



ANNUAL MONITORING REPORT 2008/09

PERIOD 1/9/2008 TO 31/8/2009

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NATIONAL POLLEN AND AEROBIOLOGY RESEARCH UNIT

ANNUAL MONITORING REPORT 2008/09

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A GENERAL OVERVIEW FOR THE ACADEMIC YEAR

National Pollen and Aerobiology Research Unit (NPARU) had another very successful year in 2008 to 2009 despite the constraints of limited space and facilities, staff shortages, economic recession and the impacts of the building works on NPARU room usage and the demands of this project on staff time.

The NPARU has again successfully maintained a balance between academic and commercial work with attention being given both to income generation and to activities which enhance the reputation of the NPARU as an international centre of expertise and excellence in Aerobiology. In addition NPARU has maintained a notable role in knowledge transfer and education.

The unit's work includes a wide range of activities and is interdisciplinary in nature. It spans many subject areas such as allergy, environmental health, microbiology, palynology, and forensics, all linked by the central theme of organic matter in the air. The interdisciplinary nature of NPARU's work is reflected in the fact that the unit is not part of any institute within the University.

It is not possible to include all aspects of our work in the annual report but details of some are provided in the following sections. In many cases these activities (such as conducting basic research, writing research papers, giving conference presentations and acting as referees for scientific journals) do not generate income directly but they do provide an essential academic base which leads to opportunities for contracted work and sponsored research.

The academic programme of NPARU included having a major role in European Community funded research projects and a COST action, presenting many papers at national and international conferences as invited and/or keynote speaker and publishing the results of research in peer reviewed journals. The unit was also very active in commercial work and consultancy. For example it conducted a clinical trial of a phototherapy device for Lloyds Pharmacy, tested many types of appliance and products for allergen removal or reduction and did forensic work for major crime incidents including murders, rapes and fraud.

NPARU runs the UK National Pollen monitoring network (including training, quality control and keeping the National Pollen data bank) and provides all pollen forecasts to the UK media. The outlets include national TV, national and local radio, national press, web sites and journals.

The unit also has a key role (Jean Emberlin and Louise Robertson are two of the 4 directors) in running the European Pollen Information Service (a consortium of 47 countries). This has a data base of European pollen counts in Vienna for use in research and commercial activity such as international clinical trials.

A large proportion of the work done in NPARU has relevance for education both at undergraduate and post graduate levels and also for CPD. The work feeds directly into several undergraduate courses (e.g. Forensics, Aerobiology and Health, Cardio vascular physiology), attracts PhD students and also provides themes and material for Symposia for GPs and Practice nurses. One of the research students in NPARU (who was co-funded by Nasaleze Ltd) was awarded her PhD in the review period. Two new PhD students were appointed.

NPARU hosted several visits by overseas researchers including an expert from the Russian forensic service and a four month study visit by Dr Paul Beggs, University of Sydney (President of the International Biometeorology Society).

The work of NPARU is disseminated to the public through members of staff giving talks to local societies and presenting lectures at public events such as the Allergy Show at Olympia. It is also disseminated through numerous media interviews. The unit has a very high profile in the media which leads to a considerable volume of unpaid public relations work. In the review period members of the unit gave over 85 media interviews (including TV, radio and articles in regional and national press and in professional and popular journals) and answered a large volume of enquiries from the general public and health care workers on aspects of hay fever, pollen, asthma and general allergies.

It was hoped that the work on the new building, which houses the environmental chamber, and new laboratories for forensics and microbiology, would be completed in June 2009, followed by a short period of fitting out. The main work on the building was finished by July but there were notable delays in several aspects of the final fit out and the delivery of furniture and equipment. (The work is still ongoing in November 2009. The offices can be occupied but the labs and test room are not ready yet).

During the review period the work of the NPARU was constrained severely by lack of space and facilities. For example the main office could not be used for many weeks and there were not enough desk spaces for all the staff. The amount of work through put and income was at a plateau as we were working at saturation capacity with reduced space. However maintaining income in these circumstances with the additional burden of the general economic downturn should be viewed as a success.

