



EU-China competition week

Meeting with MOFCOM

16 October 2017

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Agenda

1) Market definitions in seeds

2) Market definition in crop protection

3) Dow/Dupont Case Study

Market definition in seeds

- **Seeds are developed and cultivated for a specific type of crop**
 - ❑ Demand side substitutability:
 - Farmers buy a seed product based on the specific type of crop they want to grow. A product targeting another type of crop is not substitutable.
 - ❑ Supply side substitutability
 - A supplier producing seeds for a specific type of crop cannot start competing in the short term, and without incurring significant costs, for another type of crop.

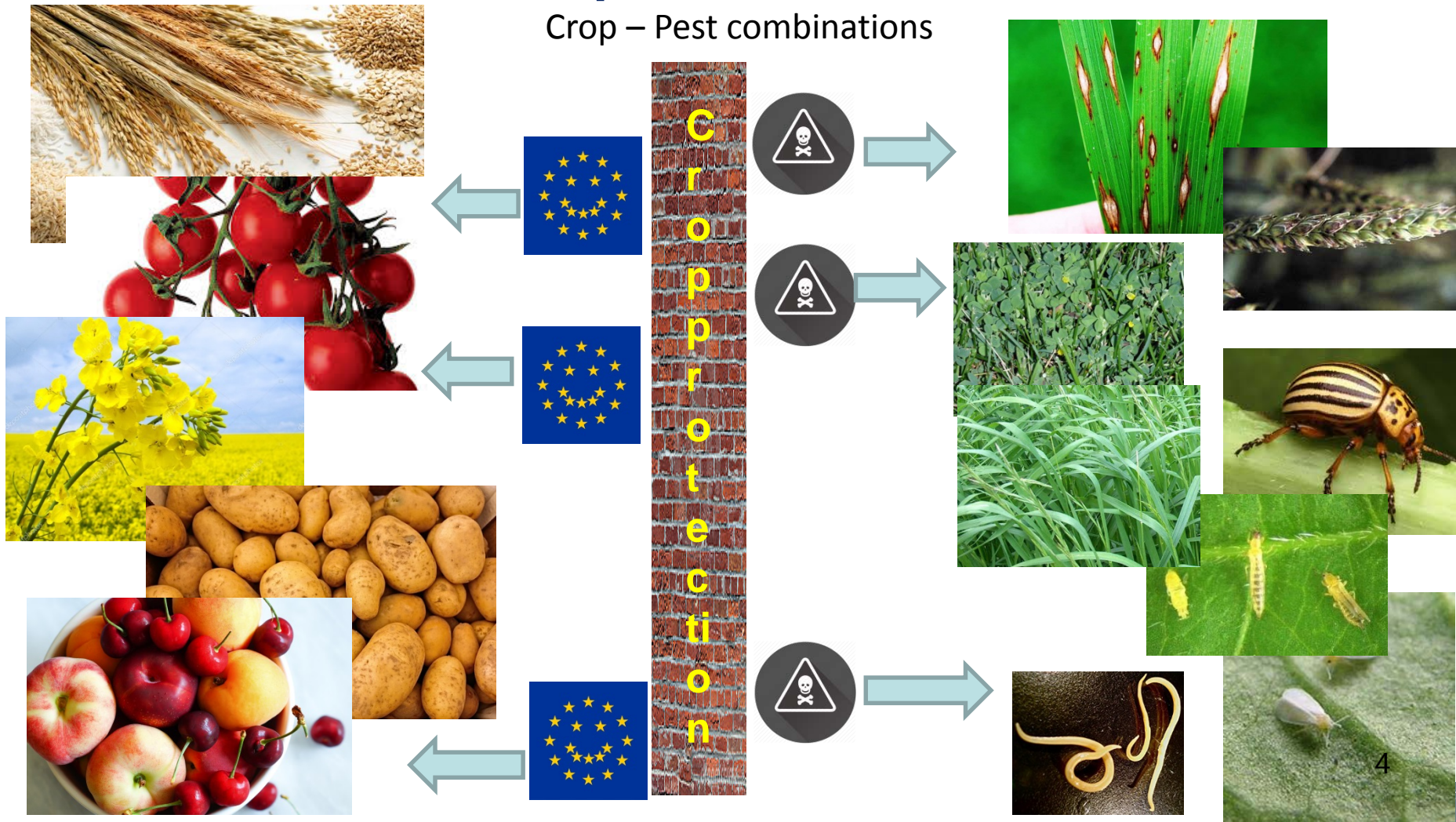
- **For vegetable seeds: 1 product market per crop** (e.g. 1 market for tomato seeds, one market for cucumber seeds, 1 market for salad seeds, etc.)
 - However, differentiated markets by sub-segments. For example, a specific type of tomato, a specific type of salad, etc. Previously left open if separate product markets
 - If sub-segments are not separate markets, may still affect competitive analysis (importance of each sub-segment within the crop product market, closeness of competition in each sub-segment)

