

# IOBC Newsletter 57

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

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IOBC/OILB is affiliated to the International Council of Scientific Unions (ICSU)  
as the Section of Biological Control of the International Union of Biological Sciences (IUBS)

## EDITORIAL

### "Sex, Lies and Computer Tapes"

I would first like to acknowledge the leadership and hard work by the past Executive Committee: President, Jack Coulson; Secretary-General, Jean-Paul Aeschlimann; Vice-Presidents, F.A. Klingauf and G. Beglyarov, and Treasurer, J. Freuler.

During the last four years, the Executive Committee, working closely with the eight Global Working Groups (*Ostrinia nubilalis*; *Heliothis*; Quality Control of Mass-Reared Arthropods; *Trichogramma* and Other Egg Parasitoids; Fruit Flies of Economic Importance; Biological Control of Bruchids; Ecology of Aphidophaga; and Biological Control of *Plutella*), the six Regional Sections (West Palearctic; East Palearctic; South and East Asian; Nearctic; Neotropical; and Afrotropical), and the Chief Editors (C. Bénassy and J.M. Rabasse) and reviewers of *Entomophaga*, has helped to revitalize biological control and IOBC. They have set a high standard of excellence, and a challenge for us to meet. My thanks go to all on behalf of the membership of IOBC.

It is a privilege to have been selected to serve as President of IOBC, and I thank my colleagues for this great honor. I believe that biological control offers more opportunities than ever to contribute to basic and applied research in many fields, and to help manage pests of agriculture, forestry, environmentally-sensitive situations, and urban areas. It is clearly the most cost-effective and environmentally-favorable strategy for pest management. Together, we can raise the visibility, credibility, acceptability, and use of biological control.

You may wonder about the title of my address, "Sex, Lies and Computer Tapes": how it relates to biological

control, and what relevance it has to global pest management. Let me explain.

### "Sex ..."

Biological control is a very sexy topic! What area of research could be more stimulating and satisfying than working with basic ecological systems, and having the results benefit society as a whole?

This view that biological control is a sexy or highly appealing topic is, of course, not new. It is interesting to look back at some of the editorials by past IOBC Presidents, who expressed similar sentiments:

In 1977 (*IOBC Newsletter* 9), E. Biliotti pointed out that more than 25 years ago, "far-sighted pioneers ... recognized the need for an ecologically oriented crop protection", and that these people succeeded despite poor support and "even antagonism."

By 1981, K.S. Hagen (*IOBC Newsletter* 19-20) concentrated on the increasing numbers of pests that were becoming resistant to pesticides, and looked to biological control, host-plant resistance and integrated pest management (IPM) as priorities for the future. Hagen also noted that very few IPM programs "include monitoring for natural enemies and consideration of their impact on pest populations". This is as true today as it was in 1981. He also thought that the importance of biological control of pests was widely recognized.

In 1984, V. Delucchi (*IOBC Newsletter* 33) was less optimistic, stating about IOBC (but also true of biological control in general) that "The present financial situation is, however, catastrophic and old problems tend to persist."

J. Coulson, in 1988 (*IOBC Newsletter* 44), concentrated on the international nature of biological control, and the need for colleagues in different

disciplines to come together. He also expressed the sentiment that biological control is "a most exciting profession [that] requires international communication and cooperation."

However, it is not the membership of IOBC that must be convinced about the sexy nature of biological control. I believe that the greatest challenge to be faced in the next decade is to share our excitement and passion about biological control with those who, for lack of objective information about its unprecedented safety and benefit:cost record (or perhaps for other reasons), are often lukewarm, or even negative about biological control. These biological control stakeholders include environmentalists, politicians, the media, regulators, and the general public.

"... Lies ..."

*Redefining Biological Control: "Lumpers" vs. "Splitters"*

One of the ironic aspects of biological control is that it is *so* sexy that some workers in valuable related fields (e.g., integrated pest management, cultural control, sterile insect technique, some aspects of biotechnology, etc.) define their work as biological control.

Such inappropriate redefinition is also clearly not supported by most traditionally-trained biological control practitioners (i.e., those workers trained in classical biological control, augmentation of natural enemies, or conservation of natural enemies).

IOBC recognized that these were separate but inter-related disciplines decades ago, when our journal was named *"Entomophaga. A Journal of Biological and Integrated Control."*

I think that the most important pitfall is that *redefining biological control based on political or economic expediency confuses non-scientists, which can lead to less support for biological control and unrealistic expectations of what it can deliver. All biologically-based pest management strategies are not biological control.*

*"Biological Control is Simple"*

Another misstatement is that "biological control is simple." Superficially, biological control *seems* simple: a natural enemy attacks or competes with a pest (the naive "good bug vs. bad bug" conundrum).

The danger of this concept is that, since biological control is sometimes thought to be simple, non-specialists think that it can be done part-time, and with few resources. However, 100 years of research indicates that when simplistic, undersupported, or non-evaluated "squirt and count" biological control is conducted, the success rate is lower, the mechanisms for success or failure are not learned, resources are wasted, the pest is probably not managed, and biological control gets a "black eye."

The lesson from this is that biological control is certainly *not* simple, and is most effective when directed by full-time scientists who are trained in and dedicated to biological control. We need to make it clear to decision-makers that the very complex, fascinating ecological mechanisms which underpin biological control can only be revealed through careful, long-term, science-driven research, and that the resources invested in research are returned manifold in greater efficiency of future programs and more knowledge about biodiversity and the world in which we live.

*Classical Biological Control "Re-establishes the Natural Balance"*

I have frequently heard it stated that a goal of classical biological control is to re-establish the "natural balance" as it exists in the home range of the pest. This is normally expressed in the context of trying to simplify complex ecological interactions to educate non-specialists.

Of course, this is completely incorrect, and ignores basic ecological mechanisms. In the home range, the "natural balance" is between a species (which becomes a pest in a new or disrupted environment), its natural enemies, and *their* natural enemies, all interacting in specific habitats, influenced by climate, season, land management practices, pesticide loads, and so forth.

Only those natural enemies which are sufficiently specific and appear to operate at a time in the life history of the pest when they can have some impact on the pest population should be considered as biological control agents. Therefore, *biological control attempts to create quite an "unnatural balance" by utilizing carefully-selected species from specific trophic levels.*

*"The Golden Rule", or Philosophical Commitment?*

Another disturbing trend with which I disagree is the tendency to concentrate on what some call "The Golden Rule." This means that the scientist with the *Gold* (money) *Rules* (controls). It is true that more resources -- much more -- are needed in biological control globally. However, the needed resources extend far beyond *Gold*.

