

Honorary Members IOBC Global

IOBC Global awards honorary memberships to persons who have played an important role in the history of IOBC and biological control. A short biography of each of the honoured biological control scientists is given below and can be found on the website of IOBC Global.

Prof.dr. Alfred S. Balachowsky, France (2008)
Dr. Franz Bigler, Switzerland (2012)
Dr. Emile Biliotti, France (2008)
Karel Bolckmans (2016)
Dr. Ernst F. Boller, Switzerland (2008)
Prof.dr. Vanda Bueno, Brazil (2012)
Dr. Matthew Cock, United Kingdom (2012)
Prof.dr. Paul H. DeBach, United States of America (2008)
Prof.dr. Vittorio L. Delucchi, Switzerland (1996)
Prof.dr. Jost M. Franz, Germany (2008)
Dr. Dave Gillespie Canada (2012)
Dr. Pierre Grison, France (2008)
Prof.dr. Ken S. Hagen, United States of America (2008)
Dr. Peter Harris, Canada (2008)
Prof.dr. Yoshimi Hirose (2008)
Prof.dr. Heikki Hokkanen, Finland (2012)
Prof.dr. Carl B. Huffaker, United States of America (2008)
Prof. Dr. Marshall Johnson, United States of America (2016)
Prof.dr. Li-Ying Li, China (2008)
Prof.dr. Jerzy J. Lipa, Poland (2008)
Prof. Dr. Joop C. van Lenteren, The Netherlands (2016)
Prof.dr. Robert F. Luck, United States of America (2005)
Dr. Peter Mason, Canada (2016)
Dr. Rachel McFadyen, Australia (2012)
Dr. Rangaswamy Muniappan, United States of America (2012)
Dr. Peter Neuenschwander, Switzerland (2008)
Prof.dr Stefan K. Pruszyński, Poland (2008)
Dr. Les Shipp, Canada (2012)
Prof.dr. Filippo Silvestri, Italy (2008)
Prof.dr. Catherine and M. Tauber, United States of America (2012)
Prof.dr. Jeff Waage, United States of America (2012)
Dr. Eric Wajnberg, France (2016)
Dr. Ren Wang, China (2016)
Dr. Frank Wilson, Australia (2008)
Prof.dr. Keizo Yasumatsu, Japan (2008)
Prof.dr. Miguel C. Zapater, Argentina (2008)

Prof.dr. Alfred S. Balachowsky (1901-1983, France)



At the 8th International Congress of Entomology in 1948 Stockholm, 11 specialists of biological control met under the auspices of IUBS (International Union of Biological Sciences) and with the financial support of UNESCO. They discussed possibilities to establish an organisation able to coordinate biological control activities on an international basis. This important meeting is well documented (IUBS, 1949. *Les bases scientifiques d'une organisation internationale pour la lutte biologique. Proceedings of a meeting held 5 – 7 August, 1948 at Stockholm. IUBS Series B (Colloques) No. 5, 142 pp.*). Present at this meeting were M. André (France), A.S. Balachowsky (France), Ch. Ferrière (Switzerland), J. Ghesquière (Belgium, Congo), D. Miller (New Zealand); A.J. Nicholson (Australia), S. Novicky (Austria), L.O. Parker (USA), F. Silvestri (Italy), O.H. Trägårdh (Sweden) and P. Vayssière (France, Secretary General of IUBS). After examination and analysis of the

international situation of biological control, the group formulated a resolution addressed to UNESCO with the goal of forming an international organization dealing with biological control. The intention of the group was described in the resolution as follows: *“The proposed international organisation is viewed as an extension to other countries of the kind of work already being carried out by the United States of America and the British Commonwealth. This organisation should work in co-operation with all institutes and individuals actively carrying out biological control work”*.

The participants of the Stockholm group, in which Dr. Balachowsky played a key role, recommended in their resolution *“that international action can and should begin at once, by setting up an organisation providing the following services”*:

- A documentation service for the collection of pertinent information
- A taxonomic service dealing with the identification of natural enemies
- A survey service to study the natural enemies existing in the major regions of interest
- An application service devoted to collecting, breeding, transporting, acclimatising and establishing natural enemies in regions where local institutions are unable to undertake this work themselves.

IUBS decided to support the establishment of a “Commission Internationale de Lutte Biologique (CIBC) as part of the IUBS Division of Animal Biology. A first *ad hoc* committee (“Commission pour les recherches sur la lutte biologique”) was established in Menton, France and it started the detailed planning of the organization. Preparatory meetings were held with government representatives, experts and potential members of the future organisation in Madrid (1951), Jouy-en-Josas, Geneva and Portici (1953), Colmar (1954) and Zürich (1955). A group consisting of representatives from France, Switzerland and Germany produced the final draft of the statutes and organized the first meeting of the organization in 1956.

Alfred Serge Balachowsky (15 August 1901, Karotcha /Kursk - 1983 Paris) was a French entomologist born in Russia. He specialised in Homoptera: Coccoidea, but also worked on Coleoptera. Dr. Balachowsky worked at the Muséum national d'histoire naturelle. In 1948 he was elected president of the Société entomologique de France.

Dr Balachowsky was one of the founding members of IOBC and served as president from the initiation of IOBC in 1956 for many years. In 1968, he resigned and was replaced by Dr. Biliotti.

Selected publications by Balachowsky

- Balachowsky, A.S. 1932. Etude biologique des coccidies du bassin occidental de la Méditerranée. PhD Thesis.
- Balachowsky, A.S. & L. Mesnil. 1949. Les insectes nuisibles aux plantes cultivées. Leurs moeurs. Leur destruction. Traité d'entomologie agricole concernant la France, la Corse, l'Afrique du Nord et les régions limitrophes. Tom 1. 1137 pp. Paris. Faune de France, Volume 50: Coléoptères Scolytides 320 pages, 300 b/w line illus.
- Balachowsky, A.S. 1951. La lutte contre les insectes: principes, methodes, applications. Payot, Paris, 380 pp.
- Balachowsky, A.S. 1954. Les cochenilles paléarctiques de la tribu des Diaspidini. Institut Pasteur, Paris.
- Balachowsky, A.S. 1956. La Commission internationale de lutte biologique contre les ennemis des cultures. Buts, fonctionnement et statuts. *Entomophaga* 1: 5-18.
- Balachowsky, A.S. 1963. Entomologie appliquée à l'agriculture. Traité. Tome I. Coléoptères. Maisson et Cie Éditeurs, Paris, 1391 pp.
- Balachowsky, A.S. & J. D'Aguilar. 1972. Lepidoptères. Masson et Cie, Paris.

Dr. F. Bigler (1948, Switzerland)



Franz Bigler (1948) obtained his MSc in Agronomy at the Swiss Federal Institute of Technology (ETH), Zurich in 1974. His MSc research concerned migration and population dynamics of the grape berry moth, *Eupocilia ambiguella*, in Swiss vineyards. After his MSc he was awarded a research grant of the French government and spent a year at the Institut National de Recherches Agronomiques INRA, Division of Zoology and Biocontrol, Antibes, France, where he worked on biological control of greenhouse pests, nutrition and mass rearing of arthropods used in biological control and on artificial diets for insects. In 1979 he obtained his PhD degree on the thesis “The role of wild olive trees in the population dynamics of the olive fruit fly, *Dacus oleae*, in Western Crete. Ecology and agricultural entomology, natural enemies of pests, faunal studies, biological control” at the Swiss Federal Institute of Technology (ETH), Zürich under the supervision of Prof.dr. V.L. Delucchi (also an honorary member of IOBC). After his study he was employed at Agroscope Reckenholz-Tänikon Research Station in Zurich, Switzerland where he started as research scientist and moved up from senior scientist, research group leader to deputy department head. During his employment at Agroscope he worked on Agricultural entomology, plant protection, biological control of pests in arable crops, testing of pesticides on arthropod natural enemies (method development), faunal studies in arable crops; Integrated Pest Management of agricultural pests with special emphasis on biological control, environmental risk assessment of GM crops and on arthropods used in biological control, biodiversity assessment (flora and fauna) in agricultural crops and landscapes; Development of research projects in environmental risk assessment of GM crops, invasive arthropods and arthropods used in biological control. Implementation and communication of research results to stakeholders such as regulatory bodies, ministries and the public. He was a lecturer for over 20 years at the Swiss Federal Institute of Technology (ETH) in Zurich for case-studies in plant protection.

Currently, Franz is Head of the Research Unit on Biosafety and Deputy Department Head at Agroscope Reckenholz Research Station ART in Zürich, Switzerland. Agroscope is the umbrella of the Swiss Ministry of Agriculture Research Institutes. Biosafety research includes the use and implementation of Biological Control Agents into IPM, Genetically Modified Plants (GMPs) in IPM systems and the evaluation of risks of Invasive Arthropods and their effects on the environment and agriculture. His key qualifications are IPM, biological control including mass-rearing of insects, quality control, risk assessment and effects of pesticides on natural enemies and other non-target organisms. As an expert on pesticides and natural enemies he serves the Swiss Pesticide Regulatory Board in which his responsibilities were within the insecticide applications for arable crops (1980- 2000), and, since 2000, within the evaluation of environmental risks of biological control agents. He is a member of the panel on “Regulation of Invertebrate Biological control Agents” of the European and Mediterranean Plant Protection Organization (EPPO) and served the Organization for Economic Co-operation and Development (OECD) from 1998 to 2003 as an expert for the same purpose. He was leading or was involved in many national and international research projects on biological control and IPM and has evaluated research projects for the EU and other donors.

Franz joined IOBC/WPRS in 1980 (WG: “Pesticides and Beneficial Organisms”), and he served the Global IOBC as co-convenor and convenor of the WG “Quality Control of Mass-Reared Insects” (1989-1992). From 1993 to 1996, he was the Secretary-General of IOBC Global. From 1997 to 2005 he was a Council Member of IOBC/WPRS and Liaison

Officer for the WGs “Pesticides and Beneficial Organisms” and “Genetically Modified Organisms in Integrated Production”. From 2003 to 2005 he chaired the new IOBC/WPRS Commission on “Harmonized regulation of Invertebrate Biological Control Agents”. Since October 2005 he is President of IOBC/WPRS and as such a Council member of IOBC Global.

Selected publications by Bigler

- Bigler F., Babendreier D. and Van Lenteren J.C. 2010. Risk assessment and non-target effects of egg parasitoids in biological control. In: Parra J. R.P., Consoli F.L. Zucchi R.A. Egg Parasitoids in Agroecosystems with Emphasis on *Trichogramma*. Springer, Berlin.
- Cock, M.J.W., J. C. van Lenteren, J. Brodeur, B.I.P. Barratt, F. Bigler, K. Bolckmans, F.L. Cônsoli, F. Haas, P.G. Mason, J.R.P. Parra, 2010. Do new Access and Benefit Sharing procedures under the Convention on Biological Diversity threaten the future of Biological Control? *BioControl* 55: 199-218.
- Meissle M. Mouron P. Musa T. Bigler F. Pons X. Vasileiadis V. P. Otto S. Antichi D. Kiss J. Pálincás Z. Dorner Z. van der Weide R. Groten J. Csember E. Adamczyk J. Thibord J. B. Melander B. Cordsen Nielsen G. Poulsen R. T. Zimmermann O. Verschwele A. Oldenburg E. 2010. Pests, pesticide use and alternative options in European maize production: current status and future prospects. *J. Appl. Entomol.* 134: 357 – 375.
- Sanvido O. Romeis J. Bigler F. 2009. An approach for post-market monitoring of potential environmental effects of BT-maize expressing Cry1Ab on natural enemies. *J. Appl. Entomol.* 133: 236 – 248.
- Aviron S. Sanvido O. Romeis J. Herzog F. Bigler F. 2009. Case-specific monitoring of butterflies to determine potential effects of transgenic Bt-maize in Switzerland. *Agriculture, Ecosystems and Environment* 131: 137 – 144.
- Bale, J., Lenteren, J.C. van and Bigler, F., 2008. Biological control and sustainable food production. *Philosophical Transactions of the Royal Society, Series B* 363 (1492): 761-776.
- Lenteren J.C. van, Loomans A.J.M., Babendreier D. and Bigler F. 2008. *Harmonia axyridis*: an environmental risk assessment for Northwest Europe. *BioControl* 53: 37-54.
- Bigler F., Babendreier D. and Kuhlmann U. 2006. Environmental Impact of Invertebrates for Biological Control of Arthropods: Methods and Risk Assessment. CABI Publishing, Wallingford, UK, 299.
- Lenteren, J.C. van, Bale, J., Bigler, F, Hokkanen, H.M.T., Loomans, A.J.M., 2006. Assessing risks of releasing exotic biological control agents of arthropod pests. *Annual Review of Entomology*, 51: 609-634. + supplemental material

Dr. Emile Biliotti (1925-1978, France)



Emile Biliotti was a man of prodigious intelligence and exceptionally dynamic and generous. These qualities, which were already apparent at the Toulon Lycee where he excelled, made him a student of particular promise at the National Institute of Agronomy in Paris. His aptitude for the biological sciences subsequently determined the orientation of his career towards phytosanitary research, and his entry in 1947 to the National Institute of Agronomic Research (INRA).

His first studies concerned forest biocoenoses and, more particularly, the pine and oak procession moths, two important pests in the Mediterranean Basin. These investigations are reported in 24 publications, which comprise specific studies of parasitoid complexes, especially tachinid flies. The quality of these publications came to the attention of his superiors, particularly since he endeavoured to elucidate the complicated mechanisms governing population dynamics, thus aligning with the ecological approaches recommended by IOBC.

Together, his gifts as a researcher and organizer led to rapid promotion in INRA, and increased recognition at the international level. Following his appointment as assistant in 1948, he became Chargé de Recherches in 1957, Director of the Station of Zoology and Biological Control at Antibes, as well as Maître de Recherches in 1961, Director of Research, and in 1963, Director of the Agronomic Research Centre at Antibes. The following major publications date from this period: *Phoracantha semipunctata* on Eucalyptus, possibilities of using *Doryphorophaga doryphorae*, *Elatophilus nigricornis* on maritime pine, and *Phanerotoma flavitestacea* antagonists of *Ectomyelois ceratoniae*. Numerous, more general studies are of considerable value in defining themes of attaining the different objectives of the Centre. His enthusiastic leadership resulted in expansion of the Antibes station and growing prestige of France in the field of biological and integrated control. Within INRA, he moved from Antibes to Versailles where he became Director of the Central Zoology Department and Head of the INRA Zoology Department. Six years later, he assumed the highest office in phytosanitary France in his capacity as Inspector-General of Agronomic Research. He clearly defined the options to adopt within the framework of modern plant protection in a lecture addressing the Commission of the European Communities in 1975. He was involved in many organizations, such as President of the Zoological Society of France, the Entomological Society of France, member of the Standing Committee for International Plant Protection Congresses, member of the International Entomology Congresses and member of the Panel of Experts on Integrated Control. He was Chevalier de la Légion d'Honneur, Officier du Mérite Agricole and Officier des Palmes Académiques.

Because of his deep interest in IOBC, he was appointed President in 1968, a post which he occupied until 1977 (IOBC WPRS), after which he was appointed President of IOBC Global.

Selected publications by Biliotti

Biliotti, E. 1956. Entomophages et maladies des insectes. *Entomophaga* 1, 45-53.

Biliotti, E. 1956. Mise au point d'une méthode de lutte biologique utilisant des suspensiors de spores de *Bacillus*. *Entomophaga*.

- Biliotti, E. 1956. Biologie de *Phryxe caudata* Rondani [Dipt. Larvaevoridae] parasite de la chenille processionnaire. *Rev. Pathol. Veg. Entomol. Agric. France*.
- Biliotti, E. 1958. Les parasites et prédateurs de *Thaumetopoea pityocampa* Schiff. (Lepidoptera). *Entomophaga*.
- Biliotti, E. and P. Delanoue. 1959. Contribution à l'étude biologique d'*Opius concolor* Szepi. (Hym. Braconidae) en élevage de laboratoire. *Entomophaga* 4, 7-14.
- Biliotti, E. 1961. Les problèmes de systématique dans les recherches écologiques sur les insectes entomophages. *Entomophaga*.
- Biliotti, E. 1961. La lutte biologique contre les insectes ravageurs Université de Paris, Palais de la découverte, Paris.
- Biliotti, E. 1971. Ecology, basis and support of biological control. General introduction. *Ann. Parasitol. Hum. Comp.* 46, Suppl. 5-10.

K.J.F. Bolckmans (1966, Belgium)



Karel Bolckmans (1966) obtained his MSc degree at the Faculty of Agricultural and Applied Biological Sciences of the Catholic University Louvain (KU Leuven), Belgium with a major in crop production and a minor in crop protection.

After his study, he started in 1992 to work as Market Development Manager at Biobest in Belgium, where he later became Product Development Manager and Business Development Manager. In these functions he was, among others, responsible for the development and acquisition of new biological control agents, microbial and botanical pesticides, development of new field application methods and mass-rearing systems, testing of pesticide side effects. In 1995 he also set up of bumble bee production Canada. Next in 1997 he moved

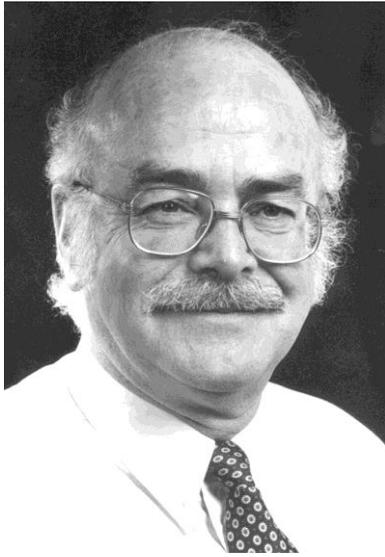
for half a year to Australia to become Insectary Project Manager at Integrated Pest Management Pty Ltd (“Bugs for Bugs”) in Mundubbera, Queensland, followed by an appointment as International Field Research Coordinator at Koppert Biological Systems in the Netherlands in 1998. Later at Koppert he became respectively R&D Manager Entomology, International Production and R&D Manager, and Director Global R&D and Production. At Koppert he worked in many different areas, such as: coordination of international field research on biological control agents; pesticide side effect testing; development of business plans; implementation of a long-term continuous improvement and innovation plan in the production department which lead to (1) major cost savings, (2) substantial increase of the reliability of the production systems and (3) improvement of product quality; coordination of the production departments for production of natural enemies and microbial biopesticides in the Netherlands, Spain, Mexico and Brazil; coordination and organization of Koppert’s Global Research and Development of invertebrate biological control agents (20 researchers in the Netherlands, Spain, France, Mexico and Canada) and microbial and botanical biopesticides and biostimulants; new product development, and production technology development and improvement. As a member of the Corporate Management Team he has been deeply involved in the development and execution of the company’s strategy since 1999. From 2014 to 2016 Karel was employed as Business Development Director at Special Fruit NV, Belgium, a leading European importer of berries and exotic fruits and vegetables, where he was responsible for sustainability, new product development and strategic marketing and learned about the influence of retailers on the environmental and social sustainability practices of farmers. In the fall of 2016, he has accepted a new position as Chief Operations Officer at Biobest Belgium.

Karel taught Crop Protection at the Catholic University of Louvain, Belgium for several years and is teaching a class in Biological Control at the Laboratory of Entomology of Wageningen University, The Netherlands. He has also been very active in the field of creative thinking and facilitation, systematic innovation and inventive problem solution. He is member of IOBC/WPRS where he participated in several working groups and presented a number of talks. He published many papers on biological pest control in reviewed journals, IOBC/WPRS bulletins and grower’s journals, and wrote several book chapters. Karel is well known for his contributions to the use of phytoseiid predatory mites. He also holds several patents related to mass rearing and release methods for predatory mites.

Selected publications by Bolckmans:

- Bolckmans K., Sterk, G., Eyal, J., Sels, B., Stepman, W. (1995). PreFeRal WG (*Paecilomyces fumosoroseus* strain Apopka 97), a new microbial insecticide for the biological control of whiteflies in greenhouses. Med. Fac. Landbouww. Univ. Gent 60 (3a): 707-711.
- Bolckmans K. (2003). State of affairs and future directions of Product Quality Assurance in Europe. In: Quality Control and Production of Biological Control Agents: Theory and Testing Procedures. J. C. van Lenteren (ed.). CABI Publishing, CAB International, Wallingford UK.
- Vandekerkhove, B., Baal, E. van., Bolckmans, K., de Clerq, P. (2006). Effect of diet and mating status on ovarian development and oviposition in the polyphagous predator *Macrolophus caliginosus* (Heteroptera: Miridae). Biological Control 39: 532-539.
- Calvo, F.J., Bolckmans, K., Belda, J.E. (2009). Development of a biological control-based Integrated Pest Management method for Bemisia tabaci for protected sweet pepper crops. Entomologia Experimentalis et Applicata 1-10.
- Cock, M. J. W., van Lenteren, J., Brodeur, J., Barratt, B., Bigler, F., Bolckmans, K., Consoli, F. L., Haas, F., Mason, P. G., Parra, J. R. P. (2010). Do new access and benefit sharing procedures under the Convention on Biological Diversity threaten the future of biological control? Biocontrol 55: 199-218.
- Chiel Elad, C., Gerling, D., Steinberg, S., Klapwijk, J., Bolckmans, K., Zchori-Fein, E. (2012). Contagious sterility in the parasitoid wasp *Eretmocerus mundus* (Hymenoptera: Aphelinidae). Biocontrol Science and Technology, 22, 2012.
- Houten van Y. M., J. J. Glas, H. Hoogerbrugge, J. Rothe, K. J. F. Bolckmans, S. Simoni, J. van Arkel, J. M. Alba, M. R. Kant, M. W. Sabelis, (2013). Herbivory-associated degradation of tomato trichomes and its impact on biological control of *Aculops lycopersici*. Experimental and Applied Acarology, Volume 60, Issue 2, pp 127–138.
- Bolckmans K.J.F., Houten Y.M. Van, Mite composition, use thereof, method for rearing a phytoseiid predatory mite, rearing system for rearing said phytoseiid predatory mite and methods for biological pest control on a crop. PCT/NL2004/000929, Priority date: December 31, 2004. Granted patent.

Dr. E.F. Boller (1938, Switzerland)



Dr Ernst F. Boller studied at the Faculty of Agronomy, Swiss Federal Institute of Technology, Zürich from 1958-1962. He did his PhD research at the Swiss Federal Research Station for Arboriculture, Viticulture and Horticulture at Wädenswil under the supervision of Prof. P. Bovey from 1962-1966. During this period, he was appointed as junior entomologist and PhD. student, and was responsible for fruit fly research and small fruit entomology. After obtaining his PhD degree at the Swiss Federal Institute of Technology (Entomology) (ETHZ), he worked from 1966-1968 as Post-doctoral fellow of the Canadian Research Council and worked at the CDA Research Institute for Biological Control at Belleville, Ontario (B.S. Beirne, Prof. M. Mackauer, Dr H. House) and CDA Research Stations at Vancouver, BC and Summerland, BC (Dr J. Proverbs).

In 1968 he returned to the Swiss Federal Research Station for Arboriculture, Viticulture and Horticulture, Wädenswil, where he worked as senior entomologist on fruit fly research and grape entomology. From 1985-1999 he participated in and was project leader of the development of the interdisciplinary program "Integrated Production in Viticulture". From 1989-1998 he was president of the coordinating committee of the Swiss Federal Office of Agriculture for the preparation of direct payments for sustainable agriculture. He was appointed Head of the Department of Zoology and Weed Science, Swiss Federal Research Station for Arboriculture, Viticulture and Horticulture, Wädenswil in 1991, Deputy Director in 1994, Head Service Center and Strategic Planning in 1999, and retired from Federal Government services and ETH Zürich in 2001. Dr Boller published more than 200 scientific papers and book chapters.

