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IN THIS ISSUE

The Plant Pathology Internet Guide Book

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Introduction

As scientists, we all depend on the latest information to carry on with and to plan future research activities. All of us are reading journals or are in contact with colleagues to keep up-to-date, but we are still aware of the fact that we might miss important information. Therefore, a tool which would allow one to screen the available information on a specific topic in a fast, reliable and easy to access way would be beneficial. In this context, the World Wide Web (WWW, Internet) is a widely accepted tool to find and get scientific information. During the last few years, the WWW has grown to include over 180 million documents, representing personal and institutional pages, scientific networks, and on-line journals. Like other research tools, we have to learn how to use the Internet to find information without wasting time or missing important resources. In the following article I will briefly discuss search strategies on the WWW and their advantages and disadvantages. I will mainly focus on the Plant Pathology Internet Guide Book (KRASKA). The impact of the WWW will be shown by examples taken from this Internet Guide.

The Information Problem

We have all grown up using libraries to get information from books and journals and watching television for news and information. It is normal to use these media without reflecting on how to use them. The Internet has brought up a new quality in the world of information and we are facing the problem of how to use this new tool to get information. What are the main difficulties we are confronted with when using the Internet?

1. The quantity of available documents on the WWW: at the moment there are more than 180 million documents available on the WWW and this number is underestimated.
2. The Internet is a pool of information which does not differentiate between reliable and non-reliable resources.
3. The addresses to locate a document on the Internet are often difficult to remember and sometimes they are changed for technical reasons without leaving a hint as where to find it.

Therefore, a search tool or strategy is required to find a document (web-site).

There are three possible search strategies:

Personal Communication

A colleague or friend informs you of an interesting web-site and its location on the Internet. The web-site location (link) can be stored in the bookmark file of your Internet browser for later use. This is the easiest way, but it is only applicable to a low number of web-sites.

Search Engines

Search engines like ALTAVISTA, LYCOS, YAHOO and others collect web-sites by using different indexing algorithms. Web-sites are included during an automatic indexing process or after a URL has been submitted to a search engine manually by the web-site owner. The quality of the search results are dependent on the user's experience and his knowledge of search operators (e.g. boolean operators like AND or NOT). One example may show the main problems associated with search engines: Take ALTAVISTA and enter "Arabidopsis" as a single keyword: 66,150 documents will be found in return to this query. Narrow the search down by using the AND operator and the phrase "cell-death" will result in 591 matching sites. Adding a third keyword "pathogen" gives 201 and a fourth keyword "disease resistance genes," 30 documents. Until entering four keywords, the number of web-sites is so high that it would be a waste of time to visit them all, because it is quite uncertain that the document you are searching for is ranked in a top position. Moreover, using the same keywords in a different order or at a different time might change the number as well as the order of listed sites. The main advantage of search engines (the indexing of "all" available sites) is at the same time their main disadvantage.

Web Guides

To overcome some of the disadvantages of search engines, web guides were established that are written and compiled by scientists in a specific field of interest. Many of the Internet Guides are listed in ARGUS CLEARINGHOUSE Directory. The Plant Pathology Internet Guide Book (PPIGB) was created for Phytopathology, Applied Entomology, and related sciences. PPIGB and other guides are not intended to index the whole Internet, but to have some kind of pre-sorting (KAISER1998).

The Plant Pathology Internet Guide Book (PPIGB)

The PPIGB, located at http://www.ifgb.uni-hannover. de/extern/ppigb/ppigb.html, searches the Internet for web-sites in the field of plant pathology in its broadest sense. In contrast to a search engine, it will not list all available sites (which is impossible), but those with relevant information. Once a potential web-site has been found, it will be visited, checked in detail (including authorship, localization, content, usability, reliability, etc.), reviewed and categorized before it is included in PPIGB. PPIGB currently contains more than 2,500 listed web-sites in 25 sections. For each web-site a brief description will be written and up to 30 keywords added. Web-sites are categorized in sections for institutions, general topics (e.g. virology), more specific topics (e.g. molecular biology), and organized by format (e.g. journals) and features. The PPIGB screen is divided into two frames (Fig. 1) where you will find the menu displaying the available sections on the left and a text frame on the right side. Select a section from the menu on the left and the result will be displayed on the right side. The major advantage of PPIGB is that all listed web-sites are reviewed, pre-sorted and validated on a regular basis to keep information and links up-to-date.

To search for a web-site in PPIGB you can use the simple search feature. An example is given in figure 2 where keywords were used which are not displayed in the description of the web-site. This search feature will be extended in the future to a more comprehensive search tool.