For example, there is a critical shortage globally of trained systematists for virtually all taxa. Even more disturbing is that very few scientists are being trained as systematists. Unless this trend is reversed, who will provide this vital research function for biological control? In fact, the need for systematists in biological control is exactly the same as for other critically-important activities, such as evaluating biodiversity.

What good will be served in supporting "squirt and count" biological control instead of long-term, scientifically based, ecological investigations? From whence will come the data bases on evaluation of successes, failures, impact on non-target species and biodiversity, reductions in pesticide usage, benefit:cost studies, etc., if *Gold* remains the goal? How will the

science of biological control advance, and how will the contributions that biological control can bring to global environmental health be delivered, if short-term resources and political expediency, rather than science, dictate the selection and direction of projects?

In short, I believe that concentrating on "*The Golden Rule*" to the exclusion of other needs is a naive and dangerous practice which contributes to bad science, short-term rewards, and loss of credibility. Instead, we should emphasize a philosophical commitment to science, as is generally the goal in biological control programs.

Given the "Sex ..." and "... Lies ..." of biological control, and I have only listed a few of each of these, what can we do as biological control scientists to increase credibility, and expand the use of biological control globally?

### "... Computer Tapes"

Although somewhat trite, I believe that a large part of the answer to some of the challenges facing biological control lies in informing and educating our stakeholders. Scientists do not have a good track record in this area. For example, Barry Jones (former Minister for Science in Australia), was fond of calling scientists "wimps", because they would rarely speak out in defense of their science, and relied on someone else to do it for them.

Of course, "someone else" rarely appears. Biological control, like many aspects of science, suffers globally because of a lack of informed biological control advocates (i.e., ambassadors and lobbyists), and available, objective, pertinent information.

What can we do? Some suggestions follow.

Be clear about what constitutes biological control.

Redefinition of terms is not new to science or to biological control, and can be positive, since it forces re-examination of our biases. It is unlikely that we will be able to alter this practice pertaining to biological control. We can, however, define carefully what we regard as biological control, and what is more appropriately placed in other strategies of integrated pest management.

Be realistic about biological control.

I believe that we should be very careful not to present biological control as a "magic bullet" or a panacea. There are *always* risks associated with introductions of exotic species, augmentative releases of parasitoids, predators and diseases, and conservation of natural enemies. The challenge is to make decisions based on a relative risk assessment (where biological control is often the method of choice), but not to equivocate due to absence of unattainable, absolute information.

Also, does biological control have a "perfect record," as is often stated? By "perfect" is it meant that there are

*no effects* on non-target species or the environment? It can be demonstrated that there are *no major negative effects* as a result of biological control in the vast majority of cases, but this is not a "perfect record" by the above definition. After all, successful biological control results in major environmental perturbations: reduction of a pest species, concomitant re-ordering of the trophic interactions, etc. To be sure, these are almost always *positive environmental effects*, but they also can be *major environmental effects*. If biological control couldn't produce major environmental effects, why would it be conducted? *Biological control affects the environment, usually in ways that are subtle and beneficial to humankind and the environment.*

Finally, I believe that *biological control should be the first option considered when faced with a pest problem*. It should also be the first option ruled out where it is inappropriate (such as when it is possible to eradicate a newly discovered pest species). Too often biological control is only considered when all other options for managing a pest have failed. Even then, biological control is often successful.

Inform and educate biological control stakeholders.

We must become proactive: inform administrators, environmentalists, politicians, the media, regulators, students, other scientists, and the public about the benefits of biological control. Prepare educational materials, written in non-technical language, and target key groups and individuals. Speak at local environmental group meetings. Follow with telephone calls, personal visits, and radio or television interviews. Most scientists are prevented from *lobbying*, but not from *informing*.

Many potential supporters are occasionally cautious about biological control because they know something of the damage caused by detrimental introduced species. However, when presented with the outstanding safety record of biological control, cautious people can become supporters. This is particularly true for environmentalists, who should be (and sometimes are) our strongest supporters, but often lack objective information on which to form an opinion. We can change this.

Individual scientists can do much to inform and educate stakeholders about biological control. However, any us alone has limited knowledge and resources. Therefore, I have proposed formation of a new Global IOBC Working Group on "Training, Information and Education in Biological Control" (see page 5) to help coordinate this effort on a global scale.

Support development of a biological control philosophy that can be used to guide decision-makers. (One example, from the United States Department of Agriculture, Animal and Plant Health Inspection Service, is included in this *Newsletter*.)

Once a philosophical position supporting biological

control is in place, commitment to its use *will* follow. I do not want to downplay the difficulty in doing this: some individuals (amazingly, even some scientists) scoff at developing "philosophies" for their organizations. But consider this: why is support for biological control eroding, rather than strengthening, in some parts of the world? A major reason is that resources are more limited now than ever before, and the people who allocate resources are committed to something else. *If biological control scientists don't take the time to educate decision-makers, support for biological control will continue to lag!*

Reject "squirt and count" biological control and "*The Golden Rule*", and emphasize the benefits of long-term, science-based, and science-driven programs, in which teams of collaborators plan, conduct, monitor and evaluate the work.

Very little is learned when agents are released haphazardly or without evaluation, when hypotheses are not proposed or tested, or when collaboration is minimized. Biological control is often best handled by teams (researchers, extension workers, farmers, economists, etc.) who collaborate on the program from beginning to end. In fact, I believe that success rates have very little to do with how much money is spent, if the use of those resources is misdirected or not based on the best available science.

Let me close by saying that your new Executive Committee wants to hear from you about any issues of importance to biological control. We look forward to working with you over the next four years, and to the challenge of strengthening global biological control.

E.S. DELFOSSE  
President IOBC Global

## 1992 IOBC COUNCIL MINUTES

Meetings were held 2 and 3 July during the 19th International Congress of Entomology in Beijing, China. The following council members were present: J.R. Coulson, Past President Global IOBC; E.S. Delfosse, President Global IOBC; J.P. Aeschlimann, Past Secretary-General; F. Bigler, Secretary-General Global IOBC; E. Hoebaus, Treasurer Global IOBC; R. Cavalloro, President WPRS; F. Kozar, Exec. Committee Member EPRS; Y. Hirose, President SEARS; M. Takagi, Secretary/Treasurer SEARS; J. Boussienguet, President ATRS; P. Liedo, Vice-President NTRS; G.R. Buckingham, President-elect NRS.

