UNIT REVIEW FOR CY 2014

Unit Name: School of Plant Sciences

Unit Head: Karen S. Schumaker

Date of review: February 9, 2015
A. Unit finance and business (10 min presentation + 10 min discussion)

1. Business personnel assessments
   b. Reorganization indicated that staff accountants were underutilized. Training was provided, workload and responsibilities increased.
   c. Business office review (by CALS Admin) led to policies to strengthen practices, reduce waste, and increase efficiency; office staff were given ethics training.

2. Finance and budget – focus on overview of strengths (+) and weaknesses (-) of the unit financially
   (+) Brought in $1,054,158 in ICR, operational expenses are down 30% from the prior year.
   (-) SPLS has limited sources of revenue – 85% of revenue is from State funds, total revenues are down 17% from the prior year.

3. New resource generation – specific opportunities you are exploring
   Facilitating research collaborations, teaching more students on-line and in Yuma, seeking development funds.

4. How are business functions in your unit helping achieve the goal of being “the most effective, efficient, responsive, flexible, and financially sustainable college on campus”?
   The two staff accountants service half of the faculty each, the grants and contracts embed and the principle accountant specialize in grants and HR, respectively. Office retreat and customer surveys guide evaluation of old practices and development of new ones.
### B. Cooperative Extension (10 min presentation + 10 min discussion)

1. **Total Extension FTE annually for the last 3 years (3 numbers):**
   
   - FY12 6.52
   - FY13 6.10
   - FY14 5.56

2. Economic outcomes and impact by program

<table>
<thead>
<tr>
<th>Kopec</th>
<th>Improved turf cultural practices for golf and baseball industries. Water savings ~ $2.5M, Poa reduction ~ $1.2M, fall/spring transition ~ $1.5M</th>
<th>Educating and training under-represented groups within the State</th>
</tr>
</thead>
<tbody>
<tr>
<td>Matheron</td>
<td>Reduced crop losses from disease - $8M farm gate (saved 1% of lettuce and melon production previously lost to plant diseases)</td>
<td>Education of the public, sustainability of agriculture in the State, maintaining the economic viability of rural Arizona</td>
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<tr>
<td>McCloskey</td>
<td>Reduced crop losses from weeds - $10M (identification of herbicide tolerant crops and yield increases due to weed control in cotton, alfalfa, and pecans). Reduced fire risk from buffelgrass control – $1-2M</td>
<td>Sustainability of agriculture in the State and maintaining the economic viability of rural Arizona</td>
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<td>Olsen</td>
<td>Reduced seedling disease - $1M (includes savings for: 1) replanting and cost of fungicide applications in cotton and turfgrass and 2) reduced use of ineffective fungicides</td>
<td>Education of the public (planting/expansion of crops that are well-suited for AZ agriculture, sustainability of agriculture in the State, maintaining the economic viability of rural Arizona</td>
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<tr>
<td>Ottman</td>
<td>Increased grain yield - $50M and 100 jobs (best practices for alfalfa and small grain production)</td>
<td>Sustainability of agriculture in the State and maintaining integrity of rural communities and farm families. Conserving water, land, and air resources</td>
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<tr>
<td>Pessarakli</td>
<td>Reduced water use – hundreds of thousands of dollars (identification of stress tolerant turf grass cultivars)</td>
<td>Training undergraduate students for jobs in the turf industry and improving quality of life through better lawns and recreation areas</td>
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<tr>
<td>Quist</td>
<td>Training for the green industry and economic contribution to the UA - millions of dollars and thousands of jobs (landscape professionals and ecosystem services provided by campus trees)</td>
<td>1) Education of the students and the public (the Campus Arboretum reached: a) students through formal UA classes, b) community visitors through tours and workshops, c) landscape professionals through talks and training, d) adult and student volunteers who provided many hours of service) and 2) improving quality of life (~2,000 individuals)</td>
</tr>
<tr>
<td>Rorabaugh</td>
<td>Support for the Controlled Environment Agricultural Center (education, training, and outreach)</td>
<td>Education of the students and the public (workshops, tours, and individualized training programs)</td>
</tr>
<tr>
<td>Schuch</td>
<td>Educational programs and research – water savings and improved horticultural practices</td>
<td>Education of the public (healthy landscapes to promote health, physical and mental well-being and social safety)</td>
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<tr>
<td>Wright</td>
<td>Reduced labor costs for dates (~ $5M), improved citrus rootstocks and varieties (~ 10% yield increase ~ $1.5M)</td>
<td>Sustainability of agriculture in the State</td>
</tr>
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</table>

3. Describe the level of program integration (e.g. with county Extension programs, center programs, and stakeholders) of Extension programs in your unit:

   **strong integration with farmers, industry groups, State Government, County Agents, Pest Control Advisors, and Forest Service and National Park Service employees. Faculty provide information for farmers, County Agents and Pest Control Advisors and offer workshops (e.g., Master Gardener) for the public**

4. Describe the level of integration between the research and Extension components of faculty programs in your unit:

   **complete to very strong integration. Research projects are conducted to solve current State problems or to gather information that will serve as the basis of practices to improve agriculture**

5. Units Extension summary in one or two sentences:

   **SPLS carries out applied or translational research to identify new crops and improved germplasm, define innovative cultural practices, reduce plant diseases, pests, and weed damage, and educate people in Arizona to increase yields and profits, natural resource conservation, and the long-term sustainability of agriculture in the State**
List Company, corporation or industry interactions with Cooperative Extension in your unit this past year including advisory boards, individual faculty/industry research projects, and classroom or curricular participation

**Kopec** – USGA Green Section Committee Member; NTEP Policy Committee Member, Western Regional Representative, Germplasm Location Committee; USDA Turf and Forage Crop Germplasm Committee Member

**Matheron** – Crop protection industry partnerships with Valent USA Corporation, FMC Agricultural Products Group, ISK Biosciences, Isagro USA, GASF Corporation, Syngenta Crop Protection, Gowan Company, Bayer CropScience, Marrone Bio Innovations, Chemtura Agrosolutions, Cheminova Inc.

**McCloskey** – Pesticide Advisory Board, Interactions with Monsanto, Bayer, GASF, Dow AgroSciences, Syngenta AZ Pecan Growers Assoc, AZ Cotton Growers Assoc, Fertizona, Crop Protection Services, Oak Creek Ranch, Chase Farms LLC, FICO – Green Valley Pecans LLC, Red Rock Pecans LLC,

**Olsen** – AZ Crop Improvement Association Advisory Board

**Ottman** – AZ Crop Improvement Assoc Advisory Board Member, AZ Grain Research and Promotion Council, AZ Grain, World Wide Wheat, Second Nature Research, Barkley Seed Co., Wilbur-Ellis, Helena Chemical, National Geographic, Empire Caterpillar, Advanced Forages, Alforex Seeds, Forage Genetics, Pioneer Hi Bred, S & W Seeds. WL Research, Allstar Seed, guest lecture in PLS 195A

**Pessarakli** – USGA, Bio Huma Netics Inc, Seed West Corp

**Quist** – Desert Legume Program Board; partnered with AZ State Forestry Division’s Urban & Community Forestry Program, National Phenology Network, AZ LEAF Network, Desert Florilegium Program, City of Tucson Mayor’s Office

**Rorabaugh** – None reported

**Schuch** – AZ, Landscape Contractor’s Association, AZ Nursery Association, AZ Community Tree Council, AZ Plant Diagnostic Network, AZ DoA, Pecan Growers Association

**Wright** – AZ Citrus Research Council, CA Citrus Research Board, Bard Valley Medjool Date Grower’s Assoc, Limoneira Co, Mission Citrus, Glen Curtis, Inc, Marlin Packing, DuPont, USDA Clonal Repository for Citrus and Dates, Royal Farms and Gardens
C. Research. Units fill in *italics* only, CALS Central Admin will provide you with the other data. (slides 5-8; 15 min presentation + 15 min discussion)

1. Total State-Funded Research FTE (research appointed faculty only) annually for the last 5 years (5 numbers):
   
   FY12 17.19; FY13 18.80; FY14 19.12; FY15 16.56; mean = 18.21

2. Unit Research Expenditures CY14 (total unit research expenditures, 2425):
   
   $6,460,770

3. Unit's share of CALS research input (research FTE, start-up and any other investment) for the last 5 years (5 percentages):
   
   FY10 20.5%; FY11 25.1%; FY12 24.0%; FY13 22.3%; FY14 26.3%

4. Number of extramural proposals submitted by the unit divided by faculty FTE annually for the last 5 years (5 numbers):
   
   FY12 120/17.19 = 6.98; FY13 113/18.80 = 6.01; FY14 120/19.12 = 6.28

5. Number of peer-reviewed publications divided by faculty FTE annually for the last 5 years (5 numbers):
   
   FY12 107/17.19 = 6.22; FY13 90/18.80 = 4.79; FY14 107/19.12 = 5.60

6. List of successful proposals, sponsors, direct funding amount, total amount and match amount on separate Excel spread sheet for CY14.
   