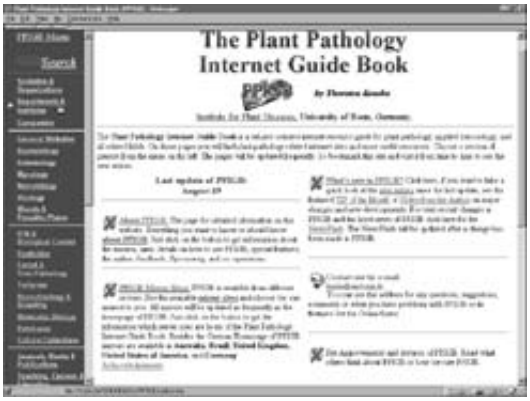


Figure 1. Starting screen of PPIGB with menu on the left and the display on the right side.

PPIGB Search Result

You have used the following parameters for your search:

- Keyword(s): resistance peronosporq parasitica
- Boolean Operator: AND

The following entries were found in PPIGB using your search parameters:

The Delaney Lab, Terrence P. Delaney Laboratory, Department of Plant Pathology, Cornell University. Research in this lab is focused on molecular aspects of plant-pathogen interactions and mechanisms of plant defense responses mainly on bacterial and funga diseases of Arabidopsis. Research Topics: Systemic Acquired Resistance (SAR) in plants, multiple roles of Salicylic Acid in Disease Resistance, mutants unable to develop SAR, mutants that constitutively express SAR. Further available: Protocols (DNA & RNA preparation methods), people (visit the Lab) and some selected Links.
Additional Keywords: Mycology, Fungi, Plant Pathology, Phytopathology, Plant Responses to Pathogens, Peronospora parasitica, Arabidopsis thaliana, non-inducible immunity, ignal transduction pathway, defense genes, salicylate hydroxylase gene

Figure 2. Example of a search result displaying the web-site description and the additional keywords.

Another advantage of PPIGB is its open structure. Improvements can be made according to suggestions made by users. A good example is the new PPIGB book shop. In conjunction with AMAZON.COM, a book shop was created with an on-line keyword search. Recommendations and book reviews will follow soon along with other features like an announcement service, help for users in creating their own web-sites, mirroring of PPIGB and a reader's corner. For more information, a contact address is given on nearly every page and PPIGB is open to user input, as demonstrated by the mirror service and the position announcement pages.

The role of the World Wide Web in Plant Pathology

Two examples taken from PPIGB should demonstrate the possible impact of the Internet in plant pathology. The first concerns electronic publishing and the second teaching. The role of the WWW in extension has been discussed in detail by BRIGGS AND GROVE (1998).

In the section, "Journals, Books & Publications" of PPIGB you will find the peer-reviewed journal MOLECULAR PLANT PATHOLOGY ON-LINE, published by the British Society for Plant Pathology. This is the first true on-line journal in plant pathology without a printed counter-part and the advantages are obvious: faster publication than in printed journals, extended use of graphics and other media without additional costs, linking to external resources (e.g. sequence databases); and it is fully citeable. Publication is faster because the printing process is eliminated and communication with the author(s) can be done electronically for each step of publication. For other sciences, on-line publication is already state-of-the-art and it will soon be the same for plant pathology.

The Internet also opens new opportunities for teaching. The on-line course "Plant Pathology On the World Wide Web" at the University of Nebraska-Lincoln developed by J.P. Partridge is an excellent example for future directions.

Conclusions

The Internet has had a major impact on the scientific community, and in a shorter time than we might have expected it's use will be as common as reading a book. On-line journals will exist along with printed journals, but with new features not currently in use. Communication is easier and faster with the Internet, provided users know how to find the information they need. The PPIGB, as a web guide for plant pathology, provides users with a quick and reliable means by which to sort through vast amounts of information. (SCOTT 1998).

References and URLs:

- Altavista: http://www.altavista.digital.com
- ArgusClearinghouse: http://www.clearinghouse.net/
- Briggs, A. R., Grove, G. G. (1998): Role of the World Wide Web in Extension Plant Pathology: Case Studies in Tree Fruits and Grapes. Plant Disease, 82 (5), 452-464.
- Kaiser, J. (1998): Net Watch Site Visit: The Science of Sick Plants. Science, 280, 1663.
- Kraska, T.: The Plant Pathology Internet Guide Book, (PPIGB), available websites:
    - Germany (home page): http://www.ifgb.uni-hannover.de/extern/ppigb/ppigb.htm
    - United Kingdom: http://www.bspp.org.uk/ppigb/
    - United States: http://www.scisoc.org/ppigb/
    - Australia: http://www.bes.murdoch.edu.au/sabc/ppigb/
    - Brazil: http://www.cena.usp.br/ppigb/ppigb.htm
- Molecular Plant Pathology On-Line (MPPOI): http://www.bspp.org.uk/mppol/
- Patridge, J.P.: Plant Pathology on the World Wide Web, http://www.ianr.unl.edu/ianr/plntpath/peartree/homer/index.html
- Scott, P.R. (1998): The incredible Pace of Change: Information Technology in Support of Plant Pathology. In: Bridge, P., Jeffries, P., Scott, P.R. (eds.): Information Technology, Plant Pathology & Biodiversity. CAB International, Wallingford, UK.

