INTERNATIONAL ORGANIZATION FOR BIOLOGICAL CONTROL
OF NOXIOUS ANIMALS AND PLANTS (IOBC)

IOBC NEWSLETTER 81

WWW.IOBC-GLOBAL.ORG

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"IOBC: History of the first 50 years" has appeared. Order your copy (10 Euro or 15 US$) by emailing Joop.vanLenteren@wur.nl

PDF files of previous newsletters can be found at www.iobc-global.org

1. EDITORIAL: WHAT ARE WE DOING AT THE MOMENT?

During the past year, the Executive Committee of IOBC Global has worked on a number of issues that are discussed later in this newsletter. In general, we can look back with satisfaction on the activities of 2006. The financial situation of Global keeps improving, membership increased, several regional sections embarked on new activities, a book about the history of IOBC was published, and our journal BioControl saw a change of Editor in Chief.

The coming year will be a busy one as well for IOBC. Global takes part in the co-organization of various activities of regional sections and working groups. Further, Global is involved currently in the organization of several symposia for the International Congress of Entomology in Durban in 2008. Programmes have been and speakers have been invited for the following symposia:

- Critical analyses of successes and failures of biological control in Africa
- What are ecology's contributions to biological control and vice versa?
- Environmental benefits and risks of biological control
- Can boundaries between biocontrol and GMO's be overcome?

During 2007 we expect that the following new working group will be formed: **Benefits and risks associated with exotic biological control agents**. Global and WPRS will both coordinate the activities of this working group. The aims of this working group are, among others, (1) to assess the characteristics of exotic natural enemies which are considered to be successful biological control agents, and (2) to assess the characteristics of exotic natural enemies introduced into a country as biological control agents which subsequently become invasive alien species. More news about this working group will soon be available at the websites of IOBC Global and WPRS.

In 2007 the Executive Committee of IOBC Global plans to meet twice and in November 2007 an IOBC Global Council meeting will be held for which representatives of all Regional Sections are invited. The agendas for these meetings will be available on our website.

It is with deep regret that we report the death of our colleague and friend Dr. David Greathead. An obituary of David is presented later in this newsletter.

Joop C. van Lenteren,

President IOBC-Global

2. COUNCIL MEETING 2007

A council meeting of IOBC Global is planned to be held during a congress organized by NRS, NTRS and the Mexican Society for Biological Control from 11-16 November 2007 in Merida, Mexico. We have already many items for the agenda, but we welcome any contributions from members. Global will present an overview IOBC activities and relationships and will inform participants about the financial situation and the journal BioControl.

The council will be asked its opinion about:

- Proposed adaptations in statutes and by-laws of Global and all Regional Sections
- Proposed guidelines IOBC Global, including Regional Sections and Working Groups
- Proposed Honorary members

The council will be asked to officially dissolve the following Working Groups:

- Biological control of Heliothis
- TIE training, informationand education

- Biological Control of Coffee Berry Borer
- Fruit flies of Economic Importance (but may be activity by Boller, Joop will ask)

The council will be asked to officially approve the formation of a new Working Group on Benefits and risks associated with exotic biological control agents.

Ample time will be reserved for a general discussion on future activities of IOBC Global, its regions and working groups.

If you have any items for the agenda, please contact the Secretary General at colazza@unipa.it

3. OBITUARY DAVID GREATHEAD

David Greathead: a Life in Biological Control

It is with deep regret that we report the death of our colleague and friend Dr. David Greathead on 13 October 2006 at the age of 74. David was well known by the IOBC community. He made a number of very important scientific and practical contributions from which IOBC benefited, such as the BIOCAT database, the IIBC reviews of biological control and the FAO code of conduct for the import and release of natural enemies. David was also a constant source of inspiration and information for biological control researchers worldwide, and his encyclopaedic knowledge helped many of us with our research. CABI allowed me to compose the following text which was excerpted from a longer article by Rebecca Murphy and Matthew J.W. Cock in *Biocontrol News and Information* 28(1), 1N–9N (March 2007) and available also at www.pestscience.com/news. J.C. van Lenteren.

David Greathead was a very influential figure in biological control, and his career reflected many of the changes and developments in biological control over this period, which is hardly surprising since he was central to many of them. A naturally thoughtful demeanour coupled with an encyclopaedic knowledge of biological control endowed him with wisdom and foresight. His legacy includes successful and in some cases ground-breaking biological control initiatives, extensive publications in biological control and taxonomy, contributions to an international regulatory framework for biological control, and last but by no means least the many scientists whose early careers he fostered and some of whom are now well known names themselves. His achievements were a direct result of his rare combination of broad perspective and attention to detail. He inspired loyalty and affection in his staff, was excellent company and could spin a great story – his experiences gave him plenty of material to work with.

David graduated from the University of London's Imperial College of Science and Technology (now Imperial College London) with a BSc in Zoology in June 1953, and was later awarded a PhD and a DSc. In 1953 he was recruited by Dr (later Sir) Boris Uvarov to work at the Desert Locust Survey (DLS). During this time he was involved in field work and research in Ethiopia, Somalia, Kenya and what was then the Aden Protectorate (now part of Yemen). David married Annette in 1958. A graduate of the University of St Andrews in Scotland, Annette was recruited by ALRC (Anti-Locust Research Centre) in London and then temporarily seconded as a librarian to the International Red Locust Control Service in what was then Abercorn in Northern Rhodesia (now Mbale, Zambia). After their marriage

she was to become David's professional colleague too, and her talents were an asset to CABI, both in Uganda where she worked with David on projects, and when they returned to the UK where she earned respect for her meticulous editing – notably for the *Bulletin of Entomological Research*.

David joined the Commonwealth Agricultural Bureaux (CAB, now CABI) in 1962 to set up their first African base with the founding of the CIBC East African Station at Kawanda Research Station in Uganda, some eight miles west of Kampala. The purpose of establishing the CIBC station in Africa was to assist African countries and to find natural enemies for export to other countries. This was during the aftermath of the era when synthetic pesticides had led many countries to abandon biological control, while remaining practitioners often tried to show that biological control was cheaper and permanent. The ease of shipment that air travel afforded had tempted many to economize on detailed ecological studies, and instead ship large numbers of species for release to see which would establish; lessons learnt from an earlier era were forgotten, inappropriate species were introduced, the success rate fell, and biological control came to be seen as something unlikely to succeed and to be used only as a last resort. Against this background, David's emphasis on science-based biological control was invaluable.

David developed the East African station from practically nothing to a compact unit. A number of young expatriate and Ugandan scientists worked with and were trained by David, who placed particular emphasis on this particular aspect of the Unit's work. Encouragement of young scientists was to become one of David's hallmarks. One of the first projects he tackled concerned the *Antestiopsis* spp. complex, the main pests of Arabica coffee, which demonstrated how David went straight to the root of a problem and had the scientific skill to solve it; in this case, the identity of the pest was unclear, and David published a series of papers on this.

Subsequent work on the sugarcane scale *(Aulacaspis* spp.) led to the establishment of a coccinellid introduced from Uganda to Mauritius but not control of the pest. However, another coccinellid, *Rhyzobius lophanthae* (syn. *Lindorus lophanthae*) introduced from Mauritius to northern Tanzania was outstandingly successful in the continuous cropping system there and brought the pest under control within 18 months of being released. Other projects were on cereal stemborers and lantana biological control – a weed that continues to frustrate biocontrol scientists to this day.

Together with Professor Fred Legner from the University of California at Riverside (where he is now Emeritus Professor), David spent time searching for natural enemies of the common housefly in Kenya and Uganda in 1966–67 for the US National Institutes of Health. This proved a significant partnership for Mauritius, where *Stomoxys* spp. stableflies were a severe constraint to dairy farming and cattle were kept in straw huts to protect them. First attempts to control flies by releasing New World parasitoids from dung-feeding flies had been unsuccessful in humid inland areas. Subsequently it was discovered the parasitoids controlled dung-breeding *S. calcitrans,* but not *S. nigra* which bred in the plentiful rotting vegetation (notably sugarcane trash) of the humid zone. Later, David's team found *Tachinaephagus stomoxicida* in breeding sites in Uganda. *Tachinaephagus stomoxicida* was released and rapidly established in Mauritius, where it provided substantial control of *S. nigra* for most of the year – a case of careful ecological study reaping benefits.

David and Annette remained in Uganda under increasingly difficult political circumstances under the regime of Idi Amin until 1973. By then permission to leave the country even temporarily was difficult to obtain, but David managed to extract a letter personally signed by the Minister of Internal Affairs allowing him to leave. A new CIBC East African Station was subsequently established at the Kenya Agricultural Research Institute (KARI) at Muguga.

In 1971 David published *A review of biological control in the Ethiopian Region*, the fifth in IIBC's Technical Communications series, designed to review and document the development of biological control in different parts of the World. Thorough planning, meticulous attention to detail, and immaculate execution of every stage of his work, were the hallmarks of David's own research, and of

research projects under his authority. He later wrote an overview of work on biological control in Africa (Greathead, 2003).

From East Africa, David moved back to the UK, where he was based until his retirement. One of the first tasks he took on, was editing a companion to his review of African biological control: *A review of biological control in western and southern Europe*, which was published in 1976. He moved to Silwood Park (Imperial College) in 1981, and IIBC's UK Centre started to grow. David became Director of IIBC in 1989, on the retirement of Fred Bennett, and continued to develop the UK Centre with strong links to Imperial College. His belief that good science was the way forward lay behind the recruitment of Jeff Waage from Imperial College as Chief Research Officer (he became Director after David's retirement). David supported Jeff in the establishment of the Leverhulme Fellowship scheme, a joint CABI–Imperial College initiative that was to produce useful research with applications to biological control. The inclusion of quarantine facilities at the Silwood Park site also meant that staff and students based at a UK university were able to study tropical pests. David took advantage of the stability of a managerial role and association with Imperial College to get involved in supervision of research students in the 1980s.

David's return to Europe did nothing to dim his enthusiasm for helping developing countries conduct safe and effective biological control. It was one of his motives in championing the need for international guidelines. Increasing environmental awareness had had a double-edged impact on biological control: potential environmental as well as economic non-target effects of introduced biocontrol agents were starting to be seen to be significant; meanwhile, the emergence of IPM, in response to overuse of pesticides, was leading to increased adoption of biological control as its cornerstone. Thus countries with little or no previous experience of biological control were starting to make introductions of biological control agents, both for classical biological control and formulated as biological pesticides. Around 1989, David, on behalf of IIBC, together with the International Organization for Biological Control (IOBC), approached FAO to propose an international code of conduct. As a result, a worldwide consultative process over the ensuing years led to the development of the code as an International Standard for Phytosanitary Measures (ISPM) of the International Plant Protection Convention (IPPC: an international treaty for protection of plant resources), under the guidance of Dr Gerard Schulten of FAO and with support from David, culminating in its endorsement by FAO member countries at the end of 1995 and formal publication in 1996 as ISPM No. 3. Until ISPM No. 3 was prepared, there was little guidance available to developing countries and none with the international authority that is embodied in ISPM No. 3. It gave them increased confidence to proceed, based on the assurance that they were following international standards and procedures. (ISPM No. 3 was revised and republished in April 2005.)

