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International Aerobiology Newsletter

Newsletter of the International Association for Aerobiology



Bernard Clot
IAA President

Another calendar year comes to its end and, as every year, December is the busiest month. A time for a look back to the past before jumping into the future. In this issue, I forego the traditional "*message from the President*". Instead, I have decided to replace my message with the (in my opinion) excellent text from Paolo Mandrioli entitled "Strengths and Weaknesses of a Multidisciplinary Aerobiology Platform". However, I have not completely relinquished my responsibilities and have contributed text celebrating the 30th Anniversary of the Italian Aerobiology Association.

I wish you all, your families and friends, a peaceful and joyful Christmas time. I wish you start 2016 with renewed enthusiasm and strengths. See you in 2016!

Strengths and Weaknesses of a Multidisciplinary Aerobiology Platform

Paolo Mandrioli

Istituto di Scienze dell'Atmosfera e del Clima (ISAC-CNR), Bologna, Italy and Departamento de Biodiversidad y Gestión Ambiental, Universidad de León, León (España p.mandrioli@isac.cnr.it)

The statutes of aerobiology associations define the discipline as a science focused on the transport of organisms and biologically significant particles of material through the atmosphere.

At the 1990 IAA congress in Stockholm, William S. Benninghoff emphasized how the development of aerobiology, from being a study of seasonal atmospheric diffusion of spores and allergens over long distances and bacteria and viruses over short distances, was largely the result of interdisciplinary teamwork involving biologists, specialists in physics and chemistry, meteorologists and mathematical modellers.

Writing in Issue No. 40 of the IAA Newsletter published in December 1994, British Aerobiology Federation President John Lacey commented on the scientific evolution of aerobiology in a paper entitled "Whither Aerobiology?" recalling that "Aerobiology is both a discipline in its own right and a tool used in many other disciplines. Consequently, conferences on aerobiology have to compete with the specialist interests of allergists, immunologists, occupational hygienists, medical epidemiologists, plant pathologists, entomologists, aerosol scientists and others". However, he voiced a concern: "I believe we should be especially concerned at the nature of the papers being presented at conferences. These have increasingly related to descriptive studies of the air spora, reaching a peak in 1994 where they represented almost 75% of the programme. Papers relating to experimental and fundamental aspects of aerobiology are far too few. Papers describing fundamental studies reached an all-time low of 0.4% in 1994, those on methodology accounted for 9%, dispersal 2%, deposition 1%, weather 7% and ventilation none. A hopeful sign, perhaps, is that epidemiological papers increased to 10% in 1994 but, against this, many papers (reaching 15% in 1994) had only the most tenuous if any connection with aerobiology". Generally speaking, Lacey's comments still stand for the present and future research scenario.

Without a doubt, the interdisciplinary nature of aerobiology offers advantages in the field of basic and applied research, but at the same time, it demands an in-depth analysis of the problems involving in training the "aerobiologist" who often lacks an adequate scientific grounding in the "aero" part of the discipline. Nowadays, the term "aerobiology" is used nationally and internationally as a synonym for "allergen-related respiratory diseases". But aerobiology is not simply allergology.

The unifying concept underpinning aerobiology must be the airborne particle: how particles behave, how the environment influences their dispersion, and the impact particles have on other organisms. Aerobiology is not microbiology, botany, palynology, pollen biology, plant genetics or cultivation. Nor is it entomology or plant, animal and human pathology, allergy, clinical and environmental medicine, biological warfare, aerosol science, biotechnologies or industrial hygiene, health and safety. Aerobiology touches on all these fields and more besides, but it is essentially a science focused on the study of airborne particles.

Continued on page 2...

Paolo Mandrioli, Continued from page 1...

This brings us to the problems increasingly encountered in current written and oral scientific communication. A prime example is when aerobiology experts publish "scientific breakthroughs", unaware or intentionally ignoring the fact that these so-called "breakthroughs" already exist in the literature of well-established scientific fields like physics of the atmosphere and aerosol physics.

The problem is well known to long-suffering editors and publishers of multidisciplinary scientific journals who often find it difficult to select the appropriate associated editors or referees. The importance of the matter led a major scientific journal to devote a special issue to the topic (Science 2013, Vol.342 no.6154) focused on the poor quality of scientific papers published in journals boasting a high impact factor.

Broad-spectrum interdisciplinary scientific journals frequently publish papers featuring little or no originality but clumsily repurposing research work already published in specialist journals. A good example is work comparing instruments designed for the same purpose or methods of preparing specimens for analysis. Before or after the Internet? The use of this formidable tool to search for information yields results strictly correlated to our personal capacity to "filter" the contents requested. The often disastrous outcome of the quality of published papers stems from our limited ability to establish the reliability of search results, in other words our scientific culture. There is no univocal unfettered communication in our scientific exchange but a commitment to brainstorming and discussion without the fear of our own personal ignorance. We must be aware that our ignorance is vastly superior to our knowledge; were it otherwise, advances in scientific knowledge would be impossible.

This reflection closes the circle and inevitably leads us to the key issue of the training and scientific information institutions and associations include among the attainment targets of their programmes and statutes. Have we forgotten the meaning of interdisciplinarity and its use? The strength of interdisciplinary research rests on the desire to learn from others to forge a common interface of knowledge and interdisciplinary communication. Changing scientific communication models, ever-faster communication and the pressure on publishers to ensure rapid publication and circulation of research papers have all served to undermine the ability of editors to assess the scientific content of published papers. In turn, this has added to the growing superficiality and poorer quality of information and knowledge exchange among experts from different scientific disciplines.