- **For broadacre crop seeds (wheat, sunflower, etc): 1 product market per crop**
 - Possible sub-segments left open (e.g. winter oilseed rape/summer oilseed rape)
 - However, separate upstream and downstream markets
 - Upstream: licensing/breeding of seeds (technology market)
 - Downstream: commercialisation/distribution

- **All markets national**

Crop Protection

Crop – Pest combinations



Market definition in crop protection

- Crop protection formulated products consist of finished products that are mixtures of (i) active and (ii) inert ingredients (such as solvents, fillers, and adjuvants) ready to be applied for their respective purpose.
 - Demand side substitutability:
 - Farmers buy a formulated crop protection product based on the specific crop/pest/timing they want to target. A product targeting another crop/pest/timing is not substitutable.
 - Supply side substitutability
 - a supplier producing a given formulated product targeting a given crop/pest/timing combination cannot start competing in the short term and without incurring significant costs for another crop/pest/timing combination.
 - Internal documents of the Parties indicate that they look at their formulated products as targeting markets based on crop/pest segmentations
- **All markets national**

Market definition in crop protection - conclusion

- **For herbicides: Market defined narrower than precedents, by crop/weed combination, including timing of application (pre- or post-emergence).**
 - For example,
 - Pesticide against pre-emergence of a specific weed for cereals
 - Pesticide against post-emergence of a specific weed for rice

- **For insecticides: Market defined narrower than precedents, by crop/insect combination.**
 - For example,
 - Pesticide against a specific insect for tomatoes
 - Pesticide against a specific insect for apples

Market definition in crop protection - groupings

- However, because no data available for market shares on these narrow markets, products were grouped in **broader categories on the basis of available data**:
 - **For herbicides:** (i) broadleaf herbicides, (ii) graminicides or (iii) cross-spectrum herbicides.
 - **For insects:** (i) chewing insects, (ii) sucking insects
- These groupings were used for market share purposes and to analyse overlaps by groups.
- However, within each group, a closeness of competition analysis was carried out (if the combined market share for a group was over a certain market share, it could be that the overlap was even higher when looking at the specific crop/pest/timing combination).
- This closeness of competition analysis was carried out by reviewing internal documents.



