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

IOBC NEWSLETTER 75

ORGANISATION INTERNATIONALE DE LUTTE BIOLOGIQUE
CONTRE LES ANIMAUX ET LES PLANTES NUISIBLES (OILB)
2004

Web address: www.iobc.agropolis.fr

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as the Section of Biological Control of the International Union of Biological Sciences (IUBS)

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CONTENTS OF IOBC GLOBAL NEWSLETTER ISSUE 75

1. IOBC GLOBAL GENERAL ASSEMBLY, AUGUST 2004, BRISBANE, AUSTRALIA

The General Assembly (GA) of IOBC GLOBAL was held on Monday, 16 August, in the evening, during the XXII International Congress of Entomology, 15-21 August 2004, Brisbane, Queensland, Australia.

First, the Executive Committee (EC) 2000-2004 reported about its work. The situation concerning membership (increasing), regional sections (several very active, some dormant), working groups (many important activities), IOBC Global Symposia (two well attended symposia were organized in Montpellier), the newsletter and website, and the journal BioControl was summarized during the meeting by Ms. Mireille Montes de Oca, based on a written report prepared by Ms. Montes de Oca and A. Gassmann. Several officers of Regional Sections and convenors of Global working groups told the meeting about their activities (see below). The president, L. Ehler, provided information about the financial situation, answered questions concerning IOBC Global and introduced the members of the new EC for the period 2004-2008 (see below).

Next, J.C. van Lenteren, the new president, thanked the old EC for their work, and in particular Ms. Mireille Montes de Oca (see Mireille at item 12) for her excellent coordinating activities for IOBC Global and its regional sections. Then, he presented the plans of the new EC for the coming 4 years (see below).

The official part of the General Assembly was followed by a Cocktail. After the Cocktail, the new EC met with the officers of the Regional Sections to discuss the plans of the new EC.

2. Plans Of The New Executive Committee 2004-2008

The new EC informed the meeting about their plans for the coming 4 years. Some of these plans will be outlined in this newsletter, details of other plans follow in the next issues of the newsletter. Our plans are to:

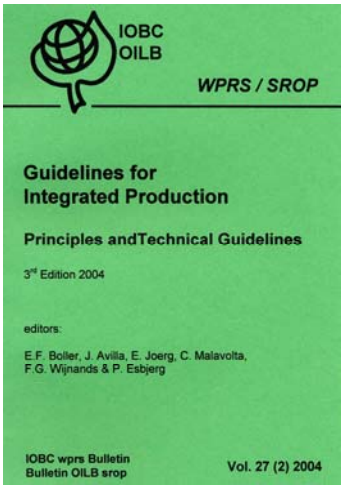
1. Celebrate 50th Anniversary of IOBC at several occasions worldwide.
2. Communicate wherever possible about important findings of biological and integrated control in the framework of sustainable production of sufficient and healthy food in a biodiverse world. Play an active role on national and international levels to safety of biological control (quality control, safety of exotic natural enemies) and illustrate the benefits of integration of biocontrol with other control methods.
3. Work on revival of activities of several regional sections. Develop incentives to make membership more attractive for all types of members. Active search for new IOBC members by IOBC Global and Regional Sections.
4. Try to obtain free/strongly reduced subscription of electronic versions of Biocontrol journals for members/institutes in developing countries via the Agora network (= Access to Global Online Research in Agriculture).
5. Improve information provided at website and in newsletter (only via website) by regular updates.
6. Publish, step by step, an internet book on biological control successes for each IOBC region on the IOBC website, resulting in the production of a book on 50 years of successes in biological control and new strategies for implementation of biological control (***see below***).
7. Organize IOBC International Symposia.
8. Consolidate the good international position and quality of our journal BioControl.
9. Support work of IOBC Global Working Groups, consider start-up of working groups in relevant new areas of biological control.
10. Start IOBC partnerships for writing articles (***see below***)

3. Executive Committee meeting End October 2004: send your ideas!

The new EC will meet during the last weekend of October 2004 in Perugia, Italy. We would very much appreciate any input from IOBC members for this and following meetings. Please react to our plans and help us to realize them. Particularly relevant would be suggestions (1) for new IOBC Global working groups, (2) the publication of an internet book on biological control (important reviews, unpublished reports, your willingness to summarize information for a certain country/area), and (3) IOBC partnership for writing articles (your willingness to help writing 1 paper on biocontrol with a colleague from a developing country where English is not the first language).

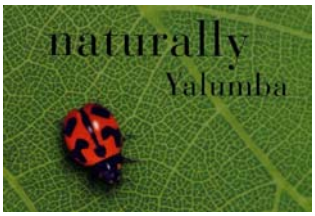
Send your reactions to the Secretary General: **Colazza@unipa**.it

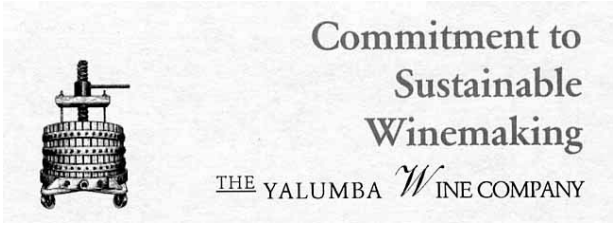
4. IOBC certification of Integrated Production



Dr. Ernst Boller and colleagues (IOBC Commission IP Guidelines and Endorsement) recently produced the 3rd edition of the Basic Document on Integrated Production. It has been revised and increases the compatibility of the IOBC endorsement system with the inspection procedures of other international standards like EUREP-GAP. The new document does not result in many changes at the farm level if member farms operate already with a good IP standard, but the inspection system has undergone major changes. The full Integrated Production document can be downloaded from www.iobc.ch. Hard copies can be ordered via www.iobc-wprs.org; look under publications.

5. Integrated Viticultural Management at The Yalumba Wine Company (Australia) - the IOBC approach

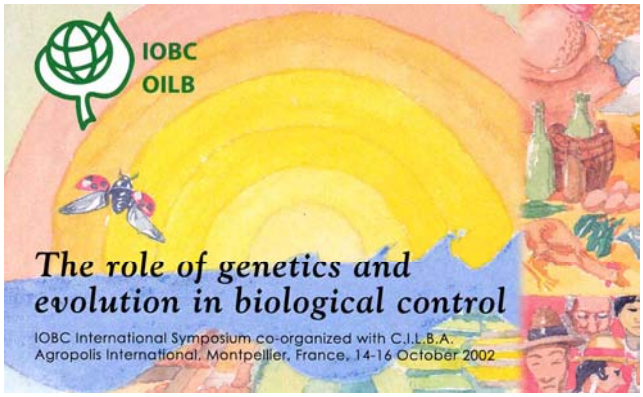


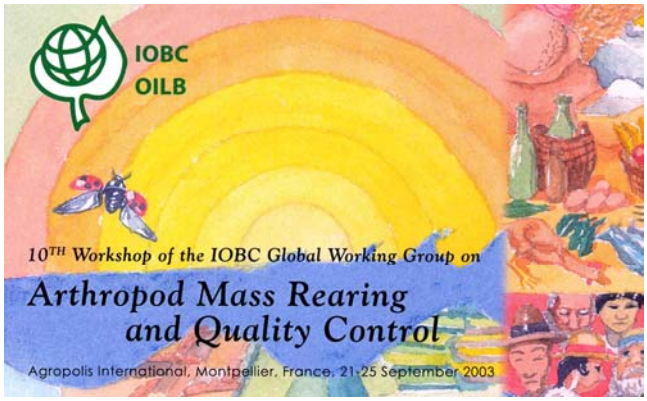


The Yalumba Wine Company, a family owned business with wineries in several locations in Australia, aims to produce wine by means of an environment-friendly sustainable process as this is increasingly being recognised as an intrinsic aspect of quality. Yalumba is operating in the rural environment for 150 years. It is now focusing on integration of environmental objectives into relevant business decisions and addresses environmental responsibilities as part of normal operating procedures. At Yalumba wineries, Dr. Cecil Camilleri is the Senior Technical Manager for Environmental matters. He developed Yalumba's Vitis Programme (Best Practice Environmental Management in Viticulture), which is based on the principles of integrated production described by in the IOBC IP documents (see item 4 of this newsletter). Dr. Robert Luck (left on picture, Biocontrol and IPM expert, University of California at Riverside, USA) and

Dr. Joop van Lenteren (right on picture, IOBC and Laboratory of Entomology, Wageningen University, The Netherlands) were invited by Dr. Cecel Camilleri to visit the Barossa wine area in August 2004 and discuss integrated wine production. The Yalumba winery is trailing the Vitis programme with the aim of obtaining IOBC endorsement. IOBC has earlier certified organisations producing pome fruits, stone fruits and grapes/wine. For information on the integrated production of wine at Yalumba, see www.yalumba.com or contact ccamilleri@yalumba.com.