The quantity and quality of David's publications were recognized in 1977 when London University awarded him a DSc. He continued to contribute significantly to biological control literature, including, with Jeff Waage, *Opportunities for biological control of agricultural pests in developing countries* published in 1983, and he edited with Jeff the Royal Entomological Society of London's symposium volume *Insect parasitoids* in 1994. A major contribution during this phase, and still used today, was the BIOCAT database. This was initially a card database, kept by David, of all introductions of insect natural enemies (parasitoids and predators) for biological control of insect pests worldwide; his wife Annette took over running it when it was put on computer. David recognized, and he and Annette say in their 1992 review of BIOCAT in *BNI*, "the results of introductions of agents of classical biological control are of great interest, not only to biological control practitioners, but also to ecologists interested in biogeography, and the process of colonization by invading species, to taxonomists who may encounter unfamiliar species and to conservationists concerned with their impact on native biota."

Jeff Waage (former President of IOBC Global) says: "My favourite memory of David was during his time as Director of IIBC, while I was his Deputy, perhaps because he had such an influence on me, when I finally took that role." He realized that, "David was not one of those people who likes management for its own sake. For him, management seemed more of a duty or a service, undertaken in

order to support his team, to help us to develop our programmes and to protect us from the whims of the organization above. He was approachable, sympathetic, and supportive, as such a manager would be. He could be a powerful calming force to a fretful scientist. He did this with the aid of a pipe, the filling, lighting and smoking of which created those frequent, thought pauses that turned the crisis into a process of solution." Jeff also saw characteristics many others have recognized: "The other feature of David's management that left a permanent stamp on the persona of IIBC was his continuing interest in research and the day-to-day business of biocontrol. In so many organizations, you find staff and management tend to differentiate, taking on different interests and priorities. In IIBC, we were all, like David, just curious scientists. He set the example, and that enabled us to all remain one team of colleagues, whatever our secondary management role might be. And he let us all be our own managers – under David, IIBC was a place where you could chase any good idea you wanted, as long as you could find the money. In gentle and supportive ways, David would get involved with many projects."

David was deeply involved in the development of the LUBILOSA programme, which went on to develop Green Muscle® as a biopesticide for acridids. The programme grew out of concerns about the use of chemical pesticides during the locust plagues of the late 1980s which fuelled a demand for an alternative. A short concept paper by Chris Prior and David in the *FAO Plant Protection Bulletin* in 1989 identified deuteromycete fungi as promising candidate pathogens for locust control. From this initial idea, CABI went on to lead, with the International Institute of Tropical Agriculture, a multi-national, multi-institutional team which confirmed that an isolate of the fungus *Metarhizium anisopliae* var. *acridum* (IMI 330189) was the most effective biological control agent available, and developed robust formulation and application technology to allow it to be deployed as an effective biopesticide, Green Muscle®, which has subsequently proved its credentials in many field trials against locusts and grasshoppers in Africa. Commercially produced for the first time in South Africa in 1999, it is registered throughout West and East Africa, and is recommended by FAO for use in environmentally sensitive areas; most recently FAO organized a trial of Green Muscle® against local hopper outbreaks in Mauritania in October 2006. David's early population studies are achieving new significance: understanding multiplication rates and population numbers is becoming important in deploying Green Muscle® to manage population size in pre- and early post-swarming locust populations.

At 60, David came up against CABI's obligatory management retirement age, and against his wishes stepped down as Director of IIBC. However, he was awarded an Honorary Senior Research Fellowship at the Centre for Population Biology, Imperial College London at Silwood Park, and remained professionally very active in biological control and bombyliid taxonomy. He continued to maintain BIOCAT, for example, and kept up a regular flow of information and ideas to *BNI.* He remained a stalwart support to staff, and as ready as ever to discuss ideas and problems and dispense advice based on his unparalleled knowledge.

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LUBILOSA website: www.lubilosa.org/

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Excerpted with permission from a longer article by Rebecca Murphy and Matthew J.W. Cock (CABI) in *Biocontrol News and Information* 28(1), 1N–9N (March 2007), which thanked Cliff Ashall, Roy Bateman, Keith Cressman, Charles Dewhurst, Harry Evans, Neal Evenhuis, David Girling, Keith Harris, Jocelyn Hemming, Richard Hill, Tecwyn Jones, Peter Kenmore, Fred Legner, Joyce Magor, Donald McNutt, Sean Murphy, James Ogwang, Mark Ritchie, Ian Robertson, S. P. Singh, Gordon Tiley and Jeff Waage for help and contributions, and acknowledged a particular debt to Keith Harris for sources, contact details and advice.

4. BOOKS ON BIOLOGICAL CONTROL: HOW MANY ARE THERE?

IOBC Global is preparing an overview of available biological control books in national languages. See the appendix of the IOBC Internet Book of Biological Control for the first listing. Ah, you miss your country's biocontrol book? Send us a short summary and a jpeg file of the first page and the book will be added to the list. The Fourth Edition of the **IOBC INTERNET BOOK OF BIOLOGICAL CONTROL** with a list of biocontrol books is out: see IOBC-Global.org

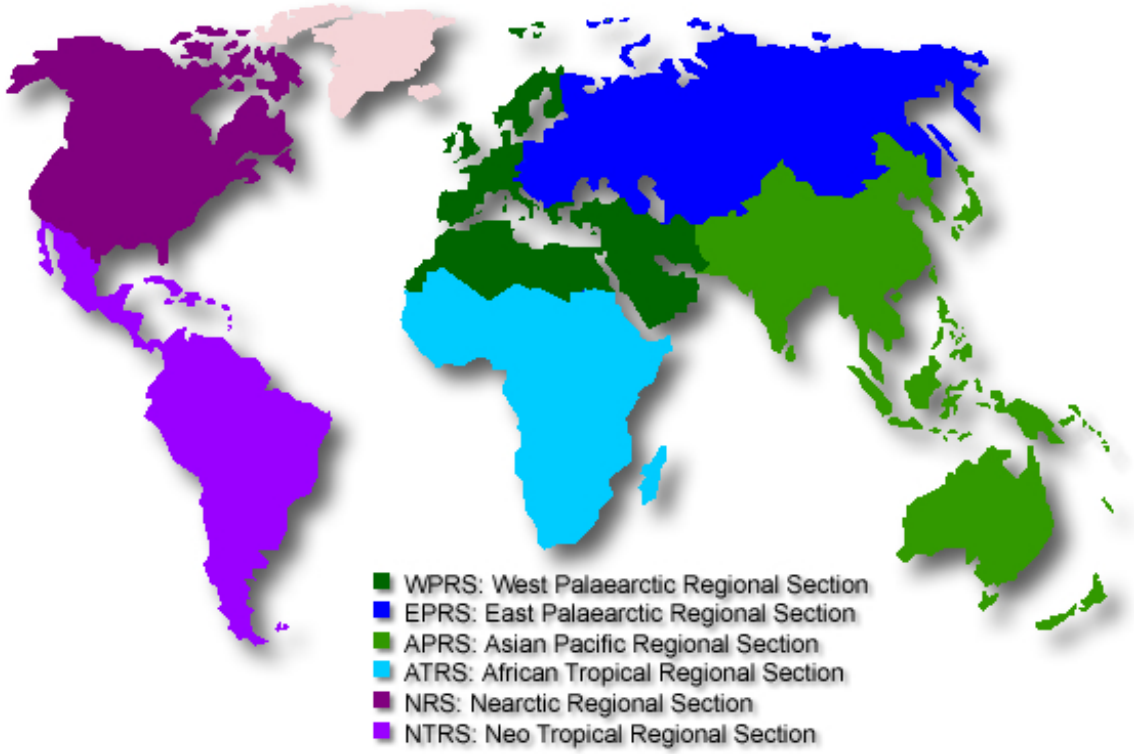
5. A NEW EXECUTIVE COMMITTEE OF THE IOBC GLOBAL FOR 2008 - 2012

The four years period of the Executive Committee will end after the next General Assembly that will be organised within the Framework of the XXIII International Congress of Entomology, Durban, South Africa, in the summer of 2008. New officers are elected by all IOBC members by email postal ballot which will be performed before the General Assembly, likely in the spring of 2008. The Executive Committee consists of the President, the immediate Past-President, the two Vice-Presidents, the Treasurer and the Secretary General. With the exception of the Secretary General, officers are not eligible for a second term in the same office. Any member of the IOBC can be a candidate for the election. If you are interested to be a candidate (either as President, Vice-President, Treasurer or Secretary General), please contact the Secretary General of the IOBC (collazza@unipa.it). The details of the election procedure will be given in one of the following issues of the IOBC Newsletter. For official information on elections, see the statutes at our website.

6. MEMBERSHIP FEES 2006

Membership fees for 2007 are the same as for 2006! Please be so kind to pay the 2006 fees to the your Regional Section. All information about membership and fees can be found on our website.

7. State of affairs of Regional Sections of IOBC



Short information of all the Regional Sections, with a link to their websites, can be found on www.IOBC-Global.org and at the end this newsletter.

In 2005, the relationships with the East Palaerctic Section (EPRS) have been intensified. A new Executive Committee was elected during the General Assembly in Budapest, Hungary June 2005. EPRS organized a conference on "Biological Control in Integrated Production"in Poznań, Poland, May 15-19, 2006.

In 2006, much work has been done to reactivate the NeoTropical Regional Section (NTRS). First, a meeting with representatives of several Latin American countries and previous NTRS board members was held in Buenos Aires, Argentina. As a result, elections of a new Governing Board were organized. During a meeting in Recife, Brazil in August 2006, the new Governing Board presented itself and organized a meeting to discuss the future activities of NTRS. In this same period, NTRS organized a meeting in Colombia. The result of these activities is that NTRS membership increased from 3 to 75 during the past year!

In the other regions, the situation is similar to what was written in previous newsletters.

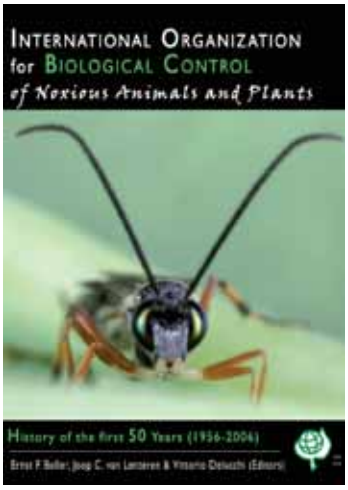
8. State of affairs Working Groups IOBC-Global

Short information of all the Global Working Groups, with a link to their websites, can be found on www.IOBC-Global.org. at the end of this newsletter.

