NEWSLETTER

INTERNATIONAL HUMIC SUBSTANCES SOCIETY

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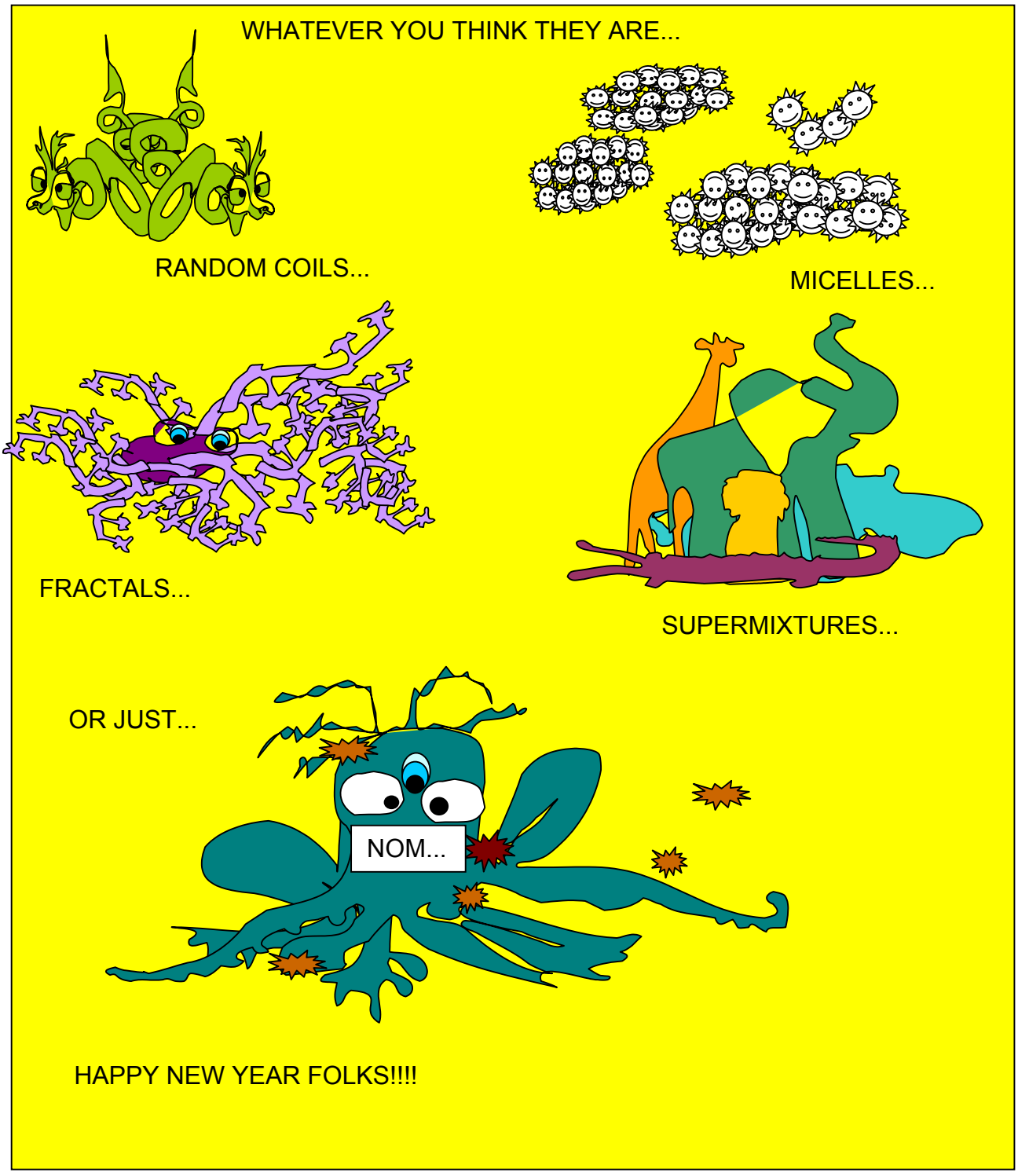

INTERNATIONAL HUMIC SUBSTANCES SOCIETY
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International Humic Substances Society on the World Wide Web

Visit our home page at:

http://www.ihss.gatech.edu

NEW UPDATE!!! The website now contains a lot of analytical data on the standard and reference samples of the IHSS Collection

Dr. E. M. Perdue is coordinating the development of the IHSS WEB page. You can follow the progress on the above WEB site which is located on the server of the Georgia Institute of Technology, Atlanta, USA.

Suggestions and comments regarding the content and organization of the WEB pages are actively requested from all IHSS members.

E-mail Dr. E. M. Perdue at **michael.perdue@eas.gatech.edu** for more information.

MEETINGS

1st General Assembly of the European Geophysical Union, Nice, France, 26-30 April 2004.
by Jerzy Weber

Dear Colleagues, all scientists involved with the soil environment (primarily but not exclusively, from Europe) are cordially welcome to attend the first General Assembly of the EGU. Please, visit the Home Site of the meeting: http://www.copernicus.org/EGU/ga/egu04/index.html. As you probably know, the European Geosciences Union (EGU) was founded in 2002 (http://www.copernicus.org/EGU/) by merging the European Geophysical Society (EGS) and the European Union of Geosciences (EUG). This new European interdisciplinary society consists of several divisions representing different fields of the environment, Earth and planetary sciences, including space. Divisions and sections are listed at http://www.copernicus.org/EGU/info/present_officers.htm. Soil science is represented by Soil System Sciences (SSS), which is a division co-ordinating scientific activity connected with all aspects of the soil environment http://www.copernicus.org/EGU/egu_info/officers_Soil_System_Sciences.htm.
Soil sessions (and conveners) of the EGU 2004 are as follows:
SSS1 - Weathering and soil mineralogy (G. Stoops, Belgium); SSS2 - Soil organic matter and organo-mineral interactions (T. Miano, Italy); SSS3 - Soil and regolith morphology and genesis (V. Targulian, Russia); SSS4 - Soil and water management and conservation (D. Gabriels, Belgium); SSS5 - Soil chemistry and biogeochemical cycles (S. Staunton, France); SSS6 - Soil biology and microbiology (P. Nannipieri, Italy); SSS7 - Soil pollution, degradation and remediation (J. Bech, Spain); SSS8 - Fire effects on soil system functioning (S. Doerr, UK).
Additional sessions will be organized and co-ponsored by the SSS.
You are warmly invited to submit before January 2004 a half-page abstract prepared according to layout and format given at http://www.copernicus.org/EGU/ga/egu04/layout.htm
Note that advanced registration fee (before January 1, 2004) is EUR 200 for members of EGU (EUR 260 for non-members), and EUR 100 for students (http://www.copernicus.org/EGU/ga/egu04/registration.htm)

