Post Harvest Storage Opportunities and Regulatory Issues

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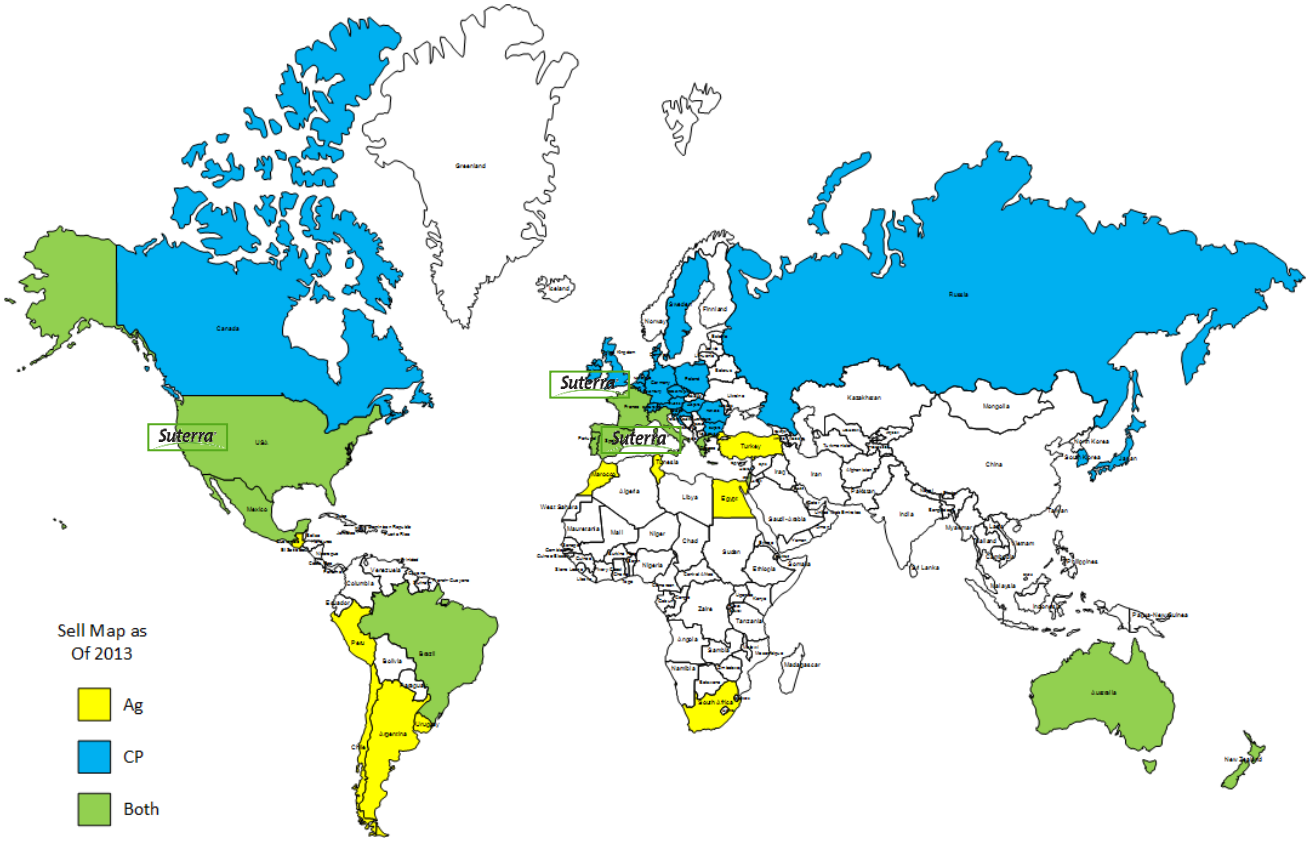
Who is Suterra?

