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IN THIS ISSUE

The 50th Anniversary of the Japan Society for Culture Collections

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Introduction

The first service culture collection to be established in Japan dates back to 1899. The Tax Administration Agency of the Japanese Government undertook basic and applied studies in the production of sake and other fermented products and set up the Brewing Experimental Station, now the National Research Institute of Brewing. A culture collection of microorganisms was located at the Station (RIB) charged with the distribution of microbial cultures on demand. Another early and noteworthy culture collection was the Central Research Laboratory of the South Manchuria Railway Company (CLMR) at Dairen, Manchuria (at present Dalian, Liaoning Province, China). These culture collections were major sources of microbial cultures in Japan before World War II. Unfortunately, these collections were destroyed during the war but part of the CLMR culture collection was transferred to Hiroshima and Osaka Universities (Hasegawa, 1996). The very first service culture collection in the world is reported to be the Kral Culture Collection founded by Frantisek Kral in Prague in 1890 (Sly et al., 1990) at a similar time to the establishment of the RIB Culture Collection.

In 1876 the Komaba Agricultural College, now the Faculty of Agriculture, University of Tokyo, was established. Teaching of applied microbiology started at that time and intensive research into the taxonomy, biochemistry, and physiology of microorganisms involved in traditional fermentations has been carried out. The research brought about new microbial industries in Japan including those involved in the production of antibiotics, amino acids, nucleosides and nucleotides, as well as useful microbial enzymes. This stimulated basic microbiological studies and as a result new fermentation processes were developed. Given this background, it can be understood how the modern microbial industry developed in Japan.

Taxonomic studies on a wide variety of microorganisms of economic importance have been carried out at the Brewing Experimental Station. Consequently, universities and private sectors have preserved microbial cultures for research purposes, and particular attention has been paid

to the maintenance and development of culture collections. In fact, the Higher Education and Science Bureau of the Japanese Ministry of Education carried out a survey in 1952 on microbial cultures preserved in research organizations, including universities, governmental institutes, and private sectors. It concluded that 22,300 cultures were maintained by 251 culture collections belonging to 144 organizations. The Bureau published *A Catalogue of Cultures of Microorganisms Maintained in the Japanese Culture Collections* (The Higher Education..., 1953) in 1953 edited by Dr. K. Kominami in which the scientific names of holdings were given, the history of the cultures and the culture collections preserving the cultures were described.

Establishment of the Japanese Federation of Culture Collections (JFCC)
The JFCC was established in 1951 following the recommendation of the Japanese Ministry of Education and Science Council of Japan. The aim of the federation is to encourage research on microorganisms and exchange information on microbial cultures. The federation currently consists of 23 Japanese culture collections and encompasses collections in the fields of general microbiology, medical microbiology, applied microbiology, and environmental microbiology. The JFCC was the first "network" of culture collections and data banks in Japan (Komagata, 1977). In response to social needs and growth of microbiology, the federation changed the name to the Japan Federation for Culture Collections (JFCC) in 1974, and the Japan Society for Culture Collections (JSCC) in 1993. In commemoration of the development and progress of the Japanese Federation of Culture Collections, the JSCC organized and held the 50th anniversary, and commemorative lectures were presented in July 2001.

The First International Conference of Culture Collections
The delegation of the Japanese government submitted a proposal to 12th General Conference of UNESCO in 1962 as recommended by the Japanese Federation of Culture Collections (JFCC). It included the following: (1) the development of culture collections on a worldwide scale; (2) the development of research on microorganisms; and (3) the training of researchers in both of these fields. The proposal was adopted at the 13th General Meeting of UNESCO in 1994 as a long-term project entitled "promotion of research of microorganisms". As a result, UNESCO held the International Meeting of Specialists on Microorganisms in Paris in 1966, and representatives of UNESCO, the Section on Culture Collections of International Association of Microbiological Societies (IAMS now the International Union of Microbiological Societies, IUMS), Japanese Federation of Culture Collections, WHO, and FAO discussed plans for this long-term project. This meeting made the following recommendations to the Section on Culture Collections of IAMS: (1) a worldwide survey of culture

collections; (2) the preparation of a world directory of culture collections; (3) the training of researchers; (4) the promotion of exchange of cultures; (5) standardization of terminology, and methods of determination and recording of research information; (6) the convention of international conferences; and (7) the organization of an international federation. These recommendations were considered by the Section on Culture Collections of IAMS and were approved by the Executive Committee of IAMS and the ICRO-UNESCO Panel on Microbiology. Japan was requested to hold an international conference as the original proposer of the project. The Japanese Federation of Culture Collections discussed the matter with the Japan National Council of Science and the Japanese Commission for UNESCO, and organized the conference in Japan. Thus, the First International Conference of Culture Collections (ICCC-1) was held in Tokyo in 1968 (Iizuka et al., 1970). The Japanese Federation of Culture Collections played important roles in ICCC-1, 526 persons from 52 countries participated in the conference. Resolutions were unanimously decided and contained the following:

Resolutions

1. That it is recommended that an International Federation for Culture Collections be established and that an ad hoc committee consisting of Professor Iizuka (chairman), Dr. Senez, Professor Skerman, and Dr. Martin be appointed to prepare a draft constitution for the Federation for submission to and consideration at the 10th International Congress of Microbiology in Mexico City in 1970.
2. That this conference recommends that conferences on culture collections be held at regular intervals and that the next international conference be held in Czechoslovakia in 1972.
3. That the Section on Culture Collections be asked to investigate the need for special training courses and to advise on procedure in submitting requests for such training courses. And that a specific request be made through the appropriate channels for a special technical training course in the methods of preservation of cultures in 1970. And that the ICRO/Unesco panel should be approached on this matter.
4. That the conference recommends the establishment of reference laboratories, e.g., of a type similar to those organized by WHO.
5. That this conference recommends the establishment of an international center for the characterization of strains of

microorganisms to provide aid for individual workers unable to fully characterise strains in their own laboratories or who wish (as may biochemists) to have the strains characterised by taxonomic specialists.
6. That the conference recommends that the problem of provision of laboratory supplies and cultures to developing countries be drawn to the attention of UNESCO, WHO, and FAO with the view to obtaining financial assistance to enable specified research institutes to obtain these materials.
7. That this conference recommends that a feasibility study to be made on the establishment of an international center for information.

The activities of the Japanese Society for Culture Collections (JSCC)
The JSCC holds a general meeting once a year to discuss activities of the member collections and considers international trends in culture collections. The journal of "Microbiology and Culture Collections" is published twice a year by the JSCC containing original papers covering the systematic study of microorganisms, development of microbial preservation, and other related studies. The members of the JSCC have participated in international training courses and workshops as trainers and lecturers. "The International Training Course on Bioinformatics: Data Management and Computer Usage in Culture Collections" was held in Osaka and Tokyo in 1986 under the sponsorship of UNESCO, WFCC, WDC-MIRCEN, ICBiotech Osaka University, and JFCC. The program of this training course included lectures on international organizations related to culture collections, importance of culture collections, preservation of microorganisms, management of culture collections, microcomputer usage and study tours. 13 persons from 10 countries participated.

