2014 NCAC15 meeting,
El Tropicano Riverwalk Hotel, San Antonio, TX
23 – 24, February, 2014

Present: Jesus Esquivera (USDS,ARS and President SEB-ESA), Chris Selvig (ESA),
NCAC015: Bill Hutchison (MN), Steve Yaninick (IN), David Wright (SD), Gary Brewer (NE), Jim English (MO), Sue Blodgett (IA), Lee Solter (IL),
SAC012: Phil Muldar (OK), Dave Ragsdale (TX), Rob Wiedenman (AR),

1. Welcome to San Antonio by SEB-ESA President Jesus Esquivera
    a. Highlights of SEB-ESA include an Insect Expo on Monday, March 24, 2014 9 am. And description of the SEB-ESA Meeting
2. Introductions
3. USDA-NIFA Report – Bob Nowierski (not in attendance) but sent a report/file
    a. New CARE program Critical Agricultural Research and Extension. 3 yr projects, 150K total, must be R-E from the start. Letter of Intent due date June 4, 2014. Program Manager, Marty Draper
    b. Re-establishment of Specialty Crop Research Initiative (SCRI), Organic and Beginning Farmers and Rancher programs
    c. AFRI budget is up $25 million in the new budget proposal
    d. New pest management program consolidates many pest management programs, and combines IPM at 7 mill, PMAP 1.1 mill, Integrated Pest Management 3.5, IPM decision support, IPM Centers $35M, RIPM $2.4M(see NIFA notes). CAR and RAMP were actually cut. One of the implications of this is for the IPM program, which will be through competitive grants that are combined with other pest management programs.
    e. New emerging pests: SCRI funded at $80 million, $25 million committed to Citrus Health: citrus greening is predicted to cause the collapse of the FL citrus industry and is vectored by citrus psyllid. In FL the first yr 2% infection detected, 6 years later 100% was infected. All trees will need to be replanted; 1st infected tree in CA found in 2013. Mandarin oranges are resistant. 1/3 of specialty crop farm bill is dedicated to citrus greening. Grapefruit is somewhat resistance. Transgenics are being developed and are likely to be approved. Same gene is being deployed in spinach.
    f. Discussion of how the farm bill changes to more competitive grant funds will influence formula funds which are primarily dedicated to salary. Erosion of formula funds will have a large impact on staffing,
    g. Some institutions are looking at reallocating IDCs, more $ to central expenses for research support,
    h. Interest in the position that Monte Johnson held, is it being filled?

i. New alfalfa research and extension $1.35 mill
j. NIFA Update http://www.csrees.usda.gov/newsroom/newsletters/update14/2_20_14.html
k. FFAR Foundation for Food and Agriculture– new initiative that represents an industry partnership. $200 million in funding; the goal is to foster public-private partnerships. FFAR must be matched 1:1 with non-federal funding.
l. Regional climate hubs have been announced

4. State Reports – filed electronically through an ISU Entomology website.
   a. Data needs discussed and changes to this system will be made
   b. How data are used by departments were discussed.
   c. Discussed modifications to the state reports. All student information may not be needed. Would like to see the summary. Need space for more than one UG major. Modify the faculty line to TT FTE (no slash). Add a line to faculty line for lecturer or equivalent (professor or practice).
      i. Would like to have a summary report – for the quantitative fields
      ii. Partial save function and a complete button, and ability to edit reports.
      iii. Do not break down UG; How many in Ent major, how many in other major (name other)
      iv. If have gender info put it in.
      v. Add information on options to the narrative section
      vi. Grad student reporting total.
      vii. Would like to be able to print copy.
   d. There are also salary surveys conducted through CEDA.
5. Discussion (Yaninek) about issues facing entomology. Following some discussion at CEDA (Austin), a discussion of 'cluster hires' will help to inform strategic plans and department reviews. Who is going to train the next generation of plant protection/entomology. Taking a fresh look at where the discipline is heading. Interest in writing white papers.
   a. How can we have impact – on policy as it relates to ENT. Biocontrol is one area.
   b. White papers & topics for discussion:
      i. IPM Concepts — Crop Protection & Global Food Security (G. Brewer)
      ii. Needs in teaching of IPM (John Obrycki)
      iii. Micro-organism mediated interactions (Steve Yaninek)
6. ESA President Frank Zalom described science policy and Science Policy ESA fellows. ESA Governing Board (GB) approved the hire of Lewis Burke Assoc. a consultant/advocacy group in D.C. Also developed an ESA science board committee – represent each sections. Rob W. is the GB rep to the science policy board committee. This committee would define what would happen with