A COLUMN - FROM THE PRESIDENT

Science is building up momentum

The recent success in the US House of Representatives of the passage of the Agricultural Research, Extension, and Reform Act of 1998 is most welcome to biological researchers interested in agricultural problems. This bill will provide $US 600 million in new competitive research funding over the next five years beginning in FY 1999. Similarly, a US Senate subcommittee is recommending an appropriation of $US 2.725 billion for Research and related activities to the NSF budget. Even more recently British Science and Technology was given a boost with an extra 1.1 billion pounds to be spent over three years; and this came on top of the 1.34 billion pounds science budget for 1999-2002. This is a great turn around in the fortunes of science support and will enhance many different fields. Contrast this with the Asian-Pacific region where Japan is in recession and most of the other areas are battling not to join her. Support for science research and R&D in many of these countries suffers as a result of the generally "smaller" government program push and budget cuts where some of the first to go are education and science spending.

The above information on the various national budget positions came available to the international science community in less than 24 hours. Where does this rapid dissemination of such information come from?

I would like to tell you of one constant source which is rapid, accurate and very often thought-provoking. Several years ago on a trip to India, Dr. Desh Pal Verma, a past President of the MPMI, got the idea that if he could get an effective E-mail system going between Indian scientists and the outside world, maybe he could get them rapid, accurate and thought-provoking information and also set up an information exchange. Out of his own pocket, Dr. Desh Pal Verma has funded a system which certainly fulfills the above aspirations. I have been most fortunate to be able to "listen in" over the last year and follow such subjects as the latest controversies over multinational corporations and biotechnology, patent piracy issues, corruption in science and science administrations, discussion about the way forward for Developing Nations, and of course, the shifts in science spending in the major research nations of the planet. I believe Des Pal has reminded us all, yet again, that an individual can make a difference, that science is truly trans-national and that rapid communication can change ways of thinking. Thank you Desh for your personal efforts.

Professor Barry G. Rolfe

EMPLOYMENT OPPORTUNITIES

A postdoctoral fellowship sponsored by Academia Sinica is going to open Feb. 1999 for a candidate who has a PhD and is trained in molecular biology, plant pathology or cell biology. The fellowship provides health insurance and 13.5 months of 50,000 NT$ per month pay (equivalent to about 19,000 US$ per year). The position involves work on the molecular mechanism of plant hypersensitive response induced by plant pathogens. This tenure track faculty position is open immediately for the candidate who has at least 2 years of postdoc training related to the field of MPMI. Academia Sinica, Taipei, is a highly equipped and internationally recognized

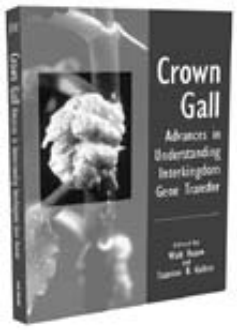
research institution supported by the Taiwan government. Applicants should send their CV to Dr. FENG, Teng-yung, Institute of Botany, Academia Sinica by e-mail: bofeng@sinica.edu.tw

BOOK REVIEWS

Crown Gall: Advances in Understanding Interkingdom Gene Transfer. W. Ream and S. B. Gelvin, eds. APS Press, St. Paul, MN, 1996.

Ann G. Matthysse
University of North Carolina at
Chapel Hill

This small book (145 pages) contains 8 papers presented at a meeting held in September, 1995 to honor Eugene Nester and Milton Gordon for their contributions to research on crown gall and the scien-tific community generally. The papers are all concerned with the mechanism and regulation of DNA transfer from Agrobacterium tumefaciens to plant cells or to other bacteria and the fate of the transferred DNA after it is received by the host cells. Included are chapters on signal detection by VirA (Doty, Heath, and Nester), studies on the mobilization of



pRSF1010 between strains of A. tumefaciens (this transfer is used as a model for the transfer of pTi to plant cells) (Fullner and Nester), how T-DNA is targeted to the host cell nucleus and integrated into host chromosomes (Rossi, Angel, Tinland, and Hohn), studies of the loss of virulence of agrobacteria in nature (Dion, B,langer, and Marquis), the regulation of the conjugation of pTi between bacteria (Winans, Wang, Dwen, Fuqua, Mor, Alt-M"rbe, Styker, and Burbea), the organization of the T-DNA transport apparatus (Spudich, Dang, Fernandez, Zhou, and Christie), bacterial and plant genes which affect T-DNA transfer and integration (Narasimhulu, Nam, Deng, Sarria, Ream and Gelvin), and the role of the VirE1 protein in the export to plant cells of the VirE2 single-strand DNA binding protein (Sundberg, Meek, Dombek, Carroll, Das, and Ream). Some of the actual results have been superseded by more recent papers in journals, but the papers present a useful overview of the field. In general, the papers are well written and easily accessible to someone who does not follow this literature and does not work with agrobacteria. In fact, this book would be a good starting place for a scientist who wants to become familiar with studies of the mechanism of DNA transfer from agrobacteria to plant cells.