During his appointment in Wädenswil, Dr Boller obtained the following two extra degrees at the ETH in Zürich: PD (Private Lecturer with *venia legendi*); Habilitation at ETHZ (Faculty of Agronomy, Institute of Phytomedicine, Prof. V. Delucchi). He was teaching an interdisciplinary course "Case histories in plant protection" at ETHZ from 1982 to 2001. From 1974 to 1994 he was giving courses on "special topics in plant protection and integrated production in viticulture" at the Agricultural College for Arboriculture, Viticulture and Horticulture in Wädenswil. From 1996 to 2001 he was guest lecturer at the University of Milano where he taught Integrated Plant Protection and Production. In addition, he was a participant in several IAEA/FAO expert panels on fruit flies and was holding research agreements with that agency. He was visiting FAO expert in Greece for Olive fly projects on Crete.

During most of his career, Dr Boller has been very active in IOBC. He was founding Member of the IOBC/WPRS Commission on "Integrated Production Guidelines and Certification" 1990-2006, founding Convenor of IOBC/WPRS Working Group on "Genetic Control of *Rhagoletis cerasi*" 1968-1978, founding President and member of the IOBC/WPRS Working Group on "Fruit Flies of Economic Importance" 1978-1998, founding member and co-ordinator of the Global IOBC Working Group on "Fruit Flies of Economic Importance" 1986-1990, founding President of the Global IOBC Working Group "Quality Control in Mass Reared Arthropods", member of the IOBC/WPRS Working Group on "Side effects of pesticides on beneficial organisms", member of the IOBC/WPRS Working Group on "Integrated protection in viticulture", and member of the IOBC/WPRS Council 1981-1985. In appreciation of all his work for IOBC, Dr Boller received an honorary membership of the West Palaearctic Regional Section in 2005.

Selected publications by E.F. Boller:

- Boller, E.F. & Prokopy, R.J. 1976. Bionomics and management of *Rhagoletis cerasi* L. *Ann. Rev. Entomol.* 21: 223-246.
- Boller, E.F., Russ, K., Vallo, V. & Bush, G.L. 1976. Incompatible races of European cherry fruit fly, *Rhagoletis cerasi* L. (Diptera: Tephritidae), their origin and potential use in biological control. *Ent. exp. et appl.* 20: 237-247.
- Boller, E.F. & Chambers, D.L. 1977. Quality of mass-reared insects. *In*: "Biological control of insects by augmentation of natural enemies". (eds R.L. Ridgway & S.B. Vinson). Plenum Press, New York. pp. 219-236.
- Boller, E.F. & Hurter, J. 1985. Oviposition deterring pheromone in *Rhagoletis cerasi* L.: Behavioral laboratory test to measure pheromone activity. *Ent. exp. et appl.* 39: 163-169.
- Boller, E.F., Remund, U. & Candolfi, M.P. 1988. Hedges as potential sources of *Typhlodromus pyri* - the most important predatory mite in vineyards of Northern Switzerland. *Entomophaga* 33: 15-22.
- Boller, E. & Aluja, M. 1992. Oviposition deterring pheromone in *Rhagoletis cerasi* L.: Biological activity of four synthetic isomers and HMP discrimination of two host races as measured by an improved laboratory bioassay. *Z. ang. Entomol.* 113: 113-119.
- Boller, E.F., Hippe, C., Prokopy, R.J. et al. 1994. Response of wild and laboratory reared *Ceratitis capitata* Wied. (Dipt., Tephritidae) flies from different geographic origins to a standard host marking pheromone solution. *J. Appl. Ent.* 118: 84-91.
- Boller, E.F., Gut, D. & Remund, U. 1997. Biodiversity in three trophic levels of the vineyard agro-ecosystem in Northern Switzerland. pp. 200-318 *In*: "Vertical food web interactions: Evolutionary patterns and driving forces" (eds K. Dettner, G. Bauer & W. Völkl). Springer Publishing.
- Boller, E.F. 2001. The IOBC position with respect to food labels and Integrated Production of Vegetables. pp. 57-60. *In*: Proceedings VEGINECO Workshop 20- 21 June 2001, Amsterdam, 115 pp.
- Boller, E.F., Häni, F. & Poehling, H.M. 2004. "Ecological Infrastructures: Ideabook on Functional Biodiversity at the Farm Level". ISBN 3-906776-07-7, 226 pp.

Prof.dr. V.H.P. Bueno (1954, Brazil)



Vanda Helena Paes Bueno (1954) studied biology at the University of Sao Paulo (1972-1976; UNESP), then went for her MSc study in Entomology to ESALQ/USP in Piracicaba (1978-1980). Her MSc thesis was on Biology and morphological aspects of *Montina confusa* (Stal, 1859) (Hemiptera: Reduviidae). She did her PhD at the same university (1980-1984) and wrote a thesis on Occurrence and ethological aspects of *Porasilus barbiellini* Curran, 1934 (Diptera: Asilidae), the predator of leafhopper *Deois flavopicta* (Stal, 1854) (Homoptera: Cercopidae) in pastures of *Brachiaria decumbens* Staph. She was appointed Associate Professor at the Federal University of Lavras 1982 – 1994, and Full Professor at the same university. She also holds an appointment as productive CNPQ (the Brazilian National Science Foundation) researcher since 1987.

From 1991-1992 she was Post Doctoral Fellow at the University of California at Berkeley's Department of Biological Control with Prof.dr. Ken Hagen (also an honorary member of IOBC). Her research concentrates on biological control of pests in protected cultivation, and bioecology and mass-rearing of parasitoids and predators. She published many articles in this research area and is easily one of the best informed researchers in this field in Latin America. Vanda Bueno teaches courses in Applied Entomology, Biological Control of Pests with Entomophagous Agents, Biological Control of Pests in Protected Cultivation for undergraduate and graduate students, and supervises BSc, MSc and PhD students. She was Chairwoman of the Department of Entomology at the Federal University of Lavras from 2000 to 2004. Besides many scientific functions, she is Member of the Technical Scientific Council of the Brazilian Association of Biological Control Producers (ABCBio) since 2009.

She has spent sabbatical leaves at the Department of Entomology in Wageningen, The Netherlands (1996, with Dr. W.F.Tjallingii) and at the Section of Entomology in Perugia, Italy (2010, with Prof.dr. F. Bin and Dr. E. Conti). She often contributed to courses on biological control in Latin America and she organized several national/ international courses of Biological Control and Quality Control and Mass Rearing of Natural Enemies. One of these courses resulted in the publication of a book.

Vanda Bueno played an active role in IOBC-NTRS. She was treasurer of IOBC-NTRS from 1994-1998, and later she played a crucial role in revival of this Regional Section as President (2006-2010). Currently, she is still very active in NTRS as Past President.

Selected publications by Bueno

- BUENO, V.H.P.; VAN LENTEREN, J.C., 2012. Bioecology and Nutrition of Predatory Heteroptera. Chapter 21 in Bioecology and Insect Nutrition (Panizzi, R.A., J.R.P. Parra, eds.). Taylor & Francis Group (in press).
- DE CONTI, B. F. ; BUENO, V. H. P. & SAMPAIO, M. V. 2011. Biological parameters and thermal requirements of the parasitoid *Praon volucre* (Hymenoptera: Braconidae) with *Macrosiphum euphorbiae* (Hemiptera: Aphididae) as host. Biocontrol Science and Technology (Print), v. 21, p. 497-507.
- LINS J. . Jr ; BUENO, V. H. P. ; SILVA, D. B. ; SAMPAIO, M. Vinicius, 2011. *Praon volucre* (Hymenoptera: Braconidae: Aphidiinae), a natural enemy of *Macrosiphum euphorbiae* (Hemiptera: Aphididae): life table and intrinsic rate of population increase. European Journal of Entomology, v. 108, p. 575-580.
- SIDNEY, Livia Alvarenga; BUENO, V. H. P. ; LINS Juracy Caldeira Junior ; SAMPAIO, Marcus Vinicius ; Silva, D. B. 2010. Competition between *Aphidius ervi* and *Praon*

- volucre (Hymenoptera: Aphidiinae) in *Macrosiphum euphorbiae* (Hemiptera: Aphididae). *Environmental Entomology*, v. 39, p. 1500-1505.
- CARVALHO, Livia Mendes ; BUENO, V. H. P. ; CASTAÑÉ, C. 2010. Avaliação de substratos de oviposição para *Orius insidiosus* (Say) (Hemiptera, Anthocoridae). *Revista Brasileira de Entomologia (Impresso)*, v. 54, p. 115-119.
- BUENO, V. H. P., 2009. Controle Biológico de Pragas: Produção Massal e Controle de Qualidade. 2. ed. Lavras/MG: Editora UFLA. v. 1. 429 p.
- CONTI, Bruno F de; BUENO, V. H. P.; SAMPAIO, Marcus Vinicius, 2008. The parasitoid *Praon volucre* (Hymenoptera: Braconidae: Aphidiinae) as a potential biological control agent of the aphid *Uroleucon ambrosiae* (Hemiptera: Aphididae) on lettuce in Brazil. *European Journal of Entomology*, v. 105, p. 485-487.
- STARY , P.; SAMPAIO, Marcus Vinicius; BUENO, V. H. P. 2007. Aphid parasitoids (Hymenoptera, Braconidae, Aphidiinae) and their associations related to biological control in Brazil. *Revista Brasileira de Entomologia*, v. 51, p. 107-118.
- BUENO, V. H. P.; MENDES, Simone Martins; CARVALHO, Livia Mendes, 2006. Evaluation of a rearing-method for the predator *Orius insidiosus*. *Bulletin of Insectology, Bologna-Italia*, v. 59, n. 1, p. 1-6.
- SAMPAIO, Marcus Vinicius; BUENO, V. H. P.; SOGLIA, M. C. M.; CONTI, Bruno Freitas de; RODRIGUES, Sandra Maria Moraes, 2006. Larval competition between *Aphidius colemani* and *Lysiphlebus testaceipes* after multiparasitism of the host *Aphis gossypii*. *Bulletin of Insectology*, v. 59, p. 147-151.
- BUENO, V. H. P. Implementation of biological control in greenhouses in Latin America: How far are we?. In: Second International Symposium on Biological Control of Arthropods, 2005, Davos, Switzerland. Forest Health Technology Enterprise Team - Technology Transfer -Biological Control. Virginia-USA : USDA Forest Service, 2005. v. II. p. 531-537.
- BUENO, V. H. P. 2000. Controle Biológico de Pragas: Produção massal e Controle de qualidade. 1. ed. Lavras/MG: Editora UFLA. v. 1. 215 p.
- BUENO, V. H. P.; GUTIERREZ, A. P.; SCORZA JR, R. P 1996. Dinamica Populacional de *Acyrtosiphon pisum* (Harris), *Acyrtosiphon kondoi* Shinji e *Therioaphis trifolii* (Monel) (Homoptera,Aphididae) Em Dois Cultivares de Alfafa (*Medicago sativa* L.) Em Albany, California, Eua. *Revista Brasileira de Entomologia*, v. 40, n. 1, p. 31-34.
- BUENO, V. H. P.; GUTIERREZ, A. P.; RUGGLE, P., 1993. Parasitism By *Aphidius ervi* (Hym.:Aphidiidae): Preference For Pea Aphid and Blue Alfalfa Aphid (Hom.:Aphididae) And Competition With *A. smithi*. *BioControl*, v. 38, n. 2, p. 273-284.

Dr. M. Cock (1952, United Kingdom)



Matthew Cock (1952) studied Zoology and Applied Entomology at Imperial College, London where he obtained a BSc in 1973 and next finished a PhD in Ecology at the same institution. He has been associated with Commonwealth Institute of Biological Control (CIBC, later IIBC and now CAB International) since 1978. Within CIBC/CABI he has worked in the area of biological control and IPM for more than 30 years. During that time he has been involved in classical biological control of insects and weeds, pest management, evaluation of natural enemies, invasive alien species and most recently the implications of the Convention on Biological Diversity and climate change for biological control. At different times, he has been in charge of CABI's centres in Trinidad & Tobago, Kenya, UK and Switzerland, as well as the IIBC's international operations; he has also been CABI's Global Leader for Weed Biological Control and recently was appointed CABI Chief Scientist. Throughout this long career he has been motivated by his belief in the value of biological control and natural enemies as the foundation of IPM.

When managing CABI's various Regional Centres, Matthew has nurtured young and mature scientists of varied backgrounds, and encouraged them to publish their results in peer-reviewed international scientific journals, motivated them to join scientific societies and international organisations such as IOBC, and to attend international meetings and conferences.

As well as writing more than 100 papers, Matthew has edited and co-written books on biological control in the Caribbean, limacodid pests of palms and their natural enemies in South-east Asia, comprehensive literature summaries on cotton whitefly, a field guide to the African bollworm and its natural enemies in Kenya, a handbook (toolkit) of best practice for the management of invasive alien species, and a monograph on the ecology and management of giant hogweed in Europe. This in spite of being in roles which demanded increasing attention to management, leaving reduced time for hands-on research.

Although the first 20 years of Matthew's career focussed on biological control and IPM in the tropics, his appointment as Regional Director of CABI's centre in Switzerland, led to a new involvement in temperate issues, and an important role in aspects of the science and regulation of biological control. He has participated in IOBC and European initiatives to define the information needs for biological control, and the assessment of environmental risks.

Following his appointment as Chief Scientist in 2009, he joined the IOBC Global Commission on Biological Control and Access & Benefit Sharing, and led the preparation of the Commission's report on biological control and access & benefit sharing to the Commission on Genetic Resources for Food and Agriculture (CGRFA) of FAO. The report was delivered in 2009 and followed up with a forum paper in *BioControl*, and various awareness raising activities, including a "World View" in *Nature*, and this may have influenced the negotiations for the Nagoya Protocol on Access & Benefit Sharing in 2010, which was in broad agreement with IOBC's suggestions, without explicitly mentioning biological control as just one sector. This year Matthew has been leading another study for CGRFA on climate change and invertebrates important to agriculture, applying his expertise in biological control again. He is also getting the BIOCAT database of insect introductions for biological control of insects updated and made available on-line with support from IOBC amongst others.

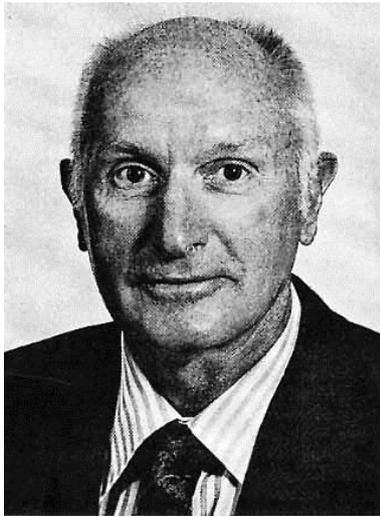
Dr Matthew Cock is known by his colleagues for his outstanding contributions to biological control and IPM on an international level. His recent excellent work as a member

of the IOBC Global Commission on Biological Control and Access & Benefit Sharing may have influenced on the Nagoya Protocol on Access & Benefit Sharing, which alone would justify his nomination.

Selected publications by Cock

- Cock, M.J.W.; Congdon, T.C.E. (2011) Observations on the biology of Afrotropical HesperIIDae (Lepidoptera) principally from Kenya. Part 2. Pyrginae: Tagiadini. *Zootaxa* 2893, 1-66.
- Cock, M.J.W.; Congdon, T.C.E. (2011) Observations on the biology of Afrotropical HesperIIDae (Lepidoptera) principally from Kenya. Part 2. Pyrginae: Tagiadini. *Zootaxa* 2893, 1-66.
- Cock, M. (2010) World View: Anti-biopiracy rules should not block biological control. *Nature* 467 (23 September 2010), 369.
- Cock, M.J.W.; van Lenteren, J.C.; Brodeur, J.; Barratt, B.I.P.; Bigler, F.; Bolckmans, K.; C onsoli, F.L.; Haas, F.; Mason, P.G.; Parra, J.R.P. (2010) Do new Access and Benefit Sharing procedures under the Convention on Biological Diversity threaten the future of biological control? *BioControl* 55, 199-218.
- Cock, M.J.W.; Kuhlmann, U.; Schaffner, U.; Bigler, F.; Babendreier, D. (2006) The usefulness of the ecoregion concept for safer import of invertebrate biological control agents. Pp. 202-221 in
- Bigler, F.; Babendreier, D.; Kuhlmann, U. (eds.) *Environmental Impact of Invertebrates for Biological Control of Arthropods: Methods and Risk Assessment*. Wallingford, UK, CABI Publishing, pp. 202-221.
- Nentwig, W.; Bacher, S.; Cock, M.J.W.; Dietz, H.; Gigon, A.; Wittenberg, R. (eds.) (2005) *Biological invasions – from ecology to control*. Neobiota 6. Institute of Ecology of the TU Berlin, Berlin, Germany, 195 pp.
- Cock, M.J.W.; Ellison, C.A.; Evans, H.C.; Ooi, P.A.C. (2000) Can Failure be Turned into Success for Biological Control of Mile-a-Minute Weed (*Mikania micrantha*)? Proceedings of the Xth International Symposium on Biological Control of Weeds, Bozeman, Montana, 4-9 July 1999, pp. 155-167.
- Cock, M.J.W. (1994) Biological weed control. In: Labrada, R.; Casely, J.C.; Parker, C. (eds) *Weed management for developing countries*. FAO Plant Production and Protection Paper 120. Rome, Italy: FAO, pp. 173-180.
- Cock, M.J.W. (Ed) (1986) *Bemisia tabaci - a literature survey on the cotton whitefly with an annotated bibliography*. Ascot, U.K.; C.A.B International Institute of Biological Control, 121 pp.
- Cock, M.J.W. (1978) The assessment of preference. *Journal of Animal Ecology* 47, 805-816.

Prof.dr. Paul H. DeBach (1914 – 1992, USA)



Paul Hevener DeBach studied first at UCLA and later at UCB where he majored in entomology and received a B.A. in 1938. He then began graduate studies and worked with Harry Schott Smith at the Citrus Experiment Station in Riverside. Paul was awarded his PhD in 1940, with a major in biological control.

Paul's first appointment was with the U.S. Public Health Service (1942-1943) as a junior entomologist involved in malaria control. Subsequently, he worked with the USDA (1943-1945) in Gulfport, Mississippi, on control of the white fringed beetle. Immediately following World War II, Paul was appointed an assistant entomologist with the Department of Biological Control at the Citrus Experiment Station. He remained with the CES throughout his career, retiring in 1983 as professor and entomologist, twice over scale.

Paul DeBach was responsible for developing the first formal courses offered in biological control at UCR. With the aid of NSF and Ford Foundation grants, he attracted many graduate students to UCR during the 1960s and 1970s. These former students and postdoctoral fellows have become nationally and internationally prominent in biological control and entomology. Many of them have established courses in the field at their universities, thereby extending the philosophy and approach to biological control that was espoused by Paul DeBach.

Paul's teaching accomplishments were noteworthy, but his leading contribution lay in scientific research. Over a career of more than forty years, he wrote 200 papers and four books. His practical interests involved the control of citrus pests, particularly scale insects, whiteflies, and mealybugs. His theoretical interests involved principles of biological control, including systematics of parasitic hymenoptera and the ecology of host-parasite interactions. As a member of the Citrus Experiment Station, Paul DeBach engaged in extensive foreign exploration for natural enemies of citrus pests occurring in California. A guiding principle in the field is that pests become a problem when they migrate from their home of origin and escape their natural enemies. Paul's work culminated in the establishment of many species of predaceous beetles and parasitic wasps that were important in the control of several pests of citrus, including California red scale. He also imported other species of parasitic wasps that were responsible for control of olive scale. His last outstanding success, during the mid-1970s, involved using parasitic wasps to control the woolly whitefly in southern California. His importation of natural enemies has resulted in millions of dollars of annual savings in reduced pesticide application by California agriculture. The savings is greater when viewed on a global scale because many of the natural enemies field-tested in California were moved elsewhere. Countries receiving natural enemies from DeBach included Australia, Spain, Italy, Greece, Israel, South Africa, Mexico, Peru, Chile, Brazil, and Japan.

Early in his career, Paul recognized the importance of correctly identifying the zoological entities with which he worked. Correct scientific names are essential when reporting the results of applied biological control and ecological research. At the time Paul worked, too few taxonomic specialists were available to provide authoritative, timely taxonomic identifications. Thus, Paul was compelled to personally solve many taxonomic problems encountered in his biological control work. His taxonomic interests in biological control focused on parasitic wasps that are important natural enemies of scale insects, mealybugs, and whiteflies. His research, combined with the work of graduate students, foreign colleagues, and staff research associates pointed to the existence of numerous sibling

species and cryptic-species complexes among parasitic wasps that attack these pests. His work in this area culminated in the 1979 monograph on the genus *Aphytis*, for which he was co-recipient of the first Filippo Silvestri Prize for original research in biological control.

Paul was adroit at identifying the basic nature of seemingly complex problems and providing elegantly simple solutions for them. For instance, he was responsible for pioneering work in the “check method” that is used throughout the world to evaluate the effectiveness of natural enemies. Earlier workers had no methodology for qualitatively or quantitatively assessing the efficiency of natural enemies. Paul also worked extensively in ecological principles such as “competitive displacement.” Before his work, this was a little-studied aspect of ecology, and one whose importance went unnoticed by most biological control workers. DeBach's work on competitive displacement and so-called ecological homologues is noteworthy because his research stimulated substantial research by other workers. Finally, at the time of his retirement, DeBach was actively engaged in artificial selection research aimed at improving the efficiency and performance of parasitic wasps.

Paul was a member of many professional societies and served on many national and international society boards. In such positions he fostered worldwide interest in and implementation of biological control. He was responsible, with C.B. Huffaker, for developing the UC International Center for Biological Control, which encouraged the training of students from underdeveloped countries. Also, Paul was a key figure in developing the Integrated Pest Management Program under the International Biological Program. This program was designed to develop pest management strategies with minimal reliance on conventional pesticides. Nineteen universities and the U.S. Department of Agriculture participated in this program. Paul also served as president of the International Organization for Biological Control in 1971.

Paul was the principal editor of *Biological Control of Insect Pests and Weeds* and author of key chapters in this book. Published in 1964, the book is the bible of biological control and has been translated into Russian and Spanish. Paul also published *Biological Control by Natural Enemies* (1974), a popular work whose second edition came out in 1991. He published more than 200 scientific papers.

Paul was the recipient of numerous national and international awards. Some of these were the Rockefeller Fellowship (Brazil 1962); Fulbright Senior Research Scientist (Greece 1963); Honorary Foreign Member, Entomological Society of the USSR (1973); and C.W. Woodworth Award for Scientific Achievement, Entomological Society of America (1977).

Selected publications by Paul DeBach

- DeBach, P. 1951. The necessity for an ecological approach to pest control on citrus in California. *J. Econ. Ent.* 44, 443-447.
- DeBach, P. and R.A. Sundby. 1963. Competitive displacement between ecological homologues. *Hilgardia* 34, 105-199.
- DeBach, P. (ed.) 1964. *Biological Control of Insect Pests and Weeds*. Cambridge University Press, Cambridge, 844 pp.
- DeBach, P. and K.S. Hagen. 1964. Manipulation of entomophagous species. In: P. DeBach (ed.), *Biological Control of Insect Pests and Weeds*. Cambridge University Press, Cambridge, pp. 429-458.
- DeBach, P. 1966. The competitive displacement and coexistence principles. *Annual Review of Entomology* 11, 183-212.
- DeBach, P. 1974. *Biological control by natural enemies*. Cambridge University Press, Cambridge, 323 pp.
- DeBach, P. 1976. The *Aphytis* story: an illustration of principles and practice in biological control. 25th Annual Faculty Research Lecture University of California at Riverside, 23 pp.