the committee including such things as statements, newsletters. Committee or advocacy group can bring policy statement forward, and Lewis Burke will help to get issues/policy statements in front of decision makers,

i. ESA committee members include : Mark Whalon, Michael Smith, Susan Weller, Reddi Palli
ii. Policy documents/ statements – good scientific tools for views on particular issue. Policy statements can support advocacy, discussion with public officials, used at local, state and federal levels, and can be used by news media.
iii. Two types: Society's focused statement on hot button topics, such as climate change, GMO; also statements that are broader in scope that set a direction for the future, funding, and ecosystem services
iv. Process for developing statements, includes an open and transparent process, need topics identified, and a committee for developing a statement, file a notice of intent and request input from members. There may be some issues that either NCAC015/SAC013 and/or CEDA would like to suggest.

b. Science Policy Fellows –individuals that work with Lewis/Burke and visit Washington DC decision-makers. One approach is to have Science Policy fellows received training in working with decision-makers, included in public affairs updates, participate in national congressional, home district advocacy, contribute to social media,
c. New Presidential committee has been established to identify structure for Science Fellows, solicit applicants, select, 5 fellows identified prior to Portland meeting. Training and activities would occur in 2015. Two year terms, with overlap of 5+5. Cadre of individuals that could provide expertise on science-based advocacy. There is some interest from the Canadian ENT society and they would like to have Canadians be part of the Science Policy Fellow program.
d. Help align ENT challenges with other Society challenges. Policy could be used to coordinate and establish some similar policy statements that could be used on a local level for establishing faculty positions.
e. Discussion on how to get society member buy-in and allow feedback. Perhaps a vote, or minority opinion, comment period. The statements might end with suggestions for future research.

7. Invasive species conference at Oklahoma State in March 2014.
8. Faculty position – future hires are general: Invasive species, water issues, pest resistance. Ask ESA to provide the past 12 months of job advertisements from universities to identify recent advances and needs for faculty positions and skills.
    a. Insect pop genetics, drug discovery/vaccine development, epigenetics, bioinformatics, insect-microbe interactions, biomaterials , genomics -

    b. Identification of research clusters at Purdue and Oklahoma State that include entomologists. In some states teaching assignments may drive some of the new positions.
    c. Clusters such as plant stress biology (NE),
9. Adjourn at 4:55pm, February 23, 2014.
10. Re-convene 8am. February 24, 2014
11. IPM 'white paper' that Gary Brewer had written for UNL. Crop Protection and Global Security. New directions in IPM, multiple tactics including environmental impacts on pest management and ecosystem considerations. EU emphasizes the ecosystem; facilitate natural enemy activities, pollinator health, soil health, and environmental protection including water quality and soil erosion.
    a. Many of our departments operate as discipline groups – however many colleges are asking for interdisciplinary work groups or initiatives.
    b. Need for plant breeding to consider major biological stressors to a system. Build specific examples around the issue ie. Pest resistance; weed resistance to herbicides, WCR, cotton thrips.
    c. Emergence of new pests – not predicted. For example in drought tolerant plants, spider mites come in earlier and neonicotinoid seed treatments have caused greater spider mite problems. Plant bugs are emerging as new pest. Continuing need for IPM. With technology in pest management moving to seed – for many growers pest management has become more of a black box and controlled by their consultants.
    d. Figure from the TX A&M with phyto-microbiomes (see Appendix) as the focus and how they related to ecosystem health, food safety/security, value added bio-products, and epidemiology/prevention.
    e. Pesticide reduction still needs to be on the table. General public would like to see pesticide reduction. New technologies have reduced the need for pest management decision-making. Concern was expressed about the relevancy of IPM
12. Discussion: Where microorganisms fit into entomology, new world of discovery – Steve Yaninek; microbe-mediated insect interactions. New technologies. Ex: termite work at Purdue that has found gut has both cellulose digesting enzymes but also microorganisms that are important contributors. Pathogens that influence systems, several examples are provided in a handout.
    a. New organisms identified in gut flora of termites, what is their biology, what role do they play.
    b. Insect immune response may be a function of plant health. Expand into these areas at several institutions. Skills needed include molecular bio, sequencing.
    c. Students need cross-discipline training that includes traditional ENT, genetics, molecular bio skills, and with this area also some training with plant path, microbiology. Assembling this type of position or positions requires ent component of a larger picture/cluster.