Suterra is a world-leading provider of pheromone-based insect control products, offering organic, eco-friendly, and cost-effective solutions based on Semiochemicals for crop protection and commercial pest control.

www.suterra.com

Suterra Serves a Global Marketplace

- 160+ registrations for products and active ingredients
- Products sold on 5 continents in over 40 countries
- 3 locations worldwide
  - Bend OR, USA: Global head office, pheromone synthesis, manufacturing, R&D
  - Cardiff, Wales: Head office for global commercial pest sales, manufacturing, R&D
  - Barcelona, Spain: Head office for Ag sales in EU, Southern Hemisphere, R&D



Suterra's Product Lines & Markets

Suterra makes products for end use by three different types of customers:

- **Agriculture**
- **Pest Control Operators**
- **Retail**

Bio-rational Approach

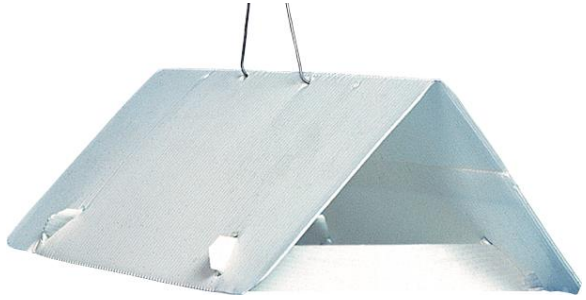
Market Sector	Mating Disruption			Attract & Kill	Monitoring
	CheckMate	Flowables	Puffers	Magnet	
Agriculture					
PCO					
Consumer					

Markets Beyond Agriculture

- From Xenex Associates: the Beyond Agriculture market was worth about $3.9 billion in Europe in 2012
- $500 million (about 13% of the above) is in the Pest Control and Public Health sectors where post harvest opportunities lie.
- In the Post Harvest Sector insect pests are a significant problem world-wide
- Semiochemicals have an important role to play in strategies used to management them
- Their use in Monitoring of both beetle and moth pests in storage has become very well established
- Their use in Control of stored product insects is still in its infancy

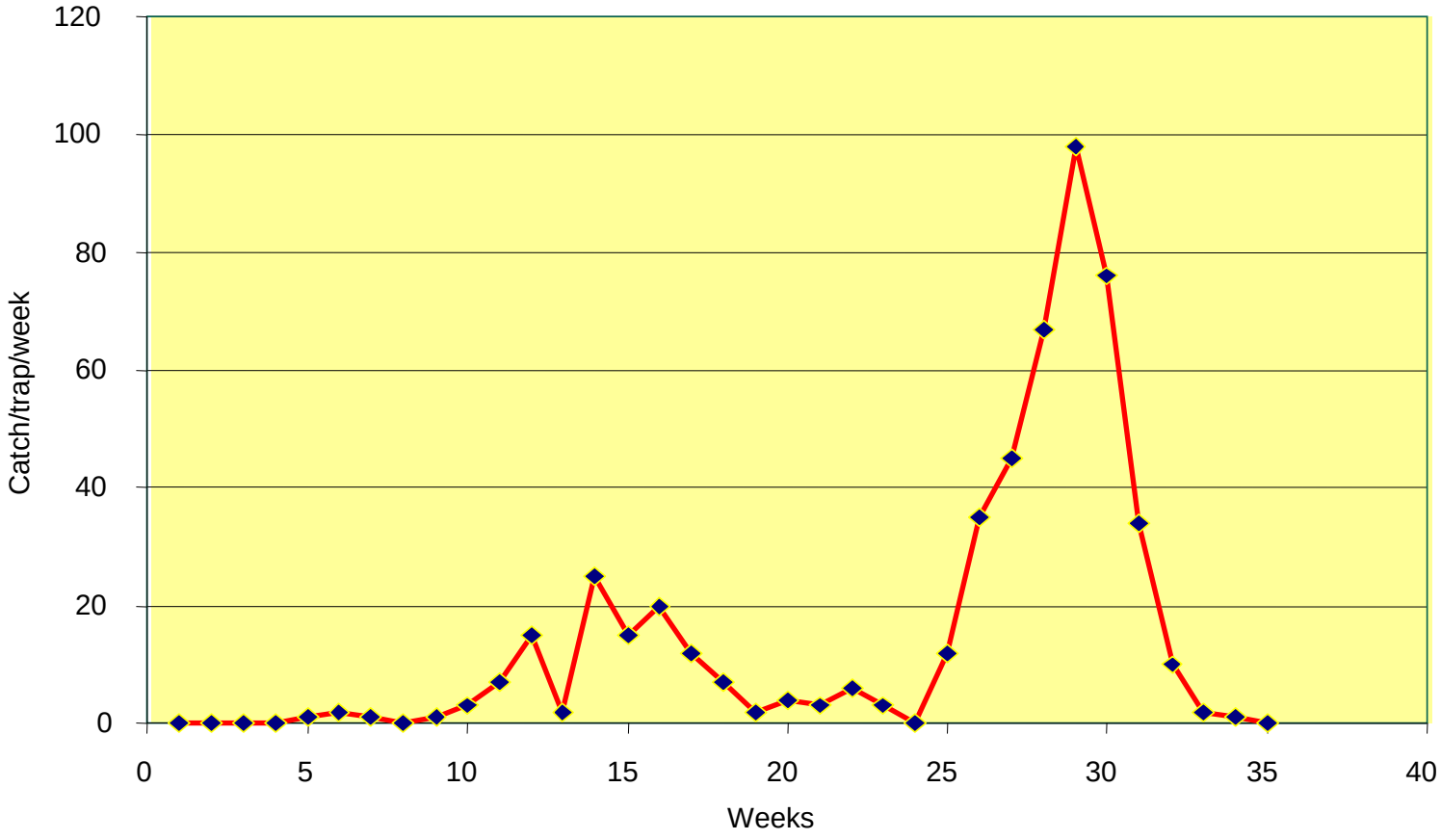
Stored Product Moth Monitoring with Pheromones

