

International Aerobiology NEWSLETTER

DECEMBER 2011

ISSUE N° 72

ISBN 0357 451

BI-ANNUAL PUBLICATION OF THE INTERNATIONAL ASSOCIATION FOR AEROBIOLOGY

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Minimum requirements to manage aerobiological monitoring stations included in a national network involved in the EAN

Following the recommendations of The Quality Control Workshop, held in the framework of the 4th *European Symposium on Aerobiology*, in Turku (Finland) on August, 14th 2008, the W.G. ESA "Quality Control" working group organized a Workshop at the Perugia University, Italy, on November 27th, 2009, with the aim to give some recommendations to standardize the aerobiological monitoring, its elaboration and the methodologies, network management and training programs.

The Participants at the Workshop, after a wide and interesting discussion on the themes presented and taking into consideration the questionnaire with the first results regarding the regional/national networks involved in EAN, decided to prepare a preliminary list of "Minimum requirements" to manage an aerobiological monitoring station included in a national network.

After different discussions on this task, also continued during the last *Basic European Course on Aerobiology*, held in Denmark last summer, it is time to inform all of you about these recommendations and continue with new proposals:

1. flow rate: 10 l/min;
2. check every week the flow;
3. adhesive: silicon (polydimethylsiloxane) or vaseline (can include Vaseline and paraffin wax mixture)
4. mounting media: glycerine gelatine or Gelvatol or Mowiol
5. staining: no staining or suggested basic fuchsin or safranin
6. minimum surface examined: 10%
7. counting methods: longitudinal or transversal transects
8. yearly monitoring (Jan-Dec)
9. training: for example, attend national or international courses or stage periods, etc. with a particular emphasis on: identification main pollen types, how to manage the pollen trap, preparation of the sampling slide
10. internal validation of counted samples: among different staff members
11. external validation of counted samples: in the frame of a national network, among different networks at international level, among different project partners
12. To produce a yearly final written Report

We invite all of you to participate in a Quality Control external survey for reading slides, as a new step.

European Aerobiology Society (EAS) Quality Control Working Group.

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Editorial Note

EAS Quality Control Working Group open this issue writing about the minimum requirements to manage aerobiological monitoring stations included in a national network involved in the EAN. The importance of this subject makes that also Giuseppe Frenguelli speaks us about Quality Control of the Aerobiology Italian Network, detailing results from the last survey in that country. Mikhail Sofiev, from the Finish Meteorological Institute, writes about the European COST Action which has recently finished with good results of cooperation between European Aerobiology groups, including a book reviewing last advances on Aerobiology and that will be published in next months.

The aerobiological education offered us different possibilities last summer: the 10th Basic Course on Aerobiology held in Holbaek, Denmark (6-13 July) and the Advanced Aerobiology Course about allergen detection, that organized the University of Worcester, UK (14-18 August). Many young researchers attended both of them that were a great success.

The Nordic Aerobiology Federation held its XIII Symposium last September in Gothenburg (Sweden) where Jane Sommer was elected as new president, congratulations Jane!

The IAA Newsletter is a great tool for providing valuable information

of research, courses and meetings and for keeping members in touch. It's a big pleasure to receive information about scientific and educational aerobiological activities everywhere and I encourage aerobiologists to go out of the laboratories and to attend the proposed events. Meeting colleagues open new doors to new knowledge and projects, overall in this multidisciplinary science.

Best wishes and a Happy New Year,

Herminia García Mozo

Newsletter Editor

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XIII NAF

First weekend of September the XIII Nordic Aerobiology Federation (NAF) Symposium were held in Gothenburg and a new NAF board and IAA representative was elected at the NAF members meeting. So for yours and IAA information:

NAF board 2011-2013 is:

Janne Sommer as president, Hallvard Ramfjord as vice-president and IAA representative, Carsten Ambelas Skjøth as secretary, Åslög Dahl as treasury, Laura Veriankaite as webmaster and Jukka Reiniharju as NAF newsletter editor.

Riga in Latvia will be the location for the next NAF meeting to be held in 2013. Laimdota Kalnina will be the local organiser.