Work on gaining accreditation to UKAS for NPARU's core activities continued to progress well. This is a long and expensive process which involves a large amount of detailed work on procedures, protocols, health and safety, quality assurance, training, evidence of adherence to good laboratory practice etc and is very unusual in the University sector. The final stage in preparation for this, which is the in house accreditation of operators for various protocols, needs to be done in the context of the new laboratories. UKAS accreditation will assist greatly in the expansion of our market and services which will be required to support the enlarged facilities.

All members of the team were encouraged to attend relevant training during the review period as far as budget resources permit. Individual needs and aspirations are identified at staff annual reviews and also at frequent times through the year at informal meetings. The continued increase in academic strength and maturity of the NPARU team is apparent this year in the contributions to conference presentations and publications. It is also evident in the wider range of topics that are covered by NPARU in research and contracted work.

B Staffing :

Date Started	Date left	Forename	Surname		Status	Hours if part time	Comments
01/09/1994		JEAN	EMBERLIN	PhD	Current		Director
01/09/2004	Jan 2009	CLAIRE	POTTER	PhD	left		Business Development and Project Manager Resigned Jan 2009 to take up new post
20/07/09		STEVEN	ROE	BSc MA	Current		Business Development and Project Manager
01/10/1998		BEVERLEY	ADAMS-GROOM	BSc	Current	29	Chief Palynologist / Research assistant
28/09/2005	09/04/09	INMACULADA	BUSTOS DELGADO	PhD	left		Research assistant Left to return to Spain
01/10/2000		MATTHEW	SMITH	PhD	Current		Senior Research assistant
16/05/2003		ANGELA	WARREN	BSc	Current		Research assistant Maternity leave 13.10.08 to 13.04.09
24/01/2006	03/07/09	JOSE CARLOS	PRIETO BAENA	PhD	left		Research assistant

							Left to return to Spain
27/03/2006		SALLY	WALL	Admin	Current		Administrator
31/3/07		NOEL	EGGINTON	BSc	Current		Technician
27/03/2006		RACHAEL	MARKS	BA	Current	20	Admin support
29/04/2004		LOUISE	ROBERTSON	MSc	Current	30	IT and admin
NB A Senior technician and a microbiologist were appointed to start in October and early November 2009							
Research students							
		Bernadette	Diethart	MSc	FT		Co sponsored by Nasaleze ltd
		Claire	Tillyer	BSc	FT		Joint UW and NPARU funded
N.B. Two new research students were appointed to start September 2009							

Senior Honorary Research Fellows

Prof Richard Lewis, Consultant in General and Respiratory Medicine, Worcestershire Royal Hospital

Dr Alastair McCartney, Plant Pathology, Rothamsted Research, Harpenden, Herts.

C. REVIEW OF RESEARCH OUTPUT AND DISSEMINATION FOR THE YEAR

Main research and development activities

1. The development of pollen forecast models

(Main researcher is Dr Matt Smith). The work seeks to improve forecasting methodology. Several papers have been published on this in the review period and more are in preparation both individually and in collaboration with other institutions in the UK and Europe, especially with NERI, Denmark and through the EU COST action programme .

2. The development of forecast models for airborne pollen in Albania.

(Elona Hoxja). Elona was awarded her PhD in early 2008 and is now writing papers for publication. One has been written in draft form so far.

3. The use of inert cellulose powder as a remedy for rhinitis.

This doctorate project was co-sponsored by UW and Nasaleze Ltd, to investigate the characteristics of the powder and its mode of action. Bernadette Diethart was awarded her PhD in the review period and has written two papers on the results for publication.

4. Forensic work

NPARU developed more forensic work during the review period and continued its consultancy agreement with the major company LGC forensics (formerly Forensic alliance Ltd). Forensic work was also conducted independently for defence cases. Several research projects are in progress for forensic palynology. The PhD project on DNA in pollen forensic samples, supported matched funding from UW progressed well (Claire Tillyer).

6. Development of a National Aerobiology Archive

The British Aerobiology Federation National Archive was being catalogued. It was housed in the archive room but this had to be used for office space for NPARU staff. Work on this had to stop due to lack of space in the archive room.

7. Testing products for allergen reduction or removal

NPARU has maintained a high volume of work in testing products for allergen reduction and control for the seal of approval for Allergy UK (British Allergy Foundation). Products tested include air purifiers, vacuum cleaners, ionisers and washing machines. Work has also been done for various firms directly.

