Pan American Aerobiology Association

Newsletter Winter 1999

Editor's Note

Dear readers: being elected for a second term as Newsletter Editor looks to me like being doubly challenged to do a good job. I will do my best to live up to the expectations implied in your voting. One million thanks for the honor, as we say in Spanish.

My appreciation goes to all collaborators in this issue. Their names appear next to their contributions. In addition I received a lot of 'kept-anonymous' help from dear friends whom I do not hesitate to bug with requests and questions. I can always count on and use their prompt and reliable answers. I thank them also.

As you will probably notice the Newsletter is getting bigger (too big, perhaps? Let me know). In this issue you will find records of PAAA business, reviews of meetings and books, announcements, a look at both Aerobiology 99 Tucson and Aerobiology 2000 Albany, a touch of poetry inspired by one of our study subjects, the spore. New and colorful Inserts accompany the Newsletter main body. Leaf through them.

And yes, news keeps coming in but I have to stop at some point. Therefore, interesting material will be left for the next issue. Look forward to a story on the PAAA logo, and to a report on what the Working Groups are doing.

Inés Hurtado

The President's Corner

Millenium Message From The PAAA President

This is my opportunity to provide a message to inspire everyone in the PAAA for the upcoming millenium. Aerobiology is a discipline that appears to be gaining greater visibility, and we are fortunate to be in this field as we begin the 21st Century. Maybe some of this visibility is due to indoor air quality concerns and media hype about indoor fungal contamination, but I also see greater recognition coming from other areas as well. Recent articles about biological warfare have focused on the importance of the aerobiological pathway. There was also the article in Nature last May about the monarch butterfly larvae feeding on milkweed leaves dusted with genetically engineered corn pollen. The article noted the natural airborne dispersal of pollen around cornfields. The positive feed-back that I received about the Aerobiology Symposium at the International Botanical Congress was very exciting. I talked to a number of non-aerobiologists who attended the session and were very interested. I also seem to be getting more calls from the media as well. Recently, I spoke at length with Hannah

Holmes, a science writer who is completing a book on Dust. In this book there is a chapter that includes a major emphasis on aerobiology. This is not a technical book, but it is one being written for the lay person. Ms. Holmes will be spreading our message. In my remaining time as PAAA President, I hope to continue to be an active spokesperson for aerobiology through symposia and conferences in related disciplines and through contact with the public. I see incredible opportunities for those of us in aerobiology to interact with scientists in a variety of disciplines, and I encourage you all to join me in spreading the word about the aerobiology pathway.

I hope that everyone has a wonderful new year and good beginning for the millennium. I look forward to seeing you all in Albany this April.

Estelle Levetin

Message From The PAAA Webmaster

As Webmaster, I see many advantages for the PAAA in effectively utilizing the vast capabilities of the World Wide Web. Over the past several years, the PAAA Web site has proven to be valuable tool for "communicating" with members, enlisting new members, and connecting us to the broader scientific community, and the public at large.

I'd like to thank our past Webmaster, Jay Portnoy, for his tremendous effort in establishing the PAAA Web site and giving the PAAA a valuable Web presence.

At the beginning of my term as Webmaster, I set some primary objectives in updating the Web site. Regarding content, these were:

- to expand on and update the informational content of the site
- to be the primary location for all PAAA resources such as printable membership dues forms, Student Development Award applications and current statutes, policies, procedures and guidelines.
- to provide contact information for all members (upcoming)
- to provide links to members research Web sites
    - My technical objectives included:
- making the pages visible to all surfers not just those with the latest browsers (please let me know if you have trouble viewing any features)
- making access times quick by limiting the quantity of fancy graphics and images
- making sure the site is easy to update, with a quick turn around time for changes and improvements

Future plans for the Web site

As the PAAA Web site evolves with content contributed by its members, I hope to see it develop into the reliable source of PAAA history, PAAA policies, statues and guiding procedures, and information on potential funding sources for aerobiological research.

In addition, over the coming years, I would like to see the PAAA site increase in usefulness for anyone looking for information on aerobiology. As a future project,

I plan to incorporate capabilities for searching a listing of published articles. I would like all members to send a list of all published articles to me within the coming year. I will combine all information into a database of articles that can be searched by subject, keyword, or author. The key to the success of this project depends upon each member submitting information on all of your publications plus any others of aerobiological interest.

Please take a moment to visit the new PAAA Web site (www.paaa.org). I hope you enjoy it and find it informative. Please let me know how you feel it could be improved and become a primary source of information for you.