d. Positioning programs for the future – more interdisciplinary. Cluster hire that was put together at OSU called National Institute for Microbial Forensics & Food and Agricultural biosecurity (NIMFAD) http://entoplp.okstate.edu/nimffab/home is an example of a highly successful team with strong leadership; this group needs a plan for the future.
e. Ragsdale: Controlling exotic and invasive insect-transmitted pathogens. $6 million proposal to the legislature for Texas A&M ENT including new new faculty positions. This addresses animal health related. Forensic link to plant and animal health, with training available in evidence handling training. Consider regional approach to some of these specialized training programs specifically forensics and evidence handling.

13. Faculty evaluations. Many departments are measuring the same parameters, using metrics, Google Scholar. Spreadsheet on publications – break-out refereed, book chapters etc, For example, if the impact factor for journal >6 then counts as 2 papers.
    a. Ragsdale demonstrated the Texas A&M system that is used in ENT. Spreadsheet based includes several criteria grants (new grants awarded, expenditures,). This system has 100 point scale; 20 pts – service; 30% teaching, 50% research. Would need to add sheet for CES, lead program, evaluate program.
    b. Valuing team efforts. How do you consider authorship? 1st author vs. place in the authorship. Faculty who do not function as team members, or are not invited to continue as team members, will generally not succeed on the parameters that are measured. Some faculty report their input (intellectual, writing etc.) for each publication including journal impact factor. Impacts are submitted or reported for projects. Team awards are another way to recognize team efforts
14. Next year's NCAC15/SAC13 meeting will be held in conjunction with NCB in 2015. Meeting will be held in Manhattan, KS May 31-June 3 2015.
    a. 2016 would plan to meet with southeastern branch meeting. Maybe North Carolina? 2016 will be the ICE in September.
15. Ruberson will chair in 2015 for NCAC15. Art was supposed to be the SAC15 chair.

1. John Obrycki – "Addressing needs in teaching of IPM – concepts and sub-disciplines"
    a. Core Courses
        i. Purdue
            1. Basic Entomology course – organismal
            2. Insect Molecular Biology/Physiology
            3. Graduate special topics courses (3-4, 1 to 3 credit courses)
        ii. Texas A&M

1. Fundamental core is Insect Taxonomy, Physiology, Ecology, Molecular Biology
2. Too few PhD students were not taking enough credit in ENTO for me to hire them as a lecturer (18 hrs. in the discipline)

iii. Illinois

1. Strong core of 5 courses plus Stats; IPM, Taxonomy, Genetics/Genomics, Physiology, IPM, Statistics

b. If this is an issue (lack of expertise to teach IPM or too few students interested in IPM)
   i. Would an online resource where collectively we have the expertise to teach parts of the applied curriculum
   ii. Should students who are destined for bench work be asked to spend a
c. Industry Fellowships
   i. BS student sponsored for an MS
      1. Works at Purdue and plans underway at Minnesota
d. Certificate Programs – an option for some degree programs. Example Texas A&M

State Reports
http://www.ent.iastate.edu/chairs/results

Login: entchair
Password: entreport!

CEDA List os maintained by Teresa Gold (t-gold@tamu.edu) at Texas A&M. Teresa is the Administrative Assistant to department head David Ragsdale and she maintains the current complete mail listing for CEDA and can get you in the loop.