XII International Meeting of IHSS will be held in Brazil (July 2004)
by Ladislau Martin-Neto

The XII International Meeting of IHSS will be held in Brazil, in July (26-30), 2004. This decision was taken by the IHSS General Assembly, during the last IHSS Meeting in Boston. The chairman of the next meeting will be Dr. Ladislau Martin-Neto, a Member of Board of IHSS and Coordinator of the Brazilian Chapter. The meeting theme will be "**Humic Substances and the Soil and Water Environment"** and the following symposia will be included: Soil Humic Substances; Aquatic Humic Substances; Soil Carbon Sequestration; Characterization of Humic Substances: Emphasis on Advanced Methodologies; Soil Amendment and Remediation; Applications of Humic Products: Plant Growth, Organic Agriculture, Medicine, Sensors, etc.; Complexes of Humic Substances with Metal Ions; and Pesticide Reactions.
The meeting will be held in the city of São Pedro (a small tourist city, 35,000 inhabitants), in the State of São Paulo, in the center of Brazil and will be hosted by the Brazilian Corporation of Agricultural Research (Embrapa), the largest agricultural institute of Latin America, in cooperation with the University of Säo Paulo (USP), the Federal University of São Carlos (UFSCar) and the State University of Säo Paulo (UNESP). This region has a pleasant climate (700 m altitude) and is known for its tourist attractions: water sources, water falls, historic coffee farms, and several sugarcane factories, which also produce large quantities of ethanol as renewable automobile fuel. Complete information and data regarding meeting is available at web page: www.xiiihss.com.br or in the official web page of IHSS (Conferences): www.ihss.gatech.edu The deadline to extended abstract submission was changed to February, 09. Any additional query send message to organizing committee: 12ihss@cnpdia.embrapa.br. The Brazilian membership of IHSS is highly motivated and excited about holding the XII International IHSS Meeting and they will do their best to organize an outstanding conference. So please make a note of the conference dates and we look forward to welcoming you to Brazil in July 2004.

Int. Workshop "Dissolved organic matter and the cycling of carbon, nutrients and metals" (DOM 2004), Bayreuth, Germany, 3-6 October 2004.
by Karsten Kalbitz and Klaus Kaiser

More than two years ago, we had a successful international workshop on ecological aspects of dissolved organic matter in terrestrial ecosystems at the University of Bayreuth (9 to 11 October 2001). About 60 colleagues from 10 countries attended and enjoyed discussions on (i) definitions, methods, concepts, (ii) nutrient cycles, biodegradability, effects of DOM on microorganisms, (iii) mobilization and transport of metals

and organic pollutants, and (iv) land use effects on DOM, role of DOM for C sequestration in soils. The main results of the workshop were published in a special issue of Geoderma (2003; 113, 177-411). The participants also enjoyed the atmosphere of the location, a mediaeval castle in the remote countryside of Northern Bavaria. This atmosphere stimulated intense discussions thus contributed to the success of the workshop.
During the last two years, considerable progress was made in "DOM research". Despite these efforts, numerous questions are still waiting to be answered, such as DOM contribution to the cycling of nutrients, the preservation of C and to the binding, mobilization, immobilization and toxicity of metals.
The aim of the 2004 workshop is to continue the 2001 discussion on properties and dynamics of DOM in relation to its ecological effects and functions in terrestrial and related ecosystems, including recent advances and new ideas and concepts. Invited speakers will offer new perspectives on different aspects and provoke new questions to focus on in further studies.
These keynotes will be followed by brief oral presentations of volunteered contributions on specific topic. The oral presentations and additional volunteered poster presentations will serve as a base for an intensive discussion in the auditorium. The discussion is planned to comprise the major part of the workshop following the to the principle "less oral contributions but more intensive discussions". This concept was the base of the success of the first workshop. Specifically, the topics addressed will be: 1. Carbon: mineralization, stability, C storage; 2. Nutrients: coupling with carbon cycle, temporal and spatial variability; 3. Metals: binding, mobilization and immobilization, toxicity.
This message is to encourage you and your co-workers to attend the workshop and to submit an abstract to one of the above given subjects until 31 May 2004. Please forward this message to anybody possibly interested in the meeting.

Please use the workshop website for further information, abstract submission and registration: http://www.bitoek.uni-bayreuth.de/dom2004. Contact person: Dr. Karsten Kalbitz, Dept. Of Soil Ecology, Bayreuth Institute for Terrestrial Ecosystem Research (BITOEK), University of Bayreuth, D-95440 Bayreuth, Germany. e-mail: karsten.kalbitz@bitoek.uni-bayreuth.de

NOM Conference in Australia

NOM Research Conference: Innovations and Applications for Drinking Water. This 4- day event on practical applications of NOM research will be held in Victor Harbor, South Australia, on 2-5 March 2004.