International Conference on Biological Control. The idea of an International Conference on Biological Pest Control, organized by IOBC was discussed. The Council believes that there is an urgent need for such a Conference in the near future because: 1. An

international, common platform should be offered to biocontrol specialists working with different organisms (weeds, fungi, arthropods) in order to strengthen cooperation and communication. 2. An increasing number of contributions at international pest control conferences deal with biocontrol. 3. IOBC would like to increase future activities in biocontrol of weeds and fungi and promote interdisciplinary research and implementation in biocontrol.

The president of Global IOBC will draft a proposal and submit it for comment to the whole IOBC. Other organizations which could support the conference logistically and financially and eventually act as co-organizer will be contacted. It is suggested to organize the conference in Montpellier, France, possibly in 1994 or 1995.

Finances and Membership. The financial situation and the evolution of membership was presented by the past Secretary-General. Finances have improved and the number of IOBC members increased considerably. The Secretary-General will ask the conveners of the working groups to establish a budget for the years 1993 and 1994 by the end of 1992.

Entomophaga. A report on the journal *Entomophaga* was given by the past Secretary-General. The number of subscribed copies increased considerably during the last few years. The delay between acceptance and publication of articles was reduced to approximately 12 months. Several Council members expressed their hope that this time lapse will be reduced further. The rejection rate of submitted manuscripts was 44% (1991) and 34% (1992). The past Secretary-General informed about a managing committee meeting held in May 1992 in Montpellier. The managing committee recommended to amend the title of the journal. This was discussed and several options to *Entomophaga* were proposed. It was decided that the president should submit proposals to all regional sections, the managing committee taking the final decision afterwards. It was discussed whether regional sections of IOBC could support journals other than *Entomophaga* within their respective regions. The Council decided unanimously that regional sections could do so provided the name or the logo of IOBC is not mentioned in these journals.

Global Working Groups. Activities of the global working groups were presented by the past Secretary-General. Proposals for establishing two new working groups were discussed. *Chromolaena* is recognized as an important weed in tropical areas on which a working group could promote the dissemination of information and foster research activities. An official application to establish the new working group is expected from Dr. R. Muniappan (Guam) by fall 1993. The council recognized the need for a working group dealing with public relation activities regarding biocontrol, including information, education and training in biological control

at all teaching levels. Moreover, the working group should bring information on biocontrol and IOBC activities closer to politicians and decision makers. It was proposed to contact other international and national bodies as e.g. UNESCO, FAO, UNEP, USDA; European Commission etc. to negotiate support and common programmes. A proposal will be prepared by the president of the Global IOBC within the next months. A number of comments were made on the activities of Working Groups. Among others were discussed: - publications of working groups (proceedings, bulletins etc.) should bear the IOBC sign, - structure and organization of a group can vary according to the needs, e.g. 2 or 3 convenors instead of a single convener, - convenors can raise additional funding for their working group activities, - IOBC funding of the working groups is limited and should be used primarily for publications, general costs of meetings etc. rather than for travel and accommodation expenses of single members or invited persons.

#### Reports of Regional Sections.

##### South and East Asian Regional Section (SEARS)

The president of SEARS reported on the financial problems of the section, especially those of members in China who are not able to pay the membership fee in foreign currencies. The problem has to be discussed and solutions should be found in the near future. G. Buckingham offered his help and will come up with a proposal he is preparing together with R. Wang from the Institute of Biological Control in Beijing.

##### African Tropical Regional Section (ATRS)

This section was founded in 1990 and still faces major problems regarding the finances and the establishment of working groups. However, two working groups (Stemborers and *Chromolaena*) are being discussed. Political and linguistic barriers are among the main difficulties mentioned by the president. The *Chromolaena* meeting in 1993 in Ivory Coast will offer an excellent opportunity to make IOBC known and a PR campaign should be prepared for the meeting.

##### Neotropical Regional Section (NTRS)

At present, three working groups are functional (*Trichogramma*, Biocontrol of weeds and Fruit Flies). A new working group on Coffee borer will be established soon and a new group on Whitefly is being proposed.

##### West Palearctic Regional Section (WPRS)

The president reported on the activities of this section. At present there are 14 working groups, 4 study groups and 4 commissions formed, each with a specific subject. An average of 6-10 bulletins are published every year generated by IOBC/WPRS scientific workshops and conferences. A list of all IOBC/WPRS publications is being prepared.

##### East Palearctic Regional Section (EPRS)

The political changes in eastern Europe and the former USSR created a variety of difficulties to this section.

Though it was decided during an EPRS Council meeting in May 1992 in Poland to keep the present structure of the section, changes are expected with the developments in this geographical area. At present, six permanent commissions and 10 working groups are established and proceedings are disseminated regularly.

##### Neartic Regional Section (NRS)

At present, two working groups (Biocontrol in North-Eastern US and Biocontrol in Glasshouses) are established and a new working group on Whitefly is proposed. One section meeting is organized once a year and Newsletters are mailed several times a year.

The council meeting was closed by the President who acknowledged the merits of the Past President, the Past Secretary-General and the Past Treasurer.

F. Bigler  
Secretary-General IOBC Global

## WORKING GROUPS

Names and addresses of the chairmen of WG can be found in IOBC Global Newsletter No 56.

#### **A Proposal for a New IOBC Global Working Group:**

##### *Training, Information, and Education in Biological Control*

Several factors sometimes prevent biological control scientists from becoming proactive in informing key stakeholders about the benefits of biological control (heavy demands on our time, lack of specific training, resistance from administrators, etc.). I believe (see *Editorial*) that we *must* do a better job of informing administrators, environmentalists, politicians, the media, regulators, and the public about the benefits of biological control.

Individual scientists can do much to inform and educate stakeholders about biological control. However, any of us alone has limited time, knowledge and resources. Therefore, I propose formation of a new Global IOBC Working Group on "*Training, Information, and Education in Biological Control*" (the *TIE WG*) to help develop and coordinate this effort on a global scale. I raised this proposal at the Executive Council meeting in Beijing, which was supportive of developing the concept further. I have also discussed it with key biological control scientists around the world. I would now like **feedback** from IOBC members.

Some possible activities for the *TIE WG* in each category are listed below.

### Training

A need often expressed is for adult training in various aspects of biological control and integrated pest management. For example, groups which have expressed interest in the United States are State Departments of Agriculture, the National Plant Board and the USDA. The specific subjects requested include short courses in quarantine procedures, basics of biological control, and basics of integrated pest management.