APPENDIX

Crop Protection & Global Food Security

IPM Designed for the Future

Crop Protection

Fewer Pest Outbreaks

Reduced Evolution of Virulent Pests

Reduced Pesticide Use

Global Food Security

Cost Effective Protection from Insect Harm

Biologically-based Pest Management

Least Possible Risk to People, Resources, and the Environment

Integrated Pest Management
effective, safe, environmentally benign control of pest insects

- **Providing** targeted activities, durable tactics and system technologies
- **Ensuring** human and environmental safety
- **Meeting** social and regulatory concerns

Multiple Pest Resistance

- **Fundamental** objective of crop protection
- **Best Approaches** using conventional and genetic technologies

New knowledge in pest and crop ecology

- **Protecting** natural enemies, pollinators, and other beneficial organisms
- **Providing** cropping system heterogeneity and environmental resistance to pests
- **Promoting** soil and plant health

Low-Impact Interventions

- **Inundative** biological control
- **Behavior** disrupting semiochemicals
- **Selective pesticides** with targeted range of action

Entomology
Research, Extension, Education

for agriculture, food systems, and natural resources

Crop Protection and Global Food Security

With the global population expected to increase by 3 billion by 2030 and the amount of arable land available for production remaining unchanged, agriculture is facing challenges at least equivalent to those defining the Green Revolution. Besides needing to feed more people, agriculture will be challenged by increasingly scarce and costly inputs (Neff et al. 2011), pest exacerbation due to climate change, a reduction in cropland available per capita, stricter regulations, and growing numbers of resistant pest species.

With more people demanding higher quality diets a second green revolution (Serageldin and Persley 2000) is needed. In part, the success of the first green revolution was dependent on intensive pest management practices (Fresco 2009). To succeed, the second green revolution will need biologically based products to replace conventional chemical pesticides and other scarce or expensive inputs. And it will need sustainable management systems where the environment is a priority, where genetics and biotechnology are used to improve productivity, and where crop resistance to biotic and abiotic stressors is an emphasis.

To protect our crop genetics and plant protection products, we need implementation and cropping system strategies to reduce the likelihood of pest outbreaks and of evolution of pests virulent to management approaches. The United Nations Environmental Program has listed pesticide resistance as the third most serious threat to global agriculture behind soil erosion and water pollution. In the United States, crop losses due to pesticide resistance are estimated to be $1.4 billion annually (Hart and Pimentel 2002). In Nebraska alone, the occurrence of pesticide resistance in the western corn rootworm increased control costs, reduced yields, and was estimated to cost producers at least $4 million annually from 1995-1998. Today, there are populations of corn rootworms that are resistant to GMO corn in Nebraska and other Midwestern states.

Current approaches to crop protection are inadequate for meeting future food production needs. Despite a 7-fold increase in the use of crop protection products over the last 40 years, losses to all categories of crop pests have remained essentially level. Currently, insects alone consume or damage sufficient food to feed 1 billion people (Oerke et al. 2004, Oerke 2006). Climate change is likely to further increase insect pressure on crop production (Gregory et al. 2009, Newton et al. 2011). To address these challenges, an emphasis shift from reactive crop protection to a preventative genetic and ecological systems approach is essential.

Plant resistance to arthropods and other pests, whether developed through conventional breeding or genetic engineering approaches, must be a fundamental objective of future crop development and protection. Resistant crops limit the build-up of pest populations and minimize crop losses. They are generally compatible with other

management techniques and are effective in conditions that can impede other pest management practices.

Another critical component to insuring food security is ecological engineering of our agroecosystems to promote diverse and robust populations of natural enemies, pollinators, and other beneficial organisms as a necessity of sustainability. Ecological engineering, especially when applied on an area-wide basis, will enhance cropping system heterogeneity and build environmental resistance to pests. Based on a thorough understanding of pest and crop ecology, designed agroecosystems will protect yield, reduce the need for pesticides, reduce selection pressure on pests, and promote sustainability.

An equally critical element is how to protect crops when conditions favor pest outbreaks or before effective plant resistance or ecological engineering technologies are available. Included are techniques such as inundative biological control, semiochemicals (pheromones, repellents, and attractants) that disrupt pest behavior, and judicious use of selective pesticides to provide local management.