For more information contact Dr. Gayle Newcombe, Australian Water Quality Centre, CRC for Water Quality and Treatment, PMB 3 Salisbury, SA 5108, phone 61 8 82590317, fax 61 8 82590228, e-mail: gayle.newcombe@sawater.com.au; web site: http://www.waterquality.crc.org.au/nom

PAST MEETINGS

9th Symposium of the Nordic Chapter of IHSS, Sundsvall, Sweden, May 2003
"Abundance and Functions of Natural Organic Matter Species in Soil and Water"
by Dr. Ulla Lundström

The 9th Symposium of the Nordic Chapter of IHSS "Abundance and Functions of Natural Organic Matter Species in Soil and Water" was held at Mid Sweden University, Sundsvall, Sweden May 19-21, 2003 hosted by the research group in Soil Chemistry lead by prof. Ulla Lundström. 110 researchers from 24 countries all over the world participated in the conference. There were 38 oral presentations and about 50 poster presentations dealing with characterization and identification of Natural Organic Matter (NOM), their abundance and functions in terrestial and aquatic systems, their relations to climate change and interaction with heavy metals and xenobiotics. These presentations ranged from analytical methodology to ecosystem interpretation. Selected contributions

will be published in special issues of Geoderma and Aquatic Sciences. At a business meeting held in connection to the symposium it was decided to merge the Nordic and Baltic Chapters in a Nordic-Baltic Chapter. This was appreciated and will hopefully lead to intensified collaboration and strengtening of the NOM research. Before the meeting a field trip along the river Indalsälven to the Forest Research Park Bispgården, 90 km NW Sundsvall was made to inspect a catchment field experiment on the effects of wood ash application on forest soil and also to look at other attractions in the valley. The board of IHSS had a meeeting before the symposium and thereafter took part in the conference, which was much appreciated.

IHSS CHAPTER UPDATES

The Newborn IHSS-Chapter:
Regional Chapter of the Commonwealth of Independent States (CIS-IHSS)
by Irina Perminova, regional coordinator and Olga Iakimenko, vice-coordinator

It is our pleasure to inform the Society about the decision of the scientists and engineers from Russia and the other countries of the Commonwealth of Independent States (CIS) to join their efforts in fostering humic substances research in the framework of the newly born Regional Chapter – CIS IHSS.

The idea to organize the CIS Chapter was born by the spirit of the NATO Advanced Research Workshop (ARW) “Use of humates to remediate polluted environments: from theory to practice” held in September 23-29, 2002 in Zvenigorod, Russia. The Workshop brought together more than 50 scientists all over the world including 25 participants from five CIS states (Georgia, Kazakhstan, Kyrgyzstan, Russia, and Ukraine). We were proud to see among the participants the President of IHSS – Prof. Chen, and Past President of IHSS - Prof. Frimmel.

The ARW gave a unique chance to the humic researchers from the Former USSR to meet again after a long break. It was attended by the representatives of almost all the leading Soviet schools in the field of humic research including Acad. Jorobekova (Bishkek, Kyrgyzstan), Prof. Bezuglova (Rostov-on-Don, Russia), Prof. Gorova (Dnepropetrovsk, Ukraine), Dr. Chukov (St. Petersburg), Drs. Kogut and Sadovnikova (Moscow, Russia), Dr. Vasilchuk (Kiev, Ukraine). Unfortunately, two invited lecturers from Belarus – from the Institute of Rational Use of Natural Resources and Ecology (NAS) - Acad. Bambalov and Prof. Puntus had to cancel their visits shortly before the beginning of the ARW, – and we indeed missed their lectures. Nothing could replenish a void of absence of Prof. Galina M. Varshal - the prominent Soviet-Russian scientist from the Institute of Geochemistry and Analytical Chemistry of RAS. She passed away on July 16, 2001: her lecture on the geochemical role of humics in metal migration would have had to open the Workshop... Prof. Varshal was an outstanding scientist and a bright and generous personality, - the real “knight of science”. Her science will live further in her works, and her life will continue in those of us who got lucky to get a personal touch of hers. Thank you for being in our lives, Galina Moiseevna.

The lectures, posters, scientific discussions, - all about our common “humic” science, as well as conversations, jokes, and songs, - all about and from our common life, have shown that we still have so much to share that we don’t want to lose our common roots again. The general feeling was that together we can reach much more than living further separated from one another. That is why it was not surprising at all that the Meeting of the National Russian IHSS Chapter opened for all the CIS participants of the ARW, turned out to be the birth place for the idea of the Regional CIS Chapter. The quintessence of the idea was that the new Regional Chapter should in no means become an alternative to the existing Russian Chapter; on contrary, its main strength and purpose could be reached only if the Russian Chapter would support the above idea and join the Regional Chapter. Having these considerations in mind the participants of the Meeting took unequivocally two main decisions: (1) to announce the foundation of the new Regional Chapter – CIS IHSS, and (2) to turn to all the members of the Russian Chapter with a request for the ballot vote on the issue of integrating the Russian Chapter into the CIS Chapter. The responsibility for conducting the corresponding ballot vote was delegated to the Regional Coordinator and Vice-Coordinator. As those were unequivocally elected Irina Perminova (Department of Chemistry, Lomonosov MSU) – Coordinator, and Olga Iakimenko (Department of Soil Science, Lomonosov MSU) - Vice-Coordinator.

Shortly after the meeting, the information letter on the organization of CIS-IHSS and the detailed protocol of the Open Meeting of the Russian IHSS were put at the web-site of the newly formed Chapter. Together with the ballot votes, they were e-mailed to the members of the Russian Chapter. The corresponding voting took place in December 2002. Plus to 8 members attending the Workshop in Zvenigorod, 15 more Russian IHSS members took place in the voting. This made 23 votes out of about 50 members that were in the list of the participants of the Russian IHSS. Given that substantial part of members were students who have changed their addresses, affiliations, and activities, whereas some members moved abroad or changed their working profile, and few members passed away, the obtained vote participation was considered as representative. All the votes were for joining the newly formed CIS IHSS Chapter that made the latter a legitimate successor of the Russian IHSS Chapter. As the main goal of its activities, the CIS IHSS has declared consolidation of the efforts of the CIS scientists in the field of basic and applied humic research.