1. Use larger traps for main detection

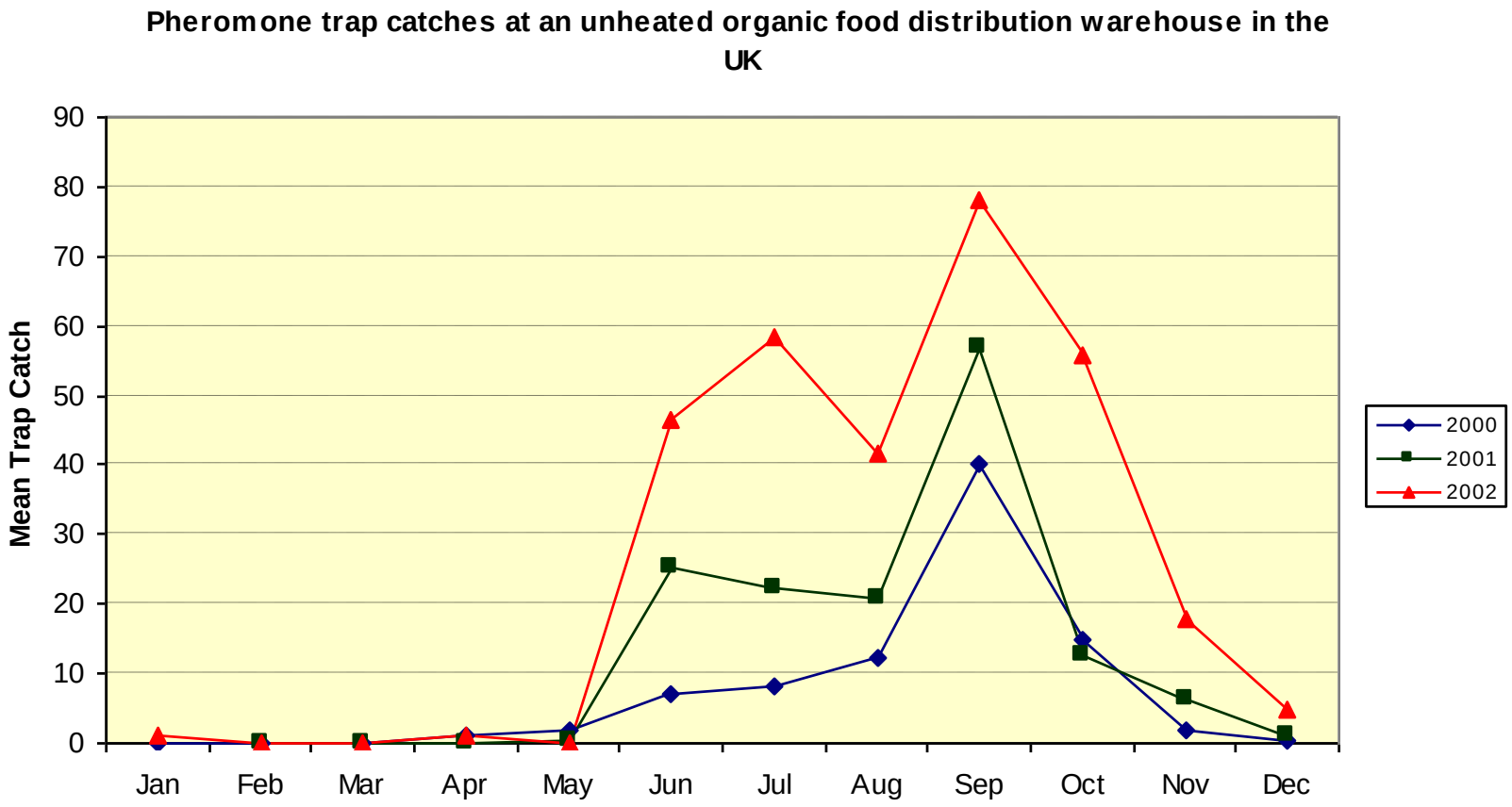


2. Combine with smaller Locator to Pin Point infestation

Example of moth population changes in a food production area



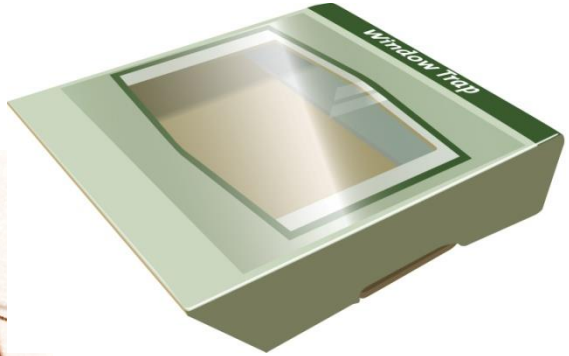
Example of moth population changes over 3 years