- DeBach, P., C.B. Huffaker and A.W. MacPhee. 1976. Evaluation of the impact of natural enemies. Chapter 11 *In*: C.B. Huffaker & P.S. Messenger (eds.), *Theory and Practice of Biological Control*. Academic Press, New York, pp. 255-285.
- DeBach, P. and D. Rosen. 1991. *Biological control by natural enemies*, 2nd edition. Cambridge University Press, Cambridge, 440 pp.
- Rosen, D. and P. DeBach. 1979. *Species of Aphytis of the World (Hymenoptera: Aphelinidae)*. W. Junk, The Hague, 801 pp.

Prof.dr. V.L. Delucchi (1925-2015, Switzerland)



Vittorio L. Delucchi attended the Faculty of agronomy and food sciences, Swiss Federal Institute of Technology (SFIT), Zurich from 1945 to 1949, and obtained his PhD in 1953. In 1949 he was appointed as a research officer with the Commonwealth Institute of Biological Control (CIBC), now International Institute of Biological Control (IIBC) and worked for 10 years on biological control projects, collecting and mass rearing parasitoids and predators from Sweden to southern Italy, and shipping them to Canada, Australia, and New Zealand for biological control of agricultural and forestry pests introduced from Europe.

From 1959-1963 he worked as an FAO expert in Morocco, mainly preparing the basis for the introduction of parasitoids against the citrus red scale *Aonidiella aurantii* and of Sunn pest, *Aelia* sp. After a short period of activity at the SFIT, he returned to FAO in 1965, where he was in charge of the entomology section at its headquarters in Rome. Besides the supervision of projects financed by FAO and the organization of international meetings and conferences, part of the time was devoted to the internationalization of the IPM concept with the collaboration of the Californians Ray Smith and Hal Reynolds.

In 1968 he was appointed as Professor of Entomology by SFIT, Zurich, where he remained until his retirement in 1990. He was teaching entomology and crop protection and supervised the research of 52 PhD candidates (10 of them in tropical or subtropical countries) and many Masters degree students. His research focused mainly on agroecosystems, with particular reference to preventative methods of pest control and the importance of native parasitoids and predators of pests. He was Dean of the Faculty of Agronomy and Food Sciences (1976-78), in charge of the Department of Entomology (1972-81), of the Department of Phytomedicine (1981-87) after merging with the Department of Phytopathology, and of the Department of Plant Sciences (1987-90) after merging with the Department of Crop Production. He was also member and chairman of the commission of the National Fund for Scientific Research for the Italian-speaking part of Switzerland (1977-87).

Outside SFIT, he organized and supervised several research projects, among them the Greek project on IPM in olives groves of Crete on behalf of FAO and financed by UNDP (1969-80), a project on IPM in rice in the Lake Alaotra region of Madagascar (1983-92), and on potato tuber moth in Tunisia (1986-90) financed by the Swiss Development and Cooperation agency, a project on IPM in cotton in Gezira, Sudan (1977-80), and on the citrus pest *Cryptophlebia leucotreta* in the Republic of Bénin (1974-76). He was chairman of the Expert Advisory Committee for Biological Control, a member of the Board of Trustees of the International Institute of Tropical Agriculture (IITA), Ibadan, Nigeria (1983-93) and carried out missions in Lebanon (1963-64), São Tomé (1970), Republic of Congo (1971), Paraguay (1989-90) and Bolivia (1991).

He participated in the activity of several international organizations. First of all in IOBC, of which he was a member of the first executive bureau (1956) in charge of the secretariat of the identification service and of the documentation on parasitoid taxonomy, later on Secretary General (1968-76), Treasurer (1976-80), and President (1984-88). In 1968 he was appointed as a member of the International Biological Programme (IBP), Use and Management of Natural Resources section and became chairman of the working group on

Biological Control (1968-76). He was also a member and later chairman of the FAO panel on Integrated Pest Management (1969-78).

Selected publications by V. Delucchi

> 170 scientific papers in books and journals

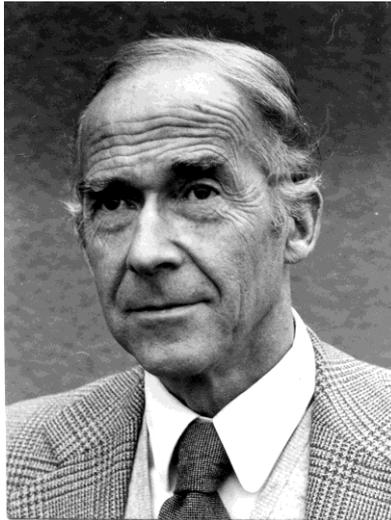
Delucchi, V.L. & H. Chapot, 1963. Maladies, troubles et ravageurs des agrumes au Maroc, INRAM, 339 pp.

Delucchi, V.L. & G. Remaudière, 1966-1971. Index of entomophagous insects, 6 volumes, Le François, Paris

Delucchi, V.L. (Ed.), 1976. Studies in Biological Control, IBP vol. 9, Cambridge University Press, 304 pp.

Delucchi, V.L. (Ed.), 1987. Integrated pest management: quo vadis?, Parasitis, Geneva, 411 pp.

Prof.dr. Jost M. Franz (1915-1994, Germany)



Jost Martin Franz was born in Dresden in 1915, went to Gymnasium in Würzburg and Königsberg and studied Zoologie, Botanik and Physiologie at the universities of Königsberg, München and Freiburg. His PhD research was on the biology and ecology of *Choristoneura (Cacoecia) murinana* (Hb.), a pest of fir trees, and he obtained his degree in 1940. Next he worked as assistant and scientific assistant of Prof.dr. H. Zwölfer at the Institute of Applied Zoology in München. When young, Prof. Franz was an enthusiastic ornithologist, published various articles in this area and was a member of several boards for bird study and bird protection. His dissertation was of great interest to Canadian forest entomologists, who were looking for natural enemies of the related Canadian *Choristoneura* species. This brought Prof.

Franz in contact with the Commonwealth Institute of Biological Control (CIBC), which would have great influence on his future career. He worked for a while at the European station of CIBC and was leader of the German substation from 1949 till 1953.

In 1953, he was employed by a government institute in Darmstadt, which was initially called “Institute for the study and control of the Colorado Potato Beetle”, and was renamed in 1955 as “Institute for Biological Control”. With great energy he established research on biological control, a new field of research and application for Germany. His specialization was population dynamics and reduction of population densities of damaging insects by natural enemies. He employed several researchers, also in the field of insect pathogens, and he established a diagnostic service for insect diseases. Soon, the Darmstadt institute was well known and respected for its work worldwide. On the 20th anniversary of the institute in 1973, a brand new building was inaugurated. During this period, the first applications of several insect pathogens (e.g. *Bacillus thuringiensis*) and parasitoids (e.g. *Trichogramma* spp.) were realized in Germany.

Later, Prof. Franz invested much energy in the study of integrated plant protection (IPM) methods. In order to be able to use natural enemies in IPM programs, he thought it essential to know the side effects of pesticides on natural enemies. Thus, he developed a number of tests and formed an IOBC working group to be able to evaluate the effects of pesticides in different countries and crops. Some of these tests are now used in the European Community testing programme for legislation of pesticides.

In 1958 he was teaching Applied Entomology at the Technical University of Darmstadt, and he obtained an honorary professorship at the same university in the Department of Biology in 1965, where he was teaching biological control and ecology. He supervised a number of MSc and PhD students.

Prof. Franz gave more than 200 lectures about biological control and IPM in German, French and English, and published more than 200 scientific papers and chapters in books. He wrote a handbook on biological control in German, which was reprinted and updated several times, and edited other books. He was a member of a number of professional organizations in the field of biological control and entomology, such as Member of the Permanent Commission of the International Plant Protection Congress and Member of the Panel of Experts on Integrated Pest Control of FAO. He travelled extensively, spent several sabbaticals in the USA and visited China in 1979 as a guest of the Chinese Academy.

Prof. Franz played an important role during the establishment of IOBC in the 1950s and fulfilled several tasks, including Vice President (1956-1968), Convenor of the

Documentation Service of IOBC (1956-1968), Convenor of the Working Group on Biological Control of the Colorado Potato Beetle (1957-1968), Council Member of IOBC WPRS (1977-1980), and Founder and Convenor of the Working Group on Side Effects of Pesticides on Natural Enemies (1974-1979).

Prof. Franz received many awards, among others the Harry Scott Smith Memorial Award of the University of California, Riverside, USA (1962), Medaille in Gold of the Fondazione Filippo Silvestri, Naples, Italy (1965), Heinrich Cotta Award of the Faculty of Forest Studies, Technical University, Dresden, Germany (1966), and he was appointed "Officier du Mérite Agricole" by the French Minister of Agriculture in 1970.

Selected publications by J.M. Franz

- Franz, J.M. 1953. Neue Möglichkeiten und Ergebnisse der biologischen Schädlingsbekämpfung. *Mitt. Biol. Zentralanstalt Berlin-Dahlem* h-75, 12-22.
- Franz, J.M. 1955. Mikroben gegen Insekten.-Neue Wege der biologischen Schädlingsbekämpfung. *Umschau* 55, 209-11.
- Franz, J.M. 1957. Ein Vergleich des europäischen und des nordamerikanischen Tannentriebwicklers (*Choristoneura murinana* (Hb.) und *C. fumiferana* (Clem.)) *Ztschr. Pfl.krankh.* 64, 578-84.
- Franz, J.M. 1961. Biologische Schädlingsbekämpfung, pp. 1-302. In: H. Richter (ed.), *Sorauer Handbuch der Pflanzenkrankheiten*, 2nd ed. Vol. 6, No. 3, Paul Parey, Berlin & Hamburg. 302 pp.
- Franz, J.M. 1961. Biological control of pest insects in Europe. *Ann. Rev. Ent.* 6, 183-200.
- Franz, J.M. 1971. Influence of environment and modern trends in crop management on microbial control, pp. 407-440. In: H.D. Burges & N.W. Hussey (eds.), *Microbial Control of Insects and Mites*. Academic Press, London.
- Franz, J.M. 1972. Gründung einer Weltorganisation für Biologische Schädlingsbekämpfung. *Nachrichtenblatt. Deutsch. Pflanzenschutzdienst (Braunschweig)*, 24, 91-92.
- Hagen, K.S. and J.M. Franz. 1973. A history of biological control, pp. 433-476. In: R.F. Smith, T.E. Mittler & C.N. Smith (eds.), *History of Entomology*. Ann. Rev., Inc., Palo Alto, Calif.
- Franz, J.M. 1976. Towards integrated control of forest pests in Europe, pp. 295-308. In: J.F. Anderson & H.K. Kaya (eds.), *Perspectives in Forest Entomology*. Academic Press, Inc., New York, San Francisco, London.
- Simmonds, J.F., J.M. Franz and R.I. Sailer. 1976. History of Biological Control, pp. 17-39. In: C.B. Huffaker & P. S. Messenger (eds.), *Theory and Practice of Biological Control*. Academic Press, New York, San Francisco, London.
- Franz, J.M., H. Bogenschütz, S.A. Hassan, P. Huang, E. Naton, H. Suter and G. Viggiani. 1980. Results of a joint pesticide test programme by the working group: pesticides and beneficial arthropods. *Entomophaga* 25, 231-37.
- Franz, J.M. and A. Krieg. 1982. *Biologische Schädlingsbekämpfung*, 3 Auflage. Verlag Paul Parey, Berlin-Hamburg. 252 pp.
- Franz, J.M. (ed.) 1986. *Biological Plant and Health Protection. Biological Control of Plant Pests and of Vectors of Human and Animal Diseases*. Gustav Fischer Verlag, Stuttgart, 341 pp.
- Franz, J.M. 1988. From CILB to IOBC/OILB and WPRS/SROP. *Entomophaga* 33, 131-134.

Dr. D. Gillespie (1952, Canada)



Dave Gillespie (1952) obtained his M.Sc. degree in Biology-Entomology at Simon Fraser University in Burnaby, British Columbia in 1979. His research focused on the taxonomy of immature stages of parasitic Hymenoptera, and his thesis title was “Classification of final-instar larvae of Ichneumoninae (Hymenoptera: Ichneumonidae)”. At the same time he also studied parasitoids of *Operophtera brumata* (L) (Lepidoptera: Geometridae) and the taxonomy of adults of Ichneumoninae (Hymenoptera:

Ichneumonidae). In 1982 he completed a Ph.D. in Biology-Pestology, also at Simon Fraser University in 1982 on “Introduced and native leafrollers (Lepidoptera: Tortricidae) on berry crops in the Lower Fraser Valley, B.C.” under the supervision of Dr. Brian Beirne. Since completing graduate training, he has been employed by Agriculture Canada (now Agriculture and Agri-Food Canada), first at Sidney, then Vancouver, and currently in Agassiz, British Columbia. Dave has been closely associated with faculty and students of the Centre for Pest Management at Simon Fraser University for 17 years, and is currently an adjunct Professor in the Department of Biological Sciences. He has served on supervisory committees for numerous MPM and M.Sc. students at Simon Fraser University, and at other institutions, and has also served as external and public examiner on M.Sc., MPM and Ph.D. thesis defences. He has held many research grants and contracts, some in collaboration with faculty of the Centre for Pest Management at Simon Fraser University and the Department of Biology, University of Windsor, Ontario. He has served as a subject editor for Bulletin of Entomological Research and a member of the editorial advisory board for Biocontrol Science and Technology

Dave’s research on natural enemies of insects and mites has contributed directly to the widespread use of many of these species for biological control in commercial greenhouse operations around the world. Research on responses of greenhouse insects to colour led to the use of colour traps for monitoring greenhouse pests. On a more fundamental level, his research program has centred on developing a theoretical framework for selecting a natural enemy for use in classical, augmentative and inundative release programs. Inherent in this are studies on the biotic and abiotic constraints that affect the interaction between natural enemies and target and non-target organisms, and between natural enemies in food webs.

Commercial biological control producers speak very highly of Dave because he has recognized their needs and has over his career consistently provided expert advice and introduced new biological control agents (e.g. a predaceous plant bug and a predaceous mite) for the industry. In recognition of his extraordinary contributions, Canada’s Applied Bio-nomics, a commercial biological control company, requested that the previously unknown predaceous mite be named in Dave’s honour. This species has now been formally named *Gaeolaelaps gillespiei* Beaulieu, 2009.

Dave Gillespie is a member of many professional societies, including IOBC. He has contributed numerous times to IOBC sponsored symposia and was chair of the organizing committee for the joint meeting of the West Palaearctic and Nearctic greenhouse IPM working groups, in 2002. He continues to be an active IOBC member.

Selected publications by Gillespie

GILLESPIE, D.R., NASREEN, A., MOFFAT, C.E., CLARKE, P. AND ROITBERG, B.D.
2012. Effects of simulated heat waves Ontario an experimental community of pepper plants, green peach aphids and two parasitoid species. *Oikos* 121: 149-159.

- NASREEN, A., GILLESPIE, D. R. AND MUSTAFA, G. 2011. Graphical marginal analysis of the economics of natural enemy production: An example using a pilot mass rearing system for green lacewing. *Biological Control* 57: 44-49.
- PETER G. MASON, DAVID R. GILLESPIE AND CHARLES VINCENT (Eds.)
Proceedings of the Third International Symposium Ontario Biological Control of Arthropods. Christchurch, New Zealand, 8-13 February 2009, United States Department of Agriculture, Forest Service, Morgantown, WV, FHTET-2008-06, December 2008, 636p.
- GILLESPIE D.R., R.R MCGREGOR, J.A SANCHEZ, S.L. VANLAERHOVEN, D.M.J. QUIRING, B.D. ROITBERG, R.G. FOOTIT, M.D. SCHWARTZ, AND J.L. SHIPP 2007. *Dicyphus hesperus* (Hemiptera: Miridae) as a success story in development of endemic natural enemies as biological control agents. Pp. 128 – 135, in Vincent, C., Goettel, M. and Lazarovits, G. *Case Studies in Biological Control: A Global Perspective*. CABI Publishing, UK
- SHIPP, L., D. ELLIOTT, D. GILLESPIE AND J. BRODEUR. 2007. From Chemical to Biological Control in Canadian Greenhouse Crops. Pp. 118 – 127, in Vincent, C., Goettel, M. and Lazarovits, G. *Case Studies in Biological Control: A Global Perspective*. CABI Publishing, UK
- GILLESPIE, D.R., MASON, P.G., DOSDALL, L.M., BOUCHARD P., GIBSON G.A.P. 2006. Importance of long-term research in classical biological control: an analytical review of a release against the cabbage seedpod weevil in North America *Journal of Applied Entomology* 130: 401-409.
- GILLESPIE D.R. AND ROITBERG B.D. 2006 Plant-feeding omnivores and IGP: Inter-guild influences Ontario intra-guild outcomes. Pp 71 - 100 in Brodeur, J. and Boivin, G. *Trophic and Guild interactions in Biological Control*. Springer.
- GILLESPIE, D.R., AND QUIRING, D.M.J. 2005. Diapause induction under greenhouse conditions in two populations of *Dicyphus hesperus* (Hemiptera: Miridae). *Biocontrol Science and Technology* 15(6): 571 – 583.
- GILLESPIE, D.R.; MCGREGOR, R.R. 2000. The functions of plant feeding in the omnivorous predator *Dicyphus hesperus* (Heteroptera: Miridae): Water places limits Ontario predation. *Ecological Entomology*. 25: 380-386.
- MCGREGOR, R.R.; GILLESPIE, D.R.; QUIRING, D.M.J.; FOISY, M.R.J. 1999. Potential use of *Dicyphus hesperus* Knight (Heteroptera: Miridae) for biological control of pests of greenhouse tomatoes. *Biological Control* 16:104-110.

Dr. Pierre Grison (1912-2000, France)



Pierre Grison is remembered by his French colleagues as an enormously enthusiastic and dynamic person, always full of new ideas about research and organization of entomological work in France. Since the creation of the INRA (French National Institute of Agricultural Research) in 1946, he trained many young people in the fields of zoology, entomology and biological control at the Versailles INRA station. He did not limit his work to the laboratory, but stressed the importance of field work. He used ecological principles and their application for his research approach. During the first decades of pesticide use, he kept telling his colleagues that biological control should not be neglected

and he was able to establish a laboratory studying the possibilities of pathogenic micro-organisms for biological pest control. In 1955 he left Versailles and started to work at INRA la Minière. During his career, he founded several INRA research groups and laboratories, was a member of many committees of the French National Scientific Organization (CNRS), was president of the Ecological Society, founded an organization for amateur and professional entomologists (OPIE) and was a member of the French Academy of Agriculture.

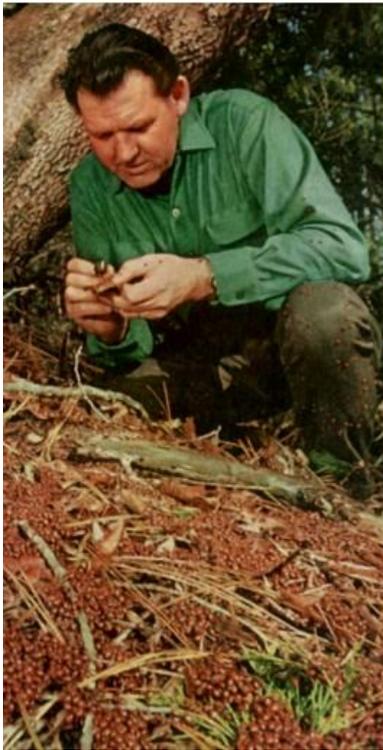
He published many papers on population dynamics of pests and natural enemies in orchards and forests, on the use of *Bacillus thuringiensis* in IPM programs, and he wrote a history of agricultural zoology in France (Chronique historique de la zoologie agricole Française, INRA, 1992).

Dr. Grison played an active role in the creation of IOBC. He was the first Secretary General (1956-1965), and produced Entomophaga (now BioControl) for a long period.

Selected publications by P. Grison

- Grison P., M. Feron, and K. Sacantanis. 1950. Développement de la Mouche des fruits *Ceratitis capitata* (Wied.) en milieu nutritif synthétique. C.R. Acad. Sci., 231, 996–998.
- Grison P. and E. Biliotti. 1951. Relations entre la biologie des insectes entomophages et l'application des traitements chimiques. C.R. Acad. Agric. Fr., 37, 610–614.
- Grison P. and E. Biliotti. 1953. La signification agricole des stations refuges pour la faune entomologique. C.R. Acad. Agric. Fr., 39, 106–108.
- Grison P. and J.R. Le Berre. 1953. Caractères de la dispersion par vol du Doryphore (*Leptinotarsa decemlineata* Say) dans le Sud du Cotentin en 1952. Rev. Zool. agric. appl., 10–12, 124–130.
- Grison P. 1957. Les facteurs du comportement chez l'imago du Doryphore (*Leptinotarsa decemlineata* Say). Bull. Biol. Fr. Belg., Suppl. 43, 154 pp.
- Grison P. 1962. In A.S. BALACHOWSKI : *Traité d'Entomologie appliquée à l'Agriculture*. Masson, Paris, 1, p. 659.
- Grison P. 1992. Chronique historique de la zoologie agricole Française, INRA, Paris, circa 400 pp.

Prof.dr. Ken S. Hagen (1919 –1997, USA)



Kenneth Sverre Hagen attended U.C. Berkeley, where he earned his BS in entomology in 1943. After serving for several years in the US Navy, Ken came back to California and was hired as the supervising entomologist for the Pest Control Association in California's Central Valley in 1946, becoming the first supervised control entomologist in California. This position played a key role in the development of integrated pest management. Ken then returned to Berkeley as a graduate student, working as a technician in the Division of Biological Control. He received his MS there in 1948, and his PhD in 1952, under the direction of Richard Doutt. This was a particularly rich time to be at Berkeley, as Ken studied under such luminaries as Essig, Linsley, Usinger and Michelbacher, and worked under Harry Scott Smith. He was appointed Junior Entomologist in the Division of Biological Control, Agricultural Experiment Station (at the Gill Tract in Albany, California) in 1952, advanced to Entomologist in 1965, and to Professor of Entomology in 1969. He officially retired in 1990, but continued to work at the Gill Tract until the day of his death.

Ken was involved in the importation of the natural enemies of pear psylla, acacia psyllid, spotted and blue alfalfa aphids, pea aphid, walnut aphid, plum aphid and other pest insects. However, it was in the area of augmentation of natural enemies, coupled with insect nutrition, that Ken made his most important contributions to science. He was the first to develop an "artificial egg" for the mass-rearing of *Chrysoperla*, and also helped develop artificial diets for coccinellids. His innovative work on food sprays for predators was a major breakthrough in augmentation of field populations of aphidophaga. Ken considered that his most significant research contribution was presented in a paper wherein he hypothesized that the occurrence of amino acids in honeydew helped protect honeydew producers from ant predation, and presented data showing that chrysopids were attracted to a combination of plant volatiles and kairomones from honeydew.

Ken was truly a scientist of international stature and experience. He engaged in collaborative research in Mexico, Central America, Brazil, Greece, Kenya and China, but his travels also extended through Europe to India, Malaysia, Australia, New Zealand and China. Of the 22 visiting scientists and postdocs he hosted in his lab, 18 were from other countries, and of the 28 graduate students he supervised, eight were from abroad.