Today, after a year of our founding date – September 25, 2002 - CIS IHSS has a membership of 62 scientists and engineers, 48 of those are regular members, and 14 are student members. They are scientists and engineers both from research institutes and industrial firms. Russia is represented by the scientists from the Lomonosov Moscow State University (Departments of Chemistry, Biology, Geology, and Soil Science); Rostov State University, Saint-Petersburg State University; Bach Institute of Biochemistry RAS; Gubkin State University of Oil and Gas; Dokuchaev Soil Science Institute; Sukachev Institute of Forestry RAS, and other organizations; the other CIS-States – by the scientists from the Institute of Hydrobiology Ukrainian NAN; the Al-Farabi Kazakh National University; Institute of Chemistry and Chemical Technology, Kyrgyz Republic. The scope of scientific interests includes structure, molecular properties, and genesis of humic substances, interactions of humics with heavy metals and organic ecotoxicants, application of humics for remediation technologies, biological activity of humics; technologies of manufacturing and agricultural applications of humics, and others. The full list of members and of their contact information you can find on the web-site of the CIS IHSS: www.mgumus.chem.msu.ru/ihss/

The contact e-mail address of the CIS IHSS is: ihss@org.chem.msu.ru. We are glad to be a part of the world-wide humic research community. We are open for cooperation and welcome any kind of HUMIC activities.

LIFE HISTORIES OF HONORARY IHSS MEMBERS

Dr. Morris Schnitzer, Senior Research Emeritus
Chemistry and Biology Research Institute, Agriculture Canada, Ottawa, Canada
by Yona Chen and Ed Clapp

Morris Schnitzer was born into a Jewish family in Bochum, Germany, in February 1922. At that time, Bochum was one of the industrial centres of the Ruhr Valley, some 40 kilometres east of the Rhine river. After completing 4 years of public School, he entered the local Gymnasium in 1932. During his first year at that school, Hitler came to power in January 1933. As time went on, his fellow students began to wear the uniform of the Hitler Youth and put pressure on Morris to leave the Gymnasium where he was the only Jewish student in his class. In 1936, he left the Gymnasium but managed to be accepted by the only Jewish Gymnasium in Germany which enabled its students to enter University, but which was in Berlin far away from his home. In November 1938, he was arrested and forced to leave Germany. He left in December 1938 on a Kinder (Children's) transport for Holland. In 1940, when Germany invaded Holland, Morris had no choice but to roam Western Europe (Holland, Belgium, Switzerland, France, and Belgium once more) trying to elude the Nazis. During that time, he took on three different identities, (his own, that of a Dutchman and that of a Belgian) in order to save his life. He spent much of the time on the run and in jails. Last year he published a book on his odyssey that saved his life under the title "My Three Selves" (Lugus Publications, Toronto, 2002).

With the help of his brother, the only surviving member of his family, Morris came to Montreal, Canada in May 1947. He had been out of school for nine years. These nine years were years of war, starvation, severe physical and mental hardship and insecurity. Did he still possess the capacity to concentrate, study and write examinations? He decided to test himself and began preparations for writing the required entrance examination for McGill University. He had three months to study for these examinations. His brother supplied him with the required textbooks and offered him the use of his house in the country approximately sixty miles north of the city. He studied there 14 to 16 hours each day, all by himself. After three months hard work, he returned to the city, and to the astonishment of his relatives and himself passed all exams and was admitted to McGill. This was one of the most important tests of his life. He was now ready to satisfy his hunger for knowledge.

Morris obtained his B.Sc. with first class honors in 1951, M.Sc in 1952, and Ph.D. in 1955, all from McGill University in Soil Chemistry. From 1954 to 1956 he worked as a Research and Development Chemist for the Aluminum Company of Canada (ALCAN) in Arvida. Quebec. His task was to develop analytical methods for the analysis of metals in aluminum alloys. Morris says that his work in industry gave him a strong background in analytical chemistry, which underlies all of chemistry and prepared him for the research work that he assumed later. In 1956 he joined the Research Branch of Agriculture Canada. His first research dealt with the formation of complexes between metals and fulvic acid in Spodosols. The characterization of these complexes led to in-depth studies on the characteristics of fulvic acid and to research on its chemical structure.

From 1961 to 1962, Morris did post-doctorate studies in the Organic Chemistry Department of the Imperial College of Science and Technology in London, England, under the guidance of Sir Derek Barton, Nobel Laureate in Organic Chemistry. He did his research on a Spodosol fulvic acid which he had brought from Canada. The fulvic acid was first exhaustively methylated so that 50% of it became soluble in benzene. The benzene extract was then separated over Al_2O_3 with solvents of increasing polarity into several fractions which differed in molecular weights, oxygen-containing functional groups and spectroscopic properties. More important than the research were his many discussions with Sir Derek on how to apply Organic Chemistry, or more specifically natural products chemistry, to solving structural problems in fulvic acid.

After his return to Canada, Morris started a long-term investigation on the oxidative degradation of humic acids, fulvic acids and humins as well as whole soils, using a variety of oxidants. The oxidation products were extracted by organic solvents, separated by gas chromatography and identified by mass spectrometry. Among the oxidation products were aliphatic carboxylic, phenolic, and benzenecarboxylic acid. These studies showed that: (a) isolated aromatic rings are important structural units of all humic substances; (b) aliphatic chains are linking aromatic rings to form aromatic networks; and (c) structures contain voids of various dimensions that can trap organics and inorganics. Other studies were concerned with the symmetry and coordination of paramagnetic metals bound to humic and fulvic acid. In the early 1980's he began extensive research in finding the most favourable conditions for ^{13}C-NMR analysis of humic substances, soil organic matter, and whole soils. These experiments showed the importance of aliphatic C in these materials. Near the end of the 1980's, Morris initiated collaborative research with H.-R. Schulten which lasted for twelve

years, and resulted in the publication of 70 scientific papers on the development and application of pyrolysis-soft ionization mass spectromatic methods for the analysis of humic acids, fulvic acids, humins, and whole soils. In an other application, Curie point-pyrolysis-gas chromotography/mass spectrometry was used in structural studies on humic and fulvic acids. This research resulted in the development of two-dimensional structural models for humic acids. The latter were then converted by computational chemistry to three-dimensional humic acid model structures.

In other investigations, Morris and his co-workers examined a colloid-chemical properties of humic materials, mechanism of water retention, reaction with metals and minerals, and with pesticides and herbicides. With the aid of pyrolysis-gas chromatographic/mass spectrometric methods, more than l00 N-compounds were identified in soils and humic substances. These included pyrroles, pyrrolidines, imidazoles, pyridines, pyrazines, nitriles, indoles, quinolines, benzathiazoles and pyrimidines, all heterocyclic N -compounds.