Yet aerobiology does not only have weaknesses; it also boasts numerous strengths. In its forty years of activity, the International Association for Aerobiology, founded in 1974, and the other national associations that have come into being since have made great strides and achieved important national and international results. These include strengthening and inserting biology and aerobiology into the studies and procedures characterizing air quality, presenting aerobiology as a third pillar alongside physics and chemistry and making the results of this action visible especially in indoor air quality standards. Nor should we forget the long-standing importance exerted by aeropalynology in the field of respiratory allergies where studies and applications implemented in partnership with the medical community continue to open new frontiers in the field of molecular biology. Other pioneering research areas include the long distance transport of biological aerosols and its applications, interest in meteorology and physics of precipitation but also the spread of airborne diseases (man, plant, animal) and aerobiology's growing interest in the conservation of cultural heritage implementing the concept of continuous interaction between artefact and environment, and monitoring environmental air quality by means of biological markers.

I shall end with a message for present and future scientific researchers: science and knowledge progress thanks to our burgeoning ignorance. We must continue to foster our scientific curiosity, our ignorance, as the key to learning. The facts, our results, must not be seen as a point of arrival but a point of departure. Finally yet importantly, things do not always turn out the way we expect: there will always be unforeseen results and unhoped-for consequences, including positive outcomes that can change the direction of our scientific research field.

Message from the editor...

Welcome to Issue No 79 of the International Aerobiology Newsletter. Compiling this issue of the Newsletter was made so much easier by the number of high quality submissions by colleagues from all over the world, and as always I thank all contributors for their help.

In this issue of the Newsletter, we hear about recent research from North America, Europe and Africa. The latter has been submitted by Dr. Peter Adeonipekun from Nigeria, who participated in the 12th European Course on Basic Aerobiology that was held at the University of Reszów (Poland) in July 2015.

Education is one of the core activities of the IAA, and we also bring news of the International Association for Aerobiology's 8th Advanced Aerobiology Course "From phenology to sophisticated forecasting" that was held in Siauliai University (Lithuania), in August 2015. In addition, this issue brings word from the journal Aerobiologia about new instructions for submitting short communications that are aimed at clarifying the submission process and hopefully promoting the use of this platform for brief studies.

This issue has a distinctly Italian feel. Paolo Mandrioli, past President of the IAA (1994-1998), provided some excellent text (I wholeheartedly agree with Bernard on this) about the interdisciplinary nature of aerobiology. This sets the tone for an issue in which we celebrate 30 years of the Italian Aerobiology Association (Bernard Clot) and the XIV Italian Congress on Aerobiology that was held in Fondazione Minoprio, near Lake Como, September 2015 (Roberto Albertini). Looking to the future, we have news about the 11th International Congress on Aerobiology that will be held in Parma, Italy, 3-7 September 2018.

From France, we hear about the First National Air Quality Day "La première Journée nationale de la qualité de l'air (JNQA)" and the how the RNSA (French Aerobiology Network) used this as an opportunity to disseminate information on pollen and ragweed in Lyon. We also have news about the eagerly awaited 6th European Symposium on Aerobiology that will be held 18-22 July, 2016, Lyon. For young ragweed researchers (under 35 years of age), the International Ragweed Society announces the competition for three grants (2 oral presentations and 1 poster) to participate at the 6th ESA.

It is important for scientists to meet, so that they can discuss their work and present their findings. We have reports from Dr. B. E. Rangaswamy on the Indian Aerobiological Society's 18th National Conference on Aerobiology held at Tumkur University, India, September 2015, and Dorota Myszkowska on the 32nd IUBS that took place in Berlin, December 2015.

Matt Smith, IAA Newsletter editor

IAA Advanced Aerobiology Course

The 8th Advanced Aerobiology Course “From phenology to sophisticated forecasting“ was held in Siauliai University (Lithuania), 16-22 August 2015



Participants of the 8th AAC in the “Kurtuvenai” natural park

Seventeen participants from 11 European countries broadened their knowledge and skills in aerobiology during the 8th AAC. Jose María Maya Manzano (University of Extremadura, Spain) and Claudia Testoni (Local Health Authority Milan, Italy) were awarded grants from the IAA to attend the course.

The course was in English, and included days dedicated to: Mycology (indoor moulds); Botany; Vegetation; Climate; Data handling. Issues about invasive plants were also addressed. Leading scientists from the field of aerobiology provided state-of-the-art training sessions in auditoriums.

Participants learned three methods of how to assess the presence of airborne moulds indoors on Mycology Day. Botany Day commenced with a summary of the novel developments in the field of phenology and invasive plants. There was also the opportunity to conduct research on invasive species in the field. Fieldwork was performed in the “Kurtuvenai” natural park. Course participants investigated forest and meadow habitats.

Ambrosia modelling was conducted using data from various sources. Ragweed was not found during the excursion, but the information collected on Botany Day contributed towards the ecosystem analysis.

Lectures and practical work on the effects of pollution on pollen was completed with a visit to the Environmental Protection Agency and the Laboratory of Atmospheric Research to get an insight in the air quality measurements and monitoring.

Climate Day included research on the effects of pollution on pollen but the main focus was on the influence of climate and weather patterns on pollination.

The course ended with the Data Handling Day, which included participants presenting reports on their respective pollen information networks or their aerobiological research. The students all passed a 20 question exam and successfully received their certificates.


Lectures conducted on the 8th AAC

News from Aerobiologia the official journal of the IAA

Prof. Carmen Galán the Editor in Chief of Aerobiologia, is implementing a proposal to encourage the submission and clarify the instructions of short-communications. Springer will introduce the following definition:

“*Short communications are brief manuscripts (1,500 words, not including abstract) that describe new research discoveries or information with the intention of circulating this information quickly. No more than 3 tables / figures and no more than 15 references. The Editorial Board will streamline the review process for this type of manuscript*”

From Magdalena Sadyś (Guest Editor Aerobiologia) we hear that Prof. Galán and Springer have agreed that the first special issue of the journal will be printed in March 2016. The title is “The impact of climate change on fungal aerosols”. First official call was sent out at the beginning of February this year, then subsequently in May, July and September to more than 40 researchers from Europe and North America specialised in monitoring and analysing fungal spores dispersed via the air currents. The final deadline for article submission was the end of November 2015. All articles will be published online in order to be printed in March 2016. Magda said that "I selected this theme since there is so little known about the response of fungi towards the climate change".