Kind regards

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UNIVERSITY OF GOTHENBURG

ASSESSMENT OF PRODUCTION, RELEASE, DISTRIBUTION AND HEALTH IMPACT OF ALLERGENIC POLLEN IN EUROPE (EUPOL)



The COST Action EUPOL (<http://www.eupollen.eu>) started in September 2007 and finished in October 2011. The Action has been established as a multi-disciplinary forum for: (i) critical review of existing information and its use in assessment and forecasting of pollen in the atmosphere; (ii) identification of the gaps of knowledge; (iii) improved co-ordination of on-going and planned research; (iv) development of research strategy and action plan; (v) strengthening the dialogue with users of pollen information.

The Action was chaired by Mikhail Sofiev (Finnish Meteorological Institute, Action Chair) and Christian Bergman (Allergy Centre Charite, Medical University of Berlin, Action Vice-Chair).

EUPOL has brought together scientists from 29 countries and organized discussions on three research directions: Pollen production and release; Pollen transport, transformation and interaction in the atmosphere; Applications of pollen forecasts and assessments.

Among the results of the Action, one should mention two major products. The Action has produced a book (is being published by Springer) that summarizes the present knowledge on airborne pollen in European and global environment. Secondly, a practical approach for determination of pollen threshold level for allergic people has been proposed and evaluated using the information of several population and patient cohorts. The methodology and the corresponding recommendations will be presented as scientific research papers and summarized in a dedicated brochure.

Apart from the above main products, EUPOL has participated in organization and financing of three aerobiological schools, supported over 20 scientific exchange visits around Europe, contributed to numerous conferences and workshops. The Action also provided the framework for development of several international and national project proposals (see e.g. the HIALINE project in Newsletter N 71, June 2011).

Special attention was given to the problem of pollen forecasting, which has facilitated quick developments in this area. The discussions led to a unified approach, which brings together pollen observations by European Aeroallergen Network (EAN), SILAM modeling system of FMI, and health-related information, such as Patient Hay-Fever Diary (Medical University of Vienna, <http://phd.polleninfo.org>). It also facilitated the development of the new operational modelling systems, such as COSMO-Art (Meteo Swiss), Enviro-HIRLAM (Danish Meteorological Institute). With a support of European projects MACC (Monitoring of Atmospheric Composition and Climate) and PASODOBLE (Promote Air Quality Services integrating Observations – Development Of Basic Localized Information for Europe), this approach promises a breakthrough in the quality and availability of the pollen information and forecasts.

The Action has also identified a series of challenges to be addressed in the future. One of them is a lack of sustainable funding and technological capacity of the observational activities. Development of automated pollen monitors is yet to be finalized, while the present observational techniques are very laborious, expensive, and slow.

In co-operation with the Action, the European Aerobiological Society (EAS) has conducted a survey of the national and international legislation, which revealed a woeful lack of regulation related to the allergenic air quality – also in sharp contrast to the “classical” pollutants, such as ozone, sulphur and nitrogen oxides, fine particles, etc (see http://ec.europa.eu/environment/air/quality/legislation/existing_leg.htm).

As a way to address the challenges, the Action, with a support from EAS, World Meteorological Organization, and a series of national and international bodies, initiated the development of the concept of biochemical air quality to take into account their interactions and combined impact on human health. Further development of this concept, establishment of operational biochemical air quality assessment and forecasting, and its connection to the clinical information will constitute the major outreach of the Action.

Presentations of Italian regional ring-tests: POLLnet 2011.

Following the recommendations of the Quality Control Working Group of EAS, in the spring of 2011 the University of Perugia has started a QC survey in which participated 19 Centres (Table 1) of the Environmental Agencies of four Italian regions: Emilia-Romagna, Toscana, Umbria, Veneto. The initiative was developed in POLLnet, which is the network of aerobiological monitoring of the institutional system of the Italian Environmental Agency, which assemble fifteen regional Environmental Agencies coordinated by the Institute for Environmental Research and Protection (ISPRA). The University of Perugia provides scientific support to the activities of POLLnet, and in particular to the initiatives relating to the Quality issue, namely the standardization of procedures, the qualification of operators, the planning of interlaboratory comparisons.