8. Clinical trial of phototherapy device.

NPARU conducted a double blind placebo controlled pollen challenge trial of a phototherapy device for Lloyds pharmacy with 101 volunteer hay fever sufferers. The results were published in a peer reviewed medical journal.

9. MONALISA EU Life Environment programme.

A successful application was made to the EU for a grant together with colleagues in five European countries and a French Biotechnology firm for 3 year funding from 2005 to develop a new method of air sampling using immunological techniques. The grant application required international meetings plus considerable time investment but it was ranked very highly. Work has been ongoing to complete the project in the review period. The satisfactory outcome of this project has led to an application for new funding for another EU grant which had a successful outcome. Several papers have been written on this and presentations given.

10. HIALINE EU programme

A successful application for EU funding (Second programme of community funding in the field of health) in 2008 for a project which built on the outcomes of the MONALISA. In this project, NPARU together with 12 partners in Europe will develop a high volume small particle sampler plus associated ELISAs. The funding was awarded with the project starting Feb 2009.

11. Pollen monitoring network and forecasting

The NPARU continues to run the National Pollen Monitoring Network, keep the National Pollen count database and do the QC for the system. NPARU produces the pollen and spore forecasts for the UK media (from April to November). Training of personnel for new sites was undertaken at the NPARU during May-June and several pollen monitors visited the unit for refresher training during the period March to September.

13. Fungal spore monitoring.

From Jan 2005 NPARU has been monitoring daily fungal spore counts. Very few sites (only 2 others) in the UK do this as it is very specialised and time consuming work. It has enabled us to start to produce spore forecasts thus extending the forecast season and to attract work in this area. It has also enabled us to extend our training to offer external courses for fungal identification.

14. AIRPATH.

A joint grant (with UCL London and University of Essex) was awarded in 2007 by NERC on the theme of airborne human pathogens. Work on this progressed in 2008-9 with themed seminars and research meetings. A publication on the work has been accepted.

15. EU COST ACTION ESO630 .

Prof Emberlin and Dr Smith were appointed as UK representatives for a EU COST action programme which started in the autumn of 2007. The programme involves 35 countries in collaboration on the theme of allergy, pollen forecast methodology and provision, and phenology. JE and MS had significant input to the grant bid which was ranked highly in a very competitive field. JE has subsequently been appointed to the management committee and was in charge of one of the three work packages for the project.

16. Human exposure to allergens in urban environments.

Joint funding for a PhD project was secured from NERI, the Danish National Environmental Agency, and was match funded by UW. A suitable research student was found in summer 2009 and will start in September

17. Fungi and biodeterioration.

A small grant was obtained from the British Mycological Society to support research to investigate fungal infestation on ancient books and manuscripts in the Library at Worcester Cathedral. The objective was to advise on improving conditions for preservation. This work was completed in 2009 and a report written.

18. Trends in the incidence and prevalence of hay fever in relation to climate.

Data from the Royal College of General Practitioners' Research unit at Birmingham (Dr D. Flemming) has been used to analyse relationships between the incidence of hay fever in the UK and the severity of pollen seasons. The results have been used to predict trends in the demand for health care from GPs for hay fever in the scenario of changing climate. Predictive maps for prevalence in the UK were produced to the year 2060. The work was presented at the British Society of Allergy and Clinical Immunology meeting in July as invited speaker.

D. PUBLICATIONS

"Outdoor environments and human pathogens in air" Authors: Ka man Lai, Jean **Emberlin** and Ian Colbeck for AirPath. Paper accepted for publication in Environmental health. 2009

"A double blind placebo controlled pollen challenge study of a phototherapy device for reducing the symptoms of hay fever. J.C. **Emberlin** and R. A. Lewis , Current Medical Research and Opinion, 2009 vol 25: 7, 1635-1644

"Influence of the North Atlantic Oscillation on grass pollen counts in Europe". **Matt Smith, Jean Emberlin** et al. Aerobiologia. September 19th, 2009 published on line as pre print version. Print version due soon.

Skjøth, C. A., **Smith, M.**, Brandt, J. and **Emberlin, J.** (2009). Are the birch trees in Southern England a source of Betula pollen for North London? Int J Biometeorol **53**, 75-86.