Four studies are already available online:

http://link.springer.com/article/10.1007/s10453-015-9411-5

http://link.springer.com/article/10.1007/s10453-015-9410-6

http://link.springer.com/article/10.1007/s10453-015-9404-4

http://link.springer.com/article/10.1007/s10453-015-9402-6

New collection and classification device makes "Pollen Sense"

Landon Bunderson

Currently, collecting and counting pollen is laborious and expensive work. The advent of an affordable device that could efficiently quantify pollen in near real-time would enable new possibilities. Networks of these devices could report highly localized spikes in allergen concentrations the moment they occur. Valuable data would become available for research, forecasting and medical purposes. Data delivered to physicians and patients would prove valuable for allergy treatment and avoidance.



New Pollen Sense device (left) and traditional Hirst type volumetric spore trap (right)

A US-based company claims to have developed such a device. "Pollen Sense" is currently being tested against conventional pollen and spore collection devices. It is about the size of a shoe box and mounts on a conventional weather equipment pole. The device uses patent-pending technology to capture, image, categorize, and release airborne particulates in the roughly 1-100 µm range, without making use of any consumables besides an occasional air filter. The device constructs multi-dimensional images of the particles and uses machine vision (AI) to classify them. Images are automatically pushed to the cloud for storage, analysis, and quality control. The cloud is also used to weigh the recognition classifications against a statistical model of temporal and spatial particulate data. The data and images are accessed from a web browser or mobile device in near real-time. It can be powered with AC or DC and costs $5,500 (US) + mounts, installation & accessories.

The core team responsible for developing this device includes aerobiologist Landon Bunderson, biologist Rich Lucas, engineer Nathan Allan, and communications specialist Kevn Lambson. The team has been able to move from idea, to proof of concept, to alpha, and now to beta devices in the course of just over a year. Though the company is not ready for mass production, they are currently accepting limited orders for beta testers. See pollensense.com/IAA or call +1 (765) 536-9449 (POLLENWHIZ) for images and details.

Indian Aerobiological Society Biennial conference

Dr. B. E. Rangaswamy

Around 150 delegates from different parts of India participated in the 18th National Conference on Aerobiology held at Tumkur University, Tumkur, Karnataka State, India, 28-30 September 2015. The theme of the conference was “Impact of Aerosols on Health, Heritage and Environment”. The programme was inaugurated by Sri. T.B. Jayachandra, Hon. Minister in Govt. of Karnataka by the traditional lighting the lamp (right). Dr. A.H. Rajasab, a well-known aerobiologist and Vice Chancellor of the Tumkur University, was the organizing committee Chairman. There were 20 invited talks which included Dr. Sreeramulu's oration lecture and Dr. Sunirmal Chanda's Endowment lecture. Dr. Jayaram Bhatt a well-known mycologist delivered the Conference keynote address. Senior aerobiologists like Dr. S.N.Agashe, Dr. B.P.R. Vittal, Dr. S.T. Tilak, Dr. Kashinath Bhattacharya and Dr. S.S.Navi, from the University of Iowa, USA were part of the programme. A total of 42 research papers in oral and 78 research papers as posters were presented at the conference. Thirteen young researchers presented their research findings in the P.H.Gregory Award contest.



The First National Air Quality Day, France

September 25, 2015

The First National Air Quality Day in France "La première Journée nationale de la qualité de l'air (JNQA)" was one of the actions of the roadmap of the environmental conference that was held in 2014. The purpose of which was to involve citizens in air quality.

To mark the First National Air Quality Day, the RNSA (French Aerobiology Network) held an information stand on pollen and ragweed at Croix Rousse in Lyon. A hundred people visited the stand and many documents about allergies, pollen, air quality and ragweed were distributed. It was a good opportunity to communicate with the general public about biological particles present in the air, and to disseminate information about the health impact of aeroallergens (right).



Disseminating information to the public during the First National Air Quality Day in France

Revolutionising Pollen Forecasting

Press release

A team of researchers are developing a new generation of pollen monitoring which they hope will lead to improved forecasts for thousands of the UK population suffering from summer allergies.

For millions of people, the onset of spring and summer brings misery as they battle with itchy eyes and sneezing brought about by their reaction to pollen. Around 5% of the adult UK population has reported suffering hay fever and around 10% suffer asthma, that can be aggravated by pollen.

However, with around 150 different species of grass in the UK and no easy way of distinguishing between their different pollen grains, identifying which species of grass pollen people are allergic to is a very difficult task.

Understanding which species of grass pollens are in the air in high quantities at a particular time will allow those with hay fever and asthma to better manage their disease by being aware of risky periods, avoiding exposure and having their medicines to hand.

A team of researchers is now aiming to revolutionise the UK's pollen forecasts by using molecular genetic approaches. The UK is in a unique position, since teams of researchers led by Dr. Natasha de Vere at the National Botanic Garden of Wales and Aberystwyth University have made a DNA reference library for UK plants that can be used to identify most species. Combined with DNA sequencing, the UK plant database can be used to identify which species, or combination of species, are linked to asthma attacks.

The Natural Environment Research Council (NERC) has awarded a three year grant to a consortium of universities to carry out the research, led by Bangor University, along with the Universities of Aberystwyth, Exeter, Worcester and the Met Office.

Dr Simon Creer, the coordinator from Bangor University's School of Biological Sciences, said: "I have suffered pollen allergies for almost 30 years and now we have an opportunity to find out which species of grass are linked to one of the worst allergic responses, asthma. In combination with developing new technologies to measure and model pollen, the grant offers an exciting opportunity."

It is predicted that the new forecasts will give more precise (and shorter) time periods that disease sufferers will have to be cautious in, and provide guidance of when these may occur.