Most of the 8 IOBC Global working groups are active and have planned meetings in the near future. We have received several proposals for new working groups. Proposals include: (1) Environmental benefits and costs of releasing exotic natural enemies, (2) Designing agroecosystems that nurture biological control, (3) Unisex (pure female lines) and biological control. Persons interested in starting up a Global Working Group are invited to contact the Secretary General (colazza@unipa.it).

Because of our earlier poor financial situation, we had to reduce the support for working groups in 2004 and 2005. However, we are now be able to support working groups again if they fulfil the IOBC criteria (see website). Most working groups attract many participants to their meetings, but a rather low percentage of the participants is member of IOBC. We would appreciate working groups to motivate participants to apply for IOBC membership!

9. IOBC- 50TH ANNIVERSARY



Publication of book about history of IOBC

In this book, edited by Ernst Boller, Joop van Lenteren and Vittorio Delucchi, the history of IOBC Global and its Regional Sections is summarized, as well as of all the working groups and commissions of the organization on about 275 pages. The book will appear by the end of this year and can be ordered at Joop.vanLenteren@wur.nl.

Many colleagues have made most valuable contributions to this book either by adding interesting details to the histories of the Regional Sections and IOBC Global, or by writing short historic reviews of individual IOBC Commissions and Working Groups. In reading all these texts, you will discover an interesting characteristic of IOBC: its linguistic diversity. The vast majority of persons actively involved in IOBC activities do not communicate in English as their mother tongue, but in 30 or more different languages. Inevitably, the effort to communicate during international meetings and through written contributions in IOBC publications has created an unorthodox but lively "IOBC English" which captures the flavour of the authors' own culture and geographic regions. Transmitting the content has always been more important than striving for linguistic perfection. Therefore, following a long IOBC tradition, we as editors of this book have refrained from linguistic polishing of the individual contributions, but have intervened discretely where errors could have led to serious confusion.

Fifty Years of IOBC in West Europe and the Mediterranean: Dijon, France, 17-21 September 2005.

IOBC OILB WPRS / SROP

The region where IOBC was founded, West Europe, has held an anniversary meeting in conjunction with the General Assembly of WPRS in Dijon, France from 17-21 September 2005.

Fifty Years of IOBC in the Nearctic Regional Section
In May 2005 (Bromont, Canada) NRS has held a 50 years anniversary symposium.

Fifty Years of IOBC in the East Palearctic Regional Section
EPRS commemorated the 50th anniversary of IOBC during its General Assembly in June 2005.

Fifty Years IOBC in Latin America: May and August 2006.
During two IOBC meetings that were organized in Latin America (in Colombia (May 2006) and in Brazil (2006)), the fact that IOBC was 50 years old was commemorated.

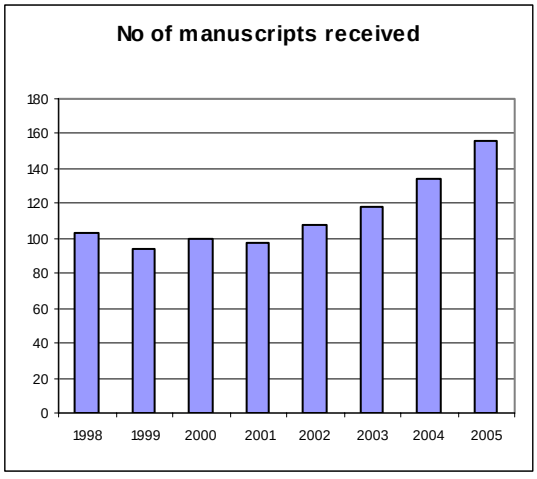
Fifty Years IOBC in Africa and Worldwide: Summer 2008.
In collaboration with the Organization Committee of the 22nd International Congress of Entomology, IOBC-Global will organize several symposia. For symposia titles, see the editorial of this newsletter.

10. IOBC GLOBAL JOURNAL BIOCONTROL

Ten years of work for *BioControl* by Heikki Hokkanen

The text below was prepared by Heikki Hokkanen and formed his last editorial as Editor-in-Chief of BioControl. The Executive Committee and members of IOBC Global wish to thank Heikki for the immense job done in materialising our new journal after a difficult period with its predecessor Entomophaga. IOBC hopes that the new Editor in Chief, Dr. Eric Wajnberg, will be as successful as Heikki and we wish him good luck!

In autumn 1996 I was made aware of the plans for a complete overhaul of the IOBC scientific journal, and of the creation of "*BioControl*". The request by the IOBC President to me to become the first Editor-in-Chief of this 'newborn' journal was flattering, and as I am usually not shy of exciting new challenges, an agreement was quickly found. Having served longer than initially foreseen, it is high time after ten years to pass the helm to the competent hands of Eric Wajnberg, and to wish him success in steering the journal to yet greater heights. This is an appropriate time to review how the journal actually has fulfilled its aim in serving the biocontrol and the overall scientific community, as the 'flagship' journal of the IOBC.



Manuscript flow

During its first ten years *BioControl* attracted well over 1000 manuscripts; on 26 November 2006 the number was 1027. After a stable period of some five years at about 100 manuscripts per year, a steady increase has taken place to the current over 150 received manuscripts per year (Fig. 1).

Figure 1. Number of manuscripts submitted to *BioControl* 1998-2005.

In my view *BioControl* has covered the global research community probably better than any other journal in our area: we have received manuscripts with the corresponding author residing in at least 50 different countries, including 8 countries from Africa, 5 from South- and Central America, 9 from Asia, and 4 from the Middle or Near East. *BioControl* has evolved and maintained a remarkable balance between the different sub-disciplines (Table 1). With the scientific heritage of *Entomophaga*, it is hardly surprising that in the first 1-2 years parasitoid papers were dominating, and that papers reporting on the biological control of plant pathogens were rather rare. By 2005, these two groups were almost even, with the majority of the growth in manuscript numbers being due to plant-pathology papers.

Table 1. Proportion of submitted papers by sub-disciplines

	1999	2002	2005
Parasitoids	37.1	22.3	21.2
Predators	16.8	12.7	15.2
IPM	12.8	16.3	13.2
Weeds	10.1	14.4	11.1
Insect pathogens	10.4	13.9	15.7
Plant pathology	8.0	15.4	20.7
Nematodes	5.1	3.8	3.0

Quite interestingly, the published papers through these nine years (1998-2006) follow these proportions very well: *BioControl* published 101 parasitoid papers (24.8% of all published papers), 72 predator papers (17.7%), 56 papers on IPM (13.8%) as well as on weed biocontrol (13.8%), 50 papers on insect pathogens (12.3%), 49 on plant pathogens (12.0%), and 23 papers on entomopathogenic nematodes (5.7%).

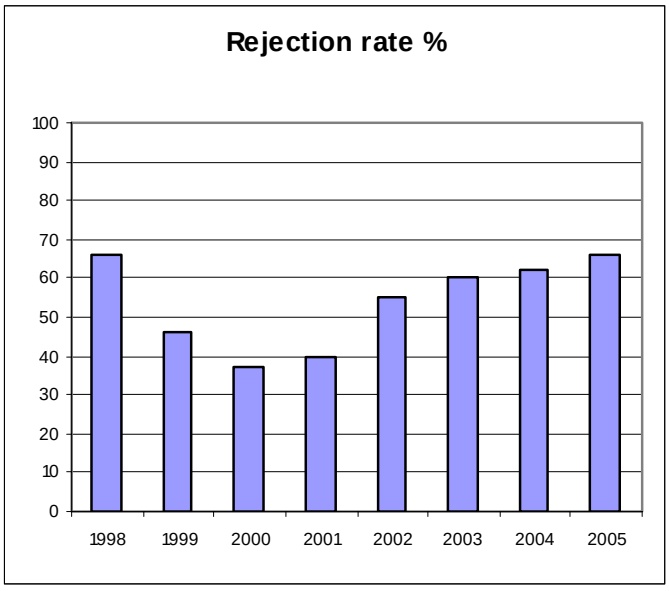


Figure 2. Rejection rates of manuscripts submitted to *BioControl* 1998-2005.

Editorial work and journal production

An efficient team of Associate Editors and a superb Editorial Office of the publisher have made the job of the EiC relatively easy. In addition, hundreds of biocontrol experts – *BioControl* readers and contributors – have collaborated in the vital process of peer-reviewing the submitted manuscripts. In the end the editors have filtered a total of 407 papers for publication in the journal from 1998 till 2006. Many good manuscripts had to be rejected simply due to the lack of space: the journal has a fixed annual page budget, which has increased over the years from 492 pp to the current 850 pp. With increasing number of submitted manuscripts, this automatically had to lead to a gradual increase in our rejection rates (Fig. 2). Currently we only can publish about one out of every three submitted manuscripts (close to 70% rejection rate).

Making an impact

The quality of a scientific journal is currently most often measured by its Impact Factor, published annually for the majority of well-established and esteemed journals. For the editorial team it is gratifying to see that *BioControl* has made impressive increases in this respect (Fig. 3), and ranks currently among the top-third of all entomological journals in this rating. Considering that more than half of all scientific articles published in the world's around 15000 journals are never cited, the citation data for articles published in *BioControl* look very good (Table 2). Please note that the more recent the Volume is, the less time there has been to cite those articles – the data cannot be compared between different years as such.

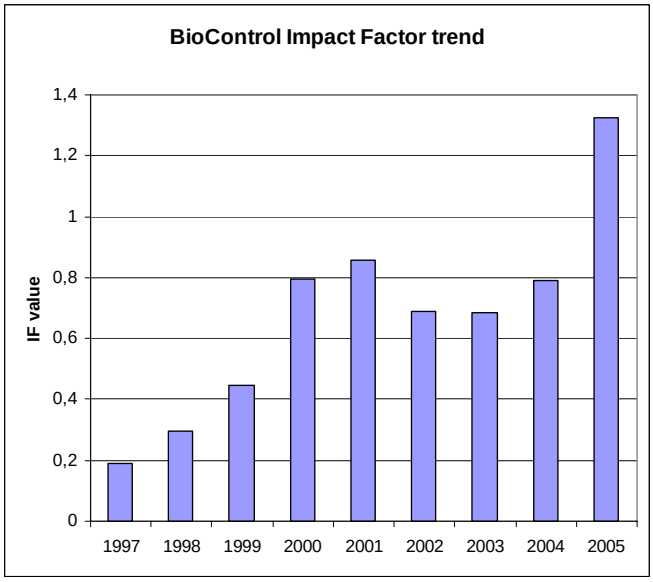


Figure 3. Impact Factors of *BioControl* 1998-2005 [1997 = *Entomophaga*]. Source: Web of Science/Science Citation Index.

