



ANNUAL MONITORING REPORT 2007/08

PERIOD 1/9/2007 TO 31/8/2008

NATIONAL POLLEN AND AEROBIOLOGY RESEARCH UNIT

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A GENERAL OVERVIEW FOR THE ACADEMIC YEAR

National Pollen and Aerobiology Research Unit had another very successful year in 2007 to 2008. This is reflected in the increase in income of 15.8% despite the constraints of limited space and facilities. 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, linked by the central theme of organic matter in the air. 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 expansion in the area of Forensics continued in 2007 to 2008. NPARU dealt with the palynological and botanical aspects of major cases including murders, rapes and fraud. This included scene of crime visits, processing and analysis of samples and serving as an expert witness in court.

The academic programme of NPARU included having a major role in the European Symposium on Aerobiology in Finland, presenting many papers at other national and international conferences and publishing the results of research in peer reviewed journals. We also conducted a trial on Ocular Allergy with Aston University funded by AWM Science city which had a strong CPD component.

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.

It 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).

During the review year NPARU continued to develop and enhance its international links. It has been active in the Aerotop programme financed by a grant awarded from the EU Marie Curie Foundation for a five year scheme of transfer of knowledge with partners at the University of Cordoba, Spain and the University of Poznan, Poland. It has also been active in a programme work supported by an EU grant awarded for 3 years together with five European partners under the Life Environment programme to develop immunological techniques of air monitoring (MONALISA) which ended in 2008. Prof Emberlin and Dr Smith commenced their roles as the UK representatives for an EU COST programme, ES0630, to run for 4 years, in which Jean Emberlin is the leader of one of the three work packages.

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 was awarded her PhD in the review period. NPARU hosted a six month visit by a PhD student from Denmark which was sponsored by his employer (NERI, the Danish Environmental Agency). This led to further collaborative work and the offer from NERI to co fund a PhD project

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 continued to have 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 80 media interviews (including TV, radio and articles in regional and national press and professional 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 will house the environmental chamber, new forensics and microbiology labs, would start early in 2008 but this was changed to June. Since then progress has been very good and the building should be completed in June 2009, followed by a short period of fitting out. Until the new building is completed the work of the NPARU will be constrained severely by lack of space and facilities. The volume of work and the amount of income is expected to plateau in the intervening period as we are working at saturation capacity. However we will continue to try to increase efficiency with our existing resources.

All members of the team were encouraged to attend relevant training during the review period. 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 larger number of staff who have contributed to conference presentations and publications. It is also evident in the wider range of topics that are covered by NPARU in research, contracted work and training.

C. REVIEW OF RESEARCH OUTPUT AND DISSEMINATION FOR THE YEAR

Main research and development activities

1. The development of pollen forecast models

(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.

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

(Elona Hoxja). Elona was awarded a Chevening Scholarship from the British Council for her first year of study. She worked on a PT basis during the review period. Support from NPARU has enabled Elona to spend two periods of six weeks each year at UW for intensive work. In between she has been working in Albania but with supervisory contact by e-mail and telephone. (Thesis was submitted in autumn 2007, viva was in early 2008 and PhD awarded).

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

This area of work has been on going for several years and includes work on clinical trials. A doctorate project is being co-sponsored by UW and Nasaleze Ltd, to investigate the characteristics of the powder and its mode of action. Bernadette Diethart started on this work in Jan 2006. The work is progressing well and should be finished early in 2009.

4. Thunderstorm asthma and particle deposition in the lung.

A collaborative project was started in 2003 with The Physics Dept', Brunel University, Prof Balachandra and NHS, Worcestershire Royal Hospital, Prof Lewis. A research student (Mark O'Leary) was appointed to be based at Brunel. Several poster presentations have been made on this theme. The work is ongoing.

5. 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. A paper by JE on aspects of forensic work has been accepted for publication and another is in preparation. A key note talk was given on Forensics by Jean Emberlin at the European Aerobiology Symposium.

Several research projects are in progress for forensic palynology.

6. Development of a National Aerobiology Archive

The British Aerobiology Federation National Archive was being catalogued. It is housed in the archive room. 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 .

8. Trial of Bedding Material for Amicor fibre.

NPARU conducted a trial of anti allergy bedding, initially for Acordis fibres/ Fibres world wide .