Ken's work with the Coccinellidae included documenting the complex migratory behaviour of *Hippodamia convergens*, which involved the use of hot air balloons and scoops fitted onto fixed wing aircraft to sample airborne beetles. This work led to an article in the National Geographic (1970; see the photograph), entitled "Following the ladybug home".

Ken published more than 150 scientific papers, and contributed a number of chapters to various books on biological control and ecology.

Ken was a member of many entomological societies in the USA, Society of Systematic Zoology, American Association for the Advancement of Science (Fellow), American Institute of Biological Sciences, International Society of Hymenopterists, and the International Organization for Biological Control (President 1980-1984). He was honoured at the 1989 national meeting of the Entomological Society of America with a symposium entitled "Native and Introduced Predaceous Coccinellidae: A Tribute to Kenneth S. Hagen for

His Contributions to Coccinellid Biology". In 1990 he was awarded the Berkely Citation by the University of California, Berkeley for outstanding service to the University. In 1992 and 1993 he received the Distinguished Service Awards by the Association of Applied Insect Ecologists, Hawaiian Entomological Society and Pacific Coast Entomological Society. In 1995, the International Organisation of Biological Control presented Ken with the Distinguished Biological Control Science Award, and he presented an invitational talk on the Chemical Ecology of Chrysopidae at the IOBC conference honouring him.

Irrespective of these many scientific honours, Ken Hagen was probably best known among his colleagues for several personal traits. First, he always kept a pot of coffee going in his lab, and this served as a focal point for staff and visitors to drop in and discuss entomology. Second, he had a virtual encyclopaedic knowledge of entomology and biological control. It was generally understood that if you had a question, your first stop should be Hagen's office. Finally, he was extremely generous with his time and knowledge. No matter who approached him, Ken would be happy to lay aside whatever he was working on, and give that person his full attention until he got the answer, or could refer the person to the correct authority.

Outside of entomology, Ken's greatest interest was book collecting. His book and journal collection eventually outgrew his house, and when the house next to his came up for sale, Ken and Maxine ended up buying it, largely to use the garage as a storage space for his overflowing library.

A tireless researcher, a loyal and dedicated member of the University of California faculty, an enthusiastic teacher, a helpful and stimulating colleague, and a generous human being, Ken Hagen was, in every sense of the word, a true gentleman.

Selected publications by K.S. Hagen

- Stern, V.M., R.F. Smith, R. van den Bosch and K.S. Hagen. 1959. The integration of chemical and biological control of the spotted alfalfa aphid. I. The integrated control concept. *Hilgardia* 29, 81-101.
- Hagen, K.S. 1962. Biology and ecology of predaceous Coccinellidae. *Ann. Rev. Ent.* 7, 289-326.
- Hagen, K.S. 1964. Nutrition of entomophagous insects and their hosts. pp. 356-380. In: DeBach, P. (ed.). *Biological control of insect pests and weeds*. Reinhold, New York.
- Hagen, K.S. and R.L. Tassan. 1966. Artificial diet for *Chrysopa carnea* Stephens. pp. 83-87. In: Hodek, I. (ed.) *Ecology of Aphidophagous Insects*. Czechoslovak Academy of Sciences, Prague.
- Hagen, K.S. and R. van den Bosch. 1968. Impact of pathogens, parasites and predators on aphids. *Ann. Rev. Ent.* 13, 325-384
- Hagen, K.S., R. van den Bosch and D.L. Dahlsten. 1971. The importance of naturally-occurring biological control in the western United States. pp. 253-293. In: Huffaker, C.B. (ed.). *Biological Control*. Plenum Press, New York.
- Hagen, K.S. 1974. The significance of predacious Coccinellidae in biological and integrated control of insects. *Entomophaga* Mém. Hors-Série. 7, 25-44.
- Tassan, R.L., K.S. Hagen and E.F. Sawall, Jr. 1979. The influence of field food sprays on the egg production rate of *Chrysopa carnea*. *Environ. Entomol.* 8, 81-85.
- Daane, K.M. and K.S.Hagen. 2001. An evaluation of lacewing releases in North America. pp. 398-407. In: McEwen, P.K., T.R. New & A. Whittington (eds.). *Lacewings in the Crop Environment*. Cambridge University Press, London.

Dr P. Harris (1930, UK)



Dr Peter Harris obtained his BSc in Forestry from the University of British Columbia (Canada) in 1955, his Diploma of Imperial College (DIC)(London, UK) in 1958 and his PhD in Entomology at the University of London (UK) also in 1958. He was employed by the Canada Department of Agriculture (later Agriculture Canada) in Belleville, Ontario in 1959, where he served as Research Officer, Research Scientist and Acting Director. In 1972 he moved to Agriculture Canada in Regina, Saskatchewan and in 1992 he moved to Agriculture & Agri-Food Canada (AAFC) in Lethbridge, Alberta, where he is still active as Emeritus Scientist.

Dr Harris is recognized internationally as a leader in classical weed biocontrol research and has published 49 research papers (including 1 in *Science* and 2 in *Nature*), 27 reports, 16 special publications, 1 book, 24 book chapters, 31 conference proceedings and 3 reviews. His publications encompass both the theoretical and practical aspects of weed biocontrol. He played a major role in developing the protocols for assessing the safety of candidate weed biocontrol agents that became the basis of screening tests in use worldwide. In the late 1970's he conducted the first economic evaluation of the costs and benefits of weed biocontrol. His international stature is evidenced by requests to review the program of the USDA Biological Control of Weeds Laboratory (1982); to serve as Chair of the VI International Symposium on Biological Control of Weeds (1984); to review the program of the USDA Grassland, Soil and Water Research Laboratory (1990); to review a feasibility study on the use of biocontrol agents in cocoa production for the US Congress Office of Technical Assessment (1991); and to serve on the Scientific Advisory Board of the prestigious journal, *Zeitschrift für angewandte Entomologie*.

As a result of Dr Harris's efforts during his career with AAFC, the Canadian weed biocontrol program is recognized as being one of the world's most successful. He has been involved with the importation, screening, release and impact assessment of 36 insect and 1 nematode biocontrol agents. Of these, 26 have become established, an unusually high success rate, and some have proved dramatically effective. An example of his work is the introduction of the nodding thistle seed-head weevil, which reduced the status of nodding thistle in Canada from that of a major problem to one of ephemeral occurrence on disturbed sites. Subsequently, this biocontrol agent was successfully utilized by many other countries and the control of nodding thistle achieved is now recognized as being the world's third most successful weed biocontrol project in terms of impact and the area affected. He also introduced insects that significantly reduced the toxic pasture weed tansy ragwort, in both British Columbia and the Maritime provinces. As a result of these successful biocontrol efforts several provinces have removed the above weeds from their noxious weeds list. The savings in chemical and cultural control costs for these weeds and the value of the increased grazing capacity resulting from their suppression by the introduced biocontrol agents amounts to many millions of \$ annually in both the USA and Canada.

The public support for biocontrol of weeds was gained in large part by Dr Harris's willingness to give many talks and media interviews and to arrange or participate in field days. He initiated and established numerous cooperative agreements with Provinces, States, municipalities and counties for weed biocontrol activities, especially the secondary distribution of effective agents. He has also established many personally initiated international

cooperative links, which resulted in many potential biocontrol agents present or indigenous to other countries being obtained for screening or introduction at little cost.

At host expense he spent three weeks lecturing and consulting on weed biocontrol at the University of Beyreuth, Germany (1981); two months touring South Africa to advise on weed biocontrol (1982); several weeks in the USSR at the invitation of the USSR Academy of Science to advise on the biocontrol of ragweed (1986); several weeks in China as a guest lecturer under the UN Distinguished Persons (UNDP) Program to advise on biocontrol issues, including a visit to Inner Mongolia to look for potential biocontrol agents (1991). In 1994 he again visited China to advise on improving handling and shipping of biocontrol insects and to visit Xinjiang Province (NW China) to look for biocontrol agents for Canada thistle. He has also advised and lectured in Australia and Brazil.

Dr Harris has been inducted as a Fellow of the Canadian Entomological Society (1984), awarded the Commemorative Medal for the 125th Anniversary of Canadian Confederation (1994), was the recipient of a Special Award by the Canadian Forum for Biological Control (1996), a recipient of The Canadian Entomological Society Gold Medal (1997), Member of the Order of Canada (1997), and appointed Emeritus Scientist by the Federal Minister of Agriculture (1997).

Selected publications by P. Harris:

- Harris, P., Peschken, D. & Milroy, J. 1969. The status of biological control of the weed *Hypericum perforatum* in British Columbia. *The Canadian Entomologist* 38: 139-142.
- Zwölfer, H. & Harris, P. 1971. Host specificity determination of insects for biological control of weeds. *Annual Review of Entomology* 16: 159-178.
- Harris, P. 1979. The cost of biological control of weeds by insects in Canada. *Weed Science* 27: 242-250.
- Harris, P. 1988. Environmental impact of weed-control insects. *BioScience* 38: 542-548.
- Harris, P. 1991. Classical biocontrol of weeds: Its definition, selection of effective agents, and administrative-political problems. *The Canadian Entomologist* 123: 827-849.
- Harris, P. 1993. Effects, constraints and future of weed biocontrol. *Agric. Ecosyst. Environ.* 46: 289-303.
- Harris, P. & Clapperton, M.J. 1997. An exploratory study on the influence of vesicular-arbuscular mycorrhizal fungi on the success of weed biological control with insects. *Biocontrol Science and Technology* 7: 193-202.
- Harris, P. 1998. Evolution of classical biocontrol: meeting survival challenges. *Bull. Ent. Soc. Can.* 30: 134-143.
- Harris, P. 2002. Biological control of weeds (insects and mites). In: "Encyclopedia of Pest Management" (ed. D. Pimental). Marcel Dekker Inc. New York. pp. 74-76.

Prof.dr Y. Hirose (1936, Japan)



Prof.dr Yoshimi Hirose has been with Kyushu University (KU), Fukuoka, Japan since 1956. He obtained his PhD degree from KU in 1969 and has worked in the Institute of Biological Control, Faculty of Agriculture in KU as an assistant, associate, and full professor over 30 years, prior to his retirement in 2000. He is now Emeritus Professor at KU.

His research and teaching have focused on host-parasitoid and prey-predator interactions from the individual to the agroecosystem level. He has often been engaged in ecological and behavioral studies on egg parasitoids of various insects, having a profound knowledge of taxonomy of egg parasitoids, such as *Trichogramma* and *Telenomus*. Thus, he has contributed to development in the biological control of insect pests, such as pine moth, citrus swallowtail, and soybean bugs. He has also contributed to development in the biological control of thrips in greenhouses and open

fields. Prof. Hirose spent several periods abroad (e.g. as visiting scientist at Texas A & M (1981-1982), and as visiting professor at the University of California, Davis (2000-2001). He published more than 100 papers and gave many lectures both in Japan and abroad. In 1988, the annual award of the Japanese Society of Applied Entomology and Zoology went to him for his outstanding work on evaluation of parasitic wasps as biological control agents against insect pests.

He served as a vice president of the IOBC and both president and vice president of IOBC/SEARS, devoting his service to the development of biological control, especially in South and East Asia. He has been a member of the IOBC working group “egg parasitoids” since the group was established in 1982.

Following his retirement, he still continues to do research on the biological control of insect pests and the ecology and behavior of egg parasitoids, staying at Department of Entomology, University of California, Davis, USA, and Biocontrol Laboratory, National Agricultural Research Center, Tsukuba, Japan. He is still enjoying research, probably because for him, to do research is to find this world worth living in.

Selected publications by Y. Hirose

- Hirose, Y., Kimoto, H. & Hiehata, K. 1976. The effect of host aggregation on parasitism by *Trichogramma papilionis* Nagarkatti (Hymenoptera: Trichogrammatidae), an egg parasitoid of *Papilio xuthus* Linne (Lepidoptera: Papilionidae). *Appl. Entomol. Zool.* 11: 116-125.
- Hirose, Y., Vinson, S.B. & Hirose, Y.-K. 1988. Protandry in the parasitoid *Cardiochiles nigriceps*, as related to its mating system. *Ecol. Res.* 3: 217-226.
- Hirose, Y., Nakamura, T. & Takagi, M. 1990. Successful biological control: a case study of parasitoid aggregation. In: "Critical Issues in Biological Control" (eds M. Mackauer, L.E. Ehler & J. Roland), pp. 171-183. Intercept, Andover.
- Hirose, Y. 1992. "Biological Control in South and East Asia". Kyushu Univ. Press, Fukuoka, 68 pp.
- Hirose, Y., Kajita, H., Takagi, M., Okajima, S., Napompeth, B. & Burnapanichpan, S. 1993. Natural enemies of *Thrips palmi* and their effectiveness in the native habitat, Thailand. *Biological Control* 3: 1-5.

- Hirose, Y. 1994. Determinants of species richness and composition in egg parasitoid assemblages of Lepidoptera. *In* : "Parasitoid Community Ecology" (eds B.A. Hawkins and W. Sheehan), pp. 9-29. Oxford Univ. Press, Oxford.
- Hirose, Y. 1998. Conservation biological control of mobile pests: problems and tactics. *In*: "Conservation Biological Control" (ed. P. Barbosa), pp. 221-233. Academic Press, San Diego.
- Hirose, Y., Ehler, L.E. & Hirose, Y.-K. 2003. Influence of host age on patch use by a quasi-gregarious egg parasitoid. *Environ. Entomol.* 32: 789-796.
- Hirose, Y. 2005. Discovery of insect parasitism and its subsequent development of parasitoid research in Japan. *Biological Control* 32: 49-56.
- Hirose, Y. 2006. Biological control of aphids and coccids: a comparative analysis. *Popul. Ecol.* 48: 307-315.

Prof.dr. H.M.T. Hokkanen (1950, Finland)



Heikki Hokkanen (1950) studied at the University of Jyväskylä in Finland where he obtained his MSc in 1976, and his Licenciate of Philosophy (ecology and natural resources, hydrobiology and chemistry) in 1978. He did his PhD work at the Cornell University in Ithaca, New York, USA in the field of ecology and entomology and obtained his degree of Doctor of Philosophy in 1983.

Heikki's professional career started as assistant in Technical-Analytical Environmental Hygiene at the University of Kuopio, Kuopio, Finland in 1976 and via various other appointments he became full permanent professor of agricultural zoology at the Faculty of Agriculture and Forestry of the University of Helsinki, Finland, in 1992. He worked as Head of the Co-Operative Research Programme for Biological Resource Management, Directorate for Agriculture of the Organisation for Economic Co-operation and Development in Paris, France from 1997 – 1999.

Heikki is a frequent assessor for grant proposals at various organizations, including the European Commission, National Geographic Society (USA), Grant Agency of the Academy of Sciences of the Czech Republic, and the Finnish Cultural Foundation. He was an invited external assessor of the entomological research programmes of the Ministry of Food, Agriculture and Fisheries (MAFF), United Kingdom (1998), and invited external assessor of the quality of research at the Swedish University of Agricultural Sciences, Sweden (2009). He is member of various scientific societies and of several editorial boards of scientific journals. He is Founding Editor-in-Chief of the international scientific journal *Arthropod-Plant Interactions* (2006-present) and Founding Editor of the book series "Progress in Biological Control" (2002-present). Heikki holds two Finnish patents on the use of entomopathogenic fungi in plant protection and a patent on the use of certain betulin-based antifeedant compounds in plant protection.

Heikki supervised many MSc and PhD students. He worked as visiting scientist/professor at the Biologische Bundesanstalt, Institut für Biologische Schädlingsbekämpfung, in Darmstadt, Germany, at the International Institute of Biological Control (currently: CABI Biosciences) in Silwood Park, Ascot, UK and at the University of Kiel, Germany. He also took part in many missions related to agriculture and was, for example, Leader of the Finnish delegation of experts to visit Institutes of Plant Protection in the Soviet Union in the framework of Soviet-Finnish Commission on Scientific and Technical Cooperation.

Heikki is a long term member of IOBC/WPRS and actively promoted international collaboration via its working group on insect pathogens/insect parasitic nematodes, the working group on integrated control in oilseed rape, the working group on pesticides and beneficial organisms, and the working group on transgenic crops in IPM systems. Out of all contributions to IOBC, his most important has been the very successful restart of IOBC's journal "Entomophaga" under its new name "Journal of BioControl" in 1997. He changed the journal into a modern, well cited, regularly produced and respected periodical, and functioned as Editor in Chief for a period of 10 years.

Selected publications by Hokkanen

van Lenteren, J.C, Bale, J., Bigler, F., Hokkanen, H.M.T. and Loomans, A.M.J.

2006 Assessing risks of releasing exotic biological control agents of arthropod pests.

Annual Review of Entomology 51: 609–634.

- Eilenberg, J. & Hokkanen, H.M.T. (eds.) 2006. Ecological and societal approach to biological control. Springer Science, Dordrecht, The Netherlands.
- Hokkanen, H.M.T. & A.E. Hajek (eds.), 2003. Environmental Impacts of Microbial Insecticides: Need and Methods for Risk Assessment. Kluwer Academic Publishers, Dordrecht, The Netherlands.
- Hokkanen, H. M. T., 2000. The making of a pest: recruitment of *Meligethes aeneus* onto oilseed brassicas. *Entomologia Experimentalis et Applicata* 95: 141-149.
- Ehlers, R.-U. & Hokkanen, H. M. T., 1997. Insect biocontrol with non-endemic entomopathogenic nematodes (*Steinernema* and *Heterorhabditis* spp. *Biocontrol Science and Technology* 6: 295-302.
- Hokkanen, H. M. T. & Lynch, J. M. (eds.) 1995. Biological control: Benefits and risks. Cambridge University Press, Cambridge, UK. 290 pp.
- Hokkanen, H. M. T. & Wearing, C. H., 1994. The safe and rational deployment of *Bacillus thuringiensis* genes in crop plants. *Biocontrol Science and Technology* 4: 399-403.
- Hokkanen, H. M. T. 1993. Overwintering survival and spring emergence in *Meligethes aeneus*: effects of body weight, crowding, and soil treatment with *Beauveria bassiana*. *Entomologia experimentalis et applicata* 67: 241-246.
- Hokkanen, H. M. T. 1991. Trap cropping in pest management. *Annual Review of Entomology* 36: 119-138. (
- Dennill, G. B. & Hokkanen, H. M. T., 1990. Homeostasis and success in biological control of weeds - a question of balance. *Agriculture, Ecosystems and Environment* 33: 1-10.
- Hokkanen, H. & Pimentel, D., 1989. New associations in biological control: theory and practice. *The Canadian Entomologist* 121: 829-840.
- Hokkanen, H. M. T. 1986. Polymorphism, parasites, and the native area of *Nezara viridula* (Hemiptera, Pentatomidae). *Annales Entomologici Fennici* 52: 28-31.
- Hokkanen, H. & Holopainen, J., 1986. Carabid species and activity densities in biologically and conventionally managed cabbage fields. *Zeitschrift für angewandte Entomologie* 102: 353-363.
- Hokkanen, H. M. T. 1985. Exploiter-victim relationships of major plant diseases: implications for biological weed control. *Agriculture, Ecosystems and Environment* 14: 63-76.
- Hokkanen, H. M. T. 1985. Success in classical biological control. *CRC Critical Reviews in Plant Sciences* 3: 35-73.
- Hokkanen, H. & Pimentel, D., 1984. New approach for selecting biological control agents. *The Canadian Entomologist* 116: 1109-1121.

Prof.dr. Carl B. Huffaker (1914 –1995, USA)



Carl Barton Huffaker attended the University of Tennessee, Knoxville, where he earned a BA (entomology) in 1938 and an MS (plant ecology) in 1939. He continued his graduate studies at Ohio State University, Columbus, earning his PhD (entomology/ ecology) in 1942. While still in college he spent the summers of 1937, 1938 and 1939 working on malaria control for the Malaria Studies Division of the Tennessee Valley Authority. During the 1940-41 academic year, he was a graduate assistant (teaching) in zoology for Professor Dwight M. DeLong at Ohio State University. From April 1941 to December 1943 he was an assistant entomologist at the University of Delaware Agricultural Experiment Station. From December 1943 to January 1946 he was an entomologist for the Health and Sanitation Division of the U.S. Institute of Inter-American Affairs stationed in Bogotá, Colombia and then Santo Domingo (then Ciudad Trujillo),

Dominican Republic. During this period he conducted field research on malaria in Colombia, Haiti and the Dominican Republic.

In 1946 he joined the University of California as an assistant entomologist in the Department of Biological Control, Riverside. His first assignment was to lead, with James K. Holloway of the U. S. Department of Agriculture, the effort toward biological control of the Klamath weed. This European weed, also known as St. John's wort, *Hypericum perforatum*, had become in the 1940s a scourge on California range lands and threatened the grazing industry of northern California and other western states on some 2.25 million acres. A program of importation of several European species of insects that fed exclusively on the weed was started after reaching an agreement between the University of California and the U. S. Department of Agriculture's Bureau of Entomology and Plant Quarantine. The candidate species had been tried in Australia, where the weed had been introduced in the 1880s. The insects had become established and provided some degree of control. Although it would have been easy, under normal conditions, to obtain the insects from Europe, the war made collection there impossible. After the necessary arrangements among the involved organizations, collaborators from the Australian Council for Scientific and Industrial Research collected the insects and prepared them for shipment, and the U.S. Army Transport Command took the responsibility of bringing the material to California.

In California, at the Department of Biological Control in Albany, Carl Huffaker, Jim Holloway, and their collaborators took care of the imported material, reproduced the various species, and colonized them in the field. The colonized species were the leaf-eating beetles *Chrysolina quadrigemina* and *C. hyperici* and the root-borer beetle *Agrilus hyperici*. Eventually, a fourth species was colonized, the gallfly *Zeuxidiplosis giardi*. This program resulted in total and permanent control of Klamath weed in its area of distribution in the western states, where it is found at very low densities as a roadside plant in shady situations. The economic savings afforded by this project were estimated to be some \$79 million as of 1984. The benefits continue to accrue. Although the immediate economic benefits of this project are very significant, it has also contributed to the understanding of various aspects of the principles of biological control and population dynamics. Close, long-term quantitative studies by Huffaker and his collaborators on the consequences of this biological control project have led to improved understanding of the principles of biological control of plants and the ecological impact that phytophagous insects can have on succession and community (vegetational) structure. In addition, this example provided insights into the nature of the

whole complex of natural control of populations, involving both density-independent (e.g., weather and physical terrain) and density-related (dependent) factors such as regulating natural enemies or more direct competition.

In the context of basic science, this pioneering example was most important in showing the interactions of physical conditions and herbivores in determining the abundance and distribution of specific plant species and, consequently, the composition of vegetation. Another long-term project led by Carl involved the biological control of puncture vine, a spiny-burred, toxic weed in wasteland, urban, and certain crop situations. Two weevils that interfere with the production of seeds significantly reduced the density of the weed in most of the affected areas. A significant ecological finding was that the destruction or prevention of seeding of about 45% was sufficient, apparently, to bring about the decline in the weed's population.

