

NEWSLETTER

of

The INTERNATIONAL HUMIC SUBSTANCES SOCIETY

Number 14

AUGUST, 1995

THE PURPOSES AND THE FUTURE OF THE NEWSLETTER

The major objectives of the Newsletter are to keep persons informed about the activities of the Society, to provide news about the Chapters, to inform members about future meetings and conferences of interest, to report on conferences past which have interests for the membership, and to invite our research colleagues to give previews about exciting research and discoveries. It is also meant to serve as a medium where ideas and concepts can be 'aired', and where controversial issues can be put forward for discussion.

Chapter coordinators are requested to submit information about the activities of their Chapters. Scientists who are "bursting" to inform our members of their discoveries, conference organizers who wish to interest our membership, and all others with information of interest are invited to inform the editorship.

We request that the subject matter for communication in the Newsletter be submitted in disc, preferably in Microsoft Word. We will, however, be willing to process any material of interest, no matter how it is presented.

It is our intention to publish at least three issues of the Newsletter each year. More issues will be circulated if sufficient copy becomes available from the membership.

Newsletter No. 15 will also be assembled in Birmingham. Please send copy to Dr. M.H.B. Hayes, President of IHSS, at The University of Birmingham, School of Chemistry, Edgbaston, Birmingham B15 2TT, England. Tel (+) 44 121 414 4405. Fax + 44 121 414 4403. E-Mail M.H.B.Hayes@Bham.ac.uk

Newsletter No 16 will be published by Dr. Teodoro M. Miano (IHSS Secretary) Details for submissions to Dr. Miano will appear in issue No. 16 of the NEWSLETTER

IS THERE A NEED FOR AN IHSS JOURNAL?

A number of persons have spoken to me at various times about difficulties they have experienced in getting their good work in the Humic Sciences published in established Journals. They have referred to biased and incompetent refereeing by persons that have little awareness of the humic sciences. I have received the same complaints from persons who have received unfair, and often incompetent reports from referees who have dealt with grant applications that they have made.

Whether or not there should be an IHSS Journal has frequently been raised at the general meetings associated with the International Conferences of IHSS. In general, the membership have not favoured a Society Journal, but I have noticed that the opposition is less strong than it used to be.

I would like to canvas the views of the members, and will be pleased to bring written communications dealing with this matter to the attention of the Board of IHSS and to the General Assembly at the 8th International Conference at Wroclaw in September, 1996.

Persons who submit papers and grant proposals are advised to supply a list of referees whom they consider competent to assess their work, and who can be relied upon to be fair and objective in their appraisals. M.H.B.H.

NEWS FROM THE CHAPTERS

THE NORDIC CHAPTER

The 5th Nordic Symposium on Humic Substances in Soil and Water

Held in The University of Lund

June 6-8, 1995

Two years ago the Nordic Group became affiliated as a Chapter of IHSS, and in so doing set standards for constitution, for aspirations, and for performance for the emerging Chapters of IHSS.

The conference in Lund had 72 participants, and 15 of these were from outside the Nordic countries.

There were six sessions. The *First Session* dealt with 'Humic Substances, Chemistry and Structures'. Professor Nicola Senesi (vice president of IHSS) opened the academic session with discussion of the fractal dimensions of humic substances (see Newsletter, No. 11). Certainly the fractal approach is gathering momentum, as judged also by the contribution of Ragnar Osterberg who spoke about 'Direct observations of humic acid fractal clusters, an AFM and SANS study'. Christian Gron spoke of the 'Origin and structures of groundwater humic substances from three aquifers'. Olga Trubetskaya and her international colleagues made two presentations, one dealing with amino acids of humic acids from soils formed under different climatic environments, and a second dealing with the fractionation of humic acids by gel chromatography, ultrafiltration, and PAG electrophoresis.