Smith, M., Skjøth, C. A., Myszkowska, D., Stach, A. and Kasprzyk, I. (Abstract) Investigating Ambrosia pollen episodes in Poland using back-trajectory analysis. Allergy, **64** (Suppl. 90), 300

Šikoparija, B., **Smith M.**, Skjøth, C. A., Radišić, P., Milkovska, S., Šimić, S., Brandt J. (2009) The Pannonian plain as a source of Ambrosia pollen in the Balkans. Int J Biometeorol. **53**,263-272

Smith, M., Skjøth C. A., Myszkowska, D., Uruska A., Puc, M., Stach, A., Balwierz, Z., Chlopek, K., Piotrowska, K., Kasprzyk, I. and Brandt, J. (2008) Long-range transport of Ambrosia pollen to Poland. Agri For Meteorol **148**, 1402-1411

General activities related to publishing

Prof Jean Emberlin (JE) acted as a referee for numerous scientific journals including The Lancet, Clinical and Experimental Allergy, J of Biometeorology, Allergy, Aerobiologia, Int Archives of Allergy and Immunology, Environmental and

Experimental Botany, BMJ and Grana. She is also a member of several national and international committees for societies which have journals and serves on editorial boards.

Dr Matt Smith refereed articles for the following peer reviewed journals: Aerobiologia, Atmospheric Environment, Building and Environment, Climate Research, Clinical and Experimental Allergy, Collegium Antropologicum (Institute for Anthropological Research, Zagreb), Int. J. Biometeorology and Int. J. Environ. Res. Public Health

E. DISCUSSION OF CONFERENCES ATTENDED AND CONFERENCE PRESENTATIONS MADE, MEETINGS AND SPECIAL ACTIVITIES

Prof Jean Emberlin

Sept. 2008 International Biometeorology Society world meeting Tokyo. Invited speaker to give 3 papers and invited chair person for 2 sessions.

Jan COST EU action meeting Munich. Presentations as chairman of work package three, progress on research on theme etc.

Jan German Symposium on Environmental Allergy and Allergotoxicology, Munich. Invited chair of session on aeroallergens

Feb Nasaleze international meeting London. Invited speaker

Feb Medical Interchange meeting Birmingham. Invited speaker.

May Royal Meteorology Soc meeting invited speaker. Birmingham .

May Midlands Paediatric Allergy Society Invited Speaker. Worcs Royal Hospital Charles Hastings Education Centre.

June Royal College of General Practitioners. Environment and Medicine. Invited speaker on thunderstorm asthma.

June. British Society of Allergy and Clinical Immunology. Annual Conference. Invited speaker on allergy and climate change.

Dr Matt Smith

Smith, M., Skjøth, C. A., Myszkowska, D., Stach, A. and Kasprzyk, I. Investigating *Ambrosia* pollen episodes in Poland using back-trajectory analysis. Poster presentation, XXVIII Congress of the European Academy of Allergy and Clinical Immunology, EAACI 2009, Warsaw, Poland, June 2009. Poster given an award ~6000 participants.

Skjøth, C. A., Šikoparija, B., **Smith, M.**, Radišić, P. Stjepanović, B. Hrga, I., Apatini, D., Magyar, D., Paldy, A., Brandt, J. Christensen, J. H., Frohn, L. M., Geels, C., Hansen, K. M. and Hedegaard, G. B. Investigating atmospheric transport of *Ambrosia* pollen from the Pannonian Plain towards the Balkan region with DEHM-Pollen. Oral presentation, European Geophysical Union, Vienna, April 2009

Skjøth, C. A., Sommer, J., Stach, A., **Smith, M.**, Brandt, J., Christensen, J. H., Frohn, L. M., Geels, C., Hansen, K. M. and Hedegaard, G. B.: Modelling birch pollen dispersal on the regional scale with DEHM-pollen using a dynamical phenological model and a detailed tree species inventory. COST 725 International Conference on "Scope and current limits of linking phenology and climatology", Geisenheim, Germany. March 2009

Skjøth, C.A., **Smith, M.**, Brandt, J., Emberlin, J. Are the birch trees in Southern England a source of *Betula* pollen for North London? Poster presentation, 6th Symposium on Environmental Allergy and Allergotoxicology, Munich, January 2009.