Several countries already teach international quarantine courses, which sometimes include sections on biological control and integrated pest management, so materials are available, but scattered. The proposed *TIE WG* would request from IOBC members (and colleagues) materials that are available around the world, and produce a bibliography. Some of this material, if adequate, could be made available (with permission of copyright owners, of course) to IOBC members. It might also be necessary to produce new material covering these subjects, which could be made available to users at cost.

### Information

Each of us have prepared short summaries of programs. Individually, these are important documents, but do not carry much weight because of their specific focus. The proposed *TIE WG* would first request copies from IOBC members (and colleagues), and collate them on a worldwide basis. The idea is to produce informative, readable program summaries, which cover items (as available) such as damage caused by the target species; effects of agents; benefit:cost ratios; reduction in pesticide usage; etc. The material could be published as an *IOBC Bulletin*. This *Bulletin* could be translated into several languages, and made available generally.

### Education

Possibly the greatest need in this area is to educate the world's children about ecology and biological control. Unfortunately, there are almost no biological control educational materials available to do this. In preliminary contact with educators, we have learned that teachers will generally not use information if it is not focused (documents such as the proposed *IOBC Information Bulletin* would be a valuable resource for this project, but would not be focused sufficiently for this purpose). Age-specific lesson plans are needed for pre-school through high school and older.

The proposed *TIE WG* would request that the IOBC membership contacts educational groups in their areas for examples of available material. The *TIE WG* would then collate these documents. The *TIE WG* would then work with key educational groups around the world (United Nations, National Science Teachers' Associations, etc.), to produce age-specific lesson plans about biological control, ecology, and integrated pest

management. An *IOBC Educational Workbook* would be published, which would be translated into several languages, and made available at cost (or free if a sponsor can be found) to schools around the world.

The tasks of informing, educating and training the world about biological control is daunting. The temptation is to say that the job is too big, so it shouldn't even be started. However, unless we make the attempt, it will not be done. The potential long-term gains are as enormous as the risks. Your comments about this proposal would be greatly appreciated.

E.S. DELFOSSE  
President IOBC Global

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### A Proposal for a New IOBC Global Working Group on *Chromolaena odorata*

The Council of IOBC has decided at the meeting in Beijing (see minutes in this Newsletter) to support the establishment of a *Chromolaena WG* under the auspices of IOBC Global. The establishment is planned during the International Workshop on *C. odorata* in Abidjan, Cote d'Ivoire (November 15-19, 1993). This new WG will be the first devoted to weed control. Information can be obtained from R. Muniappan, Agric. Experiment Station, University of Guam, Mangilao, Guam 96923, USA. Fax (671) 734-6842, Tel. (671) 734-3113. Comments and suggestions are welcome.

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### WG FRUIT FLIES

With the participation of 65 Fruit Fly workers from 14 countries and 3 international organizations, the first meeting of the Working Group on Fruit Flies of the Western Hemisphere was held at San Jose, Costa Rica, November 9-13, 1992.

The WG on Fruit Flies of the West Palearctic Regional Section will have a plenary meeting in conjunction with the IOBC/WPRS General Assembly on October 14-15, 1993 at Lisbon, Portugal. For further information please contact M.I. Guardado, Instituto de Investigação Científica Tropical, Rua de Junqueira 14, 1300 Lisbon, Portugal.

The 4th International Symposium on Fruit Flies is scheduled for May 1994 at Florida, USA. The First announcement has been issued and is available from C.O. Calkins, USDA-ARS, P.O. Box 14565, Gainesville FL 32604, USA, or J. Hendrichs, IAEA Laboratories, A-2444 Seibersdorf, Austria.

Fruit Flies: Biology and management, M. Aluja & P. Liedo (Eds.) 1993, 492 pp. (Proceedings of the 3rd International Symposium), may be ordered from the publisher, Springer-Verlag, 175 Fifth Avenue, New York NY 10010, USA (Tel (212) 460-1602, Fax (212) 473-6272)

Fruit Fly News No 11, 1992, 48pp. is still available

from the chairman P. Liedo Fernandez (see Newsletter 56). The following items are included (among others) in the contents: Reference on Tephritidae Oct.90-Feb.92; Statistics 1991: Fruit Fly research throughout the World; Services available; Address list of IOBC-WG Fruit Flies.

#### WG ECOLOGY OF APHIDOPHAGA

The 5th International Symposium on "Behavioural Ecology, Augmentation and Enhancement of Aphidophaga" will be held from 6-10 September 1993 in Colle-sur-Loup (France). Other contributions fitting into the scope of the WG are also welcome and may be presented as posters. Deadline for manuscripts submission is March 31, 1993. Informations can be obtained from G. Ipert or J.M. Rabasse. INRA, P.O. Box 2078, 06606 Antibes, Cedex-France. Fax ++93678825.

#### WG TRICHOGRAMMA AND OTHER EGG PARASITOIDS

The WG is organizing the 4th International Symposium in Cairo, Egypt, September 1994. Under the sponsorship of the ministry of Agriculture, Egypt and IOBC. The publication of papers in "Les Colloques de l'IN.R.A." is planned. Members are urged to attend and give a presentation on their research work. The First Announcement can be found in issue number 6 of Tricho. News. Informations and Trichogramma News No 6 can be obtained from: Dr. S.A. Hassan, Inst. for Biological Pest Control, BBA, Heinrichstr. 243, D-6100 Darmstadt, Germany. Fax +615140790.

#### WG OSTRINIA

The International Working Group on Ostrinia (IWGO) Newsletter has been released December 1992 (Vol. 12/No 2). This issue includes an editorial from Berger H.K. (Editor), a publication of the "Saccharotrophism as a factor affecting nutritional and developmental process of *O. nubilalis* Hbn.", a report from the fifth meeting of the publication committee held in 1992 and the abstracts of papers presented at the XVth IWGO-Symposium in Martonvasar, Hungary, Sept. 1991. Information: H.K. Berger, Federal Institute for Plant Protection, Trunnerstr. 5, A-1020 Vienna, Austria. Fax +1 216 08 25.

#### WG QUALITY CONTROL OF MASS-REARED ARTHROPODS

New Chairman: N.C. Leppla, ASDA/APHIS, Fed. Bd., 6515 Belcrest Road, Hyattsville MD 20782 USA. Fax +301 436 6013.