9. EU grant for Transfer of Knowledge

A successful application for EU funding was made in 2004 together with partners in Spain (University of Cordoba) and Poland (University at Poznan) for a grant under the Marie Curie Foundation, transfer of knowledge scheme. The application is supporting a five year programme of exchanges of scientists. In the first phase, Matt Smith spent some time in Poland in 2005 to teach Polish Aerobiologists forecasting techniques. Dr Stach from Poznan spent the summer at NPARU to learn various Aerobiological methodologies from Jean Emberlin and the team. Dr Diego Sevilla (who worked for his PhD at NPARU) spent six months in Poland for the final phase of this work in 2007. The grant paid "bench fees" to the host as well as supporting the visiting scientist. Several joint papers have been written on aspects of the work and presentations made at conferences.

10. 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 in the review period and was completed in 2008. The satisfactory outcome of this project has led to an application for new funding for another EU grant (point 11). Several papers have been written on this and presentations given.

11. HIALINE EU programme

An application for EU funding (Second programme of community funding in the field of health).

An application was made to the EU for funding in 2008 for a project which built on the outcomes of the MONALISA. This project, together with 12 partners in Europe will develop a high volume small particle sampler plus associated ELISAs. The funding was awarded with the project due to start Feb 2009.

12.Planning for facilities in the new building and the enhanced work programme.

During the review period substantial progress was made on detailed planning etc.of the labs and work rooms. This work is central to our forward planning and development. Dr Claire Potter is the NPARU project manager for the build and has attended many meetings related to this in the review period.

13. 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 October). 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.

14. 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.

15. Ocular Allergy research with Aston University.

A grant was obtained in 2007 from AWM Science city programme for joint research on Ocular Allergy with Aston University. Work on this started in summer 2007 and was ongoing through 2008. The project involved a clinical trial of various treatments and an education programme day for opticians. A paper was presented on the project at the European congress on Aerobiology in Turku August 2008. Several other papers are in progress.

16. 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 has started on this and will be ongoing for 18 months. In the review period it involved several conferences with international guest speakers.

17. 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 is in charge of one of the three work packages for the project.

18. 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 not found despite interviewing 6 candidates. We will re advertise in January.

19. 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 is to advise on improving conditions for preservation. This work is ongoing.

20. 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 hayfever in the west midlands 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.

D. PUBLICATIONS

Diethart B, Emberlin J, Lewis R (2008)	Hydroxypropylmethylcellulose gel delays house dust mite allergen diffusion in vitro. <i>Allergy</i> 63 (Suppl. 88): 551.
Stach, A., Emberlin, J., Smith, M., Adams-Groom, B., Myszkowska, D.: 2007	Factors that determine the severity of <i>Betula</i> spp. pollen seasons in Poland (Poznan and Krakow) and the United Kingdom (Worcester and London). <i>Int J Biometeorol</i> online first doi:10.1007/s00484-007-0127-2
Matt Smith	Smith, M., Skjøth C. A., Myszkowska, D., Uruska A., Puc, M., Balwierz, Z., Chlopek, K., Piotrowska, K., Kasprzyk, I. and Brandt, J., Long-range transport of <i>Ambrosia</i> pollen to Poland. 2008 <i>Agri For Meteorol</i> 148, 1402-1411
Matt Smith and Jean Emberlin	Stach, A., Smith, M., Prieto Baena, J. C. and Emberlin, J.: short-term forecast models for Poaceae (grass) pollen in Poznan, Poland, constructed using regression models. <i>Environmental and Experimental Botany</i> 2008, 62 , 323-333
Jean Emberlin	" Grass , tree and weed pollen" in <i>Allergy and Allergic Diseases</i> AB Kay (Ed) 2nd edition Wiley-Blackwell 2008. Post graduate Medical text in two volumes
Jean Emberlin	"PCR to predict risk of airborne disease" Jon S West ¹ *, Simon D Atkins ¹ , Jean Emberlin ² and Bruce D Perkins ¹ <i>Trends in Microbiology</i> August 2008 380-387
Emberlin J and Lewis R	A double blind placebo controlled cross over trial of cellulose acetate as a remedy for persistent rhinitis, by nasal provocation with Der p 1 and Der f 1. <i>Current Medical Research and Opinion</i> . 2007; 23(10): 2423-2431

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

Diethart	Bernadette	Congress of the European Academy of Allergology and Clinical Immunology, Barcelona presented <i>Hydroxypropylmethylcellulose gel delays house dust mite allergen (Der p 1) diffusion in vitro</i> With J Emberlin and R Lewis
Potter	Claire	Science and Technology summit
Potter	Claire	Innovation Nation' - What does it mean for the West Midlands?
Potter	Claire	2008 West Midlands Medical Technologies Annual Forum