Another potential group of readers who would find this book useful are students. The reason for doing the experiments, the methods used, the experimental design and controls, the analysis and interpretation of data, and considerations of what should be done next are very clearly presented in many of these chapters, particularly in the first chapter. Thus this book would be a useful teaching tool for advanced undergraduates or beginning graduate students who are beginning to grapple with the problems of actually doing science. It would provide an excellent platform for discussions of how to design and do experiments and how to interpret the results. The fact that the book is short is an advantage in that this makes it more likely that students would actually read the material and have time to think about it. Detailed references are given at the end of each chapter so students should have no difficulty finding the original literature on which the chapters are based.

I would recommend this book for scientists who wish to explore what is known about how A. tumefaciens transfers DNA to plant cells and for use in teaching students about how science is done.

Thirty years of U.S./Japan and Plant/Microbe Signal Exchange …

Molecular Aspects of Pathogenicity and Resistance: Requirement for Signal Transduction
edited by D. Mills, H. Kunoh, N. Keen and S. Mayama American Phytopathological Society, 1996. $45.00 hbk (xvii + 294 pages) ISBN 0 89054 215 5

Reviewed by J. W. Kronstad
Biotechnology Laboratory
University of British Columbia

The book "Molecular Aspects of Pathogenicity and Resistance: Requirement for Signal Transduction" chronicles the proceedings of the 7th Seminar in the U.S./Japan Cooperative Science Series held from September 24 to October 1, 1995 at Tsu-city, Mie Prefecture, Japan. This Seminar Series, which has taken place at approximately five year intervals for the past three decades, arose as part of a cooperative scientific program between the United States and Japan that was announced in 1961. The scientific program in general, and this plant pathology series in particular, have provided a ex-cellent forum for scientific exchange and collaboration between Japanese and U.S. scientists.

The US-Japan seminar series

Seminar		Publications	
Date	Location	Editors	Date
1966	Gamagori	C.J. Mirocha, I. Uritani	1967
1970	Honolulu	S. Akai, S. Ouchi	1971
1977	Lincoln	J.M. Daly, I. Uritani	1979
1981	Brainerd	Y.Asada, W.R. Bushnell, S. Ouchi, C.P. Vance	1982
1985	Inuyama City	S. Nichimura, C.P. Vance, N. Doke	1987
1990	Honolulu	S.S. Patil, S. Ouchi, D. Mills, C. Vance	1991
1995	Tsu City	D. Mills, H. Kunoh, N. Keen, S. Mayama	1996

This latest book joins six volumes containing the presentations at the previous meetings beginning in 1966. One theme stressed by the organizers of the meeting and highlighted in the book is that 30 years of meetings provides an excellent perspective for evaluating the progress towards understanding host-parasite interactions. This idea was stressed in the first chapter of the book in which W. Bushnell provided a thoughtful historical view of the Seminar Series and noted the value of the proceedings from past Seminars as periodic measures of the

advancement of the field. W. Bushnell also provided a summary of five selected topic areas to illustrate concepts that have evolved over the last 30 years of investigation. These areas included induction of enzyme activity in host tissues, systemic acquired resistance, induced susceptibility, altered metabolism in susceptible host tissues and host specific toxins (HSTs). These areas fit well with the chapters presented in the book and, as part of an introductory chapter, served to set the tone for the subsequent chapters describing progress for these and other topics. A second overview chapter by H. Kunoh provided a succinct review of the importance of, and advances in, cytological approaches for the examination of pathogen interaction with host tissue.

As the title of the book indicates, the conference had signal exchange as its theme. In this context, the book provides a snap shot of selected areas in the field as it existed in 1995. Of course, the pace of discovery in this area has been, and continues to be phenomenal, particularly in the area of plant resistance gene analysis and signaling during plant defense. The book is a compilation of chapters that each deal with particular aspects of plant-microbe interactions, with the notable absence of information on plant viruses. I should note that the chapters in this book are more than the typical conference proceedings chapters. Most of the chapters in this book are more fully developed and offer more insight into the topics than one would find in the usual compilation of conference proceedings. The theme of signaling is brought home in detail in the book because of the efforts of the authors to describe the signals (e.g., phenolics, avr products, elicitors, suppressors, toxins) and the perception of, or response to the signals (e.g. VirA protein, R gene products, elicitor receptors, changes in gene expression). The following paragraphs present some of the highlights of the work recorded in the various chapters. These paragraphs are intended not only to present the con-tent of the book but also to provide some examples of the areas of plant-microbe interactions that have exploded in recent years.