Considering that more than half of all scientific articles published in the world's around 15000 journals are never cited, the citation data for articles published in *BioControl* look very good (Table 2). Please note that the more recent the Volume is, the less time there has been to cite those articles – the data cannot be compared between different years as such.

Table 2. Cumulative average number of citations to articles published in *BioControl* 1998-2004, and number of articles in each Volume that have not yet been cited at all. Calculated from Web of Science/Science Citation Index, accessed on 26 November 2006.

Volume	No of articles	Total citations per article	No of articles that have NOT been cited yet
43 (1998)	35	8.0	0
44 (1999)	28	7.8	2
45 (2000)	36	4.4	3
46 (2001)	33	5.6	5
47 (2002)	54	2.9	9
48 (2003)	52	4.2	10
49 (2004)	51	1.7	11

An Editor-in-Chief cannot resist compiling a list of the most often cited papers published in 'his' journal. For *BioControl*, the 'citation classics' or the 'top-ten most cited articles' in our journal (by 26 November 2006) have been:

Reference	Year	Citations
van Lenteren et al.	2003	37
Stouthamer et al.	1999	35
Dutton et al.	2003	33
Charudattan	2001	27
Witzgall et al.	1999	26
Sterk et al.	1999	26
Michaud	1999	26
Ehlers et al.	1998	24
Walzer and Schausberger	1999a	21
Walzer and Schausperger	1999b	19

Such a list suffers from the fact that older articles have a time-advantage over more recent papers. On a 'citations per year' –basis we can see some very prominent articles that likely will penetrate the 'top-

ten' –list quickly. For example, the paper by Obrist et al. was published in 2006, but has been cited three times already! Other high-risers in the future may include Morrison and Porter (2005; five citations already), Grabenweger (2003; ten citations), and Brown (2003; ten citations).

And the beat goes on

It has been a great and gratifying experience for me to be involved in the production of *BioControl*. I wish to thank all the supporting scientists and editorial staff for this time: it has been a true, wonderful team effort. Certainly the same spirit will continue, and carry the journal still much further, now with fresh ideas and steam.

Heikki M.T. Hokkanen, Editor-in-Chief 1997-2006; e-mail: heikki.hokkanen@helsinki.fi

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11. IOBC INTERNET BOOK ON BIOLOGICAL CONTROL

The FOURTH EDITION of the IOBC INTERNET BOOK OF BIOCONTROL IS OUT: see IOBC-Global.org

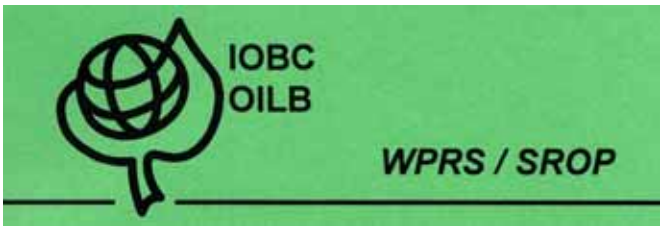
IOBC Internet Book of Biological Control

Aim: to present the history, the current state of affairs and the future of biological control in order to show that this control method is sound, safe and sustainable

The fourth edition of the book (October 2006) of more than 100 pages with information about biocontrol is available for free on our website.

We ask you to support the preparation of this book. The first priority is to receive summaries of the actual application of biological control in each country or region. The second priority is to document the history of biological control in each country, including some key references, so that it will be easier for all biocontrol workers worldwide to know what has been done and what is going on at this moment. This will help us to make clear **how important biological control is**. We have received several very good contributions during the past months, which will be included in the fourth edition, THANK YOU.

12. AVAILABILITY OF PROCEEDINGS/BULLETINS IOBC-WPRS WORKING GROUPS



The working groups of WPRS are producing each year about 10 bulletins containing the proceedings of their meetings. Bulletins that have appeared since 1993 are listed on the WPRS website, and copies of these bulletins can be ordered with a form available on this website (via www.IOBC-Global.org to WPRS, go to publications etc.). Summaries of the contents of WPRS bulletins can also be found on the WPRS website and in Profile, the newsletter of WPRS.

13. IOBC-GLOBAL WRITING PARTNERSHIP

Since the start of the IOBC writing partnership programme, IOBC assisted in preparing more than 50 manuscripts from members in Latin America, Central Europe and Asia for several refereed biological control and entomological journals.

There were quite a number of applications for this service from non-IOBC members, but we had to inform the applicants that we can only do this very time consuming work for our members.

You can apply for a writing partnership if you are from a non-English speaking developing country and member of IOBC. See our website, IOBC-Global.org, for more details and an application form.

14. Next meeting of executive committee and Council of IOBC-Global

Next meeting of the Executive Committee of IOBC Global will be held on 26 April 2007 in Rome, Italy.

The agenda of the Executive Committee meeting will be published soon on our website www.IOBC-Global.org, ***and we appreciate input from members!***

Message for all Regional Sections: in 2007 a Council Meeting of IOBC Global will be organized. Please be so kind to mail to Stefano Colazza (Colazza@unipa.it) who will represent your region. Also mail us topics to be discussed at this meeting. We already have many topics for this meetings and will send you a provisional agenda shortly after our Executive Committee meeting in November 2006.

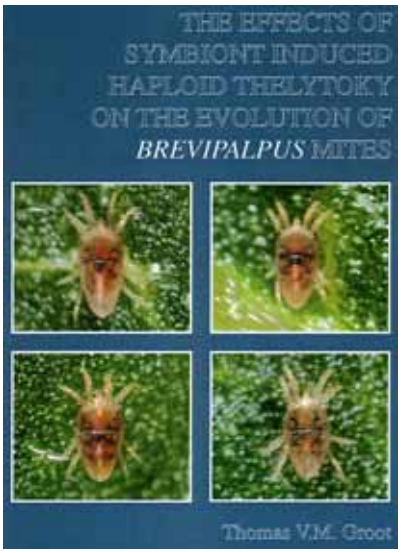
16. 3rd INT. SYMP. ON BIOLOGICAL CONTROL OF ARTHROPODS

The Second International Symposium on the Biological Control of Arthropods (ISBCA II) was held in Davos Switzerland on 12–16 September 2005.

ISBCA III will be held in Christchurch, New Zealand in February–March 2009. The key organizer of ISBCA III is Steve Wratten (Wrattens@lincoln.ac.nz) at Lincoln University.

17. SUMMARIES OF PHD THESES

The effect of symbiont induced haploid thelytoky on the evolution of Brevipalpus mites. T.V.M. Groot. PhD Thesis, University of Amsterdam, 2006, 154 pp.



With about 300 described species, the genus *Brevipalpus* is the largest genus of the family Tenuipalpidae. However, due to the small size of the mites, the taxonomic relations between the species are poorly understood. The genus contains both sexual and asexual species. This thesis is concerned about the asexual species. Although many asexual species have been described, the three main species are *B. phoenicis*, *B. obovatus*, and *B. californicus*. The morphological characters that discriminate these species are limited and intraspecific variation has frequently been reported. Each of the species is found worldwide in (sub) tropical areas and occurs on hundreds of different host plant species, which shows their remarkably broad niche. Most of these host plant species are shared between two or al three mite species. These species are considered a pest on various crop and ornamental plant species, either because of the direct damage they inflict by feeding, or because of their capacity to vector plant viruses. Generally mites are controlled by applying chemical acaricides. However, mites seem to develop resistance against acaricides rapidly, which is unexpected given their clonal mode of reproduction.

In *B. phoenicis* the asexuality has been shown the effect of a vertically endocellular symbiont of the genus *Cardinium*. The mode of reproduction in sexual species of Tenuipalpidae is arrhenotoky. *Cardinium* infected *B. phoenicis* females produce infected but unfertilized eggs. Because they are unfertilized and therefore haploid, the eggs would normally develop in males. However, the symbiont

feminizes the offspring resulting in haploid females. The same symbiont has been shown causing asexuality in *B. californicus* too. However, whether it has the same effect in all lineages of these species and also in *B. obovatus* is yet unknown.

To understand the evolutionary fate of the asexual *Brevipalpus,* it is necessary to know how clonal genetic variation might arise. Therefore, a large part of this thesis is devoted to this matter. Theoretically there are four ways in which clonal variation might arise. Firstly, new clonal varieties may arise when mutations alter the existing genotypes. Secondly, new clonal varieties may arise if the symbiont is transferred horizontally to a sexual individual that then becomes the start of a new asexual lineage. Thirdly, new clonal varieties may arise when asexual females mate with the males that make up about 1% of the asexual populations. Fourthly, new clonal varieties may arise when asexual females mate with males from related sexual species.

For chapter 1 I have studied the mode of asexual reproduction across a range of different genotypes covering the three common asexual species. First isofemale lines were produced to be used in the various experiments. It was shown that under standard laboratory rearing conditions, all *B. phoenicis* and *B. californicus* isofemale lines produce males in percentages ranging from 0.15 to 6.72 percent. In contrast, males were absent from all *B. obovatus* lines. When treated with antibiotics, all *B. phoenicis*, all *B. californicus* and half the *B. obovatus* lines produced increased numbers of males indicating that their *Cardinium* symbiont is responsible for their asexuality. Other *B. obovatus* isofemale lines did not produce males after antibiotic treatment, nor were these lines infected with *Cardinium*. It was concluded that in those isofemale lines asexuality probably was a genetic property of the mite itself. Finally, a comparison of taxonomies based on morphological and genetic characters revealed an incongruity. The isofemale lines not infected with *Cardinium* were identified as *B. obovatus* based on mitochondrial haplotype, but as *B. phoenicis* based on morphology.

In chapters 2 and 3 I have described experiments that test between the General Purpose Genotype (GPG) and Frozen Niche Variation (FNV) models to explain the broad ecological niche of these mites. In chapter 2 an ecological approach was taken. Mites from three natural populations on different host plant species were transplanted to each of the other host plants. When transplanted to a different host plant species, mites often had low reproductive values and/or died. This showed that mites are specialized to the host plant species they feed on, and thus was evidence for FNV. However, the level of host plant specialization varied among the three populations. In chapter 3 a phylogenetic approach was taken. Mites were genotyped at the mitochondrial *COI* gene and haplotype diversity was related to host plant species. This analysis revealed evidence for both models. Evidence for FNV was observed in one clade of mites collected exclusively from acerola host plants. Evidence for GPG was found in several *B. phoenicis* haplotypes that occurred on four, or more, different host plant species. The conclusion was that *Brevipalpus* contains evidence for both models. In addition, this chapter showed that on most host plants several genotypes of mites occurred simultaneously. On six out of the 22 sampled plants, different genotypes were found that belonged to different genetic clades. This showed that on a single host plant several mite species may occur simultaneously.