Bustos Delgado	Inmaculada	The 4th European symposium on Aerobiology, Turku Presented, <i>Preliminary survey of fungal spore biodiversity in the nature reserve of "Sierra de Hornachuelos" in Andalucía (Spain).</i>
Bustos Delgado	Inmaculada	The 4th European symposium on Aerobiology, Turku presented <i>Monitoring of fungal spores that might promote biodeterioration in antique books within the main Poznan University Library (Poland).</i>
Prieto Baena	Jose Carlos	The 4th European Symposium on Aerobiology, Turku presented <i>Long-term and short-term forecast models for Poaceae (grass) pollen in Poznan, Poland, constructed using regression analysis.</i>
Smith	Matt	4 th European Symposium in Aerobiology, Turku, Finland. presented <i>Long-range transport of Ambrosia pollen to Poland</i>
Smith	Matt	4 th European Symposium in Aerobiology, Turku, Finland. presented <i>Long-term and short-term forecast models for Poaceae (grass) pollen in Poznan, Poland, constructed using regression analysis</i> Co authors Stach, Alicja (Adam Mickiewicz University, Poznan, Poland), Smith, Matt (Adam Mickiewicz University, Poznan, Poland and National Pollen and Aerobiology Research Unit, United Kingdom), Prieto Baena, Jose Carlos (Adam Mickiewicz University, Poznan, Poland and National Pollen and Aerobiology Research Unit, United Kingdom) and Emberlin, Jean (National Pollen and Aerobiology Research Unit, United Kingdom).
Smith	Matt	4 th European Symposium in Aerobiology, Turku, Finland. presented <i>Dormancy release of early flowering trees Corylus and Alnus in Poznan, Central Europe: Proposal of thermal time prediction models and future IPCC trends.</i>
Smith	Matt	4 th European Symposium in Aerobiology, Turku, Finland. presented <i>The Pannonian Plain as a source of Ambrosia pollen in the Balkans</i>

Smith	Matt	4 th European Symposium in Aerobiology, Turku, Finland. Co-author <i>Integrated air quality monitoring in context of aerobiology</i> <i>with</i> Skjøth C.A., Sommer J., Smith M., Brandt J., Hertel O., Stach A., Rasmussen A., Dahl Å., Bergmann K.-C., Emberlin J., Hvidberg M., Geels C., Hansen K.M., Frohn L.M., Christensen J.H., Hedegaard G.B., Gyldenkærne S., Ellermann T., Palmgren F., Løfstrøm P., Kemp K., Ketzell M., Berkowitz R., Moseholm L.
Smith	Matt	4 th European Symposium in Aerobiology, Turku, Finland. <i>Are the birch trees in Southern England a source of Betula pollen for North London?</i> With Skjøth, Carsten Ambelas (National Environmental Research Institute, Denmark), Smith, Matt (National Pollen and Aerobiology Research Unit, United Kingdom), Brandt, Jørgen (National Environmental Research Institute, Denmark) and Emberlin, Jean (National Pollen and Aerobiology Research Unit, United Kingdom)
Smith	Matt	4 th European Symposium in Aerobiology, Turku, Finland. Co-author <i>Pre-seasonal long range transport of birch (Betula) pollen to Denmark</i> With Skjøth C. A. (National Environmental Research Institute, Denmark), Sommer J. (The Asthma and Allergy Association, Denmark), Stach A.(Adam Mickiewicz University, Poznan, Poland), Smith M., Brandt J. (National Environmental Research Institute, Denmark)
Smith	Matt	4 th European Symposium in Aerobiology, Turku, Finland. Co-author <i>The Danish THOR system as an aerobiological toolbox</i> With Skjøth, C. A, Brandt, J., Christensen, J. H, Frohn, L. M., Geels, C., Hansen, K. M., Hedegård, G. B., Smith, M., Sommer, J. & Stach, A..
Tillyer	Claire	European Symposium on Aerobiology, Turku. Presented <i>A comparison of kit based DNA extraction methods for use in forensic palynology</i> With Professor Jean Emberlin, Dr Matt Smith (NPARU)

Emberlin Jean AIRPATH, presented paper on
Bacteria on airborne particles

Emberlin Jean Current trends in Allergy, Ipswich Hospital. Symposium for GPs and nurses. Invited speaker on “Hay fever and climate change”