The *Second Session* dealt with 'Toxicity and Metal Interactions of Humic Substances'. Gudrun Abbt-Braun discussed the characterization of the reaction products by the THM- and AOX-formation potential and comparisons with data for physical water treatment processes. This was followed by a contribution by Fritz Frimmel dealing with the influence of humic substances on the aquatic transport of heavy metals in defined mineral phases, and Laszlo Hargitai discussed the role of humic substances and polyfunctionality of N forms in soils and peats affecting the movement of toxic metals in the environment. Januz Pempkowiak discussed the complexing capacities and apparent stability constants of aquatic humic acids toward lead and cadmium investigated under realistic concentrations of metals and humic substances. This was followed by the contribution of Jette Bjerre Christensen and colleagues on the effect of dissolved organic carbon on the mobility of cadmium, nickel and zinc in groundwater, and Michael Spiteller dealt with the influence of dissolved organic matter on the mobility of selected pesticides.

The *Third Session* dealt with the 'Role of Humic Substances in Biogeochemical Cycles'. Bert Allard opened the session with a discussion of how river discharge of dissolved organic matter into the Arctic ocean is a link in the global carbon cycle. Uwe Munster discussed the significance of lignoperoxidase activities in polyhumic lakes. Catharina Pettersson dealt with the seasonal variations of total organic carbon, iron and aluminium in the Svartberget catchment in northern Sweden. It will be especially interesting to read Leif Kronberg's contribution when the Proceedings are published, as judged by the impact of his intriguing topic 'Is our DNA messed up with carbons originating from humic substances'?

James J. Alberts from the University of Georgia Marine Institute at Sapelo Island, spoke eloquently (as is his way) of the utilization and transformation of riverine humic substances by estuarine microflora, and Mats Jansson addressed the topic of Bacterioplankton and phytoplankton in Lake Ortrasket - a large dystrophic lake in Northern Sweden.

The seasonality of colour in waters is of great importance for water suppliers and consumers, and this topic is in need of understanding and of quantitation for different source and environmental conditions. Colour is indigenous to many surface waters in Norway, and we await with great interest the manuscript of Per Kristian Egeberg and his coauthors (which include Egil Gjessing). Valentina Ye Prikhod'ko closed the session with a treatise on humus of soils in the nature-archaeology preserve "Arcaim", Russia.

The *Fourth Session*, which dealt with 'Photochemical Aspects of Humic Substances', was opened by Lars Tranvik who dealt with the potential depth penetration of effects of sunlight in lakes of different humic contents: Inhibition of bacteria versus transformations of DOM. It will be good for our science when we know the extent and the mechanisms by which sunlight alters the compositions and properties of aquatic humic substances. Johan Knulst described his studies on aquatic surface microlayers as photolytic reaction chambers for humic substances in coloured waters. In the view of this writer, Johan is contributing greatly to our awareness of the nature and compositions of the organic matter at the air/water interface, and his remote controlled skimmer, which removes the surface layers, must be the best of the procedures operating in this area. It is good to see that his work is progressing to considerations of the influences of the interfacial

layers, with their distinctive structural and compositional properties, on the reactions and interactions that take place involving organic substances at the air/water interface. **Nina Corin's** paper, dealing with light-induced degradation of organic matter in water, has real relevance to colour in water under natural conditions.

The **Fifth Session** addressed '**Humic Substances in Acid Environments**'. This theme is of very considerable importance in view of the extents to which upland peats and upland acid soils contribute to surface water supplies. **Ingar Aandahl** opened the session with discussion of the *effects of the reversal acidification and nitrogen addition on dissolved organic substances at Gardsjon*. This was followed by a paper by **Kevin Bishop** (a British scientist who revels in the life and science of the arctic) on *organic acidity in the spring flood at Svartberget, Northern Sweden*, and by a contribution by **James H. Ephraim** on *correlations between acidity and molecular size distributions of aquatic fulvic acid*.

The **Sixth Session** was devoted to the **International HUMEX project**. In 1988 a plastic curtain divided Lake Skjervatjern, near Forde, north of Bergen in Western Norway. This area is relatively free of the acid rain which is causing ecological imbalances in Southern Norway. Both sides of the lake were carefully monitored for two years, and then simulated acid rain has been applied annually in simulated rainfall since September 1990 to one half of the lake and its watershed. The annual acid input matches that which falls in the rain in South Norway. No acid is added to the control side of the lake or to its watershed.

