The Future Educational Needs of Industry Employers

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Agricultural Industry
Many Diverse Interests

Difficult task to speak on behalf of all in “Industry”

Where will you find “Industry” plant pathologists?
- Agricultural consulting companies
- Agrichemical companies
- Seed and plant production companies
- Tissue culture laboratories
- Diagnostic laboratories
- Botanical gardens and arboreta
- Biotechnology firms
- Biological control companies
- Private practice
- Nurseries and garden centers
- Lawn and landscape maintenance firms
- Environmental, agricultural, and patent law firms

Views expressed here are mine alone. They are taken from my 28 years with Pioneer Hi-Bred & valuable input from my Industry colleagues.

Data used from APS Career Brochure: http://www.apsnet.org/careers/careerbrochure.pdf
What changes should be made to meet Industry’s needs?

Many of my comments are consistent with some of the recommendations identified in a recent report by the National Research Council of the National Academy.

I will also cite some of their data. I encourage you to obtain & read this very insightful report.

Transforming Agricultural Education for a Changing World

Committee on a Leadership Summit to Effect Change in Teaching and Learning

First some background information, Our world is changing fast!

- Impact of technology

The same is true for technology commonly used in the Agricultural Sciences. There are many examples!

- The demographics of people going into the Agricultural Sciences has changed too.
  - No longer dominated by students coming from rural areas. Majority are now from urban areas. Limited agricultural experience.
Universities & Their Agricultural Science Programs Are Changing Too.

- Baccalaureate degrees in Agricultural & Natural Resources have increased over the past few years.
- From 1987 – 2004:
  - Baccalaureate degrees in Agriculture & Natural Sciences increased by 60% vs. all baccalaureate degrees (all fields) that increased by 40%
    - Higher rates of gain were seen in mid to late 1990’s.
      - Agricultural degrees have declined over the past few years while overall baccalaureate degrees continues to increase.
- Traditional “Colleges of Agriculture” are disappearing
  - Many are now College of Agriculture & _______________
    - Natural Resources, Life Sciences, Environ. Sciences, etc.
- New fields of study are developing: agricultural biotechnology, food science/safety, turf management, etc

Traditional majors are projected to decline
• Soil & Crop Sciences
• Animal Sciences (meat animals)
• Entomology
• Plant Pathology

This may have some important implications to the Agricultural Industry

I will focus my presentation into 3 components. These are skills that universities should place more emphasis in the teaching programs:

- Management Skills
- Interpersonal Skills
- Technical Skills
Do you have employees who are so difficult to deal with that you're ready to pull your hair out?

Do these problems sound familiar?

- Persistent absenteeism and tardiness
- Poor communication skills
- Weak team skills
- Failure to follow instructions
- Unacceptable productivity
- Poor work quality

Recognize these difficult employees?

- Whiners
- Know-it-alls
- Lone rangers
- Bullies
- Troublemakers
- Excuse makers

Source: Rockhurst University Continuing Education Center, Inc.
6901 W. 63rd Street
Overland Park, KS 66202
Management Skills

• **Business 101**
  - We’re scientists thrown into the business world – managing budgets, people, etc.
  - Not many of us were trained in business management. Develop “listening” skills!

Foster basic understandings of running a business/project:

- Spreadsheets, developing budgets, managing cost, achieving profitability targets, legal issues, business ethics, managing risk, etc.
Management Skills

Project Management Skills
Teach them how to develop these skills
• Required reading (Covey’s *7 Habits of Highly Effective People*; Kouzes & Posner’s *The Leadership Challenge*; Lencioni’s *The Five Dysfunctions of a Team*; Johnson’s *Who Moved My Cheese?*, etc.)

• Goal setting, multi-tasking,
• **Handling change/flexibility,**
• Time management,
• **Team building,**
• Creating win/win situations,
• Risk management
• Multicultural awareness
• Presentation skills

Emphasize Critical Thinking Skills
Interpersonal Skills

Foster the basics we all were suppose to learn:

• Robert Fulghum’s simple principles:
  *All I Really Need To Know I Learned In Kindergarten*

  “Wisdom was not at the top of the graduate-school mountain, but there in the sand pile at Sunday School.”

• Dale Carnegie’s Classic Principles:
  *How to Win Friends & Influence People*

• Richard Carlson’s ideas on managing your life:
  *DON’T SWEAT THE SMALL STUFF*

  … and it’s all small stuff
Technical Skills –
Need to know both worlds

Molecular pathology

How Do We Link Them With Modern Agriculture?