A student of population dynamics, especially of the interactions of factors determining density regulation, Carl Huffaker led field and laboratory work conducting "a series of experiments designed to shed light upon the fundamental nature of predator-prey interaction, in particular, and the interrelations of this coaction with other important parameters of population changes, in general." The field work involved the cyclamen mite, *Phytonemus pallidus*, a pest of strawberries, and two predatory mites in the genus *Amblyseius*, while the laboratory studies were conducted on the six-spotted mite, *Eotetranychus sexmaculatus*, and the predator *Metaseiulus occidentalis* on orange fruits. The cyclamen mite studies showed the principal role that predatory mites have in determining the pest population density. They also showed that by purposely introducing the pest early in the cycle, the interaction between prey and predators was sustained at a low density. This work pioneered the now common practice in certain areas of deliberate introduction of a pest species itself as a means of establishing quickly and perpetuating a solid biological control program. It also provided one of the clearest examples of the physical environment (density independent) and the density-dependent regulating agencies operating together to produce any given level of natural control. The laboratory work using orange ecosystems highlighted the contribution that heterogeneity of the environment can play in the balance of nature while not, however, entirely substituting for a basic density-dependent regulating mechanism.

At a time when population ecologists and pest control specialists were arguing, sometimes passionately, about whether populations were regulated by biotic or physical factors (the density dependent/independent controversy), Carl B. Huffaker was carefully planning and meticulously conducting this research to gain understanding of the population regulating mechanisms in various living systems and was rigorously analyzing his data and that of others. His conclusions, for which he was recognized as one of the leading population ecologists of his time, were the result of his strict adherence to research procedures of the highest calibre. His example as an imaginative, persistent, and demanding researcher is part of the legacy he left to all who were acquainted with him and his work.

Yet another project carried on under Carl Huffaker's leadership was the biological control of the olive scale. This insect was the major pest of California olives; it was also an important pest of many deciduous fruit crops and ornamental shrubs and trees. The successful control of this pest was achieved by importation and colonization of two species of wasps that develop at the expense of the scale, killing it. In 1949 a search for natural enemies of the scale was started. One species was collected in various Mediterranean and Middle Eastern areas. The most promising material was collected in Iran and Iraq in 1952. This parasitoid species became widely distributed in California. In 1957 a second species was found in Pakistan and was widely colonized throughout the state. During a period of some thirty years Carl and a group of collaborators implemented the program and carefully documented the biological and ecological interactions of the natural enemies with the pest and their economic impact on the

olive industr industry. The result showed the effectiveness of natural enemies in regulating the density of their hosts, and strongly suggested that a complex of natural enemies may complement each other and regulate the host population more effectively than one (the “best”) acting alone. As for the economic impact, Carl estimated that the savings as of 1984 to the California olive industry were \$15 million.

Biological control, as a tactic of pest control, in many cases involves the deliberate colonization of natural enemies into new areas. The precedence of these natural enemies may vary, and in any given area where biological control is implemented it may happen that several species, each one being a native of a different area, are colonized simultaneously or over a long period in the same area. Under these circumstances competition among some of the natural enemies may occur to the point that a species may be prevented from being established, or an already established species may be displaced by a newcomer. In other cases the species may complement each other, regulating the prey population at a lower level. The research on biological control of Klamath weed and of olive scale by Carl shed significant light on this most important aspect of ecological interactions between living organisms.

In addition to his regular activities at the University of California, Professor Huffaker generously shared his scientific and administrative expertise by participating in a number of national and international organizations. As a member of the Subcommittee on the Use and Management of Biological Resources of the U.S. National Committee of the International Biological Program, and as world coordinator of the IBP on biological control of spider mites, Professor Huffaker prepared, at the request of the National Science Foundation, a feasibility study for a long-term, nationwide, integrated pest control research program. The document he and his associates prepared was the basis for the project that eventually became widely known as “the Huffaker project.” This project, funded by the NSF and the Environmental Protection Agency, involved studies on six crop ecosystems, with nineteen land-grant universities and segments of the U.S. Department of Agriculture and U.S. Forest Service cooperating in the research. With an ecological approach to insect and mite pest control, the project has provided the expertise and methods for great reduction in the use of the more environmentally objectionable pesticides. As an example of the development of a stable program of pest control, the project serves as the prototype for integrated pest management programs worldwide.

Huffaker taught an undergraduate course in insect ecology for several years with Ray F. Smith and P.S. Messenger and a graduate course in insect population ecology. He also led numerous graduate seminars on biological control and insect ecology. Under his guidance the International Center for Biological Control at the University of California, which he founded and directed, sponsored training programs, urban entomology research and education, and developed or sponsored books on integrated pest management and biological control. The Center served also as a vehicle for other extramural-sponsored research, particularly crop ecosystem studies.

Huffaker was a long-time member of the International Organization for Biological Control, serving as its president from 1972 to 1976 and again from 1978 to 1980. He was president of the Entomological Society of America, member of the Executive Council of the Intersociety Consortium for Plant Protection, member of the Pesticide Advisory Board of the California Department of Food and Agriculture, and a member of the California Statewide Integrated Pest Management Project Organizing Committee. He served on a joint U.S./U.S.S.R. Integrated Pest Management Committee, which organized a reciprocal research and exchange effort. He participated in global conferences and task forces of the Food and Agriculture Organization and the United Nations Environmental Program. His numerous services to educational and government agencies included consultations with and briefs to the Environmental Protection Agency, National Science Foundation, President’s Council for

Environmental Quality, Agricultural Research Policy Advisory Committee, and to a number of state and national investigative agencies. At the University of California he served on the National Academy of Sciences; The C. W. Woodworth Award for Outstanding Achievement in Entomology; Honorary Fellow of the Royal Entomological Society of London; Scholar-in-residence, Rockefeller Foundation, Bellagio, Italy; Guggenheim Fellow; Fellow of the American Association for the Advancement of Science; Fellow of the Franklin Institute; The Louis E. Levy Medal of the Franklin Institute, as well as its Journal Premium Award; and co-recipient of the Wolf Prize from the Wolf Foundation, Israel.

The results of Professor Huffaker's very productive scientific career are recorded in the more than 200 papers in numerous scientific journals and chapters in books. He was editor of several books on biological control and integrated pest management.

Selected publications by Carl Huffaker

- Huffaker, C.B. 1941. Egg parasites of the harlequin bug in North Carolina. *J. Econ. Entomol.* 34, 117.
- Huffaker, C.B. and C.E. Kennett. 1956. Experimental studies on predation. I. Predation and cyclamen mite populations on strawberries in California. *Hilgardia* 26, 191-222.
- Huffaker, C.B. 1957. Fundamentals of biological control of weeds. *Hilgardia* 27, 101-57.
- Huffaker, C.B. 1959. Biological control of weeds with insects. *Ann. Rev. Entomol.* 4, 251-76.
- Huffaker, C.B. 1964. Experimental studies on predation: Dispersion factors and predator-prey oscillations. *In: Readings in Population and Community Ecology*, (ed.) W. E. Hazen, pp. 164-204. Philadelphia: W. B. Saunders.
- Huffaker, C.B. 1971. The phenomenon of predation and its roles in nature. *In: Dynamics of Populations*, (eds) P. J. den Boer and G. R. Gradwell, pp. 327-43. Wageningen: Centre of Agricultural Publishing and Documentation.
- Huffaker, C.B. 1971. (ed.), *Biological Control*. Plenum, New York, 511 pp.
- Huffaker, C.B. and J.E. Laing. 1972. Competitive displacement without a shortage of requisites? *Res. Pop. Ecol.* 14, 1-17.
- Huffaker, C.B. 1974. Some implications of plant-arthropod and higher-level arthropod food links. *Environ. Entomol.* 3, 1-9.
- Huffaker, C.B., F.J. Simmonds and J.E. Laing. 1976. The theoretical and empirical basis of biological control. *In: Theory and Practice of Biological Control*, (eds.) C.B. Huffaker and P.S. Messenger, pp. 41-78. New York: Academic Press.
- Huffaker, C.B. and P.S. Messenger (eds). 1976. *Theory and Practice of Biological Control*. Academic Press, New York, 788 pp.
- Huffaker, C.B., 1977. Augmentation of natural enemies in the People's Republic of China. pp. 329-339. *In: R.L. Ridgway and S.B. Vinson (eds). Biological Control by Augmentation of Natural Enemies*. Plenum Press, New York.
- Huffaker, C.B., 1980. *New Technology of Pest Control*. Wiley, New York: 500 pp.
- Huffaker, C.B. (ed.) & R.L. Rabb. 1984. *Ecological Entomology*. New York: Wiley-Interscience.

Dr. Marshall Johnson (USA)



Marshall Johnson has established an outstanding international reputation for contributions to the fields of biological control and entomology in research, teaching, extension, and administration. He advanced entomology during the past three decades by developing successful IPM programs in several cropping systems. His work has focused on conservation biological control, specifically the integration of natural enemies into systems where heavy pesticide use is common, such as vegetable crops. Almost 100 of his publications specifically deal with aspects of natural enemy biology or ecology, including suppression of pest populations, classical biological control, mass rearing natural enemies, sampling natural enemy populations, host specificity, use of entomopathogenic nematodes, lethal and sub-lethal impacts of pesticides on natural enemies, and pesticide resistance in natural enemies. To achieve integration, he not only focused on the biology and ecology of natural enemies, but also examined various components of agro-systems to determine how pesticide applications could be reduced. This included the development of sampling methods to time control actions, as well as determination of pest impact on crop yields to determine the need for control actions.

Johnson has published more than 240 publications, including 155 refereed journal articles, book chapters, and review articles. Nearly 100 of his articles specifically deal with some aspect of natural enemy biology or ecology. His published works have been cited over 4,100 times in the scientific literature.

But Johnson's impact on biological control extends far beyond the number of articles he has published. He has served in a leadership role in several organizations focused on coordinating and expanding the role of biological control. He served as President of IOBC-NRS; he also served on the US Western Regional Committee on Biological Control; the Customer Advisory Group of the National Biological Control Institute; and the Experiment Station Committee on Policy (Biological Control Working Group). He also served for seven years as an editor of the journal *Biological Control – Theory and Application in Pest Management*, and continues to serve on the journal's editorial board. He has helped organize and coordinate several conferences on biological control.

His many awards and honors include being named a fellow of both the Entomological Society of America and also the American Association for the Advancement of Science. He is a recipient of the C. W. Woodworth Award from the Pacific Branch of the Entomological Society of America, and the Entomological Society of America Recognition Award for Contributions to Agriculture. Notably, he received the Distinguished Scientist of the Year Award in 2012 from the International Organization for Biological Control - Nearctic Regional Section (IOBC-NRS).

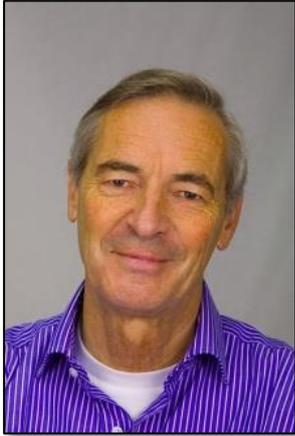
He helped train the next generation of biocontrol practitioners by teaching a biological control course at the University of Hawaii at Manoa from 1983 to 2000, where eleven of his graduate students conducted research on aspects of biological control.

Selected publications by Marshall Johnson

Wang, X.G., K. Levy, H. Nadel, M. W. Johnson, A. Blanchet, Y. Argov, C. H. Pickett, and K. M. Daane. 2013. Overwintering survival of olive fruit fly and two introduced parasitoids in California. *Environmental Entomology* 42: 467-476.

- Daane, K. M. and M. W. Johnson. 2010. Olive fruit fly: Managing an ancient pest in modern times. *Annual Review of Entomology* 55: 151-69.
- Johnson, M. W., K. M. Daane, K. Sime, H. Nadel, C. H. Pickett, and X.-G. Wang. 2008. Classical biological control introductions to manage olive fruit fly. *Biocontrol News and Information* 29(1): 3-4.
- Hooks, C. R. R., and M. W. Johnson. 2003. Impact of agricultural diversification on the insect community of cruciferous crops. *Crop Protection* 22: 223-238.
- Johnson, M. W. and B. E. Tabashnik. 1999. Enhanced biological control through pesticide selectivity. pp. 297-317. In: *Handbook of Biological Control*, Academic Press, San Diego. (T. Fisher, T. S. Bellows, L. E. Caltagirone, D. L. Dahlsten, Carl Huffaker, and G. Gordh, eds.). 1046 pp.
- Gonzalez-Hernandez, H., M. W. Johnson, and N. J. Reimer. 1999. Impact of *Pheidole megacephala* (F.) (Hymenoptera: Formicidae) on the biological control of *Dysmicoccus brevipes* (Cockerell) (Homoptera: Pseudococcidae). *Biological Control* 15: 145-152.
- Johnson, M. W. 1995. Integrating Biological Controls and Pesticides: Considerations, Possibilities, and Reality. *Pesticide Outlook* 6(5): 25-29.
- Johnson, M. W. & B. E. Tabashnik. 1994. Laboratory selection for pesticide resistance in natural enemies. pp. 91-105. In *Applications of Genetics to Arthropods of Biological Control Significance* (S. K. Narang, A. C. Bartlett, R. M. Faust, eds.), CRC Press, Inc., Boca Raton, FL. 199 pp.

Prof. Dr. J. C. van Lenteren (1945, The Netherlands)



Joop van Lenteren obtained his PhD. degree in ecology from Leiden University in 1976. He was Professor of ecology and biological control at the same university from 1981-1983. Joop next moved to Wageningen University where he served as Professor of ecological entomology, Chair and Head of department (1983-2003); Professor of entomology (2003-2010); and active Emeritus Professor (2010-onwards).

Prolific researcher with more than 200 refereed publications, Joop has made significant contributions in ecology, entomology and biological control, including population dynamics and behavioural ecology of insects, trophic interactions, biological control, pre-introductory evaluation criteria for selection of natural enemies, quality control of biocontrol agents, environmental risk assessment of exotic natural enemies, and sustainable agriculture. Throughout his career Joop has nicely and successfully combined applied and fundamental research. His contributions are recognized internationally and his outstanding research on natural enemies has contributed directly to the implementation of several biological control programmes around the world.

Owing to his strong and passionate commitment to biological control and sustainable agriculture, Joop has provided admirable service to the community by actively serving on numerous national and international committees, boards, and experts panels (e.g. Member (2006-2015) and Vice-chair (2009-2015) of the Panel of experts on Plant Health of the European Food Safety Authority (EFSA), member of Council of IOBC-WPRS (2000-2004), member of the Dutch Governmental Board for of Pesticides (1997-2007), Vice-president of the Netherlands Entomological Society (1994-2006), consultancies for FAO, World Bank, CGIAR institutes, European Community and Dutch Ministry of Foreign Affairs in Africa, Asia and Latin America. Joop has been truly dedicated to IOBC Global and his contribution is unique. He served as President (2004-2008), Vice-President (2000-2004; 2012-2016), and Secretary General (2008-2012).

Joop has received numerous and prestigious awards and distinctions throughout his career, including the Royal Netherlands Society for Sciences and Arts Life Sciences Award (1982); "Professor Harry Scott Smith" Award of the University of California (1992); "Professor Jozef van den Brande" Award of the University of Ghent (1994) for fundamental and applied entomological research; "Delta d'Oro" Award of the Province of Ferrara (Italy): Eminent scientist in field of environmental sciences and sustainable pest management (1996); Doctor *Honoris causa* of Szent Istvan University, Budapest, Hungary (1999); Royal/Shell Sustainability Prize, in recognition of fundamental and applied research in biological crop protection, The Hague (2005); Rank Prize in recognition of studies on plant, herbivore natural enemy relationships and biological control, London (2005-2006) (with Dicke and Vet); Lifetime Achievement Award of the world-wide biological control industry for outstanding contribution (2010); Doctor *Honoris causa* of Warsaw University of Life Sciences, Warsaw, Poland (2011); Certificate of distinction in recognition of outstanding achievements in Entomology by the Council of the International Congresses of Entomology (ICE 2012); Fellow of the Royal Netherlands Academy of Sciences and Arts (2001); Fellow of the Royal Netherlands Society for Sciences and Arts (1994); Honorary fellow of the Italian Academy of Entomology (2005).

Selected publications by van Lenteren:

- van Lenteren, J.C. van & K. Bakker, 1975. Discrimination between parasitised and unparasitised hosts in the parasitic wasp *Pseudeucoila bochei*: a matter of learning. *Nature* 254, no.5499: 417-419.
- van Lenteren, J.C., H.W. Nell & L.A.S. Lelie. 1980. The parasite-host relationship between *Encarsia formosa* (Hymenoptera: Aphelinidae) and *Trialeurodes vaporariorum* (Homoptera: Aleyrodidae). *Journal of Applied Entomology* 89, 442-454.
- van Lenteren, J.C. & J. Woets. 1988. Biological and integrated pest control in greenhouses. *Annual Review of Entomology* 33, 239-269.
- van Lenteren, J.C. 1981. Host discrimination by parasitoids. In: Semiochemicals: Their roles in pest control. Ed. D.A.Nordlund, R.L. Jones & W.J. Lewis. Wiley and Sons, New York: 153-179.
- Vet, L.E.M., J.C. van Lenteren, M. Heymans & E. Meelis 1983. An airflow olfactometer for measuring olfactory responses of hymenopterous parasitoids and other small insects. *Physiological Entomology* 8, 97-106.
- Carton, Y., M. Bouletreau, J.J.M. van Alphen & J.C. van Lenteren, 1986. The *Drosophila* parasitic wasps. In: The genetics and biology of *Drosophila*, vol. 3e, ed.: M. Ashburner, H.L. Carson & J.N. Thompson. Academic Press, London: 348-394.
- van Lenteren, J.C. & L. Noldus. 1990. Whitefly-plant relationships: behavioural and ecological aspects. In: Whiteflies: their bionomics, pest status and management. Ed. D. Gerling. Intercept Ltd., Andover, Hants: 47-89.
- Lewis, W.J., J.C. van Lenteren, S.C. Phatak & J.H. Tumlinson. 1997. A total system approach to sustainable pest management. *Proceedings of the National Academy of Sciences USA* 94, 12243-12248.
- van Lenteren, J.C. 2000. A greenhouse without pesticides: fact or fantasy? *Crop protection* 19, 375-384.
- van Lenteren, J.C., D. Babendreier, F. Bigler, G. Burgio, H.M.T. Hokkanen, et al. 2003. Environmental risk assessment of exotic natural enemies used in inundative biological control. *BioControl* 48, 3-38.
- van Lenteren, J.C., J. Bale, F. Bigler, H.M.T. Hokkanen, A.J.M. Loomans. 2006. Assessing risks of releasing exotic biological control agents of arthropod pests. *Annual Review of Entomology* 51, 609-634.
- van Lenteren, J.C. van, 2012. The state of commercial augmentative biological control: plenty of natural enemies, but a frustrating lack of uptake. *BioControl* 57: 1-20.
- Ruschioni, S., J.J.A. van Loon, H.M. Smid, J.C. van Lenteren, 2016. Insects can count: sensory basis of host discrimination in parasitoid wasps. *PLoS ONE* 10(10): e0138045. doi:10.1371/journal.pone.0138045

Prof.dr L.Y. Li-Ying (1931, China)



Prof.dr Li Li-Ying studied from 1951-1956 at the Division of Plant Protection of the Department of Agronomy of the Moscow Agricultural Academy (Timiryazev, Moscow, USSR), where she graduated in 1956. From 1956-1961, she worked at the Entomological Institute of the Academy Sinica, and since 1961 she has worked at the Guangdong Entomological Institute in Guangzhou as Chief Senior Scientist and later Director of the Guangdong Entomological Institute. She has been Vice President and President of the Chinese Entomological Society, member, Vice-President and Honourable member of the council for International Entomological Congresses, member of the council for the International Plant Protection Congresses, member of the council for the Asia-Pacific Conferences of Entomology,

President and Honourable President of the Academic Council of the Guangdong Entomological Institute, and Professor at the South China Agricultural University.

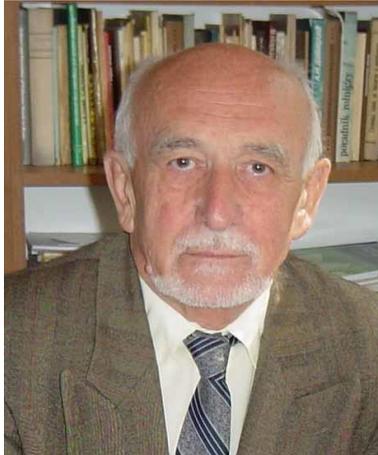
Prof. Li Li-Ying studied biology, ecology, mass production, oviposition behaviour, diapause and in vitro rearing of *Trichogramma* spp. She also worked on introduction, mass production and utilization of entomopathogenic nematodes, in vitro rearing of *Anastatus japonicus* and its utilization, mass production and utilization of *Eucanthecona furcellata* and *Cryptolaemus montrouzieri*, biological control of *Mikania micrantha*, and rice IPM. She has published approximately 110 papers and 9 books.

Selected recent publications by Prof. Li Li-Ying

- Li-Ying. Li. 1990. Mass production of *Trichogramma* spp. and *Anastatus japonicus* Ashmead with artificial diets in China. In: "The Use of Natural Enemies to Control Agricultural Pests". Proceedings of the International Symposium on Utilization of Parasitoids and Predators, Japan, 1989. pp. 207-211.
- Li-Ying. Li. 1990. Parasitoids. In: "Pest Control Strategy and Methods". Academic Press: 427-447 (in Chinese).
- Li-Ying. Li. 1992. Recent status of biological control of insect pests in China. 1992. In: "Biological Control in South and East Asia" (ed. Y. Hirose, Kyushu University Press). PP. 1-10.
- Li-Ying. Li. 1992. In vitro rearing of parasitoids of insect pests in China. *Korean Journal of Applied Entomology* 31: 241-246.
- Li-Ying. Li. & Di-fang, Zhu. 1992. Temperature and host factors, inducing the diapause of *Trichogramma* spp. *Natural Enemies of Insects* 14: 113-126 (in Chinese).
- Li-Ying. Li. 1994. Worldwide use of *Trichogramma* for biological control on different crops - A survey. In: "Biological Control with Egg Parasitoids" (eds E. Wajnberg & S.A. Hassan). Oxon, UK. CAB International, Chapter 2, pp. 37-54.
- Li-Ying. Li, Di-fang, Zhu. 1995. Intraspecific variation and the role of superparasitism in diapause induction of *Trichogramma evanescens* Westwood. *Entomologia Sinica* 2: 337-344.
- Li-Ying. Li, Ren, Wang &, Waterhouse, D.F. 1997. The Distribution and Importance of Arthropod Pests and Weeds of Agriculture and Forestry Plantations in Southern China. ACIAR Monograph No. 46, 185 pp.
- Li-Ying. Li. 1997. "Parasitoids and Predators (Insecta) of Agriculture and Forestry Arthropod Pests". Guangdong High Education Press, 416 pp.

Li-Ying. Li. 1998. New advances in research on *Trichogramma*. In “New Advances in Biological Control of Insect Pests and Diseases of Agricultural Crops in China” (ed. Piao Yongfan, Chinese Agricultural Press).

Prof.dr J.J. Lipa (1932, Poland)



Prof.dr Jerzy Lipa obtained a BSc in Biology (1953) and an MSc in Parasitology (1957) at the Warsaw University, a PhD in Entomology (1962) and a DSc in Zoology (1967) at the Poznan Agricultural University. During his studies, he worked as Research Assistant at the Laboratory of Agricultural Entomology of the Institute of Plant Protection in Pulawy from 1953-1957, he was Head of the Laboratory of Biological Control at the Institute of Plant Protection in Poznan from 1960-1966, Associate Professor and Head of the Department of Pest and Disease Control and Head of Laboratory of Biological Control at the Institute of Plant Protection in Poznan from 1967-1971, Professor and Head of the Department of Pest and Disease Control and Head of Laboratory of Insect Pathology of the Institute of Plant Protection, Poznan from 1972-1989, and Professor and Head of the Department of Biological Control and Quarantine of the Institute of Plant Protection in Poznan from 1972-1989. Since 2003, he has been Active Professor Emeritus at the Department of Biological Control and Quarantine of the Institute of Plant Protection in Poznan.