Various aspects of gene-for-gene interactions were described in several chapters in the book including descriptions of both classical and molecular genetic analyses. A lead-off introduction by A. Ellingboe (Chapter 3) provided the genetic background of the gene-for-gene hypothesis as described by Flor and discussed classical genetic analyses of avirulence in the rice blast fungus Magnaporthe grisea. In addition, the evidence for presence of suppressors of avirulence genes in M. grisea was presented; these results are reminiscent of earlier genetic evidence for suppressors of avirulence in the Melampsora lini/Flax interaction as described by Lawrence et al., (1981). These studies offer important genetic insights into additional levels of complexity within the context of gene-for-gene interactions; these complexities that will eventually need to be explored at the molecular level. A discussion of fungal avirulence genes and their role in the definition of forma speciales within the powdery mildew fungus was presented by Y. Tosa (Chapter 4). This chapter served as a reminder that the host specificity employed to define forma speciales can be explained, at least in part, by gene-for-gene relationships.

Two chapters illustrated the range of ongoing efforts to isolate and characterize plant resistance genes. Shimamoto and co-workers (Chapter 15) described the use of maize Ac/Ds to tag the rice Pi-zt gene which confers resistance to the rice blast fungus M. grisea. G. Martin and his colleagues (Chapter 14) presented their work on elucidating the signal transduction events mediated by the Pto locus that confers resistance to bacterial speck disease of tomato. This highly informative chapter highlighted the sophisticated application of current molecular genetic techniques such as the two hybrid system to isolate additional components in the Pto signaling pathway. A description of experiments to explore the molecular basis of specificity between Pto and a related gene (Fen) was also presented along with the results of efforts to transfer Pto and Fen to other plant species.

On the pathogen side of gene-for-gene interactions, N. Keen and coworkers (Chapter 12) briefly described the status of work on bacterial avirulence genes in general and their own work on the syringolide elicitors specified by the avrD gene of Pseudomonas syringae pv. tomato. Of particular note was the description of preliminary

efforts to identify binding sites for the syringolides in cells of rpg4 and Rpg4 soybean cultivars. Interestingly, a ligand specific binding site was detected in the soluble cellular fractions, but not in the membrane fraction.

Several chapters were devoted to the topic of plant defense and, in this regard, a significant portion of the book reflects W. Bushnell's themes of induction of enzyme activity in host tissues, systemic acquired resistance, induced susceptibility, and altered metabolism in susceptible host tissues. J. Leach and her coworkers (Chapter 10) described their work on the interaction between Xanthomonas oryzae pv. oryzae and rice with emphasis on avirulence genes in the pathogen and defense responses in rice. The discussion of possible defense responses focused on the evaluation of the role of extracellular peroxidases as components of the lignin biosynthetic machinery. Total peroxidase activity is elevated in tissues upon infiltration with an incompatible strain of the bacterium. Similarly, chapters by T. Yamada et al.(Chapter 13) and Shiraishi et al. (Chapter 17) described their analysis of the regulation of pea phenylpropanoid metabolism genes (PAL, CHS) by elicitor and suppressor (Supprescin) activities produced by the pea blight fungus Mycosphaerella pinodes. The analysis of suppressors of defense gene activation is particularly interesting and the suppressor from M. pinodes has been shown to inhibit pea plasma membrane ATPase and polyphosphoinositide metabolism (Yoshioka et al, 1990, 1992). Nicholson and Hipskind (Chapter 18) described the routes of synthesis of the phenylpropanoids and flavonoids as mediators of resistance in the monocots maize and sorghum, respectively. They make the point that little information is available on the role of these compounds in disease resistance in monocots, compared with the extensive literature on dicots.

Mayama et al. (Chapter 19) described their efforts to understand the molecular basis of accumulation of the phytoalexin avenalumin I in oats and the linkage of the gene for control of accumulation and expression of specific resistance to the crown rust fungal pathogens. Specifically, the oat Pc-2 locus confers resistance to certain races of the crown rust pathogen Puccinia coronata f. sp. avenae and the fungus Helminthosporium victoriae, which produces the host-specific toxin victorin. Victorin may actually function as a specific elicitor of avenalumin accumulation in oats carrying the Pc-2 gene. In addition, victorin sensitivity in oats is conditioned by the dominant Vb gene which may be identical or closely linked to Pc-2. Mayama and coworkers report the identification of a RAPD marker linked to the Pc-2 gene that may be an important step towards isolating the gene. In complementary work, Wolpert and coworkers (Chapter 21) described studies on the structure of victorin and the used of a labeled derivative of victorin for use in identifying binding proteins. This work has led to the interesting discovery that a 100 kDa victorin binding protein is the P-protein component of the mitochondrial enzyme glycine decarboxylase (GDC) and a 15 kDa victorin binding protein is the H-protein component of the enzyme. The chapter by Wopert et al. presents a clear description of the interaction of victorin toxin with GDC and a summary of the evidence that GDC is the target or part of the target for the action of victorin.

