Impact of Mega Mergers on New Technology for Specialty Crops

IR-4 Food Use Workshop
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Items In Place For Minor Crops

• EPA- Extension of Data Protection for up to three years
  • 1 year per 3 minor crops accepted

• IR-4 working with growers and crop protection industry
• Own crop protection company initiatives to support growers

• Major crop in other regions of the world and import tolerance required to US or Canada
What Causes Mergers and Acquisitions

• Synergies
  • Cost Savings → Greater Profitability
  • Prioritization of Development Projects- Overlap can be sold (license) or stopped

• Complementary Portfolio
  • Row crops drive a good bit of development-Seed and Chemical
    • Larger specialty crop included- especially with global footprint- Pome Fruit & Citrus

• Current mergers is not changing ai development
Cost to Develop new AI

- A common annual R&D investment is 10% of turnover and product take an average of 10 years to come to market so one project requires a company turnover of $286 Million to fund so cost is $339 Million with inflation over 10 years.

- Expect smaller development companies to propose joint ventures or partnerships to bring new ai’s to market.

### Yearly Costs

<table>
<thead>
<tr>
<th>Year</th>
<th>1995</th>
<th>2000</th>
<th>2008</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual $(M)</td>
<td>$152</td>
<td>$184</td>
<td>$256</td>
<td>$286</td>
</tr>
<tr>
<td>Inflation Adjusted to 2014 $(M)</td>
<td>$236</td>
<td>$253</td>
<td>$281</td>
<td></td>
</tr>
</tbody>
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Source: Phillips McDougall CropLife Survey - March 2016
New AI Development Trend

• New active ingredients introductions from 1950 to 2016

• Trend of increases to 1986
• Trend of decrease since 1997

• Companies are still screening thousands of compounds only now with much better equipment - patent levels are stable over time - so research is there

• AI’s have many more hurdles now to pass internal and external review - we have a narrow funnel of success

New Active Ingredients from 1950 to 2016
Source: Phillips McDougal - March 2017
New AI Development Costs

• Development costs are projected to continue and increase
  • Study costs increase, more studies requested globally

• Companies do have an increase focus on traits (lower costs)

• Opportunity for biorational products to increase (lower cost to develop and register)

• Cost to develop MRL’s in export countries
R&D Spend by Large Companies

• R&D spend for Agrochemicals was surpassed by seed and traits in 2009

• This trend had already been established before the recent mergers

Source: Phillips McDougal – March 2017
How will Mergers Impact Small Growers

• Some of your current products may be sold by another company
  • Focus leads to divestments- Gowan looks at these opportunities

• Development will not stop on major pest problems, minor/local pest problems may need biorational approach

• Plant breeding and trait research can bring value to specialty crops- more tolerance to pests

• Biggest technology shortfall is annual minor crops for herbicides
  • Weed control is there, but crop tolerance may not be acceptable
What Can Be Done to Support Minor Crop Support

• Use representative residue studies from other crop commodities- if links can be made
  • Super Crop Groups
  • Use pattern same residue- Greenhouse Argument

• For minor crop support- extending beyond 3 years of exclusive use, can attract more interest for companies to register more minor crops

• Funding to support IR-4
Gowan USA

- Gowan does not have ai development- so we license, partner or acquire ai’s from ai discovery companies
- We focus to identify market opportunities through segmentation and development
- Developing both conventional and biorational products from early to late stages
- Strongly support minor crop growers and like to get our boots dirty
Thank You for Supporting Minor Crops
1 & 2: What is Considered a Minor Crop/Use?

• Extends the exclusive use period by adding **minor uses** to the active ingredient
  • Minor use = <300,000 acres
  • Uses that do not provide sufficient economic incentive for registration
    • Most fruits and vegetables and some disease vectors
    • Specific set of circumstances must apply....
1 & 2: Criteria for Exclusive Use Must Also Meet One of the Following:

- I) there are insufficient efficacious alternative registered pesticides available for the use;
- (II) the alternatives to the minor use pesticide pose greater risks to the environment or human health
  - Reduced risk rationale can be used for the minor use extensions
  - Request must be made within 2 years of RR determination
- (III) the minor use pesticide plays or will play a significant part in managing pest resistance; or
- (IV) the minor use pesticide plays or will play a significant part in an integrated pest management program