New Assistant Chairman: M. Benuzzi, Biolab, Via Masiera 1, 1191, 47020 Martorano-Cesena, Italy. Fax + 547 380795.

Reports of a workshop held in Horsholm, Denmark in November 1992 can be obtained from the Secretary-General of IOBC Global (F. Bigler, address indicated in

this issue).

The report includes: 1. figures on the total value of marketed biological agents including microbials (J.C. van Lenteren), 2. the objectives of a proposal for EC Quality Control programme funding ( J.C. van Lenteren), 3. a table with information on import and registration regulations in 18 countries, 4. a summary of quality issues discussed among 13 producers of natural enemies from Europe and North America and 5. guidelines for Product Control of 12 natural enemies (*Encarsia formosa*, *Phytoseiulus persimilis*, *Diglyphus isea*, *Dacnusa sibirica*, *Aphidius spp.*, *Aphidoletes aphidimyza*, *Chrysoperla carnea*, *Orius spp.*, *Amblyseius cucumeris*, *Aphelinus abdominalis*, *Trichogramma brassicae*, *T. minutum*).

The next meeting will be held in Rimini, Italy, September 13-16, 1993. Information can be obtained from M. Benuzzi or N.C. Leppla.

## REGIONAL SECTIONS

### SOUTH AND EAST ASIAN REGIONAL SECTION (SEARS)

A new **Executive Committee** has been elected recently

**President:** R. Muniappan, Agricultural, Experiment Station, University of Guam, Mangilao, Guam 96923 (USA).

**Vice Presidents:** T.M. Manjunath, Biocontrol Research Lab., Pest Control Ltd., 479 5th Cross, R.T. Nagar Post, Ganganagar, Bangalore 560032, India.

A.I. Mohyuddin, PARC-IIBC Station, Murree Road, P.O. Box 8, Rawalpindi, Pakistan.

**Secretary-Treasurer:** M. Marutani (same address as R. Muniappan)

We all would like to express our thanks to the resigning SEARS committee members for their efforts and leadership in IOBC/SEARS. We welcome the new Committee and wish them success and satisfaction.

Biological Control in South and East Asia, Y. Hirose (Ed.), 1992. Kyushu University Press. IOBC/SEARS. (Proceedings of the 3rd IOBC/SEARS Regional Meeting held on October 4, 1989 in Tsukuba, Japan), may be obtained for \$12.00 from Y. Hirose, Institute of Biological Control, Faculty of Agriculture, Kyushu University, Fukuoka 812, Japan. Fax (92) 641 2928.

Report of an International Seminar on "Biological Control and Integrated Management of Paddy and Aquatic Weeds in Asia" held at Isukuba, Japan, October 19-25, 1992. Contents: IPM and prospects for biocontrol, Current status and improvements in IPM (country reports), Prospects for biocontrol of weeds,

Integrated control (IC) and allelopathy, IC and bioherbicides. Guidelines for biocontrol of weeds.

A summary of the report may be ordered from B. Napompeth, Director NBCRC, P.O. Box 9-52, Bangkok 10900, Thailand; Fax: (662) 579 3649.

Dr. B. Napompeth, Executive Director, National Biological Control Research Center, Kasetsart University, P.O. Box 9-52, Bangkok 10900, Thailand (Tel/fax (662) 579 3649 communicates the following new items from SEARS region:

1. The mottled waterhyacinth weevil, *Neochetina eichhorniae*, is now widespread in Thailand and neighboring countries. It was introduced to Thailand and released in 1977. The weevil is also doing very well in Australia. Under the auspices of the Australian Center for International Agricultural Research (ACIAR) the chevroned waterhyacinth weevil, *Neochetina bruchi*, was introduced from Florida to Australia and Thailand. Field releases began in Australia in 1989 and it is gaining its widespread establishment in both countries. In the field evaluation made in Thailand by CSIRO entomologists and NBCRC counterparts, Hansgeorg Pag and Menguito of the German-Philippine Biological Plant Protection Project also joined the evaluation team. As a result two consignments of the weevils, each of the respective species have been introduced to the Philippines for biological control of water hyacinth.

2. The leucaena psyllid, *Heteropsylla cubana*, which is native to South America and has become devastating in the Asia and Pacific region since 1984 is now reported from the East Coast of Africa. The coccinellid *Curinus coeruleus* and the parasite *Psyllaephagus yaseeni* have been introduced into several countries in the infected area. Cultures of these known natural enemies are available in Thailand for those interested in introducing them. They can be made available during December to January. Contact Dr. B. Napompeth.

3. In a collaboration with the Hawaii State Department of Agriculture, the tephritid gall fly, *Procecidochares utilis*, has been introduced and released in Thailand in September 1992 for the biological control of *Ageratina adenophorum* which is invading the northern naked hills of Thailand probably from the infestation in southern China. Earlier field releases made in October 1991 did not result in field establishment.

#### WEST PALEARCTIC REGIONAL SECTION (WPRS/SROP)

The proceedings of the conference organized by IOBC/WPRS in Veldhoven (NL) on September 8-13, 1991: "Biological Control and Integrated Crop Protection: Towards Environmentally Safer Agriculture" has been released. The book (239 pages) contains 9 contributions in the Research Section, 5 articles in the Policy Section and 4 articles in the Extension Section. The Conclusions and Recommendations are a synthesis of the conference and an outlook to the future of IPM and biocontrol and it is addressed to scientists, extension

specialists and policy makers.

The book can be ordered from Pudoc Scientific Publishers, Wageningen, The Netherlands.

A "commission on guidelines and endorsement" of WPRS has prepared guidelines on Integrated Production/Integrated Farming Systems (IP/IF). This basic document defines IP/IF, describes the underlying strategy and establishes technical guidelines and standards for implementation. Procedures for IOBC endorsement of regional IP/IF organizations are described. It is the first time that IP/IF guidelines are established by an international body and we hope it will help organizations, institutions and authorities to accelerate the dissemination of Integrated Farming. The full text is written in English, French and German. The book can be ordered from Dr. E. Boller, Swiss Federal Research Station, 8820 Wädenswil, Switzerland. Fax + (1) 780 63 41.

The next General Assembly of WPRS will be held at Lisbon, from October 18 to 20, 1993.

The WPRS Publication Commission has issued the following Bulletins:

1992/XV/1. Study Group "Biological Control of Fungal and Bacterial Pathogens", (jointly with EFPP). "New Approaches in Biological Control of Soil-borne Diseases". D.F. Jensen, J. Hockenhull & N.J. Fokkema (Eds). Proceedings of a Workshop. Copenhagen, Denmark, June 30 to July 4, 1991, 222pp.