There has been a tremendous impact that shows like CSI has had in generating scientific interest in students.
Our students need to be part CSI investigators too!
Powerful, *useful tools* readily available to us to better understand Genetics & Host/Pathogen interactions

Chromosome coordinates based on MaizeSequence.org marker positions for locus name: rpp9

The exact coordinates for this locus were not found. The coordinates will be estimated based on the nearest flanking loci with known coordinates.

The Locus **rpp9** is flanked by the following loci with known chromosome coordinates: *(rpl1 and umcl319)*

The Locus **rpp9** is *estimated* to be between position **2,783,200** and position **3,454,500** on Chromosome **10** based on the map: IBM2 2008 Neighbors 10

Use a different map [IBM2 2008 Neighbors](#)  [Find Coordinates based on this map](#)

This region is **671,300** base pairs long.

(Click [here](#) to go to the Genome Browser or scroll to the bottom of the page)

<table>
<thead>
<tr>
<th>Locus</th>
<th>Chr</th>
<th>Map Position</th>
<th>Chr Start</th>
<th>Chr End</th>
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<tr>
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<td>2778300</td>
<td>2783200</td>
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<td>rpp9</td>
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<td>umcl319</td>
<td>10</td>
<td>62.6</td>
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</tr>
</tbody>
</table>

Loci known to be between the flanking loci at map positions **53.04** and **62.6** on the IBM2 2008 Neighbors map:

[Click to expand details](#)

The Locus **rpp9** is *estimated* to be between position **2,783,200** and position **3,454,500** on Chromosome **10**

(Click on image to go to the Genome Browser)

Source: http://www.maizegdb.org
Technical Skills – Need to know both worlds

You need **trained** people to evaluate your discovery!

It’s just one of many required traits in a plant.
Give opportunities to find the new Gregor Mendel’s in students!

Help to Ignite that spark of curiosity! Why is one good and one so bad?

Students learn more when they are actively involved in real life situations/scenarios
Technical Skills – Offer Training Opportunities

FIELD OBJECTIVES:

- Field Identification (Symptoms)
- Diseases Epidemiology
- Group Interaction
- Crop Management

DISEASES TRAINING PIONEER MEXICO
2008
mexico.pioneer.com
Fundamentals – Mycology, entomology & other core essentials

We don’t need expensive and time consuming testing procedures for all pathogens. Many times the pest will show us who they are if we know what & where to look.

Students need to have a good understanding of core competencies. 

What are they?
Most of us would agree with past surveys of Industry needs:
Skills & Abilities needed – College Graduates

- Interpersonal Communication Skills
- Critical Thinking Skills
- Writing Skills
- Computer Skills
- Cultural/Gender Awareness Sensitivity
- Quantitative Analysis Skills
- Knowledge of Business Management
- Oral Presentation Skills
- Knowledge of Accounting/Finance
- Intern/Co-op Work Experience
- Knowledge of Macroeconomics, International Trade
- Broad-based Knowledge in Liberal Arts
- International Experience
- Foreign Language Skills
- Production Agriculture Experience

Making Changes

I support Recommendation #8 in the N.A.S. Report *Transforming Agricultural Education For A Changing World*

“Stakeholders in academe and other sectors should develop partnerships that will facilitate enhanced communication and coordination with respect to the education of students in food and agriculture. The partnership should include the following elements:

- Academic institutions should include representatives of industry and other employers on visiting committees, on advisory boards, and in strategic planning. Companies should include academic faculty on their advisory committees...
Making Changes - continued

• Exchange programs should be developed that enable food and agriculture professionals to spend semesters teaching and working at academic institutions and enable faculty to spend sabbaticals working outside of academe.
  • *For Industry, taking a semester off may be difficult, but becoming involved in teaching a unit, etc. is more likely.*

• Opportunities for students to work in non-academic settings should be developed and greatly expanded. Programs might include internships, cooperative education programs, summer opportunities, mentoring and career programs, job shadowing, and other experiences.
  • *Making a Co-op or internship as part of a undergraduate or graduate degree program?*
The Dawn of a new age in teaching agriculture?
Coordinated Regional Training Opportunities

Universities within a region and the Agri. Industries, in partnership, pool their resources to host Mini-Workshops, diagnostic clinics, IPM, or other programs on a rotational basis.

These would give students an opportunity to visit industry and see possible career opportunities they might not have known existed or really seriously considered. It would give those in academe greater interaction & communication with industry.
Thank You!