Case Study

M.7932 DOW / DUPONT



Crop protection and seeds players

- "Merger of equals" of Dow and DuPont

Dow/DuPont revenues: ~\$82B

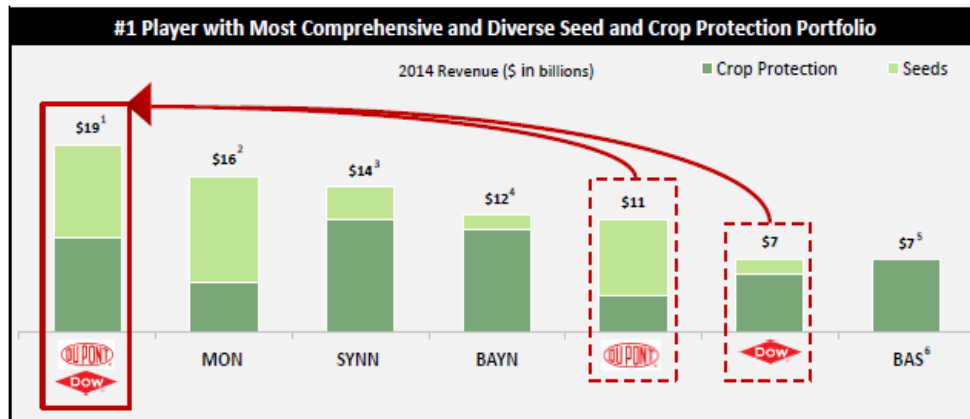
Agriculture

Material science

Speciality



- Crop protection products and seeds players



INTRODUCTION TO CROP PROTECTION INDUSTRY

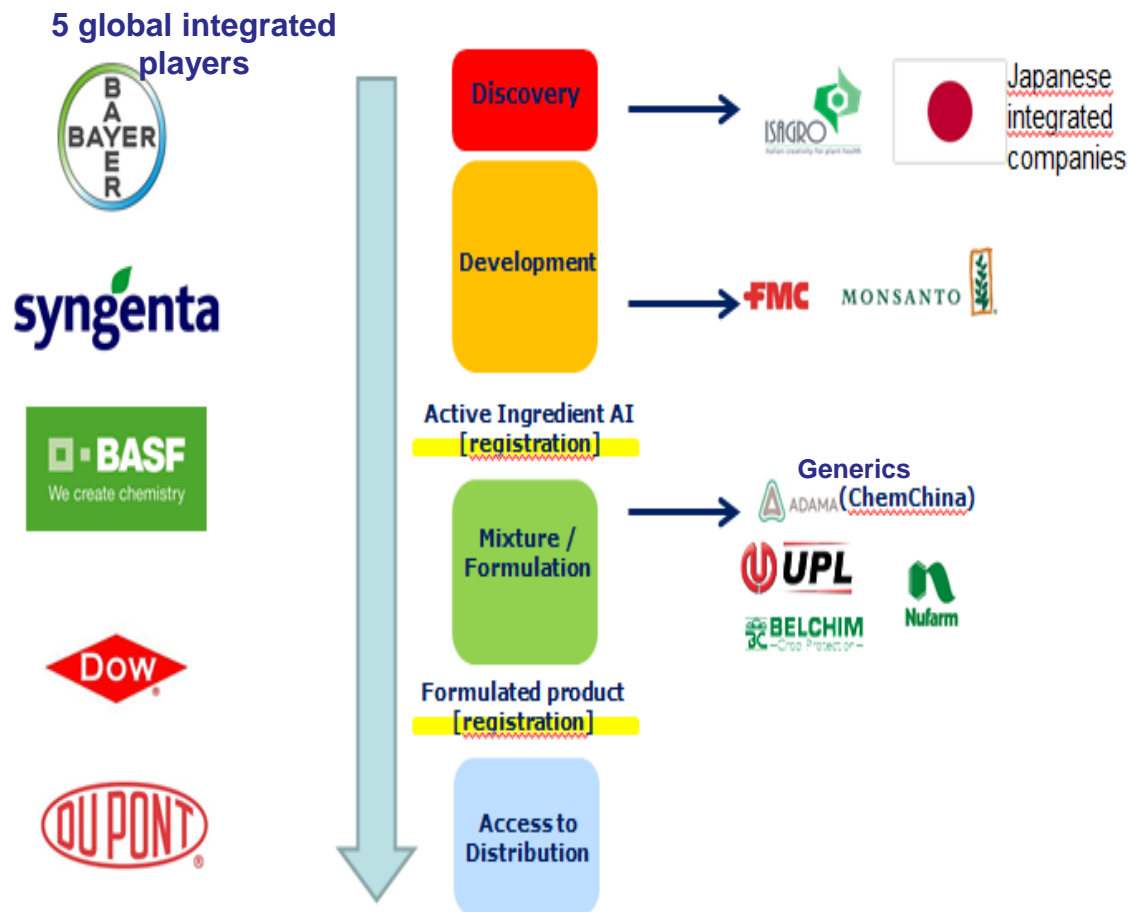
Global market: **USD 51 billion** in 2015

EEA market: **USD 10 billion**

Distinguish **Active Ingredient (AI)** and **formulated products**

The lifecycle of a new AI starts with an R&D company's **discovery** and **development**:

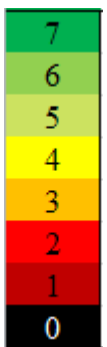
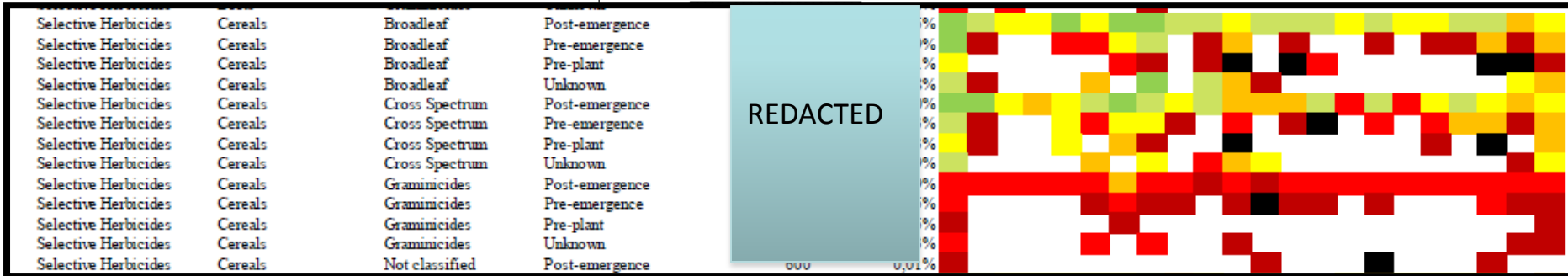
- **Total costs** of discovery and development at around **USD 280 million** dollars,
- Around **USD 80 million** in **discovery** and **USD 160 million** in **development**
- **Discovery** takes **3-4 years**, and development **5-6 years**. The decision to move a molecule to development is thus key