On the occasion of the 15th International Congress of Microbiology, IUMS in Osaka in 1990, the Kral symposium entitled "100 Years of Culture Collections" was held to cerebrate the centenary of the establishment of the first recorded service culture collection. Dr. F. Kral was the founder of the first service culture collection (Sly et al., 1990). Dr. M. Kocur, Czechoslovak (at present Czech) Collection of Microorganisms, presented a paper of "History of the Kral Collection", and Dr. D. Fritz, DSM, and Dr. M. Kocur displayed posters depicting documents of Dr. F. Kral and his collection.
The Japan Collection of Microorganisms, a member collection of JSCC, conducted a 5-year project entitled "Asian Network on Microbiological Research" from 1994 to 1999, and large numbers of microbiologists and culture collections in Asian countries participated in this project. The motto of the project was "establishment of a human network". The project was successful providing useful knowledge, assistance in the

exploitation of microbial diversity and aiding the development of culture collections in the Asian region.

Holdings of JFCC member collections

The data of the World Data Center for Microorganisms (WDCM) in 2000 provides information on 489 culture collections in 60 countries and the holdings of these collections number 912,049 strains (World..., 1999). There are 393,809 cultures of bacteria (43.2%); 398,121 fungi (43.6%); 15,724 viruses (1.7%); 9,723 cell lines (1.1%); and 94,717 others cell types (10.2%). An increase of 96,525 cultures was recorded from 1994 to 2000 and the number of cell lines doubled in this period.

The JSCC member collections held a total of 206,157 cultures in 2000 (Japan..., 2001). Of these 136,404 are bacteria (66.2%); 6,529 actinomycetes (3.2%); 36,561 filamentous fungi (17.7%); 21,728 yeast cultures (10.5%), 1,280 microalgae (0.6%); 636 viruses including plant viruses, animal viruses, and bacteriophages (0.3%); and 3,021 others including archaeon, plasmids, plant cell cultures, animal cell cultures, phytoplasma, protozoa, nematodes, etc. (1.5%). An increase of 16,286 cultures was seen between 1999 and 2000. The JSCC member collections distribute approximately 20,000 cultures to domestic and overseas researchers and organizations each year. The JFCC-JSCC has maintained its interest in maintenance of a variety of cultivable or culturable organisms.

Microbial industry in Japan

The applied microbiology and microbial industry of Japan has grown in response to the social need to solve problems in traditional fermentations and to develop modern microbial processes. Japanese traditional fermentations were recorded about 1,000 years ago. Since the 17th century, steamed rice abundantly grown with Aspergillus oryzae has been used as a koji starter for making sake and has been sold to licensed sake makers. At this time it was recorded that a feudal lord strictly regulated the production of the koji starter and collected tax from its sale (Sakaguchi, 1964). The systematics, biochemistry, enzymology and other properties of koji molds have been intensively studied. Today the production of many kinds of indigenous foods has been developed to form the current modern industry.

Japanese microbial industry can be classified in four major phases.

1) Traditional fermentation

Koji molds, yeasts, and lactic acid bacteria have been employed for making sake, soy sauce, and fermented soybean paste. Sake is a national drink, and shouchu is a distilled spirit made from rice, sweet

potato, and other starchy materials. Both soy sauce and fermented soybean paste are fermented foods of soybean and are still important seasonings for the Japanese. Sake and soy sauce are now made on modern industrial lines and some processes are automatically controlled.

2) Fermentation industry introduced from overseas
Brewing of beer and making of wine and other beverages were introduced from overseas. Production of citric acid by Aspergillus strains opened a new field of microbial application. In addition, the introduction of acetone-butanol fermentation strongly influenced the development of the Japanese microbial industry, and the construction of large-scale fermentors and studies of bacteriophages were initiated in applied microbiology in Japan. Such industrialization seems to be a significant step in the movement from food industry to the nonfood industry.

3) Modern microbial industry
After World War II, penicillin production was introduced from the United States and was quickly and successfully industrialized and since then research has energetically pursued new antibiotics. Large numbers of useful strains have been isolated from natural sources and mutants with high potential have been screened. As a result, large numbers of new antibiotics were found by Japanese workers, and have appeared on the market. In 1946 the Japan Penicillin Research Association (now the Japan Antibiotics Research Association) was established for the promotion of the research and industrialization of antibiotics. Its members were from universities, national institutes, and industry, and they made all their data open and public. This Association contributed to the substantial development of research and production of antibiotics in Japan.
Microbial production of amino acids, nucleosides, and nucleotides is a significant achievement of modern biotechnology in Japan. The Japanese have widely used dried sea tangle, Laminaria, "kombu" in Japanese, as a flavoring material for a long time. A substance with the flavor of "kombu" was crystallized as monosodium glutamate in 1908. After this study, sodium glutamate was commercially produced by the hydrolysis of wheat protein, followed by the hydrolysis of soybean protein. This flavoring material is sold in a chemically pure state. However, the raw materials were not easily obtained just after World War II because they had been imported. As a result, Japanese workers attempted to produce glutamic acid from other raw materials. In 1957 they succeeded in producing glutamic acid from glucose by employing Corynebacterium glutamicum strains. This success was the first step anywhere in the world toward the commercial production of amino acids by using microorganisms. Studies of the production of glutamic

acid have been undertaken from the viewpoint of biochemistry, genetics, regulation of metabolism, and other aspects. Microbial production of lysine and other amino acids was achieved by employing mutants in which part of the metabolic pathway was blocked.

In addition, the Japanese have used dried skipjack tuna as a flavoring material. Skipjack tuna is a kind of sea fish, Euthynnus pelamis, and dried skipjack tuna is called "katsuobushi" in Japanese. In 1913 inosinic acid was found to have the flavor of "katsuobushi". Japanese researchers started to study the production of inosinic acid by the hydrolysis of yeast RNA by a fungal enzyme in 1951, and they found that only 5'-inosinic acid and 5'-guanylic acid tasted good, and the addition of sodium glutamate to these nucleotides enhanced the flavor. The microbial production of nucleotides was later attempted. One research group succeeded in the production of inosine and guanosine by mutants of Bacillus species, and 5'-nucleotides were produced by chemical phosphorylation. Another group attempted to produce 5'-nucleotides directly from glucose, and succeeded in doing so by using strains of Corynebacterium species and improved media.