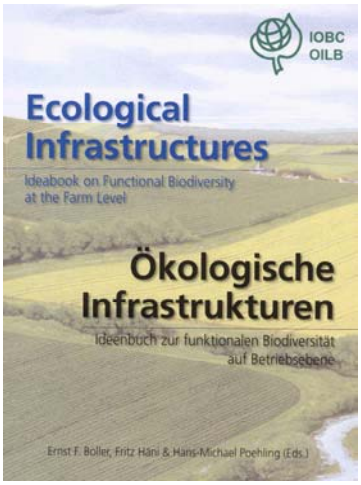
6. IOBC Global Symposia Bulletins still available





The bulletins with abstracts of IOBC Global Symposia "The Role of Genetics an Evolution in Biological Control" (2002) and "Arthropod Mass Production and Quality Control" (2003, organized by the IOBC Global Working Group) can still be ordered at 15 Euro per bulletin. Information about ordering: www.iobc agropolis.fr or iobc@agropolis.fr

7. IOBC Ideabook on Ecological Infrastructures appeared



Multifunctional agriculture, functional biodiversity, conservation biological control and ecological infrastructure are recent terms reflecting a change to a new philosophy in agricultural production. Healthy, safe food and an attractive, biodiverse production environment are becoming increasingly important benchmarks for high quality produce requested by critical, well-educated consumers.

The International Organization for Biological Control (IOBC) has a long tradition and much expertise in the field of conservation biological control, and also in its incorporation into sustainable production systems. However, the practical implementation of scientific knowledge and further development of this knowledge at the farm level is often hampered by the lack of information about the available tools and expertise gained in other regions.

Practical information is especially scarce and diffuse in the developing fields of functional biodiversity, habitat management and quality assessment of ecological infrastructures. The IOBC Commission on Integrated Production Guidelines and Endorsement has been able to motivate many specialists in Europe to help preparing this Ideabook. As a result of the very stimulating guidance by Dr. Ernst Boller, this Ideabook containing a wealth of until now unavailable information, could appear to fill important gaps in common knowledge about Integrated Production.

With tools like this Ideabook IOBC pursues as international scientific organisation the traditional objective to make new, field-tested and sustainable knowledge available to the farmers' community.

The full document can be downloaded from www.iobc.ch. Hard copies can be ordered via www.iobc-wprs.org; look under publications. More about this idea book in the next issue of our newsletter.

8. IOBC Internet Book of Biological Control

One of the new initiatives of the EC is to produce the "IOBC Internet Book of Biological Control". During the General Assemblee in August 2004, concern was expressed about the rather poor way how biological control scientists often communicate with the policy makers, the press and the public. We are frequently hyper critical about our own work, while forgetting to say that biological control has been proven over and again to be the most cost efficient and environmentally friendly pest management method (see van Lenteren's presidential address at www.iobc.agropolis.fr).

We, the new EC, think it relevant to produce a body of information on biological control that is easily available and provides examples of worldwide successes. Although several publishers have already expressed their interest in printing such information, we think it is of higher priority to have the material freely available on internet first. Later, a printed version which includes more detail and illustration, may be produced. A start will be made very soon with the publication of the history and current situation of biological control in Latin America. In this "IOBC Internet Book of Biological Control" will intend to incorporate a section with general and specific books on biological control and websites with biological control information.

We need your help to achieve this goal. Not only because it is a lot of work, but also since much of the information on biologica control successes is hidden in the grey, unpublished literature.

Please inform us (Colazza@unipa.it) about difficult to access literature on biological control successes, provide us with book titles and help us to summarize biological control information. You also help us a lot by writing a "country or region report".

9. IOBC partnerships for writing articles

The idea to develop an IOBC partnership for writing articles was warmly welcomed at the General Assemble in August 2004. For starting scientists not born in an English speaking country, it appears often very difficult and frustrating to prepare an article for a leading biological control journal. Some "starters" either have easy access to an English speaking colleague, or have funds available for translation and correction, but others do not have these possibilities. Our concept is to help IOBC members from developing countries where English is not the first language, one time with the writing of a research paper. Several IOBC members from English speaking countries spontaneously mentioned that they were willing to take part in this partnership. ***If you need help or if would like to assist* one time *in this IOBC partnerships for writing articles, please contact* Colazza@unipa.it.**

10. Summary of information on functioning of IOBC Working Groups, based IOBC-WPRS handbook for convenors

During the General Assemblee in August 2004, the topic of starting new working groups and running existing ones came up. Below, information on the aims and functioning of working groups is summarized. This information is taken from the IOBC-WPRS handbook from convenors. The new executive committee of IOBC Global proposes to use these same guidelines for all IOBC working groups.

Aims of a Working Group (WG):

- Foster collaboration between scientists interested in problems common to several members of IOBC;
- Share experience and eventually facilities, with special emphasis on joint or complementary programmes of work;
- Increase the general knowledge in the area of interest of its members and offer this knowledge to the whole scientific community

Working Group Activities. Activities of WGs are meetings, though some groups conduct collaborative research. Other activities, e.g. mailing lists, web sites etc. may be developed where appropriate. The WG convenor is responsible for the management of all WG activities. Such duties, however, may be divided among leaders of subgroups, appointed by the convenor and communicated to the Secretary General. Par-

ticipation in a particular WG is open to all persons actively concerned with the WG's specific topic. A WG is led by a convenor elected among persons covered by IOBC membership (for details concerning election, see IOBC-WPRS handbook). A convenor is appointed for 5 years and can be re-elected for another 5 years. The convenor is responsible for initiating, co-ordinating and reporting all those WG activities, which are necessary to fulfil the mission of the WG with respect to exchange of information and collaboration within its subject area. Each WG member will receive the WG meeting Bulletin without extra payment. Non-IOBC members have to buy the Bulletin. The convenor of each WG, SG and Commission prepares after each meeting an activity report, and an annual report, a financial report and a (short) contribution for one of the IOBC newsletters. The convenor also shortly explains IOBC goals and solicits for membership at each WG meeting.

Study group. A study group (SG) is a preliminary WG, which can be transformed into a WG if this is justified by IOBC priorities, member interests and activities. A SG is led by a convenor like a WG, and the same rules apply.

Commissions. Commissions are in several practical aspects comparable to WGs. However, they are much more limited in size, much more focused on a specific subject and consist of experts appointed by the EC of IOBC. A commission may, for example, define a long-term programme for the development of biological and integrated control strategies or it may establish and maintain an adequate service requested by IOBC members.

Members of WGs, SGs and Commissions. Members are participants covered by a membership of IOBC. A list of members shall be maintained by the convenor. WG and SG meetings are usually open for participation by non-members, but non-members pay an additional registration fee and pay for the Bulletin of the meeting.

IOBC Bulletins. The IOBC Bulletin is a medium mainly for rapid and cost effective publication of the proceedings of meetings of a WG. The Bulletins serve as a vehicle for spreading knowledge within and outside a working group.The convenor has the responsibility for coordinating the timely production of manuscripts for the Bulletin. The process involves the soliciting of contributions, editing of manuscripts and keeping to strict deadlines for timely delivery of camera-ready material.

11. THE EXECUTIVE COMMITTEE OF IOBC GLOBAL FOR 2004-2008

During the Global Assembly of IOBC GLOBAL (16 August 2004, Brisbane, Australia) the newly elected members of the Executive Committee were introduced. Information about the new members is presented below.

President: Joop C. van Lenteren (1945).

Full professor of Entomology at Wageningen University, The Netherlands. Honorary Professor at universities of Beijing (China) and Perugia (Italy).

University training as ecologist / population dynamicist. PhD research in behavioural ecology and population dynamics (Leiden University, The Netherlands). Post doc at University of California, Riverside. Sabbaticals at University of California, Riverside, University of Massachusetts, Amhers, and University of Perugia. Fellow of the Royal Netherlands Society for Sciences and Arts and Fellow of Royal Netherlands Academy of Sciences.

Since 1970 active in field of behavioural ecology, biological and integrated control of pests in greenhouses, arable crops and fruit orchards. Besides pure scientific and applied research on parasitoid – host relationships (some 200 publications, 65 PhD students and 200 MSc students) active in field of teaching behavioural ecology and biological/integrated control. Recent addition to field of work: functional biodiversity and agro-ecology.

Member of many missions and committees (FAO, Worldbank, Ministry of Foreign Affairs, CGIAR institutes) evaluating biological control and IPM projects. Policy related work: (1) Development

of Quality Control Guidelines for biological control (with EC funding), and (2) designing a protocol for importation and release of exotic biological control agents (EC, OECD and IOBC funded).

Secretary General: Stefano Colazza (1957)

Associate Professor at University of Palermo, Italy. University training in Agricultural Science at University of Perugia, Italy. CNR fellowship Department of Entomology, Texas A&M University, TX (USA); CNR-NATO fellowship Department of Entomology, University of California, Riverside CA (USA); OECD fellowship Ecologie Comportementale I.N.R.A. Antibes (FR); USDA grant USDA-ARS Beltsville, MD (USA). One year sabbatical c/o Department of Entomology, University of California, Riverside CA (USA).