Dr Carsten Skjøth, a lead researcher in the National Pollen and Aerobiology Research Unit (NPARU) at the University of Worcester, added: "The work will provide information for healthcare professionals and charities to help individuals live healthier and more productive lives. It will also kick-start a next generation of pollen forecasting systems, benefitting the UK population. This can help individuals with allergic respiratory disease so that they can self-manage their conditions, contribute more effectively to the workplace and be less reliant on the health system. Employers will benefit from greater employer productivity and pharmaceutical companies will be able to better target the distribution of their products and therapies."

The research is being under taken in collaboration with the charities Asthma UK, Allergy UK, British Lung Foundation, the Royal Botanic Gardens of Edinburgh, the Leiden University Medical Centre and Fera Science Ltd. (Fera).



Image *Dactylis glomerata* pollen release Carsten Skjøth

Aerobiology/Aeropalynology In Nigeria

Dr. Peter Adeonipekun

Introduction

Aerobiology in Nigeria started as far back as the 1980s in some Nigerian hospitals, though emphasis has been on fungi and bacteria to the exclusion of pollen, and spores of pteridophytes. Notable fungi isolated from indoor and outdoor environments of some Nigerian hospitals include Aspergillus niger, Aspergillus flavus, Botryodiplodia acerina, Rhizopus stolonifer, Nigrospora zimm, Mucor sp., Monilla infuscans, Penicillium sp., Candida sp. Fusarium spp. and Trichoderma viridis while notable bacteria include Staphylococcus aureus, Staphylococcus epidermis, Bacillus cereus, Bacillus sp., Serratia marcescens and Micrococcus sp. (Ekhaise and Ogboghodo, 2011). In 1992, Professor C.O.C. Agwu and his students in the University of Nigeria, Nsukka, published the first aeropalynological work with emphasis on pollen and spores in the southeastern part of Nigeria (Agwu and Osibe, 1992). Professor Agwu and his students continued with more works in the southeastern Nigeria with more publications that include Agwu (2001), Agwu et al. (2004), Njokuocha and Osayi (2005) and Njokuocha (2006). All of these studies were conducted with less than one calendar year of data, except Njokuocha (2006) who identified the pollen of Poaceae, Casuarina equisetifolia, Milicia excelsa, Elaeis guineensis, Celtis integrifolia, Alchornea cordifolia, Amaranthaceae/ Chenopodiaceae, Combretaceae/ Melastomataceae; and the spores of Nephrolepis biserrata, Thelypteris totta, and Dryopteris spp. as characteristic aeropalynomorphs of Nsukka, southeast Nigeria. For this study, he recognized three pollen seasons: (1) dry season; (2) rainy season; (3) late rainy season to early dry season/Harmattan.

In southwest Nigeria, Adekanmbi and Ogundipe (2010), Adeonipekun and John (2011), Adeonipekun and Olowokudejo J.D. (2012), and Adeniyi et al. (2014) are the major published works on aeropalynology known to this author. Adeonipekun and John's (2011) work on strange dust on a car bonnet revealed the dynamism of the harmattan laden Northeast Trade winds in bringing savanna pollen from northern Nigeria to coastal secondary forest areas in the southwest in March 2010. This phenomena was confirmed in Adeonipekun (2012) where sampling the same location and month in 2011 showed that the aeroflora contains a different set of taxa. Results of the two years' March records further comfirmed the allochthonous source of the strange dust in March 2010 and a trigger/recharging in the strength of the withdrawing trade winds. Another interesting work by Adeonipekun et al. (in prep.) has also recognized four pollen seasons in a southwest Nigeria location - Ayetoro Ota - in one calendar year. Pollen of Poaceae, Alchornea cordifolia, Elaeis guineensis, Typha spp., Cleome spp., Ocimum gratissimum, Arecaceae (Palmae), Amaranthaceae and Combret/ Melastomaceae dominate the aeroflora with the Pteridophytes dominated by Dryopteris sp. Acrostichum aureum, Polypodium, Nephrolepis, cf. Cyclosorus afer and Pteris spp. Also, for the first time, a bisaccate pollen similar to Podocarpus/ Pinus sp. was recorded, and its abundance was shown in the months with the highest wind speed in Nigeria – August-September.

Current Research/ Collaboration

Currently, monthly data collection since has been ongoing since 2011 to generate a five year dataset. Apart from pollen, spores and fungal elements, frustules of diatoms such a Aulacasiera, Navicula, Pinnularia, Diatoma and Synedra have been recorded by Adeonipekun and John (2011), Adeonipekun (2012) and Adeonipekun et al. (in prep.). Adeonipekun (2012) reported the highest abundance of diatoms in the month of March coinciding with that of the pollen in Ayetoro-Itele, Ota southwest Nigeria. Adeniyi et al. (2014) in an integration of the palynological data obtained from three Local Government Areas in Lagos with pollinosis incidences found out that with respect to allergy, October – January recorded the highest proportion of allergenic pollen in the air. This agrees with the results of Njokuocha (2006) - late rainy season-early dry season/Harmattan - and Adeonipekun et al. (in prep.) - dry Typha-Alchornea: TA season - with highest pollen abundances. Pollen of Poaceae, Cyperaceae, Amaranthaceae, Casuarina and Alchornea cordifolia were recognized as candidate allergens in Adeniyi et al. (2014) for their high occurrence and significant positive correlations with prevalence of pollinosis in nearby hospitals.