Prof. Lipa has spent several periods at foreign research institutes: from 1958–1959, he worked as Research Associate in the Laboratory of Insect Pathology, Department of Biological Control, University of California, Berkeley (USA) with a Fellowship of the Rockefeller Foundation, from 1965-1966 he received a fellowship of the USSR Academy of Sciences which was used to work as visiting scientist at the Institute of Zoology, USSR Academy of Sciences in Leningrad; All-Union Institute of Plant Protection in Leningrad; Ukrainian Institute of Plant Protection in Kiev; Institute of Animal Morphology AN USSR in Moscow; State University in Irkutsk; Limnological Institute of AN USSR in Listvennichnaya at Baykal Lake; Biological Institute SO AN USSR in Novosibirsk; Agricultural and Forestry University in Voronezh. Further, he worked as invited research professor at SARH and International Center for Improvement of Maize and Wheat (CIMMYT), Mexico (1989), at the Institute of Plant Protection, Agricultural Research Center of Finland in Jokioinen, and the University of Helsinki (1990), at the University of Cordoba, ETSIAM, Chair of Applied Entomology, Cordoba (Spain), and at the Public University of Navarra (UNAM) in the Departamento Produccion Agraria, Pamplona (Spain).

Prof. Lipa is member of various foreign and domestic Academies of Sciences, and honorary member of domestic and foreign Scientific Societies. He has been active in a number of national and international organizations, committees, societies and boards, e.g. Member of FAO and WHO Panel of Experts on Integrated Pest Control, National Coordinator - Biological and Integrated Plant Protection Programme, Vice President of the International Organization of Biological Control (IOBC-EPRS), etc. etc. He received a number of national and international orders, medals, prizes and awards, e.g. Silver Cross of Merit (from the President of Poland), Special prize from the Minister of Science, Education and Technology for outstanding scientific achievements and implementation of biological control into greenhouse crop protection systems in Poland (with S. Pruszyński and co-workers), Special prize of the Minister of Agriculture and Forestry for implementation of use of microbial insecticides in plant and forest protection in Poland (with co-workers), Gold Medal of Merit from the Minister of Agriculture for initiation of production of biopesticides in Poland, Cavalier's Cross of the Order Polonia Restituta (from the President of Poland), Gold Medal of "Merit for Services to Environmental Protection" from the Minister of Environmental

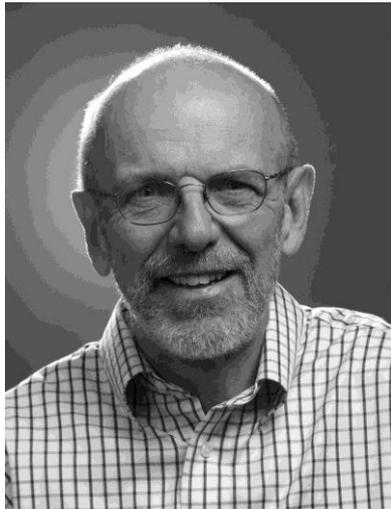
Protection, Gold Medal of Appreciation from the Faculty of Agriculture of the Agricultural University in Krakow, Poland, etc.

Prof. Lipa has published more than 1000 articles, reports and book chapters.

Selected publications by J.J. Lipa:

- Lipa, J.J. 1958. Effect on earthworm and *Diptera* populations of BHC dust applied to soil. *Nature* 181: 863.
- Lipa, J.J. & Steinhaus, E.A. 1959. *Nosema hippodamiae* n. sp., a microsporidian parasite of *Hippodamia convergens* Guerin (Coleoptera, Coccinellidae). *J. Insect Pathol.* 1: 304-308.
- Lipa, J.J. 1968. *Nosema leptinotarsae* sp. n., a microsporidian parasite of the Colorado potato beetle (*Leptinotarsa decemlineata*) *J. Invert. Pathol.* 10: 111-115.
- Lipa, J.J. 1971. Microbial control of mites and ticks. pp. 357-373. In: "Microbial Control of Insects and Mites" (eds. H.D. Burges & N.W. Hussey). Academic Press, London, 861 pp.
- Lipa, J.J. & Bartkowski, J. 1972. A newly discovered poxlike virus disease of dung beetles, *Geotrupes silvaticus* (Coleoptera: Scarabaeidae). *J. Invert. Pathol.* 20: 218-219.
- Lipa, J.J. 1975. "An Outline of Insect Pathology". USDA and NSF, Springfield, 269 pp.
- Lipa, J.J. & Hokkanen, H.M.T. 1992. *Nosema meligethi* I. & R. (Microsporidia) in populations of *Meligethes* spp. in Europe. *Biocontrol Sci. Technol.* 2: 119-125.
- Lipa, J.J. & Hokkanen, H.M.T. 1992. Safety of *Nosema meligethi* I. and R. (Microsporida) to *Apis mellifera* L. and *Coccinella septempunctata* L. *J. Invert. Pathol.* 60: 310-311.
- Lipa, J.J., Santiago-Alvarez, C., Vargas-Osuna, E., Aldebis, H.K., Caballero, P. & Hernandez-Crespo, P. 1993. Microorganisms, nematodes and parasitoids of *Ocnogyna baetica* (Rambur) (Lep.: Arctiidae) in southern Spain with potential for use in biological control. *Biocontrol Sci. Technol.* 3: 347-353.
- Lipa, J.J. & Smits, P.H. 1999. Microbial control of pests in greenhouses. pp. 295-309. In: "Integrated Pest and Disease Management in Greenhouse Crops" (eds R. Albajes, M.L. Gullino, J. C. van Lenteren & Y. Elad). Kluwer Academic Publishers, Dordrecht. 545 pp.

Prof.dr. R.F. Luck (1945, Canada)



Bob Luck started his work in entomology through his interest in forestry. After doing a tour of duty in the navy from 1966-68 he started working on his PhD at UC Berkeley. During that time the Berkeley faculty consisted of such biocontrol greats as Huffaker, van den Bosch, Hagen and Dahlsten. Dahlsten was Bob's major professor. During his PhD research he studied the control of the pine needle scale. These scales had become an upset-pest following area-wide sprays with malathion against mosquitoes.

After he finished his PhD in 1973 he applied for a series of positions in Forestry, but was told in no uncertain terms by van den Bosch that he should take the position in the Department of Biological Control in Riverside. Upon his arrival there, Bob initiated work on the biological control of the elm leaf beetle, and eventually became involved with the

biological control of the citrus red scale (CRS). This territory had been occupied for a long time by Paul DeBach. Bob became very interested in the reasons why the successful parasitoid *Aphytis lingnanensis* was replaced by the parasitoid *Aphytis melinus*. The reasons for this displacement were found through detailed studies of the oviposition and sex allocation of the parasitoids. *Aphytis melinus* appeared to be able to produce daughters on smaller scales than *A. lingnanensis*, eventually leading to the displacement of *A. lingnanensis*. To study the dynamics of the interaction between the CRS and *Aphytis melinus*, a large-scale, multi-year study was initiated, in which the density of both CRS and the parasitoids was monitored.

Bob was also much involved in the development of an economically and biologically highly successful IPM program for control of citrus pests.

Publications

> 150 scientific papers in books and journals.

Luck, R.F. and Podoler, H. 1985 Competitive exclusion of *Aphytis lingnanensis* by *A. melinus*: Potential role of host size. *Ecology* 66, 904-913.

Luck, R.F., B.M. Shepard and P. Kenmore. 1988. Experimental methods for evaluating arthropod natural enemies. *Annual Review of Entomology* 33, 367-391.

Luck, R.F., Forster, L.D., and Morse, J.G., 1997. An ecologically based IPM program for citrus in California's San Joaquin Valley using augmentative biological control.

Proceedings of the International Society of Citriculture, VIII International Citrus Congress, May 12-17, 1996, Sun City, South Africa 1, 504-507.

Luck, R.F., Jenssen, J.A.M., Pinto, J.D. and Oatman, E.R. 2000. Precise sex allocation and sex ratio shifts by the parasitoid *Trichogramma pretiosum*. *Behavioural Ecology and Sociobiology* 49, 311-321.

Luck, R.F. and L.D. Forster. 2003. Quality of augmentative biological control: A historical perspective and lessons learned from evaluating *Trichogramma*. Pp. 231-246. In J. C. van Lenteren (ed). *Quality Control and Production of Biological Control Agents*. CABI Publishing Wallingford, Oxon. UK.

Dr. Peter Mason (1952, Canada)



Peter has contributed extensively to the knowledge and management of insect biological control agents and insect pest targets, and has been instrumental in the education of new entomologists in that field. He has worked on a diverse range of insects, including bertha armyworm, *Lygus* plant bugs, cabbage seedpod weevil, and leek moth. His research on these and other systems has made applied contributions in pest management and in the regulation of biological control, which are of great significance in Canada and around the world.

Peter has been instrumental in the development of procedures for testing biological control agents against non-target species. The changes in perception of the safety of introduction of natural enemies for classical biological control of pest insects led governments in North America and around the world to implement new regulations that required extensive testing of candidate biological control agents against species that might be harmed by the introduction. Through his work, Peter and collaborators have developed scientifically-sound approaches to meeting the non-target testing regulations. These include procedures for the selection of key species for non-target testing, the recognition of potential conflicts between weed and arthropod biological control agents, and the development of non-target testing lists for insect biological control projects that are pre-approved by regulatory agencies. As chair of the Canadian Biological Control Review Committee, which oversees the importation of biological control agents into Canada, Peter has been instrumental in assisting entomologists to meet these guidelines. These approaches are being adopted by the international community of biological control practitioners.

Peter has been instrumental in the promotion of biological control approaches to insect pest management. His book “Biological Control Programmes in Canada, 1981-2000” (Edited by Mason and Huber), and a new volume in the series, “Biological control Programmes in Canada 2001 – 2012” (in press), highlight biological control programmes and practices in Canada and provide a much-needed justification for ongoing support of these programmes, including programmes in entomology.

Peter’s achievements can be summarized as follows:

- Over 60 published research papers, with an average citation rate in excess of 3 per title.
- Numerous book chapters and reviews on insects and insect biology.
- Management of the AAFC National Arthropod Quarantine facility.
- Leadership of scientists in the Biodiversity section, AAFC Research Centre, Ottawa, ON, since 2001.
- Entomological Society of Canada President (2011-12); a long serving member of committees, organizer of meetings in the ESC; a key member of the North American Plant Protection Organization, Biological Control Committee; a co-convenor of the IOBC Global working group on benefits and risks of biological control agents.
- Recently awarded an OECD Co-operative Research Programme Fellowship.
- Co-supervisor and committee member for graduate students at universities across Canada and internationally in China and Europe.

Dr. R. McFadyen (1944, Australia)



Rachel McFadyen (1944) was born in India, and then raised in the UK where she gained her first degree at Cambridge University. She then spent seven years in Trinidad in the West Indies, working for the (British) Commonwealth Institute of Biological Control, and received her PhD at the University of the West Indies on research into potential biocontrol agents for the weed *Chromolaena*. She then spent 3 years working from a base in Tucuman in north-western Argentina with the CIBC, finding and testing insects to control *Harrisia cactus* for Queensland. Her work led to several insects including the highly successful mealy bug *Hypogeococcus festerianus* being released in

Australia and later South Africa.

Dr McFadyen emigrated to Australia in 1976 at the end of this project and joined the weed biocontrol team at the Alan Fletcher Research Station, Sherwood, Brisbane. There she worked on *Harrisia cactus*, *Parthenium*, annual ragweed, rubber vine, and finally *Chromolaena* again (this time for projects in Indonesia and the Philippines). The projects for *Harrisia cactus* and ragweed were regarded as highly successful and a good measure of control was ultimately provided for *Parthenium*. Many of the *Parthenium* insects were also introduced to other countries such as India, Pakistan and South Africa where *Parthenium* is a major problem. She successfully completed a Master in Public Administration through the University of Queensland writing her thesis on the eradication of *Harrisia cactus* and its implications for policy makers. In the 1990s she also took up responsibilities as a program leader for weed biological control within the Cooperative Research Centre for Tropical Pest Management which had been established to integrate activities between several agencies and universities. In 1997 she became manager of the Queensland Department of Natural Resources' Pest Management Research group. In 1999 she was awarded the Council of Australian Weed Science Societies' Award for Excellence in Leadership for her work in biological control of weeds.

Over most of her career, she has maintained a close association with IOBC. Although originally a member in the Nearctic Section, she joined the then South and East Asian Regional Section of IOBC (now APRS) after her emigration and became its President for some years from 1996.

In 2003, Dr McFadyen was appointed Director (CEO) of the Cooperative Research Centre for Australian Weed Management which linked weed scientists from a number of agencies in every major Australian city. She retired when the CRC closed in 2007 but remains active in weed circles. She is presently Vice President of the Queensland Weed Society and has recently chaired a review of a national cost-shared eradication program targeting a number of weeds in Queensland's Wet Tropics. Dr McFadyen also remains active in the Anglican Church and has been a representative to the Diocesan Synod.

Selected publications by McFadyen

Julien M, McFadyen R.E.C., Cullen J (eds), 2012. *Biological Control of Weeds in Australia*.

CSIRO Publishing, Melbourne; with the following 7 chapters in the above:

- McFadyen R.E.C., *Mimosa diplotricha* C. Wright ex Sauvalle – giant sensitive plant. pp. 373-378.
- McFadyen R.E.C., *Harrisia martinii* - *Harrisia cactus*: *Acanthocereus tetragonus* - sword pear. pp. 274-281
- McFadyen R.E.C., *Ageratina adenophora* (Spreng) King & Robinson – crofton weed. pp 29-32.

- McFadyen, R.E.C. and Morin, L. *Senecio madagascariensis* Poir. – fireweed. pp. 526-536
- Day, M. and McFadyen, R.E.C. *Chromolaena odorata* King & Robinson – chromolaena. Pp. 162-169.
- Dhileepan, K. and McFadyen, R.E.C. *Parthenium hysterophorus* L. - parthenium. pp. 448-462
- Palmer W and McFadyen, R.E.C. *Ambrosia artemisiifolia* L. – annual ragweed. pp. 52-60

McFadyen R.E.C., 2008. Return on investment: determining the economic impact of biological control programmes. In: Proceedings of the XII International Symposium on Biological Control of Weeds, eds. Julien, M. pp. 75-82.

Dhileepan, K., Lockett, C.J. & McFadyen, RE. (2005). Larval parasitism by native insects on the introduced stem-galling moth *Epiblema strenuana* Walker (Lepidoptera: Tortricidae) and its implications for biological control of *Parthenium hysterophorus* (Asteraceae). *Australian Journal of Entomology*, 44: 83-88.

McFadyen R.E.C., 200) Biological control: managing risks or strangling progress? *Proceedings of the 14th Australian Weeds Conference*, Charles Sturt University, Wagga Wagga, NSW, pp. 78-81.

McFadyen, REC & Spafford Jacob, H., 2003. Insects for the Biocontrol of Weeds: Predicting parasitism levels in the new country. Proc. XI Int Symp Biol Control Weeds, Canberra, Australia. Pp.135-140.

McFadyen, REC, Desmier de Chenon, R. & Sipayung, A., 2003. Biology and host specificity of the chromolaena stem gall fly *Cecidochares connexa* (Macquart) (Diptera: Tephritidae). *Aust. J. Ent.* 42:294-297.

McFadyen, REC, Vitelli, M. & Setter, C., 2002. Host specificity of the rubber vine moth, *Euclasta whalleyi* Popescu-Gorj and Constantinescu (Lepidoptera: Crambidae: Pyraustinae): field host-range compared to that predicted by laboratory tests. *Aust. J. Ent.* 41: 321-3

McFadyen R.E.C., 1999. Successes in Biological Control. In NR Spencer (ed.) Proc. Xth. Int. Symp. Biol. Control Weeds, Montana State University, Bozeman, Montana, USA, July 1999. pp.3-14.

McFadyen R.E.C., 1998. Biological Control of Weeds. *Annual Review of Entomology* 43:369-93

McFadyen R.E.C., 1985. Larval characteristics of *Cactoblastis* spp. (Lepidoptera: Pyralidae) and the selection of species for biological control of prickly pears (*Opuntia* spp.). *Bull. Ent. Res.* 75: 159-168.

Dr. R. Muniappan (1941, United States of America).



Rangaswamy Muniappan (1941) (Muni)'s educational experience includes a B.S. in General Agriculture and an M.S. in Entomology, with specialization in Nematology, from the University of Madras, and a Ph.D. in Entomology with specialization in Biological Control from Oklahoma State University. He continued at Oklahoma State with one year of postdoctoral work on tritrophic interactions among aphids, parasitoids, and susceptible and resistant lines of sorghum.

Subsequently, he moved to the Guam Department of Agriculture and worked on extension and quarantine programs for four years in the early 1970s. During that period, he wrote the Quarantine Regulations for Guam and collaborated directly with APHIS representatives in Honolulu, Hawaii, as there was no APHIS presence in Guam at the time.

When the Land Grant Program was started at the University of Guam (UOG) in 1975, Dr. Muni was recruited as a faculty member in the College of Agriculture and then became Associate Director of the Agricultural Experiment Station. This position gave him an opportunity, in coordination with the director, to provide leadership in procuring land and establishing field stations, recruiting faculty, and developing research programs. From 1976, he implemented and managed Hatch Act and regional research projects at UOG. He promoted and raised local participation in the Tropical Subtropical Agricultural Research program of the CSRS at USDA (now known as CSREES) in 1984, and added the McIntire–Stennis research program to the university's funding sources in 1990. He also actively collaborated with USDA and members of the U.S. Congress to facilitate the introduction of the Soil Conservation Service (Natural Resource Conservation Service) and Bureau of Land Reclamation to Guam.

Dr. Muni led the Agricultural Experiment Station in developing research collaborations with regional and international organizations such as the South Pacific Commission (now called the Secretariat of the Pacific Community), the Food and Agricultural Organization of the United Nations (FAO), the Australian Centre for International Agricultural Research (ACIAR), the International Benchmark Sites Network for Agrotechnology Transfer (IBSNAT), and the international centers of the Consultative Group on International Agricultural Research (CGIAR). While administering the UOG Experiment Station from 1976 to 1995, he also maintained his own research projects in entomology. Some of the areas he worked on included the biological control of exotic weeds in the Pacific basin and in Asia, and IPM of ornamental palm and tropical fruit and vegetable pests.

One of Dr. Muni's projects that has evolved over time and actually still continues at the University of Guam today, began in 1983, when the invasive neotropical weed *Chromolaena odorata* was identified as a problem in the Northern Mariana Islands. There was no recognized predator of this plant, but he noticed that in the late 1970s, the Commonwealth Institute of Biological Control in London (now called CAB International) had discontinued a project that attempted to use the arctiid moth, *Pareuchaetes pseudoinsulata*, for control of *Chromolaena* in India, Malaysia, Sri Lanka, Ghana and Nigeria. The reason for failure was that the moth could not be established. He felt this project likely had some viable aspects and secured a Fulbright fellowship in India to study the moth and characterize the reasons for CAB International's project failure. He found that the number of *Pareuchaetes* caterpillars and moths being released into the field was not large enough to overcome predatory pressure before establishment. His observations resulted in positive changes in the local management of the weed and successful biological control of *Chromolaena* in Guam and the Northern Mariana Islands.

Aside from a three-year research period in Oklahoma, the bulk of Dr. Muni's experience and involvement has been in tropical agricultural programs. He has been able to successfully transfer the research results he obtained in Guam to the Pacific region (Micronesia) and then to Asia and Africa. In doing so, scientists in other countries have been able to apply his research results toward protecting their local resources and developing their economies. For example, when *Chromolaena odorata* became a problem in Guam in the early 1980s, he procured extramural funds to develop a project for the biological control of this plant. Based on the encouraging results obtained from this study, he organized six international workshops since 1983 on management of this weed in Bangkok (Thailand), Bogor (Indonesia), Abidjan (Ivory Coast), Bangalore (India), Durban (South Africa), and Cairns (Australia). The next workshop was scheduled in Taiwan in September 2006. He chaired the working group of *Chromolaena* in the International Organization for Biological Control until 2006. To enable the participation of scientists from developing countries, he secured funds from various donor agencies such as the Commonwealth Foundation, Food and Fertilizer Technology Center, FAO, European Community, International Organization for Biological Control, and ACIAR, to name a few. The workshops have provided a forum for information exchange between scientists from around the world. The proceedings of the past six workshops have been published and distributed free of charge to interested scientists in developing nations. In addition, he has been able to publish and distribute 16 *Chromolaena odorata* newsletters between 1988 and 2005. The workshops and newsletters have promoted the initiation of national, regional and international projects on biological control of *Chromolaena*. Because of the successful suppression of *Chromolaena* in various countries, involved researchers opted to expand the working group to include another invasive weed, *Mikania micrantha*, which has become a serious problem in the Pacific and tropical Asian regions.

There is a number of additional research projects that Dr. Muni has conducted based on the entomological needs of Guam, the results of which were successfully conveyed to other parts of the world. In the early 1990s, he initiated research and transferred biological control technology for *Lantana camara* to the rest of the Micronesian region. When he observed the accidental introduction of the papaya mealybug (*Paracoccus marginatus*) in Guam in 2002, he obtained funding from the Cooperative Agricultural Pest Survey (CAPS) in APHIS and introduced the parasitoids *Anagyrus loecki*, *Pseudleptomastix mexicana*, and *Acerophagus papayae* from Puerto Rico, with the help of Dr. Dale Meyerdirk of USDA, to successfully control the mealybug. Since then, APHIS has extended the CAPS program on Guam for control of other pests. When the papaya mealybug was observed in Palau in 2003, he obtained CAPS funding to personally introduce the same parasitoids to Palau. To date, the papaya mealybug is successfully under control in both Guam and Palau. When the orange spiny whitefly (*Aleurocanthus spiniferus*) became a problem in Pohnpei, Chuuk, and Yap (islands in the Federated States of Micronesia), he successfully introduced the parasitoid, *Encarsia smithi*, from Guam with support from the USDA program, 'Agricultural Development in the Pacific'. When this whitefly established itself in Palau in 2004, he initiated funding support from FAO and led the biological control project there. The FAO regional office in Samoa asked Dr. Muni to develop an IPM program for the fruitpiercing moth, *Eudocima phalonia*, in Vanuatu in 2004 and for this project he developed and adopted a number of methods for protecting the nation's commercially-valuable fruit trees and vegetable crops from both fruit-piercing moths and fruit flies. He conducted several workshops, in different islands of Vanuatu, to encourage local farmers and demonstrate the success of the methods.

In 2003, the Legislature of the Commonwealth of the Mariana Islands recognized Dr. Muni's work and passed a commending resolution while the Governor of Guam sent him a

personal letter of appreciation. His research findings have been published widely in regional and international journals and he has attended numerous conferences around the globe to present his findings.

As a result of Dr. Muni's extensive research experience in biological control of tropical pests, a number of international organizations asked him to personally review their research projects and provide recommendations for improvement. He reviewed the Plant Quarantine Program of the Philippines for the CSRS Foreign Agricultural Program in 1984. In 1995, the German Technical Assistance Program (GTZ) asked him to evaluate its Biological Control Project in the Pacific. This project operated for ten years in the South Pacific region and involved developing IPM for cabbage in Fiji and corn in Papua New Guinea, as well as biological control of the tropical weed *Lantana camara* in the Solomon Islands, Cook Islands and Samoa. In 1991, he reviewed ACIAR's projects on biological control of fruit-piercing moths in the Pacific and its biological control of *Chromolaena odorata* project in Indonesia and the Philippines in 1996.