Research experience in Biological Control of insect pests; biology and behavioral ecology of parasitoids; morphology and physiology of insect parasitoids; chemical ecology in tritrophic interaction; Insect Parasitoid Morphology and Physiology; Agricultural Entomology and Pest Control; Biological Control of pest; Efficacy of tachinid parasitoids; Chemical Ecology of Insect Parasitoids; Behavioral ecology of Insect Parasitoids (about 70 scientific publications).

Teaching for undergraduate and graduate courses in Integrated Pest Management, Biological Control, and Biotechnological Control of Insect Pests. Since 1989 MSc supervisor for circa 15 students and PhD supervisor for 6 students.

Treasurer: Lise Stengård Hansen (1953)

Senior scientist at Danish Pest Infestation Laboratory, Ministry of Food, Agriculture and Fisheries, Lyngby. University training in biology at Copenhagen University, Denmark.

Earlier employment at Danish Research Centre for Plant Protection, Danish Pest Infestation Laboratory, Ministry of Food, Agriculture and Fisheries, and Danish Technological Institute section Biotechnology.

Research experience in (1) biological control of stored product pests (flour moths in flour mills; granary weevils in grain stores), (2) biology and ecology of pests of stored maize in West Africa; (3) rapid analysis methods for detecting fungi and pests in stored grain, (4) non-chemical methods for control of insect pests in museum artefacts, (5) insect and mite allergens in stored grain, production, detection, (6) wood destroying insects, biology and control, and (7) biological and integrated control of insect pests in glasshouses.

Among others, member of Ad Hoc Group – Stored Product Protection, Committee of Experts on Nutrition, Food Safety and Consumer Health, Council of Europe, and external supervisor for PhD-students.

Vice president: Marilyn Y. Steiner

Senior Entomologist, National Centre for Greenhouse Horticulture, Gosford Horticultural Institute NSW Agriculture, GOSFORD, NSW, Australia. University training in Applied Biology specialising in crop protection, at Bath University, England.

Earlier employment in England (Agricultural Development Advisory Service, Wye, Kent, UK) and Canada (Entomology Section, Alberta Department of Agriculture, Edmonton, Alberta, and Entomology Section, Alberta Environmental Centre (now Alberta Research Council), Vegreville, Alberta).

Since 1980 specialised in pest management in protected crops. First developed a program for pests at the Muttart Conservatory in Edmonton, Alberta. Next managing pests in greenhouse crops across Alberta using strategies that included evaluating both pesticides and biological control agents (e.g. evaluation of a new thrips predator, *Amblyseius cucumeris* and management of the silverleaf whitefly). Also worked on the causes of poor quality of predators, in particular invertebrate pathogens such as microsporidia, rickettsia and virus, and helped to focus attention on the need for quality assurance programs for producers. In Australia, main task was finding indigenous natural enemies to combat western flower thrips. This project resulted in the finding of one candidate that had all the relevant criteria for a successful commercial agent: *Typhlodromis montdorensis*. It is now reared in semi-commercial quantities and uptake by the industry is increasing. I also work on IPM programs suitable for a variety of Australian conditions for a range of crops and pests. Active participant in IOBC-WPRS working group on IPM in greenhouses.

Vice president: Eizi Yano (1951)

Employed at the National Agricultural Research Center for Western Region, Fukuyama, Hiroshima, 721-8514, Japan. Former Head, Biocontrol Laboratory, National Agricultural Research Center, Tsukuba, Ibaraki, 305-8666, Japan. University training in Entomology at Kyoto and Nagoya Universities.

Earlier employment at Shikoku Agricultural Experiment Station, at Vegetable and Ornamental Crops Research Station, at National Institute of Agro-Environmental Sciences, at Agriculture, Forestry and Fisheries Research Council, Ministry of Agriculture, Forestry and Fisheries, and at Laboratory of Biological Control Agents, National Institute of Agro-Environmental Sciences. Post docs and sabbaticals at Entomology, Wageningen University, The Netherlands.

Research experience in (1) biological control of glasshouse pests, (2) ecology and behavior of natural enemies, and (3) population modelling of prey-predator and host-parasitoid interactions. About 80 scientific publications including about 30 refereed papers, 30 reviews, 20 book chapters and 1 book.

Long-term member of IOBC, since 2001 president of IOBC/APRS (Asia and the Pacific Regional Section). Received in 2002 the Award of the Japanese Society of Applied Entomology and Zoology.

12. PERMANENT SECRETARY AT AGROPOLIS, MONTPELLIER

On November 23, 2003, Gerard Matheron, President of Agropolis, informed the Executive Committee (EC) of IOBC GLOBAL that Agropolis would terminate the agreement that ties IOBC GLOBAL to Agropolis.
The present and former Executive Committees, and the representatives of all Regional Sections and Global Working Groups, gratefully acknowledge Ms. Mireille Montes de Oca (see photograph) for 8 years of outstanding work and enthusiasm as permanent secretary of the IOBC GLOBAL. Ms. Montes de Oca was also thanked for all her contributions during the General Assembly in Brisbane. She is currently assisting us in a smooth transfer of responsibilities from the old to the new EC.

Mireille: thank you!

13. BIOCONTROL

IOBC Global's Journal BioControl is doing very well. The impact factor is the same as other top journals on biological pest control, and the number of submitted articles is high and constant. Ownership of the journal (IOBC Global or the publisher) was shortly discussed at the General Assembly in Brisbane, Australia, this year. The new president (Van Lenteren) made clear that the ownership of the journal will remain with IOBC, as it is one of the most important characteristics of IOBC.

14. REGIONAL SECTIONS

ASIA AND THE PACIFIC REGIONAL SECTION (APRS)

Share your information: Activities and events within IOBC Regional Sections may be of interest to your colleagues outside the Sections as well. They will most probably not be informed if you do not tell them. You may share information by sending any kind of news to the Secretary General (Colazza@unipa.it).

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Vice Presidents: Dr. Fang-Hao Wan, Biological Control Institutue, Chinese Academy of Agricultural Sciences, Beijing, P.R. China. Email: wanfh@cjac.org.cn
Dr. Suasa-Ard, Director of the National Biological Control Research Center (NBCRC), Central Regional Center (CRC) at Kasetsart University, Nakhon Pathom, Thailand. Email:agrwis@ku.ac.th

Secretary/Treasurer: Dr. Takeshi Shimoda, Insect Biocontrol Lab., National Agricultural Research Center, 3-1-1, Kannondai, Tsukuba, Ibaraki, 305-8666 Japan.
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Past President: Dr. Rachel McFadyen, Australia.
Email: Rachel.mcfadyen@dnr.qld.gov.au

Asia and the Pacific Regional Section Report

Korea-Japan Joint Conference of Applied Entomology and Zoology, 2003. The first Korea-Japan joint conference of applied entomology and zoology was held in Busan during 28-31 May, 2003. In the symposium sections, there were two symposia relating to biological control and IPM: Biocontrol-based IPM for Greenhouse Vegetables and Integrated Pest Management in Orchards. Since horticulture and greenhouse cultivation are important aspects of agriculture for both countries, IPM or biocontrol are common important issues for both Korea and Japan. Augmentative release of insect natural enemies in greenhouses is being put into practice. IPM systems are being developed for reducing chemical applications in orchards.

International Symposium on Biological Control of Aphids and Coccids

Tsuruoka, September 24-28, 2005. This meeting of the **WG BIOLOGICAL CONTROL OF APHIDS AND COCCIDS** will be organized by Yamagata University with support from The Japanese Society of Applied Entomology and Zoology, The Entomological Society of Japan, The Japanese Ecological Society, and The Society of Population Ecology. It will build upon the long-term series of symposia held from 1965 to 2004 on the behavior and ecology of Aphidophaga. The symposium offers an excellent opportunity for interested researchers from around the world to gather in Japan to discuss wide-ranging topics concerning interactions of aphidophagous and coccidophagous insects and the insects that they attack. The aim of this symposium is to explore both differences and similarities between the ecology of aphidophagous and coccidophagos insects and their interactions with their hosts, in order to establish a general theory for effective biological control of these pests. Six sessions focused on predatory and parasitoid insects of aphids and coccids will be offered :
Session 1: Natural enemy augmentation in protected culture
Session 2: Conservation and promotion of natural enemies
Session 3: Environmental risks of natural enemy introduction
Session 4: Interactions of ants, Homopterans, and natural enemies
Session 5: Intraguild predation, Gary Polis memorial session
Session 6: Information acquisition and foraging in insect parasitoids and predators
To receive further announcements and information regarding the symposium, please contact Dr. Hironori Yasuda (hyasuda@tds1.tr.yamagata-u.ac.jp), Professor of Animal Ecology Department of Agriculture, Yamagata University 1-23 Tsuruoka, Yamagata, 997-8555, Japan.