Table I - Centres and Lecturers	
ArpaER Piacenza	Gallinari G, Contardi L
ArpaER Parma	Pinto G, Fontana F
ArpaER Reggio	Ingrassia M, Cavalchi M
ArpaER Modena	Barbieri C, Bonini P
ArpaER Bologna	Bordignon G, Billi B
ArpaER Forli	Veronesi P, Morrone F
ArpaER Ravenna	Pagnani M
ArpaER Rimini	Anelli P, Para C
ArpaER Ferrara	Manfredini E, Ferioli A
CAA, S. Giovanni in Persiceto (BO)	Marvelli S, Rizzoli E
Dip. Provinciale ARPAT, Pistoia	Begliomini V, Bigagli V, Vannini J
ARPA Umbria, Terni	Flori C, Della Bella V
ARPAV - Belluno	Favero A, Selle D
ARPAV, Rovigo	Sanavia G, Dall'Ara B
ARPAV, Verona	Mosconi M, Giacomazzi F
Univ. Verona, Dip. Sanità Pubblica e Medicina di Comunità	Olivieri M, Nicolis M
Univ. Perugia, Dip. Biologia Applicata	Tedeschini E

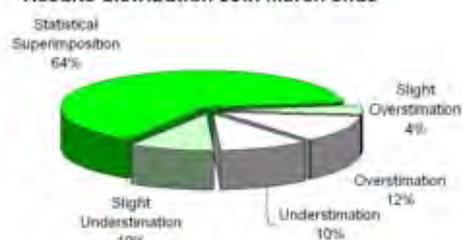
The ring test

To all the participating Centres were sent via mail, documents with information on materials used in the test and on organizational aspects.

Recognition and counting exercises

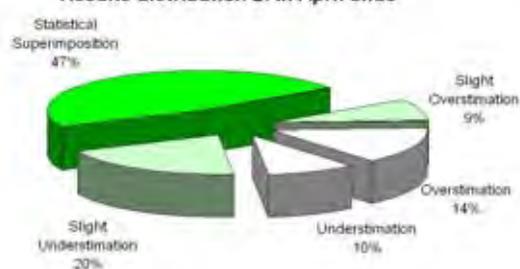
- Test Material: No 2 slides from the routine monitoring of the University of Perugia (03/30/2010 and 04/27/2010).
- Test Question: to recognize and count all the pollen grains and express them as concentration per cubic meter of air.

Results distribution 30th March slide



- Mode: Each team will follow their standard of reading by examining a certain percentage of the area (e.g. 12% or 15% or 20%, etc.). Expression Data: *taxa* recognized are expressed as concentration per cubic meter of air, and must also be added to the percentage of slides read.

Results distribution 27th April slide



Counting exercise for horizontal lines

- Test Material: slide from Bologna's routine monitoring (04/21/2010). On coverslips were cut three horizontal lines. Each row has been marked by a number. Test Question: counting, for each row, all the pollen grains observed with 40x objective, keeping in the middle the line drawn, without considering pollen *taxa*.

- Expression Data: number of pollen counted per line, adding the field diameter of the lens used.

Return data and slides shipment between Centres

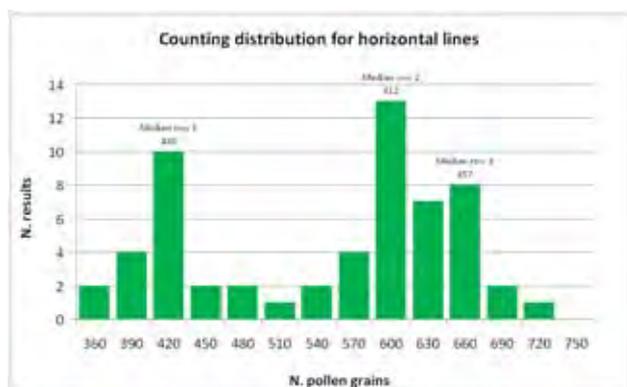
- Return data: via email to the organizer, when finished reading.
- Shipping: by each Centres according to a prearranged schedule.

Data processing and evaluation criteria

Presentations of Italian regional ring-tests: POLLnet 2011.

