Functional systematic and phylogeny of pharmaceutically and biotechnologically important groups of Basidiomycetes in China, with a special emphasis on the *Ganodermataceae* and *Perenniporia*ceae 'Bio-pharma' - BL/10/C41

(Geographic) study area (country/region) :
China (Provinces Beijing, Fujian, Hainan, Jiangsu, Liaoning, Yunan,)

OSTC testsite (if applicable) **:**

Data used:

Satellite imagery used: not applicable

Context and objectives

Mushrooms are empirically used in traditional Oriental medicine since more than 3000 years, for the prevention and treatment of a wide range of disease. Many eastern peoples are familiar with *Ganoderma lucidum*, known as "Lingzhi" in China or "Reishi" in Japan, and has been the subject of many myths of medicinal application. The first record of the use of Ganodermataceae in traditional medicine dates back from 220 A.D. Interest in medicinal mushrooms is also now spreading worldwide. Both groups are also important wood decomposers, producing very efficient enzymes, which have a high biotechnological potential in many applied fields (bioremediation, paper industry, etc.). However, the development of the pharmaceutical or biotechnological industry, somehow, and this is especially true in occidental countries, is hampered by the lack of standardization and scientifically sound validation of, on a first hand, the organisms dealt with, and on the second hand its specific actions.
The research project clues for comprehensive understanding of the biological (including phylogeny), and functional diversity of pharmaceutically and biotechnologically important groups of fungi in China: *Ganodermataceae* and the *Perenniporiaceae*, Poroid *Hymenochaetaceae*.

Methodology

- Field survey in different ecosystems, from temperate (Liaoning, Beijing) to subtropical and tropical (Jiangsu, Fujian, Yunan, Hainan);
- Culturing in the field and preliminary morphological characterization; ecosystem characterization
- Morphological studies in laboratory;
- Molecular characterization in the laboratory by sequencing of genomic markers, data-basing of DNA sequences, comparison of sequences and phylogenetic inferences;
- Building up a molecular database for further identification of important medicinal or biotechnological species
- Building up a database with additional and combined morphological, biogeographical and ecological data of the *Ganodermataceae* worldwide

Results

Research stays of Chinese scientist in Belgium: 2 Chinese visitors, in 2006 and 2007 (a third one expected in October 2007).
Field surveys in China: 2 field surveys (August 2006, September 2007); about 300 strains incorporated in BCCM/MUCL and about 400 herbarium specimens.

Phylogeny.

- A preliminary sequence database of 210 strains of *Ganodermataceae* based on documented voucher specimens has been build up for a molecular marker; sequencing of all the described species of *Fomitiporia* for 2 molecular markers.
- About 70 terminal clades or phylogenetic species identified for the *Ganodermataceae*; possibly up to 8 undescribed clades evidenced in the *Fomitiporia*;

- 2 strains per clades / species of Ganodermataceae are presently sequenced for a second genomic marker (mitochondrial DNA); combination of both markers in a single database for a robust phylogeny (Genealogical Concordance Phylogenetic Species Concept);
- Publication of standardized descriptive fiche foreseen, on line and in paper format, based on phylogentic species and morphological data

New taxa of mushrooms / new classifications

- 10 undescribed species of *Perenniporia* evidenced: *Perenniporia rhizomorpha sp. nov*. published (see list of publications);
- 2 (possibly 4) new species of *Fomitiporia* from China (4 additional undescribed taxa evidenced during the project from other regions of the world*:* 1 species already submitted for publication *Fomitiporia punicata* sp. nov. (see list of publications);
- Several other taxa reclassified in correct genera (e.g. *Perenniporia cystidiata* demonstrated to be synonym of *Microporellus violaceo-cinerascens*)
- Invalidation of species concept in China (e.g. *Ganoderma coffeatum* sensu Chinese authors, *Perenniporia cystidiata*).

Two graduations thesis completed at UCL based on materials and thematic directly link to the project objectives

- The *Perenniporia fraxinea* complex. Graduation thesis in collaboration with ULB and UCL;
- The *Fomitipora* complex. Graduation thesis in collaboration at UCL

Products and services

Publication in peer reviewed journals:

Dai Y.-C., Yuan H.-S., He W., and Decock C. 2006. Polypores from Beijing area, Northern China. Mycosystema. 2225: 368-37;

Cui Bao Kai, Dai Yucheng, Decock C. 2006. Two species of *Perenniporia* (Basidiomycota, *Aphyllophorales*) new to China. Fungal Science 21: 23-28;

Cui B. K., Dai Y. and Decock C. 2007. A new species of *Perenniporia* (Basidiomycota, *Aphyllophorales*) from eastern China. Mycotaxon 99: 175-180

Decock C., Herrera Figueroa S. 2007. Studies in Ganodermataceae (Basidiomycota): The concept of *Ganoderma coffeatum* in the Neotropics and East Asia. Cryptogamie Mycologie 28: 77-89.

Decock C. 2007. On *Microporellus* with two new species and one recombination (*M. papuensis sp. nov.*, *M. adextrinoideus sp. nov.*, *M. terrestris comb. nov.* Czech Mycology (special Prof. Kotlaba memorial issue): in press.

Dai Y.-C., Cui B.-K., Decock C. 2008. A new species of *Fomitiporia* (Hymenochaetaceae, Basidiomycota) from China. Mycological Research: submitted

Database of *Ganodermataceae* sequence: available only at BCCM/MUCL.

Execution

Period: Dec. 2005- Nov 2007

Laboratory/network:
Dr. Cony Decock, Mycothèque of the catholic University of Louvain (Belgium);

Dr. Yu-Chen Dai, Institute of Applied Ecology, Shenyang, China

Discipline

Taxonomy (Fungi)
Forest & natural vegetation
Agriculture Environment