



Impact of Mega Mergers on
New Technology for Specialty
Crops


IR-4 Food Use Workshop
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Eric McEwen
Gowan USA

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

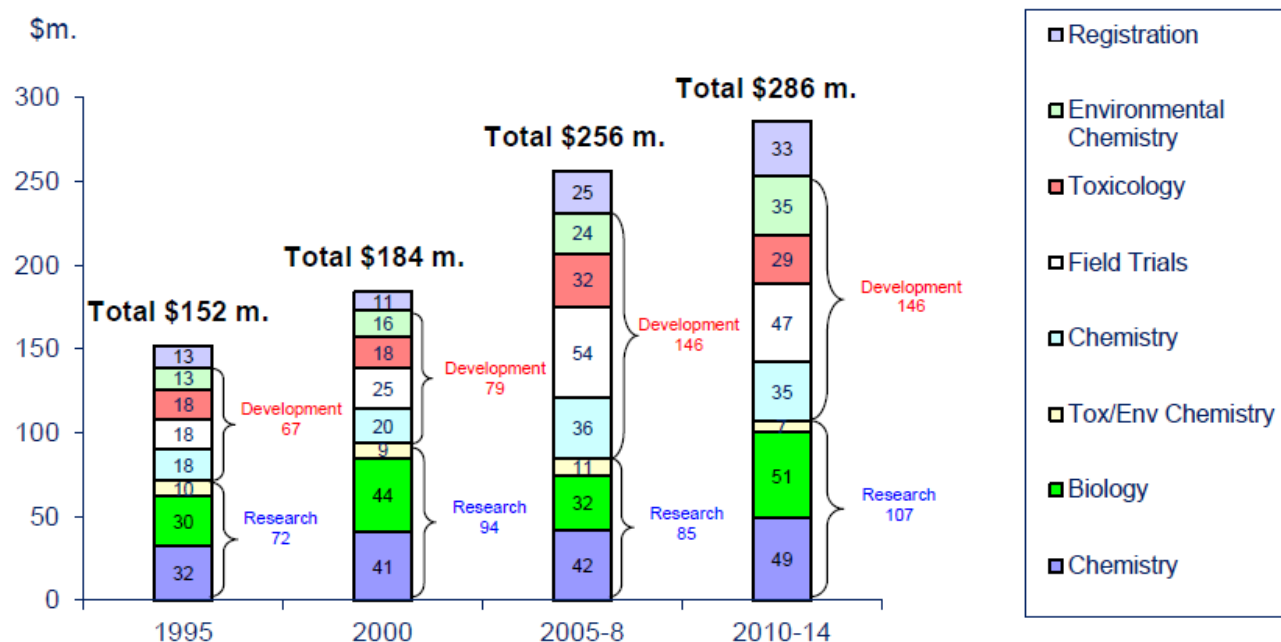
What Causes Mergers and Acquisitions

- 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 foot print- 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- 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



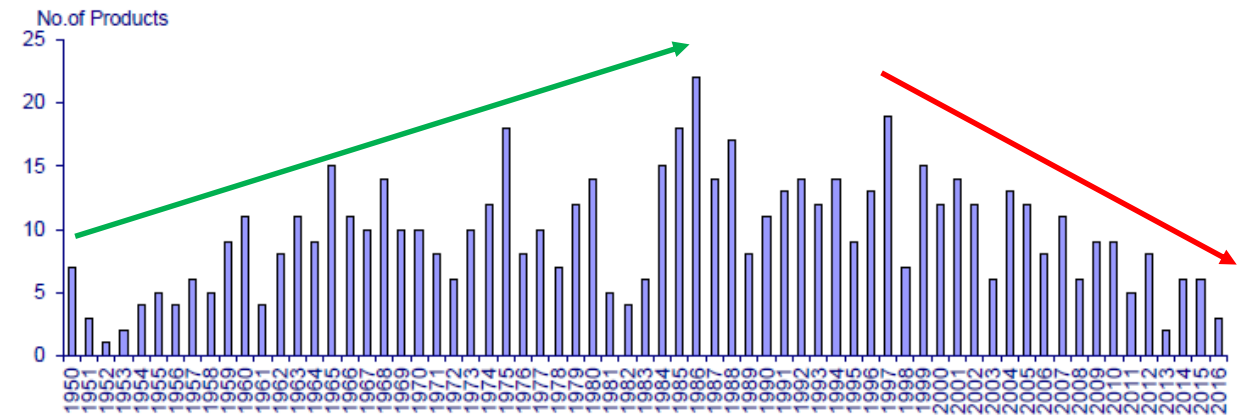
Year	1995	2000	2008	2014
Actual \$(M)	\$ 152	\$ 184	\$ 256	\$ 286
Inflation Adjusted to 2014 \$(M)	\$ 236	\$ 253	\$ 281	

