

**International Organization for Biological Control**



**Mass  
Rearing  
&  
Quality  
Assurance**  
working group

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## **14<sup>th</sup> IOBC-MRQA Workshop**

# **Mass Rearing High Quality Invertebrates for Multiple Purposes**

## **PROGRAM**

**November 14 – 17, 2017**  
**Hotel El Conquistador, Mérida,**  
**Yucatán, Mexico**



**IOBC Global**



## Tuesday, November 14

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5:30 – 7:00 pm	Registration – meeting room hallway, Hotel El Conquistador Reception – Poolside
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## Wednesday November 15

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8:00 – 8:30 am	Registration – meeting room hallway, Hotel El Conquistador
8:30 – 8:40 am	Welcome Tom Coudron
8:40 - 9:00 am	History of IOBC-MRQA Norm Leppla

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### Symposium: Mass rearing invertebrates for management of arthropod crop pests

Organizers: Lynn LeBeck and Andrew Parker; Moderator: Lynn LeBeck

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9:00 – 9:30 am	Mass production and release of ladybird beetles for aphid control in protected culture: Search for oviposition stimulants	<u>Eric Riddick</u>
9:30 – 10:00 am	Drone-based dispersion of natural enemies in agricultural systems	<u>Christian Nansen</u> , Zhaodan Kong
<b>10:00 – 10:30AM</b>	<b>Break/posters/registration</b>	
10:30 – 11:00 am	Improvements in the in vitro rearing of the tachinid parasitoid <i>Exorista larvarum</i> (L.)	<u>Maria Luisa Dindo</u> , Patrick De Clercq
11:00 – 11:30 am	Flight propensity of <i>Trichogramma pretiosum</i> Riley isofemale lines at two relative humidities	<u>Aloisio Coelho, Jr.</u> , Richard Stouthamer, José R. Postali Parra
11:30 – 12:00 Noon	Testing nutrigenomics as a new approach to formulating diets for insects	<u>Tom Coudron</u> , De-Yu Zou
<b>12:00 – 1:00 pm</b>	<b>Luncheon adjacent to the restaurant – buffet style</b>	

1:00 – 1:30 pm	Mass-rearing optimization of the parasitoid <i>Psytalia lounsburyi</i> for biological control of the olive fruit fly	<u>Floriane Chardonnet</u> , Arnaud Blanchet, Beatrice Hurtel, Francesca Marini, Marie-Claude Bon, Kent Daane, Charlie Pickett, Xingeng Wang, Lincoln Smith
1:30 – 2:00 pm	Discussion of presentations and posters	

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## Symposium: Mass rearing for veterinary and medical applications

Organizers: Andrew Parker; Moderator: Andrew Parker

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2:00 – 2:20 pm	Mass production and quality control of <i>Wolbachia</i> -carrying <i>Aedes</i> mosquitoes for the combined IIT/SIT to control dengue, chikungunya and Zika	<u>Zhiyong Xi</u> , Cui Yang, Jian Zhu, Xiaohua Wang, Dongjing Zhang, Andrew Parker, Jeremie Gills, Kostas Bourtzis, Ziqiang Yan, Yongjun Li, Xiaoying Zheng, Yu Wu, Pablo Manrique
2:20 – 2:40 pm	Preliminary observations on adults of the U.S. native mosquito assassin, <i>Toxorhynchites rutilus</i> , released weekly and their impact on peri-domestic container breeding pest mosquitoes	<u>Anita Schiller</u> , Rudy Bueno, Mary Allen
2:40 – 3:00 pm	Quality control of sterile male tsetse flies after long distance transport as chilled, irradiated pupae	<u>Soumaila Pagabeleguem</u> , Momar Talla Seck, Mireille D. Bassene, Assane Gueye Fall, Thérèse A.R. Diouf, Baba Sall, Marc J.B. Vreysen, Jean-Baptiste Rayaissé, Peter Takac, Issa Sidibé, Andrew G. Parker, Gratian N. Mutika, Jérémy Bouyer, Geoffrey Gimonneau

**3:00 – 3:30 pm** *Break/Posters/registration*

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## Symposium: Mass rearing insects for feed and food

Organizers: Patrick De Clercq, Norm Leppla & Tom Coudron

Moderator: Tom Coudron

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3:30 – 3:50 pm	Improving <i>Tenebrio molitor</i> reared for maximizing biomass production	<u>Juan Morales Ramos</u>
3:50 – 4:10 pm	Improving diets for insect farming	<u>Guadalupe Rojas</u>
4:10 – 4:30 pm	Dynamics in the developing insect food and feed industry and opportunities for private/public/academic collaboration	<u>Eric Schmitt</u>
4:30 – 5:00 pm	Discussion of presentations and posters for last two symposia	

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**8:00 – 12:00  
midnight**      **Cocktails with SMBC in Salón Mirador I, Hotel El Conquistador**