In addition to the chapters describing the work on victorin and the Pc-2/Vb locus, two other chapters in the book dealt with the topic of host-specific toxins (HST) produced by species in the genus Alternaria. For example, Tsuge et al. (Chapter 11) provided a review of the various Alternaria toxins in the context of the phylogeny of the genus and gave an update on the molecular analysis of AK-toxin production by the Japanese pear pathotype of A. alternata. In a related and complementary chapter, Otani et al. (Chapter 22) presented a clear description of the structures, sites of action and efforts to define receptors for the HSTs from Alternaria species. These chapters highlight a traditional strength of Japanese investigators in the investigation of Alternaria HSTs.

For bacterial toxins, Bender and coworkers (Chapter 20) provided a description of the mode of action, biosynthesis and regulation of production of the phytotoxin coronatine by Pseudomonas syringae pv.glycinea. Coronatine is known to be a virulence factor in several of the diseases caused by P. syringae pathovars. Bacterial pathogenesis was also discussed for Xanthomonas by Tsuyumu et al. (Chapter 9) and for Agrobacterium tumefaciens by Nester and coworkers (Chapter 8). In the case of Xanthomonas, information was provided on the roles of putative virulence factors such as the carotenoid-like pigment xanthomonadin, tryptophan (as required for growth or for IAA synthesis), extracellular enzymes and cyclic glucan. The discussion of crown gall caused by Agrobacterium tumefaciens focused on the interaction of the sensor protein VirA with phenolic inducers of vir gene expression. Three chapters in the book dealt specifically with fungal pathogens and the development of infection structures (appressoria) or an infectious cell type. Dean and his coworkers (Chapter 5) described the role of cell surface communication in appressorium formation for Magnaporthe grisea. These investigators have provided evidence that Ca++ and cAMP signaling is important for appressorium formation. Similarly, a role for cAMP signaling was described by Mills and coworkers in Chapter 7 for the dimorphic switch associated with formation of the filamentous infectious cell type of Ustilago hordei. These chapters highlight the emerging realization that cAMP plays an important role in fungal phytopathogenesis (Kronstad, 1997). Finally, Kubo et al. (Chapter 6) described a detailed analysis of the genes for melanin biosynthesis in the cucumber anthracnose fungus Colletotrichum lagenarium. Melanin biosynthesis in appressoria is important for penetration of host tissues.

Of course, the investigation of plant-microbe interactions is moving so fast that it would be difficult for any book to remain timely. For the new student in this field, this type of book will provide a snapshot of several areas of active investigation with more of a historical perspective than is usually provided. In addition, this book series is commendable because most of the chapters offer a more detailed and complete discussion of the topics, compared to the usually brief (and reluctantly contributed) chapters found in most compilations of conference proceedings. Of course, for the latest advances in the field, a book like this cannot substitute for more rapidly published reviews (e.g. Vivian and Gibbon, 1997; Hammond-Kosack and Jones, 1997; Yang et al., 1997; Somssich and Hahlbrock, 1998) or journal issues devoted to the topic (e.g., the Plant Cell compilation). As I mentioned at the start, one valuable contribution of this series is the historical perspective that can be obtained from an on-going compilation of the proceedings of this sort. This theme was reiterated by a closing synopsis chapter provided by S. Ouchi and D. Mills. This synopsis provides a good perspective on the achievements reported at the meeting and provides a useful reminder of the value of science as a means of raising cross-cultural awareness.

Literature cited

- Lawrence, G. J., et al., 1981. Interactions between genes controlling pathogenicity in the flax rust fungus. Phytopathol. 71: 12-19.
- Kronstad, J. 1997. Virulence and cAMP in smuts, blasts and blights. Trends in Plant Science. 2: 193-199.
- Yang, Y., et al., 1997. Signal perception and transduction in plant defense responses. Genes Dev. 11: 1621-1639.
- Sommssich, I. E. and K. Hahlbrock. 1998. Pathogen defense in plants - a paradigm of biological complexity. Trends in Plant Science. 3: 86-90
- Vivian, A. and M. J. Gibbon. 1997. Avirulence genes in plant pathogenic bacteria: signals or weapons? Microbiol. 143: 693-704.
- Hammond-Kosack, K.E. and J.D.G. Jones. 1997. Plant disease resistance genes. Annu. Rev. Plant

Physiol. Plant Mol. Biol. 48: 575-607.
- Yoshioka, H. et al., 1990. Suppression of pisatin production and ATPase activity in pea plasma membranes by orthovanadate, verapamil and a suppressor from Mycosphaerella pinodes. Plant Cell Physiol. 31:1139-1146.