Recognition and counting exercises

- The list and the concentrations of *taxa* provided by the organizing laboratory are **reference** for the results evaluation returned by participants.
- All the values provided by the Centres are compared rounded to one decimal place. Any *taxa* missing in the lists of participants enter in the comparison with zero value.
- The reading values of the workshop organizers are used to define the first range of complete **statistical overlap** of the results by Comtois's formula: $E\% = 128 \text{ to } 34.2 (\ln \text{ COUNT}) + 2.3 (\ln \text{ COUNTING})^2$
- To this first interval are added two lateral bands of width equal to 15%. This because the formula for higher counting values becomes very restrictive and only takes into account the error of "accuracy". These ranges are considered **slightly over-or underestimation**. Results outside of these ranges are considered **over-or underestimated**.
- To evaluate the performance, both overall on individual *taxa*, and for individual laboratories,
- The values within the first range, both inclusive, have assigned 1 point, 0.5 points in the second, outside 0.



Counting exercise for horizontal lines

All the data provided are evaluated.

Results evaluation

Recognition and counting exercises

All participating Centres have years of experience and operate according to standardized rules. Many of them also participated at similar initiatives in previous years. The results distribution of the readings of both the slides do not show large differences. The ranges of over-and under-estimation combine with approximately 20% of the results (Figs. 1 and 2).

We observed that, at high counts, the formula Comtois, also increased by 15%, did not properly evaluate the overall behaviour of the laboratories. For Cupressaceae, easily identifiable and countable in both slides, almost half of the laboratories provided values over-or underestimated.

Cross-analysis of the results provided by the laboratories showed marginal specificity errors for similar pollen attributable at families as Betulaceae, Corylaceae, Fagaceae (*Quercus*), Aceraceae.

Counting exercise for horizontal lines

The percentage variation coefficient showed from all data for the individual lines was around 7%. The overall performance for this exercise was very good, we must remember that in the last year similar exercise the coefficient of variation was above 20%.

One reason may be due to the tracking of guidelines on the coverslip.

The graphical representation of class distribution by all the results shows the ability of laboratories to discriminate the differences between the counts of lines, further confirming the good evidence provided by the laboratories (Fig. 3).

Considerations

The main strengths of this experience were the use of slides of normal monitoring and the optimal reading conditions in own laboratory while the main criticism was the relatively long time course (more than 8 months).

References

Method for sampling and counting of airborne pollen grains and fungal spores - Project presented by P. Mandrioli to the Italian Environmental Commission UNI, cod.U53000810 – 7th November 2000.

Comtois P. and Mandrioli P. (1997) - Pollen capture media: a comparative study. *Aerobiologia*, vol.13, 3:149-154.

Comtois P., Alcazar P., Neron D. (1999) – Pollen counts statistics and its relevance to precision. *Aerobiologia* 15: 19-28.

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Felicori M., Bordignon G., Billi B. (Regional Agency for Environmental Protection in the Emilia-Romagna Region, Italy), Frenguelli G. (Dep. Applied Biology, University of Perugia, Italy).

The 7th IAA Advanced Aerobiology Course (AAC 2011)

Matt Smith

The International Association for Aerobiology (IAA) runs a series of advanced courses that aim to give participants an understanding of the scientific principles behind aerobiological sampling and analyses, and supply a solid background for the interpretation of aerobiological results. The 7th Advanced Aerobiology Course took place at the National Pollen and Aerobiology Research Unit (NPARU), University of Worcester, UK and ran from the 14th to 18th August 2011.



Fig. 1: AAC 2011 - Lecturers and participants with the Vice Chancellor and Prof. Roy Kennedy of NPARU

the Institute of Science and the Environment at UW. The course was kindly supported by the British Aerobiology Federation and the UK Met Office. AAC 2011 was attended by 20 participants from 13 different countries. Most participants were from Europe, but it also included people from as far away as the USA (Fig. 1).

