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Distinguished Scientist Award: Mark Hoddle

Dr. Mark Hoddle, at UC Riverside, has been a driving force in the development of biological control programs for invasive arthropod pests affecting California's citrus, avocado, and grape industries, urban regions, and areas of conservation importance. Notable pest species that Mark has worked on include the persea mite, avocado thrips, glassy-winged sharpshooter, red palm weevil, gold spotted oak borer, Asian citrus psyllid, and cottony cushion scale in the Galápagos Islands. Much of this work has encompassed a significant overseas component involving extensive foreign exploration efforts in México, Central and South America, Pakistan, southeast Asia, the Middle East, and the Galápagos Islands. Mark was responsible for the biocontrol

Mark Hoddle (right) and President Don Weber (left) at Minneapolis 2015.

(Mark cont. on p. 4)

O'Neal Outstanding PhD Student Award: Paul Abram

Paul Abram is a PhD student at the Université de Montréal with Drs. Jacques Brodeur and Guy Boivin. He obtained his Masters from Carleton University with Drs. Peter Mason and Naomi Cappuccino. His Master's project examined European parasitoids of the Swede Midge, an invasive alien species recently introduced into Canada. He spent two summers at the laboratory of CABI (Commonwealth Agriculture Bureau International) at Délemont, Switzerland.

Paul's PhD project examines the host exploitation behaviors expressed by a egg parasitoid Scelionidae). Paul has also included aspects of evolutionary ecology into his project, looking at the impact of another invasive alien species, the Brown Marmorated Stink Bug, on the population of

Paul Abram (right) and President-Elect Jim Nechols (left) at Minneapolis 2015.

(Paul cont. on p. 3)

Message From the President:

INVASION: It's not just for pests anymore!

Don Weber
USDA-ARS, Beltsville

IOBC-NRS President
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Biocontrol happens: everywhere and all the time. And sometimes, exotic biocontrol agents such as tiny parasitoid wasps bypass all the regulatory and quarantine barriers to entry. There are three recent examples of "just showin' up" by natural enemies for high-profile exotic pests: soybean aphid, kudzu bug, and brown marmorated stink bug.

Seven years after the detection of soybean aphid in North America, *Aphelinus certus*, an Asian soybean aphid parasitoid native to Asia, was found at many sites in commercial soybean fields in Ontario. This was the first record of this species in North America. *Aphelinus certus* is a generalist, parasitizing several genera of aphids in addition to soybean aphid. It was not considered for deliberate classical biological control because its wide host range includes a number of native aphid species. Heimpel et al. (2010) characterized a complex of Old World species, including soybean aphid, its woody winter host buckthorn, and several natural enemies including *A. certus*, as part of an "extensive invasional meltdown" with widespread implications for native North American ecosystems.

In contrast, sometimes accidental introductions seem to accomplish (again without APHIS Technical Advisory Group (TAG) or similar approval) exactly what petitioning researchers working with natural enemies in quarantine, were preparing to propose. *Paratelenomus saccharalis* suddenly appeared parasitizing kudzu bug egg masses in Georgia in 2013, only four years after its host's discovery in 2009 (Gardner et al. 2013). This scelionid appears to be specific to the bug family Plataspidae, which is an exclusively Old World family – with the exception of course, of the recent invasion of kudzu bug. Genetic analysis showed this natural enemy did not escape from quarantine colonies, but was a distinct population arising from a separate introduction.

In 2014, about 500 meters west of my office and lab, another parasitoid, the scelionid *Trissolcus japonicus*, successfully attacked sentinel brown marmorated stink bug (BSMB) eggs, put out to measure the oviposition and success of native parasitoids on this exotic pest (Talamas et al. 2014). This species was (and still is) under intensive study in quarantine as a candidate for classical biocontrol introduction from China, where it is a very important parasitoid of BMSB – and other genera of stink bugs. A major issue in any release petition for this natural enemy would be its demonstrated ability to attack asopine predatory stink bug eggs, including those of the important predator *Podisus maculiventris*. Now, this potential quandary may well be rendered moot by the establishment and spread of *T. japonicus* to Virginia, D.C., and now Washington state (Acebes-Doria et al. 2016). As with *P. saccharalis*, all of these adventive populations are by genetic analysis, separate, introductions (Acebes-Doria et al. 2016). The video version is here, under "Research Update: Biological Control" at stopbmsb.org.