4) Gene manipulation and new biotechnology
The development of techniques of gene manipulation has made it possible to produce novel organisms and useful substances. Besides microorganisms, animal cells are also targets of such studies, which are concerned mainly with the production of diagnostic reagents, research reagents, enzymes, amino acids, and other products. An erythropoteitic hormone, erythropoietin (EPO), is commercially produced by using gene-engineered organisms and employed for hemodialysis.

Annual production of Japanese microbial industry
The Japanese traditional microbial production in 1966 was approximately 5 trillion yen (approximately 34 billion US dollars. 1 $=145 yen). Further, the production of modern biotechnology including related manufacturing is valued at approximately 1 trillion yen (approximately 6.8 billion US dollars). Gene-engineered organisms produce erythropoietin, hormones, and enzymes for use as detergents. The production of enzymes for the detergent was estimated to be worth approximately 200 billion yen (approximately 1.4 billion US dollars). The Japanese microbial industry will contribute more than 1.5% of the gross domestic products (GDP) (500 trillion Yen) in 1996.

Retrospective and perspective
Since the early days of microbiology, astronomical numbers of microorganisms have been isolated from a wide variety of natural sources and used for scientific research and in the microbial industry.

However, large numbers of microbial cultures had lost in the past, and they are no longer available. Microbiologists often lose microbial cultures that they studied because of the change of their interests and difficulties in keeping the cultures. This negative outcome is due to the absence of reliable culture collections in which microbial cultures can be maintained properly and supplied promptly on demand.

Through the study of microbial cultures maintained in culture collections, potential properties of microorganisms have been developed, and the future perspective of microbiology will be foreseen. Effective research needs adequate and reliable sources of properly preserved cultures. In the near future, enormous numbers of microbial strains will be isolated during the study of microbial diversity, and the attributes of large numbers of the strains will be improved. Therefore, reliable and well-organized culture collections are needed as depositories and for the promotion of research and application of the cultures. In fact, culture collections play a key role in maintaining type strains in bacteriology and, as a consequence, the study of bacterial systematics cannot be completed without culture collections.

Microorganisms are widely used for biological studies and new advances in biochemistry, genetics, and molecular biology are essentially due to the studies of microorganisms as a models. The 21st century will see a new era of biotechnology particularly with the development of science and technology relevant to microorganisms.

Microorganisms are not only of value for the production of useful substances, but they also play unique roles in element cycles with plants and animals. To a great degree, humans depend on individual microorganisms in biotechnology and diverse ecosystems on the earth. Microorganisms are also significant gene pools, and these gene pools must not be lost. From this point of view, microorganisms can be regarded as a cultural heritage and a cultural property, and they must be transferred to the next generation in a normal and healthy condition.

Conclusion

Society's need for culture collections is increasing year-by-year and their effective and smooth management is required to provide the services required. Exchange of information and cooperation amongst culture collections are key. Enhancement of culture collections is crucial for the further development of microbiology, microbial industry, and biotechnology. In addition, the good operation and management of culture collections are in great part due to the activity of the highly trained and experienced personnel working in them.

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News: GBIF and the Global BRC Network

The Governing Board of the Global Biodiversity Information Facility (GBIF) met in Paris on September 11th and 12th. Dr. Jim Edwards was appointed to the Executive Secretary of GBIF there. The secretariat is located in Copenhagen and it is expected that GBIF will become a real entity soon. There are some microbial collections already involved in GBIF according to reports from countries and NGOs. Please refer to http://www.gbif.org/ for detailed information on GBIF.

The OECD activity on Biological Resource Centre (BRC) keeps going on and the BRC Task Force 2 of the Working Party for Biotechnology will meet in Paris on November 19th and 20th. The report of "Biological Resource Centers: Underpinning the Future of Life Sciences and Biotechnology (*)" by the Task Force 1 proposes to establish a "Global BRC Network (GBN)" based on scientifically acceptable, objective international criteria. The Task Force 1 was led by Japan and the implementation of the GBN is entrusted to the Task Force 2 led by France.
(*) For the full report, please refer to http://webnet1.oecd.org/oecd/pages/home/displaygeneral/0,3380,EN-document-617-1-no-no-5054-0,00.html or follow the link from http://wdcm.nig.ac.jp/

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Operation and Establishment of a Russian Biological Resource Centre

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Summary

The following information is provided to facilitate access to the bioresources of the Ural Specialized Collection of Alkanotrophic Microorganisms IEGM. This new Russian collection was established to study and preserve potentially valuable microbial cultures able to degrade oil hydrocarbons and xenobiotics. The IEGM collection is registered with the World Federation for Culture Collections and has established a database (http://www.ecology.psu.ru/iegmcol). It utilizes methods of polyphasic taxonomy and has personnel trained in handling hydrocarbon-oxidising microorganisms and skilled in the preservation of cultures. The collection is engaged in the comprehensive study of biology of alkanotrophs and collecting representative strains. It carries out characterisation provides taxonomic descriptions of the isolates and assesses their biotechnological usefulness. Improvement of methods for long-term storage of cultures and the provision of relevant information to users are key activities. The IGEM collection is involved in applied aspects using the collection gene pool for example the production of new products and the development of novel safe technologies. The collection provided the basis for the development of an oil-contaminated soil remediation technology using bacterial surfactants, with ecological effect being achieved during one vegetation period, and subsequent use of remediated soils for non-agricultural purposes. This technology is recommended for remediation of soil and water resources.

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Value of Microbial Diversity

According to the experts' estimations, if species continue to disappear at the current ratet, then 50 % of species on the Earth are expected to

disappear over the next hundred years with 20 to 75 biological species disappearing every day by 2040 (Sands, 1994).

Because natural resources are endangered, the secure preservation of the microbial gene pool is of primary importance, since microorganisms are the base of the life's pyramid crowned by humankind. It should be noted that much more attention has been given recently to microorganisms as significant components of biological diversity. Microorganisms are increasingly being discussed in relevant international initiatives established to solve global ecological issues (Convention on Biological Diversity, 1992; Global Biodiversity Strategy, 1992; Diversitas, 1996). The key areas of the international DIVERSITAS program are the intensive study of microorganisms associated with the human activity, that are involved in the remediation of ecosystems affected by this activity, the establishment of specialized biological resource centres and information networking.

Culture Collections

Culture collections have accumulated considerable experience in preserving and studying microbial diversity, with the number holdings of collections rapidly increasing. The World Directory of Culture Collections of Microorganisms (1999) describes 497 collections in 60 countries. Culture collections are no longer considered to be just facilities for depositing randomly collected strains. Collections of microbial cultures are now recognised as significant sources of scientific information and rich resources for biotechnology. In this respect, microbiological collections are becoming more valuable and there is already a tendency to estimate their monetary value. Thus, one American collection of microorganisms was reported to contain greater potential riches than those stored in the safe deposits of all the United States banks taken together.

Attempts are being made towards preservation and utilization of microbial resources using market stimuli (The economic value ..., 1998; Desmeth, 1999). To estimate the market value of microbial resources is far from being an easy task.