A crop protection toolbox based on genetic and ecological systems complemented with specific and low-impact technologies will protect agroecosystem health and sustainability. A crop protection emphasis shift to genetic and ecological systems will reduce grower costs, protect crop quality and quantity, and better position agriculture to meet growing food security needs.

References

Gregory PJ, Johnson SN, Newton AC, Ingram JSI. 2009. Integrating pests and pathogens into the climate change/food security debate. J Exp Bot 60(10): 2827-38.

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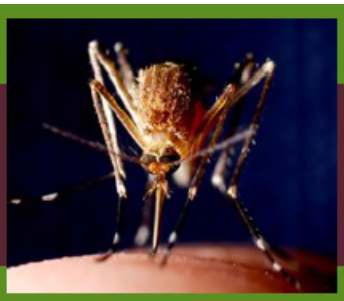
Serageldin I and Persley GJ. 2000. Promethean science: Agricultural biotechnology, the environment, and the poor. Consultative Group on International Agricultural Research, Washington, DC: 5.

Gary Brewer, November 2011

TEXAS A&M AGRILIFE RESEARCH



FY 2014 & FY 2015 Exceptional Item

Requested Amount (biennial):
$6 Million

CONTROLLING EXOTIC AND INVASIVE INSECT-TRANSMITTED PATHOGENS

OBJECTIVE
Establish comprehensive research programs that will find new ways to disrupt the spread of insect-transmitted pathogens (disease-causing agents such as bacteria and viruses) that infect plants, humans, or animals and have a devastating economic impact in Texas.

Benefit to Texans

Texas A&M AgriLife Research will develop new ways to combat insect-transmitted pathogens to guard the overall welfare and economic sustainability of Texas. The knowledge gained through this research will position Texas as a leader in insect-vectored pathogen issues nationwide.

Description and Justification

Insect-transmitted pathogens that infect plants, humans, and/or animals are a serious threat to public health and to the Texas economy. Diseases caused by these pathogens have resulted in many deaths. They also currently cost Texas hundreds of millions of dollars in lost agricultural productivity, decreased economic opportunity, and increased health care costs for livestock, companion animals, and citizens. The introduction of exotic insects and pathogens — and of disease epidemics — has greatly increased in recent years because of expanded international trade and the need to feed an ever-increasing human population. As this trade expansion continues, more plants, insects, and animals and the microbial pathogens they harbor will find their way into Texas, overwhelming our ability to inspect for these vectors. We must improve our ability to detect and counter those threats, using our unique capabilities in the biological sciences to develop solutions, including vaccines and infection-resistant plant varieties.

In the summer of 2012, West Nile virus caused hundreds of cases of human illness and many deaths. This mosquito-vectored virus will continue to cause repeated outbreaks, but the cyclical nature of these outbreaks is not fully understood. Other vector-transmitted pathogens are increasing, such as those causing dengue fever, Lyme disease, and Chagas disease, all of which infect people, and the Chagas pathogen can also infect dogs. In relation to livestock, over one million acres in Texas were quarantined in 2010 to contain cattle fever ticks.

Insect-vectored threats include citrus greening disease (e.g. Huanglongbing), identified in Texas in 2012, which threatens citrus throughout the Lower Rio Grande Valley and has already devastated the Florida citrus industry. Two new insect-vectored citrus pathogens are migrating from Mexico, and the vector for citrus leprosis virus was recently detected in Texas. The state also has ongoing outbreaks of zebra chip disease in potatoes and Pierce's disease, which is often mentioned as the number one reason grape production in Texas is not growing in acreage. Wheat production across millions of Texas acres is subject to periodic devastation by a complex of viruses transmitted by curl mites. Oak wilt disease causes millions of dollars in losses to landowners across the state, and there is no effective control.

Texas A&M AgriLife Research scientists will develop techniques to reduce the impact of pathogens on farming and ranching operations and to assist public health agencies. Existing chemical products can temporarily reduce insect populations. However, they are only a short-term solution. Insect populations can become resistant to these compounds over time. The insect-transmitted pathogens we currently recognize represent "the tip of the iceberg" as far as these threats are concerned.