## Thursday, November 16

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8:30 – 12:00 noon	Tour of Laboratorio Regional de Reproduccion de <i>Tamarixia radiata</i> del Sureste; meet in the hotel lobby	
<b>12:00 – 1:00 pm</b>	<b>Luncheon – buffet style at Hotel El Conquistador</b>	
1:00 – 5:00 pm	Free afternoon	
5:00 pm	Visit to Uxmal Archaeological Site, meet in Hotel El Conquistador lobby	

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## Friday November 17

### Symposium: Development & validation of protocols for invertebrate mass rearing and quality assurance

Organizers: Rose Beutenhuis and Tom Groot

Moderators: Rose Beutenhuis and Tom Groot

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8:30 – 8:50 am	Opportunities to bring more native natural enemies to market in North America	<u>Rose Buitenhuis</u> , Rose Labbe, Taro Saito, Michael Brownbridge
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8:50 – 9:10 am	Using proximal remote sensing in studies of insects and in quality control for production of natural enemies	<u>Christian Nansen</u>
9:10 – 9:30 am	The importance of dormancy management to biological control	<u>Dan Hahn</u>
9:30 – 9:50 am	New extraction method to assess the amount of predatory mites in a carrier material	<u>Elmer van Baal</u> , Tom Groot
<b>9:50 – 10:10 am</b>	<b>Break/Posters</b>	
10:10 – 10:30 am	A new initiative for quality control of natural enemies	<u>Tom Groot</u>

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### **Symposium: Breeding of beneficial arthropods**

Organizers: Maria Luisa Dindo; Moderator: Maria Luisa Dindo

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10:30 – 10:50 am	Toward the future: potentiality and challenges of commercial production of beneficial insects	<u>Marco Mosti</u>
10:50 – 11:10 am	BINGO: breeding invertebrates for next generation biocontrol	<u>Tom Groot</u>
11:10 – 11:30 am	Updates on the production process of the mosquito larval predator <i>Toxorhynchites rutilus</i> for use in releases in Harris County, Texas	<u>Anita Schiller</u> , Mary Allen, Arielle Fike
11:30 – 12:00 noon	Microbiota, probiotics and complications	<u>Tom Coudron</u>
<b>12:00 – 1:00 pm</b>	<b><i>Luncheon adjacent to the restaurant – buffet style</i></b>	

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## **Symposium: Networking and instruction on arthropod rearing**

Organizers: Norm Leppla; Moderator: Norm Leppla

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1:00 – 1:20 pm	The International Insect Rearing Workshop at Mississippi State University	<u>Norman C. Leppla</u>
1:20 – 1:40 pm	Recruiting and training employees to rear commercial biological control products.	<u>Richard Ward</u>
1:40 – 2:00 pm	Insect Rearing Google Group	<u>Léon Westerd</u>
2:00 – 2:30 pm	Discussion of presentations and posters	

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## **Symposium: Legal and ethical issues associated with mass rearing invertebrates**

Organizer: Brian Spencer

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2:30 – 3:30 pm	Panel discussion: Brian Spencer, Hugo Bernal, René Ruiters	
<b>3:30 – 3:50 pm</b>	<b>Break/Posters</b>	

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### **Poster discussions**

Organizer: Tom Coudron

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3:50 – 4:30 pm	Open floor for discussion of symposia, posters, or new topics	
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### **IOBC-MRQA Business Meeting**

Moderator: Tom Coudron

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4:30 – 5:00 pm	Discussion of new conveners and next location	
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<b>8:00 – 12:00 midnight</b>	<b>Dinner and Closing Ceremony with SMCB</b>	
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## POSTERS

Development, reproduction, and flight of the mealybug destroyer, *Cryptolaemus montrouzieri*, when reared on an unnatural food and an artificial oviposition substrate

Patrick De Clercq, Sara Maes,  
Jean-Claude Grégoire

Cover crop and *Trichogramma brassicae* interactions

Sajedeh Sarlak, Somayeh  
Rahimi Kaldeh, Ahmad  
Ashouri

Seasonal diversity, mass rearing and application of trichogrammatids in India

Yadavalli Lalitha

Comparative assessment of four Steinernematidae and three Heterorhabditidae species for infectivity of larval *Diabrotica virgifera virgifera*

Ryan Geisert, Bruce Hibbard,  
David Shapiro-Ilan, Kent  
Shelby, Thomas Coudron

Diversity of bacteria composition of spined soldier bug, *Podisus maculiventris* (Heteroptera: Pentatomidae), digestive system

Kent Shelby, Aaron Ericsson,  
Michelle Grefory, Thomas  
Coudron

Diet improvement for rearing larvae of western corn rootworm (Coleoptera: Chrysomelidae) using response surface methodology

Man Huynh, Lisa Meihls,  
Bruce Hibbard, Steve  
Lapointe, Randall Niedz,  
Dalton Ludwick, Thomas  
Coudron

**Organizing Committee:**

Patrick De Clercq, Tom Coudron, Lynn LeBeck, Julio Bernal,  
Norm Leppla, Andrew Parker

**Program Committee:**

Rose Buitenhuis, Lynn LeBeck, Andrew Parker, Tom Coudron,  
Tom Groot, Maria Luisa Dindo, Patrick De Clercq, Brian Spencer

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