In chapter 4 I have described an experiment to test the mode of transmission of the *Cardinium* symbionts. From a large number of field-collected mites representing all three species, both one gene of the mite and one gene of the symbiont were sequenced. Based on these, the two phylogenies were constructed separately and compared. The symbiont phylogeny contained three clades, each associated with one of the mite species, showing that there is general congruence between host and symbiont phylogeny. This congruence was expected because the symbionts are generally transmitted vertically. However, the symbiont that was mainly associated with *B. phoenicis* also occurred in some *B. obovatus* and *B. californicus* samples. These incongruities between mite and symbiont phylogenies are indicative of horizontal transmission of *Cardinium* among *Brevipalpus* species. There was some minor incongruity between host and symbiont within *B. phoenicis* too, indicating that horizontal transmission might take place at this level as well.

For the final two chapters I have investigated the possibility that the asexual *Brevipalpus* species occasionally reproduce sexually. In chapter 5 I have described an experiment that tested whether *B. phoenicis* females fertilize their eggs after having mated with males from the same species. Males and females of two closely related isofemale lines were crossed reciprocally, and the presence of the paternal genotype in the offspring was tested using two microsatellite markers. The effect of the

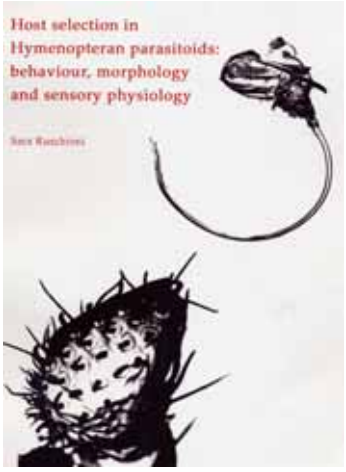
symbiont on the fertilization rate was tested by making four separate crosses. In all four combinations naturally occurring males and males that result from antibiotic treated females were mated with untreated and antibiotic treated females. The results of all four crosses were that all tested offspring contained the maternal genotype only, which showed that these *B. phoenicis* females do not fertilize their eggs, regardless of their infection status. It is argued that this failure may be caused by a 'functional virginity mutation'; a mutation that prevents the fertilization of eggs. Such a mutation will spread through an asexual population because individuals expressing the mutation will save the cost of genome dilution that is associated with sexual reproduction.

Finally, in chapter 6 I have described an experiment that tested if there is evidence for long-term absence of sexual reproduction in the various *Brevipalpus* species. The phylogeny of the mites based on a mitochondrial marker (*COI* sequences) was compared with the phylogenies based on two nuclear markers (AFLP and ITS1 sequences). If reproduction has been strictly clonal since the divergence of a clade, both mitochondrial and nuclear markers were expected to reveal similar phylogenies. On the other hand, incongruities were interpreted as evidence for sexual reproduction. At a higher taxonomic level mitochondrial and nuclear phylogenies were incongruous showing that sexual reproduction has occurred after this group of species started to diverge. Analysis at this level also showed that four distinct groups of mites could be identified; these were *B. phoenicis*, *B. californicus*, and the *Cardinium* infected and uninfected *B. obovatus* as separate groups. At a lower taxonomic level the evidence for strict clonality was variable. Within *B. phoenics* and the infected *B. obovatus* there was no evidence for strict clonality. These species have either become asexually only recently, or still occasionally reproduce sexually. There was evidence for strict clonality in *B. californicus* and the uninfected *B. obovatus*. These two species probably have reproduced strictly asexual for a considerable period of time. In addition, chapter 6 shows that there is a high amount of intragenomic variation in ITS1 sequences. This is most likely the result of a decrease in the efficiency of gene conversion caused by the fact that these mites are haploid.

The results I presented in my this thesis indicate that the *Cardinium* symbiont is parasitic to its *Brevipalpus* hosts. When a sexual mite is first infected and becomes asexual, the symbiont relieves the mite from paying the cost of sex, and thus increasing the fitness of the host. When fertilization is no longer required for reproduction, traits involved in sexual reproduction are not maintained by natural selection and will accumulate deleterious mutations. Because of these mutations, the possibility to reproduce sexually will eventually be lost. From this moment on, the mite will experience the long term disadvantages of asexuality, in the end driving it extinct. Hence, although the *Cardinium* infection renders a short term benefit, eventually it drives the mite extinct and therefore I considered the symbiont a parasite. Before its host goes extinct, the symbiont needs to find a new host through horizontal transmission. This thesis has revealed that *Cardinium* indeed is capable of horizontal transmission.

The full text of this thesis can be downloaded from: http://dare.uva.nl/document/33053

Host selection in Hymenopteran parasitoids: behaviour, morphology and sensory physiology. S. Ruschioni, PhD Thesis, University of Marche at Ancona, November 2006, 120pp.



The general aim of this thesis was to analyse aspects of host-selection behaviour of two very different types of hymenopteran parasitoids: *Trichogramma* spp. and *Leptopilina heterotoma*. Behavioural studies were performed, which were supported by in-depth morphological investigations of the sensory structures linked with host selection, in particular the gustative sensilla on the *Trichogramma* antennae and on the *L. heterotoma* ovipositor.

Endoparasitoids of the genus *Trichogramma* (*Hymenoptera: Trichogrammatidae*) are the most important natural enemies used in biocontrol worldwide. They are solitary or gregarious endoparasitoids of insect eggs, usually associated with the eggs of moths. Observations and description of the host selection behaviour and the sensory structures linked with it were carried out in *T. cacoeciae, T. dendrolimi*, *T. sibericum*, *T. turkestanica* and *T.*

chilonis. Initially, *Trichogramma* parasitoids search for the host by moving their antennae alternately and rhythmically in the air, touching the surface only sporadically and lightly. Once the antennae have touched the host, the parasitoid climbs on it and starts walking more or less longitudinally, moving the antennae frequently and touching the egg. An inverse correlation was noted between the area of the clava that is in contact with the host surface and the velocity with which the antennae are moved up and down during drumming. After antennation of the egg surface, the host may be rejected. Two different types of rejection were observed: one occured on eggs that were never visited by parasitoids before, the other occurred on eggs that had been previously visited and parasitized. If the host is accepted, oviposition follows.

In *Trichogramma* spp. female antennae are geniculate at the scape-pedicell joint and they carry ventrally a clava with many different sensilla on it. A peculiar arrangement of sensilla, which is involved during antennation and touching of the substrate, appears on the distal and ventral parts of the clava. These sensory organs are laterally flattened recurved sensilla trichoidea, that originate from a round basal depression of the cuticle. The lateral sides of the peg bear some grooves which run through the body of the peg to the tip. The grooves meet on the outer margin of the peg that comes into contact with the substrate, forming a crest that carries several pores.

The other hymenopteran parasitoid studied in detail in this thesis is the larval-pulal endoparasitoid *Leptopilina heterotoma* (*Hymenoptera: Eucoilidae*), that attacks *Drosophila* larvae (*Diptera: Drosophilidae*). When a *Leptopilina* female has found a substrate where host larvae are likely to be present she walks over it, pricking the ovipositor rhythmically into the fermenting substrate. During the first few seconds after insertion of the ovipositor in the host, the parasitoid decides whether it will accept or reject the host for oviposition. The ovipositor is made of one pair of ventral valves and one dorsal valve, interconnected through a tongue-and-groove mechanism. The unpaired valve, which ending is rounded, is very long and thin, and does not present any cuticular apophysis in its apical part. The paired valve, long and thin as well, ends with a tooth-like apophysis, useful for the penetration of the host cuticle. Two types of sensilla are present on the ovipositor, mechano- and gustatory sensilla. A large number of sensilla is present all along the ovipositor; these are innervated with only one neuron and are supposed to be mechanoreceptors. Seven gustative sensilla are present at the distal end of the ovipositor, three on each of the paired valves and one on the unpaired valve. The sensilla on the paired valves have an oval shape consisting of a cuticular ring with a tubular structure. The sensillum on the unpaired valve is round to oval in shape and exhibits a dome-like central structure of. Each of these 7 sensilla is innervated with six dendrites. The asymmetrical position of the sensillum at the very tip of the unpaired valve is rather remarkable.

During this PhD project a suitable set-up for electrophysiological observations had been developed. Multi-neural responses from the single sensillum on the unpaired ovipositor valve were recorded. In all cases electrophysiological activity of at least 2 units was recorded, although in some cases just one neuron seemed to respond, the second neuron showing a low spike frequency. The result of finding the chemosensilla and the development of the electrophysiological set up is that, for the first time in history, the recording of action potentials was possible from a structurally defined coeloconic sensillum located on the tip of the unpaired valve of the ovipositor of *L. heterotoma* in response to host haemolymph.

Information about this thesis can be obtained at: sara.ruschioni@hotmail.it

For information about the following PhD theses, see Global Newsletters from 75 onwards (pdf files on website):

A novel bacterial disease of the predatory mite *Phytoseiulus persimilis*: disease syndrome, disease transmission and pathogen isolation. PhD thesis Conny Schütte (The Netherlands), Wageningen Universiteit, February 2006. *A pdf version of this thesis can be obtained at: conny.schuette@tiscali.nl*

Assessing the risks and benefits of flowering field edges: strategic use of nectar sources to boost biological control. PhD thesis Karin Winkler (Germany), Wageningen University, Laboratory of Entomology, The Netherlands; December 2005. *A pdf version of this thesis can be obtained at: Karin.Winkler@wur.nl; or Joop.vanLenteren@wur.nl*

Associative learning in two closely related parasitoid wasps: a neuro-ecological approach. PhD thesis Maartje A.K. Bleeker (The Netherlands), Wageningen University, Laboratory of Entomology, The Netherlands; December 2005. *A pdf version of this thesis can be obtained from maartje.bleeker@wur.nl*

Bioecology of *Aphidius colemani* Viereck, 1912 (Hymenoptera: Braconidae, Aphidiinae). PhD Thesis of Marcus Vinicius Sampaio (Brazil), Federal University Lavras, Minas Gerais, Brazil. *Information about this thesis can be obtained from VHPBueno@ufla.br*

Biological control of plant bugs, Lygus spp., PhD thesis T. Haye, Department of Zoology, Christian-Albrechts University, Kiel, Germany, 2004. *The full version of this thesis can be obtained at: http://e-diss.uni-kiel.de/diss_1133*

Chemical ecology and integrated management of the banana weevil Cosmopolites sordidus in Uganda. PhD Thesis of W. Tinzaara (Uganda), Laboratory of Entomology, Wageningen University, February 2005. *A pdf copy of this thesis can be obtained from arnold.vanhuis@wur.nl*