Emberlin	Jean	MONALISA project Lyon. Presented results from UK, with Jose Baena
		European Symposium on Aerobiology, Turku presented <i>A challenge study of ocular allergy to determine thresholds of response to grass allergen</i> with Potter Claire*, Wolffsohn James S**, Naroo Shehzad A **, Gupta Navneet **. ** Aston University
Emberlin Emberlin	Jean Jean	4 th European Symposium in Aerobiology, Turku, Finland. presented <i>The reduction of exposure to fungal spores in beds by the use of Amicor treated material in bedding: a double blind placebo controlled cross-over trial</i> <i>With</i> Emberlin J., Robertson L., Warren A., Adams-Groom B., Smith M., Bustos Delgado I., Prieto Baena J.C., Marks R., Potter C., Wall S. (all University of Worcester)
Emberlin	Jean	European Symposium on Aerobiology presented Keynote talk: <i>Forensic palynology; Pollen in the battle against crime</i>
Emberlin	Jean	European Symposium on Aerobiology presented <i>The impact of grass pollen season severity on doctor consultation rates for hay fever. Recent trends in the UK</i>
Emberlin	Jean	COST project Helsinki presenter of WP3 and background
Emberlin	Jean	COST project BERLIN
Emberlin	Jean	AIRPATH UCL London presented
Emberlin	Jean	<i>Pathogens on airborne dust</i>
Emberlin	Jean	Nasaleze London Presented clinical trial results CET Ocular Allergy, Aston University Presented
Emberlin	Jean	<i>Epidemiology of Allergy</i> Basic Clinical Allergy Imperial College London presented
Emberlin	Jean	<i>What's new in Pollen?</i> AIRPATH UCL London presented papers on
Emberlin	Jean	<i>Bioaerosols and EU projects.</i>

Other events

Five members of NPARU

Lord Stafford Enterprise fair . NPARU had a display stand of some elements of our work.

Allergy Show at Olympia. Jean Emberlin was an invited speaker and gave two lectures. 1. On outdoor allergens and hay fever and 2. On indoor allergens , asthma and perennial rhinitis.

F CONSULTANCY

The work of NPARU includes research, 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.

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

JE Taught unit BIOS 2024 Aerobiology and Health with input from MS; JE gave 2 lectures for BIOS Forensics course and practicals; JE gave 1 Lecture for Cardiovascular 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.

Jean Emberlin gave a lecture for Opticians on allergies at a CPD training day for the ocular allergy project at Aston University

I. Statement of resources

1. Accommodation and facilities

As in the case of the previous year, lack of space and facilities continue to be a problem. This difficulty will continue until the new building is ready in June 2009.

2. Income and expenditure

The accounts were kept by the Institute of H, SC and P and the NPARU administrator.

A detailed annual budget is made by NPARU and monthly income and expenditure is monitored by us against this plan. We have always made a surplus due to the great care taken to work to our budget.

J Constraints and problems during the review period

1. Staffing

The technician left to take a job closer to home in November 2007. Due to various delays beyond our control, we could not recruit a replacement until March 2008. For the four months when we had no technician the rest of the team had to share the tasks he would have done.

2. Accommodation

As mentioned previously in the report, NPARU is at saturation capacity for accommodation, lab use and storage. This imposes considerable restrictions on the volume of work we can do. We will endeavour to cope as best as possible and to continue to increase output through overtime and a phased shift system in which some staff start and finish earlier than others.

3. Security

NPARU staff are concerned about the number of thefts from this area of the building and grounds. The unit itself is relatively secure as we have security grills and a touch key entry. However items worth over £1,000 were stolen from our container lock up over one weekend, including a large compressor and high quality bedding (for trial).

K. Outline of forward plan for 2008/2009.

The forward plan has been formulated with reference to the strategic plan of the University. In the next year NPARU plans to continue its current activities and to make notable progress in certain key areas. If the new building is ready in June 2009 major changes will take place in the scale of operation of the unit. The business plan has been made with detailed consideration of this step up, including a phased recruitment of staff and marketing. A parallel research plan is being written to cover the next five years. This will include plans for collaboration with other areas such as Biology and MARRC within UW, and with other Institutions and organisations externally. In particular the forward plan includes:

1. Continued training of existing staff in preparation for the step up in activities in 2009, especially in the area of microbiology and health.
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 COST application etc.
4. Maintaining the volume of work on trials of products and devices for allergy relief. (this continues to be at saturation capacity now).
5. Continued development of the forensic work including research of techniques.
6. Publication of more work in high impact journals.
7. Development of KT .This is progress with the Met Office Health warning team.
8. Aiming for UKAS accreditation for our main processes.

10. Expand our portfolio into biodeterioration.

The forward plan seeks to maintain a balance between research and commercial work. Although we are at saturation level in terms of staff accommodation and facilities until the new building is completed, we need to increase income to keep pace with staff and other increasing costs. NPARU plans to achieve this by using some off site facilities and by using the existing resources with maximum efficiency until the new facilities are available.

NB. NPARU Media log is available on request

Jean Emberlin

23.10.08