Christine Rogers

News From Estelle Levetin's Lab

This has been a busy and exciting year in the Aerobiology Lab at the University of Tulsa. Since my column in the last Newsletter we have had a number of visitors in the Lab. Paul Comtois and his student Véronique Séguin made a brief stop in Tulsa on their way to the PAAA meeting last summer. Another of Paul's students, Ginette Leclaire, spent a week with us in July. We all enjoyed Ginette's visit because of her incredible enthusiasm for airborne spores. I can immediately identify with anyone who gets excited over basidiospores - they are magnificent spores! Elliott Horrner made a brief visit to the lab while he was on campus for an Indoor Air workshop. Elliott talked to my students about the pros and cons of the indoor air field. Jay Portnoy visited the lab in December while he was in town presenting a series of lectures at the medical school. I was sorry that it was our winter break when he stopped by because all my students were gone at the time. Our final visitors (just last month) were Motoo Suzuki and Kohei Uosaki from the Japan Weather Association. These scientists have been working on forecasting Japanese cedar pollen (the leading cause of allergies in Japan). They have been developing dispersion models for a number of years and came to visit our lab and Charlie Main's lab at North Carolina State University to see our forecasting system and discuss their model with us.

Speaking of forecasting, we are just finishing up our second winter of forecasting the airborne dispersal mountain cedar pollen in the southern Great Plains. (http://pollen.utulsa.edu). Those of you planning to attend the PAAA meeting in Albany will get an update on this project. It has been a great collaborative effort between us in Tulsa and Charlie Main and Thomas Keever at N.C. State. In other projects, we finally finished the data analysis on the use of UV-light to control fungal contamination. I have talked about this at two previous PAAA meetings, and it was good to get this project completed. I do hope to continue working in this area if and when additional funding comes through. The data analysis on a study comparing the yearly pollen capture from Tauber traps and a Burkard sampler was also completed recently. I will be reporting on this at the PAAA meeting as well.

We currently have a great group of students in the lab. This includes three undergraduates: Micah Burch, Cashel Troutt, and Dirk Engle. Micah and Cashel are working on Tulsa area spore collections, while Dirk is assisting in the analysis of mountain cedar pollen from some of our Burkard samplers. Midge Carey who graduated last May is the other student in the lab, and she is working

on a variety of projects including some DNA sequencing of mountain cedar and eastern red cedar. I hope you will all be able to meet these great students at a future PAAA meeting. A former student from my lab, Melinda Sterling Sullivan, recently completed her MS degree in Plant Pathology at Oklahoma State University and has moved to N.C. State where she is starting her PhD work, also in Plant Pathology.

One final item from my lab is to offer hearty congratulations to Pete Van de Water for completing his PhD this past fall from the University of Arizona. Most of you remember that Pete joined my lab as a post-doc last year with just a little more writing to do. Although his dissertation was somewhat out of the realm of aerobiology (d ^{13}C and Stomatal Density Variability in Modern and Fossil Leaves of Key Plants in the Western United States) we consider him an aerobiologist in spirit after spending 10 years working for Mary Kay O'Rourke in Tucson.

Estelle Levetin

Latin-American News

Aeroallergen Course

The "II Congreso Nacional de Asma e Inmunologia" held in Bucaramanga, Colombia (August 12,'99) was preceded by an Aeroallergen Identification Course.

Congress and Course Organizers: Gerardo Ramirez MD, and Claudio Mebarack MD.

Course Faculty: Ines Hurtado, MD, PhD (USA); Alfonso Cepeda, MD, Sarita Villalba Vargas, MS Bact, Adriana Rodriguez Ciodaro, MS Bact, and Carmen Cecilia Cabrales, MS Bact(Colombia).

An illustrated brochure was distributed. Thanks to Ms. Dorothy Smith, an Allergenco Air Sampler and the E. Grant-Smith "Sampling and Identifying Allergenic Pollen and Molds" book were available for demonstration.

Twenty physicians and allied health professionals from seven Colombian cities took the Course. The Course was mainly oriented toward microscopic identification. This goal was made possible by having two video projectors, and by each participant having his/her own microscope and reference slides of spores and of neotropical pollen.

Some attendants had aerosampled and brought their "unknowns". All were eager to learn.

The AAAAI encourages aerosampling in Latin America.

The AAAAI reserved two places in the Aeroallergen Course, free of charge, for two Latin-American allergists attending the San Diego Academy meeting. Dr. Antonio J. Castillo from the Dominican Republic, and Dr. Arnaldo Capriles from Venezuela were selected. Dr. Castillo already has a sampling station operating in Santo Domingo. Dr. Capriles is been working, together with Dr. Albert De Veer, towards mounting another station in the Caribbean Aruba Island close to the Venezuelan Coast.