Development in different temperature and rearing optimization of the predator *Orius insidious* (Say, 1832) (Hemiptera: Anthocoridae). PhD Thesis of Simone Martins Mendes (Brazil), Federal University Lavras, Minas Gerais, Brazil. *Information about this thesis can be obtained from VHPBueno@ufla.br*

Extremely selfish B chromosome initiates only male offspring by eliminating a complete genome: Mode of action, origin and structure of the Paternal Sex Ratio chromosome in the parasitoid wasp Trichogramma kaykai. PhD thesis of J.J.F.A. van Vugt (The Netherlands), Laboratory of Entomology, Wageningen University, The Netherlands. *A pdf copy of this thesis can be obtained from joke.vandervugt@wur.nl*

Evaluation of *Lysiphlebus testaceipes* (Cresson, 1880) (Hym.: Aphidiidae) as an agent of biological control of aphids in protected cultivations. PhD Thesis of Sandra Maria Morais Rodrigues (Brazil), Federal University Lavras, Minas Gerais, Brazil. *Information about this thesis can be obtained from VHPBueno@ufla.br*

Evaluation of Orius species for biological control of Frankliniella occidentalis (Pergande) (Thysanoptera: Thripidae). PhD thesis M.G. Tommasini (Italy), Wageningen University, Laboratory of Entomology, The Netherlands; September 2003. *A pdf version of this thesis can be obtained from tommasini@crpv.it.*

Interaction chrysanthemum-aphid-parasitoids/predator seeking the biological control under protected cultivations. PhD Thesis of Maria da Conceição de Menezes Soglia (Brazil), Federal University Lavras, Minas Gerais, Brazil. *Information about this thesis can be obtained from VHPBueno@ufla.br*

Parasitic wasps on buttefly expedition: foraging strategies of egg and larval parasitoids exploiting infochemicals of Brussels sprouts and their *Pieris* hosts. PhD thesis of Nina A. Fatouros (Germany), Freien Universität Berling, Juni 2006, 181 pp. *Thesis information available at Nina.Fatouros@wur.nl*

Parasitoids as Biological Control Agents of Thrips Pests. PhD thesis A.J.M. Loomans (The Netherlands), Wageningen University, Laboratory of Entomology, The Netherlands; September 2003. *A pdf version of this thesis can be obtained from a.j.m.loomans@minlnv.nl*

Record and association of *Orius* and thrips species, influence of the photoperiod on the reproduction and evaluation of *Orius insidiosus* (Say, 1832) (Hemiptera: Anthocoridae) on biological control of thrips (Thysanoptera) in greenhouses. PhD Thesis of Luis Cláudio Paterno Silveira (Brazil), Federal University Lavras, Minas Gerais, Brazil. *Information about this thesis can be obtained from VHPBueno@ufla.br*

Semiochemical relationships in the tritrophic system Leguminous plants, *Nezara viridula* (L.) and *Trissolcus basalis (*Woll.*).* PhD thesis Alessandro Fucarino, Palermo University, Italy; February 2004. *A pdf version of this thesis can be obtained from elfucaro@hotmail.com*

Semiochemicals used by scale insects and their parasitoids: behavioral and chemical ecology investigations. PhD thesis Paolo Lo Bue, Palermo University, Italy; February 2004. *A pdf version of this thesis can be obtained from paololobue@hotmail.com*

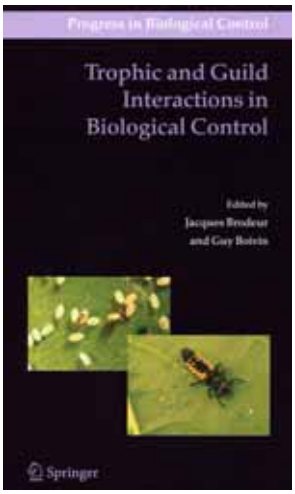
Tailoring complexity: Multitrophic interactions in simple and diversified habitats. PhD thesis T. Bukovinszky (Hungary), Wageningen University, Laboratory of Entomology, The Netherlands; June 2004. *A pdf-version of this thesis can be obtained at: Tibor.Bukovinszky@wur.nl*

The entomopathogenic fungus Metarhizium anisopliae for mosquito control, PhD thesis E-J. Scholte, Laboratory of Entomology, Wageningen University, The Netherlands, November 2004. *A pdf version of this thesis can be obtained from ErnstJan.Scholte@wur.nl*

Whitefly control potential of Eretmocerus parasitoids with different reproductive modes. PhD Thesis of Mohammad Javad Ardeh (Iran), Laboratory of Entomology, Wageningen University, February 2005. *A pdf copy of this thesis can be obtained from mjardeh@gmail.com*

18. RECENT PUBLICATIONS AND BOOKS ON BIOLOGICAL CONTROL AND IPM

If you miss important recent books on biological control or IPM, send us (colazza@unipa.it) a jpeg picture of the front page, a short summary and information on how and where the book can be ordered. Also, please send us pdf files or reprints of important new biocontrol publications and they will be mentioned in the next issue of our newsletter.



Trophic and Guild Interactions in Biological Control. J. Brodeur & G. Boivin (eds.). Progress in Biological Control , Volume 3. Springer, Dordrecht, 2006 (ISBN 10 1 4020-4766-5).

Natural enemies of herbivores exist in nature as an assemblage of species that interact with one another and may transcend trophic levels. The community embracing a natural enemy can be complex and includes taxonomically dissimilar species of pathogens, parasitoids, and predators. These interactions involve predation and competition processes and share the typical characteristics of resource-consumer relationships where the resource species is killed and consumed by the other. Although they are mostly viewed as primary carnivores (developing on herbivores), natural enemies can also be secondary carnivores (when they attack other natural enemies), hosts, prey, or even herbivores, as several species may also feed on and acquire energy from plant resources.

This book explores a broad range of ecological and evolutionary issues in animal species interactions, mostly in the context of biological control. From the beginning of this project we were seeking original viewpoints on a growing field. All authors have used ecological theory to better interpret emerging patterns of interactions in biological control. The core of the book is a series of chapters that examine how species interactions, such as competition, predation, parasitism, disease, mutualism, and omnivory affect population dynamics of natural enemies. Chapters include critical discussions of the current status of research in the field, comparative and meta-analyses, case studies, new data, models, and approaches to measure trophic and guild interactions. Drawing on a diversity of plant, herbivore and natural enemy examples from different ecosystems, each contribution illustrates how trophic and guild interactions, whether they be direct or indirect, simple or complex, strongly affect the efficiency of natural enemies and, over time, determine the outcome of biological control.

Jacques Brodeur and Guy Boivin

For information on the publications below: see IOBC Global Newsletters from 75 onward (pdf files on iobc website).

Biology, History, Threat, Surveillance and Control of the Cactus Moth, *Cactoblastis cactorum.* H. Zimmermann, S. Bloem, H. Klein. IAEA/FAO-BSC/CM, Printed by the IAEA, Vienna, Austria. ISBN 92-0-108304-1

Biological Control in Brazil (in Portuguese). Information about this book can be obtained from the senior editor, Prof. dr. J.R.P. Parra (jrpparra@esalq.usp.br).

Biological Control in IPM Systems in Africa. P. Neuenschwander, C. Borgemeister and J. Langewald (eds.), CABI, Wallingford, UK, Hardback, 448 pp., ISBN 0 85199 639 6

Biological Control in Protected Culture. Editors: Kevin M. Heinz, Roy G. Van Driesche and Michael P. Parrella. Ball Publishing, Batavia, Illinois, Hardbound, ISBN 1-883052-39-4, 552 pp

Biological Control of Invasive Plants in the United States. E. M. Coombs, J. K. Clark, G. L. Piper & A. F. Cofrancesco (Eds). Oregon State Univerity: 476 pp. ISBN 0-87071-029-X. Ordering info at: http://oregonstate.edu/dept/press/a-b/BioControl.html

Biology, History, Threat, Surveillance and Control of the Cactus Moth, *Cactoblastis cactorum.* H. Zimmermann, S. Bloem, H. Klein. IAEA/FAO-BSC/CM, Printed by the IAEA, Vienna, Austria. ISBN 92-0-108304-1

Biological Pest Control in Chile: History and Future. S. Rojas, 2005. Libros INIA 12, Ministry of Agriculture, Instituto de Investigaciones Agropecuarias, 125 pp. ISBN 956-7016-19-4l ; ISSN 0717-4713. (In Spanish).

Bioinsumos: Una Contribucion a la Agricultura Sustentable. Lecuona, R.E. (ed.), 2004. Ediciones Instituto Nacional de Technologia Agropecuaria, 58 pp. (In Spanish)

Catalog of Phytofagous Insects of Argentina and their associated plants. H.A. Cordo, G. Logarzo, K. Braun, O.R. Di Iorio (eds.), South American Biological Control Laboratory, USDA-ARS, Sociedad Entomologica Argentina.

Control Biologico: Espescies entomofagas en cultivos agricolas. Molinari, A.M., 2005. Ediciones Instituto Nacional de Technologia Agropecuaria, 80 pp. (In Spanish)

Cabbage, Eggplant and Tomato Integrated Pest Management, FAO Inter-country Programme for IPM in Vegetables in South and Southeast Asia. Anonymous, 2000. FAO Regional Office for Asia and the Pacific. Phra Athit Road, Bangkok 10200. Thailand, 205 pp.

Crop protection in biological agriculture in Italy. M. Benuzzi and V. Vacante, in Italian. Information about this book can be obtained from M. Benuzzi (benuzzi@intrachem.it).

Discovery of the Parasitoid Lifestyle. Special feature in Journal of Biological Control Vol 32, No. 1, January 2005.

Durable Crop Protection: policy for crop protection towards 2010. Anonymous, 2005. Ministry of Agriculture, Nature and Food Quality, The Netherlands. (Report can be downloaded from www.minlnv.nl).

Ecological Infrastructures: Ideabook on Functional Biodiversity at the Farm Level. Boller, E., Häni, F. & Poehling, H.-M., 2004. ISBN 3-906776-07-7. 230 pp.

Environmental Impact of Invertebrates for Biological Control of Arthropods: Methods and Risk Assessment; Edited by F. Bigler, D. Babendreier and U. Kuhlmann. CABI, Wallingford, Oxon, UK, 2006.

From farmer field school to community IPM. Ten years of IPM training in Asia. Pontius, J., R. Ditls, A. Bartlett, 2002.FAO Regional Office for Asia and the Pacific. Phra Athit Road, Bangkok 10200. Thailand, 106 pp.

Fundamentos y Perspectivas de Control Biologico. Badii, M.H., A.E. Flores & L.J. Glan Wong (eds.) 2000. Universidad Autonom de Nuevo Leon, Mexico, 462 pages ISBN: 970-694-033-2.