A more comprehensive account of Morris' life-time research has been published in Advances in Agronomy 68: 1-58, 2000. Morris retired in January 1991. At the same time, he was named Emeritus Distinguished Research Scientist by Agriculture Canada. He has continued his research on a part-time basis. He carried on his collaborative research with H.-R. Schulten on the application of mass spectrometric methods to the analysis of humic materials until 1999. He also collaborates with Henri Dinel and his colleagues on the chemistry of composting, and with P.M. Huang and his students on the synthesis in soils of N-heterocyclics by the Maillard Reaction catalyzed by δ-MnO_2.

Over the years, Morris managed to attract 30 postdoctorate fellows and visiting scientists from 15 different countries to work with him in Ottawa for various lengths of time. These young scientists included Yona Chen, Nicola Senesi and Michael Spiteller. In addition, he collaborated closely with 12 well-established scientists. He enjoyed working with the young scientists, he says: “He learned as much from them as they learned from him”. Morris published 3 books and 350 refereed scientific papers on the chemistry and reactions of humic substances.

Morris was awarded Fellowships by the Canadian Society of Soil Science (1971), Soil Science Society of America (1977), American Society of Agronomy (1977), Honourary Member, International Humic Substances Society (1986), and Royal Society of Canada (1991). He received the Soil Science Award of the Soil Science Society of America in 1984, the Soil Science Distinguished Service Award of the Soil Science Society of America in 1995 and was co-winner of the Wolf Prize in Agriculture in 1995/96.

He has presented papers at many national and international meetings. He was chairman of Commission II (Soil Chemistry) of the International Society of Soil Science (1978 - 1982), Founding Member of the IHSS (1982) and has served on editorial boards of the *Canadian Journal of Soil Science*, *Soil Science*, *Geoderma, Agrochimica*, and *Plant and Soil*.

ABOUT BIOCYCLE AND COMPOST SCIENCE & UTILIZATION

by Rill Ann Miller, The JG Press, Inc -- BioCycle, Compost Science & Utilization

BioCycle, Journal of Composting & Organics Recycling, published since 1960, is recognized worldwide as the foremost magazine on using organic residuals to maximum advantage – from improving the health of soils and crops to producing renewable energy in the form of methanc and alcohol fuels. Every monthly issue shows readers how to change wastes and wastewater into marketable end products. Subscription rates: U.S., one year (12 issues) $69; two years (24 issues) $113; Canada, one year $89; two years $153; Foreign, one year $97; two years $169. To subscribe, visit www.biocycle.net or call 610.967.4135, ext. 22. American Express, Visa and MasterCard accepted. Published by The JG Press, Inc., 419 State Ave., Emmaus, PA 18049.

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BOARD OF DIRECTORS BUSINESS MEETING - UPDATES

The last Board of Directors meeting was held at Mid Sweden University, Sundsvall, Sweden, on May 19-21, 2003, during the 9th Symposium of the Nordic Chapter of IHSS "Abundance and Functions of Natural Organic Matter Species in Soil and Water". On behalf of the Board, the President thanks Profs. Ulla Lundström and Georg Becher for their kind hospitality, their overall support for IHSS and the excellent conference of the Nordic Chapter of IHSS.

The main items and resolutions of the IHSS Board of Directors were as follows:

IHSS Elections

The President appointed three members for the Nominating Committee: B. Korshin, K. Yonebayashi and G. Gleixner, who will propose candidates for board positions in the upcoming elections.

National Chapters and IHSS Organization Worldwide

The Spanish Chapter is currently being reorganized with the help of Josemaria Garcia-Mina (jgmina@inabonos.com).

The former Russian chapter has been reorganized into a new Regional Chapter of the Commonwealth of Independent States (CIS-IHSS), which includes most of the former USSR

countries. Dr. Irina Perminova was elected as regional coordinator and Dr. Olga Iakimenko as vice-coordinator.

The Baltic and Nordic chapters of IHSS agreed, during their general assembly, to merge into one regional chapter. Dr. Georg Becher was elected as Coordinator of the newly founded Nordic-Baltic chapter.

13th International Meeting of the IHSS in 2006

A formal proposal for organization of the 13th International Meeting in 2006 was presented by Fritz Frimmel and Gudrun Abbt-Braun. The proposal was still a draft, but described the location, possible accommodation and additional facilities. No other formal offers have been presented to date. The Board agreed to hold the meeting in Karlsruhe, Germany or in a nearby location in the country. The Board requested a detailed proposal.

IHSS Training Grants

The Board of Directors decided to promote a new initiative of financing small research programs for young scientists. The money should support travel and living expenses for the scientists to spend a research period of 1 to 3 months, in a foreign lab. Availability of matching funds from other institutions will increase the chances for approval by the Board. The review process will take place once a year. Further details are given in this newsletter (see section on IHSS Training Bursaries).

IHSS Sample Collection

The Board approved the new sampling of the Suwannee River in order to replenish the collection. Dr. Michael Perdue will head the team that includes two of his graduate students and Norbert Hertkorn, from Germany. Jim Alberts and Paul Bloom will give additional help. The goal is to collect enough river water to extract 100 g of HA. The sampling will be done from a dam on a sill that formerly controlled the water level in the area where the Suwannee River flows out of the Okefenokee Swamp. Hydrological changes might be expected to affect the composition of the water. The Collection Committee will submit to the Board a written proposal to expand the Collection with additional samples representing other important natural and climatic areas of the world.

IHSS STANDARD AND REFERENCE COLLECTION

by Paul Bloom

IHSS Samples the Suwannee River again for Humic Acid

The IHSS no longer has an adequate reserve of Suwannee River Standard Humic Acid and last May and June an IHSS sponsored team returned to the original sampling site to extract humic substances from the Suwannee River. The team, led by Mike Perdue of the Georgia Technological University, included two of Perdue's graduate students, Jason Ritchie and Jean-Francois Koprivnjak, and Norbert Herkorn who came all the way from Germany to help. Jim Alberts and Paul Bloom supplied additional help. The goal was to collect enough river water to extract 100 g of HA.