A large group of scientists from several countries have been monitoring changes to the chemistry and the biology attributable to the acidification. These scientists convene annually to discuss their results.

Egil Gjessing has been a prime mover in designing the experiment and getting it underway. In his opening address he dealt with '**RO-isolates from HUMEX A**' (the acidified side) '**and B** (the control). **Differences and similarities**'. **Mike Perdue**, who (with James Alberts) has organised the Atlanta meeting (described in Newsletter 13), outlined the success he had when '*using reverse osmosis at Skjervatjern*'. **Pirkko Kortelainen** dealt with *organic versus anthropogenic acidity in lake Skjervatjern*, and **Rolf D. Vogt** discussed *natural and acid induced alterations of DOC and its role in HUMEX soil water chemistry*.

Anders Kullberg dealt with *dissolved organic matter and its hydrophobic fraction from hydraulic vents of an experimentally acidified humic lake*. **Gunnhild Riise** discussed *the mobility of trace elements at the Humex Site, studied by a hollow fibre filtration technique*, and **Wilhelm Graneli** dealt with *photooxidative CO₂ production in lakes of different humic content*.

There was considerable emphasis on the effects of acidification on biota. **Pal Brettum** spoke about *changes in the volume and composition of phytoplankton after experimental acidification of a Humic Lake*, and **Eli-Anne Lindstrom** discussed *factors controlling periphyton growth in acidified humic water. Experiments with nutrient diffusing substrates in the Humic Lake Skjervatjern*, and the last paper on the biological theme was presented by **Dag Hessen** who described *the zooplankton story of the HUMEX Acidification Experiment*.

Espen Lydersen, who has taken over coordination of the HUMEX project, gave the final address on the '*Future Science at the Norwegian HUMEX Site*'.

Thirty one posters of very high standard were presented, and appreciation of these was reflected in the lively discussion of the contents of these. The Proceedings will be published in Environmental International (1 st. issue, 1996).

Compiled from Information Provided by Egil Gjessing.

THE ITALIAN CHAPTER

The First national Meeting of the Italian Chapter of IHSS was held in the University of Bari, May 4-5, 1995

Report from Information Supplied by Nicola Senesi and Teodoro M. Miano

The conference, to the theme '**Humic Substances in the Ecosystem. Scientific and Applicative Aspects**' was organized by Professor Nicola Senesi (Vice-President of IHSS) and Dr. Teodoro M. Miano (Secretary of IHSS), and was held in the impressive setting of the Aula Magna of the Faculty of Agriculture of the University of Bari.

There were about 60 participants from various Italian Universities, Research Institutions, and private companies.

The meeting was structured to accommodate four invited keynote lectures, four oral sessions, and a poster session. The keynote speakers were:

Dr. M.H.B. Hayes (*President of the IHSS*), Professor C.E. Clapp (*Treasurer of IHSS*), Professor P. Sequi, and Professor A. Piccolo. The themes for the oral sessions were:

- I. The Structures of Humic Substances and Modern Methodologies for Their Investigation;
- II. Quality of and Evolution of Organic Inputs to the Soil;
- III. Interactions of Humic Substances with Herbicides and Metal Ions; and
- IV. Physiological Activities of Humic Substances.

There were 23 oral presentations, and each of these was followed by very considerable discussion. The end of each session was characterized by intense and exhaustive discussion. An Abstracts Volume, and a short communication for each paper presented, was edited by N. Senesi and T.M. Miano.

The Meeting was followed by a General Assembly of the Italian Chapter of IHSS, and during the course of the meeting 10 new members were welcomed to the Italian Chapter. The National Coordinator, Professor Nicola Senesi, summarised the state of the art with regard to the important aims of the IHSS, and he gave detailed information about the editing of the Volunteered Papers presented at the 7th International Conference of IHSS held in Trinidad in July, 1994. (The invited papers presented at the Conference will be presented as a separate Volume).