From Adeniyi et al. (2014), relative humidity was recognized as the most significant meteorological parameter for its significant negative correlation with abundances of candidate allergenic pollen (Fig.1). Temperature and rainfall however correlate with pollen abundances though not as significantly as humidity in Nigeria. In our laboratory in the Palaeobotany/Palynology Unit, Department of Botany University of Lagos, Nigeria, we are presently assessing biochemically these candidate pollen. The next stage in this current effort is to identify the proteins contained and carry out clinical assessment of the identified proteins on human sera. This has been a big challenge for the limited resources and non-availability of the technology involved locally. We therefore seize this opportunity to seek for collaboration on this project from any laboratory of IAA members. We hope that this collaboration will help in identifying specific allergenic pollen proteins that are important in developing immunotherapy drugs for patients towards and improving health care delivery system in Nigeria. We also intend to produce a database of allergenic proteins from pollen grains in Nigeria and West Africa. *Continued...*

Fig. 1. The influence of Relative Humidity on Total Pollen

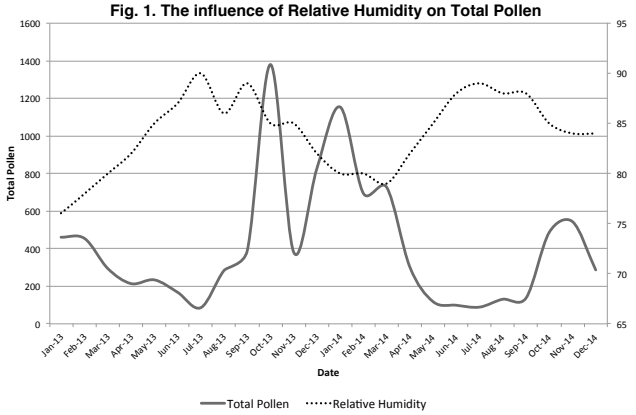



Fig. 2: AGWU M6-5 Passive pollen sampler

Peter Adeonipekun continued...

Challenges

Comparing aerobiology in Europe, America and even in South Africa with Nigeria reveals a large gap between aeropalynology and allergology. The necessary link between these disciplines is yet to be made. It is highly desirable that aeropalynologists get feedback from the allergologists so that candidate allergenic pollen can be identified and evaluated. Another important challenge is that published works in Nigeria use adapted gravimetric aerosamplers, unlike Europe and America where volumetric traps have become standard. This is mainly due to the fact that regular electricity is a mirage in most African countries, including Nigeria, without which a typical volumetric sampler like the Hirst-type will not function well. To surmount this challenge, Agwu and his students adopted the AGWU M6-5 passive pollen sampler (Fig. 2) and Adekanmbi and Ogundipe (2010) adopted the Tauber type - Pollen bucket while Adeonipekun and his team also adopted Tauber type – Gbenga-2 (Fig. 3). This makes it difficult to compare pollen data from same area, unlike in the developed world where the sampler has been standardized. There is therefore a need to standardize our samplers in Nigeria for easy data integration as done in Europe. This was recognized at the last palynologists' gathering – The 8th International conference and Exhibition of the Palynological Association of Nigeria (PAN) that was held in May 2015 at the University of Ibadan, Ibadan Nigeria. The next Palynological Association of Nigeria's conference comes up in May 2017, this time at the University of Lagos, Akoka Lagos (UniLag), Nigeria with aerobiology as one of the subthemes. Efforts at using volumetric traps are being made with alternative power sources (heavy duty battery and solar power) which are more expensive. With the power problem solved, hourly, daily, weekly as well as monthly recordings can be made more easily.

The high diversity of plants in Nigeria and the tropics generally compared to temperate Europe is another important challenge. This diversity has made candidate allergenic pollen to be large in number, and all need to be biochemically and clinically assessed to make the number more manageable. This requires lots of money and manpower both of which are limiting factors in our research efforts. Molecular characterization has not been easy, due in part to the high diversity challenge, even though barcoding of some Nigerian arid trees are almost completed in our molecular laboratory at UniLag. Although entomophilous plants dominate in Nigeria and in the tropics, some identified candidate allergenic pollen have been recognized among them. Many of these pollen and even spores have also been found to travel far by wind. For instance Adeonipekun et al. (in prep) recorded salt-water Acrostichum aureum in Ayetoro-Itele Ota Ogun State an area of more than 90 km away from source while an allochthonous bisaccate pollen of ?Podocarpus/Pinus type was also recorded more than 600km away from source area.

With the above summary of events so far, more students and other Nigerians including governments are showing more interest in aeropalynology. In five years time, these present successes will have been multiplied, for we have two PhD students working across the six geopolitical zones in the country.





Fig.s 3 a & b: Gbenga -2 Sampler

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Bacterial-Laden Aerosols in the Operating Room

J.O. Falkinham, III Ph.D. Professor of Microbiology, Department of Biological Sciences, Virginia Tech, Blacksburg, VA 24061 USA

Recently there have been reports of Mycobacterium species infections in patients following cardiovascular surgery (Sax et al., 2015). The infections have been traced to the presence of the infecting Mycobacterium species in the water reservoirs of heater-cooler-pumps used to circulate blood in patients during cardiac surgery. It has been theorized that mycobacteria in the reservoirs are aerosolized by the instrument's cooling fan during operation. Both the U.S. Food and Drug Administration (FDA, 2015) and the European Centre for Disease Prevention and Control (ECDC, 2015) have issued alerts about the threat of infection related to the heater-coolers. The Mycobacterium species identified in the outbreaks (i.e., Mycobacterium chimaera and Mycobacterium abscessus) are members of the group of environmental mycobacteria (nontuberculous mycobacteria, NTM) that are widely distributed in the human environment. Importantly for these outbreaks, the mycobacterial habitats include drinking water distribution systems and premise plumbing, most notably hospitals and homes. If not sterilized the hospital water added to the reservoirs would likely contain mycobacteria.

A number of mycobacterial characteristics are responsible for their presence in drinking water, hospital plumbing, and the heater-cooler reservoirs. Mycobacterial cells are resistant to the disinfectants used in drinking water treatment (e.g., chlorine, chloramine, and ozone). In fact, they are at least 1,000-times more resistant than the bacterium used as the industry standard for disinfection, Escherichia coli (Taylor et al., 2000). For example, at a concentration of 1 ppm chlorine, it would take approximately 5 seconds to kill 99.9 % of E. coli cells, but 2 hr to kill 99.9 % of Mycobacterium avium cells (Taylor et al., 2000). Disinfectant resistance is due to the presence of a lipid-rich outer membrane that serves as a hydrophobic barrier. In addition, the hydrophobic mycobacterial cells preferentially attach to surfaces to form thick biofilms containing high numbers (e.g., 10,000/cm2) that are difficult to remove and kill. In fact, disinfectant-resistance of mycobacterial cells in biofilms is substantially higher (Sneed and Falkinham, 2006). Thus, standard disinfection regimens fail to kill even a small proportion of Mycobacterium spp. cells.