Inés Hurtado

Original Article

T h e S p o r e

John Haines, New York State Museum Biological Survey

To see the world in a grain of sand,

And Heaven in a wild flower,

Hold infinity in the palm of your hand,

And eternity in an hour.

William Blake

Faced with the task of reviewing basic mycology with a diverse audience of mycological experts and neophytes and having allotted myself only a few minutes to do it in, I devised the following story which could entertain the cognoscente and educate the novice. It has aspects of the poetry I read for amusement and the fairytales I tell to my grandson, but it also include life cycles, spore release, seasonality, vegetative and sporulating stages, take-off and some of the other concepts important to the aerobiology of fungi. Perhaps it will help, in a small way, to break down the barrier of technical language that makes fungi seem more mysterious than they need to be.

A spore lies dormant and still inside. Slowly water seeps through its wall and fills it with tension. In the water, enzymes become active and respiration speeds. A germ tube pushes out from one end, growing longer and longer. What was germ tube is now a hypha with cytoplasm at its tip and waste products pushed to the back where they are sealed off behind walls. A single nucleus remains behind in each cell. The hypha grows toward the concentration of nutrients. Soon it will grow into the leaf. It will branch and become interconnected. It will become a mycelium, growing and expanding in the leaf, in between cells, into cells, hidden from the light, hidden from human eyes, and protected from predators and the harsh environment. It secretes enzymes, and absorbs sugars and salts. This vegetative stage could grow forever, but that is never the reality, eventually the food in the leaf will be exhausted, the leaf is left in a condition closer to earth, and the fungus will enter a new stage. The cytoplasm that once flowed outward now returns to the center and begins to produce a new generation of spores. The

entire fungus turns to producing spores, hundreds of spores, thousands of spores, millions of spores.

These spores, like the one we first encountered, are at rest inside, poised on their fungus towers in the still air surrounding the leaf, ready. Ready for the signal to leave. Ready to be launched on a journey away from the now barren and brown leaf. That signal may be wind, or rain, or sun, or moist air or dry air. Each kind of spore knows its own signal. The time must be right. Too much sun and it will be killed, Too little moisture and it won't germinate, too little wind and it will fall back to the infertile leaf

Now the launch, moist air, gentle breeze, sun behind a cloud, rain on the horizon. The still air in which the spore is poised gets thinner until the wind is on the spore itself. The spore is caught in the air. The weight of the spore is insignificant in the thick air. It does not fall, but is held in the moving air. The air has total control now. The spore leaves behind the leaf that nourished it, moves past the small branch, past the larger branches, until a new and fresh leaf appears in its path and the spore is pushed onto its surface by its own momentum while the pliable air diverts at the last second. It germinates and starts to grow again as before. But this time in growing it encounters another hypha from another spore. Is it antagonistic? Is it compatible? Recognition! Is it not only compatible. It is irresistible. The hyphae connect and the nuclei of one flow to the other. The nuclei pair, side by side. Together they are protected in a fruiting body for the consummation that must come, one nucleus formed from two, followed by meiosis and a new kind of spore is born. Different from the previous one. More strongly walled, it resides in its protective structure. A structure that will help place the spores into the air at precisely the right time. The launch. This time not passive, but shot into the air with great force in a jet of liquid, past the branch, past the tree, past the grove in the valley, past the river, past the houses, past the labored breathing of an asthmatic child, and finally to a new leaf, in a new forest. But, the season is different. Cold now, soon to be frozen. The spore will lay dormant until spring. Only then will the cycle repeat with infinite variations.

Most spores will never reach this happy end. Only a fraction, of a fraction of 1% will be successful. The rest will end in infertile and unlikely places forming a layer of ready, but doomed, spores on every surface. Eventually, they become dried, consumed, or meet an ignominious end in an air sampler or respiratory pathway.

John Haines

Meeting Report

American Association for Aerosol Research Annual Meeting

The 18th annual meeting of the American Association for Aerosol Research was held on 11-15 Oct 1999 in Tacoma, Washington, USA. The American Association for Aerosol Research (AAAR), as stated on their Web page (www.aaar.org), "…is a nonprofit professional organization for scientists and engineers who wish to promote and communicate technical advances in the field of aerosol research. The Association fosters the exchange of information among members and with other disciplines through conferences, symposia, and publication of a professional journal, Aerosol Science and Technology."