E. Yano, National Agricultural Research Center, Japan

AFROTROPICAL REGIONAL SECTION (ATRS)

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Email: jamesogwang@hotmail.com
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Nearctic Regional Section Report
The IOBC/NRS held its annual business meeting and symposium in conjunction with the annual meeting of the Entomological Society of America 28 October, 2003 in Cincinnati, Ohio.

The evening included the symposium Landscape Structure, Non-Crop Habitat and Biological Control (**see also item 7 of this newsletter, ideabook**) attended by leading researchers in the field with the goal of presenting recent research findings, generating new ideas, fostering collaboration, and discussing future research directions. Habitat fragmentation as a threat to biodiversity is a well-known phenomenon, but habitat fragmentation as a threat or impediment to the success of biological control has only more recently begun to be explored. Recent research has highlighted the influence of a variety of factors on the abundance of natural enemies, and the importance of non-crop habitat and intervening matrix vegetation on the movement and impact of natural enemies on insect pests and weeds. This exciting new direction in biological control research promises to provide valuable new insights for enhancing the activity of natural enemies in agricultural crops and natural environments and would be of broad interest to the entomological community.

The 2004 IOBC/NRS meeting will be held in conjunction with the annual ESA meeting 14-17 November, 2005 in Salt Lake City, Utah.

The NRS Greenhouse Working Group has co-organized, with the Asia and Pacific Regional Section (APRS), a symposium on Approaches to Diversity: Pest Management in Protected Crops at the XXII International Congress of Entomology in Brisbane, Australia in August 2004.

The NRS Greenhouse Working Group will meet jointly with the WPRS IPM in Glasshouses Working Group in Turku, Finland, 10-14 April 2005.

The Biocontrol Network (a Canadian organization - Jean-Louis Schwartz, Chair, e-mail: jean-louis.schwartz@umontreal.ca) has proposed collaborating with the IOBC/NRS to host a 2005 joint conference in eastern Canada in early May 2005 that would provide an opportunity to celebrate the 50th anniversary of IOBC Global. The NRS Governing Board is still discussing the details of the proposal at this time, but expects to support it and become a full partner in the meeting.

The NRS publishes a newsletter 3 times a year. Beginning with the summer issue the newsletter will be offered to members electronically instead of as a printed copy.

Susan Mahr, University of Wisconsin, Madison

NEOTROPICAL REGIONAL SECTION (NTRS)

President: Dra Orietta Fernandez-LarreaVega. Instituto de Investigaciones de Sanidd Vegetal. Calle110 #514 E/5ta E y 5ta F Playa, Ciudad La Habana, Cuba.
Email: oflarrea@inisav.cu
Secretary: Dr.Luis Vazquez Moreno; same address, Cuba
Email: lvazquez@inisav.cu
Treasurer: Dra Esperanza Rijo Camacho; same address, Cuba.
Email: erijo@inisav.cu

After a long period silence, IOBC Global was recently informed that a new Executive Committee was formed. The first contacts have been made and both, IOBC-NTRS and IOBC Global will do their best to revive this once so active section with about 300 members.

The new NTRS Executive Committee organized the 3rd Congress of IOBC-NTRS in Cuba. Among others, it was decided that each NTRS country will identify a national coordinator, who will collaborate with the Executive committee in matters of membership and activities. Coordinators for 9 countries have already been identified. (*van Lenteren*)

EAST PALEARCTIC REGIONAL SECTION (EPRS)

President: The president of EPRS, Prof.dr. A. Smetnik, sadly passed away in 2003. A new president will be elected at the General Assembly this year.
Vice Presidents: Dr. S. Pruszynski, Plant Protection Institute, 60-138 Poznan, Miczurina Str. 20, Poland.
Tel:+48-61-679-222
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Email: margot@ior.poznan.pl
Dr. I. Eke, Hungary
General Secretary:
Dr. E. Sadomov, Russia

Historically, this has been a Region with many biological control activities and the world's largest area with practical application of biological control (more than 10 million hectares). 24 institutions and organizations from East and Central Europe are members of the EPRS. In the past years, because of economic and political problems in countries of this region, the number of members of the EPRS has decreased, and contacts with a number of countries have been lost. The Secretariat of EPRS undertakes attempts for renewal of old relations. In 2003 reports on implemented actions were published in scientific and periodical journals of Georgia, Kirghizia, Belorussia and Ukraine with the aim to distribute information about the activity of the EPRS/IOBC to researchers and experts.

Recently, 9 EPRS meetings were held in Russia, Belorussia, Poland, Bulgaria, Hungary and Ukraine. Also, international conferences, symposia and meetings were organized to discuss biological control of pests. Researchers and experts from Russia, Ukraine, Poland, Hungary, Belorussia, Georgia, Kazakhstan, France, the Czech Republic, Serbia, Bulgaria, Lithuania, Thailand took part in these meetings or sent their papers. The results of international meetings were published in two books (in English and in Russian). In 2002 a regular Information Bulletin of the EPRS/IOBC (issue 33) was published. Two issues of The Bulletin of the Standing Commission of the Biological Control of Forests have been published since 2003. Another two issues are printed and will be published in the first half of the year 2004.

EPRS proposes to strengthen contacts among IOBC regions, and to coorganize meetings (e.g. topics as Control of Gypsy Moth, Biocontrol of Exotic Invasive Species).

A General Assembly of this Region will take place during the spring/summer of 2004 in Hungary.

(*Information based on reports by Dr. Pruszynsky, summarized by Van Lenteren*)

WEST PALEARCTIC REGIONAL SECTION (WPRS)

President: Dr. P. Esbjerg, Zoology Section Royal Veterinary and Agricultural University, Frederiksberg, Denmark,
Email: peter.esbjerg@ecol.kvl.dk
Vice Presidents: Prof. Dr. R. Albajes, Universita de Lleida, Centre Udl-IRTA, Lleida, Spain.
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Treasurer: Dr. C. Gessler, Ecole Polytechnique Fédérale de Zurich, Phytomedizin-Pathologie, ETH Zentrum / LFW, Universitätstr. 2, 8092 Zurich, Switzerland
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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. Please consult this website www.iobc-wprs.org for any information about IOBC-WPRS.

In addition to many working group meetings which will be hold this and next year (see website), WPRS will organize its General Assembly in September 2005. (van Lenteren)

15. Working Groups

WG Biological Control of Aphids and Coccids (formerly Ecology of aphidophaga) (By J.-L. Hemptinne)

Chairman: Prof. J.-L. Hemptinne, Laboratoire d'Agroécologie, Ecole nationale de Formation agronomique, BP 87, 31326 Castanet-Tolosan, France.
Email: jean-louis.hemptinne@educagri.fr
The proceedings of the past conference of our workgroup "Ecology of Aphidophaga" are now available at the following address: onofre@notes.uac.pt. People interested in obtaining a copy must contact Dr. Antonio Onofre Suares at the above address.
The Working Group has adopted a new name ; it is now "Biological control of aphids and coccids" because it is more descriptive than "Ecology of Aphidophaga". In addition, under that name, the Scientific Committee hopes to attract people working on both coccids and aphids. The ability to compare aphids and coccids is crucial because, while biological control using these two kinds of insects shares the same problems, there are also differences. By understanding the common points and differences, the Scientific Committee hopes to foster progress in biological control. The new name also emphasizes the fact that the Working Group is interested in the systematics, biogeography and ecology of natural enemies of coccids and aphids.
The Scientific Committee is now composed of A. F. G. Dixon (University of East Anglia, U. K.), E. W. Evans (Utah State University, USA), J-L. Hemptinne (Chairman; Ecole nationale de Formation agronomique, France), J. van Schelt (Koppert), W. W. Weisser (University of Iena, Germany) and H. Yasuda (Yamagata University, Japan). The web site is:
http://www.bf.jcu.cz/tix/strita/aphidophaga/main.html
The Working Group will meet in 2005 at the University of Yamagata (Japan) from September the 25th to the 29th. Full details as well as first announcement are at the following address :
http://www.bf.jcu.cz/tix/strita/aphidophaga/tsurprog.html
J.L. Hemptinne

WG Arthropod Mass-Rearing and Quality Control (By Simon Grenier)

Co-chairman: 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.
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Co-chairman: 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
Co-chairman: Dr. P. De Clercq, Laboratory of Agrozoology, Department of Crop Protection, Faculty of Agricultural & Applied Biological Sciences, Ghent, Belgium. Email: Patrick.DeClercq@rug.ac.be

The organization's renewed mission is to facilitate and advance cost-effective rearing of high-quality arthropods in support of biological control and integrated pest management. It will remain broadly based in arthropod quality control and flexible to address opportunities in the use of mass-reared arthropods. Pioneers of this working group never imagined the excessive amount of time that would be spent on regulatory issues, requirements for international shipment of natural enemies, the advent of genetically modified organisms, and many other issues we currently address. After conducting ten international workshops, the IOBC-AMRQC has evolved strong roots and traditions in its search for improvements in the rearing and quality control of mass-reared arthropods.