MEETINGS

November 2-3, 1998. Transgenic Plants: Novel Developments in Insect and Disease Resistance, Buena Vista Palace, Lake Buena Vista, Florida, USA. Contact: IBC, 225 Turnpike Rd., Southborough, MA 01772-1749, USA, Phone: 508-481-6400, Fax: 508-481-7911, E-mail: reg@ibcusa.com, Website: www.ibcusa.com/conf/transgenic

November 7-8, 1998. The 19th Annual Crown Gall Conference. Purdue University, West Lafayette, Indiana. Contact: Dr. Stanton B. Gelvin, Department of Biological Sciences, Purdue University, West Lafayette, IN 47907. Telephone: 765-494-4939; Fax: 765-496-1496; e-mail: gelvin@bilbo.bio.purdue.edu

November 12-15, 1998. Stress-Inducible Gene Expression Conference, Danvers, Massachusetts. Contact: Bill Adams, (SIGE), Cognizant Communication Corp., 3 Hartsdale Road, Elmsford, NY 10523 USA, Fax: 914-592-8981, Email: cogcomm@aol.com

November 8-12, 1998. APS/ESA Joint Meeting. Las Vegas, Nevada, USA. Contact: Lori Kuennen, IS-MPMI, 3340 Pilot Knob Road, St. Paul, MN, USA. Telephone: 651-454-7250 Fax: 651-454-0766, E-Mail: ismpmi@scisoc.org

February 8-14, 1999. Interactions and Intersections in Plant Signaling Pathways, Silverthorne, Colorado, USA. Contact: Keystone Symposia, 221 Summit Place #272, Drawer 1630, Silverthorne, CO 80498, Phone: 800-253-0685 or 970-262-1230, Fax: 970-262-1525, E-mail: keystone@symposia.com, Website: http://www.symposia.com

April 6-11, 1999. Apoptosis and Programmed Cell Death, Silverthorne, Colorado, USA. Contact: Keystone Symposia, 221 Summit Place #272, Drawer 1630, Silverthorne, CO 80498, Phone: 800-253-0685 or 970-262-1230, Fax: 970-262-1525, E-mail: keystone@symposia.com, Website: http://www.symposia.com

April 9-14, 1999. Specificity in Signal Transduction, Silverthorne, Colorado, U.S.A. Contact: Keystone Symposia, 221 Summit Place #272, Drawer 1630, Silverthorne, CO 80498 USA, Phone: 800-253-0685 or 970-262-1230, Fax: 970-262-1525, E-mail: keystone@symposia.com, Website: http://www.symposia.com

July 17-21, 1999. International Symposium for Plant Peroxidases, Columbus, Ohio USA. For registration and Information see: http://www.hcs.ohio-state.edu/pod/pod.htm Or contact: L. Mark Lagrimini, Assoc. Professor, Dept. of Horticulture and Crop Science, 2001 Fyffe Court, Columbus, OH 43210-1096 Phone: 614-292-3851, Fax: 614-292-3505, E-mail: lagrimini.1@osu.edu

July 25-30, 1999, 9th IS-MPMI Congress, Amsterdam, The Netherlands. Contact: Eurocongres, J. van Goyenkade 11, 1075 HP Amsterdam, The Netherlands, Telephone: +31 (0)20 679 34 11, Fax: +31 (0)20673 73 06, E-mail: eurocongres@RAI.NL

August 22-25, 1999. Seventh International Fungal Biology Conference, University of Groningen, Groningen, the Netherlands. Contact: Hans Sietsma, Molecular Plant Biology Laboratory, Biological Centre, P.O. Box 14, 9750 AA Haren, The Netherlands, Phone: +31 50 3632326/-2281, Fax: +31 50 3632273, E-mail: IFBC@biol.rug.nl, Website: http://www.biol.rug.nl/fungalconf

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MOLECULAR PLANT-MICROBE INTERACTIONS
9th INTERNATIONAL CONGRESS
AMSTERDAM, JULY 25-30, 1999

Under the auspices of the International Society of Molecular Plant-Microbe Interactions

INVITATION

The International Society of Molecular Plant-Microbe Interactions invites you to participate in the 9th International Congress of Molecular Plant-Microbe Interactions

VENUE AND DATE

The congress will take place in the RAI International Exhibition and Congress Centre, Amsterdam, the Netherlands, July 25-30, 1999. The Congress Centre is located within the city of Amsterdam and has efficient public transport to the city centre, ample parking facilities, direct motorway access and a direct rail connection to Amsterdam International Airport (Schiphol) and the Amsterdam Central Railway Station.

SOCIAL PROGRAMME

During the congress, participants and accompanying persons will have the opportunity to participate in several social events and sightseeing tours. Both Amsterdam and the Netherlands will surprise you with their beauty, history, culture and social life.