Post harvest Beetle pest monitoring

- Beetle pests in stored grains
  - *Sitophilus, Cryptolestes, Rhysopertha*, etc

- Beetle pests in flour
  - *Tribolium* spp



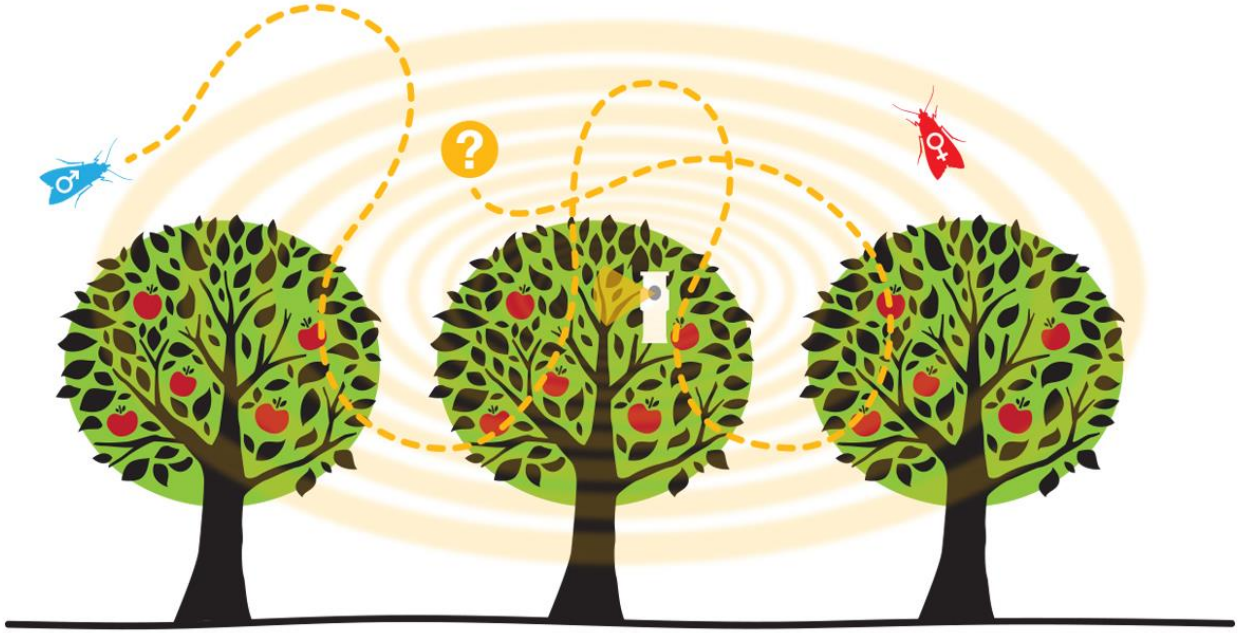
- Beetle pests in Tobacco
  - *Lasioderma serricorne*