Genetics, Evolution and Biological Control. L.E. Ehler, R. Sforza and T. Mateille (eds.), 2000. CABI, UK, Wallingford, UK, Hardback, 288 pp., ISBN 0 85199 735 X.

Improving biocontrol of Plutella xylostella. Editors A.A. Kirk & D. Bordat. Proceedings of the international symposium. Montpellier, France, 21-24 October 2004.

Insects and their Natural Enemies Associated with Vegetables and Soybean in Southeast Asia. Shepard, B.M., G.R. Carner, A.T. Barrion, P.A.C. Ooi, H. van der Berg, 1999.Quality Printing Company, Orangeburg, South Carolina, USA (ISBN 0-9669073-0-2), 108 pp.

Insect Plant Biology by Louis M. Schoonhoven, Joop J.A. van Loon & Marcel Dicke. Oxford University Press, Oxford, UK, 421 pp. http://www.oup.co.uk/isbn/0-19-852594-X

Integrated Pest and Disease Management in Greenhouse Crops. Editors: Ramon Albajes, M. Lodovica Gullino, Joop C. van Lenteren and Yigal Elad. Kluwer Academic Publishers, Dordrecht, Hardbound, ISBN 0-7923-5631-4, 568 pp.

The IPM Practitioner. Annual Directory of Least-Toxic Pest Control Products. For information, contact BIRC, POBox 7414, Berkeley, California, 94707, USA.

Natural crop protection in the tropics. Letting information come to life. Stoll, G., Margraf Verlag. 2nd edition, 2005, 380 pp.; 15 ills. ISBN 3 8236 1317 0.

Natural Enemies: An Introduction to Biological Control. Ann Hajek. Cambridge University Press, Cambridge, UK, Hardback and Paperback, 378 pp., ISBN 0 521 65295 2

Parasitic Wasps: Evolution, systematics, biodiversity and biological control. G. Melika and C. Thuroczy, eds. Agroinform, Kiado & Nyomda kft, Budapest, 2002: 480 pp.

Quality Control and Mass Production of Natural Enemies. V.H.P. Bueno (ed.), in Portuguese. Information about this book can be obtained from V. H.P. Bueno (vhpbueno@ufla.br).

Quality Control and Production of Biological Control Agents: Theory and Testing Procedures. J C van Lenteren (ed.), CABI, Wallingford, UK, Hardback, 327 pp., ISBN 0 85199 688 4

The Manual of Biocontrol Agents. Third Edition. Editor: L.G. Copping. BCPC, Alton, Hampshire, 2004: 702 pp. ISBN 1 901396355. Info: www.bcpc.org.

19. REGIONAL SECTIONS OF IOBC

Information provided below about regional sections of IOBC is limited, most information is regularly updated on our website www.IOBC-Global.org.

ASIA AND THE PACIFIC REGIONAL SECTION (APRS)

President: Prof. Masami Takagi, Institute of Biological Control, Faculty of Agriculture, Kyushu University, Fukuoka 812-8581 Japan, TEL 81-92-642-3035 FAX 81-92-642-3040, E-mail mtakagi@grt.kyushu-u.ac.jp

Vice Presidents: Prof. Shu-Sheng Liu(Zhejiang University, China), Institute of Insect Sciences, Zhejiang University, 268 Kai Xuan Road, Hangzhou 310029, People's Republic of China, Tel. (86-571) 86971505, Fax (86-571) 86049815, E-Mail: shshliu@zju.edu.cn

Dr Barbara Barratt, Programme leader for Biosecurity at AgResearch in New Zealand. Email: barbara.barratt@agresearch.co.nz.

Secretary General: Dr. Takatoshi Ueno, Institute of Biological Control, Kyushu University, Fukuoka 812-8581, JAPAN, Tel. +81-92-642-3036 (office), Fax.+81-92-642-3040, E-mail: ueno@grt.kyushu-u.ac.jp

Treasurer: Dr. Leigh Pilkington, Gosford Horticultural Institute, Locked Bag 26, Gosford NSW 2250, AUSTRALIA, Telephone: +61 2 4348 1953 , Fax: +61 2 4348 1910 , Mobile: +61 409 77 00 61 , Email: leigh.pilkington@dpi.nsw.gov.au

Past President: Prof.dr. Eizi Yano,

AFROTROPICAL REGIONAL SECTION (ATRS)

President: Dr. James A. Ogwang, Biological Control Unit, Namulonge Agricultural Research Institute, Kampala, Uganda. Email: jamesogwang@hotmail.com

Past President: Dr. H.G. Zimmermann, Agricultural Research Council, Plant Protection Research Centre, Weeds Research Division, Pretoria, South Africa. Email: riethgz@plant2.agric.za

Vice-President: Dr. Charles O. Omwega, International Centre of Insect Physiology and Ecology, Nairobi, Kenya. Email: comwega@icipe.org

General Secretary: Dr. M.P. Hill, ARC PPRI, Private Bag X 134, Pretoria 001, South Africa. Email: riethgz@plant2.agric.za

Treasurer: Dr. J. Ambrose Agona, Post Harvest Program, Kawanda Agricultural Research Institute, Kampala, Uganda. Email: karihave@starcom.co.ug

IOBC Global and IOBC ATRS are organizing a symposium at the next Congress of Entomology in Durban about biocontrol in Africa.

EAST PALEARCTIC REGIONAL SECTION (EPRS)

President: Dr. Istvan Eke. Budapest, Hungary. Email: Ekei@posta.fvm.hu; istvan.eke@freemail.hu
Vice Presidents: Dr. Danuta Sosnowska. Institute of Plant Protection, Department of Biocontrol and Quarantine, 60-138 Poznan, Miczurina Str. 20, Poland.
Email: D.Sosnowska@ior.poznan.pl
Dr. Vladimir Nadykta (Institute of Biocontrol, Krasnodar, Russia)
General Secretariat: Dr. Yury Gninenko and Dr. E. Sadomov, Russia

Report of the EPRS/IOBC meeting „Biological methods in Integrated Plant Protection and Production", 15-19 May 2006, 2006, Poznan, Poland: see newsletter 80

NEARCTIC REGIONAL SECTION (NRS)

President: Robert N. Wiedenmann, Center for Economic Entomology, Illinois Natural History Survey, 607 East Peabody, Champaign IL 61820, USA. Email: rwieden@uark.edu
Vice-President: Nick Mills, University of California, Berkeley, CA 94720, USA. Email: nmills@nature.berkeley.edu
Secretary-treasurer : Stefan T. Jaronski, USDA ARS NPARL, 1500 N. Central Ave., Sidney, MT 59270 USA. Email: sjaronski@sidney.ars.usda.gov
Corresponding Secretary: Susan Mahr, Dept. of Entomology, University of Wisconsin, Madison WI 53706, USA. Email: smahr@entomology.wisc.edu
Past-President: Molly S. Hunter, Department of Entomology, University of Arizona, Tucson AZ, USA. Email: mhunter@ag.arizona.edu
Members-At-Large: Jacques Brodeur, Dept de Phytologie, Universite Laval, Sainte-Foy, Quebec, Canada. Email: jacques.brodeur@plg.ulaval.ca; George Heimpel, Department of Entomology, St. Paul, MN 55108, USA. Email: heimp001@tc.umn.edu; Sujaya Rao Department of Entomology, Oregon State University, Corvallis, USA. Email: sujaya@science.oregonstate.edu

NEOTROPICAL REGIONAL SECTION (NTRS)

President: Prof.dr. Vanda .H.P. Bueno, Department of Entomology/UFLA, P.O.Box 3037, 37200-000 Lavras, MG, Brazil. Email: vhpbueno@ufla.br
Secretary General: Dr. William Cabrera, South American Biological Control Laboratory, Agricultural Counselor American Research Service Laboratory, USDA--ARS, U.S. Embassy–Buenos Aires. Unit 4325, APO AA 34034–0001.
Email: gcabrera@speedy.com.ar
Treasurer: Dr. Luis Devotto, Avda. Vicente Méndez 515, and Instituto de Investigaciones Agropecuarias (INIA), Chillán, Chile. Email: ldevotto@inia.cl
Vice President 1: Dr. Maria Manzano, Universidad Nacional de Colombia, sede Palmira, Colombia. Email: mrmanzano@palmira.unal.edu.co
Vice President 2: Dr. Mary M. Whu Paredes, Enrique León García N° 527. Urb. Chama-Surco. Unidad de Producción de Insectos Benéficos del Programa Nacional de Control Biológico del Servicio Nacional de Sanidad Agraria -SENASA Lima-Perú. E-mail: mwhu@senasa.gob.pe
Vice President 3: Dr. Leopoldo Hidalgo, Centro Nacional de Sanidad Agropecuaria (CENSA), Carretera a Tapaste y 8 vías, Apartado 10, CP 32700, San José de las Lajas, La Habana, Cuba.
Email: lhidalgo@censa.edu.cu
President Elect: Prof.dr. F. Consoli, Department of Entomology, Fitopatologia e Zoologia Agrícola, ESALQ. Universidade de São Paulo, Av. Pádua Dias 11, Piracicaba, SP 13418-900, Brazil. Email: fconsoli@esalq.usp.br
Past President: Dr. Raquel Alatorre, Mexico. Email: alatoros@colpos.mx

WEST PALEARCTIC REGIONAL SECTION (WPRS)

President: Dr. F. Bigler, Switzerland, email: franz.bigler@fal.admin.ch
Vice Presidents: Prof.dr. Sylvia Blümel (Austria), Dr. Heidrun Vogt (Germany), Prof. Dr. L Tirry, University of Gent, Laboratory of Agrozoology, Department of Crop Protection, Gent, Belgium. Email: luc.tirry@ugent.be
Secretary General: Dr. Philippe Nicot(INRA, Avignon)
Treasurer: Prof. Dr. R. Albajes, Universita de Lleida, Centre Udl-IRTA, Lleida, Spain. Email: ramon.albajes@irta.es

This Section of IOBC has always been one of the most active and has an excellent website with all information on working groups, meetings and bulletins: www.iobc-wprs.org. This website also has PDF files of the WPRS newsletter **PROFILE**, providing all recent information about IOBC WPRS.

20. WORKING GROUPS OF IOBC GLOBAL

Information provided below about working groups is limited, most information is regularly updated on our website and the websites of the working groups.