Sampling was done from a dam on a sill that formerly controlled the water level in the area where the Suwannee River flows from the Okefenokee Swamp. This is the same site where a United States Geological Survey (USGS) team, led by Ron Malcolm, obtained the original Suwannee River Humic and Fulvic acids in 1983. However, the river has changed since1981. In 2000 the US Fish and Wildlife Service abandoned the idea of trying to control the water level and they lowered the gates on the dam, dropping the water level by at least a meter. This change in hydrology could be expected to cause changes on the composition of the river water. Indeed, the DOC was 70 ppm, almost twice the value reported in 1981. The very rainy weather this May and June may also have contributed to the greater DOC.

As in 1981 the XAD-8, pH 2.0, method was used for separating the humic and fulvic acid from the water. Unlike the 1981 team, Perdue and his team concentrated the HA and FA eluted from the XAD-8 using reverse osmosis (RO). This greatly reduced the quantity of concentrate to haul to the laboratory at Georgia Tech for final processing.

In the more than 3 weeks of sampling, the team collected 18,000 liters of water. All of this water was transported in 24 L carboys to a temporary laboratory in a house on the Okefenokee National Wildlife Refuge for XAD-8 separation and concentration by RO. This required much lifting and hand carrying of heavy carboys, frequently working in the rain.

Currently Perdue and his students are doing the final laboratory processing of HA. They will also prepare some of the FA generated, as well as some RO-NOM.

The USGS and the US Fish and Wildlife Service provided valuable assistance for the sampling effort. The USGS loaned 3 ten-liter columns, used by Ron Malcolm in 1981, and some XAD-8 resin. The Fish and Wildlife Service loaned a house that was used as residence and temporary laboratory.

PhD Theses

Alkaline and Solar Induced Degradation of Natural Organic Matter

Thomas Brinkmann, Universität Karlsruhe, January 2003. *Supervisor:* ***Prof. Dr. F. H. Frimmel***

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The aim of this work was to characterize the structure of humic rich dissolved organic matter (DOM) from a bog lake in the Northern Black Forest by degradation reactions in alkaline solution. Furthermore, photodegradation experiments with simulated solar UV light were performed under differing experimental conditions. Changes in DOM composition were mainly characterized by UV spectroscopy and size-exclusion chromatography (SEC) coupled to on-line UV and DOC detection. Low-molecular-weight organic acids (LMWOA) were analyzed as important degradation products.

Anion exchange chromatography with suppressed electrical conductivity detection using hydroxide eluents was used to determine LMWOA. Method detection limits were in the sub µmol/L range. A sample clean-up procedure made the method successfully applicable to samples with high contents of DOM. The linearity of calibration curves was investigated by calculating theoretical functions and comparing the results to experimental data. At low concentrations up to 1 µmol/L, the autoprotolysis of water induced left-curved calibration functions even for strong electrolytes like nitrate. The experimental data were better described by a quadratic function, the differences between linear and quadratic regression being up to 10%. At higher concentrations the calibration curves for strong electrolytes were linear. Due to incomplete dissociation, the calibration curves for weak mono- and dibasic acids showed a right curvature.

Alkaline degradation reactions were performed with the original DOM or its isolated fulvic acid fraction at different reaction times and temperatures. Depending on the wavelength and the reaction time, the UV/VIS absorbance between 230 and 600 nm increased or decreased. The results could be rationalized by comparison to the UV/VIS spectroscopic behavior of model compounds in alkaline media. SEC showed that the average size of DOM decreased, and that a major part of the degradation products consisted of LMWOA. The kinetics of their release were compared to those of model compounds from which evidence was derived that carboxylic ester moieties play a role minor in the release of LMWOA.

Photodegradation experiments were done with the original DOM and simulated solar UV light. With increasing amounts of absorbed light energy, the DOC concentration and the UV/VIS absorption decreased. The wavelengths of the maximum bleaching effect and of the maximum amount of absorbed energy were found to coincide. A decrease in the average hydrodynamic radii was shown by SEC. Furthermore, evidence was given that hydrophilic moieties of the DOM were preferentially photodegraded while the hydrophobic ones remained relatively unaffected or were even formed. The combined photochemical-biological degradation proved to be more important than the pure photochemical mineralization. Formic, acetic, pyruvic, oxalic, malonic, and succinic acid were identified as degradation products. Their contribution to the dissolved organic carbon increased significantly due to irradiation. In addition, they were shown to constitute a major fraction of the bioavailable photoproducts. Kinetic experiments indicated that degradation of LMWOA occurred simultaneously during irradiation experiments, LMWOA with α-oxygen groups being more amenable to these processes. The influence of nitrate on photodegradation of DOM could not be observed in the investigated system. Dissolved iron turned out to be a catalyst of DOM degradation and LMWOA formation. Copper however, another redox active metal ion inhibited the bleaching

processes. Furthermore, copper played an antagonistic role in LMWOA formation, reducing the concentrations of formic, acetic, and malonic acid while increasing the concentration of oxalic acid.

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Interactions between Metallic Species and Humic Substances Extracted from Soils of the Micro Drainage Basin of the Anhumas Reservoir, Araraquara, São Paulo State

Ademir dos Santos, Univ. São Paulo, June 2003. *Supervisor*: ***Prof. Maria Olimpia de O. Rezende***
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The results about the distribution of Al, Cd, Cu, Mn, Ni, Pb, and Zn in different sites of the micro-basin of drainage in Anhumas Reservoir, where samples were collected at the depths of 0-5, 5-10, 10-20 and 20-40 cm respectively, indicate that, in a general way, the sandy soils have lower concentrations of total metals than those which have clayey characteristic. The data also showed that, the concentration of total metals and their distribution in the sites, do not depend on the depths, on the type of soil (sandy or clayey), on the kind of vegetation (sugar-cane or ciliary's forest) and neither on the soil mixed with industrial solid residues. Regarding the metallic types (or species) potentially bio-available, on the surface (0-10cm), the dendograms showed that in function of the concentration, the sites where samples were collected can be separated in two different groups and that, depending on the way the soil is handled, there is a direct influence in the bio-availability of metals. However, the bio-availability has not been harmed, and the odds are against any environmental impacts in the Reservoir of Anhumas although some metallic species are carried to it from dumping grounds which have industrial solid residues located in the micro-basin.