The Federal research program on Biological Diversity adopted in Russia requires as one of its major goals, the establishment of decentralised national collections which meet user demands and that are specialised nodes in an integrated net operating according to common regulations in Russia and all over the world.

IEGM

Ural Specialised Collection of Alkanotrophic Microorganisms (acronym

IEGM; WDCM # 768; http://ecology.psu.ru/iegmcol) could serve as an example of a node in the developing net of resource collections. The collection is a part of the laboratory of alkanotrophic microorganisms at the Institute of Ecology and Genetics of Microorganisms, Ural Branch of the Russian Academy of Sciences. The collection was established around the author's collection of hydrocarbon-oxidising microorganisms started in 1975 to study this group of organisms as potential bioindicators of oil and gas prospecting and environmental pollution. The IEGM collection studies the general microbiology, biotechnology aspects and preservation, with special emphasis on representatives of ecological-trophical groups of microorganisms which oxidise natural and anthropogenic hydrocarbons. Therefore it is involved in both the biogeochemical processes in the biosphere leading to a hydrocarbon free atmosphere of the Earth.

The collection contains over 1000 pure identified and characterised bacterial cultures which were isolated from thousands of soil, surface and stratal water, snow, air and core samples taken from ecologically and geographically separated regions (Perm Preduralye and Westen Sibiria, or Ulyanovskoye Povolzhye and Krasnoyarski Krai etc.). Industrially valuable extremophilic forms such as psychroactive strains, halo-, thermo-, baro-, osmo-, xero-, acido- and alkalotolerants; strains which degrade various classes of widely distributed organic pollutants, crude oil and oil products included; producers of indispensable amino acids, vitamins, fatty acids and biosurfactants; as well as bioindicators of oil -and gas-bearing areas, and at different stages of natural attenuation of oil-contaminated soils are extensively represented in the collection.

Features of Rhodococcus

Rhodococcus bacteria represent the core part of the collection. Until recently rhodococci have been little studied; it would seem that slow growth, difficult isolation and identification and the lack of marked pathogenic properties have prevented researchers from using this group of organisms in basic research. However, upon data accumulation from soil and geological microbiology, development of taxonomic analysis and establishment of biotechnology, it has become obvious that rhodococci have valuable features the scope of which has still to be fully delineated.

Rhodococci are now the object of research in many countries of the world. The ever growing interest in these bacteria is mainly due to the application of rhodococci in chemical transformations and in the biosynthesis of practically valuable compounds.

During studies of pure cultures of rhodococci we have found that natural isolates reveal high fitness and extreme adaptability based on a

variety of strategic survival patterns. These include alkano- and oligotrophic modes of life, ability to synthesize and accumulate endogenous substances as additional energy substrates, diauxotrophia, ability to grow at low temperatures (4 to 10C) and in a wide pH range, the ability to utilize organic substrates. Additionally, the existence of a complex morphological evolution cycle, high cell differentiation, and surface adhesion and colonization has been detected using scanning electron microscopy.

The presence of n-alkanes generally results in the formation of fibrillar capcules of polysaccharide nature, increase of various inclusions with reserve substances, formation of developed intracellular membrane structure and excessive cell wall growth (Ivshina et al., 1982; Glazacheva et al., 1990). Hypersynthesis of rhodococci cell wall during growth in the presence of gaseous hydrocarbons is an essential adaptation to form a kind of depot to fix gaseous substrates.

Furthermore, when grown on liquid n-alkanes rhodococci are able to synthesize surface active substances which decrease surface and interfacial tensions of water (up to 26-28 and 2-5 mN m-1). The biosurfactants produced exhibit high emulsifying activity and have significant advantages over synthetic detergents. Rhodococci-based surfactants are 100 times less toxic than synthetic ones (Ivshina et al., 1998; Kuyukina et al., 2001). We have successfully used these biosurfactants for oil-contaminated soil bioremediation. We have also developed a bacterial surfactant-based technological protocol for oil-contaminated soil remediation using a solid - slurry phase bioreactor and aerated soil plots, with a 90 % remediation efficiency being achieved within 7 weeks with oil-contaminated soils that have a high initial contamination level (20 %). The residual level oil products do not exceed 0.1 % (w/w) which allows subsequent utilization of remediated soils for non-agricultural purposes. The feasibility of the above technology was successfully tested at the Kokyiskoe oilfield, Perm region.

Rhodococci are ecologically and industrially interesting as they are able to synthesize extracellular acids, including indispensable aminoacids, when grown on n-alkanes.
These, and many other properties of rhodococci allow these organisms to dominate in biocenoses of the ever increasing number of extreme habitats under current ecological crisis; these are biotopes of oil-contaminated areas and oil-extracting outline zones, biotopes with increased mineral salt contents, etc.

Among the collection holdings of alkanotrophic rhodococci, particular

place belongs to representatives able to assimilate gaseous hydrocarbons (C2-C4) as a sole carbon source. They are capable of transforming almost all classes of organic compounds oxidatively. It is now possible to use this group of rhodococci as biocatalysts in fine organic synthesis, as highly effective hydrocarbon gas-based protein biosynthetics and bioindicators of hydrocarbon accumulation. Many rhodococci representatives are of importance as unique sources of immunomodulators, biopolymers and specific enzyme systems. Since 1975 we have been carrying out a complex study of ecology, the unique biological properties and taxonomy of rhodococci and related organisms. We have examined the laws governing the introduction of rhodococci into open ecosystems, the uniqueness of structural and metabolic arrangement of rhodococci under induced alkanotrophic metabolism and the biosynthetic, degrading and transforming activities of natural rhodococci strains. Our studies have resulted in the development of methods for ex/in situ rapid detection and identification of rhodococci (Ivshina et al., 1986; Ivshina, Kuyukina, 1997; Bell et al., 1999), and reliable techniques for long-term preservation of rhodococci cultures including lyophilization of cells with previously induced alkanotrophic metabolism. (Ivshina et al., 1994).

The IEGM collection currently holds the most complete collection of non-pathogenic rhodococci strains. Each strain has been examined by collection staff, each strain has been studied using traditional and state-of-art methods of polyphasic taxonomy including classical features, cell wall and structure, fatty acids, hemotaxonomic markers, species-specific PCR, protein electrophoresis and immunochemical methods.

The world holdings of the genus Rhodococcus bacteria are quite limited (World Directory of Culture Collections , 1999). Considering the high scientific and potential economic value of rhodococci and in the interests of reducing duplication of effort it seems opportune to discuss the re-distribution of rhodococci strains to establish a Rhodococcus-centre.