The assembly also dealt with membership fees, and with financial matters related to the Italian Chapter. Discussion was given to the status of humic research, and short reports were presented by persons involved in two official National Research projects dealing with humic substances studies.

There are now 110 active members of the Italian Chapter of IHSS

Note added by M.H.B. Hayes

I had been to Italy once before the Meeting of May 4-5 (to attend the magnificent 6th IHSS International Conference in Bari organised by Nicola Senesi and Teodoro Miano in September, 1992). That first visit was a delight from both the academic (as everyone at Bari '92 will agree) and the social points of view.

The scientific content of this year's Italian Chapter was excellent, and Ed Clapp concurs. The quality of the science came through to us despite our incompetence in spoken Italian (no, a classical education with emphasis in Latin is of little use when endeavouring to comprehend the spoken word in modern Italy).

Ed and I arrived in time for the May Day holiday, and the gracious Senesi invited us to the 25th anniversary of his nuptials with the elegant Lady Rosella. The Mass (similar to that of 25 years before) was held in the chapel of a medieval fortress (now a restaurant), and Ed and I were amazed to observe the devotion of the, to the world at large, seemingly cavalier splendid humic scientist that we know as Nicola Senesi. The countryside was breathtakingly beautiful, with lush grass, flowers in bloom, and birds in song all around. (Those who went on the field trip in 1992 will remember the beautiful scenic countryside south of Bari.)

I was not quite prepared for the banquet which followed the Mass. Course 1 came and went. It was delicious, of course. Then course 2 followed close by, which I had anticipated to be the main course. It was delightful, and of delicate and subtle taste. I duly set to it with gusto, but then I noted that those around ate with restraint, and with far better table manners. I remarked to my better travelled colleague (Ed) that our companions had remarkable restraint when faced with such delicious victuals. He curtly replied "they know how to pace themselves for a marathon of delights. Do you realise that you will have 12 courses"?

The banquet lasted all afternoon, with time taken for speeches, poetry, music and song, and there was time to mingle with the guests, to walk through the fields, and to observe the beautiful surroundings. These Italians I reflected, have retained a clear awareness of the importance of the quality of life.

It was great to socialise with people who represent the best in science, literature, music, and art (and such great artists), and who love life. They have a saying in Italy "One does not grow old at the table". This I had seen in TV ads, but did not know what it meant till I encountered the great experience of the Italian way at the 25th wedding anniversary of Rosella and Nicola.

THE BRITISH AND IRISH CHAPTER of the INTERNATIONAL HUMIC SUBSTANCES SOCIETY

An International Conference on the theme of

***'Humic Substances in Soils, Peats, and Waters: Implications for Plant Growth, Industry,
and a Sustainable Environment'***

will take place September 18-19, 1995, in University College Belfield, Dublin 4, Ireland.

The symposium is co-sponsored by:

The Agriculture Group of the Royal Society of Chemistry;

The Agriculture and Environment Group of the Society of Chemical Industry; and by

The British Society of Soil Science.

There will be four Sessions. *Session 1* on Monday, September 19, will deal with '**Composition, and Structures and Some Interactions of Humic Substances**'. The keynote paper in this Section will be given by **Dr. Michael Hayes** (*President of IHSS*). This will be followed by an address by **Dr. David McGrath** of *Teagasc, Johnstown Castle, Wexford* dealing with *Organic Matter in Irish Soils*. After coffee **Drs. D.B. McPhail** and **M.V. Cheshire** (*of the Macaulay Land Use Research Inst.*) will discuss '*Effect of Ascorbate Reduction on the Electron Spin Resonance Spectra of Humic Acid Radical Components*', and **Alison Lacey** of the *University of Birmingham* will discuss '*Interactions between Humic substances, (Hydr)oxides, and Clays*'. **Dr. D.D. Harkness** and **R.A. Bol** (*NERC Radiocarbon Laboratory, East Kilbride*) will discuss the '*Potential of Naturally Occurring Carbon Isotope Ratios as Tracers for the Impact of Climate Change on the Carbon Flux through Organic Rich Soils*', and **Dr. J.A. Meredith** of the *University of Reading* will close the session with the question '*Soil Organic Matter: Does Chemical or Physical Stabilisation Predominate?*'