1992/XV/2. Working Group "Integrated Control in Viticulture". Proceedings of a meeting at Conegliano, Italy, February 26-28, 1991. A. Schmid (Ed.), 121 pp.

1992/XV/3. Working Group "Pesticides and Beneficial Organisms". "Guidelines for Testing the Effects of Pesticides on Beneficial Organisms: Description of Test Methods". S.A Hassan (Ed.), 186 pp.

1992/XV/4. Working Group "Integrated Control of Field Vegetable Crops". Proceedings of a meeting at Vienna, Austria, October 28-30, 1991, 193 pp.

1992/XV/5. Working Group "Use of Pheromones and other Semiochemicals in Integrated Control". Proceedings of a meeting at San Michele All'Adige, Italy, August 31 - September 3, 1992, 145 pp.

#### EAST PALEARCTIC REGIONAL SECTION (EPRS/SREP)

The next General Assembly of EPRS will be held at Bratislava (Republic of Slovakia) from April 5 to 9, 1993.



## NEARTIC REGIONAL SECTION (NRS)

President: G.R. Buckingham, USDA/ARS, P.O. Box 147100, Gainesville, Florida 32614. Fax: + 904 374 6801.

Secretary-Treasurer: J.M. Nechols, Department of Entomology, Kansas State University, Manhattan, KS 66505. Fax: + 913 532 6232.

Corresponding Secretary: R. van Driesche, Department of Entomology, University of Massachusetts, Amherst, MA 01003. Fax: + 413 545 115

## NEOTROPICAL REGIONAL SECTION (NTRS/SRNT)

The proceedings of the IOBC Workshop on the "Opportunities for Implementation of BioControl in Latin America", J.R. Coulson and M.C. Zapater (Eds.), 1992 (72 pp.) have been released. Informations: M.C. Zapater, IOBC/NTRS President, Facultad des Agronomia, Univer. de Buenos Aires, 1417 Buenos Aires, Argentina. Fax: + (541) 7436 461

## ANNOUNCEMENTS

### BOOKS

ADAMS J.R., 1991. Atlas of invertebrate viruses, 336 pp., CRC Press, London. ISBN 0-8493-6806-5.

COULSON J.R., 1992. Release of Beneficial Organisms in the United States and Territories-1982. U.S. Department of Agriculture, Miscellaneous Publication No. 1505, 529 pp. While supplies last, single copies of this publication may be obtained, at no cost, on request from the USDA Biological Control Documentation Center, Bldg. 004, BARC-West, Beltsville, MD 20705. Fax: (301) 504 6355.

LAIRD M., LACEY L.A. & DAVIDSON E.W., 1990. Safety of microbial pesticides, 259 pp. CRC Press, Boca Raton, USA.

METCALF R.L. & METCALF E.R., 1992. Plant kairomones in insect ecology and control, 168 pp. Chapman & Hall, New York.

OHLENDORF B.L.P., ALDEN A. & SENEY H., 1991. Integrated pest management for apples and pears, 214 pp. Univ. of California, Div. Agricult. and Nat. Resources, Oakland CA, USA.

TARDIFF R.G., 1992. Methods to assess adverse effects of pesticides on non-target organisms, 270 pp. Wiley, Chichester.

VINCENT C. & CODERRE D. (Eds), 1992. La lutte biologique, 702 pp. G. Morin, Editeur. (Order from Lavoisier, Cachan Cédex, France).

ANNUAL REVIEW OF ENTOMOLOGY vol.38, January 1993, can be ordered for \$49.00 at following address: Annual Reviews, 4139 El Camino Way, P.O. Box 10139, Palo Alto, Ca 94303-0897. USA.

HARLEY AND FORNO L.W., 1992. Biological control of weeds: a handbook for practitioners and students, 88 pp. Inkata Press, Australia. Agribook services, 3 Evans Street, Burwood, Victoria, Australia 3125. P.O. Box 90, Hawksburn, Victoria, Australia, 3142. Tel./Fax (03) 888 8307.

KNIPLING, E.F., 1992. Principles of Insect Parasitism Analyzed From New Perspectives: Practical Implications for Regulating Insect Populations by Biological Means. USDA/ARS, agriculture handbook number 693, 337 pp. Can be ordered from Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954.

DE BARIAC H. & SUTHERLAND D., 1991. Bacterial Control of Mosquitos and Black Flies. Chapman and Hall, ISBN 0-04-45984-X.

ROUSH R.T. & TABASHNIK B.E., 1991. Pesticide Resistance in Arthropods, Chapman and Hall, ISBN 412-01971-X.

JULIEN M.H. (Ed.), 1991. Biological control of weeds. A world catalogue of agents and their target weeds. 3rd ed. 160 pp. CAB International, Wallingford, Oxon, UK.

### PERIODICALS-REVUES-PROCEEDINGS

ACTA PHYTOPATHOLOGICA ET ENTOMOLOGICA HUNGARICA vol 27/1-4, 1992 Part II, Proceedings of an International Symposium on Integrated Plant Protection in Orchards, held July 31-August 5, 1990. Order from Akadémiai Kiadó, H-1519 Budapest, P.O. Box 245.

LOMER C.J. & PRIOR C. (Eds.), 1992. Biological Control of Locusts and Grasshoppers. Proceedings of a workshop held at Cotonou, Benin, April/May 1991, 394 pp., CAB International Oxon OX 10 8 DE, UK. ISBN 0-85198-779-6.

CLOUSON J.R., SOPER R.S. & WILLIAMS D.W., 1991. Biological control quarantine: needs and procedures. Proceedings of a workshop, 336 pp. Publ. USDA/ARS ARS-99, Beltsville, USA. Fax: (301) 504 6355.

RIDGWAY L., MAY INSCOE & ARN H., 1992. Insect pheromones and other behaviour-modifying chemicals: Application and regulation. Proceedings of a Symposium held at the Brighton Crop Protection Conference - Pests and Diseases 1990, 19th November 1990. BCPC Monograph No. 51. BPCP, Farnham, Surrey, UK.

CARLO M.I., 1990. Microbial Insecticides. CRC Handbook of Natural Pesticides. 260 pp. CRC Press, London.