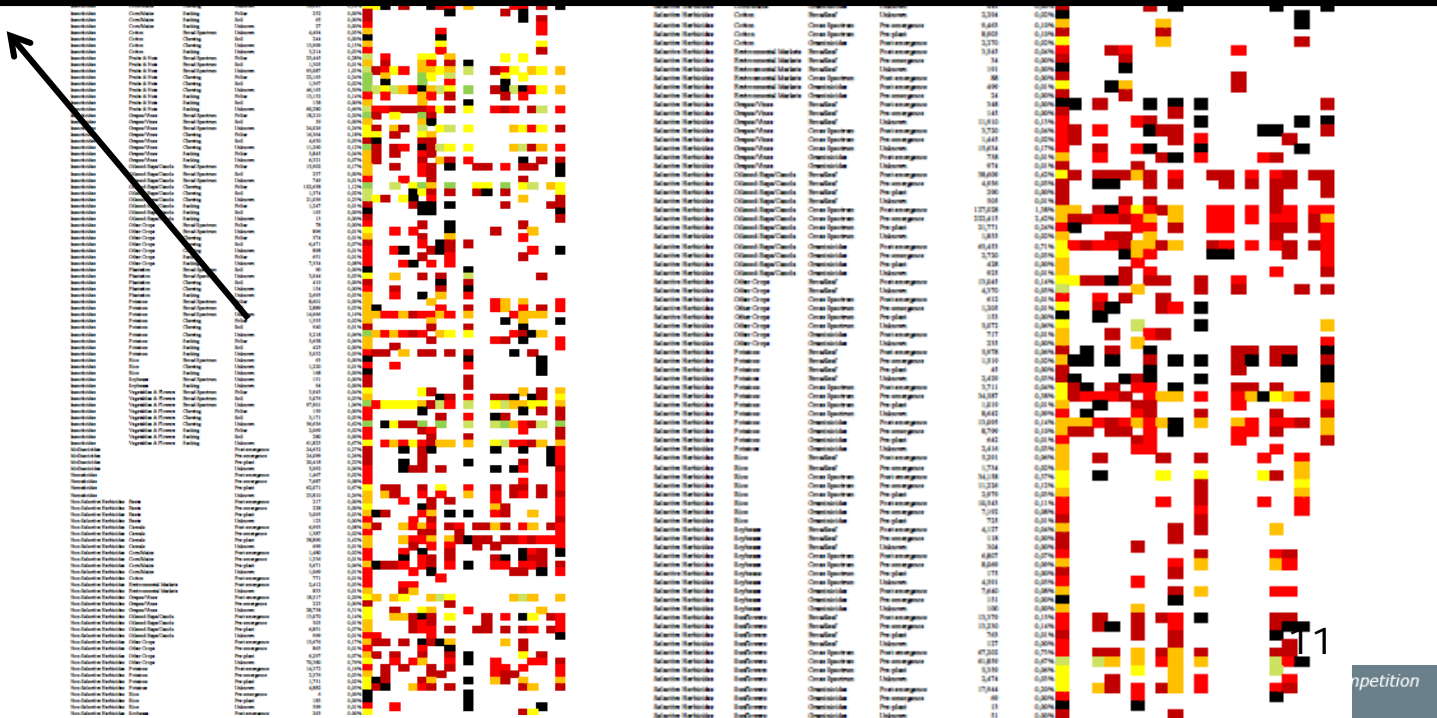


European Commission

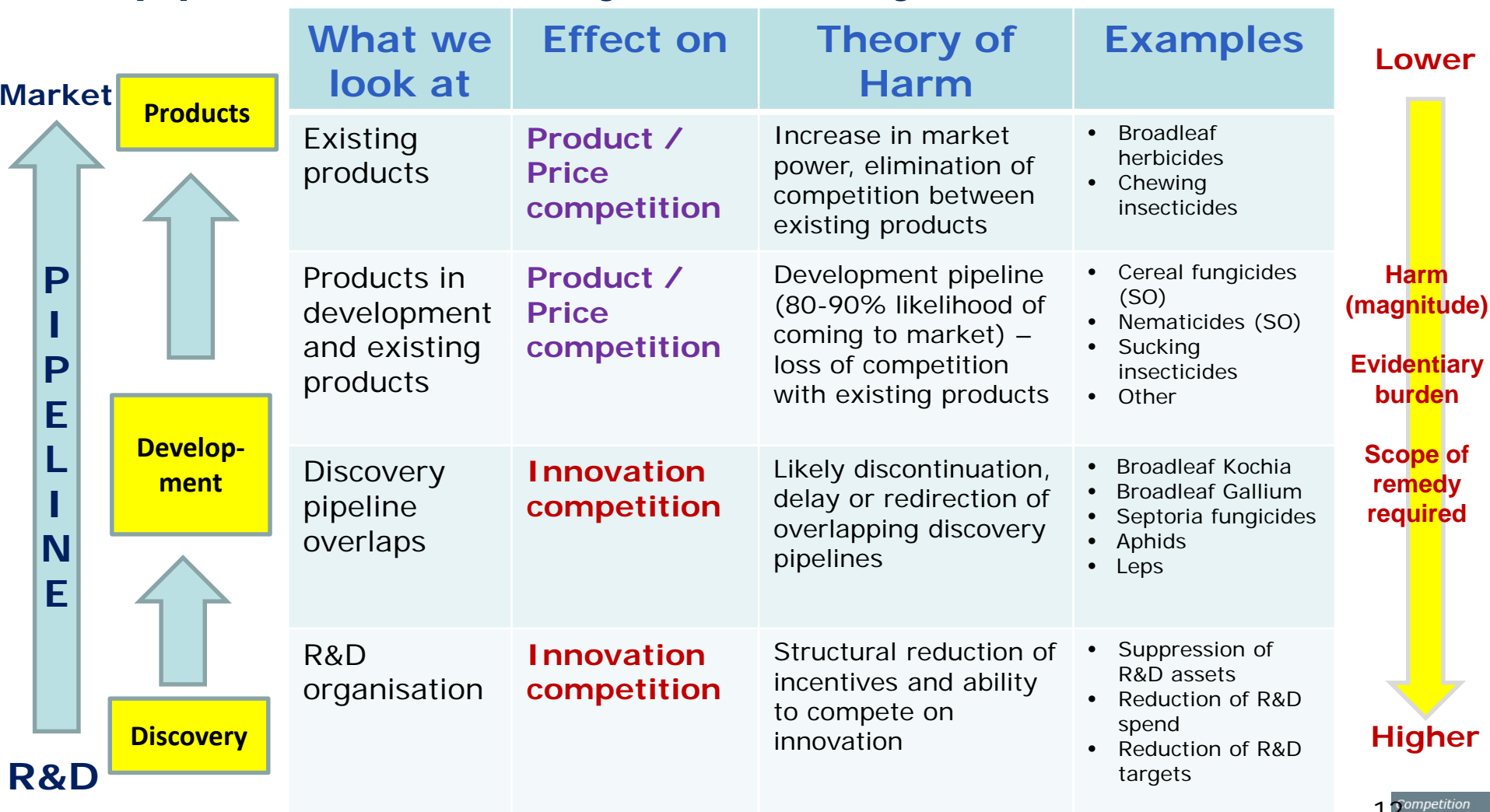
Concentration at 'markets' level (groupings)



- Number of R&D companies with products in the selected market.
- May overstate number of players at market level (e.g. R&D player with genericised products is counted)



Crop protection industry and four layers of the assessment



Herbicides product competition

- **Dow and DuPont are strong players**, in particular in cereal herbicides in most EEA countries, with major new products
- **Parties' claim: portfolios did not compete closely** → Not supported by internal documents or public sources
- **SIEC** found in:
 - cereals (pre- and post-emergence broadleaf and post-emergence cross-spectrum)
 - oilseed rape (post-emergence broadleaf)
 - sunflower (post-emergence broadleaf)
 - rice (post-emergence cross-spectrum)
 - pasture (selective)