Sustainability and roles of IEGM

According to Dr. K. Yamasato classification (1992) the collection of alkanotrophs could be classified into a 'healthy and safe' category. However, it is not an easy task to keep the collection within this category, and from year to year it is becoming more difficult as maintenance of a collection is not only labour intensive but also expensive. It is estimated that US $4 million are required to establish and maintain a collection of 3,000 microorganisms for 25 years. Hence, to maintain the IEGM collection of 1,500 cultures at an appropriate level we require US $80,000 per year. The actual support is less than 10 % of this.

The collection distributes cultures for training and research purposes on request within the country and abroad in accordance with International Regulations on Shipping (1999). Cultures and strains are generally distributed free to educational institutions or on the basis of equivalent exchange of strains with other collections. On average, the cost per strain deposit is US $60. The actual cost, however, is higher and is approximately US $2,000, if expenses for natural material sampling, isolation, identification, storage and quality control are included.

Within its life span, the IEGM collection has been partly supported by the Russian Federation Foundation for Basic Research, the Royal Society (UK), the NATO Science Program and Cooperation Partners, J. Soros' Foundation (Biodiversity program) and is currently funded in the frame of the Federal Biological Diversity Program. The first issue of the Catalogue of Strains (1994) held by the collection was funded by Perm Region Administration. It is also worth mentioning the support received from the WFCC in the form of training courses on computerized information systems. We acknowledge, in person the WFCC President Prof. Jean Swings, and past WFCC Presidents Barbara Kirsop and Vanderlei Perez Canhos for invaluable information support, their efforts in facilitating the interests and promoting the development of the resource collection. We would like to express our acknowledgments to Prof. L.V. Kalakoutskii, head of the Russian Collection of Microorganisms (VKM), for his continued interest to the collection activity over many years. We are in constant diualogue with him and his staff on the development of the collection information system. Finally, we appreciate our Institute colleagues' understanding of the true sense and importance of the culture collection activities. To establish a sustainable collection and to keep it working is only feasible due to the creative efforts of its researchers (Guidelines for ..., 1999).

Obviously, cooperative efforts of multidisciplinary specialists are required for the collection potential to be used effectively. Links with the following Institutes in collaborative studies serve as examples of scientific cooperation: the Institute of Organic Chemistry, Sibirean, Novosibirsk, and Institute of Chemistry, Ural Branch, Russian Academy of Sciences, Perm (biotransformation of organic compounds); with the Republic Engineering Centre for Powder Metallurgy, Perm (ceramic compound biodestruction); with Napier University, Edinburgh, UK (synthesis of biosurfactants); with PermNIPIneft plc. (LUKoil Co.), Perm and Contaminated Land Assessment and Remediation Centre CLARRC, Edinburgh, UK (oil-contaminated soil bioremediation).

The continued development of this biological resource centre includes basic research (thorough the study of alkanotroph biology), collecting

(e.g. adequate sampling of natural material, classification and taxonomic description of isolated cultures; estimation of biotechnological value; improvement of long-term preservation methods; access to the collection information and easy data search; continuity in transferring strains and the acquired information to users), also applied research using collection cultures (e.g. development of novel preparations and advanced technologies). The Centre can not be clkassified as 'safe, but endangered' resulting from the current economic hardships in Russia.

The IEGM collection delivers the following services: distribution and exchange of strains; information provision by means of printed and on-line catalogues; identification and characterisation of strains; immunochemical analysis; isolation and preservation of strains; scientific consultancy and training courses in methods for isolation, cultivation and identification of alkanotrophs.

Acknowledgement
The aim of this article is to facilitate users access to the collection's bioresources and to emphasize the need for continued directed support for the IEGM collection. It is particularly essential in this new era of ecologically safe technologies which will require the application of new groups of microorganisms.
Studies were supported by the grants from the Russian Federation Foundation for Basic Research, the Royal Society (UK), the NATO Science Program and Cooperation Partners, and is currently funded by the Federal Biological Diversity Program.

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ENDANGERED CULTURE COLLECTIONS - Help us to help you!

Peter N. green
Chair, WFCC endangered culture collections sub-committee

The endangered culture collection sub-committee of the WFCC was created to help advise and assist owners of endangered collections of microorganisms throughout the world.
However we can only try to help those collections who come forward and seek such help or advice. There is no need to feel there is a stigma associated with the endangered status of your collection; indeed if we are all honest, many of the so called "premier" collections in the world have at some point in their history either been endangered and/or had their funding source threatened. This has certainly happened to several of the UK culture collections over the years, including my own collection, NCIMB. Many collections of course do not have the luxury of government funding and their existence is therefore even more precarious. Such collections should communicate any immediate or foreseen difficulties to the WFCC endangered collections sub-committee. The committee members operate to a strict code of confidentiality and all communications to the committee are treated with sensitivity. Only those collections who wish to seek public support will have appropriate details disclosed to the wider scientific community and only with the collection owner's permission.
In many cases, we may not be able to help, certainly not in cash terms; but we can offer confidential advice, in many cases drawn from personal experience. Such help and advice can range from ways of improving or economising preservation techniques, to lobbying government officials on your behalf through to trying to find an appropriate sponsor or location for your collection if its loss is imminent.

We can try to help you in many ways ---- but only if we know you have a problem!
You can contact the WFCC endangered culture collection sub-committee via the web site (http://wdcm.nig.ac.jp/wfcc/index.xml) or by e-mailing ether myself as chairperson (p.green@ncimb.co.uk) or one of the committee members who serves your geographical region. A full list of committee members and the goals of committee are provided on the web site above. Please help us to help you.

Collections that have indirectly been brought to the attention of committee

1.The Eliava Institute Phage Collection in Tbilisi, Georgia.
No direct contact could be established.
2. A fungal collection of Mario Piaggio in Montevideo, Uruguay.
This collection has responded and sought advice from CABI Bioscience in the UK.
No further feedback has been received.

Please click at http://wdcm.nig.ac.jp/wfcc/index.xml when you are down.

ECCO XX

European Culture Collection Organization Meeting
October 13-17, 2001, University of Heraklion, Heraklion, Crete

Final announcement: Many of the ECCO members have already booked for this exciting meeting. The programme includes key developments affecting culture collections and their users and gives participants the opportunity to help develop new project proposals, and set up collaboration with scientists in European Countries. The OECD Biological Resource Centre Initiative moves into an implementation plan development phase and the opportunity for ECCO and other participants to have input must not be missed. The European Biological Resource Centre Network EU project commenced in May 2001 and a workshop to introduce its activities and for participants to interact is being held. The opportunity to discuss collection work, policy, strategy and research with like-minded people is the main objective of ECCO annual meetings. Details can be found below and updated information will be displayed on the ECCO web site: <http://www.eccosite.org>