Prof. Roy Kennedy was the course leader, and he was supported by other members of the NPARU team. These included experts in immunological (Alison Wakeham and Gary Keane) and molecular (Mahmut Tor) techniques. In addition, there were two visiting lecturers, Prof. F. Javier Rodríguez-Rajo (University of Vigo, Ourense, Spain) and Prof. Carmen Galán (Universidad de Córdoba, Spain). The course was in English and included the following topics: An introduction to allergens; Allergens and human health; The use of immunoanalysis in agriculture; The use of Low Volume and High Volume sampling systems; Immuno-fluorescent techniques in aerobiology; ELISA analysis; Lateral Flow Devices; Molecular techniques in aerobiology; Data analysis and interpretation (Fig. 2). It wasn't all work. At the end of the course the participants had the opportunity to visit Stratford-upon-Avon, a town synonymous with William Shakespeare. The social event involved a walking tour through the town, a visit to the church where Shakespeare is buried and a boat trip along the River Avon (Fig. 3). This was followed by the end of course dinner at a restaurant in Bidford-on-Avon.

The course was entitled “Measuring allergens and other aerobiological material” and combined a variety of lectures and practical sessions that introduced participants to a range of cutting-edge techniques used in sampling and analysing aerobiological material. Members of staff at the NPARU have been actively involved in this area of research and so the lectures and practical sessions were based on actual work being carried out at the research centre.

Lectures and practical sessions were carried out in the Charles Darwin building (<http://www.worcester.ac.uk/discover/science-facilities.html>) including the brand-new teaching laboratory on the first floor that was provided by



Fig. 2. Mahmut Tor teaching a practical session on “molecular techniques” in the teaching laboratory on the first floor of the Charles



Fig 3. Course participants enjoying a boat trip along the River Avon.

10th European Basic Course on Aerobiology Janne Sommer, Carsten Ambelas Skjøth and Matt Smith

The 10th European Course on Basic Aerobiology took place in Holbæk, Denmark, from the 6rd to 13th July 2011 at an old mine sweeper station with a picturesque location directly at the coast. The course was organised by the European Aerobiology Society (EAS) with support from European Commission COST Action ES0603. The organising committee from the EAS were Siegfried Jäger (President of the EAS), Michel Thibaudon, and Giuseppe Frenguelli (President of the IAA). The course was locally organised and prepared by Janne Sommer and her pollen team from the Danish Asthma- Allergy Association.

The course was attended by 16 participants from 11 different countries. Most participants were from Europe, but it also included people from as far away as India (Fig. 1). The course was structured to help agrobiologists and other professionals to analyse bio aerosols from air samples and how use the data for a variety of different applications such as allergy avoidance, phenology, statistical and mechanistic modelling and forecasting.

Emphasis was as always put on practical sessions in the laboratory where the participants were introduced to major aspects of the daily work carried out by aerobiologists. Practical sessions included the identification of 27 different pollentypes, the identification of 5 fungal spores, scanning and counting of daily slides, practical plant identification and taxonomy.

As well as time spent in the laboratory, the participants were given a series of lectures and practical exercises that were aimed at introducing the participants to various aspects of aerobiology. The presentations included:

Aerobiology, Aerodynamics and Pollen sampling (M. Smith), Pollen structure and morphology (G. Frenguelli), Pollen development, Biology and Function (C. Gálan), Moulds and Allergy – fungal spores – production and release (L. Larsen), Pollen and allergy (L. K. Poulsen), Quality Control (C. Gálan), Collecting pollen, processing and storage for pharmaceutical use (ALLERGON), Practical Plant Identification and Taxonomy (G. Frenguelli), Basic microscopy; calculating the field of view; scanning the slides; sources of error (G. Frenguelli), Basic statistics applied to Aerobiology (C. Gálan), Health Impacts of Pollen and Molds (M. Thibaudon), EAN database, EPI and polleninfo.org (M. Thibaudon), Direct Sampling of Aeroallergens (M. Thibaudon), Seasonal and Short Term Forecasting (M. Smith), Phenology, Pollen and Climate Change (Å. Dahl), Meteorological Aspects of Particle Dispersal (C. A. Skjøth), Protocol for analysis of LDT using trajectory models (C. A. Skjøth)



Fig. 1 Lecturers and students from the 10th European Basic Course on Aerobiology in Holbæk, Denmark 2011

Aerobiology and Forensic (Å. Dahl), Using GIS for analysis and presentation of data (C. A. Skjøth).

All lectures and abstracts with suggestions for more reading were delivered to the students on a Memory-Stick. The course was visited by the companies Bertin, Allergon, and Lanzoni in order to introduce the participants to typical equipment used in aerobiology. The students had a final examination (theory and practical). All participants passed the evaluation successfully and received a certificate. Between a third and half of the participants were already affiliated with monitoring programmes and they all obtained very good results.