The 10th workshop of IOBC-AMRQC, Agropolis International, Montpellier, France, 21-25 September 2003
The workshop was a great success and involved about 80 participants from 20 different countries in America, Europe, the Middle East, and Africa. The approximately 30 papers presented provided a basis for discussion and exchange, with the final aim of improving collaboration among scientists, practitioners and regulators. A poster exhibition added useful descriptions of quality control projects being conducted throughout the world. A producers business meeting was held on the last day of the workshop.

Proceedings of the Eighth, Ninth, and Tenth Workshops of IOBC-AMRQC
Quality Control for Mass-Reared Arthropods (combined proceedings of the 8th and 9th IOBC, AMRQC workshops) edited by Norm Leppla, Ken Bloem and Bob Luck will be provided free of charge to colleagues who join the IOBC-AMRQC Working Group. Current members of the Working Group can request free copies from Norm Leppla (ncl@ifas.ufl.edu). This publication is also posted at the IOBC-AMRQC Website :
(http://www.amrqc.org).

Proceedings of the 10th workshop, compiled and edited by Simon Grenier, Patrick De Clercq and Norm Leppla, were published as the N°2 (2003) Global IOBC Bulletin available at the IOBC Permanent Secretariat in Montpellier (54 pages, ISBN 2-9518864-1-1).

Membership Application
Membership in the IOBC-AMRQC Working Group is open to all individuals and institutions, both private and public, active in the field of arthropod mass rearing and quality control. Membership in the Working Group is free but members are strongly encouraged to join IOBC. Members will be included in the mailing list and informed about events organized by the Working Group. Colleagues who wish to be enrolled as new members, especially those people not present at the Montpellier workshop, should submit their membership application form. Please download the form in PDF or Word format from the AMRQC website: (http://www.amrqc.org) and send or mail it to: Dr. Patrick De Clercq, Laboratory of Agrozoology, Department of Crop Protection, Ghent University, Coupure Links 653, B-9000 Ghent, Belgium.
Fax: +32-9-264-62-39
Email: Patrick.DeClercq@ugent.be
Patrick De Clerq

WG IWGO – *OSTRINIA* AND OTHER MAIZE PESTS (BY H. BERGER)

Co-Convenor: Harald K. Berger; AGES, Spargelfeldstraße 191; 1226 Wien; Austria;
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Fax: # 43/1/732-16-2106
Email: harald.berger@ages.at
Co-Convenor: Ulrich Kuhlmann; CABI-BioScience; Head Agricultural Pest Research CABI Bioscience Switzerland Centre, Delémont; Switzerland,
Email: u.kuhlmann@cabi-bioscience.ch

Co-Convenor: C. Richard Edwards**;** Purdue University; Dep. of Entomology; Indiana; USA;
Email: richedwards@entm.purdue.edu

I. MEETINGS, WORKSHOPS

The Xth Conference of the last meetings of IWGO **Diabrotica Subgroup** (together with 9th FAO/TCP Meeting, the 8th EPPO ad hoc Panel) took place in Engelberg, Switzerland, January 14-17, 2004. The next meeting is planed for January 2005 in Bratislava, Slovak Republic

II. PUBLICATIONS

The Working Group released several publications, partly with the support of Global IOBC. The most recent issue of the **IWGO - NEWSLETTER**, Volume XXV / 1, a scientific magazine edited by H. K. Berger (Vienna, Austria) since 1981, was released in February 2004.
All earlier issues of the "IWGO - NEWSLETTER" can be obtained from the convenor.
IWGO has its own homepage on the internet which partly supplements the "IWGO – NEWSLETTER". All relevant data, reports and future meetings will be published via this medium in the future. The address of the IWGO home-page is: http://www.infoland.at/iwgo/
It is planned to merge the *Diabrotica* Subgroup with the main IWGO group in the future. The meeting in Bratislava will probably be the last meeting of the Subgroup. From 2005 on, there will most likely be just one IWGO meeting dealing with all matters concerning maize pests. The group will be lead by 3 co-convenors in the future: Harald K. Berger (Austria), C. Richard Edwards (USA) and as a new convenor in IWGO, Ulrich Kuhlmann (Switzerland).

III. REPORT

The most important event in IWGO is still the appearance of *Diabrotica virgifera virgifera* in Europe in 1992 and its subsequent spread. Since that time, 10 IWGO-*Diabrotica* Subgroup meetings (Subgroup Convenor C.Richard Edwards, Purdue University, W. Lafayette, Indiana, USA) have taken place.
The Subgroup increased rapidly in numbers due to the appearance and rapid spread of this pest in Europe. In 1995, the first *Diabrotica* Subgroup meeting took place in Graz, Austria where 25 colleagues attended the meeting. At the recently completed Xth Subgroup Meeting in Engelberg, Switzerland, there were about 110 participants. The abstracts of the papers presented in Engelberg will be published in the next issue (XXV/1) of the IWGO newsletter in February 2004.

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
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Dr. McPheron informed us that this group has been inactive for the past several years. The fruit fly workers have met in May in Florida, USA this year. Dr. McPheron will contact the leaders of that group to identify a new chair of the IOBC fruit fly working group. (van Lenteren)

WG Biological Control of Chromolaena Odorata

Chairman: Dr. R. Muniappan, Agricultural Experimental Station, University of Guam, Mangilao, Guam 96923 USA.
Fax: +1-671-734-6842
Email: rmuni@uog9.uog.edu
http://www.ehs.cdu.edu.au/chromolaena/siamhome.html

WG Biological Control of Plutella

Co-chairman: 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
Co-chairman: Dr. A. Sivapragasam, Strategic, Environment and Natural Resources Centre, MARDI, Kuala Lumpur, Malaysia. Email: sivasam@mardi.my.
Co-chairman: Dr. D.J. Wright, Department of Biology, Imperial College at Silwood Park, Ascot, Berkshire, UK.
Email: d.wright@ic.ac.uk

WG Egg Parasitoids

Chairman: 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
Co-Chairman: Dr. E. Wajnberg, Ecologie Comportementale, I.N.R.A., Sophia Antipolis, France
Email : wajnberg@antibes.inra.fr
Co-Chairman: Dr Guy Boivin, Research Station, Agriculture Canada, St-Jean-sur-Richelieu, Québec, Canada
Email: boiving@em.agr.ca

This Working Group met in September 2002 in Perugia, Italy. It also organized a one day symposium during the XXII International Congress of Entomology, 15-21 August 2004, Brisbane, Queensland, Australia. (van Lenteren)

WG Biological Control of Water Hyacinth

Chairman: Dr Martin Hill, Agricultural Research Council, Plant Protection Research Centre, Weeds research Division, Private bag X134, Pretoria 0001, South Africa.
Tel:+27 12329-5743
Fax:+27 12329-3278
Email: rietmh@plant2.agric.za

Global WG on Transgenic Organisms in IPM and Biocontrol

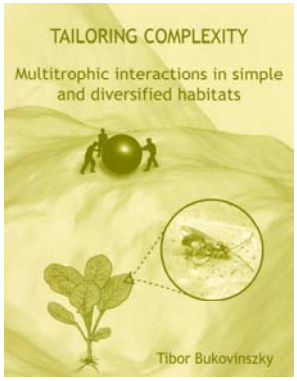
Chairwoman: Dr. Angelika Hilbeck, Swiss Fed. Inst. of Technology, Geobotanical Institute, Zurichbergstr. 38, CH-8044,Zurich.
Tel: +41 (0) 1 632 4322
Fax:+ 41 (0) 1 632 1215
Email: angelika.hilbeck@env.ethz.ch

This Working Group just published it's 7th Newsletter on the GMO Guidelines Project, reporting about the 3rd project workshop in Vietnam (a case study on Bt cotton using the earlier developed Guidelines framework). For information about this working group goto: www.gmo-guidelines.info or contact evelyn.underwood@env.ethz.ch. (van Lenteren)

16. SUMMARIES OF PHD THESES

This is an experiment, please mail Colazza@unipa.it if this kind of information is appreciated or redundant. Our aim is to have new biocontrol related information distributed as soon as possible. Usually it takes years before thesis material is published in journals. We may create a place on the website for this type of information. Please realize that the examples below are a NON-random selection of theses that recently appeared!

Tailoring complexity: Multitrophic interactions in simple and diversified habitats. PhD thesis T. Bukovinszky (Hungary), Wageningen University, Laboratory of Entomology, The Netherlands; June 2004.