CHROMOLAENA ODORATA Newsletter No 6 has been released. This NL presents a paper on the "Effect of

Crude Oil on the Growth and Anatomical Features of *Chromolaena odorata* (L.) by L.S. Nyawuame, H.G.K. & Ekhhametalor, A.O., and an additional bibliography of *C. odorata*. Informations about the Newsletter can be obtained from R. Muniappan, Agric. Experiment Station, University of Guam, Mangilao, Guam 96923 USA. Fax: (671) 7346 842.

ILEIA Newsletter 3/92 (35 pp.) and 4/92 (35 pp.) include an article entitled "Learning about biological pest control" by J.W. Bentley. Order from ILEIA, P.O. Box 64, 3830 AB Leusden (NL).

ENVIRONMENTAL SOFTWARE is a periodical that publishes research articles and short communications on recent advances in environmental modelling and software. Subscription information can be obtained from: Nick Birch, Elsevier Science Publishers Ltd, Crown House, Linton Road, Barking, Essex, IG11 8JU, UK.

ECOLOGICAL ENGINEERING is a periodical for ecologists who, because of their research interests or occupation, are involved in designing, monitoring or constructing ecosystems. Elsevier Science Publishers, Attn. Mr. R. Hayward, P.O. Box 181, 1000 AD Amsterdam, (NL).

BIOLOGICAL CONTROL, THEORY AND APPLICATION IN PEST MANAGEMENT is a new multidisciplinary journal released by Academic Press Inc. For information: Academic Press, Inc., Journal Promotion Department, 1250 Sixth Avenue, San Diego, CA 92101, USA. Fax: (619) 699-6742.

PLANT PROTECTION NEWS No 28, June 1992, from South Africa is entitled "100 Years of Biological Control" and is entirely devoted to this topic. Editors address: Plant Protection Research Institute, Private Bag X134, Pretoria 0001, South Africa.

THE IPM PRACTITIONER: Monitoring the Field of Pest Management, Vol. XIV, No 11/12, Nov./Dec. 1992, presents the 1992 Directory of Least-Toxic Pest Control Products. Information: Bio-Integral Resource Center (BIRC), The IPM Practitioner, P.O. Box 7414, Berkley, CA 94707. Fax: (510) 524-1758.

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#### MEETINGS-CONFERENCES-COURSES

April 25-29, 1993. IOBC-NRS/WPRS joint working group meeting: "Integrated Control in Glasshouse". Asilomar Conference Center, Pacific Grove, California. Requests for informations should be addressed to: M.P. Parrella, Dep. of Entomology, Univ. of California, Davis, CA 95616.

May 2-6, 1993. "Pest Management: Biologically Based Technologies", Beltsville Symposium XVIII, Beltsville, USA. For information contact: XVIII BARC Symposium, Attn: Virginia Hupfer, Friends of Agricultural Research Beltsville, Rm. 128, Bldg. 001, Beltsville Agricultural Research Center-W, Beltsville, MD 20705-2350. Fax: 301-504-637.

August 1-6, 1993. 26th Annual Meeting of the Society for Invertebrate Pathology, Great Smokies Hilton Conference Center, Axheville, North Carolina. For local arrangements contact: Dr. Wayne Brooks, Dept. of Entomology, N.C. State Univ., Raleigh, NC, Fax: (919) 515-7746.

August 22-25, 1993. At the occasion of its 75th anniversary, the Wageningen Agricultural University (NL) is organizing an international conference entitled: The Future of the Land, Mobilizing and Integrating Knowledge for Land Use Options. Informations and registration forms may be obtained from the Congress Office, Wageningen Agricultural University, J.L. Meulenbroek, P.O. Box 9101, 6700 HB Wageningen (NL). Fax +31 8370 84884.

September 1994. 4th International Symposium on Trichogramma and other Egg-Parasitoids (for details see page 7 this Newsletter).

September 6-10, 1993. Weed management towards tomorrow. 14th APWSS and 10th CAWSS Conference. Contact APWSS & CAWSS Conference Secretariat, P.O. Box 1237, Milton, Qld. 4064, Australia, Fax: (07) 367 1471.

September 6-10, 1993. 5th International Symposium on Agghidophaga (for details see page 7 this Newsletter).

September 13-16, 1993. 7th International Workshop on Quality Control of Mass-Reared Arthropods (for details see page 7 this Newsletter).

September 14-16, 1993. 13th Long Ashton International Symposium: Arable Ecosystems for the 21st Century. The University of Bristol, England. Contact H.M. Anderson, Long Ashton, Bristol BS18 9AF England, Fax (275) 394007.

September 28-30, 1993. International Conference on Thysanoptera. Contact B.L. Parker, UVM Entomology, Research Laboratory, 65513 Spear ST., So. Burlington, VT 05403 USA, Fax: (802) 656-0285).

October 14-15, 1993. Fruit flies of economic importance. Workshop of the IOBC/WPRS WG (for details see page 6 this Newsletter).

November 1-14, 1993. A two weeks International Course on "In vitro Rearing Techniques for Egg Parasitoids of Insect Pests" at the Guangdong Entomological Institute Guangzhou 510260, Xingang West Road 105, China).

November 15-19, 1993. 3rd International Workshop on *Chromolaena odorata*, Abidjan, Ivory Coast. Contact R. Muniappan, Agric. Experiment Station, University of Guam, UOG Station, Mangilao, Guam 96923, USA. Fax: (671) 734-6842.

December 7-9, 1993. 3rd International Conference ANPP on agricultural pests. Contact F. Leclant,

ENSA/INRA, 2, Place Pierre Viala, 34060 Montpellier, France, Fax: 67 52 1554.

May 24-28, 1994, 7th European Workshop on "Insect Parasitoids". Contact T. Hofsvang, Norwegian Plant Protection Institute, Dep. of Entomology and Nematology, Fellesbygget, N-1432 As, Norway.

## MISCELLANEOUS NEWS

### Organizational Biological Control Philosophies

I believe (see Editorial) that two of the main reasons why biological control is not supported as strongly as might be expected, given the current global emphasis on development of environmentally acceptable strategies for pest management, are that resources are more limited now than ever before, and the people who allocate resources are committed to something else.

It is difficult to modify the entrenched philosophies of organizations, but it can be done. One example is the biological control philosophy recently approved by the United States Department of Agriculture, Animal and Plant Health Inspection Service (USDA/APHIS). This statement follows (from Mr. R. Melland, Administrator, 7 August 1992)

"APHIS believes that modern biological control, appropriately applied and monitored, is an environmentally safe and desirable form of long-term management of pest species. It is neither a panacea nor a solution for all pest problems. APHIS believes that biological control is preferable when applicable; however, we also recognize that biological control has limited application to emergency eradication programs. Wherever possible, biological control should replace chemical control as the base strategy for integrated pest management.