A social programme was included where the students had the opportunity to visit one of the attractions on the UNESCO World Heritage list: Roskilde Cathedral. The programme also included a visit to the Viking Ship Museum, sailing a Viking ship on Roskilde Fjord as crew (fig 3), and ended with a dinner at an excellent restaurant.

Besides European Aerobiological Society, the course was kindly supported by 10 different sponsors: COST ESO603, RNSA, Lanzoni, Allergon, Hounisen, Leica, Phadia, Bertin, GlaxoSmithKline and IAA. This included materials and microscopes for the practical lessons as well as grants from COST, RNSA and IAA to support student participation, and support of travel expenses of lecturers.



Fig. 2 Janne Sommer (centre) with the students awarded with grant. From left to right: Gülay Saitoglu and Emre Bayram from Turkey, Dr. B. E. Rangaswamy from India, who attended on a IAA grant corresponding to 50% of the registration fee, and Marija Prentović from Serbia, who was awarded with a full grant by Le Réseau National de Surveillance Aérobiologique (R.N.S.A.) Laboratory.

Doctoral Thesis "Meteorological characterization and modelling of western Andalućia"

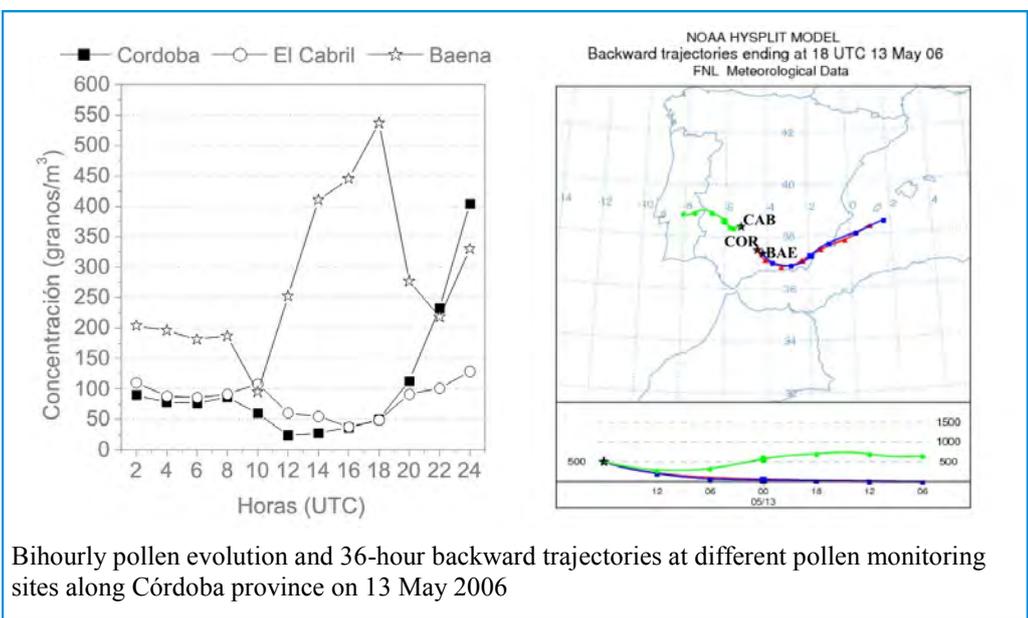
On 22nd July in 2011 was celebrated the public defence of Miguel ngel Hernndez Ceballos PhD thesis "Meteorological characterization and modelling of western Andalućia", in Huelva University (Spain). This PhD was performed due to the collaboration of the groups, Physics of Radiations and Environment of the Huelva University and the Atmospheric Sounding Station "El Arenosillo" belongs to National Institute for Aerospace Tecnology (Spain). The dissertation study was designed to develop a detailed meteorological study of this region, in which diverse meteorological aspects are approached, using both experimental observations and tools of meteorological modelling.