In 2005, the cycad aulacaspis scale, *Aulacaspis yasumatsui* (Hemiptera: Diaspididae), which is native to Southeast Asia, had become a serious problem in Florida, Hawaii, and Guam. Dr. Muni collaborated with the Florida Department of Agriculture, University of Florida, Hawaii Department of Agriculture and APHIS to control this pest. He also secured funds from the Indo-U.S. Science and Technology Forum to conduct a workshop in India in June 2006 to create local awareness of the risk posed to endemic cycads if this pest were to be introduced to India. (Six endemic species of cycads occur in India). Although he retired from UOG ten years ago, he maintained a research laboratory and a USDA-approved biological control quarantine facility at the university, and carried out his local, regional and international research activities with extramural funds until June 2006.

During his 35 years of service of the Government of Guam, he has successfully worked with various officials from the UOG, as well as local, federal, national, regional and international agencies. In addition to developing and maintaining numerous research projects as a professor at UOG, he has managed research projects for the university's Agricultural Experiment Station and prepared research reports for USDA, FAO, and other donor agencies.

Overall, Dr. Muni is an eminent entomologist who has specialized in biological control and pest management research in the tropics for over 35 years. He is now responsible for management of the IPM CRSP and coordinating with USAID and project partner institutions in the United States and developing countries in Asia, Africa, Eastern Europe, the Caribbean and Latin America.

Selected publications by Muniappan

- Muniappan, R., B.M. Shepard, G.R. Carner and P.A.C. Ooi. 2012. Arthropod Pests of Horticultural Crops in Tropical Asia. CABI, England (in press).
- Muniappan, R., G.V.P. Reddy, and A. Raman. (eds.). 2009. Biological Control of Tropical Weeds Using Arthropods. Cambridge University Press, 495p.
- Muniappan, R., B. M. Shepard, G. W. Watson, G. R. Carner, A. Rauf, P. Hidayat, J. V. K. Afun, G. Goergen, and A. K. M. Ziaur Rahman. 2011. New records of invasive insects (Hemiptera: Sternorrhyncha) in Southeast Asia and West Africa. *Journal of Agriculture and Urban Entomology* (2009) 26: 167-174.
- Muniappan, R., B. M. Shepard, G. W. Watson, G. R. Carner, D. Sartiami, A. Rauf, and M. D. Hammig. 2009. First Report of the Papaya Mealybug, *Paracoccus marginatus* (Hemiptera: Pseudococcidae), in Indonesia and India. *Agricultural and Urban Entomology*, (2008), 25: 37-40.
- Muniappan, R., G.V.P. Reddy, and A. Raman. 2009. Biological control of weeds in the tropics and sustainability, In: R. Muniappan, G.V.P. Reddy, and A. Raman (eds.).

- Biological Control of Tropical Weeds Using Arthropods, Cambridge University Press, Cambridge, U.K., pp 1-16.
- Muniappan, R., G.V.P. Reddy, and A. Raman. 2009. *Coccinia grandis* (L.) Voigt (Cucurbitaceae), In. R. Muniappan, G.V.P. Reddy, and A. Raman (eds.). Biological Control of Tropical Weeds Using Arthropods, Cambridge University Press, Cambridge, U.K., pp 175-182.
- Muniappan, R., A. Raman, and G.V.P. Reddy. 2009. *Ageratina adenophora* (Sprengel) King and Robinson (Asteraceae), In. R. Muniappan, G.V.P. Reddy, and A. Raman (eds.). Biological Control of Tropical Weeds Using Arthropods, Cambridge University Press, Cambridge, U.K., pp 63-73.
- Muniappan, R., Meyerdirk, D.E., Sengebau, F. M., Berringer, D.D. and Reddy, G.V.P. 2006. Classical biological control of the papaya mealybug, *Paracoccus marginatus* (Hemiptera: Pseudococcidae) in the Republic of Palau. *Florida Entomologist*, 89: 212-217.
- Cruz, Z., Muniappan, R. and Reddy, G.V.P. 2006. Establishment of *Cecidochares connexa* (Diptera: Tephritidae) in Guam and its effect on the growth of *Chromolaena odorata* (Asteraceae). *Annals of the Entomological Society of America*, 99: 845-850.
- Reddy, G.V.P., Z.T. Cruz, J. Bamba and R. Muniappan. 2005. Host adaptation of the fruit piercing moth, *Eudocima fullonia*. *Physiological Entomology* 30: 398-401.

Dr P. Neuenschwander (1943, Switzerland)



Dr. Peter Neuenschwander followed high school in Switzerland and obtained a Gymnasiallehrer-Diplom (higher teaching degree) in 1969. This was followed by a PhD in Zoology (minors: Botany, Chemistry) from the University of Bern, Switzerland in 1972. He conducted his postdoctoral studies at Prof. K.S. Hagen's laboratory at the University of California, Berkeley, USA from 1973-1975, where he worked on biological control of pests of alfalfa and artichoke. He then joined FAO in a project on IPM in olives in Chania, Crete, Greece from 1976-1981. Still with FAO, he led a biological control project against leaf mining flies in Dakar, Senegal (1982). In 1983, he joined the biological control project against cassava mealybug at IITA in Ibadan, Nigeria. The project expanded to include biological control and IPM of

mango mealybug, spiraling whitefly and floating water weeds, and he moved to Cotonou, Benin, in 1988. Since then, he has successively been coordinator of the Biological Control Programme, director of the Plant Health Management Division, as well as Office-in-Charge of the Biological Control Center for Africa, IITA, Benin. He was member of the Research and Development Council of IITA. For his contribution he was honoured by the African Association of Insect Scientists and the International Society for Tropical Root Crops - Africa Branch.

Peter Neuenschwander performed many missions, exploration trips and consultancies for various organizations. He is author of well over 100 peer-reviewed research articles, a book and book chapters. He reads and speaks German, French, English, Italian, Greek and learns Fon. He retired from IITA at the end of 2003, and is living in a Benin village and with his family near Bern.

Selected publications by Neuenschwander:

- Neuenschwander, P., Hagen, K.S. & Smith, R.F. 1975. Predation on aphids in California's alfalfa fields. *Hilgardia* 43, 53-78.
- Neuenschwander, P. & Michelakis, S. 1978. The infestation of *Dacus oleae* (Gmel.) (Diptera, Tephritidae) at harvest time and its influence on yield and quality of olive oil in Crete. *Z. ang. Ent.* 86, 420-433.
- Neuenschwander, P., Schulthess, F. & Madojemu, E. 1986. Experimental evaluation of the efficiency of *Epidinocarsis lopezi*, a parasitoid introduced into Africa against the cassava mealybug *Phenacoccus manihoti*. *Ent. exp. appl.* 42, 133-138.
- Neuenschwander, P., Hennessey, R.D. & Herren, H.R. 1987. Food web of insects associated with the cassava mealybug, *Phenacoccus manihoti* Matile-Ferrero (Hemiptera: Pseudococcidae), and its introduced parasitoid, *Epidinocarsis lopezi* (De Santis) (Hymenoptera: Encyrtidae), in Africa. *Bull. ent. Res.* 77, 177-189.
- Neuenschwander, P. & Herren, H.R. 1988. Biological control of the cassava mealybug, *Phenacoccus manihoti*, by the exotic parasitoid *Epidinocarsis lopezi* in Africa. *Phil. Trans. R. Soc. Lond.* 318, 319-333.
- Herren, H.R. & Neuenschwander, P. 1991. Biological control of cassava pests in Africa. *Ann Rev. Entomol.* 36, 257-283.
- Neuenschwander, P. 1996. Evaluating the efficacy of biological control of three exotic homopteran pests in tropical Africa. *Entomophaga* 41, 405-424.

- Neuenschwander, P. 1998. Review of "Soft Scale Insects: Their biology, natural enemies and control" (eds Y. Ben-Dov & C.J. Hodgson). *Ent. exp. et Appl.* 86: 197-200.
- Neuenschwander, P. 2003. Biological control of cassava and mango mealybugs in Africa. *In*: "Biological Control in Integrated Pest Management Systems in Africa" (eds P. Neuenschwander, C. Borgemeister & J. Langewald). CABI Publishing, Wallingford, pp. 45-59.
- Neuenschwander, P. 2004. Harnessing nature in Africa. Biological control can benefit the pocket, health and the environment. *Nature* 432: 801-802.

Prof.dr S.K. Pruszyński (1940, Poland)



Prof.dr Stefan Kazimierz Pruszyński studied at the Agricultural University of Poznan (Poland) where he obtained an MSc degree in 1965. In 1975 he finished his PhD research at the Plant Protection Institute in Poznan, and he obtained the degree of DSc in 1983 at the same institute. In 1989 he was appointed Professor of Agricultural Sciences in Poznan. During his appointment at the Plant Protection Institute he moved up from Assistant (1965) to Professor and General Director of the Institute (1989-2007). Currently, he is head of the Department of Ecology and Agricultural Environment Protection. He was working as Research Assistant at the Washington State University (USA) from 1970-1971.

He coordinated several large national research programs (e.g. the large Polish research program on Elaboration of Backgrounds of Integrated Plant Protection). He was cofounder and first president of the Polish Plant Protection Society. He coordinated plant protection research for Central and East European countries.

Stefan Pruszyński has been an active member of many professional bodies related to plant protection (e.g. IOBC/EPRS, IOBC Global, European Plant Protection Organization, and several national organizations such as the Polish Entomological Society and the Polish Plant Protection Society).

Stefan Pruszyński edited several books on plant protection, was co-editor of the Polish Journal of Plant Protection Research and a member of various editorial boards of national and international journals. He organized a number of scientific conferences in the field of plant protection. He published more than 115 scientific papers, 220 technical and popular articles and a number of book chapters. He received several awards, including a Special Award from the Ministry of Science Education and Technology for Outstanding Scientific Achievements in biological control research for control of greenhouse pests (1976).

Selected publications by Pruszyński:

- Lipa J.J., Pruszyński, S. & Węgorzek, W. 1967. Preliminary report on the introduction of *Phytoseiulus persimilis* to Poland (in Polish, English summary) *Biul. Inst. Ochr. Roślin Poznań*: 36: 87-92.
- Pruszyński, S. & Lipa, J.J. 1971. The occurrence of predatory Coccinellidae on alfalfa crops. *Ekologia Polska* XIX 26: 365-386.
- Pruszyński, S. & Cone, W.W. 1972. Relationships between *Phytoseiulus persimilis* and other enemies of the two spotted spider mite on hops. *Environmental Entomology* 1: 431-433.
- Pruszyński, S., Miciński, B. & Beger, W. 1978. Integrated control of hop aphid (*Phordon humuli* Schr.) (in Polish, English summary). *Mat. XVIII Sesji Nauk. Inst. Ochr. Roślin, Poznań*: 199-212.
- Pruszyński, S. & Węgorzek, W. 1980. Researches on biology and introduction of *Podisus maculiventris* Say - new for Poland predator of the Colorado potato beetle (*Leptinotarsa decemlineata* Say). *Mat. XX Sesji Nauk. IOR, Poznań*: 127-136.
- Pruszyński, S. 1982. Biological and integrated methods of protection of the glasshouse cultures against pests - advantages and prospects (in Polish, English summary). *Mat. XXII I XXIII Sesji Nauk. Inst. Ochr. Roślin*: 293-301.

- Pruszyński, S. & Rosada, J. 1987. Researches on the migration and hibernation of the predatory bug *Podisus maculiventris* Say using radiotracer ^{32}P (in Polish, English summary). *Prace Nauk. Inst. Ochr. Roślin*. XXVIII: 409-421.
- Pruszyński, S. 1992. Research on and use of biological methods of pest control in glasshouse crops in Poland. *Bulletin OEPP/EPPO* 22: 405-410.
- Pruszyński, S. 2005. Plant Protection in Poland: Past, Present and Future. *Ann. Rev. Agricul. Engineering* 4: 11-20.
- Pruszyński, S. 2006. Crop protection in sustainable agriculture (in Polish, English summary). *Probl. Inż. Roln.* 2: 71-80.

Dr. L. Shipp (1951, Canada)



Les Shipp (1951), obtained his BSc in Biology (1977) and MSc degree in Environmental Biology (1974) at the University of Guelph. He obtained his PhD in Entomology in 1982 at Iowa State University.

His employment history started as Research Scientist with Agriculture and Agri-Food Canada at the department of Animal Parasitology of the Lethbridge Research Centre, he then moved to the department of Entomology and later to the department of Biological Science of which he became head in 1996 and assistant director in 1997. Since 2005 he is Adjunct Professor at the Department of Biology of the University of Windsor in Canada, since 2007 he is Adjunct Professor at the School of Environmental of the University of Guelph in Canada, and since 2009 Professeur associé at the Département de Science biologiques of the Université of Montréal, also in Canada.

Les Shipp's research with greenhouse pests has involved the development of integrated pest management programs for control of insect and mite pests with the emphasis on non-chemical control measures. He has investigated the role of pollinators as vectors for microbial agents for control of pests and diseases, and optimized pollination efficiency in greenhouse crops using bumble bees. He also evaluated the influence of greenhouse microclimate on pest management strategies and the use of trap plants as a control strategy. Next, he investigated intraguild relationships among predator and parasitoid communities, elucidated the role of insects in the epidemiology of plant diseases and developed monitoring programs and economic injury levels for western flower thrips and its biological control agents. Les was project leader for the development of the decision-support software program "Harrow Greenhouse Manager" for tomatoes and cucumbers. In addition, he has experience with the evaluation of chemicals for use in integrated pest management programs, impact on non-target organisms and the registration of chemicals under the Minor Use Program in Canada. He published more than peer reviewed 150 papers in scientific journals and books, functioned in the editorial board of several scientific journals,

In 2007, Les was Co-recipient of the Ontario Greenhouse Vegetable Growers 2007 Industry Builder Award for recognition of his research contributions to the Ontario Greenhouse Vegetable Industry as a member of the Greenhouse Vegetable Research team at the Greenhouse and Processing Crops. Since 2009 he is Honorary Scientist and Advisor at the Rural Development Administration in South Korea on Agricultural Green Technology.

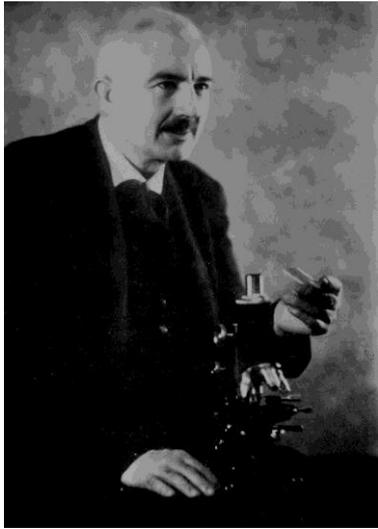
Les is a long-term member of the IOBC/WPRS working group Integrated Control in Greenhouses and IOBC/NRS, he functioned as board member and President of IOBC-NRS, he was co-convenor of the IOBC/NRS Working Group "Greenhouse, Nursery and Ornamental Landscape IPM", and played an important role as coordinator-cooperator in several meetings organized by IOBC/WPRS and IOBC/NRS, and by IOBC/NRS and IOBC/NTRS.

Selected publications by Shipp

- Johansen, N.S., Vänninen, I., Pinto, D.M., Nissinen, A.I. and Shipp, L. 2011. In the light of new greenhouse technologies: 2. Direct effects of artificial lighting on arthropods and integrated pest management in greenhouse crops. *Annals of Applied Biology* 159: 1-27.
- Buitenhuis, R., Shipp, L. and Scott-Dupree, C. 2010. Intra-guild vs extra-guild prey: effect on predator fitness and preference of *Amblyseius swirskii* (Athias-Henriot) and *Neoseiulus*

- cucumeris* (Oudemans) (Acari: Phytoseiidae). Bulletin of Entomological Research 100: 167-173.
- Shipp, L., Elliott, D., Gillespie, D. and Brodeur, J. 2007. From chemical to biological control in Canadian greenhouse crops, pp. 118-127. In Vincent, C., Goettel, M. and Lazarovits, G. (eds.), Biological control: A global perspective – Case studies from around the world. CABI Publishing, U.K.
- Kevan, P., Sutton, J. and Shipp, L. 2007. Pollinators as vectors of biocontrol agents – The B52 story, pp. 319-327. In Vincent, C., Goettel, M. and Lazarovits, G. (eds.), Biological control: A global perspective – Case studies from around the world. CABI Publishing, U.K.
- Buitenhuis, R. and Shipp, J.L. 2006. Factors influencing the use of trap plants for the control of *Frankliniella occidentalis* (Thysanoptera: Thripidae) on greenhouse potted chrysanthemum. Environmental Entomology 35: 1411-1416.
- Zilahi-Balogh, G.M.G., Shipp, J.L., Cloutier, C. and Brodeur, J. 2006. Influence of light intensity, photoperiod, and temperature on the efficacy of two aphelinid parasitoids of the greenhouse whitefly. Environmental Entomology 35: 581-589.
- Buitenhuis, R. and Shipp, J.L. 2005. Efficacy of entomopathogenic nematode *Steinernema feltiae* (Rhabditida: Steinernematidae) as influenced by *Frankliniella occidentalis* (Thysanoptera: Thripidae) developmental stage and host plant stage. Journal Economic Entomology 98: 1480-1485.
- Shipp, J. L. and Ramakers, P. M. J. 2000. Biological control of thrips on vegetable crops, pp. 265-276. In Heinz, K. M., Van Driesche, R. G. and Parrella, M. P. (eds.), Biological control of arthropod pests in protected culture. Ball Publishing, Geneva, Illinois.
- Valentin, R. and Shipp, J. L. 2000. History of commercial biological control: Growth of the insectary business and the producer/grower relationship, pp. 55-70. In Heinz, K. M., Van Driesche, R. G. and Parrella, M. P. (eds.), Biological control of arthropod pests in protected culture. Ball Publishing, Geneva, Illinois.
- Clarke, N. D., Shipp, J. L., Jarvis, W. R., Papadopoulos, A. P. and Jewett, T. J. 1994. Integrated management of greenhouse crops - A conceptual and potentially practical model. HortScience 29: 846-849.

Prof. dr. Filippo Silvestri (1873-1949, Italy)



Filippo Silvestri was among the entomologists who met in Stockholm in 1948, on the occasion of the 8th International Congress of Entomology, and proposed to found the International Organization for Biological Control. He was one of the pioneering scientists who greatly contributed to the development and spread of biological control of pest insects. After the first successful biocontrol programs of *Pseudaulacaspis pentagona*, developed with Antonio Berlese when he started his activity in Portici, he enthusiastically continued his deep involvement in a number of different projects, which took him around the world for several years, to collect and study beneficial insects. He became a world authority in the field, and was invited by different foreign countries (USA, Argentina, Spain, Mexico, Brazil) to supervise several biological control programs. This successful

research work in agriculture was complemented by an impressive series of studies on the biology and systematics of insects. His outstanding achievements were internationally recognized with several honours and prizes, and two honorary degrees of “*doctor honoris causa*”. The lecture “Insect Polyembryony and its general biological aspects”, given at Harvard University (USA) in 1936, when he was nominated “*doctor honoris causa*”, represents a brilliant contribution to the basic biology of parasitic Hymenoptera.

Selected publications by Filippo Silvestri

- Silvestri, F. 1905. Un nuovo interessantissimo caso di germinogronia (poliembrionia specifica) in un Imenottero parassita endofago con particolare destino dei globuli polari e dimorfismo larvale. *Rendiconti R. Accademia dei Lincei, Classe Scienze Fisiche Matematiche Naturali* 14 Serie 5 (10), 534 - 542.
- Silvestri, F. 1910. A survey of the actual state of agricultural entomology in the United States of North America. *The Hawaiian Forester and Agriculturist* 6, 287-336.
- Silvestri, F. 1909b. Squardo allo stato attuale dell'entomologia agraria negli Stati Uniti del Nord America e ammaestramenti che possono derivarne per l'agricoltura italiana. *Bollettino Società Agricoltori Italiani*, Roma 8, 1-65.
- Silvestri, F. 1937. Insect polyembryony and its general biological aspects. *Bulletin Museum Comparative Zoology, Harvard College* 81 (4), 469 - 498.

Drs. C. and M. Tauber (United States of America)



Catherine and Maurice Tauber earned their Ph.D. degrees in entomology at the University of California Berkeley in 1966 and 1965, respectively. Since then they have represented one of the most successful collaborative teams in entomology, if not all of biological science. The impact of their research goes well beyond their collective expertise in insect seasonality, behavior, evolutionary biology, systematics, and biological control. For the Taubers have demonstrated the rare ability to blend what they have learned in multiple areas of insect biology to reveal complex life histories and biological relationships involving beneficial and pest insects, and to apply that knowledge to improve biological control programs.

Maurice Tauber served for many years as a Professor in the Department of Entomology at Cornell University where he was also department chair for two terms. Catherine served as Senior Research Associate. Currently the Taubers are in active retirement at the University of California Davis, where they are Visiting Professors. Their contributions to entomology and science are recognized internationally, and individually and together they have received numerous awards and distinctions, including AAAS Fellow (MJT), honorary fellows of the California Academy of Science, and the IOBC/NRS Distinguished Achievement Award, which they received in 2002.

Prolific researchers, Maurice and Catherine have published more than 200 papers in most of the major journals in entomology, zoology, and biological science, including several papers in *Science* and *Nature* as well as two annual review articles and more than twenty book chapters. Owing to their strong commitment to biological control, which they have instilled in all of their graduate students, Maurice and Catherine Tauber have devoted a significant part of their careers to applying fundamental knowledge to enhance biological control and pest management in general. For example, their landmark book, 'Seasonal Adaptations of Insects', published in 1986, contains chapters that illustrate the importance and practical use of information about seasonal adaptations for biological control and integrated pest management. Most of the Tauber's work has focused on the Neuroptera, specifically the families Chrysopidae and Hemerobiidae, which represent important predators of several groups of arthropod pests. However, the breadth of their research encompasses eight insect orders representing both pest and beneficial species in diverse cropping systems. The Taubers have significantly advanced our knowledge of enemy-pest synchrony, host/prey selection, tri-trophic interactions, mass-rearing of predators, biological control of weeds, and the taxonomy and systematics of lacewings. In so doing, their work has strengthened classical, conservation and augmentative biological control programs worldwide. In addition to their research, the Taubers have provided exemplary service serving on numerous university and professional society committees, boards, and task forces.

Selected publications by Catherine and Maurice Tauber

Tauber, C.A. and Tauber, M.J. 2010. Two new endemic species of *Chrysopodes* (*Neosuarius*) (Neuroptera: Chrysopidae) from the Galapagos Islands. *ZooKeys* 42: 47-78 (download PDF: <http://pensoftonline.net/zookeys/index.php/journal/article/view/359>).