Semiochemicals used for post harvest pest Control

- This field is still in its infancy
- Good progress has been made with Stored Product Moths
- Mating disruption has proved very promising

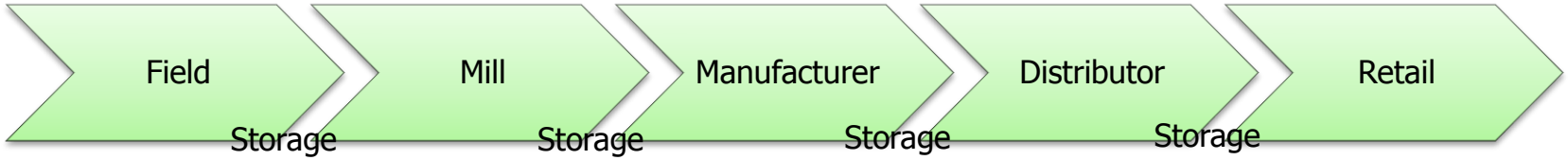
Mating Disruption – is well-proven in the agricultural sector

- Female insects release pheromones to attract males. Once mated, the females lay eggs, and the hatching larvae cause damage to crops.
- Mating disruption products release pheromones to interfere with the ability of male insects to locate females of the same species, thereby disrupting mating and controlling the damage to crops inflicted by the hatching larvae
- The reduced ability of male pests to find and mate with a female, finally results in reduced offspring and reduced pest populations

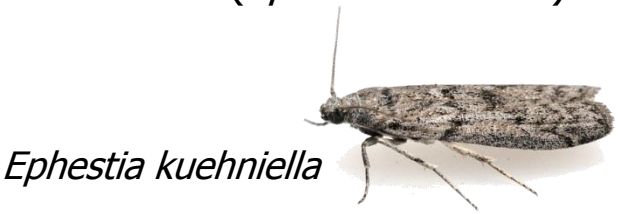


CheckMate® SPM – Characteristics

- CheckMate SPM has been specifically designed for mating disruption of Stored Product Moths (Ephestia and Plodia spp.) in warehouses and food processing facilities, more broadly wherever storage pests are an issue along the food supply chain.