With this aim, a progressive development of dissertation research tasks has been performed. At the beginning, a reliable meteorological database based on hourly observations from 2000-2007 was created, being used to study the temporal and spatial variability of temperature, relative humidity and wind in this area. After that a characterization of the air masses over the study area was performed by the computation of backward trajectories using the HYSPLIT model, being identified the most frequent meteorological scenarios. Once identified this meteorological scenarios, due to the need to go deeper into the meteorological conditions associated, the mesoscale meteorological model WRF was used. A working configuration for WRF model in this area was defined, applying it in the two most typical weather scenarios (sea-land breezes and westerly advection).

At last, this PhD revealed the usefulness of meteorological tools in the interpretation of the spatial and temporary behaviour of biological particles. In this sense, we have applied the HYSPLIT model to achieve a major understanding on the Olive and Quercus pollen concentrations in the province of Cordoba. The study of Olive pollen was focused in providing a detailed analysis of olive-pollen transport, while the Quercus study was performed to identify the potential origin of Quercus pollen counts and establish the relationship between air-mass movements and pollen counts.

Backward trajectory analysis revealed the main influence of south Olive pollen sources due to the slow-moving stream at low altitude from the southern to the central areas under the influence of scarce isobaric gradient. This meteorological tool has also indicated the most influential source of Quercus pollen in the north of Crdoba province, associated to a regional transport by North and Northwest flows and a secondary source, in southern Andalusia, beyond the Guadalquivir valley, and related with longer distance transport of Mediterranean air masses.

The dissertation results of this PhD allow the increased of the understanding about meteorological characteristics in western Andalusia as well as the physical processes that take place in this area. In addition, the meteorological database created and the modelling tools used can be applied as complementary tools in the study of the temporal and spatial behaviour of particles and gaseous material in the atmosphere.



Bihourly pollen evolution and 36-hour backward trajectories at different pollen monitoring sites along Crdoba province on 13 May 2006



Dr. M.A. Hernndez Ceballos, PhD tutors and tribunal members. Huelva University (22 July 2011)

NEXT CONGRESSES



5th European Symposium on Aerobiology

Organized under auspices of the European Aerobiology Society

3 - 7 September 2012 Krakow, Poland

- » The Symposium on aerobiological monitoring applied in: botany, meteorology, climatology, phenology, aerogriculture, melissopalynology, forensics, bioterrorism, environmental and heritage protection.
- » **Keynotes presented by the experts in different scientific fields associated to aerobiology**
- » Medical-Palynological Conference on practical application of aerobiological monitoring in pollen allergy treatment
- » **Discussions in the allergological experts circle**
- » Fungal spore workshop, Satellite Symposia
- » **Attractive social program, Wieliczka Salt Mine visit**



See more information:
www.5esa.cm-uj.krakow.pl



Deadlines
Abstract submission 28 February 2012
Grant application 28 February 2012
Early registration 15 June 2012

Contact: 5esa@cm-uj.krakow.pl
Conference venue: Conference Centre, Jagiellonian University Medical College, Krakow, Lazarza 16



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NEXT CONGRESSES

European Academy of Allergy and Clinical Immunology Congress 2012
16 – 20 June, Geneva, Switzerland



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PALYNOLOGICAL SOCIETY OF JAPAN

2012 IPC XIII / IOPC IX Joint Meeting in Tokyo, Japan, Aug. 23-30, 2012

The joint meeting of the 13th International

Palynological Congress (IPC-XIII 2012) and the 9th International Organisation of Palaeobotany Conference (IOPC-IX 2012) will be held in Chuo University, Tokyo, Japan, under the theme: **Palynology and Palaeobotany in the Century of the Environment.**

Our world is changing dramatically. There are many urgent environmental issues, such as pollution, climate change, landscape and land-use changes, that have affected ecosystem, biological diversity and human life.

Palynology and Palaeobotany have provided baseline information on the past biological and environmental changes, which have in turn become critical for sustainable environmental management and nature conservation.

In Japan and elsewhere more medical doctors are actively involved in Aerobiology and Palynology to prevent further spread of pollen-related allergies influenced by Human-induced environmental changes. Our disciplines now have wider implications and applications relevant to the modern society than ever. The main theme is thus timely for the IPC/IOPC 2012 meeting in Tokyo, Japan.

For more information please visit:

<http://wwwsoc.nii.ac.jp/psj3/>



Sciadopitys verticillata, endemic to Japan (Photo Takeoka & Takahara)



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