Chris Rogers and I, along with a number of other Harvard University researchers, attended the meeting. Other PAAA members among the approximately 450 attendees were Janet Macher and Franco Di-Giovanni. There were a number of aerobiology-related presentations and workshops that made this meeting particularly relevant for us.

Although I didn't attend any of the numerous tutorials before the conference, there were a few that looked particularly interesting. Mark Hernandez, assistant professor of environmental engineering at the University of Colorado, in Boulder, presented a tutorial entitled *Bioaerosol Analysis: Non-Culture Based Methods for Characterizing Microorganisms in Aerosols*. The workshop was to provide an overview of microscopic methods used to characterize and enumerate airborne bacteria, fungi, and their spores. He emphasized the use of selective biological stains along with membrane filtration techniques as complimentary methods with direct enumeration methods.

Another tutorial, presented by William W. Nazaroff, Professor of Civil and Environmental Engineering at Berkeley, was on *Particles in Indoor Air*. This workshop was to provide an overview of the major processes governing the concentrations and fates of particles in indoor environments. Topics included indoor emission sources, penetration of outdoor particles, deposition onto indoor surfaces, resuspension, human inhalation exposure, modeling, and control techniques. While not specifically bioaerosol oriented, these areas all pertain to biological, as well as non-biological, particles. Other tutorials covered such subjects as: Aerosol mechanics, Aerosol charging, Aerosol sampling, and Remote sensing.

About 250 abstracts were presented during the meeting, covering topics from aerosol physics, indoor aerosols, health related aerosols, to instrumentation (which seemed to be a particularly hot topic with this group). Of particular interest to us was a symposium entitled, *The First Coordinated Health and Aerosol Characterization Supersite Experiment* put on by ARIES (Aerosol Research Inhalation Epidemiology Study) and organized by Tina Bahadori of EPRI (Electrical Power Research Institute). This ongoing study is looking at particulate and bioaerosols in outdoor air, collected at central "supersites", in relationship to a number of health outcomes, with data collected through hospital records. Because data collection is not completed and comprehensive results are not yet available, many of the presentations described the methodologies used and protocols being developed. Presentation titles included: *Characterization of Personal, Indoor, and Outdoor PM2.5 Composition and Health Effects*, *Seasonal Profiles of Outdoor Bioaerosols in Atlanta and Their Relation to Health Effects* (by Christine Rogers), *Spatial Variability of PM2.5 Mass and Composition in and Around Atlanta, Georgia*, along with about 12 other presentations in this series.

The meeting was not all presentations and workshops, there were a few social hours with opportunities for viewing posters and talking with other scientists as well as instrument vendors. Also, a very pleasant (but cool) event was the Harbor Dinner Cruise in Puget Sound that began in Elliott Bay in the heart of Seattle. The Seattle skyline at sunset was beautiful and the food was great (although not particularly bountiful). This year's meeting (19th Annual AAAR Conference) will be held from 6 – 10 Nov 2000 in St. Louis, Missouri, USA. For those who are looking to expand their knowledge of the behavior of aerosols or get some ideas of the cutting edge instrumentation that could be used for bioaerosol detection, this meeting is highly recommended.

Michael Muilenberg

Agricultural and Forest Meteorology

Special issue devoted to Aerial dispersal of pests and pathogens

The November 1999 issue of Agricultural and Forest Meteorology was devoted to aerial dispersal of pests and pathogens: implications for integrated pest management. This special issue grew from a symposium held at the joint annual meetings of the Entomological Society of America and the American Pathological Society the previous year. The volume contains articles by Mike Irwin (Implications of movement in developing and deploying integrated pest management strategies), Stuart Gage and Scott Isard (Ecological scaling of aerobiological dispersal processes), John Westbrook and Scott Isard (Atmospheric scales of biotic dispersal), Don Aylor (Biophysical scaling and the passive dispersal of fungus spores: relationship to integrated pest management strategies), Eckhard Limpert, Francoise Godet, and Kaspar Muller (Dispersal of cereal mildews across Europe), David Byrne (Migration and dispersal by the sweet potato whitefly, Bemisia tabaci), Elson Shileds and Anthony Testa (Fall migratory flight initiation of the potato leafhopper, Empoasca fabe (Homoptera: Cicadellidae): observations in the lower atmosphere using remote piloted vehicles), and Mike Jeger (Improved understanding of dispersal in crop pest and disease management: current status and future directions)

Scott A. Isard

Members News

Paul Comtois is now on sabbatical up to July 2000. His temporary address:

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He seems to be having a great time.....