Increasing vegetation diversity in agro-ecosystems by using plant-species mixtures, may suppress herbivore populations by reducing the apparency and quality of crop plants and increasing the success of natural enemies. Unfortunately, as the mechanisms of pest-suppression at the behavioural level is largely untested, there is insufficient information to explain the variable responses of herbivores and natural enemies to plant-species mixtures. The aim of my thesis project was to understand the cause(s) of lower herbivore numbers in vegetationally diversified cropping systems compared with monocultures and to study the behavioural responses of natural enemies to vegetation diversity.
The studied system included Brussels sprout (Brassica oleracea gemmifera), its herbivores, and Diadegma semiclausum, a parasitoid of the diamondback moth. Vegetational diversity was characterised by mixing Brussels sprout with either barley (Hordeum vulgare) or mustard (Sinapis alba). Numbers of several herbivore species were reduced when Brussels sprout was mixed with barley.
The study showed that the plant competition in the species mixture influenced herbivore responses by altering plant quality compared with the monocrop. Field and simulation studies showed that responses of herbivores in diversified habitats were influenced by species-related differences in foraging behaviour. Behavioural and analytical studies showed the importance of inter- and intraspecific variation in volatiles of both damaged and undamaged plants in the attraction of the parasitoid D. semiclausum. Plant mixtures interacted with the searching behaviour and time-allocation of wasps. Compared with pure sprout patches, mustard attracted and retained individuals longer, whereas barley reduced their tendency to enter the plant patch. Although both mustard and barley reduced the tendency of wasps to locate hosts on Brussels sprout, parasitoids improved their foraging efficiency through oviposition experiences and became equally efficient in finding further hosts. In conclusion, the results repored in my thesis demonstrate the importance of foraging behaviour in explaining variable responses of herbivores and parasitoids to plant-species mixtures.
A pdf-version of this thesis can be obtained at: Tibor.Bukovinszky@wur.nl

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.

The overall aim of this research was to develop a biological control programme for *F. occidentalis* through the selection of an efficient beneficial arthropod. First, a general review of the literature about thrips pest species in Europe and in particular of *Frankliniella occidentalis* (Perg.) (Western Flower Thrips) was made. Information regarding the biology, distribution, host plants of thrips and damage induced by this pest species were discussed and summarized. The main candidates as natural enemies for control of thrips emerging from this literature study and from an evaluation of all present data, were Anthocoridae,

and, thus, further research was directed towards Anthocorid predators of the genus *Orius* (Rhyncota: Heteroptera) (**chapter 1**).

Next, of the genus *Orius*, the most common species of the Mediterranean regions of Europe were chosen as candidates for biological control of *F. occidentalis*. *Orius* predators were collected in several areas in Italy on 36 plant species infested by thrips. The most common species were *O. niger* Wolff, *O. laevigatus* (Fieber) and *O. majusculus* (Reuter). No clear host-plant preferences of these *Orius* species were recorded (**chapter 2**).

Consequently, biological characteristics and predation activity of four *Orius* species (the paleartic *O. majusculus*, *O. laevigatus* and *O. niger* and the neartic *O. insidiosus*, an exotic species that was earlier released in Italy) were determined by laboratory experiments using two prey species: *Ephestia kuehniella* (Zell.) eggs and *Frankliniella occidentalis* adults. Preimaginal mortality, development time, sex-ratio, pre-oviposition period, longevity, fecundity, and predation during the instar stages and the adult stage were measured. The intrinsic rates of natural increase (r_m) and the kill rates ($k_m = \ln k_0/t_k$) for all four *Orius* species was determined. The k_m was 0.23 for *O. laevigatus*, 0.21 for *O. majusculus*, 0.25 for *O. insidiosus*, 0.19 for *O. niger,* respectively. In all species, the females that fed on *E. kuehniella* showed greater longevity and higher reproduction than those fed on *F. occidentalis*. Most data for the neartic *O. insidiosus* were similar to those of *O. laevigatus* and *O. majusculus.* Mass rearings of *O. insidiosus, O. laevigatus* and *O. majusculus* were successfully developed, while *O. niger* appeared difficult to rear. Based on these data, it was concluded that *O. laevigatus* might be the best candidate for control of thrips (**chapter 3**).

No data were available about the occurrence of diapause in *O. laevigatus*. As thrips pest occur early in the season, it is important to use natural enemies that do not go into diapause. The possibility of inducing a reproductive diapause in this palearctic species was therefore investigated in the laboratory using two strains: strain N collected in northern Italy (Po Valley) and strain S collected in southern Italy (Sicily). The influence of photoperiod on *Orius* eggs was studied. Development time, adult emergence, sex ratio, pre-oviposition period, fecundity, and the presence of mature oocytes were recorded.

The two strains of *O. laevigatus* showed to have a different way of overwintering: in the northern strain part of the population undergoes a weak reproductive diapause, while for the southern strain overwintering could best be described as quiescence (**chapter 4**).

Finally, the capacity of *O. laevigatus* to control thrips pests (*F. occidentalis* and *T. tabaci*) was studied by releases of this predator in two vegetable crops in commercial greenhouses, sweet pepper and eggplant. The releases of the pirate bugs were made as soon as thrips were detected, resulted in early establishment of the predator, in an interaction between prey and predator at low population densities and often in sufficient control of the pest (**chapter 5 and 6**).

In conclusion, the southern Italian strain of *O. laevigatus* showed to be an efficient natural enemy of thrips and *F. occidentalis.* This natural enemy is currently produced and commercially used on large scale in Europe to control thrips species in vegetable and ornamental crops, mostly in protected crops (**chapter 7**).

A pdf version of this thesis can be obtained from tommasini@crpv.it

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.

The thesis presented here is the result of a joint European Research project "Biological Control of Thrips Pests". Specific aims of the project were to collect, evaluate, mass produce and commercially apply natural enemies of thrips species. To evaluate natural enemies we applied specified selection criteria, which had proven its value in previous pre-introduction selection of natural enemies of several other greenhouse pests. In my part of the evaluation programme, I studied what prospects hymenopterous parasitoids might have as biological control agents of thrips, in particular the western flower thrips, *Frankliniella occidentalis* (Pergande).

First (**Chapter 1**) I summarised available information on the thrips pests which currently play a key role in protected cultivation in Europe. In particular I looked into *F. occidentalis, Thrips tabaci* Lindeman and two other species that I studied: *Frankliniella schultzei* Trybom and *Frankliniella intonsa* (Trybom) and reviewed their geographical distribution, economic impact, followed by additional information on thrips biology, ecology and ways of control. Then the state of the art is discussed of the most important groups of natural enemies that are currently evaluated and/or applied as biological control agents: predatory mites, pirate bugs, entomopathogenic fungi and entomophilic nematodes. Specific emphasis is put on the current status of hymenopterous parasitoids attacking thrips, their biology, ecology and life-history and the prospects they might have for thrips control in European greenhouses. Finally, I present the aim of my research project and the outline of this thesis.

When the research project started, no parasitoid of western flower thrips was known. In our search for parasitoid candidates, presented in **Chapter 2**, a sampling programme was developed, surveying *F. occidentalis* populations in its original area of distribution (USA) and newly invaded areas (South of Europe). Parasitoids of closely related thrips species, distributed worldwide, preferably from areas with climatically conditions similar to northwest European glasshouses were collected as well . Based on the host and geographic distribution records in the literature, mainly species were collected within the genus *Ceranisus* (Walker), solitary larval endoparasitoids of thrips species closely related to *F. occidentalis.* Our collection efforts resulted in a number of parasitoid species and various geographical strains, the most important being *Ceranisus menes* (Walker) and *Ceranisus americensis* (Girault) (Hymenoptera: Eulophidae). Both are solitary koinobiont endoparasitoids of thrips larvae that reproduce asexually.

A critical phase in any evaluation programme, is the development of an adequate and reliable rearing procedure, allowing a standardised supply of insects of a constant quality and large enough quantities. For laboratory bioassays on thrips and parasitoids, and eventually mass-production, it is essential that large cohorts of even aged groups of larvae are available. In **Chapter 3** we describe and evaluate laboratory methods for rearing various species of thrips, such as *Frankliniella occidentalis*, *F. intonsa, Thrips palmi* (Karny) and *Thrips tabaci* Lind. (Thysanoptera: Thripidae) and their parasitoids. When using a method based on honey-solution and pine pollen, large numbers could be produced of high quality, with relatively little time investment. For rearing parasitoids the method proved adequate as well, but less efficient in yield and time.