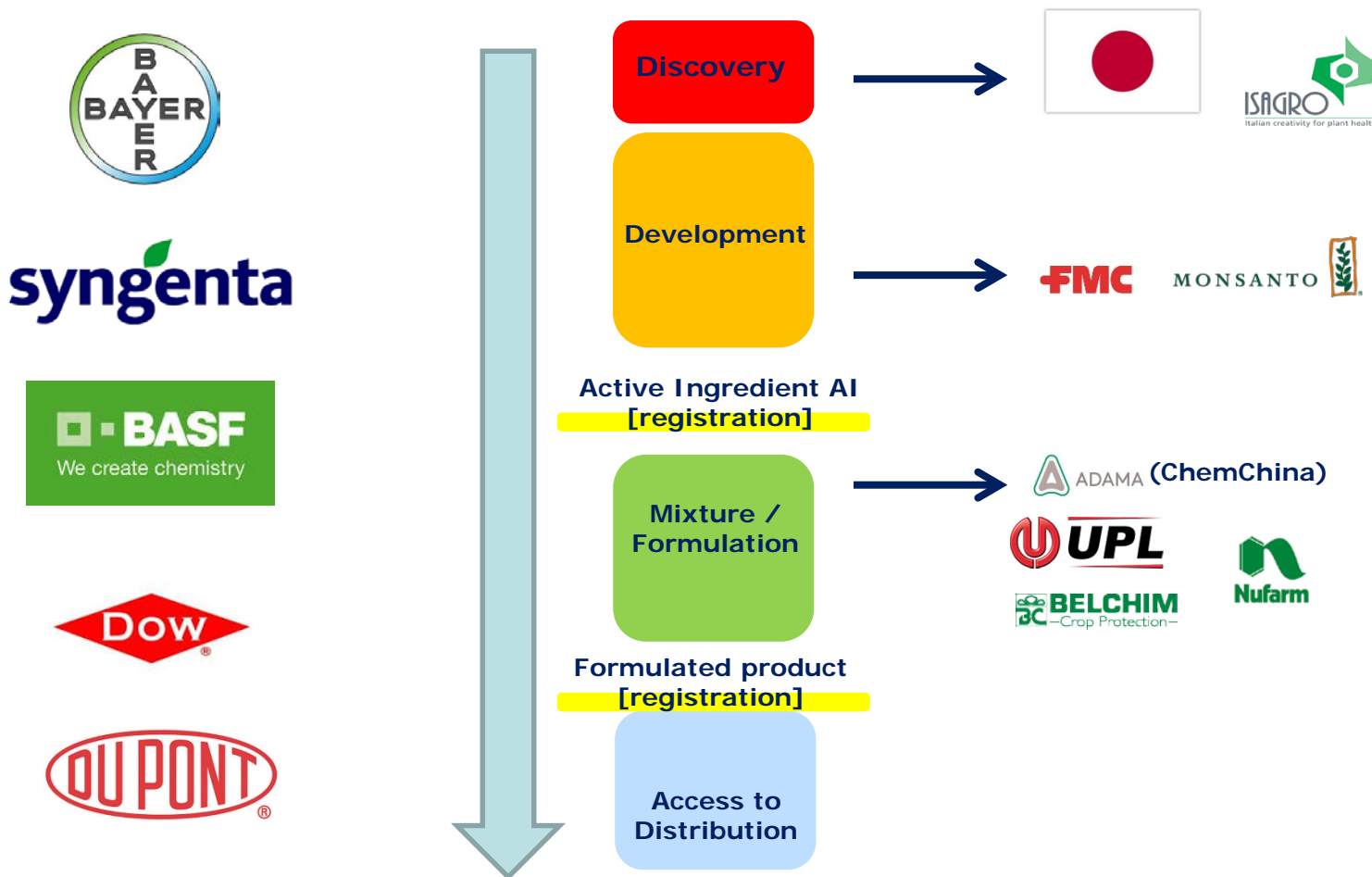
Insecticides product competition

- **Dow and DuPont had the newest portfolio of insecticide AIs** → Resistance, selectivity and tox profile of AIs particularly important to insecticide competitive assessment
- The Parties' portfolio focussed on "chewing" insecticides.
- **Parties' claim: limited overlap** in the 2 portfolios → Not supported by market investigation or internal documents
- **SIEC** found in:
 - several chewing insecticides markets - creation of a dominant position or elimination of an important competitive force
 - a small number of sucking insecticide markets - elimination of an important competitive force

Innovation – key evidence

1. The investigation showed that:
 - Innovation is a key parameter of competition in the industry
 - Concentration level high – only 5 remaining integrated (all stages of the product lifecycle) players
 - At innovation space level (i.e. innovation for a particular crop pest indication – AI around which the formula is made) even higher concentration
 - Barriers to entry in innovation are high
2. Significant R&D overlaps between Dow and Du Pont
 - Used different tools to assess this
 - Patent analysis – not just number but also quality of patents assessed for last 15 years.
3. Direct evidence of plans by the parties to cut back post-merger:
 - R&D efforts (R&D spend, cuts in numbers of researchers, site closures)
 - R&D output targets
4. Evidence that the more the industry became concentrated, the less innovation efforts became

Concentration as regards innovation at industry level is very high



Concentration as regards innovation at industry level is very high

Table 56 – Number of AIs launched during 2006-2015 and further introduced in the EEA, identified by the type of R&D players which (co-)developed these AIs, and their EEA turnover generated in 2015

	AIs developed by		<i>Total</i>
	Big 5	Other players	
Number of new AIs (#)	23	10	33
Number of new AIs (%)	70%	30%	100%
EEA turnover in 2015 (million USD)	879	65	943
EEA turnover in 2015 (%)	93%	7%	100%

Concentration as regards innovation at the level of innovation spaces it is often even higher

In several groupings of downstream antitrust markets, few R&D players are present