Draft Programme

Saturday 13 October
Registration in Hotel

Sunday 14 October
9:30am Gather for tour
10.00am - 14.00 Half day visit to Knossos GRD 12.000 per person
14:00-15:00 Lunch
15:00 Welcome address by Prof Kalatzopoulos
15:15 OECD Initiative on Biological Resource Centres: The ECCO Response, Dr David Smith President of ECCO
15:45 Report on BCCM reference strain initiative, Dr Danielle Janssens (BCCM/LMG, Belgium)
16:00 Proposal for an European Multicentre Project on Reference Strains, Dr Glyn Stacey (NIBSC, UK)
16:30 General discussion on International projects and initiatives

Monday 15 October
09:30 Collection of Streptococci, Dr. Marc Vancanneyt (BCCM/LMG,

Belgium)
10:00 CBS Yeast identification (V. Robert (CBS, The Netherlands)
10:20 Cryopreservation using alginate beads - (Glyn Stacey)
10:40 Coffee
11:10 UKNCC/SLTB meeting, Dr Glyn Stacey (NIBSC, UK)
11:30 IT system (G. Stegehuis, CBS, The Netherlands)
11:50 Sponsor presentation
12:00 Lunch
14:00 Application of DNA Microarray technology
15:00 Yeast identification
Tea followed by free communications

Tuesday 16 October
10:00 ECCO Closed meeting
12:00 Lunch
14:00 EBRCN Workshop
14:00-14:10 Introduction to the Aims and Goals of EBRCN (E. Stackebrandt, DSMZ, Germany)
14:15-15:40 Introduction to the 5 Workpackages by WP leaders

WP 1 Establish a network, the European Biological Resource Centres Network (EBRCN) to co-ordinate European BRC policies, prepare a co-ordinated European response to international initiatives on biodiversity and become the European focal point for BRCs - E. Stackebrandt
WP 2 Develop new and maintain existing quality standards for European BRCs - D. Smith
WP 3 Establish a framework to maximise complementarity and minimise duplication among European BRCs - J. Stalpers
WP 4 Introduce new techniques in information technology to the EBRCN to add value to current catalogue information and enhance accessibility - P. Romano
WP 5 Collate and disseminate relevant information to the BRCs. (e. g. compliance with legislation). - D. Smith

15:40-15:50 Discussion
15:50-16:00 Introduction to the Aims and Goals of CABRI (M. Vanhoucke, BCCM, LMBP, Belgium)
16:00-16:20 Coffee/Tea
16:20-16:30 Demonstration of CABRI (P. Romano, ABC, Italy)
16:30-16:40 Introduction to GBIF (D. Fritze, DSMZ, Germany)
16:45-16:55 Report on OECD Initiative BRC and Follow-up Initiative (N. Henry, BCCM, Belgium)
17:00 Close of Meeting

Wednesday 17 October

EBRCN project partner meeting - closed

Registration for the ECCO meeting
Please advise Prof. George Kalantzopoulos at the address below of your intention to participate in the meeting. A registration fee of 75 Euro per person will be charged on arrival for the meeting to cover teas and coffees and transport to and from the University of Heraklion. Accommodation and tour fees must be paid in advance and booked using the attached form see below for details.
Prof. George Kalantzopoulos, Agricultural University of Athens, Department of Food Science and Technology, 75 Iera Odos, Botanikos, GR-11855 Athens, Greece, Tel +30-1-5294661, Fax +30-1-5294651, Email kalatz@auadec.aua.gr.

How to reach Heraklion and the Hotel
By plane:
There are many daily flights from Athens and other European cities to Iraklio. The airport is 3,5 km from the city and you can reach it via O.A.'s local buses. For more information contact O.A. (Olympic Airways) in Iraklio tel. (081) 225.171-4 or the airport tel. (081) 282.025
By Ship:
From Piraeus to Iraklio (174 nautical miles) there are two to three boats a day in the summer and two in the winter (every 12 hours). For more information contact the Coastguard of Piraeus tel. (01) 451.1311-19
Transportation from/to Airport/Hotel:
In case you wish the travel agent to arrange your transfer from/to airport/hotel please send your flight details by Fax (+301) 3249172, 3365960 or Email: akoulouri@dolnet.gr and the travel agent will inform you about arrangements and cost.

Accommodation
Rooms are reserved at special rates at the GRECOTEL AGAPI BEACH Hotel (cat. A').The hotel is situated in Ammoudara, on the north coast of Crete, 6km west of the capital city, Heraklion. Please book by 20 July using the form in appendix 2.

Method of booking and payment for the hotel accommodation and the tours
Please complete the form below, Appendix 2. All payments should be to the order of Eurostar S.A.

-Travel Plan and can be made by Bank transfer to:
ALPHA BANK Branch 103; ACC.Number 103-00-2320-002041
or by any of the major Credit Cards (MASTECARD, VISA, AMEX, DINERS).

Address for correspondence
All correspondence concerning Hotel Accommodation & Tours Reservation must be sent to the appointed Travel Agent, EUROSTAR S. A.-TRAVEL PLAN, Congress Department
Mailing Address: 3, Christou Lada Str. 102 37 Athens, Greece
Operator: (+301) 3238801(30 lines), Congress Dept.(direct line): (+301) 3365953-5
Fax (+301) 3249172, 3365960; Email: akoulouri@dolnet.gr

THE UNITED KINGDOM NATIONAL CULTURE COLLECTION (UKNCC)
Biological Resources to Meet Your Needs

The implementation of the UK Government's strategy for UK microbial collections has brought together 9 National Collections (one on 2 sites) under the UK National Culture Collection (UKNCC).

- Access to over 70,000 organisms and cell lines via the UKNCC web site and its integrated catalogues. Includes algae, bacteria, bacteriophage, cyanobacteria, fungi (including yeasts), protozoa, animal cell lines, mycoplasma and plasmids.
- Supplies quality-controlled strains operating to a Quality Management System. Some members adhere to UKNCC standards and its quality policy, whilst others have ISO 9000 certification.
- Provides information on holdings, their handling, preservation and use.

The UKNCC Biological Resource: Properties, Maintenance and management
Edited by David Smith, Matthew J. Ryan and John G. Day

- On 382 pages, this publication provides all the information you require to run a biological resource collection.
- Details techniques used for preservation and characterisation of strains
- Provides a catalogue of uses and properties of microorganisms, listing over 5,000 strains
- Lists collections in the UK, Europe and the rest of the world, and provides hints on growing cultures, together with a comprehensive list of growth media and their formulae
- Find out about legislation that controls handling, storage and distribution of microorganisms and cell lines, and realise the capacity of the UK National Culture Collection.

Contents

- Culture collection quality management
- Legislation affecting collections
- Use and safe handling of micro-organisms
- General hints on growing microbes and cell lines
- Preservation methodology including protocols
- Microbial properties and their characterisation
- Ordering, charges, quarantine and safety
- Deposits
- Services and facilities of each member collection

The appendices list strains with specific microbial properties (including metabolites and antibiotics, enzymes, assay and test strains), media recipes, useful addresses and contacts, and information on cryopreservation protocols for hundreds of organisms. All this, together with hundreds of references to further reading and experimental details, makes this book a necessity for all microbiologists. Price £46.45 (includes package and postage).