Finally, and most important for the situations involving aerosolization of mycobacteria from heater-cooler reservoirs, hydrophobicity is also a factor in the enrichment of mycobacterial cells in droplets ejected from water (Parker et al., 1983). Hydrophobic mycobacterial cells are concentrated on the surface of air bubbles rising in water columns. When the air bubbles reach the surface, they burst and water droplets ejected into the air. Relative to the concentration of mycobacteria in the water, the concentration in the ejected droplets are 1,000 to 10,000-fold higher (Parker et al., 1983). It follows that as the heater-cooler fan operates, it blows across the reservoir and transfers the droplets with their concentrated mycobacterial cells to the airspace in the operating room.

My laboratory's current experiments are aimed at: (1) measuring mycobacterial numbers in aerosols generated by operating heater-coolers and (2) developing protocols for effective biofilm disruption (Thorel et al., 1991) and disinfection (i.e., 99.9 % killing) of Mycobacterium spp. cells.

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Italian Aerobiology Association (AIA) 30th Anniversary

Bernard Clot

Italy has long delivered important contributions to aerobiology. Varro (116-27ac) and Lucretius (98-55ac), and later Fracastoro (1478-1553), Micheli (1679-1723), Spallanzani (1729-1799) and others were the forerunners. During the 19th century, Giorgio Roster (1843-1927), Matteo Lanzi (1824-1907) and Orazio Silvestri (1837-1890) appear among the pioneers of aerobiology (Zanca, 2015).

Aerobiology had an important development during the second part of the 20th Century. Atmospheric samplers of the Hirst design allowed continuous monitoring and were the basis for the development of monitoring networks that are operational today. In this, the Italian entrepreneur Carlo Lanzoni played an important role. For further information about the life and work of Carlo Lanzoni, please refer to Issue 78 of this newsletter.

The Italian Aerobiology Association (AIA) was founded in 1985 and was among the first national networks in Europe. The numerous achievements of the AIA, including the establishment of the Italian Monitoring Network, were made possible through the commitment of AIA members to the advancement of knowledge and the well being of the population.

The AIA was officially welcomed as member of the IAA in 1990. Since then, the international contribution of AIA members to aerobiology has been remarkable. The dynamism and the radiance of Italian aerobiology is underlined here by its contribution to IAA activities.

IAA Executive Committee members

Paolo Mandrioli, President 1994-1998, nominated Honorary member in 2006;

Giuseppe Frenguelli, a member for 21 years since 1990, President 2010-2014;

Paola de Nuntiis, first Webmaster 2006-2010;

Annalisa Ariatti, Webmaster since 2010;

Roberto Albertini, member since 2014.

Teaching

Education is one of the key activities of the IAA. Two International Courses on Advanced Aerobiology were organised in Italy: Riva del Garda 1998 and Monte Cimone 2000. The International Course on Basic Aerobiology was organised in Perugia 2001. The group who took the initiative of these courses included G. Frenguelli and P. Mandrioli.

Congresses

International Aerobiology Congresses take place every four years. The 6th ICA took place in Perugia in 1998, which was organised by G. Frenguelli. The ICA will return to Italy after 20 years, the 11th ICA will take place in Parma in 2018, and will be organised by R. Albertini.

Last but not least, the Journal Aerobiologia began life in 1985 as the official journal of the AIA, and later associated to the IAA. Aerobiologia is one of the most important links between aerobiologists and the platform for displaying aerobiological research, demonstrating the multiple aspects of aerobiology and is the standard-bearer of our discipline.

On behalf of the IAA and the international aerobiology community, I would like to address my warmest congratulations to the AIA for its very important and excellent contribution to aerobiology and my best wishes for a bright and successful future and a prosperous development.

Happy Birthday, migliori auguri, long live ASSOCIAZIONE ITALIANA DI AEROBIOLOGIA!

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The XIV Italian Congress on Aerobiology

Roberto Albertini, Past President of Italian Aerobiology Association, Chairperson of the International Congress of Aerobiology – ICA 2018

The Italian Association of Aerobiology (AIA) celebrated the thirtieth anniversary of its founding with the XIV National Congress that was held in the beautiful Fondazione Minoprio, near Lake Como (24-26 September 2015).



Participants of the XIV Italian Congress on Aerobiology

There were many sessions on medical and biological topics, which were rich in diversity and originality. There were talks on a number of topics including: New methodological and technological monitoring approaches in Aerobiology; Biological environmental pollution in cultural heritage; Air monitoring in specific confined environments, e.g. spacecraft; Standardization of the air monitoring of Legionella; The contribution of meteorology and modeling for aerobiology; Guidelines for allergenic plants in public and private green spaces; Standards and quality control in aerobiology; How to implement effective communication of aerobiological data; Molecular allergens; Monitoring allergens; Presenting aerobiological monitoring data to practitioners and patients; The ragweed leaf beetle and the SMARTER approach to decide if this is a lucky coincidence or threat. Some symposia and sessions were carried out in collaboration with SIAAIC (Italian Society of Allergy, Asthma and Clinical Immunology), AAITO (The Association of Allergists and Immunologists of Territorial Hospitals) and FederASMA (Federation of the Italian Associations of patients with asthma and allergies). Invited speakers presented: The causes of the interannual variability in the pollination of grasses; Lights and shadows of a multidisciplinary platform as aerobiology; The oral allergy syndrome. It should be noted that the Presidents and Chairs of the following organisations and societies also participated in the congress: the International Association for Aerobiology (B. Clot), the European Aerobiology Society (M. Thibaudon), the International Ragweed Society (M. Bonini) and of the coordinator of COST-ACTION SMARTER (H. Müller-Schärer).