# Innovators	EEA	Market value	Austria	Belgium	Bulgaria	Czech Republic	Denmark	France	Germany	Greece	Hungary	Ireland	Italy	Latvia	Lithuania	Netherlands	Poland	Portugal	Romania	Slovakia	Spain	Sweden	United Kingdom
5	17%	\$ 1,565,788	21%	1%	2%	10%	0%	4%	1%	16%	10%	0%	2%	5%	21%	6%	4%	29%	1%	12%	4%	0%	1%
4	44%	\$ 4,115,662	23%	17%	32%	33%	17%	33%	43%	29%	50%	64%	28%	21%	34%	8%	57%	21%	45%	41%	10%	39%	50%
3	22%	\$ 1,995,847	27%	52%	30%	30%	17%	39%	36%	25%	12%	23%	44%	49%	27%	55%	17%	12%	24%	18%	34%	26%	23%
2	10%	\$ 951,239	15%	14%	18%	17%	39%	12%	16%	18%	11%	4%	12%	18%	15%	20%	12%	12%	9%	16%	27%	23%	14%
1	6%	\$ 562,237	10%	13%	18%	7%	24%	11%	3%	10%	14%	9%	9%	4%	2%	11%	9%	22%	21%	12%	17%	8%	12%
0	1%	\$ 59,948	4%	4%	1%	2%	2%	1%	1%	2%	2%	0%	5%	3%	2%	1%	1%	5%	1%	1%	7%	4%	1%
0-4	83%	\$ 7,684,933	79%	99%	98%	90%	100%	96%	99%	84%	90%	100%	98%	95%	79%	94%	96%	71%	99%	88%	96%	100%	99%
0-3	39%	\$ 3,569,271	56%	83%	67%	57%	83%	63%	56%	55%	40%	36%	70%	74%	45%	87%	39%	50%	55%	46%	86%	61%	50%



Patent analysis - proxy for innovation closeness and importance

- Why is patent analysis a useful tool?
 - Patents indicate the results of R&D effort (with a time lag)
 - Complements evidence on R&D budget (input)
 - Patent activity is an indicator of strength in specific innovation areas/spaces
 - Patent citations are an indicator of the importance/quality of R&D
 - Significant heterogeneity in citations: most patents never/rarely cited, few attracting most citations
 - High quality patents more frequently successfully commercialised
 - Can also be an indicator of closeness
- In this case, patent analysis used to show
 - Significance of parties as innovators
 - Closeness: for some lines of research, patent of one merging Party were almost exclusively cited by the other merging Party and not by their competitors
- Patent analysis main assumptions to be made
 - Geographic scope (place of patent application): worldwide vs. EEA (at least one or all)
 - End-use: crop protection vs. insecticide/herbicide/fungicide
 - Types of innovation: all vs. discovery/process
 - Types of products: products based on straight AIs and/or mixtures of AIs
 - Quality scoring method: overall patent citations vs. external patent citations
 - Selection of relevant patents: based on quality threshold (top 10%, top 25%, top 50%)
 - Top 5-6 vertically integrated players vs. all patents (including Japan)



Patent Analysis: Summary of Results

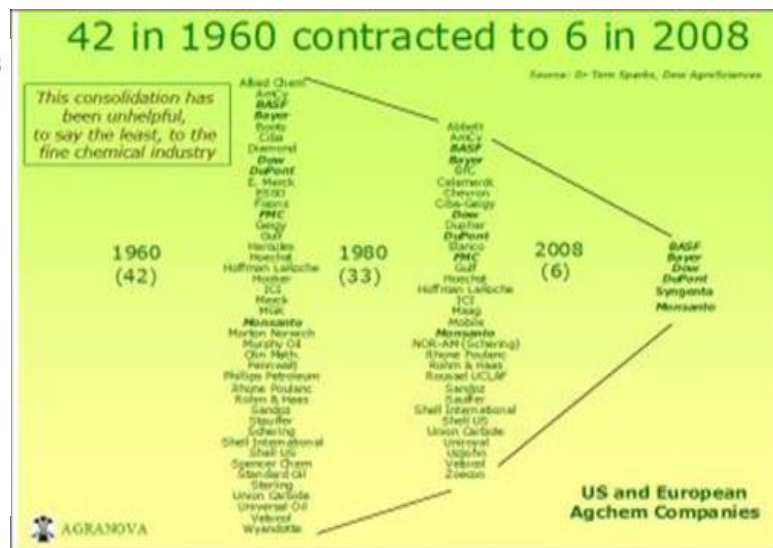
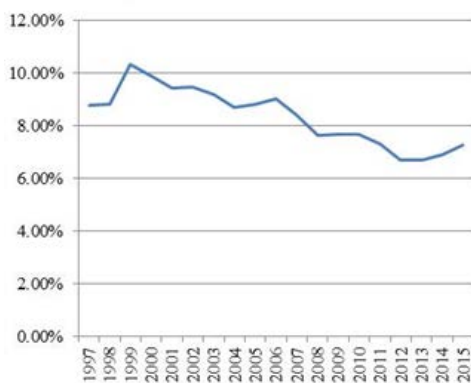
- Parties are more important innovators than their share of R&D spend suggests, with high combined patent share, increasing for high quality innovations
- DuPont's patent share high and increases significantly for high quality patents
- Even when considering Japanese companies, discovery research in crop protection remains concentrated with particularly high Delta HHI
- Limited role of BASE in high-quality patents driven by its limited innovations in herbicides and insecticides
- Monsanto's role is very limited for innovations
- Results are robust to alternative settings