The UKNCC Integrated Catalogues in 4 Volumes Also available on CD

- List of Algae and Protozoa
  Contains over 2,000 strains of freshwater and marine algae and protozoa from the Culture Collection of Algae and Protozoa at Windermere and Oban. Price £13.00 including package and postage.
- List of Bacteria
  Integrates the holdings of CABI Bioscience, National Collections of Industrial, Food and Marine Bacteria, National Collection of Plant Pathogenic Bacteria and National Collection of Type Cultures. Includes some 20,000 strains from many diverse environments, tremendous value at a cost of £27.00 inclusive of package and postage.
- List of Fungi (including yeasts)
  The holdings of CABI Bioscience, National Collection of Pathogenic Fungi, National Collection of Wood-Rotting Fungi (now held at CABI) and the National Collection of Yeast Cultures. Lists around 19,000 strains at price £27.00 including package and postage.
- Animal and Plant Cell Lines catalogue
  Lists the key resources held by the European Collection of Cell Cultures. Free of charge direct from ECACC.
  European Collection of Cell Cultures, Centre for Applied Microbiology and Research, Porton Down, Salisbury, Wilts SP4 0JG Tel: +44-1980 612512; Fax: +44-1980-611315; Email:

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WDCM will start a survey on names of strains/lines preserved

Hideaki SUGAWARA
WFCC-MIRCEN World Data Centre for Microorganisms
contact us

WDCM maintains database of CCINFO and STRAIN thanks to the cooperation of the member collections. The database CCINFO is the World Directory of Culture Collections of Microorganisms. The data in CCINFO are heterogeneous: some have detailed information and others bear the minimum data. Nevertheless I dare introduce you some statistics as of August on the culture collections in CCINFO in the following:

There are 472 culture collections in 61 countries.
196 of them are supported by government.
37 of them are semi-governmental.
164 of them are supported by university.
11 of them are supported by industry.
21 of them are private.
163 collections produce catalogues of holdings.
2,341 people work in these culture collections.

The member collections are now able to update on-line their data in the database CCINFO (Fig.1). The number of the culture collections in CCINFO has decreased from May. It is ironical that "deletion" is more promptly done in the on-line system comparing to by air-mail. The major reason of the "deletion" is the retirement of curators.

Fig.1. CCINFO Registration
http://wdcm.nig.ac.jp/CCINFOreg.html

WDCM will start a survey on the holdings from September 2001 in order to update the database STRAIN. The survey this time is supported by UNESCO. A member collection is able to download the list of its holdings from the WDCM site or asks WDCM to send the list off-line.

The WDCM site (http://wdcm.nig.ac.jp) is hit by about 300,000-400,000 pages/month. I believe that even a simple list of names is good to publicize the member collections and WFCC as well.

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Editor's note

I could manage to edit the WFCC newsletter firstly thanks to the authors. I would also like to express my acknowledgement to Dr. Joris Mergaert for acquiring the ISSN number of the newsletter and Dr. David Smith for his invaluable help.

This issue includes the history of the oldest federation of culture collections in the world and the introduction of a new collection in the Russian network. They are coupled with a report of the WFCC Endangered Culture Collections and announcements of ECCO and UKNCC. Thus this issue presents efforts in various countries and regions to enhance the culture collections activities and their linkage.

The winter issue will include an article by Dr. Peter Vandamme and the report of the WFCC Committee on Postal, Quarantine and Biosafety Regulations prepared by Dr. Christine Rohde. I still welcome any articles, news and reports from other committees, WFCC members, federations, societies, agencies and so on.

(HS)

World Federation for Culture Collections

- OECD Best Practice Guidelines for Biological Resource Centres[PDF]
- WFCC Skerman Award for Microbial Taxonomy[Word]
- 11th International Congress on Culture Collections (ICCC-11) 7-11 October, 2007, GOSLAR, GERMANY
- IATA Guidance Document Infectious substances
- Annrual Converence of the Association for General and Applied Microbiology (2006/3/19-22) [PDF] [Word]
- EBRCN transport paper WP5 Revision 15Jun05.doc
- The Biology of Vibrios: Biodiveristy, Genomics, Disease/Epidemiology, Ecology, and Applications, Ghent, Belgium (2005/11/07-08)
- Australian Society for Microbiology 2005 (2005/09/25-29)
- VI International Conference on Environmental Pollution (2005/09/20-25)
- II International Conference on Microbial Diversity: current situation, conservation strategy and biotechnological potentialities (2005/09/20-25)
- Congress of PERMI and ACLAB-3 (2005/08/25-27)
- What's New

About WFCC

- Please join us (WFCC)
- WFCC Executive Board
- WFCC Task Forces and Activities
- WFCC Statutes
- WFCC Bylaws
- Brochures

- Messages/Proposals from WFCC Executive Board
- WFCC Newsletter
- Publications on culture collections and microbial resource centers
- WFCC Workshops and Conferences
- Documents on bioterrorism and biosecurity
- Calendar of Events relevant to microbes and more

- 

We are here to help collections in difficulty (Please visit What's New!)
- WFCC membership application
- 
Contact us!

- Home Pages of Culture Collections in the world
- Statistics on Culture Collections in the world
- Federations, Societies and Networks of Microbial Resource Centers

- WFCC-MIRCEN World Data Centre for Microorganisms

Updated 2006.12.20

GBIF

... free and open access to biodiversity data

GLOBAL BIODIVERSITY INFORMATION FACILITY

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DIGIT
ECAT
OCB

Latest news [More...]

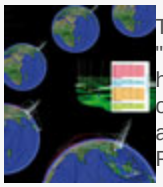
- Job opening - GBIF Web Developer - The GBIF Secretariat is seeking a Web Developer. - posted on 2007-09-17
- GBIF and FAO sign Memorandum of Cooperation - GBIF and the FAO have agreed to work together in ... - posted on 2007-09-11
- GBIF and ALARM work toward a Pollinator Information System - GBIF, through a Memorandum of Cooperation with ... - posted on 2007-09-11
- New DIGIT Programme Officer to join GBIF Secretariat - Vishwas Chavan will join the GBIF Secretariat as ... - posted on 2007-09-01
- GBIF is requesting proposals for 2007 - 2008 Seed Money - The request for proposals (RFP) for the 2007 - ... - posted on 2007-08-31

Latest articles [More...]

- Ebbe Nielsen Prize Winner to Make Presentation

This event is open to the public, who are asked to PLEASE REGISTER by clicking on the "Concerned URL" below. Paul Flemons, winner of the 2007 Ebbe Nielsen Prize, will receive the award and make a presentation on his prize-winning research.
Posted on 2007-09-11

- GBIF Science Symposium 5: Biodiversity on the Web



The public is invited, but PLEASE REGISTER by clicking on the "Concerned URL" below. GBIF Science Symposium 5 will highlight the new GBIF Data Portal, the scientific and policy uses of GBIF data, and the information infrastructure that GBIF makes available for use by other initiatives.
Posted on 2007-09-11

Upcoming events [More...]

