



Centraalbureau voor Schimmelcultures

Fungal Biodiversity Centre

Institute of the Royal Netherlands Academy of Arts and Sciences (KNAW)

Reply of the CBS Fungal Biodiversity Centre (CBS-KNAW) to the Research Assessment (2014)

The CBS was subjected to peer review in June 2014, covering the assessment period 2008–2013. In this regard the CBS is extremely grateful for the time and effort allocated to the evaluation process by the Committee.

The Committee clearly recognized the CBS as the global leading Fungal Biodiversity Centre in terms of scientific expertise, productivity, quality and relevance. It was subsequently awarded the rating as *excellent*. It was also with deep appreciation that we took note of the ratings bestowed on each of the respective research programmes, of which the continuing programmes and the collection (see below) were all rated as *excellent*. The Committee also made very valuable recommendations, which the CBS can act upon for future implementation, and we thank them for this thorough analysis.

In total 16 general recommendations were made pertaining to the institute as whole, to which we want to reply. These recommendations were structured in four categories, namely: *Resources and funding policy*, *Mission and strategy*, *Management structure*, and *Next generation researchers*.

Resources and funding policy

Recommendation 1 – budget:

We are in total agreement with the Committee that the CBS has ambitious, but realistic goals, but that the “funding is far below what is required to truly deploy the collection’s richness in fungal biodiversity to the benefit of society”. Due to continually rising costs of building infrastructure and of maintaining the world’s largest, and most diverse living fungal collection, and a declining budget, it has become increasingly difficult for the CBS to retain its quality standards and leadership position. CBS also finds itself unable to replace retiring group leaders, which hampers us from developing in new areas such as natural product discovery. We therefore welcome the recommendation that the KNAW should reconsider its direct funding to CBS in an attempt to match the steep increase in research grant-based funding and research contributions, with regard to both research quality and output.

Recommendation 2 – financial management system:

We are in agreement that the present web-based interface and buying experience with pro-forma invoices is not entirely client friendly. However, the fact that the KNAW now has a VAT number, makes it possible to introduce a system whereby clients can pay for products in our webshop via credit card, which will save a huge amount of time from staff, and also improve the user experience. The KNAW should thus consider to aid CBS in this regard, to make the new financial system fit for purpose, especially with regard to integration with the Oracle accounting system.

Mission and strategy

Recommendation 3 – knowledge to handle the broad diversity of fungi:

To retain current levels of expertise covering the major groups of fungi in agricultural, medical and industrial mycology within the collection, CBS will require additional budget. In the various CBS courses that we teach on an annual basis, we address this issue by hiring in experts where we lack the in-house knowledge. Although research requires focus, the expertise required in the collection must remain as broad as possible.

Recommendation 4 – report on the use of the collection:

We acknowledge the importance of the use of the Collection, and do have these data available. However, much of these data are covered by client confidentiality agreements, and thus cannot be made available freely online. In general terms, figures relating to numbers of orders are available internally and parts of it are provided in our biennial report, though we do not state which strains were actually ordered.

Recommendation 5 – broaden its visibility to stakeholders and society:

CBS has paid much attention to community engagement, but did not clearly state this in its report to the committee. During the evaluation period the CBS has made several television appearances, been in the popular press, on radio programmes, and has made headline news with new fungal discoveries (e.g. *Penicillium* spp. named after the Royal Family). We will, however, investigate ways of further maximizing these activities by placing hyperlinks on our website in a manner which is also attractive to the general public.

Recommendation 6 – natural product discovery:

The CBS aims to further expand its activities in industrial mycology (incl. natural product discovery). However, we will not go beyond our expertise, and aim to do initial screening of fungal extracts with partner institutions, who in turn will develop this further. As we will be collaborating with various partners, intellectual property rights will represent a significant challenge for CBS, which we will in collaboration with the KNAW try to resolve with different business models, depending on the respective projects.

Recommendation 7 – Open Access Biology:

The CBS already presents significant data online in the open access model, and is continuously striving to increase this via support from the KNAW. However, not all information can be made freely available due to client confidentiality or the commercial model linked to the specific project or product.

Recommendation 8 – Active International Participation:

We are happy to see that the committee appreciates the leadership roles that CBS has occupied in international organisations (e.g. IUMS, IMA, ISHAM, WFCC, MIRRI, ECCO etc.), and CBS will definitely continue to play an active role in these bodies in years to come.

Recommendation 9 – funding through global philanthropic organizations:

We have for several years had a highly successful grant funded by the SLOAN Foundation (just renewed), but will in future also consider other philanthropic organizations as recommended.

Recommendation 10 – IT tools and assistance:

The CBS acknowledges the recommendation to reconsider the future development of its database software. However, as CBS owns the source code of BioloMICS, and has tailored this software to suit our needs since the beginning, we are of the opinion that it is much better suited for our purposes than other commercially available or open source software packages. With a new version of the software about to be released, CBS will consider how best to proceed with future software development. Outsourcing of IT development via BioAware has in the past proven to be cheaper than in-house development. Given the diversity of data housed in the CBS collection, and the ever-increasing legal demands (such as the Nagoya protocol and quarantine, human pathogenicity, GMO and dual-use status of strains) placed on culture collections, the BioloMICS software has shown itself to be easily adaptable to meet such challenges. It is an open question whether other software would be able to adapt rapidly and in a tailor-made fashion to these and other future demands.

Management structure

Recommendations 11, 12 – implementation of strategy and organogram:

CBS has purposefully postponed all final decisions on strategy pending the findings of this review. Once these decisions are taken, time lines for a future strategy will be presented, and a new institutional organogram developed.

Next generation researchers

Recommendations 13–15 – graduate schools and mentoring:

Due to administrative hurdles linked to the appointment of one group leader as professor at a Dutch university, we purposefully postponed signing up these PhD students in graduate schools. This has subsequently been addressed. CBS provides excellent guidance to its students and PhD's, and they each have a daily supervisor and mentor. To facilitate the better integration of foreign students into the Dutch system, one of our HR staff is currently enrolled in guidance of all PhD students. PhD students and postdocs have regular discussion groups to stimulate sharing of ideas, and all also attend the Monday morning CBS seminars.

Recommendation 16 – new strategies:

Once aspects such as the merger of groups and the new budget becomes clear (*recommendations 11, 12*), CBS will communicate all decisions in a timely manner to all levels of staff via its Management Team and Works Council and generally does so in combination with weekly seminars and other plenary events.

Pedro W. Crous
Director CBS-KNAW
18 September, 2014