WG ARTHROPOD MASS-REARING AND QUALITY CONTROL

Convenors: Dr. S. Grenier, UMR INRA/INSA de Lyon, Biologie Fonctionnelle, Insectes et Interactions (BF2I), INSA, Bâtiment Louis Pasteur, 20 av. A. Einstein, 69621 Villeurbanne Cedex, France. Tel: +33 (0)4 72 43 79 88. Fax: +33 (0)4 72 43 85 34. Email: sgrenier@jouy.inra.fr. **Dr. N.C. Leppla**, University of Florida, Institute of Food and Agricultural Sciences, Department of Entomology and Nematology, Gainesville, Florida, USA. Email: ncl@gnv.ifas.ufl.edu. **Dr. P. De Clercq**, Laboratory of Agrozoology, Department of Crop Protection, Faculty of Bioscience Engeneering, Gent University, Belgium. Email: Patrick.DeClercq@ugent.be

See website for future activities: http://users.ugent.be/~padclerc/AMRQC/contacts.htm.
Next meeting of the WG is planned for OCTOBER 2007 in Canada

WG BIOLOGICAL CONTROL OF APHIDS / APHIDOPHAGA

Convenors: Dr. N. G. Kavallieratos (Greece) G. Laboratory of Agricultural Entomology, Department of Entomology and Agricultural Zoology, Benaki Phytopathological Institute, 8 Stefanou Delta, 14561, Kifissia, Attica, Greece; Email: nick_kaval@hotmail.com, **Eric Lucas** (Canada), **J.P. Michaud** (USA

Next meeting will be in Athens, Greece from 5-10 September 2007: see http://www.aphidophaga10.gr/

WG BIOLOGICAL CONTROL OF CHROMOLAENA ODORATA (SIAM WEED)

New Converor: Dr. Costas Zachariades, ARC-PPRI, Private Bag X6006, Hilton, 3245 South Africa; Tel 033-3559418, cell 0833152100, fax 033-3559423; ZachariadesC@arc.agric.za

The previous convenor, Dr. R. Muniappan, receives IOBC's great respect and compliments for all his activities in IOBC, both in the APRS Regional Section and for this Working Group! Without persons like him, IOBC would not be able to function.

The Seventh International Workshop on Biological Control and Management of *Chromolaena* and *Mikania* was held in Taiwan last September 2006 and proceeded very well as expected. Dr. Po-Yung Lai of National Pingtung University of Science and Technology hosted the workshop.

See website for future activities/newsletter: http://www.ehs.cdu.edu.au/chromolaena/siamhome.html
NB bijeenkomst gehouden, nieuwe convenor

WG Biological Control of Plutella

Convenors: **Dr. A.M. Shelton**, Department of Entomology, Cornell University, New York State Agricultural Experimenta Station, 416 Barton Lab Geneva, NY 14456, USA. Tel: +1-315-787-2352. Fax: +1-315-787-2326. Email: ams5@cornell.edu. **Dr. A. Sivapragasam**, Strategic, Environment and Natural Resources Centre, MARDI, Kuala Lumpur, Malaysia. Email: sivasam@mardi.my. **Dr. D.J. Wright**, Department of Biology, Imperial College at Silwood Park, Ascot, Berkshire, UK. Email: d.wright@ic.ac.uk

See website for future activities: http://www.nysaes.cornell.edu/ent/dbm/

WG Biological Control of Water Hyacinth

Chairman: **Dr Martin Hill**, Department of Zoology and Entomology, Rhodes University, P.O. Box 94, Grahamstown, 6140, South Africa. m.p.hill@ru.ac.za

WG Egg Parasitoids

Convenors: **Prof.dr. F. Bin**, Department of Arboriculture and Plant Protection, University of Perugia, Borgo XX Giugno, 06121 Perugia, Italy. Tel: +39-075-585-6030. Fax: +39-075-585-6039. Email: fbin@unipg.it. **Dr. E. Wajnberg**, Ecologie Comportementale, I.N.R.A., Sophia Antipolis, France. Email : wajnberg@antibes.inra.fr. **Dr Guy Boivin**, Research Station, Agriculture Canada, St-Jean-sur-Richelieu, Québec, Canada. Email: boiving@agr.gc.ca

The next meeting of this working group is planned during the International Congress of Entomology in Durban, South Africa (2008)

WG Fruit Flies of Economic Importance

Chairman: Dr. B.A. McPheron, Dept. Entomology, 501 ASI Bldg., Pennsylvania State University, Univ. Park, PA 16802, USA. Tel: +1-814-865-3088. Fax: +1-814-856-3048.Email: bam10@psu.edu

WG IWGO – *Ostrinia* and Other Maize Pests (by H. Berger)

Convenors: Ulrich Kuhlmann; CABI-BioScience; Head Agricultural Pest Research CABI Bioscience Switzerland Centre, Delémont; Switzerland, Email: u.kuhlmann@cabi.org. **C. Richard Edwards**; Purdue University; Dep. of Entomology; Indiana; USA; Email: richedwards@entm.purdue.edu. **Harald K. Berger**; AGES, Spargelfeldstraße 191; 1226 Wien; Austria; Tel.: # 43 /664/56-42-885. Fax: # 43/1/732-16-2106. Email: harald.berger@ages.at.

All relevant data, reports and future meetings are published on the IWGO website:
http://www. iwgo.org

Global WG on Transgenic Organisms in IPM and Biocontrol

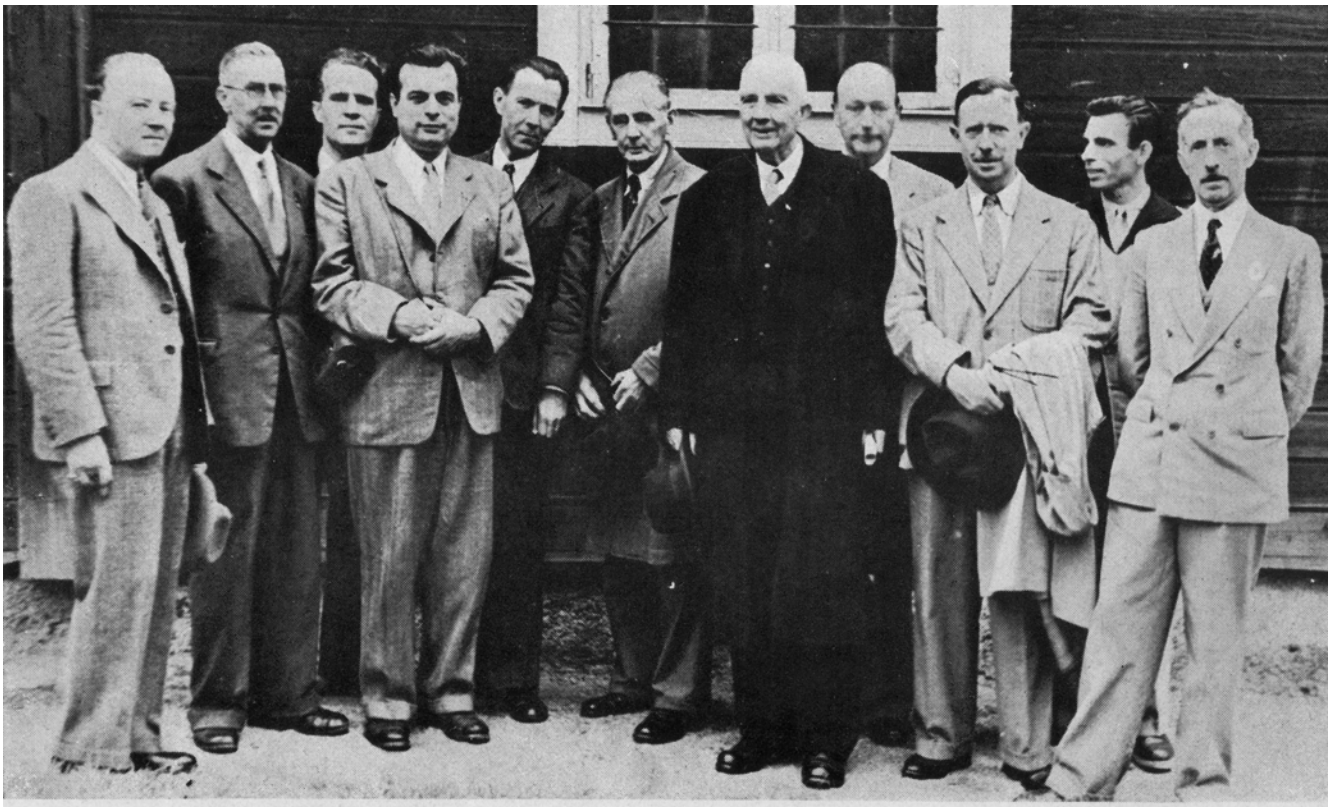
Convenors: **Dr. Angelika Hilbeck**, Swiss Fed. Inst. of Technology, Geobotanical Institute, Zurichbergstr. 38, CH-8044,Zurich. Tel: +41 (0) 1 632 4322. Fax:+ 41 (0) 1 632 1215. Email: angelika.hilbeck@env.ethz.ch. **Dr. Salvatore Arpaia,** Italy. Email: arpaia@trisaia.enea.it. **Dr. Nick Birch**, UK. Email: n.birch@scri.sari.ac.uk. **Dr Gabor Lovei**, Denmark. Email: gabor.lovei@agrsci.dk;

The WG organised the Workshop "Environmental Risk Assessment of GM plants: discussion for consensus" in Rotondella, Italy, from 6-9 June 2006, in cooperation with ENEA (Italian National Agency for New Technologies, Energy and Environment). A short report of this meeting, including a picture of the participants can be found in newsletter 80.

21. MEETINGS ON BIOLOGICAL CONTROL AND IPM

Please consult www.IOBC-Global under "meetings" for future meetings on biological control and you will be linked to the IOBC-WPRS website (www.iobc-wprs.org) where a list with meetings is kept up to date. The IOBC-WPRS newsletter PROFILE can also be found at this website and contains a lot of information about working group activities and meetings. If you would like to see your biological control or IPM meeting listed on this site, please send us an email with relevant information.

One of the best websites with information about IPM (books, papers and meeting agenda) is IPMnet News at: http://www.ipmnet.org/IPMNews/main_page.html



Membres du colloque *(de gauche à droite)* : MM. GHESQUIÈRE, FERRIÈRE, CARAYON, BALACHOWSKY, ANDRÉ, MILLER, SILVESTRI, PARKER, NICHOLSON, LE GALL, VAYSSIÈRE (photo Carayon).

Participants at very first meeting where the creation of IOBC was discussed, Stockholm, Sweden, 1948

Newsletter contributions: We would like to thank all members who provided items for this edition of the IOBC Newsletter. If you have not previously sent anything, please consider doing so. Remember that this is your opportunity to let others know what is going on in biological control. Take a few minutes and email items concerning biological control to Stefano Colazza (colazza@unipa.it), so they can be included in the next issue.

Any comments on this newsletter are welcome. Do not hesitate to contact us if there is any further information on biological control that you would like to see here.

Editors: Joop C. van Lenteren and Stefano Colazza, IOBC Global, 31 March2007