In addition, there was an intensive Course in aerobiology concerned with morphology and sampling methods of the main fungal spores types, and a special focus on the morphology of pollen from the Betulaceae family. Participants also examined and discussed images, which helped to improve knowledge and answer questions. The Congress received the patronage of the Ministry of Health and the Ministry of the Environment of the Lombardy Region and of the Italian Global Alliance against chronic respiratory disease (GARD). The finale was a social dinner on Lake of Como, at the very elegant restaurant “Imperialino” in Moltrasio. A guided tasting of “good allergenic” herbs, thanks to star chef Mariangela Susigan and the educational path in the secular park and Mediterranean and tropical greenhouses of the Minoprio Foundation.

The next AIA Congress, planned for 2018, will coincide with the next Congress of the IAA. Both will be held in Parma, Italy. This international event is a particular source of pride and satisfaction for us; it will surely be take a great organizational effort, but above all it represents an important event for all those involved in Aerobiology at both Italian and international levels. I hope that everybody can attend this important event that will take place 3-7 September 2018 in Parma and that all aerobiologists, as well as scientific and patient associations interested in aerobiology and related disciplines, will take the opportunity to highlight and share their activities in aerobiology. We look forward to seeing you there!



Presidential roll call (left to right)- Giuseppe Frenguelli, Roberto Albertini, Michel Thibaudon, Maira Bonini, Bernard Clot, Paolo Mandrioli

The IUBS 2015 – Frontiers in Unified Biology

Dorota Myszkowska, Department of Clinical and Environmental Allergology, Jagiellonian University Medical College, Kraków, Poland

The 32nd International Union of Biological Sciences, General Assembly and Conference took place in Berlin, 14-16 December, 2015. About 150 scientists participated in this event, including delegates from different societies (like the IAA). Seven parallel symposia, as well as the General Assembly of the IUBS, were arranged over the 3 days.

Current IUBS programmes are:

BCGC - Biological Consequences of Global Change - Uniting scientists from different countries and disciplines in order to facilitate collaboration to investigate and understand the BCGC and its underlying mechanisms so as to lessen harmful impacts and to identify effective approaches applicable in practical management and decision-making.

BioCode - International Committee for Bionomenclature: Naming organisms in an age of molecular-based biodiversity discovery - Modernizing the nomenclatural Codes to meet the present and future needs of the scientific community: the BioCode initiative.

BioEd - IUBS Commission for Biology Education - Major role is to formulate, initiate and facilitate effective methods of improving education in the biological sciences.

iCCB - integrated Climate Change Biology - Aims at constructing models that can predict the biological effects of future climate change by using methods developed for reconstructing climates from the deep past.

DAB - Disaster and Biodiversity - Establish international disciplines or protocols addressing how to monitor and manage disaster influences to biodiversity and biological resources at the initial stage of disaster, and organize an effective collaborative system to cope with future events.

Pollinators and coffee - Managed Pollinators to Coffee Protection & Production, a three-part approach - To assemble of a team of experts, to include agronomists, applied ecologists, agricultural extension personnel, sociologists, political scientists, and from the coffee industry itself that will develop an interdisciplinary and practical strategy for coffee production, trade, marketing, and consumption.

The main topics discussed during the conference were BCGC (including climate change), BioCode, and BioEd. The BCGC topic was the most interesting for aerobiologists, and so I mainly participated in these sessions. The presentations were focused on the impact of global changes on animals, e.g. fish diversity in Central Asia, ants all over the world, giant panda populations, lemming migration. Only a few of the presenters talked about plants. For me, the report from Israel indicating how long light waves influence our physiology was really impressive.

The General Assembly was divided into two parts. The first part included reports on the finances, activities of the Executive Committee, and current and future scientific programmes. From the point of view of the IAA, I can see a chance to join the BCGC programme, chaired by Prof. Zhibin Zhang (China). In the frame of this programme, the organization of conferences, scientific sessions, publications, training courses building databases and websites are supported. If we participate in this project, we can add information on aerobiological studies, our results on climate changes and pollen seasons on the website (globalzoology.org) or link to our website. We can contact the secretary of the project directly. I think that two aspects of our studies can be promoted:

(1) The impact of climate change and pollution on pollen seasons;

(2) The migration of pollen grains of alien species.

A new Executive Committee of the IUBS was elected (below), the current President is Prof. H. Takeda from the University of Tokyo who replaced Prof. Nils Chr. Stenseth from the University of Oslo. During the General Assembly several resolutions were discussed and voted. Two aspects were particularly controversial: (1) A resolution for decision makers to take action to drastically reduce the world population in order to save out planet; (2) Finances.

The resolution to recommend limits to the human population was not resolved.

As for finances, national societies belonging to the IUBS pay an annual fee, e.g. Russia pays 45,000 Euro/year. The IUBS supports participation in scientific conferences, primarily for young scientists, as well as conference organization. I asked whether we can apply for support for the 6th ESA or the next ICA, but France and Italy are not national members. The IAA does not pay a fee because it is a scientific society.

The next IUBS will be held in Oslo, in 2019 (Prof. Nils Chr. Stenseth). The organizers are open for new aspects of global research, and we should propose our presentations and topics before this conference.

Participants were interested in our poster, as most of them knew next to nothing about aerobiology.

In general, I think that my participation in the 32nd IUBS (as an IAA delegate) was a good idea and will result in future collaborations.



The new Executive Committee of the IUBS

The European Aerobiology Society

12th European Course on Basic Aerobiology

University of Reszów, Southern Poland, 20-26 July 2015.



Participants in the 12th ECBA

There were 22 participants on the course (including 5 who received grants from the IAA). The 12th ECBA was attended by young scientists from a variety of different backgrounds, such as plant biology, ecology, atmospheric physicists and chemistry, who wanted to increase their knowledge of aerobiology. These included people who had no previous contact with the subject area.