Skjøth, C.A., **Smith, M.**, Brandt, J., Emberlin, J. Are the birch trees in Southern England a source of *Betula* pollen for North London? Poster presentation, Association of Applied Biologists and the British Aerobiology Federation conference - Applied Aspects of Aerobiology, Rothamsted Research, Harpenden, UK. November 2008

B.Adams-Groom

Forensic Science Society's Young Forensic Scientists Seminar, Cranfield University, October 2008.

Forensic Palynology – What is pollen and how can it help to solve crimes?

British Beekeepers Association Spring Convention 2009.

The Work of the National Pollen and Aerobiology Research Unit.

Other events

Medtech exhibition Birmingham . Four members of NPARU

Allergy Show at Olympia. **Jean Emberlin** was an invited speaker for two lectures. 1. Outdoor allergens and hay fever and 2. Indoor allergens, asthma and perennial rhinitis.

F CONSULTANCY

The work of NPARU includes research consultancy, routine analysis of samples for spores, testing products for clients e.g. vacuum cleaners, washing machines, filters, ionisers, pollen monitoring and forecasting, selling data, forensics and some product development of prototypes. Of these few are strictly "consultancy" but are the provision of routine services.

Jean Emberlin is a scientific consultant for Allergy UK. This involves writing protocols, advising about testing and products. She is also a consultant for LGC Forensics. This is mainly case related forensic work. Bev Adams Groom also works on the forensic cases.

G. FUNDING APPLICATIONS AND OUTCOMES

The NPARU made several successful bids for funding, mostly with external collaborators. These are listed in the appendix.

H. EDUCATION

Undergraduate Teaching and Post graduate supervision

Jean Emberlin (JE) taught the unit BIOS 2024 Aerobiology and Health with input from Matt Smith and Bev Adams Groom; JE gave 2 lectures for BIOS Forensics course and practicals; JE gave 1 Lecture for Cardio vascular Physiology ;JE also supervised undergraduate independent studies.

JE was director of studies for 3 postgraduate research students
MS supervised one post graduate research student.

Training courses

Dr Inma Bustos Delgado taught short courses on fungal spore identification for CPD.
Bev Adams Groom taught short courses on pollen identification and monitoring for CPD.

I. Statement of resources

1. Accommodation and facilities

As in the case of the previous year, lack of space and facilities continued to be a problem. This difficulty will continue until the new building is completely ready. There were not enough work station places for the staff members so some had to share. Also there was not enough storage space or lab space to do all the work we would have liked to. In addition the main office was out of use for several months due to the building works and the main workroom was also effected for several weeks due to rewiring etc.

2. Income and expenditure

The accounts were kept by the NPARU administrator. Despite having fewer staff the income was about the same as last year. The income was top sliced by UW. In addition to salaries, income is used to purchase equipment, fund research or finance essential activities such as travel to meetings. Funds have also been used for the other non income generating activities such as those required for accreditation.

For the income 2008/09 nearly 76% was from Health related work, approx. 15% was from work in Forensics and 9% "other".

J Constraints and problems during the review period

1. Staffing

NPARU was short staffed during most of the review period. The combination of the Business development and project manager leaving in January, one person being on maturity leave for 6 months and two of the post doctorates (Spanish couple who returned to Spain) leaving in 2009 meant that capacity was notably reduced. The rest of the team and director shared the key work between them in addition to their normal work loads.

2. Accommodation

As mentioned previously in the report, NPARU was at saturation capacity for accommodation (despite staff shortages as we had less space for a lot of the time), lab use and storage. This imposed considerable restrictions on the volume of work we could do. We endeavoured to cope as best as possible through overtime and a phased shift system in which some staff started and finished earlier than others.

