A. Evaluation of the Institute as a whole

1. Introduction

The Institute was founded in 1953, and can be considered as excellent in most aspects. Three areas of strength are recognised “Evolutionary Biology”, “Medical Zoology”, and “Biodiversity” all interfacing with an interest in “Applied Zoology”.

Evolutionary biology : this area studies mating systems in fish and passerine birds, sperm morphology, host-parasite evolution (cuckoos, bitterling-muscle), thermal strategies in aquatic vertebrates, killifish and their smallest life span, hybrid zones, *Mus musculus musculus* and *domesticus* hybrid zone and secondary contact.

Biodiversity: this area studies biogeography of bats, amphibians, rodents in Africa. It also studied is genetic diversity in fish, ground squirrels, otter, chamoix, effects of habitat fragments.

Medical Zoology: this are studies vector-borne zoonoses, west Nile virus, and some pig-borne diseases, epidemiological studies, viruses hosted by rodents and bats, protozoan and helminth parasites of great apes and human.

Much research is also ongoing into **Applied Zoology**, monitoring endangered populations in CZ, in freshwater ecosystems, monitored effects of EU's Freshwater Directive, vertebrate invasions, e.g. mink, mallard, black rats in SE Asia.

There are three sites in the institute; these are located in Brno, Studenec, and Valtice. At the last evaluation there were five departments. Because there were many synergies and overlaps, a decision was made to merge all departments to one, with a flexible structure, not limited by taxa or approach. There are several international (EU) collaborative projects. The teams overall have a good combination of lab and field work. There are 101 staff, and a good number of staff are between 25 and 40.

The Brno site has facilities for tropical and cold-water fish, including a unique collection of killifish. Valtice is situated 60 km south of Brno, a wonderful riverine field site. In 1950s, the site was established, modernised in 2005 and was enhanced through the installation of state-of-art equipment in 2006 (basic molecular techniques in very clean, contamination free labs. At Studenec a new building was established in June 2013, and the breeding facility is being upgraded as well, to be opened in 2017 (48 million CZK). There is also a student facility, and a new lecture hall has been installed.

2. Strengths and Opportunities

There is a really good sense of community here. The work they are doing is very nice. It was a pleasure to hear such enthusiasm coming from the staff. They have also carved a distinctive niche, which has international value as evidenced by (1) 3 large-scale European grants; (2) field-work in many places around the world (Africa, Asia, Europe) and (3) excellent publications (see below). They also edit an in-house international journal and they have written and edited standard references. They are well placed to make an excellent international leap in conservation biology and applied zoology.

3. Weaknesses and Threats

The group could consider enhancing (perhaps via outsourcing/collaboration) the application of high throughput DNA sequencing (HTS) methods, through integrating more population genetics and genome studies into work on, e.g., hybrid zones, host-parasite interaction, population movements, disease evolution and more. All project like this could have contemporary HTS methods (e.g. genome type by sequencing) at their heart.

Because the Institute is split over three distinct sites, in Brno, Studenec and Valtice, this creates structural problems in the departmental organisation. It clearly does not make sense to divide activities into the three sites, a situation that failed previously. That structure was closed down and replaced with a collaboration-based system, without structure, which the staff publically support strongly. It does seem to be working, but care needs to be taken that all staff are engaged in this structure, and that the institute can build appropriately in key strategic areas.

4. Recommendations

To keep cutting edge, we strongly recommend that HTS-based research, involving e.g. genome analyses and population genetics is strengthened whenever practical.

Given the excellent research work going on this group as a whole, and its direct relevance to issues of international importance, the committee felt that the group could have a significant role within CZ government/EU policy making on issues relating to tropical disease threats, conservation implications of animal disease (wild or farm). For example they could have a national strategic role in biodiversity advice influencing e.g. the Czech Biodiversity Strategy documents.

5. Detailed evaluations

Declaration on the quality of the results and share in their acquisition

The publication output is good; 71 papers were submitted, 19 were classified in top grade of paper quality. Most outputs from here are publications in journals with IFs, some in excellent journals (e.g. in MBE, Nature Genetics, Cell, PNAS, and good subject journals). They generate about 100 papers a year. The quality of publication is increasing and both the total and mean IF are rising. Books are published as well, on “Evolution of house mouse”, “Microbial Zoonoses and Sapronoses”, and other books written in Czech language.

Declaration on the involvement of students in research

Students seems to be fully integrated, the collaborative nature of the structures means that students and young staff are involved in cross institutional structures. Academic staff are involved in student teaching.

Declaration on societal relevance

The direction of research is sound, and is answering direct challenges and research of general interest, including in e.g. effects of climatic change on fitness and adaptation. The results of basic research can be applied to relevant problems, e.g. in consultation services influencing policy making, developing tools in epidemiology and zoonoses, and screening activities. They are making good efforts in public understanding and public outreach.

Declaration on the position in the international and national context

Many of the staff have involvement on editorial boards of journals. They publish Folia Zoologica (a journal with IF), they have good museum collections of specimens collected over many decades, a library with 30,000 items and an educational centre. The institute has organised meeting in Zoology, including international meetings. They have had their work converted to a film in 10 editions. The publication output is good

Declaration on the vitality and sustainability

Research-wise there is no doubt that the group are sustainable. Institute budgets are stable, but will be insufficient in long term to build and grow, particularly for critical, strategic work as is being done here.

Declaration on the strategy and plans for the future

The institute is confident and ambitious to do well, building on its past successes. It would facilitate the Institute if it could build its bioinformatics base and to expand its influence in political sphere, as mentioned above.

Evaluation of the individual teams

Evaluation of the Team No. 1: Institute of Vertebrate Biology

(=See above)

Date: December 15, 2015

Commission Chair: Emeritus Professor Erick Vandamme