The 12th ECBA was comprised of a series of lectures, practical exercises, and workshops. Due to funding from European COST Action SMARTER there was particular focus on the invasive alien *Ambrosia*. The participants had the possibility to attend lectures presented by leading European experts in aerobiology, agriculture and health. Topics of the lectures included: the morphology of pollen grains and fungal spores, seasonal and short term forecasting, meteorological aspect of pollen dispersal, statistics and quality control in aerobiological study, pollen allergy, and common ragweed (*Ambrosia artemisiifolia* L.) in Europe. The problem of long-distance transport of airborne pollen was discussed in a workshop presented by Dr Carsten Ambelas Skjøth (Vice Chair of SMARTER) using examples of atmospheric *Ambrosia* pollen transport.

During the practical exercises, the trainees learnt how to identify fungal spores and the pollen grains of the most allergenic plants. Special attention was focused on *Ambrosia*, *Iva* and *Xanthium* pollen grains that are difficult to distinguished and are included in the EAS-SMARTER Quality Control Exercise currently being conducted. Participants also learnt how to operate the pollen trap and prepare microscope slides. The course was aided by the supporting information included in the "Manual for Aerobiology" book and CD-ROM that was published with financial support from SMARTER especially for this course.

The course ended with theoretical and practical examinations. All participants passed the exams successfully and received certificates.



State-of-the-art teaching facilities at the University of Reszów used for the 12th ECBA

6th European Symposium on Aerobiology

18-22 July, 2016, Lyon, France

This Symposium is being organized by the RNSA and the AFEDA with the support of different associations dedicated to Air quality. The organizing Committee wishes that many of you will join the Symposium.

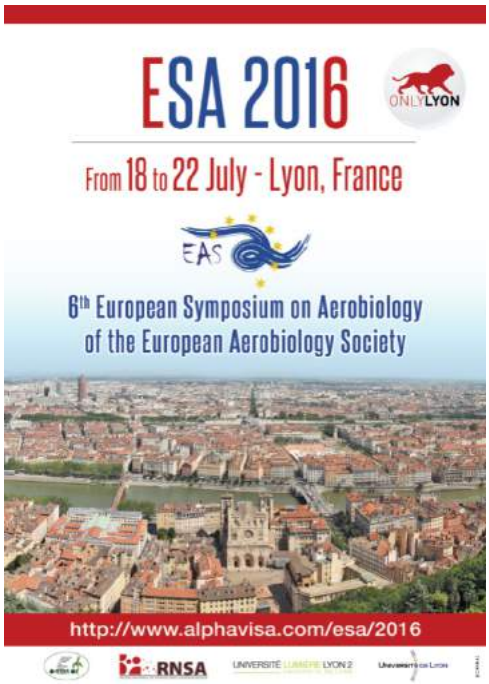
The main themes will be: General aerobiology; Phenology; Health impact (including an allergy day); Moulds outdoors and indoor with the participation of different partners; Ragweed satellite symposium in partnership with the IRS (International Ragweed Society) and a satellite symposium organized by COST SMARTER.

Deadline for abstract submission: 14 March 2016

Last day for early registration (reduced fee): 20 May 2016

RNSA (rnsa@rnsa.fr) is ready to answer your specific questions.

A website is now open where you can find all the information you need: http://www.alphavisa.com/esa/2016/index.php



International Ragweed Society (IRS) grants

Conference grants for three young researchers to attend the 6th ESA, 18-22 July, 2016, Lyon, France

The IRS is pleased to offer 3 grants (2 oral presentations and 1 poster) for young ragweed researchers (under 35 years of age). Only applicants with an accepted abstract can be granted. Applications are expected from researchers studying any aspect of ragweed and must be or become members of IRS (fee 2015-2016: 40 €; http://www.alphavisa.com/esa/fees/membership-irs.php).

Those who are awarded a grant will receive a contribution of 450 € for their participation to the entire European Symposium on Aerobiology (ESA), Lyon 18-22 July 2016.

The application deadline is 14 March 2016.

The applications will be considered using the following criteria: the qualifications of the researcher, the importance of the proposed project and its likely contribution to the research on ragweed.

Applications should be made in writing and include: a short CV outlining the applicant's qualifications and the current course of the study or employment; a copy of the identity card, or passport or document of identification; a copy of the IRS membership fee payment; the abstract of the oral presentation/poster; a brief description of how the grant would benefit the applicant's career and his contribution to the research on ragweed; a brief supporting statement signed by the applicant's supervisor or employer.

To apply:

(1) The abstract must be uploaded on the website:http://www.alphavisa.com/esa/2016/.

(2) The above listed application documents must be sent to the IRS President (maira.bonini@aslmi1.mi.it) and to the IRS Secretary (michel.thibaudon@wanadoo.fr) with message title IRS GRANTS.

The grant application must be attached to the abstract , otherwise the grant application will not be considered.

The IRS Scientific Committee will select the 2 best abstracts submitted for oral presentation, and the best abstract submitted for poster.

The selected applicants will be informed before the deadline for the early registration. They must pay in advance their registration fee before the 20 May 2016 ("Early registration") and will be reimbursed after their participation at the entire ESA certificated by a daily attestation.

Looking forward to receiving positive worldwide responses!

International Ragweed Society

IAA
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2014 - 2018

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Bernard Clot

Bernard.Clot@meteoswiss.ch

VICE PRESIDENT

Dorota Myszkowska

dorota.myszkowska@uj.edu.pl

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Javier Rodríguez-Rajo

javirajo@uvigo.es

PAST PRESIDENT

Giuseppe Frenguelli

giuseppe.frenguelli@unipg.it

2018 CONGRESS ORGANISER

Roberto Albertini

roberto.albertini@unipr.it

WEBMASTER

Annalisa Ariatti

aua15@psu.edu

NEWSLETTER EDITOR

Matt Smith

iaanewsletteredtor@gmail.com

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