Session 2 (after lunch) will address the theme '**Influence of Organic Amendments, Including Sewage Sludge, on Soil Sustainability**'. The keynote paper by **Dr. A.S. Ball** (*University of Essex*) will deal with '*The Effects of Atmospheric CO₂ on Soil Decomposition Processes*'. In view of the imminent ban on the disposal of sewage sludge to sea, the paper by **Dr. E.G. O'Riordan** (*Teagasc, Grange, Co. Meath*) dealing with '*The effects of Repeated Applications of Sewage to Soil on Soil and Metal Herbage Metal Levels*' will be highly topical. Heavy metals in sewage sludges often give rise to concern, and after tea **Dr. O'Riordan** will discuss the '*Effect of Heavy Metals on Nitrogen Mineralization*' and **Yongming Luo** and **Dr. P. Christie** of *The Queen's University, Belfast* will continue on the sewage sludge theme with an address on '*Influence of Lime stabilized Sewage Sludge Cake on Dissolved Organic Carbon and Heavy Metals in the Soil Solution*'.

Afforestation is a topical subject at this time, and not everyone is convinced that the growing of forests in acid peat soils is always environmentally the best way to utilise such lands. There is a considerable setting to forest in Ireland of acid (blanket and upland) peats, and **Dr. E.P. Farrell** of *University College Dublin* will summarise results from his extensive experimentation on '*the effects of coniferous tree plantations on acid peat soils*'.

Session 3 will be involved with the '**Influence of Organic Amendments on Plant Growth**'. **A.E. (Johnny) Johnston**, whom we consider to be the world authority on the sustainability of organic matter in arable conditions, will give the keynote address in a novel topic for him '*Peat, a Valuable Amendment for Soil Productivity*', and on the basis of past performances this will be a talk that everybody with interests in soil organic matter sustainability should hear. This paper will be followed by four contributions from Ireland, and we are confident that the interest generated by Johnny will be maintained throughout the morning of September 19. **Mary Lynch** and **E.S. MacNeidhe** of *Johnstown Castle* will discuss '*Organic Farming in Ireland*', and **J. Humphreys** and **T. Jansen**, also of *Johnstown Castle*, will deal with the '*Comparative Effects of Animal Slurry and Farmyard Manure on Plant Growth*'. After coffee there will be an interesting presentation from the *University of Limerick* when **M.V. Ross** and **G.J. Mullen** will discuss the '*Effect of Cheese Whey Application on Grass Growth. Soil Properties and Drainage Water Composition on Two Contrasting Soil Types*'. The *University of Limerick* is at the centre of Ireland's dairy industry, and the disposal to land of waste products and waters from dairy processing industries is topical in the area.

D.I. Whiteley, **D.I. Flanagan**, and **K.M. Rushton** of the *University of Leeds* will talk to the theme '*A Comparison of Lysimeter and Field Scale Estimates of Nitrogen Mineralization from Disturbed Agricultural and Woodland Soils*'.

Professor R.F. Hammond of the *Veterinary College, Dublin*, has published an excellent treatise on Irish peatlands, and his presentation (though not exactly consistent with the theme for Section 3) '*Classification and Mapping of Peatlands*' will be one of the highlights of the meeting. We anticipate that his presentation will feature in many of the lunch-time discussions.

The *fourth* and final *Session* will address '**Humic Substances and Dissolved Organic Matter**' after lunch. It is hoped that this theme will attract persons from the water industries. For the most part these industries have been slow to recognise the importance of humic substances in water. The water supplies of many major cities in Northern Europe rely on supplies from upland peat watersheds, and these waters are generally rich in humic substances. The water industry is concerned with the removal of the colour from waters, but sadly the industry has made little investment in understanding the mechanisms of colour release from the

peatlands, and the mechanisms by which the various humic fractions interact with substances with potential for the removal of colour (humic substances) from waters.