   Attached
Intellectual property data for FY14

Disclosures: 4 Provisional Patents: 2 (Orbach, Baltrus)

Patents: 0

Licenses: 1

Companies spun out: 2?
D. Academic Programs (slides 9-13; 15 min presentation + 15 min discussion) PLEASE PROVIDE COMPLETED SLIDES 9-13 AND THE ACADEMIC GRID TO JOY WINZERLING ONE WEEK IN ADVANCE OF YOUR REVIEW

1. Describe all anticipated changes, deletions or additions in your majors, minors and/or certificates.
   - Will propose a Biotechnology undergraduate major, spring semester 2015
   - Will introduce a Plant Biology Undergraduate Certificate aimed at distance learners, fall 2015

2. List current distance certificate programs, study abroad, executive and continuing education.
   - SPS Degree in Yuma
   - Distance (online outreach) courses:
     - PLP 305, Introductory Plant Pathology
     - PLP 427R, General Mycology
     - PLS 359, Plant Cell Structure & Function
     - PLS 475A, Principles of Plant Production under Controlled Environments
     - PLP 329A, Microbial Diversity
     - PLP 428R, Microbial Genetics
     - PLS 360, Plant Growth and Physiology

3. List new courses planned and/or course changes or closures for courses offered in winter or summer sessions.
   - None
4. **Describe** any anticipated changes in instruction faculty that will either streamline your operation or disrupt your course instruction.

- Need to have a discussion with faculty about:
  - Offering strong foundational courses that will meet the needs of many, if not most, of our majors in SPLS and SPS
  - What specialty courses we can teach with the faculty we have

- Two to three faculty teaching required courses may retire in the next two years

5. **Describe** your most compelling academic program need.

Our new Biotechnology Program will need support from CALS and a professional advisor (likely part-time to start)
6. **Complete** the attached course grid - **attached**

7. **Describe** your marketing/recruitment plans to increase the following ABOR metrics:

**Number of Bachelor's Degrees Awarded/Undergraduate Enrollment (Official 21st Day)**

Target students at various stages in their decision making process before they choose a major.

- Promote our majors with AZ high school academic advisors
- Participate in recruitment events throughout the year - Vision To Your Future, AZ experience, FFA events, Southwest Ag Summit in Yuma, and Meet Your Major Fair
- Work with UA Admissions office and CALS academic advisors to promote our majors to students admitted to UA and interested in science. Promote career-oriented, applied areas of PLS (such as biotechnology) by hosting workshops in summer and early fall
- Review and upgrade the presentation of our majors in the UA degree search platform - the number one avenue through which students learn about our majors

**Number of Graduate Degrees**

- Recruiting outstanding applicants - strategic interactions, promotion for university-wide, regional, and national fellowships
- Encouraging student applications for extramural funding
- Increasing partnerships with - industry, donors, and international institutions (dual-degree programs, industry-supported opportunities, contributors to endowment, and gift funds)
- Participation in cross-cutting funding opportunities in CALS and beyond (e.g., proposals for Science & Technology Centers, NSF PIRE, and related training grants)
- Revising and enhancing graduate curricula to ensure courses are maximally oriented to student development and eventual employment
8. **Number of undergraduate students in the unit involved in:**

i. **Research experiences**
   - 85 paid (35 CALS students)
   - 32 Independent Study (23 CALS students)

ii. **Extension experiences**
   - 7 Independent Study, 1 Internship (all CALS students)

iii. **Internships**
   - 18 (10 CALS students)

iv. **Experiential learning**
   - 26 Preceptorships (12 CALS students)
9. **List the top 5 employers of your graduates:**

<table>
<thead>
<tr>
<th>Undergraduate</th>
<th>Graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate School</td>
<td>Postdoctoral Research</td>
</tr>
<tr>
<td>Medical School (MD/MD-Ph.D.)</td>
<td>Small Teaching Colleges</td>
</tr>
<tr>
<td>Companies (Ventana Medical, Seed)</td>
<td>Ag Biotech</td>
</tr>
<tr>
<td>Golf courses and sports turf facilities</td>
<td>Government</td>
</tr>
<tr>
<td>Greenhouse facilities</td>
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</tbody>
</table>

10. **Describe company, corporation or industry interactions with your unit this past year including advisory boards, individual faculty/industry research projects, and classroom or curricular participation.**

   Research discussions/shared expertise with, interacted in classrooms with:
   Key Gene, Raytheon, Syngenta, Yulex, Bridgestone International, Civano Wholesale Nursery, Mesquite Valley Nursery, Mountain States Wholesale Nursery, Sewailo Golf Club, United Soybean Board, Masterfoods, Maggie's Mushrooms, Sonoran Hanging Gardens, Atzmona Organic Carrots
E. List faculty awards/recognition (1 min presentation + 1 min discussion):

- Beilstein – Mentor of the Year, UA UBRP
- Mosher – Bart Cardon Early Career Teaching Award
- Palanivelu – Top 60 STEM Leaders in So. Arizona, SARSEF
- Wing – AXA Chair for Genome Biology & Evolutionary Genomics, IRRI