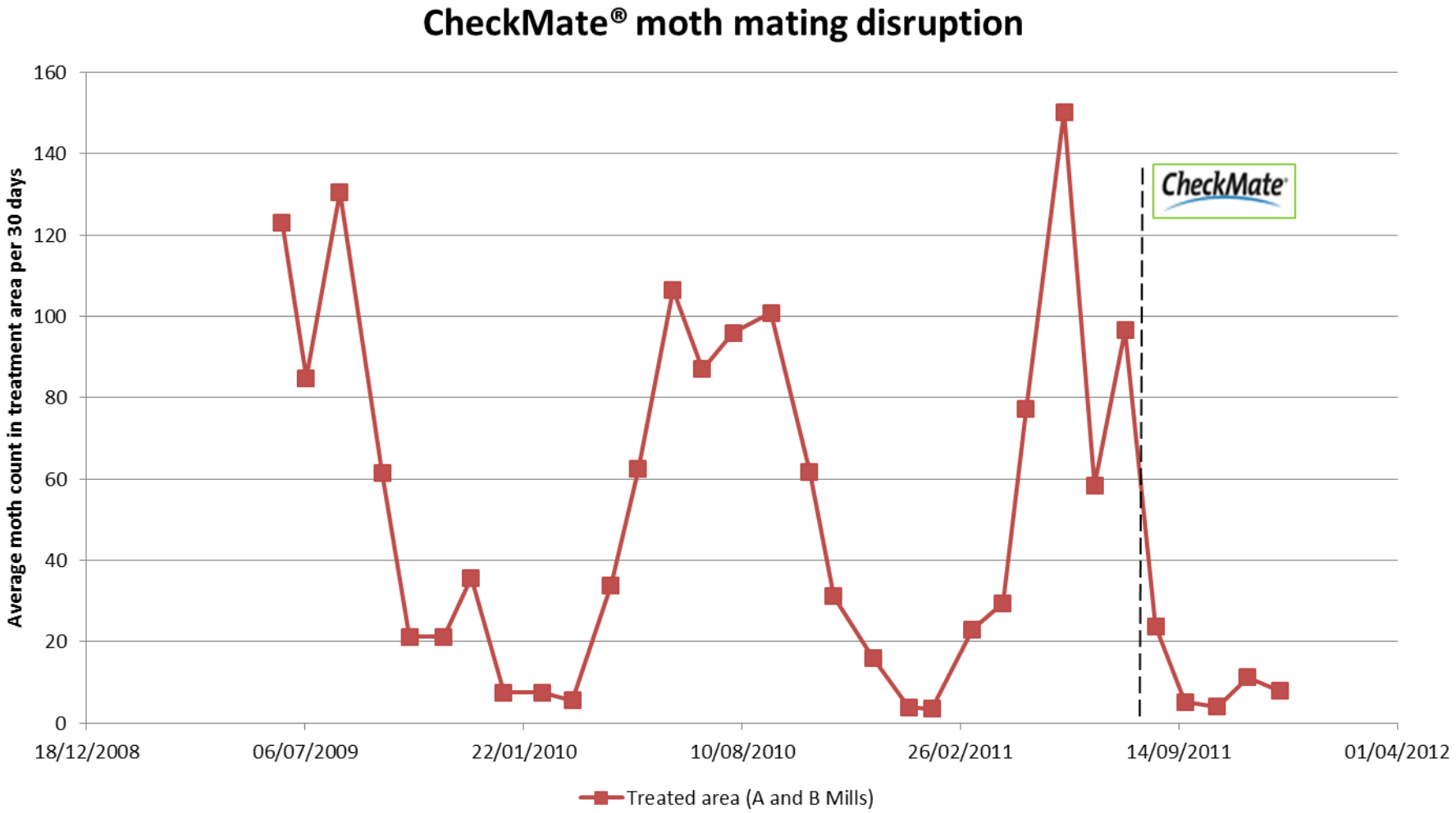
- It is a membrane dispenser emitting the synthetic replica of the straight chain natural pheromone shared by the Indian Meal Moth (*Plodia interpunctella*), Mediterranean Flour Moth (*Ephestia kuehniella*), Raisin Moth (*Cadra figulilella*), Almond Moth (*Cadra cautella*) and Tobacco Moth (*Ephestia elutella*).