K. Outline of forward plan for 2009/2010.

In the next year NPARU will undergo notable expansion and restructuring. The details of this are given in our Business plan and in our Research plan. The main development will be the completion of the new facilities which will increase our capacity for commercial work and research greatly. The unit will divide into two wings, research and commercial. The commercial activities will take place in the new accommodation, while the research wing will stay in the existing space. Both wings will instigate a phased recruitment of more staff to strengthen and enhance the current team whilst continuing training of existing staff. Any potential expansion has been postponed until this phase due to lack of room. The unit will also continue to encourage visits by overseas researchers and specialists. The activities of the two wings will be fully integrated in order to make the best use of knowledge and resources. In particular the development plans will focus on the following aspects:

1. Collaboration both with other areas such as Biology, Health and MARRC, within UW, and also with other Institutions and organisations externally in order to fully utilise the Environmental chamber and new laboratories.
2. Grant applications for post doctoral posts in order to strengthen the research team and broaden the academic base.
3. Maintaining and enhancing international links for joint research projects and grant applications especially from the EU, building on the success of the MONALISA, COST and HIALINE application etc.
4. Maintaining the volume of work on trials of products and devices for allergy relief.
5. Continued development of the forensic work including research of techniques.
6. Publication of more work in high impact journals. This is regarded as essential for the future development of the unit.
7. Development of KT.
8. UKAS accreditation for our main processes.
9. Expand our portfolio into biodeterioration. This will be achieved by a grant application for a larger scale project building on the success of the Cathedral library work.

- **Research funding applications successful and unsuccessful 1 September 2008 - 31 August 2009**

- Short Term Scientific Mission (STSM) for EU COST Action ES0603 entitled “Towards numerical forecasting of long-range air transport of Ambrosia pollen” (successfully completed November 2008);
- Health Impacts of Airborne Allergen Information Network’ - HIALINE (Successful 22.10.2008)
- University of Worcester fully funded PhD studentship entitled “Towards numerical forecasting of atmospheric concentrations of allergenic pollen from trees of the Fagales order in the United Kingdom” (successful);
- European Science Foundation Exploratory Workshop “Improving pollen information and forecasting services for allergy sufferers in Europe” (submitted 30/04/2009, not known).

Collaborative research activity:

- Participated in Management Committee meetings and workshops for European Commission COST Action ES0603 (Munich, Germany, January 2009; Geisenheim; Germany, March 2009; Florence, Italy, May 2009; Aveiro, Portugal, October 2009).
- European Commission EAHC ‘Health Impacts of Airborne Allergen Information Network’ (HIALINE). Ongoing research project.
- Published articles in several peer reviewed journals with colleagues from UK, Poland, Finland, France, Austria, Switzerland, Italy, Spain, Denmark, Serbia and Macedonia.
- NERC funded work with UCL and University of Essex for AIRPATH
- DEFRA funded work on fungal pathogens, joint with Rothamsted Research and others.
- Currently JE is DOS and MS is co-supervisor of two PhD research students with colleagues from the National Environmental Research Institute in Denmark. Commenced September 2009.
- Also members of NPARU are working on a variety of research papers with experts from other institutions including Prof Rewi Newnham (New Zealand) and Dr Paul Beggs (Australia) as well as other colleagues from Europe (including Denmark, Serbia and Poland).

- **Research students**

- Bernadete Diethart - The use of inert cellulose powder as a remedy for rhinitis ; awarded PhD spring 2009.
- Claire Tillyer - The Development of Molecular Techniques in Forensic Palynology (commenced September 2007)

Appointed August 2009

- Nicola Barber - Towards numerical forecasting of atmospheric concentrations of allergenic pollen from trees of the Fagales order in the United Kingdom (commenced September 2009)

- Robert Peel - Human exposure to allergenic pollen: Measuring and modelling human exposure to pollen allergens in an urban environment (commenced September 2009)

- **Active membership of professional bodies, learned societies etc**

Prof Jean Emberlin

Fellow of the Royal Society of Medicine (RSM)
Professional member of the Forensic Science Society (FFSS)
Fellow of the Institute of Biology
Member British Thoracic Society.
Member British Society for Allergy and Clinical Immunology (BSACI).
Member European Academy of Allergy and Clinical Immunology.(EACCI)
Fellow Royal Meteorological Society (RMS)
Exec council member British Aerobiology Federation (BAF)
Council Member European Aerobiology Society (EAS)
Council member of International Association of Aerobiology (IAA)

Bev Adams Groom

Professional membership of Forensic Science Society

Dr Matt Smith

Fellow Royal Meteorological Society
British Aerobiology Federation Executive Committee Member
International Association for Aerobiology
European Aerobiology Society
International Society of Biometeorology

NB. NPARU Media log is available on request

Professor Jean Emberlin

02.11.09