The keynote paper of **Ian Kenworthy** and **Michael Quane** (*The University of Birmingham*) will discuss '*The Effect of Acid Rain on Humic Substances in Soils and Waters*', and they will take their inspiration from their work with the soils and drainage waters of the artificially acidified watershed of Lake Skjervatjen. That watershed is acidic peat, and the results are relevant to some of the watersheds in Britain and in Ireland.

H. Lyons and **T. Reidy** (*Tralee Regional Technical College*) will discuss the '*Use of Peat in Treating Effluent*'. This topic has very definite industrial relevance. **Thomas M. Hayes** of the *University of Birmingham* will discuss the '*Complexation of Organic Chemicals by Humic Substances*'. There are many who hold that the solubilization of sparingly soluble anthropogenic organic chemicals is enhanced by soluble humic substances. If that is so, then humic substances in waters would be major transporters to surface and to ground waters of soil applied anthropogenic chemicals. It will be of interest to see what conclusions Tom Hayes has reached as the result of his studies.

After tea, **Dr. Declan J. Little** of *University College, Dublin* will discuss, in the last presentation of the symposium, '*Organic Matter of Podzols Under Oak Woodlands in Ireland*'. This fascinating study has looked at organic matter in podzols under oak forests that have never been cleared, and from the same soil types in adjacent sites where the forests have been cleared for a considerable time.

There will be several posters on display and discussion of the posters will take place after Dr. Little's presentation.

Accommodation is provided in Trinity College (founded in 1603) in a medieval setting in downtown Dublin. The modern UCD campus is in a delightful and spacious setting in Belfield (take the 47A bus from Trinity). Lunch can be obtained in Belfield, and the campus has the finest, and most convenient sports facilities on this side of the Atlantic.

Delegates will convene in Trinity on Sunday 17th. That will be a big day in Dublin because Tyrone will be playing Dublin in Croke Park for the Gaelic Football championship of Ireland.

There will be a reception on Monday night, and delegates can be sure that the social round will match the excellence of the presentations.

There is no Registration Fee for persons who are members of IHSS. All are welcome, but it is hoped that by conference end everyone who attends will be members of the Society and of its British and Irish Chapter (£12 IR or GB, and only £6 for students and retired persons).

Further details may be obtained from the Conference Organiser

Dr. W. S Wilson, Dept. of Biology, The University of Essex, Wivenhoe Park, Colchester, Essex.

THE HUMIC STANDARDS AND REFERENCE COLLECTION OF IHSS

Some information was given about the *Standard and Reference Humic and Fulvic Acids* of IHSS in Issue Number 13 of the Newsletter. The prices listed were in error. These were listed in terms of \$(US) per mg. The costs were intended to be presented in terms of \$ (as listed) per 100 mg, and not in terms of \$(US) per mg. We apologise for any concern or inconvenience that this error might have caused.

The information presented indicated that the Soil Fulvic Acid Standard is out of stock. New stocks will be available from November 1, 1995 at the listed price of \$150 per 100 mg.

A brochure, or booklet will be prepared listing data which have been obtained for the samples.

PUBLICATION OF THE PROCEEDINGS OF THE SEVENTH INTERNATIONAL CONFERENCE OF IHSS (at THE UNIVERSITY OF THE WEST INDIES, ST. AUGUSTINE)

All **Volunteered Papers** (over 40) have been edited and returned to the authors for alterations, etc. It is expected that the book of papers will be available in November, 1995. The editors are: C.E.Clapp, M.H.B. Hayes, N.Senesi, and S. Griffith. We will be grateful if members will draw the publication to the attention of their libraries. Conference attendees will be supplied with copies. A special price will be made available for members who did not attend the meeting. Details about the publication will be given in Newsletter No. 15.

The **Invited Papers** will be published as a special publication of IHSS. It is expected that this publication will be available in March, 1996.

NEWSLETTER NUMBER 15

The expected publication date is November 15, 1995. Please send copy to the President by November 1.