Significant research initiatives include:

- Understanding the complex molecular interactions among insect, host, and pathogen that will be exploited to disrupt acquisition, persistence, and spread of the insect vector and corresponding pathogen
- Identifying key pathogen and insect reservoirs that serve as sources of inoculation and seeking ways to eliminate or reduce these source populations
- Developing integrated and best management practices to impede and control the spread of the insect vector and corresponding pathogen
- Using rapid and flexible approaches to develop and manufacture vaccines to protect against disease agents, including potential corporate research collaborations to develop products for preclinical and clinical trials
- Improved detection methodologies which are critical to epidemiology and control of these pathogens

TEXAS A&M AGRILIFE RESEARCH

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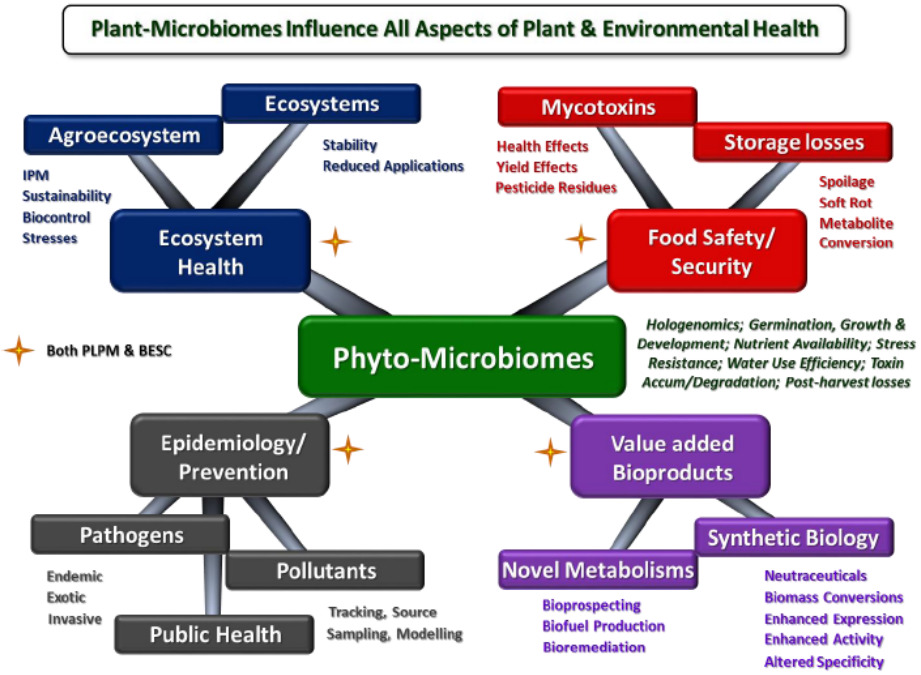
About Texas A&M AgriLife

What is AgriLife? It's a simple word for a diverse organization. With teaching, research, extension education, laboratory, and forestry facilities throughout Texas, we serve people of all ages and backgrounds. Led by Vice Chancellor Dr. Mark A. Hussey, Texas A&M AgriLife includes the Texas A&M AgriLife Extension Service, Texas A&M AgriLife Research, Texas A&M Forest Service, and the Texas A&M Veterinary Medical Diagnostic Laboratory.


Plant-Microbiomes Influence All Aspects of Plant & Environmental Health
Ecosystems
Agroecosystem
IPM
Sustainability
Biocontrol
Stresses
Stability
Reduced Applications
Ecosystem Health
Mycotoxins
Health Effects
Yield Effects
Pesticide Residues
Storage losses
Spoilage
Soft Rot
Metabolite
Conversion
Food Safety/ Security
Both PLPM & BESC
Phyto-Microbiomes
Hologenomics; Germination, Growth & Development; Nutrient Availability; Stress Resistance; Water Use Efficiency; Toxin Accum/Degradation; Post-harvest losses
Epidemiology/ Prevention
Pathogens
Endemic
Exotic
Invasive
Pollutants
Public Health
Tracking, Source Sampling, Modelling
Value added Bioproducts
Novel Metabolisms
Bioprospecting
Biofuel Production
Bioremediation
Synthetic Biology
Neutraceuticals
Biomass Conversions
Enhanced Expression
Enhanced Activity
Altered Specificity