INTERNATIONAL BRANCH

1 April 2013

# A Submission to the ESA Presidential Committee on Science Policy

In March 2013, the International Branch (IB) was surveyed to determine the issues that are most relevant to our membership. We asked members to identify three issues they would like to see addressed that serve the broad interests of our members, and which can be supported through education, outreach, and advocacy by the ESA.

We hope that these priority areas can serve as a basis for entomological policy planning and help stakeholders recognize the value of entomologists and our research.

1. Reevaluating funding priorities
2. Entomology and education
3. The globalization of research on pest insects
4. Early- and mid-career researcher concerns

## 1. Reevaluating funding priorities

a. Funding: to create entomology training centers (or, support for existing centers) in developing countries; postdoctoral funding and career paths, particularly to support international students who have completed graduate degrees to find work in their country of origin
b. Reduced rate options for ESA members in developing countries
c. Open access options for all ESA journals

The USA is uniquely placed to drive cooperative research with international partners, due to our existing infrastructure and national funding schemes to support international collaborations (e.g., through NSF). Supporting the excellent work of the ESA International Affairs Committee in obtaining NSF funding for graduate students to attend ICE should continue to be a priority for the ESA.

The NSF East Asia and Pacific Summer Institutes for US Graduate Students (EAPSI)[1] program is an excellent example of ways to fund collaborative research for graduate students. EAPSI is an annual funding program that allows graduate students to travel to one of seven locations (Australia, China, Japan, Korea, New Zealand, Singapore, or Taiwan), and pays a summer stipend and travel expenses. The goal of the program is to provide research experience and help students develop future collaboration with overseas counterparts. The NSF Postdoctoral Research Fellowships in Biology (PRFB)[2] is an initiative for early career researchers to enable them to travel overseas for a fellowship opportunity. Unfortunately, the excellent NSF International Research Fellowship Program[3] to fund US researchers in positions overseas has not been renewed. Faculty in the USA could be encouraged to use these, and other, funding programs to help create and fund international collaborations. The international side of this fellowship could provide an opportunity for a scientist to establish him- or herself in their country of origin if funding is a challenge to returning home.

Further, members once again brought up the need for ESA to align itself with other professional societies by offering a reduced-rate option for members from developing countries, as per the proposal the IB submitted to the Governing Board in 2012[4]. Open access publishing options are becoming more common, and are required by some funding agencies. These schemes would allow us to reach the broadest possible audience of scientists and entomologists without incurring a significant increase in operating costs or overheads.

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[1] http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5284

[2] http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=503622&org=NSF

[3] http://www.nsf.gov/funding/pgm_summ.jsp?pims_id=5179&org=NSF

[4] http://www.entsoc.org/PDF/International/IBAnnualReportDecember2012.pdf

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## 2. Entomology and education

a. Recognition of entomology as a stand-alone science, not just the application of other sciences
b. Better academic staff:student ratios at universities
c. Ensuring all pest management education includes behavioral ecology and biodiversity
d. Funding for entomology outreach programs/science literacy in the public

On a global scale, the science of entomology as a stand-alone discipline is under threat. Departments are being reorganized across the board, which results in a combination program (e.g., combining entomology and plant pathology), or the absorption of the entomology faculty into another umbrella department hosting a wide variety of biological disciplines. In a best-case scenario this concentrates expertise and equalizes access to funding and infrastructure, but this is not always the result; sometimes, reorganization results in the elimination of faculty positions. Maintaining a favorable staff:student ratio is an important part of all higher education, more so with classes that heavily rely on the laboratory experience as a large part of assessment, as is the case with entomology.

Concerns about the course contents for entomology, particularly with specialized areas within the science, were also brought up. Pest management courses cannot just contain biocontrol and insecticide information, but need to also address biodiversity and insect ecology as well. This should be a priority for all levels of entomology education, from higher education to extension and training programs. This is an area where ESA's BCE program could be a world-leader, and could help to support professional entomologists and pest control operators.

Continuing to offer introductory entomology classes that appeal to non-degree students, contribute to overall scientific literacy in the community and provide an important point of reference for non-scientists. Outreach programs, in addition to helping scientists develop communication skills with the media and the public, provide a high-visibility and photogenic marketing scheme for the host institution providing the resources.