- GBIF Governing Board 14th Meeting [Monday, 2007-10-15 09:00 - 2007-10-19 17:00] - Amsterdam
  The 14th meeting of the Governing Board of GBIF will be hosted by the Netherlands. Included in ...
- 2007 Ebbe Nielsen Prize award ceremony [Wednesday, 2007-10-17 17:00 - 20:00] - Mövenpick Hotel, Amsterdam, Netherlands
  The 2007 Ebbe Nielsen Prize will be awarded to Paul Flemons of the Australian Museum, who will then ...
- GBIF Science Symposium 5 [Thursday, 2007-10-18 09:00 - 18:00] - Mövenpick Hotel, Amsterdam, Netherlands
  The public is welcome to this GBIF event. **PUBLIC PLEASE REGISTER** by clicking the "I will ...
- 4th GBIF Ecological Niche Modeling Workshop [Monday, 2007-11-26 09:00 - 2007-11-30 17:00] - Warsaw, Poland
  GBIF, together with Kansas University (Biodiversity Research Center), UNAM University (Mexico) and ...

Latest uploads [More...]

Calendar of events

September 2007

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9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

GBIF UDDI Registry

* registration
* update information

Data Providers	204
Collections	978
Records	136012816

Personalised news channels

gbif CIRCA - Most Popular Items

GBIF Use Case Template
GBIF Biodiversity Data Architecture (PDF)
Guide to Best Practices for Georeferencing
GBIF standard email lists
Drawing Maps for the GBIF Data Portal
DiGIR Provider Package for Windows - Users' Guide

GBIF Recently Added / Modified Providers

Georgia Museum of Natural History
Carnegie Museums
Department of Botany - University of Coimbra
Korea National Arboretum (Korea Forest Service)

- Temporary Office Manager/Personal Assistant The Secretariat of the Global Biodiversity ... - modified on 2007-08-27
- Download GBIF tools - modified on 2007-08-06
- GB14 Web site of the 14th meeting of the GBIF ... - modified on 2007-07-13
- Report on Workshop with Nomenclators - modified on 2007-04-11
- Proleg Meeting Report - Final (PDF) Report of the Pro Bono Legal Expert Group Meeting ... - modified on 2007-03-23
- Hotels (.PDF) List of recommended hotels in Copenhagen ... - modified on 2007-03-15
- The Paleobiology Database Taxonomic and distributional information about ... - modified on 2007-03-06
- Travel Reimbursement Form for Visitors 2007 Use this form (.XLT) to calculate and present ... - modified on 2007-02-27
- Travel Authorization and Agreement Form (.DOC) To be submitted and approved before travel ... - modified on 2007-02-02
- An analysis of the implications of intellectual property rights (IPR) on the Global Biodiversity Information Facility Adobe PDF (650 Kb) - modified on 2007-01-12

Our address [More...]

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Tel: +45 35 32 14 70 Fax: +45 35 32 14 80 E-mail: gbif@gbif.org

WFCC-MIRCEN World Data Centre for Microorganisms

WFCC-MIRCEN World Data Centre for Microorganisms (WDCM) provides a comprehensive directory of culture collections, databases on microbes and cell lines, and the gateway to biodiversity, molecular biology and genome projects.

SEARCH ENGINE

- Simple Search
- Search by Fields
- AHMII
- Lineage search *NEW!!*

Home Pages of Culture Collections in the World

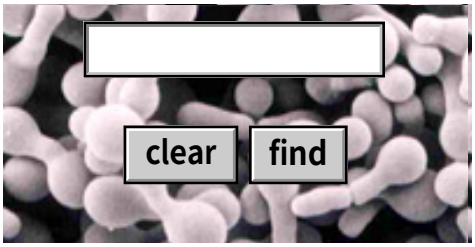
REGISTRATION/ UPDATE

- CCINFO
- STRAIN

WDCM is sponsored by/in cooperation with:

- WFCC
- MIRCEN
- CIB
- JST/BRnet
- NEDO
- CODATA
- UNESCO
- UNEP

Please search menu(s) in this site by entering keyword in the window below



Global search by Google

search

Contact us!

Home Page in Japanese

Updated 12 Feb. 2004

Cocoon 1.8.2

Error found handling the request.

org.xml.sax.SAXParseException: File "file:/data/WDCM/httpd/html/wfcc/index.xml" not found.
at org.apache.cocoon.parser.AbstractParser.fatalError(AbstractParser.java:105)
at org.apache.xerces.framework.XMLParser.reportError(XMLParser.java:1037)
at org.apache.xerces.readers.DefaultEntityHandler.startReadingFromDocument(DefaultEntityHandler.java:512)
at org.apache.xerces.framework.XMLParser.parseSomeSetup(XMLParser.java:304)
at org.apache.xerces.framework.XMLParser.parse(XMLParser.java:899)
at org.apache.cocoon.parser.XercesParser.parse(XercesParser.java:85)
at org.apache.cocoon.parser.AbstractParser.parse(AbstractParser.java:83)
at org.apache.cocoon.producer.ProducerFromFile.getDocument(ProducerFromFile.java:78)
at org.apache.cocoon.Engine.handle(Engine.java:359)
at org.apache.cocoon.Cocoon.service(Cocoon.java:183)
at javax.servlet.http.HttpServlet.service(HttpServlet.java:588)
at org.apache.jserv.JServConnection.processRequest(JServConnection.java:317)
at org.apache.jserv.JServConnection.run(JServConnection.java:188)
at java.lang.Thread.run(Thread.java:475)

Warning: this page has been dynamically generated.

European Culture Collections' Organisation

Open Menu

About

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Ecco board

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Milos Kocur obituary
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Meetings

XXVI ECCO Meeting (Goslar, Germany) - Announce
- Preliminary Program NEW (06-Jul-2007)

Ecco statutes

Ecco forum

European culture collections: Biological diversity in safe hands

CCINFO Registration

Registration	Add
Update	Change
Delete	Delete

Welcome to the CCINFO Registration page.

- Please click "Add" button, if you are going to add your collection to the CCINFO database.

- Please click "Change" button, if you are going to update the information of your collection already registered in the CCINFO database.

- Please click "Delete" button, if you have to withdraw your collection from the CCINFO database. Endangered Collections Committee might help you.

WDCM will send you an acknowledgement of your request to your e-mail address in a couple of days. Your request will be reflected to the master database after the data is validated. Please visit the following URL to confirm your data: http://wdcm.nig.ac.jp/CCINFOSearch.html

Updated 14 March 2001