A number of basic evaluation criteria for pre-introduction selection of useful natural enemies, is based on the outcome of behavioural and developmental interactions with their target host in laboratory experiments. Specific aspects of the parasitoid's host selection process are evaluated in **Chapter 4** (host age selection) and **chapter 5** (host species selection). Results presented in **Chapter 4** show that host acceptance by *C. menes* and *C. americensis* was negatively correlated with size, age and stage of the larval host. Observations on the parasitoid's behaviour showed that the extent to which a wasp could complete and attack and oviposit significantly decreased with increasing size (age) of host larvae. The apparent preference for small sizes of larvae is largely caused by defensive reactions (walking away, wagging the abdomen, anal exudate production) upon an encounter to vehement resistance (wriggling, dragging) of the larvae when attacked and stung. In larvae smaller or equal to her own size, a wasp could manage its victim, whereas larvae larger than herself managed to escape prior or during an attack. The apparent preference for small and young host larvae is valuable for developing a mass-production system for thrips parasitoids, for the timing of releases in the greenhouse and, because only a small part of the population is prone to attack, has consequences for the population dynamics of the host and the parasitoid.

Although in a greenhouse grown crop *F. occidentalis* often is the major, but not the only thrips species around it is important to know the host preference of the parasitoids with respect to different species. No-choice tests, presented in **Chapter 5** show that differences in the behaviour and biology of both the host and the parasitoid species strongly influenced their development and fitness. On the species level as well as on the population level parasitoids differed in host acceptance behaviour, parasitoid developmental time and size of their offspring. *C. americensis* preformed best on its original co-evolved host *F. occidentalis*. *C. menes* consists of a large complex of regional populations, that either reproduce sexually or asexually. They differ morphologically, geographically, behaviourally

and physiologically in their response to different geographical populations of thrips species, each of them having its unique characteristics.

Life-history studies performed on *C. menes* and *C. americensis* in the laboratory (**Chapter 6**) shows that developmental and reproductive biology were significantly affected by temperature and characteristic for each species / strain. It was found that immature developmental time took much longer when temperature decreased, in particular for *C. americensis*. Pupal development times in *C. menes* varied greatly at both temperatures for certain types (yellow) but not for others (brown). Both species have different reproduction strategies: *C. americensis* has a higher daily reproduction, but a shorter reproduction period, compared to various strains of *C. menes,* that reproduce less during a longer period. The population growth rates differed per species / strain and temperature, but where in almost all cases lower than (literature) data of *F. occidentalis*.

In **Chapter 7** it is shown that short-range host location by *C. menes* and *C. americensis* is positively affected by visual and chemical stimuli. Both species are attracted to yellow colours and were arrested on sites were larvae had been feeding. Wasps did react to the presence or damage inflicted by feeding of non-hosts, but arrestment did not seem to be very host specific: within a parasitoid species no difference was found in reaction to feeding spots of one host species, *Thrips tabaci* or another *F. occidentalis*. Parasitoid females were not attracted to the synthetic compounds of the alarm pheromone (decylacetate plus dodecylacetate) of western flower thrips in short-range flight tests, indicating a non-volatile effect.

In **Chapter 8** evaluation studies were performed on a larger scale: experimental and commercial greenhouses. In spite of repeated introductions in infested crops, either vegetables like sweet pepper and cucumber, or ornamentals like rose and potted plants, very low levels of parasitism were found. Searching efficiency and dispersal ability in a greenhouse crop were very low and parasitoids performed poorly under (temperate) greenhouse conditions. Both parasitoid species could maintain themselves, dispersed and reproduced at Dutch glasshouse conditions, but they were unable to reduce thrips populations to sufficiently low levels.

Finally, in **Chapter 9,** I summarise and discuss the main results of my research, placed in perspective of the pre-introduction criteria we used. It is concluded that, based on behavioural (host selection and searching efficiency), biological (climatic adaptation, development and reproduction capacity) and practical (mass-production) characteristics, thrips parasitoids have very limited prospects for greenhouse biological control for both seasonal inoculative and inundative release programmes in temperate and in Mediterranean greenhouses.

A pdf version of this thesis can be obtained from a.j.m.loomans@minlnv.nl

Semiochemical relationships in the tritrophic system Leguminous plants, *Nezara viridula* (L.) and *Trissolcus basalis* (Woll.). PhD thesis Alessandro Fucarino, Palermo University, Italy; February 2004.

Chemical signals are one of the best ways that phytophagous, parasitoids and plants use to communicate with one another. These chemicals present in nature are studied in Entomology and especially in Chemical Ecology, a new branch of Entomology. All these chemical signals are called "Semiochemicals". The semiochemicals are a primary method of communication in insects; they regulate the interaction between individual belong to different species (Allelochemicals) and they work as an identificator of members of the same species (Feromones). They are still being studied, by researchers in order to understand and so manipulate these interactions for better pests management, especially in IPM and biological control.

In many chemical and behaviour ecology studies, it has been shown that odour cues produced by some plant–herbivore complexes attract parasitoids and predators. These odour cues are qualitatively and quantitatively variable in the role of plant species attacked by different insect herbivores. Even if many studies have been carried out, many doubts about these interactions still remain, so the possibility of applying this knowledge in pest control to obtain satisfactory results is still premature.

In the first part of this thesis (chapter I), we give exhaustive information on the subjects of this thesis: two leguminous herbaceous plant, a pentatomid bug (Nezara viridula) and its main natural enemy (Trissolcus basalis).

The aim of the other two experimental parts (chapters II and III) is gain further information about the understanding of communicational relationships in the aggregation behaviour of different species of pentatomid bugs *(chapter II)* and in the three trophic levels "plant – phytophagous – parasitoid" *(chapter III)*.

In the 1st experimental section (chapter II), we investigated tactile and chemical cues that could mediate the aggregation behaviour of immature pentatomid bugs, using nymphs of six different pentatomid bug species: *Nezara viridula* (L.)*., Acrosternum hilare* (Say)*, Chlorochroa ligata* (Say), *Chlorochroa sayi* (Stal)*, Thyanta pallidovirens* (Stal), and *Euschistus conspersus* Uhler. Surprisingly, we also found the formation of interspecific aggregations between two different species similar to the conspecific aggregation. To understand why these species form interspecific aggregations, we determined the chemical profiles of 1st and 2nd instar nymphs of each species. It was carried out by solvent extraction of nymphs with pentane, followed by GC-MS analysis. Then, we tested the three major components of bug extracts (4-Oxo-(*E*)-2-decenal, tridecane and (*E*)-2-decenal) and crude whole-body extracts of bugs to observe any significant aggregation of 1st instar *N. viridula* nymphs at different doses of each compound.

For this test we used polysulfone beads (1 mm diameter) that were glued together in groups approximating bug egg masses and treated them with the same compounds described above.

In the 2nd experimental section (chapter III), we found that egg deposition of the pentatomid bug *N. viridula* (Heteroptera: Pentatomidae) stimulates the production of host-induced synomones that attract the egg parasitoid *T. basali*s (Hymenoptera: Scelionidae). The capacity that synomones - produced by oviposition and feeding activity- can attract parasitoids has been described in few tritrophic systems. *N. viridula* feeding and oviposition activity apparently induced synomones in two different leguminous annual plants: broad bean (*Vicia faba* L.) and French bean (*Phaseolus vulgare* L.). Moreover, this synomone production was shown to be a systemically induced plant physiological response to feeding damage and oviposition. We think these induced synomones could be produced by other annual and perennial host plants. Our tests were carried out by a Y-olfactometer and all data were processed by Xbug, a video tracking and motion analysis software.

The present thesis provides some answers to questions concerning the adaptability of oviposition-induced synomones and the aggregation pheromones in pentatomid bugs to augment the knowledge on the natural systems and so improve the control of insect pests.

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.

Chemical communication is important in the relation ship between insects, in fact, the chemical stimuli have a fundamental part, playing a key role in the relation between their life and the environment. The comprehension of the insects behavior is based on the interpretation of the chemical language used by several species.

Knowledge on chemical communication in the insects have been developed with the progress on chemical during the last years and with the study on behavior that this substances producing in the insects.

As an introductory overview a short description of several methods of communication between insects by chemical stimuli, and a little introduction about insect scale, is discussed. The experimental section will be compound of three part.

In the first part, Sex pheromone of the Oleander Scale, *Aspidiotus nerii* Bouché (Homoptera: Diaspididae) was investigated following aspects of its production and release. Quantification of sex pheromone emitted by female of Oleander Scale was performed using solid phase microextraction (SPME) subsequently analysed by gas chromatography/mass spectrometry (GC/MS), adopting syn-

thetic Oleander Scale sex pheromone as a standard. The headspace SPME of the volatile emission from about 100 Oleander Scales virgin females of a Sicilian population monitored for several days allowed individuating the initial point of sex pheromone production in females twenty-seven days-old. The amount of pheromone trapped by the resin has been estimated in 0,15 pg for single scale per day.

In the second part the role of synthetic sex pheromone of the Oleander Scale, *Aspidiotus nerii* Bouché (Homoptera: Diaspididae), in the long-range host-searching behaviour of the specialist parasitoid *Aphytis chilensis* Howard (Hymenoptera: Aphelinidae) was studied. Different concentrations in hexane of the (-) and (+) enantiomers of the synthetic host sex-pheromone were compared for their attractiveness in dual choice tests in an Y-olfactometer. The results indicate that in searching behaviour of *A. nerii, A. chilensis* is orientated towards areas likely to contain suitable host stages by host-derived information. The results obtained shown a significative attraction of *A. chilensis* to the pheromone so we can assert the synthetic pheromone has an kairomonal effect. This is very interesting for a possible use in biological pest management program.