LOCAL ORGANIZING COMMITTEE

Pierre de Wit (Chairman)
Ton Bisseling (Secretary)
Willem Stiekema (Treasurer)

NATIONAL ORGANIZING COMMITTEE

Ton Bisseling
Ben Cornelissen
Pierre de Wit
Rob Goldbach
Jacques Hille
Paul Hooykaas
Ben Lugtenberg
Willem Stiekema
Kees van Loon

IS-MPMI SOCIETY

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MOLECULAR PLANT-MICROBE INTERACTIONS
9th INTERNATIONAL CONGRESS

SCIENTIFIC PROGRAMME

Provisional topics to be covered in oral and poster presentations are indicated below.

SIGNAL PERCEPTION AND TRANSDUCTION: BIOCHEMICAL APPROACH
Microbial and plant ligands; plant receptors; second messengers; kinases; gene regulation; hypersensitive response.

SIGNAL PERCEPTION AND TRANSDUCTION: GENETIC APPROACH
Loci required for R-gene function; components controlling cell death; lesion mimics; genetics of pathogen recognition.

PLANT DISEASE RESISTANCE GENES
Structure-function relationships; resistance gene evolution; monogenic and polygenic resistances.

CELL BIOLOGY
Cell-cell interactions; protein and signal trafficking; vital imaging; microspectroscopy; cytoskeleton.

LOCAL AND SYSTEMIC RESISTANCE
Plant defence responses; oxidative burst; salicylic acid; jasmonic acid; ethylene; other signals.

PATHOGENICITY, VIRULENCE AND AVIRULENCE
Chemotaxis; toxins; pathogenicity, virulence and avirulence.

PROTEIN SECRETION SYSTEMS
Various types of secretion systems in bacteria and fungi.

DEVELOPMENTAL BIOLOGY OF PLANT-MICROBE INTERACTIONS

Biotrophic interactions; tumors; nodules; feeding cells; mycorrhizae.

PROTEIN AND DNA TRANSPORT
Protein-protein interactions; T-DNA; R-DNA; nuclear transport.

PLANT-VIRUS INTERACTIONS
Viral transport; plasmodesmata; viral proteins.

PLANT-BACTERIUM INTERACTIONS
Agrobacterium; Rhizobium; Pseudomonas; Xanthomonas; Erwinia; pathogenicity; avirulence.

PLANT-FUNGUS INTERACTIONS
Fungal morphogenesis; penetration; colonization; pathogenicity; avirulence.

PLANT-NEMATODE INTERACTIONS
Plant and nematode signals; nematode virulence and pathogenicity; plant-response and feeding cell development.

TRITROPHIC SYSTEMS
Signals involved in communication between herbivorous insects, their host plants, and their predators.

PHYLOGENY OF SYMBIOTIC SYSTEMS
Rhizobium; Frankia; Mycorrhizae.

MOLECULAR ECOLOGY AND BIOCONTROL
Growth stimulating bacteria; quorum sensing; disease-suppressive soils; root colonization; macro- and micro-environment; anti-fungal metabolites.

EXPLOITATION OF PLANT-MICROBE INTERACTIONS IN PLANT BIOTECHNOLOGY
Molecular resistance breeding; exploitation of resistance and avirulence genes; biocontrol; natural and synthetic genes; bioremediation.

EMERGING AREAS
Genomics; bioinformatics.

HOTEL ACCOMODATIONS

Amsterdam has ample hotel accommodations available in several categories. There are major hotels within walking distance and a variety of smaller hotels in different classes and styles within easy reach by public transport. Hotel accommodation can be reserved through the RAI Hotel Service. Youth hostel accommodation and camping sites are available in Amsterdam. Further details will be included in the second announcement.

FURTHER INFORMATION

A registration form and detailed information about the scientific and social programmes, and hotel accommodation will be included in the second announcement which will be mailed in November, 1998. To receive a second announcement mailing, contact the Congress Secretariat at:

Congress Secretariat

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IMPORTANT... Update your membership information.

The IS-MPMI January 1999 Newsletter will include the 1999 Membership Directory. The Directory listing will provide your name, address, (see your mailing label), phone, fax and e-mail. **For our records only**, we need your date of birth, and your member number (located on upper left corner of mailing label). If you have made any changes since the directory was last issued in September, 1997, please note them on the form below. Please enter ONLY **changes and/or additions. Your member number** must be included for this to be processed. Please fax **OR** mail **OR** e-mail (copy and paste) this form (but not by more than one of these methods) to Denise Kessler, IS-MPMI Headquarters, 3340 Pilot Knob Road, St. Paul, MN 55121, Fax No. +1.651.454.0766, e-mail: dkessler@scisoc.org, by Nov. 12, 1998. If we do not receive your changes by this date, we will publish the information currently in our files. (Please print or type.)

Ms. o Mr. o Dr. o Date of Birth: _____

Mo. Day Year

Name

Organization

Address

PO Box Dept.

City State Zip (Postal Code)

Country

Phone Number

Fax

(International Members: Please include your country/city codes with your phone and fax numbers)

E-Mail