Under a system of tangential ultra filtration, experiments were carried out, for 24 hours, focusing the influence of the time of contact in the relative lability between the exchangers aluminium, .diethylenetriaminepentaacetic acid (DTPA) and metallic species complexado by humic substances (HS). Decreasing orders of relative lability of Mn, Cd, Zn, Ni, Cu and Pb in relation to the changer aluminium were determined and Mn, Al, Pb, Cd, Zn, Cu and Ni in relation to DTPA. The kinetics and the reaction order of these processes were characterized and the half life time ($t_{1/2}$) ranged between 20 and 40 minutes, indicating a relatively slow first order reactions. Comparing aluminium changers and DTPA, aluminium exchanged in a wider range with the HS-metal species than with the chelant DTPA. Constants of change lower than 1 between the ions Al(III) and Pb, Cu and Zn were determined. However, the constant of change between manganese

and aluminium was the highest (8,26) showing that the complex HS-Mn is the least stable, in other words, among the studied elements, manganese presented the highest relative lability.

The comparison of the complexant power between humic substances and α-aminoacids (methionine, methionine sulfoxide, cysteine hydrocloride) taking into account a feature of biological interest, was carried out by also using a system of tangential ultra filtration. Studies show that the humic substances are selective complexants with higher complexation capacity than the α-aminoacids to the species Al, Cu and Pb. These results open up new prospects for further studies regarding possible therapeutic applications of the humic substances.

Hydrophobic Sites in Humic Acid as Detected by ESR of Spin-Label Stearic Acid, ^{13}C NMR of Labeled Oleic Acid and Pyrene Fluorescence

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Until recently the predominant models for humic substances (HS) were macromolecular/polymeric. In such models, conformational changes were considered to take place as in biological macromolecules such as proteins, polysaccharides, nucleic acids, and lignin. Schnitzer and Khan and, more recently, Schulten and Schnitzer proposed the existence of voids in humic structures, and voids bounded by non-polar functionalities would provide excellent sorption sites for non-polar pesticides and anthropogenic organic chemicals (AOCs). Wershaw was first to postulate a plausible alternative to macromolecular/ polymeric HS structures. Based on the well-established micelle concept, he suggested that humic aggregates are micelle-like with hydrophobic interiors and charged and polar exteriors. Engebretson and Wandruska, using the fluorescent probe pyrene (PY), also provided experimental evidence favoring the micelle-like model. More recently Piccolo et al. provided experimental data using gel chromatography procedures which indicated to them that HS are composed of associations of relatively small molecules. Their data suggested that the associations are broken when organic acids, such as ethanoic, are introduced to the systems. Their later studies, using high pressure liquid chromatography (HPLC), in which they took account of the possibilities of artifacts contributing to the separations in low pressure gel chromatography, indicate how the associations are also broken by a wider variety of organic acids, and by alcohols, and mineral acids. Data by Kenworthy and Hayes have supported the molecular associations theory. They observed that the fluorescence of PY when bromide ions were added was protected when the most hydrophobic fraction of a soil humic acid (HA) was present in the medium. (Fulvic acid had no protective effect.) However, when ethanoic acid was added, and the pH adjusted to 9, the protection was lost. They considered that the HA provided a hydrophobic environment shielding the probe from the quenching ion, and the molecular associations which provided the protection were broken by the ethanoic acid. The relevance of having a definitive model for HS is obvious. Regardless of the models proposed, there is a consensus which favors the existence of hydrophobic regions that would be excellent sorption sites for non-polar pesticides and other AOCs. Specific markers provide a procedure for identifying hydrophobic regions in HS. The present study sought hydrophobic markers to evaluate hydrophobic interactions with HAs at different pH values and for various reaction times. The markers used were: the spin-label probe 5-SASL (N-oxyl-4',4'-dimethyl oxazolidine derivative of 5-ketostearic acid), detectable by ESR; [1-^{13}C] oleic acid (OA), detectable by NMR; and the fluorescent probe PY.

Effect of Humic Acid Adsorption on the Aggregation of Magnetite Nanoparticles

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The magnetite nanoparticles are able to adsorb humic acid molecules in a large degree mainly at lower pH and at higher ionic strength. The dominant interaction between humic acid/humate and magnetite is probably a ligand-exchange reaction. The Coulombic contribution to the interaction between oppositely charged partners is significant only under acidic condition. The results from

size exclusion chromatography analysis demonstrates that the smaller size humic acid fractions enriched with functional groups are adsorbed preferentially on the surface of magnetite.

The adsorbed humic acid modifies the surface charge properties of magnetite entirely or in a certain degree depending on the amount of adsorbed polyanions. Humic acid can stabilize the magnetite nanoparticles in a steric and electrostatic way because of its macromolecular and highly charged character. We observed that humic acid-covered iron oxide nanoparticles form stable colloidal dispersion, particle aggregation and sedimentation do not occur in these systems in a wide range of pH.

Soil Organic Matter Storage and Composition as Affected by Long-term No-till Cropping Systems in Southern Brazil

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The improvement of the soil organic matter content and stability is a crucial factor for promoting the sustainability of agroecosystems. The establishment of cropping systems which allow high biomass input that surpasses the mineralization rate is a manner to increase the organic matter stocks in tropical and subtropical soils under no-tillage (Sanchez et al., 1989; Bayer et al., 2001). The objective of the present study was to investigate quantitative and qualitative changes on soil organic matter (SOM) promoted by cropping systems used in long-term no-tillage system in southern Brazil. Here, cereal and legume species are important groups of plants that constitute cropping systems.