In the last part we studied the foraging behaviour of *Metaphycus* nr. *flavus*, particularly with regard to the possible role played by cues from the host *Coccus hesperidum* Linnaeus. We used yucca leaves infested by soft brown scale (*Coccus hesperidum*); this scale emits attractants for the encyrtid parasitoid *Metaphycus* nr. *flavus.* Chemically mediated host location in *M. flavus* was investigated. Wasps were biossayed using a Y-olfactometer chamber. For each bioassay a single female was introduced into the Y-olfactometer and observed for five minutes with video tracking and motion analysis software (Xbug). We used yucca leaves infested by the *C. hesperidum* as a test. The scale age ranged from 26 to 30 days. On scale aged 26 to 29 days, parasitoids spent significantly more time in the test arm than in the control arm; when scale was 30 days old wasps showed no significant preference for either arm. In addition, the parasitoids were tested with scale-infested leaves with all scales carefully removed (leaf unwashed) vs. scale-infested leaf, and scale-infested leaves with all scales removed (leaf washed) vs. a scale-infested leaf. In both tests, female wasps showed significant preference for scale-infested yucca leaves with either *C. hesperidum* or their residue present.

Finally we tested the warm water, used to clean the scale-infested leaves with all scale carefully removed, on filter paper. The wasps were tested using this filter paper as test and filter paper with only distilled water as control. The wasps tested showed high preference to the test. This last study is still in progress to identify the nature of these substances.

A pdf version of this thesis can be obtained from paololobue@hotmail.com

17. VARIOUS RECENT PUBLICATIONS

Genetics, Evolution and Biological Control
Edited by L.E. Ehler, University of California, Davis, USA; R. Sforza, USDA European Biological Control Laboratory, France; and T. Mateille, IRD, France
December 2003 288 pages Hardback
ISBN 0 85199 735 X
Price £55.00 (US$100.00 in the Americas)
This book has been developed from the keynote addresses delivered at the third IOBC International Symposium (co-organized with CILBA) that was held in Montpellier in October, 2002, to address recent developments in genetics and evolutionary biology, and their relevance to biological control. Chapters are organized around the following themes: genetic structure of pest and natural enemy populations, molecular diagnostic tools in biological control, tracing the origin of pests and natural enemies, predicting evolutionary change in pests and natural enemies, compatibility of transgenic crops and natural enemies, and genetic manipulation of natural enemies.

Biological Control in IPM Systems in Africa

Edited by P. Neuenschwander, International Institute of Tropical Agriculture (IITA), Benin, C. Borgemeister, University of Hannover, Germany, and J. Langewald, IITA, Benin
June 2003 448 pages Hardback 64 colour plates
ISBN 0 85199 639 6
Price: £75.00 (US$140.00 in the Americas)
Biological control has made a major contribution to integrated pest management (IPM) in Africa, but its documentation has been scattered and often under-reported. This book provides a review of the most important studies, including not only successes, but also on-going challenges. The focus is on arthropod pests and weeds, but diseases are also covered where significant. In 24 chapters, case studies and promising research results are presented that cover biocontrol by naturally occurring agents, by exotic agents or by seasonal manipulation.

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Biocontrol Science and Technology

Registered members of the IOBC are entitled to a discount on the personal subscription for the Taylor & Francis' journal, ***Biocontrol, Science and Technology.*** During 2004 and 2005 (volumes 14 and 15), ***Biocontrol Science and Technology*** is available to members at US$226.00/ GBP£128.00. For further information on the journal, please visit the Taylor & Francis homepage at: http://www.tandf.co.uk/journals/titles/09583157.asp. To take advantage of this offer, please contact Taylor & Francis directly on +44 01256 813000, or email: journals.orders@tandf.co.uk

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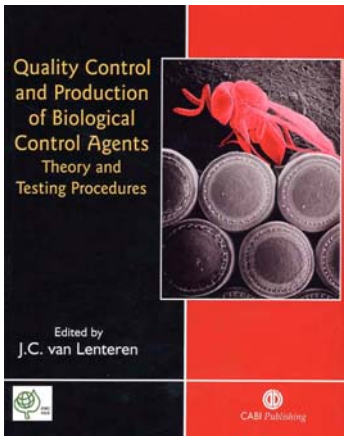
Quality Control and Production of Biological Control Agents: Theory and Testing Procedures.

J C van Lenteren (ed.), Department of Entomology, Wageningen University, The Netherlands



This book was written by many IOBC members and is the result of work done in global and wprs working groups on quality control of natural enemies. The use of biological control agents has been increasing worldwide and there are now many companies mass-producing such organisms, particularly for the control of insect pests. However, there is a great need for quality control in the production and use of these natural enemies, which include insect parasitoids and predators, fungi and viruses. This book has been written by leading scientists to provide both background theory and practical guidance on this subject. (www.cabi-publishing.org/bookshop; ISBN 0 85199 688 4, hardback, 327 pp., US $ 120.00 (some copies still available for reduced price at Joop.vanLenteren@wur.nl).

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- Variations in natural enemy foraging behaviour: essential element of a sound biological control theory, *W J Lewis, USDA-ARS, Georgia, USA, L E M Vet, Wageningen University, The Netherlands, J H Tumlinson, USDA-ARS, Florida, USA, et al*
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- Pathogens of mass-produced natural enemies and pollinators, *S Bjørnson, Sant Mary's University, Nova Scotia, Canada and C Schütte, Wageningen University, The Netherlands*
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- The relationship between results from laboratory product control tests and large cage tests where dispersal of natural enemies is possible: a case study with *Phytoseiulus persimilis*, *S Steinberg and H Cain, Bio-Bee Biological Systems, Sde Eliyahu, Israel*
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- Guidelines for quality control of commercially produced natural enemies, *J C van Lenteren, A Hale, Nature's Alternative International, Canada, J N Klapwijk, Berkel and Rodenrijs, The Netherlands, et al*
- Basic statistical methods for quality control workers, *E Wajnberg, INRA, France*

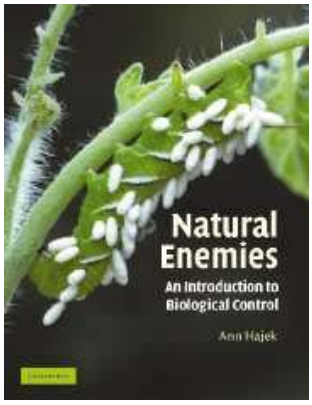
How to measure insect movement?

The 50th anniversary's issue of the International Journal of Pest Management (Vol. 50, number 3, September 2004, p. 147-242; www.tandf.co.uk) is completely devoted to the topic of effective marking and tracking techniques for monitoring natural enemy movements in pest management. In the papers the following topics are treated:

- The need for effective marking and tracking techniques for monitoring of insect predators and parasitoids
- The use of dyes to mark populations of beneficial insects in the field

- Marking by abrasion or branding and recapturing carabid beetles
- Pollen grains as markers to track movements of generalist predators
- Use of bacteria for monitoring behaviour of parasitoids
- The use of C3 and C4 plants to study natural enemy movement and ecology
- The use of rubidium marked natural enemy refuge in the establishment and movement of Bemisia parasitoids
- Gut sugar analysis in field-caught parasitoids
- A multiple ELISA system for simultaneously monitoring intercrop movement of mass-released insect predators
- Optimizing a protein-specific ELISA for the detection of protein-marked insects
- Molecular markers to study population structure and dynamics in beneficial predators and parasitoids
- Migratory and foraging movements in beneficial insects: a review of radar monitoring and tracking methods
- The potential of portable harmonic radar technology for the tracking of beneficial insects

Natural Enemies: An Introduction to Biological Control
Ann Hajek, Cornell University.



This new introductory book by Ann Hajek on biological control has recently been published by Cambridge University Press. The book covers the major strategies used in biological control, different types of natural enemies used for biological control of invertebrates, vertebrates, weeds and plant pathogens, and the ecological underpinnings behind each type of biological control. Non-target issues are discussed along with present day use of biological control and integration of biological control with other pest management strategies. Throughout the book, specific examples and case studies from around the world are provided. The book includes many illustrations, graphs and tables, along with selected references for further reading at the end of each of the 19 chapters.

18. MEETINGS AND NEWSLETTERS

Please consult the IOBC-WPRS website (www.iobc-wprs.org) for future meetings on biological control. The IOBC-WPRS newsletter PROFILE can also be found at this website and contains a lot of information about working group activities.

Newsletter contributions: I would like to thank all those members who sent 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, October 2004