## 3. The globalization of research on pest insects

a. International pest complexes and their treatment
b. Pesticide de/registrations and use in tandem with alternative control options
c. Impact of climate change: biodiversity awareness and amassing online material
d. Availability of visas to the USA for visiting entomologists; creating an online clearinghouse of information for student/scientists from other counties

Cosmopolitan insect pests are becoming the global norm, and our research funding has to align with this reality. Collaborative research programs will afford the most comprehensive protection from invasive species and existing pests, but funding for successful international projects must be coordinated sensibly between various governments. In addition to funding concerns, our members pointed out the difficulty of getting a visa to enter the USA as a visiting scientist, particularly from certain geographic regions. It was also suggested that an online clearinghouse of information would be a valuable resource for visiting students and scientists.

Further compounding the management of pest insects is the registration status of insecticides in different countries, and that emergency registrations and eradication programs may need to be deliberated differently. Minimizing the need for pesticides, clearly understanding the impact of these compounds on ecosystems, and using sustainable insecticides in tandem with natural enemies when possible will help reduce the need for the application of broad-spectrum chemical insecticides.

Climate change is causing a rapid reorganization of species and pest complexes as organisms become extinct or adapt to new habitats. Increasing the availability of online resources will be an asset to all entomologists, particularly those from underfunded areas that are most likely to be affected by changing environmental conditions. Providing searchable lists of pests within an area, including high-resolution photographs of pest insects, and outlining alternative pest management options (e.g., environmentally-friendly insecticides and biocontrol agents) would create an excellent resource. PaDIL, an initiative of the Australian Government, provides an excellent model of such a system[5].

[5] http://www.padil.gov.au/

**4. Early- and mid-career researcher concerns**

a. Job security is tied to grant cycles for academics; trained scientists are being lost to non-research careers; parent/carer benefits and scheduling flexibility are critical to retaining our scientific capacity
b. Training: create sub-meetings of ESA in less developed countries to foster an exchange of ideas and problem solving; provide training opportunities for skills workshops, particularly in rapidly evolving areas

Early- and mid-career researchers (EMCRs) are a critical part of science infrastructure. An investment in this group of researchers creates outputs for laboratory heads, students, and other researchers. EMCRs teach at the undergraduate and graduate level; supervise students in the laboratory; and, many EMCRs bring in additional funding for the laboratory and its research program. Recognizing the needs of EMCRs, which are different from those of students and established researchers, is an important part of a successful career for research scientists in academic, government, and industry positions.

Job security is a particular concern for EMCRs, particularly for academics whose jobs are tied to grant cycles. Globally, there is concern about the retention of scientists in their research roles (e.g., *Nature* 2011[6]); one way to retain researchers is to allow varied benefits, including vacation pay and schedule flexibility, and to provide a clear path to promotion. These steps have the added advantage of being particularly important to help support parents and carers. An equity document, drafted by the ESA, would help to clearly outline these benefits for employers and employees.

Training has an important role to play domestically and overseas. Our members suggested sub-meetings of the ESA in less developed countries to create a mechanism to share ideas and provide skills training; virtual broadcasting of sections of the ESA Annual Meeting via an easily accessible and free service (e.g., YouTube) would also be useful, as would making the Virtual Poster contributions accessible online *gratis* to ensure international research is able to have a high profile within the ESA. Creating a fellowship program for EMCRs to attend training workshops in cutting-edge areas would be a boon as well, particularly in rapidly evolving areas (e.g., bioinformatics, and all the 'omics fields). This also ensures that entomology remains a competitive science in the face of other, larger fields that may be housed within a single department (see 2a above).

**Summary**

Prioritizing funding for science is one of the pillars of a strong economy. Entomology in particular is a wide-reaching science, and is an important component of human and animal health programs; as a gauge of ecosystem health and environmental monitoring; and, a defining feature of sustainable agricultural and livestock production practices. Further, it is critical to ensure the training and recruitment of the next generation of entomologists withstands administrative interference, and that a robust and interactive educational experience is an integral part of the degree program. Finally, the creation of an equity document from ESA would help outline ways entomologists can ensure the diversity of our field continues to grow, and that we support all scientists personally and professionally.

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Respectfully Submitted,

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[6] http://www.nature.com/naturejobs/science/articles/10.1038/nj7371-141d