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 Ingredient Introductions



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

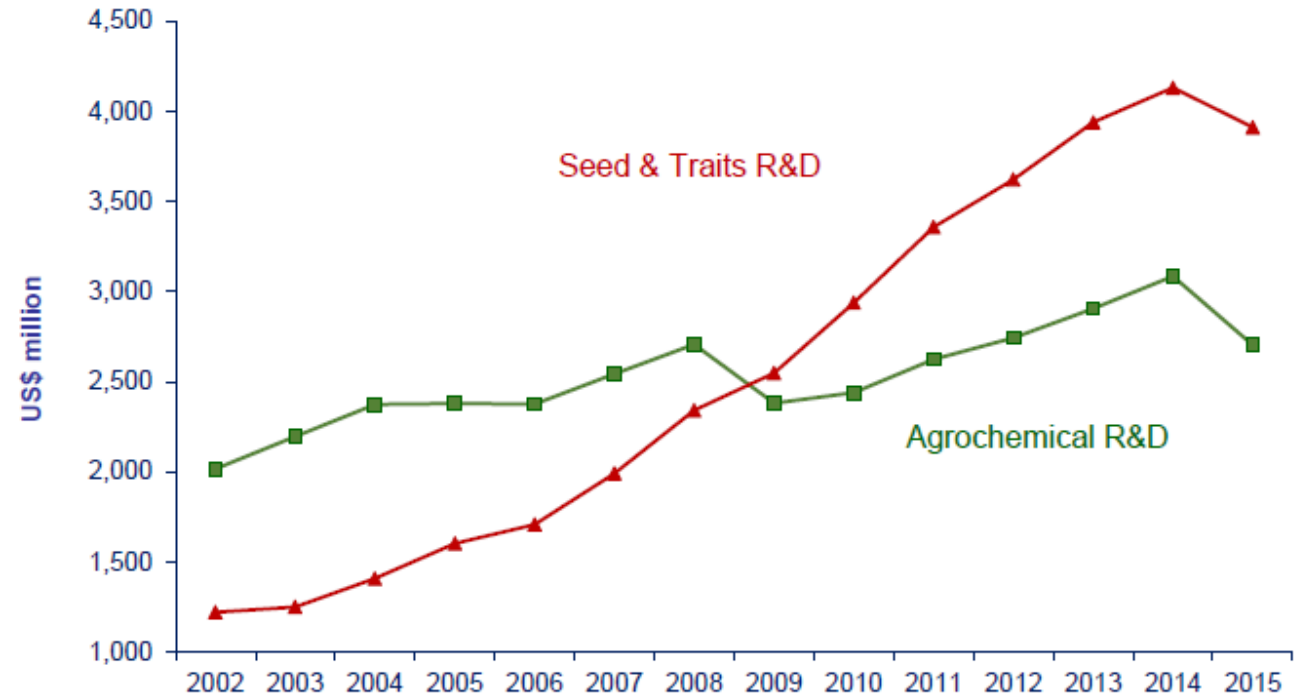
New AI Development Costs

- 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

R&D expenditure of the 'Big Six' Companies



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