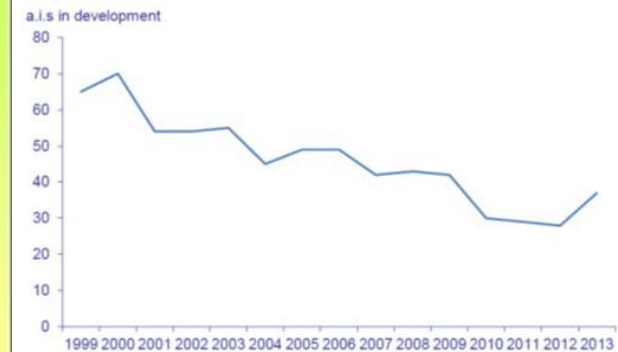
European Commission

Innovation –past concentrations seem to have harmed innovation competition in CP

Industry average R&D spending as percentage of revenues






Agrochemical Active Ingredients in Development



	1980 - 1989	1990 - 1999	2005 - 2014
% New A.I.s targeted at Europe	33.3	31.3	16.4
Europe R&D spend \$m	424	766	520
% Total R&D on new A.I.s for Europe	33.3	25.0	7.7

In practice: evidence-based investigation e.g. in *Dow/Dupont*

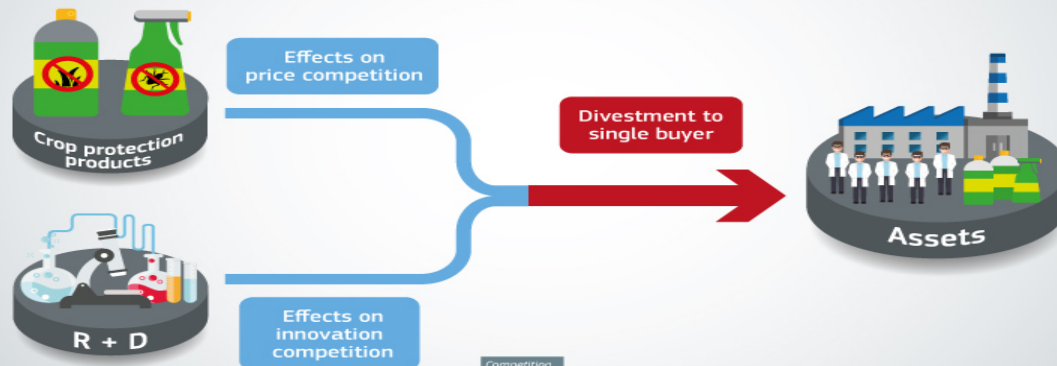
	Product/price competition	Innov. effects at innovation space level	Innov. Effects at industry level
Market structure and features		Concentration industry/innovation spaces; barriers; importance of rivalry; past mergers	
Importance and closeness		Internal docs; patent shares; AI shares; past and current products; overlaps for lines of research and pipeline products	
Efficiencies		Not substantiated/proven	
Effect on competition	Assumed	Partly direct, partly indirect evidence	Direct evidence on future spent, FTEs, capacity
Effect on price/innovation	Assumed	Partly direct evidence, partly assumed	Direct evidence on targeted output restriction

Concerns and remedies

Concerns:

Crop Protection	Product Competition	Selective Herbicides cereals/rice/pasture/OSR/sunflower
		Chewing Insecticides
		Rice fungicides
	Innovation competition	Overlapping lines of research and early pipeline products
		R&D efforts and output

Commission ensures **DOW/DUPONT** merger preserves price and innovation competition in crop protection





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Crop protection remedy

Product / Price
Competition

**DuPont
Overlapping
Herbicides**

Global

**DuPont
Overlapping
Insecticides***

Global

**DuPont
Rice Blast
Fungicides
(license)**

EEA

Innovation
Competition

**DuPont
pipeline
Herbicides**

**DuPont
pipeline
Insecticides**

**DuPont
pipeline
Fungicides**

**DuPont
R&D organisation
(Reverse Carve-out)**

Importance of cooperation

Dow/DuPont



- Exchange of insights into markets
- Comparison of approaches
- Work on timing of the review process
- Early cooperation on remedy issues
- Discussions on potential buyers