How are these natural enemies entering? Through the same routes probably as their hosts, presumably within hosts on infested plants, or as adults overwintering within packing material among the vast volume of goods imported from Asia. The abundant presence of their original exotic hosts then facilitates their establishment. Enormous streams of people and goods in travel and commerce are haphazardly rebuilding

(Biocontrol happens cont. on p. 4)

Outstanding Masters Student Award: Michael Bredeson

Michael Bredeson received his Masters degree at South Dakota State University with Dr. Jon Lundgren. Mike's research experience began with an independent undergraduate project in Dr. Lundgren's lab. He examined the non-target effects of systemic insecticides in wheat plants, and how these insecticides might affect beneficial insects, namely the lady beetle *Coleomegilla maculata*. This detailed set of experiments was published in Crop Protection.

His Masters research focuses on the economic and environmental assessment of neonicotinoid seed treatments on sunflower insect communities. In an intense research program that couples laboratory and field experiments, Mike has shown that insecticidal seed treatments are not helping farm profitability, and may actually be hurting the sustainability of sunflower production by reducing services provided by natural enemies and pollinators. The insecticides are translocated in the extrafloral nectar, and are reducing predators within the sunflower system. His work has been published in the J. Kansas Entomological Society and J. Economic Entomology. To accomplish this extensive research program, Mike had to master agronomic production of sunflowers, sample and identify entire insect communities (thousands of specimens representing hundreds of species), and learn both HPLC and ELISA to quantify clothianidin levels.

Michael Bredeson (right) and President-Elect Jim Nechols (left) at Minneapolis 2015.

Moreover, Mike has led teams of workers to accomplish our research objectives efficiently. Within the cadre of graduate students at SDSU, he has organized outreach events for the Girl Scouts, Boy Scouts, and Community library.

Jon Lundgren

USDA-ARS Brookings

(Paul cont. from p. 1)

egg parasitoids. In 2014, Paul spent six months in the laboratory of Dr. Stefano Colazza, of Palermo University, Italy. During that time, he looked at the effect of high and low temperature on the capacity of egg parasitoids to correctly assess the value of a patch and level of competition.

When Paul undertakes a project, such as the invasive stink bug acting as an evolutionary trap for indigenous natural enemies, he does it with extraordinary thoroughness and insight. Paul's work exemplifies how detailed studies of natural history and behavior can be combined with important theoretical questions to significantly advance the state of knowledge in biology. Paul has already published nine papers on a broad spectrum of topics. His research on egg pigmentation in *Current Biology* has reached the interest of researchers in evolution, chemical ecology, and insect-plant interactions.

Moreover, as a student, Paul has been helpful mentoring seven undergraduates and two graduate students from around the world. He serves on the student affairs committee for the Entomological Society of Canada and International Congress of Entomology. Paul has been awarded nine scholarships, and four travel awards.

Jacques Brodeur and Guy Boivin

Université de Montréal

(Mark cont. from p. 1)

program targeting glassy-winged sharpshooter in French Polynesia. The introduction of mymarid egg parasitoid resulted in the rapid and spectacular collapse of high density pest populations. Mark recently documented the high levels of suppression of the cottony cushion scale, *Icerya purchasi*, by the predatory beetle, *Rodolia cardinalis* in the Galápagos Islands. This was the first biocontrol program to be run in this World Heritage Site.

Mark has been dedicated to extending science to the public as evident by 57 extension talks, and 64 interviews to newspapers, TV, radio and science magazines over the last two years. Mark has published over 150 peer-reviewed journal articles, two Annual Review articles, and one text book on biocontrol. In the past two years, his program has garnered $1.4 million in research support.

Kent Daane
UC Berkeley

Killer fly

Coenesia attenuata, a predatory fly, catches prey while in flight. This fly has been touted for biological control. Neuroscientists have recorded this fly catching prey and different sized beads to examine what cues *C. attenuata* uses to decide whether or not to go after a prey target.

http://www.bbc.com/news/science-environment-34390345

Summarized from BBC News, Jonathan Webb

Photo from www.diptera.info, posted by Martin Suvák from Slovakia.

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(Biocontrol happens cont. from p. 2)

exotic food webs, with results we may consider positive, negative, or somewhere in between. The outcome may be suboptimal from the standpoint of pest biocontrol: species or biotype selection is not possible when the process is accidental. As the wheels of research and regulated introduction move slowly, biocontrol happens... sometimes with astonishing speed.

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Thank you

Thank you Kady Tauber for a donation to support the IOBC/NRS student awards. These awards help recognize outstanding work by emerging researchers, the future of biological control.