Ephestia kuehniella


Plodia interpunctella

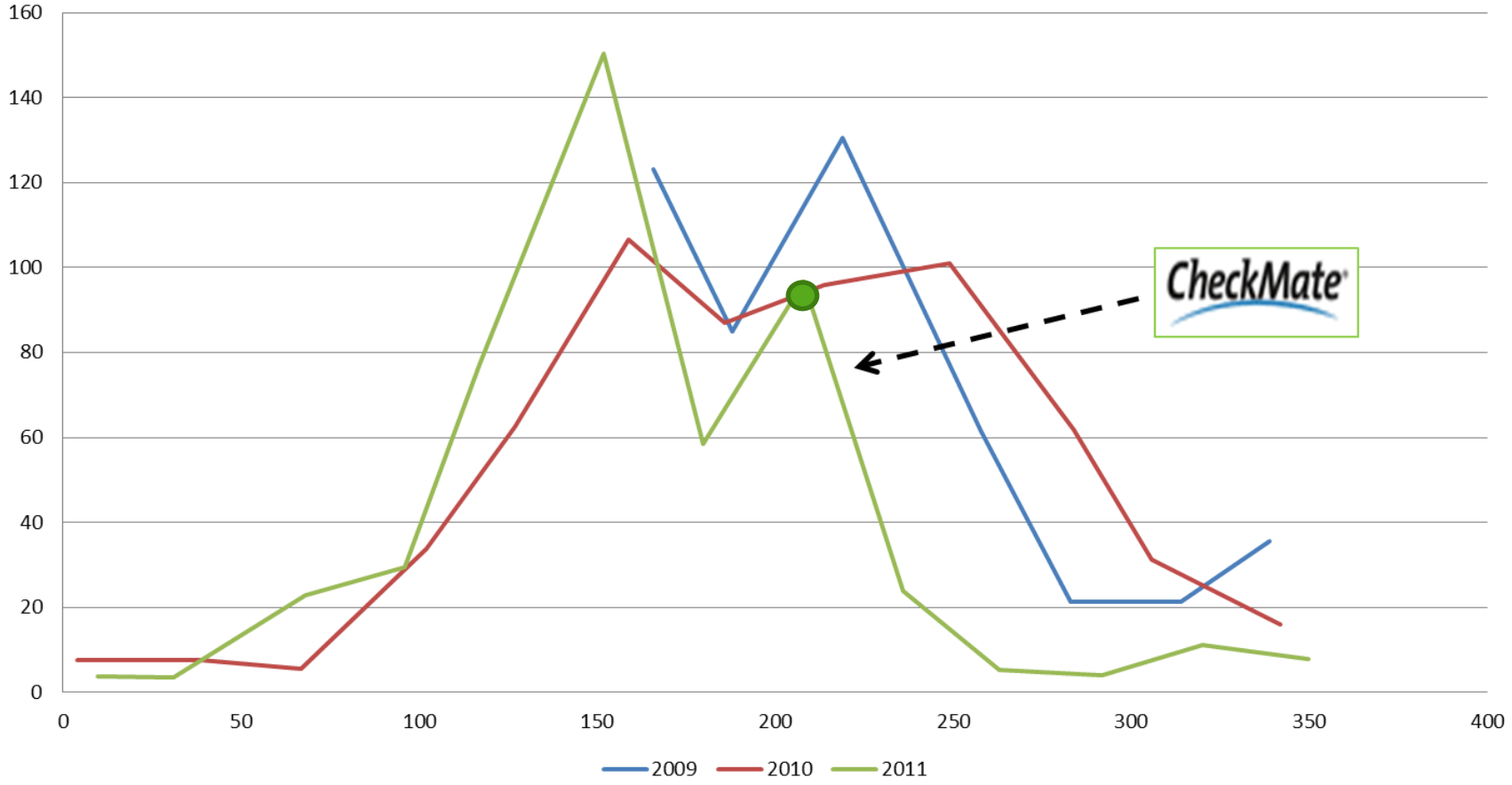
- The recommended application rate is one unit/9 m^2 positioned in a 'grid' style formation, providing 90 days of months control.
- The product is suitable for use in the food industry.