- Tauber, M.J., Tauber, C.A. and Hilton, T.W. 2006. Life history and reproductive behavior of the endemic Hawaiian *Anomalochrysa hepatica* (Neuroptera: Chrysopidae): A comparative approach. *Eur. J. Entomol.* 103: 327-336.
- Albuquerque, G. S., Tauber, C.A. and Tauber, M.J. 2001. *Chrysoperla externa* and *Ceraeochrysa* spp.: potential for biological control in the New World tropics and subtropics, pp.408-423. In *Lacewings in the Crop Environment*, P. McEwen, T. R. New and A. E. Whittington (eds.), Cambridge University Press.
- Tauber, M.J., Tauber, C.A. and López-Arroyo, J.I. 1997. Life-history variation in *Chrysoperla carnea* from its extreme southern range: implications for rearing and storing a Mexican population. *Biol. Control* 8: 185-190.
- Luck, R.F., Tauber, M.J. and Tauber, C.A. 1994. The contributions of biological control to population and evolutionary ecology, pp. 25-45. In: *Biological Control in the Western U.S.: Accomplishments and Benefits of Regional Research Project W-84, 1964-1989*. J.R. Nechols, L.A. Andres, J.W. Beardsley, R.D. Goeden and C.G. Jackson (eds.). ANR Publications, Oakland, CA.
- Tauber, M.J., Tauber, C.A., Ruberson, J.R., Milbrath, L.R. and Albuquerque, G.S. 1993. Evolution of prey specificity via three steps. *Experientia* 49: 1113-1117.
- Tauber, M.J., Baker, R.R., Dunn, P.E. and Vidaver, A.K. 1991. Biocontrol options. *Issues in Science and Technology*, *Natl. Acad. Sci.* 7: 27-28.
- Ruberson, J.R., Tauber, M.J., Tauber, C.A. and Tingey, W.M. 1989. Interactions at three trophic levels: *Edovum puttleri* Grissell (Hymenoptera: Eulophidae), the Colorado potato beetle, and insect-resistant potatoes. *Can. Ent.* 121: 841-851.
- Tauber, C.A. and Tauber, M.J. 1981. Insect seasonal cycles: genetics and evolution. *Annu. Rev. Ecol. Syst.* 12: 281-308.
- Tauber, M.J., Tauber, C.A., Nechols, J.R. and Helgesen, R.G. 1982. A new role for temperature in insect dormancy: cold maintains diapause in temperate zone Diptera. *Science (Wash.)* 218: 690-691.
- Obrycki, J.J. and Tauber, M.J. 1981. Phenology of three coccinellid species: thermal requirements for development. *Ann. Ent. Soc. Amer.* 74: 31-36.
- Tauber, C.A. and Tauber, M.J. 1977. A genetic model for sympatric speciation through habitat diversification and seasonal isolation. *Nature (Lond.)* 268: 702-705.

Prof. Dr. J. K. Waage (1953, United Kingdom / United States of America)



Jeffrey K. Waage (1953) graduated from Princeton University in 1975 and took a PhD in ecology at Imperial College London on a Marshall Scholarship, becoming a Lecturer there in 1978. His academic research focused on experimental and modelling studies of insect behaviour and ecology. In 1986 he became Chief Research Officer at the International Institute of Biological Control, an Institute of CAB International, and subsequently became its Director and then CEO of CABI Bioscience. At CABI, he extended its traditional international biological control activities into the area of integrated pest management, biological pesticides and invasive species management, through new programmes such as LUBILOSA, an international initiative on biological control of locusts and grasshoppers, and the development of farmer field schools for IPM in Asia and Africa.

He served as founding member of the Global IPM Facility of FAO, UNDP and World Bank, President of the International Organization of Biological Control, and Chair of the Global Invasive Species Programme of the Global Environment Facility. In 2000 he returned to Imperial College to as head of its new agriculture department, the former Wye College. He served on the Science Advisory Councils of Defra and Natural England, and co-led the UK Foresight Programme on “Infectious Diseases: Preparing for the Future”. Jeff was awarded an OBE in 2007 for his contributions to science. During this period he also was a member of the Independent Review of the CGIAR, and subsequently on the drafting team for its new Strategic Research Framework. In 2007 he joined the School of Oriental and African Studies to establish the London International Development Centre, an interdisciplinary collaboration between Colleges in the University of London. At LIDC, he has established the new Leverhulme Centre for Integrative Research in Agriculture and Health, and other interdisciplinary initiatives for international development. He serves today on the Research Advisory Group of the UK Department for International Development, and is a Commissioner of the Commonwealth Scholarships Commission.

Selected publications by Waage

- Cook, D. C.; Fraser, R. W.; Waage, J. K.; Thomas, M. B. (2011) Prioritising biosecurity investment between agricultural and environmental systems. *Journal für Verbraucherschutz und Lebensmittelsicherheit* 6, Supplement 1, S3-S13.
- Hawkesworth, S.; Dangour, A. D.; Johnston, D.; Lock, K.; Poole, N.; Rushton, J.; Uauy, R.; Waage, J.; Godfray, H. C. J.; Beddington, J. R.; Crute, I. R.; Haddad, L.; Lawrence, D.; Muir, J. F.; Pretty, J.; Robinson, S.; Toulmin, C. (2010) Feeding the world healthily: the challenge of measuring the effects of agriculture on health. *Philosophical Transactions of the Royal Society of London. Series B, Biological Sciences* 365, 3083-3097.
- Waage, J. K.; Mumford, J. D.; Pollock, C.; Pretty, J.; Crute, I.; Leaver, C.; Dalton, H. (2008) Agricultural biosecurity. *Philosophical Transactions of the Royal Society of London. Series B*, 363, 863-876.
- Waage, J.K.; Woodhall, J. W.; Bishop, S. J.; Smith, J. J.; Jones, D. R.; Spence, N. J. (2008) Patterns of plant pest introductions in Europe and Africa. *Agricultural Systems* 99, 1-5.
- Lynch, L. D.; Ives, A. R.; Waage, J. K.; Hochberg, M. E.; Thomas, M. B. (2002) The risks of biocontrol: transient impacts and minimum nontarget densities. *Ecological Applications* 12, 1872-1882.
- Waage, J. K.; Thomas, M. B.; Kedwards, T. (1999) The challenge of applied population biology in biological control and IPM. *Aspects of Applied Biology* 53, 9-15.

- Waage, J. K.; Persley, G. J. (1996) Integrated pest management and biotechnology: an analysis of their potential for integration. CAB INTERNATIONAL, Wallingford, UK, *Biotechnology and integrated pest management*, pp 37-60
- Godfray, H. C. J.; Waage, J. K. (1990) The evolution of highly skewed sex ratios in aphelinid wasps. *American Naturalist* 136, 715-721.
- Waage, J. K.; Greathead, D. J. (1998) Biological control: challenges and opportunities. *Philosophical Transactions of the Royal Society of London, B* 318, 111-128.
- Waage, J. K.; Greathead, D. J. (1986) Insect parasitoids. Academic Press, London, UK.
- Waage, J. K.; Davies, C. R. (1986) Host-mediated competition in a bloodsucking insect community. *Journal of Animal Ecology* 55, 171-180.
- Waage, J. K.; Lane, J. A. (1984) The reproductive strategy of a parasitic wasp. II. Sex allocation and local mate competition in *Trichogramma evanescens*. *Journal of Animal Ecology* 53, 417-426.
- Waage, J. K.; Ming, N. S. (1984) The reproductive strategy of a parasitic wasp. I. Optimal progeny and sex allocation in *Trichogramma evanescens*. *Journal of Animal Ecology* 53, 401-415.
- Waage, J. K. (1983) Aggregation in field parasitoid populations: foraging time allocation by a population of *Diadegma* (Hymenoptera, Ichneumonidae). *Ecological Entomology* 8, 447-453.
- Waage, J. K. (1982) Sib-mating and sex ratio strategies in scelionid wasps. *Ecological Entomology* 7, 103-112.
- Waage, J. K. (1979) The evolution of insect/vertebrate associations. *Biological Journal of the Linnean Society* 3, 187-224.

Dr. Eric Wajnberg (France)



Dr. Eric Wajnberg is since 10 years the Editor-in-Chief of IOBC's scientific journal BioControl. Eric is a leading world authority in insect behavioural ecology which has had significant impact on BC theory. He was director of the European Science Foundation programme 'Behavioural Ecology of Insect Parasitoids'. Eric currently chairs the INRA group 'Theoretical and Applied Ecology in Protected Environments and Agrosystems'. Eric served as SG of IOBC Global from 1996 – 2000, and also chaired the WG on egg parasitoids for 12 years, 1988-2010. As well as his editorial work for BioControl, he has served as associate editor of Ent Exp et Appl; Neotropical Entomology; Applied Entomology and Zoology, and Acta Oecologia. In summary Eric is a passionate and dedicated researcher and highly innovative scientist devoted to BC. His contribution to BC science and IOBC Global has been outstanding.

Dr. Ren Wang (China)



Dr. Ren Wang obtained his PhD in Entomology focusing on biological control of weeds with insects in 1985 at the Virginia Polytechnic Institute & State University, Blacksburg, Virginia, USA. He was a researcher (Assistant Research Professor, Associate Professor and Professor) at the Institute of Biological Control of the Chinese Academy of Agricultural Sciences (CAAS) during 1985-1993, and pioneered China's program of biological control of invasive weeds. He studied insect and weed biology and ecology, and developed techniques of mass rearing and releasing insect biocontrol agents.

Dr. Wang was the founding director of the joint Sino-American Biological Control Laboratory between USDA and the Chinese Ministry of Agriculture during 1987-1993. From 1993 to 1995, he was the Deputy Director, Program Development of the International Institute of Biological Control (IIBC), CAB International, UK. In 1994, he was appointed by the Chinese State Council as Vice President of CAAS. He had played a key role in developing collaboration between Chinese and international colleagues on biological control of weeds and pest insects from 1980-2000. During this period, he also developed and led biological control programs against alligator weed, common and giant ragweed as well as water hyacinth in China. He was vice-president of IOBC-APRS in the early 1990s.

From 2000-2007, Dr. Wang served as Deputy Director General for Research at the International Rice Research Institute (IRRI) based in the Philippines. In July 2007, He became the Director of the Consultative Group on International Agricultural Research (CGIAR) based at the World Bank in Washington, DC, USA. In Oct 2010, he returned to CAAS and was appointed as the First Vice President of the Academy, responsible for international cooperation and technology transfer. On Feb 28, 2013, Dr. Wang took his current position in Rome, Italy as Assistant Director General of FAO's Agriculture and Consumer Protection Department.

Dr. Wang served on a series of high level international boards and committees in the area of agriculture and agricultural research, and was an invited speaker at numerous conferences and forums in both China and throughout the world.

Selected publications by Wang

- Ma, F., Lu, Z., Wang, R., Wan, F. 2014. Heritability and evolutionary potential in thermal tolerance traits in the invasive Mediterranean cryptic species of *Bemisia tabaci* (Hemiptera: Aleyrodidae). *Plos One*, 9, e103279
- Ma, R., Jia, X., Liu, W., Laushman, R.H., Zhao, L. Jia, D. Wang, R. 2013. Sequential loss of genetic variation in flea beetle *Agasicles hygrophila* (Coleoptera: Chrysomelidae) following introduction into China. *Insect Science*, 20: 655-661
- Lu, J., Zhao, L., Ma, R., Fan, R., Zhang, J., Wang, R. 2012. Non-target plant testing of the flea beetle *Agasicles hygrophila*, a biological control agent for *Alternanthera philoxeroides* (alligator weed) in China. *Biocontrol Science and Technology*, 22: 1093-1097
- Ma, R., Wang, R. 2005. Invasion mechanism and biological control of alligator weed, *Alternanthera philoxeroides* (Amaranthaceae) in China. *Chinese Journal of Applied and Environmental Biology*, 11: 246-250. (Ch. En.)
- Ma, R., Wang, R., Ding, J. 2003. Classical biological control of exotic weeds. *Acta Ecologica Sinica*. 23: 2677-2688 (Ch. En.)

- Ding, J., Wang, R., Chen, Z., Fan, Z., Fu, W. 1999. Integrated management of water hyacinth with insect *Neochetina eichhorniae* and herbicide Roundup. *Chinese Journal of Plant Protection*, 25(4):4-7 (Ch. En.)
- Ding, J., Wang, R., Chen, Z., Fan, Z., Fu, W. 1998. Effects of three herbicides on water hyacinth weevil, *Neochetina eichhorniae*. *Chinese Journal of Biological Control*, 14(1) 7-10.
- Wan, F., Wang, R., Ding, J. 1995. Biological control of *Ambrosia artemisiifolia* with introduced insect agents, *Zygogramma suturalis* and *Epiblema strenuana*. in Proceedings of VIII International Symposium on Biological Control of Weeds, pp 193-200, New Zealand, 1992.
- Wang, R. 1989. Biological control of weeds in China: a status report. In Proceedings of the VII International Symposium on Biological Control of Weeds, pp 689-693, Italy, 1988.
- Wang, R., Wang Y. 1988. Host specificity of *Agasicles hygrophila* (Coleoptera: Chrysomelidae), a biological control agent of alligator weed. *Chinese Journal of Biological Control* 4: 14-17. (Ch. En.)
- Wang, R. 1986. Current status and perspective of biological weed control in China. *Chinese Journal of Biological Control* 2: 173-177. (Ch. En.)

Dr. Frank Wilson (? - ?; UK and Australia)



It has been difficult to obtain information about Frank Wilson, though I (van Lenteren) contacted several Australian and UK researchers. Wilson's special interest was in the biological control of weeds. He was posted to the South of France and remained there until June, 1940. He escaped from France on the last ship to leave Bordeaux. He reached Australia at the end of 1940. In 1959, Frank Wilson, of the CSIRO Division of Entomology, was appointed Scientific Liaison Officer in the Australian Scientific Liaison Office, London, for a period of three years. He was elected a Fellow of the Institute of Biology in 1964. Mr Wilson was Officer-in-Charge of the Sirex Biological Control Unit, England. The task of his group at Silwood Park was control of Sirex, the *Pinus radiata* wood wasp. Initially the group concentrated on arthropod natural

enemies, but eventually the group demonstrated that the nematode *Deladenus* would be effective against Sirex. Wilson was OIC of the "Sirex Unit" at the Imperial College field station from about 1962 until about 1974.

Frank Wilson was Vice-president of IOBC in 1971. He was a very well known biological control expert. One of his important achievements has been the production of an extremely well made film "The biological control of insects" in 1960, with excellent examples of various types of biological control and beautiful macrobiological images of egg laying of natural enemies.

Selected publications by Wilson

- Wilson, F. 1943. The Entomological Control of St. John's Wort (*Hypericum perforatum* L.). Australian Council for Scientific and Industrial Research (CSIRO), Australia. Bull. 169: 87 pp.
- Wilson, F. 1960. A review of the Biological Control of Insects and Weeds in Australia and Australian New Guinea. CABI, UK. CIBC Tech. Comm. 1: 102 pp.
- Wilson, F. 1963a. Australia as a Source of Beneficial Insects for Biological Control. CABI, UK. CIBC Tech. Comm. 3, 28 pp.
- Wilson, F. 1963b. The results of biological control investigations in Australia and New Guinea. Proc. 9th Pacific Science Congress 9, 112-123.
- Wilson, F. 1964. The biological control of weeds. *Ann. Rev. Ent.* 9, 225-244.
- Wilson, F. 1971. A world-wide organization to promote the development of biological control. *PANS* 17, 399-407.

Prof.dr. Keizo Yasumatsu (1908-1983, Japan)



Keizo Yasumatsu was born in Tokyo on 1 March 1908, educated in Fukuoka and graduated from Kyushu University in 1933. He received his doctorate from Kyushu University in 1945 and his doctoral dissertation was entitled “Some analyses on the growth of insects, with special reference to a phasmid, *Phraortes kumamotoensis* Shiraki”. In 1933 he was appointed Non-regular Staff Member at Kyushu University where he worked as assistant curator. In 1939 he was appointed Assistant Entomologist, followed by the appointment to Associate Professor of Entomology (1942) and Professor of Entomology (1958). He retired in 1971 after 38 years of service. Prof. Yasumatsu had already published 36 papers on biological, taxonomic and morphological aspects of various insects when he completed his MA Degree, mainly about wasps and bees. Prof. Yasumatsu was a member of several scientific expeditions

to Micronesia and China and collected many insect species. In 1945, he had become internationally renowned for the systematics of wasps, bees, ants, fleas, and stick insects. In 1946, he discovered an encyrtid wasp parasitic on red wax scale, one of the most serious pests of citrus, tea, persimmon and other economic plants in Japan. His studies led to the conclusion that this parasitoid was a very effective biological control agent of the red wax scale and after its liberation in many locations, the red wax scale no longer developed to destructive pest densities. For this success, he received the Nihon Nogaku Sho prize from the Association of Japanese Agricultural Science Societies in 1953. Since then, his interests shifted more and more towards the field of biological control.

In 1955 he received a grant to visit entomological and biological control institutes and universities in North America, and after this visit, he began writing articles on natural enemies and biological control. He became an enthusiastic supporter and advocate of the use of natural enemies for the control of pests in Japan. For this work, he was awarded the Asahi Prize from the Asahi Press in 1959. In 1964, Prof. Yasumatsu founded the Institute of Biological Control at Kyushu University. In this period, he carried out field studies on the natural enemies of rice stem borers in southeast Asia. Next he worked on biological control of a group of pests (rice stem borers, aphids, diaspine scales and mites) in The Philippines, Thailand and Hong Kong, in the framework of the International Biological Program (IBP). After his retirement in 1971, he devoted himself to integrated crop protection research in Thailand, a project that was supported by FAO and the Japan International Cooperation Agency (JICA). During 1976-1980, he was also consultant in crop protection for FAO in Korea, Malaysia and Iran.

Aside from his research, he was also active in many educational and scientific organizations, including president of the Entomological Society of Japan (1961-1968) and member of the Science Council. He played an important role in the foundation of the South and East Asian Regional Section (SEARS, now APRS) of IOBC and was the first President of SEARS, and Honorary President until his death in 1983. Prof. Yasumatsu received many awards and honours, among which was the second Harry Scott Smith Memorial Award (University of California) in 1971.

In addition to being an excellent researcher he was an effective teacher, and many of his students are successful entomologists today, holding high positions in universities, government and private industries. He was a prolific writer, publishing more than 600 papers. He wrote a famous book on biological control (Natural enemies – An approach to pest management; 1970) and a text book, Applied Entomology, first edition in 1953. He also wrote

a popular book on insects (Man and Insects) in 1965. Prof. Yasumatsu was a skillful illustrator, and most of the illustrations in his papers and books were drawn by himself.

One of his Japanese colleagues once said that Prof. Yamumatsu was not only a very kind and helpful person and great entomologist, but that he also opened the doors of the Japanese entomological world to foreign entomologists.

Selected publications by Yasumatsu

- Yasumatsu, K. 1936. Ampulicidae of the Japanese Empire (Hymenoptera). *Tenthredo* 1, 165-232.
- Yasumatsu, K. 1966. Applied Entomology (in Japanese). Asakura Shoten, Tokyo, 282 pp.
- Yasumatsu, K. 1968. Impact of parasites, predators and diseases on rice pests. *Ann. Rev. Entomol.* 13, 295-324.
- Yasumatsu, K. 1970. A handbook of field methods for research on rice stem borers and their natural enemies. IBP Handbook 14, 132 pp. Blackwell Scientific Publishers.
- Yasumatsu, K. 1975. Integrated Rice Pest Control. Report to the Government of Thailand. FAO, 57 pp.
- Yasumatsu, K. 1975. Approaches to biological control. JIBP Synthesis 7, 142 pp. University of Tokyo Press.
- Yasumatsu, K. 1975. Insects injurious to rice cultivations and their natural enemies in South East Asia. *In: Rice in Asia.* pp. 383-392. University of Tokyo Press.
- Yasumatsu, K. 1976. Rice stem borers. pp. 121-137. *In: Studies on Biological Control.* V.L. Delucchi (ed), International Biological Programme, Cambridge University Press.
- Yasumatsu, K. 1976. Biological control of pests of range, forage and grain crops. Rice. pp. 402-408. *In: Theory and practice of biological control.* C.B. Huffaker & P.S. Messenger (eds), Academic Press.
- Yasumatsu, K. 1981. Contributions to the development of integrated rice pest control in Thailand, JICA, Tokyo, 204 pp.

Prof.dr M.C. Zapater (1957, Argentina)



Prof.dr Miguel Carlos Zapater studied at the University of Buenos Aires and received his diploma of Agronomic Engineering in 1983 from the Faculty of Agronomy. He is currently Associate Professor at the Department of Applied Biology at the Faculty of Agronomy of the University of Buenos Aires and he is also technical director of INSECTARIOS, the first company supplier of beneficial insects in Argentina. He studied abroad to specialize in the genetic control of the Mediterranean fruit fly (1982-1983, ITAL, Wageningen, The Netherlands, with Dr. Alan

Robinson), to specialize in electrophoresis and cytology of Mediterranean fruit fly (1984, Pavia, Italy, with Prof.dr Milani) and in field evaluation of genetic methods related to the Mediterranean fruit fly (1991, USDA-ARS, Honolulu, Hawaii, with Dr Donald McInnis). At the University of Buenos Aires, he worked on his PhD from 1986-1989 under the guidance of Dr Alberto Prina, which resulted in the thesis “Estudios sobre líneas translocadas con posibilidad de uso en programas de erradicación de la mosca del Mediterráneo”. He published approximately 50 research papers.

Miguel Zapater is teaching several courses, supervises MSc and PhD students, is active in extension work, gave many national and international lectures, and also publishes in non-scientific journals about his work. Miguel Zapater was founder of IOBC/NTRS and functioned as President of the Regional Section of IOBC from 1989-1994. Currently, he is chairman of the Advisory Board of NTRS. He played a crucial role in establishing NTRS in 1989, as well as during activities to re-establish NTRS in 2005.

Selected publications by Zapater:

- Zapater, M. & Robinson, A.S. 1986. Sex chromosome aneuploidy in a male-linked translocation in *Ceratitis capitata*. *Canadian Journal of Genetics and Cytology* 28: 161-167.
- Coulson, J.R. & Zapater, M.C. (eds). 1992. “Opportunities for Implementation of Biocontrol in Latin America”. International Organization for Biological Control (IOBC), Buenos Aires. p. 71. ISBN 950-43-4447-X.
- Zapater, M.C. 1992. IOBC's Neotropical Regional Section. *In: Opportunities for implementation of biocontrol in Latin America*. pp. 1-6. (eds J.R. Coulson & M.C. Zapater) IOBC, Buenos Aires.
- Zapater M.C., Banchero, C., Battista, M. & Rizzo, H. 1996. Heterosis in *Ceratitis capitata*. *In: “Fruit Fly Pests: A World Assessment of their Biology and Management”*. (eds B. McPherson & G. Steck). St. Lucie Press, USA. pp. 243-250.
- Zapater, M.C. (ed.). 1996. El Control Biológico en América Latina. IOBC-SRNT. Buenos Aires. p. 142. ISBN 950-43-7227-9.
- Zapater, M.C. & Perez-Camargo, G. 1999. Use of irradiated *Musca domestica* pupae to optimize the mass rearing of the parasitoid *Spalangia*. *Proceedings of the FAO/IAEA meeting on “Evaluating the use of nuclear techniques for the colonization and production of natural enemies of agricultural insect pests”*. IAEA. Vienna, Austria. pp. 60-64.
- Zapater, M., Bartoloni, N., Perez-Camargo, G. & Briese, D.T. 2004. Natural impact of the flea-beetle, *Longitarsus* sp., on *Heliotropium amplexicaule* in Argentina and its potential for use as a biological control agent in Australia. *Proc. XI International Symposium on Biological Control of Weeds*. Canberra, Australia (eds J.M. Cullen, D.T. Briese, D.J. Kriticos, W.M. Lonsdale, L. Morin & J.K. Scott). pp. 208-214.