Effects of Lipids on the Sorption of Hydrophobic Organic Compounds on Geosorbents: A Case Study Using Phenanthrene

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The sorption of hydrophobic contaminants, such as polycyclic aromatic hydrocarbons (PAHs), on geosorbents affect their toxicity, transport, and fate in the environment. Though these interactions have been extensively studied, the mechanisms and the molecular-scale interactions controlling this phenomenon are still virtually unknown. Despite the predominant role of the organic matter (OM) in the sorption of these contaminants, the effect of the geosorbent lipid fraction is generally ignored given the small contribution lipids make to the total OM content in most soils and sediments. In this study, the impact of the lipid fraction of natural OM present in geosorbents on the sorption of PAHs was assessed using several different experiments. In the first set of experiments phenanthrene was sorbed on coastal sediments as well as on their humin and humic acid fractions, before and after lipid extraction. Before lipid extraction, sorption shows dominant partitioning characteristics expected in amorphous OM (i.e. all sites have similar affinity = linear sorption). However, the extraction of lipids from sediment and humin drastically increases, by up to one order of magnitude, their sorption affinity for phenanthrene at low sorbate concentrations resulting in increased isotherm nonlinearity. This effect is less pronounced for humic acids. These results provide evidence that lipids, despite their low relative abundance in the sediments studied, can compete with phenanthrene for specific high affinity sorption sites (e.g. matrix pores and adsorption sites) or may act like plasticizers modifying rigid domains and limiting adsorption. In a second experiment, re-addition of lipids to the extracted sediment restored the sorption isotherm linearity observed in the native material. However, if an excess of lipids is added during this process, these lipids can promote phenanthrene sorption in a manner displaying partitioning characteristics. In the final set of experiments, solid-state ^{19}F NMR using F-labeled lipids sorbed onto the sediments showed that lipids have a varying mobility in the different domains that may interact with phenanthrene. The effect of lipid removal should be considered when natural geosorbents are treated during the course of sorption studies.

IHSS TRAVEL BURSARY GUIDELINES

1. Travel bursaries will be given only to students. Investigators who have completed their Ph.D. degrees are not eligible for bursary awards.

2. A committee consisting of the IHSS President and at least two other IHSS members appointed by the IHSS President will evaluate applications for travel bursary awards.

3. The deadline for receipt of the applications is **six (6) months** prior to the IHSS International Meeting with evaluations and notifications of awards given to the applicants **four (4) months** prior to the IHSS International Meeting.

For the meeting in Brazil, the deadline has been set for February 27, 2003.

4. Applications must contain a letter of application, recent curriculum vitae including a record of classes taken and grades received, a letter of evaluation from the applicant's major professor and a manuscript of the paper to be presented. Three (3) copies of the application are to be sent to the President of IHSS so that they are received before the submission deadline.

5. Awards will be based primarily on the quality and originality of the scientific content of the manuscript and the applicant's record of scientific achievement. It should be clear that the student has had a major part in designing and conducting the research and wishes to pursue a career in a field in which humic substances science is important.

6. The number and amount of the awards will be determined by the President in consultation with the Treasurer and members of the travel bursary selection committee.

7. Travel bursary award recipients will be honored at the conference banquet with their cash award, a certificate acknowledging their status as an award winner and a one (1) year membership in IHSS.

8. **Malcolm Award** - in the judgment of the travel bursary selection committee, the top applicant for a travel bursary award will be designated the Malcolm Award winner. This individual will be recognized with a certificate and cash award of 250 US$ in addition to the normal travel bursary.

Be prepared to send your application for the IHSS Travel Bursary to attend the 12th Meeting of the International Humic Substances Society, "Humic Substances and the Soil and Water Environment", to be held in São Pedro, Brazil, July 26-30, 2004 still have to turn in the Extended Abstract by december 31, 2003 and the complete application for the bursary by January 30, 2004 as indicated above.

IHSS TRAINING GRANTS GUIDELINES

Besides the usual travel bursaries that are specifically destinated to students wishing to attend International IHSS meetings, starting from 2005 the IHSS will support a limited number of training bursarie. These bursaries will allow students to spend 1-3 months training/research periods at leading laboratories with the aim of enhancing their PhD work and becoming acquainted with new techniques and new aspects of HS research.

1. Training bursaries will be given only to students, PhD students and young scientists. Priority will be given to students and PhD students, but young scientists (i.e. '*a young scientist/researcher is someone who at the time of the application has not been in an established position for more than 2 years*') can also apply, provided they are not older than 35 years.

2. A committee consisting of the IHSS President and at least two other IHSS members appointed by the IHSS President will evaluate applications for travel bursary awards.

3. Applications should arrive or be e-mailed to the President of IHSS to the address indicated in the appropriate call, advertised in the Newsletter and in the web page, on or before April 30th of each odd calendar year.

4. Proposals (three copies, if submitted by regular mail) must be in **English**. If e-mailed, they must be sent as 1 attachment only, in **Word, rtf** or **pdf.** All margins must be at least 3cm and headers and footers not less than 2cm. Font size must be no smaller than 10. The following information should be given:

- **Name and full coordinates** of applicant
- **Proposed dates and location of the training** or research period, together with a brief description of the hosting institution
- **Invitation letter** of the hosting institution
- **Keywords** relating to the research topic (up to 5)
- **Abstract** of the proposed research topic (50-70 words)
- **Summary** of the proposed research work or training program (up to 1000 words) explaining the scientific background and rationale of the visit as well as its novel aspects. A clear justification of the need for visiting the hosting institution must be provided. The expected benefits of the training and/or outcome of the scientific work should be also outlined
- **Preliminary programme**. Indicate briefly how the research work or training will be structured during the visit
- **Estimated Budget**. Indicate (in dollars) the breakdown for travel, accommodation, meals and any other expenses. Indicate (if applicable) any financial support awarded or foreseen from the hosting institution or from sources other than the IHSS
- **Brief curriculum vitae** of applicant

5. Scientific excellence, creativity and potential are the main selection criteria. This applies at all levels: CV of applicant, standard of hosting institution, program of research activities. It should be clear that the student wishes to pursue a career in a field in which humic substances science is important. Partnership arrangements (i.e. funding of part of travel and/or lodging, etc. by hosting institution or other national and international organizations) for research periods are welcome and will be given priority.

6. The number and amount of the awards will be determined by the President in consultation with the Treasurer and members of the travel bursary selection committee.

7. Successful applicants must submit scientific reports within 3 months of the visit. Failure to do so may result in the IHSS retaining part of the award.

On line information can be found in the society's web page.