In support of this philosophy, APHIS will develop regulations that facilitate the release of safe biological control agents, while maintaining adequate protection for American agriculture and the environment. The regulations will give clear and appropriate guidance to permit applicants, including specific types of data needed for review and environmental analysis and specific time limits for Agency review. They will be updated as the science progresses. APHIS believes that public input on procedures to approve the release of biological control agents is a desirable and necessary step, and will strive to gather input from scientists, industry, and the public."

E.S. DELFOSSE  
President IOBC Global

### A burning issue: "Call to save Bt"

Research scientists are calling on the US government and industry for greater care in the use of *Bacillus thuringiensis*. The call, made in a report to the USDA by government and university research workers follows the news of resistance to Bt toxins in field populations of insects in the Pacific area and the laboratory creation of resistant pests in only a few generations. The plea is considered urgent because several agrochemical companies are developing genetically engineered crop plants that contain Bt toxin genes, in preparation for a multibillion dollar industry in insect resistant crops over the next few years. The researchers fear that this massive release of Bt toxins into the environment will accelerate the development of Bt resistant pests and render what is often considered the only commercially viable biopesticide virtually useless. The report recommends the setting up of an independent national advisory body, reporting to the USDA, to monitor the use of the biopesticide and recommend research needed. It also says that farmers should use Bt as one of a number of control methods in an IPM approach and not rely on it alone. This also includes the use of the new resistant crop varieties which should be planted alongside non-engineered plants to preserve a reservoir of susceptible insect pests. This should help to prevent Bt resistance, which is almost certainly due to massive overuse of the biopesticide by some farmers, as happened with various chemical pesticides in the past. The researchers want the government to issue regulations on the use of Bt biopesticides. So far, this seems unlikely, and the abuse which has led to some resistant pest populations already does not bode well for non-statutory guidelines.

Biocontrol News & Information,  
June 1992, Vol. 13, No. 2

### FAO Drafts Guidelines on BC Importations

As interest in biological control introductions has increased around the world, it has become evident that it would be helpful if a world body promulgated suggested standards of good practice to provide guidance to countries interested in making importations but lacking in past experience with the activity. Responding to this need, FAO assembled a group of authorities on biological control importations. IOBC was represented by several committee members (Aeschlimann, IOBC Global; Boussienguet, ATRS; Coulson, IOBC Global; Hirose, SEARS; Huber, WPRS; Napompeth, IOBC Global) as well as by council or individual members. The draft code covers matters pertaining to both the importation and release of biological control agents and the sale of either reared macro agents (parasites and predators) and formulated micro agents (pathogens). Specifically there are 11 articles.

Article 1 defines the scope and objectives of the code. It is noted that the code applies to the importation of live pest control agents (parasites, predators, and pathogens). The code does not deal with toxins produced by microbes which are covered by the code for pesticides. Nor does it apply to methods such as behavior-modifying chemicals, autocidal methods, or resistant host plants. Nor does it cover genetically modified organisms which will be dealt with elsewhere. The intent of the code is to set forth responsibilities and to establish voluntary standards of conduct for all public and private entities engaged in or affecting the distribution and use of biological control agents, especially where national legislation to regulate their use does not exist or is inadequate.

Article 2 sets forth definitions of various terms employed in the code.

Article 3 states three general principles that should govern the importation of natural enemies. First, importations should only be carried out with the consent of the government of the importing country. Second, neighboring countries in the same ecoregion should be consulted to clarify potential conflicts of interest. Third, biological control introductions should only be carried out that are in the public interest. A finding of the public interest should be made based on a feasibility assessment which would include information on the identity, distribution, probable origin, importance and natural enemies of the pest.

Article 4 covers procedures for the importation and release of natural enemies. This section notes that approval for release of an agent should be based on a dossier of information about the agent to be developed by the agency proposing to make the release and that this dossier should include information as to the identity of the agent, a summary of all existing information about the natural enemies of the target pest, and laboratory information about the natural enemies of the target pest, and laboratory information as to the host range of the natural enemy, sufficient to ensure the safety of the species to be imported (Note, the degree of host specificity information needed is not indicated, but is to be developed in another document, and will vary by type of agent to be imported).

Article 5 specifies methods for the shipping of natural enemies, the documentation needed for this process and the handling methods to be used in quarantine to ensure that shipments are free of contaminants. It is stated that all biological control agents should be reared at least one generation in quarantine. It should be noted that this is not the current practice for parasites, which in many cases are released from quarantine after being reared to the adult state from field collected immature stages. Article 6 covers the release and evaluation of biological control agents. This article indicates that records of releases should be kept and that evaluations of the impact of released agents should be made. It is interesting to note that evaluations have often been neglected by importing agencies and that the code

would elevate evaluation to a standard part of all release programs.

Article 7 deals with the creation of appropriate legislation to govern the importation of natural enemies, including specifically the creation of an agency charged with reviewing dossiers of organisms proposed for importation and making risk/benefit judgements about the pest and the proposed natural enemy importation to see where the public interest lies.

Article 8 covers the responsibilities pertaining to the commercial trade in formulated pathogens or reared natural enemies, including conformity to the FAO pesticide code, safety testing, limitation of trade to responsible firms, training of distribution staff, and response to problems that may arise.

Article 9 concerns the labeling, packaging and storage of natural enemies and formulated pathogens.

Article 10 concerns the exchange of information about natural enemies and projects, including the maintenance of records of activities, reporting activities in the public record, and keeping of voucher specimens.

Article 11 deals with monitoring the observance of the code.

NRS Newsletter, Vol.14, No.1

#### Membership fees 1993

Invoices for membership fees 1993 are already mailed or will be mailed to you soon by the Treasurers of your Regional Section or IOBC Global. In order to keep administration at minimum costs you are asked to pay your fee as soon as possible.

#### REQUESTED: NEWSLETTER CONTRIBUTIONS

I would like to thank all those members who are taking time to send items for the Newsletter. If you have not previously sent anything, please consider doing so. Remember, this is your opportunity to let others know what is going on in biocontrol. Take a few minutes and mail or fax items of biological control to the Newsletter editor, so they can be included in the next issue. The next issue is planned for September 1993.

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