Historical Trap Catch Data Show Typical Moth Cycles



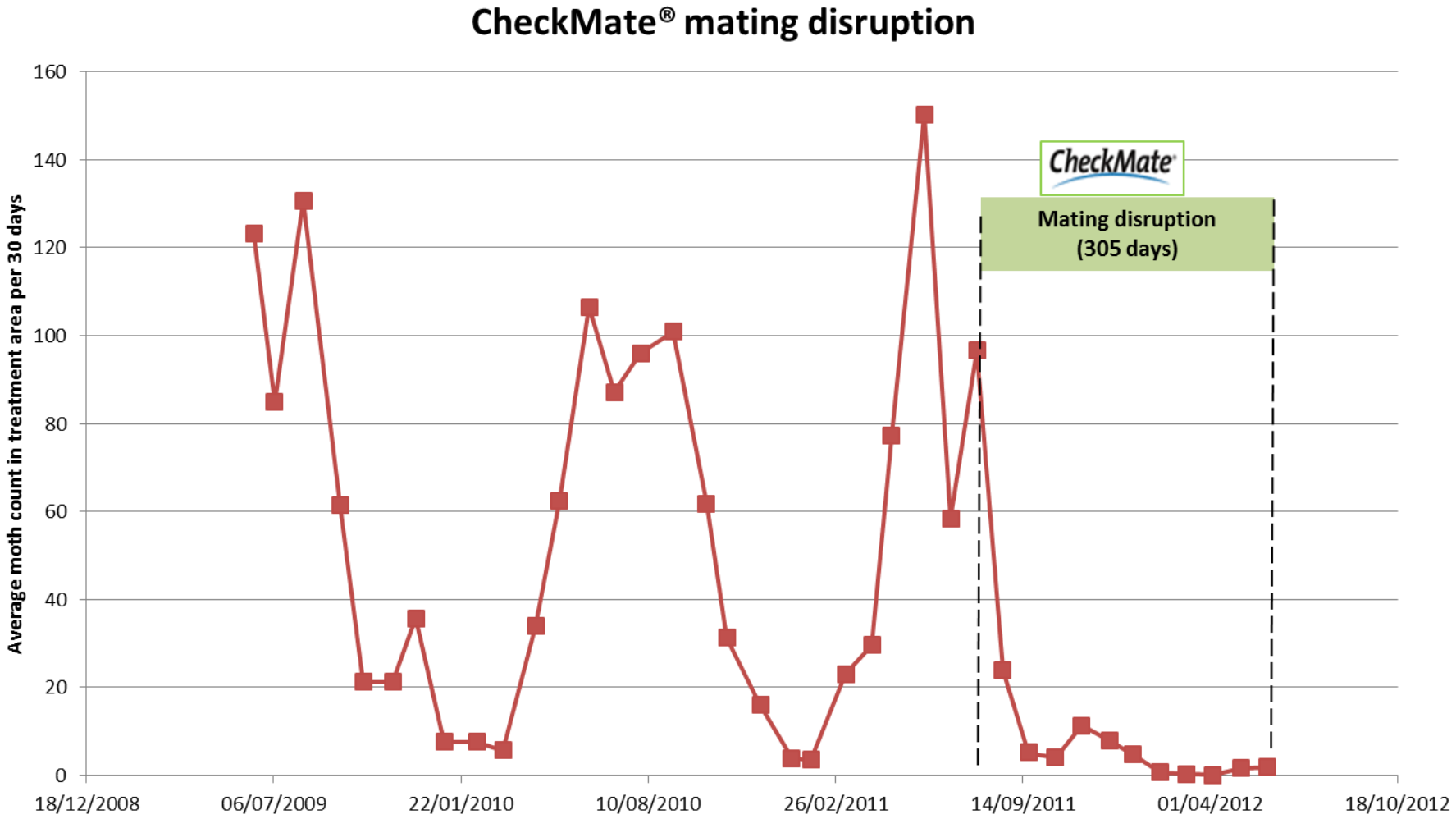
As Expected When Checkmate was applied trap catches dropped, which looks great on a chart but that is not the entire story…

Comparing Annual Trend Lines, it is Clear that Checkmate® Dispensers started disrupting as soon as they were deployed



However, how do we know if the population was actually going down or the technology was simply 'hiding the traps'?

Mating Disruption was Deployed for Over 300 Days



To really know if it was in fact reducing/suppressing the population, we needed to remove the disruption technology

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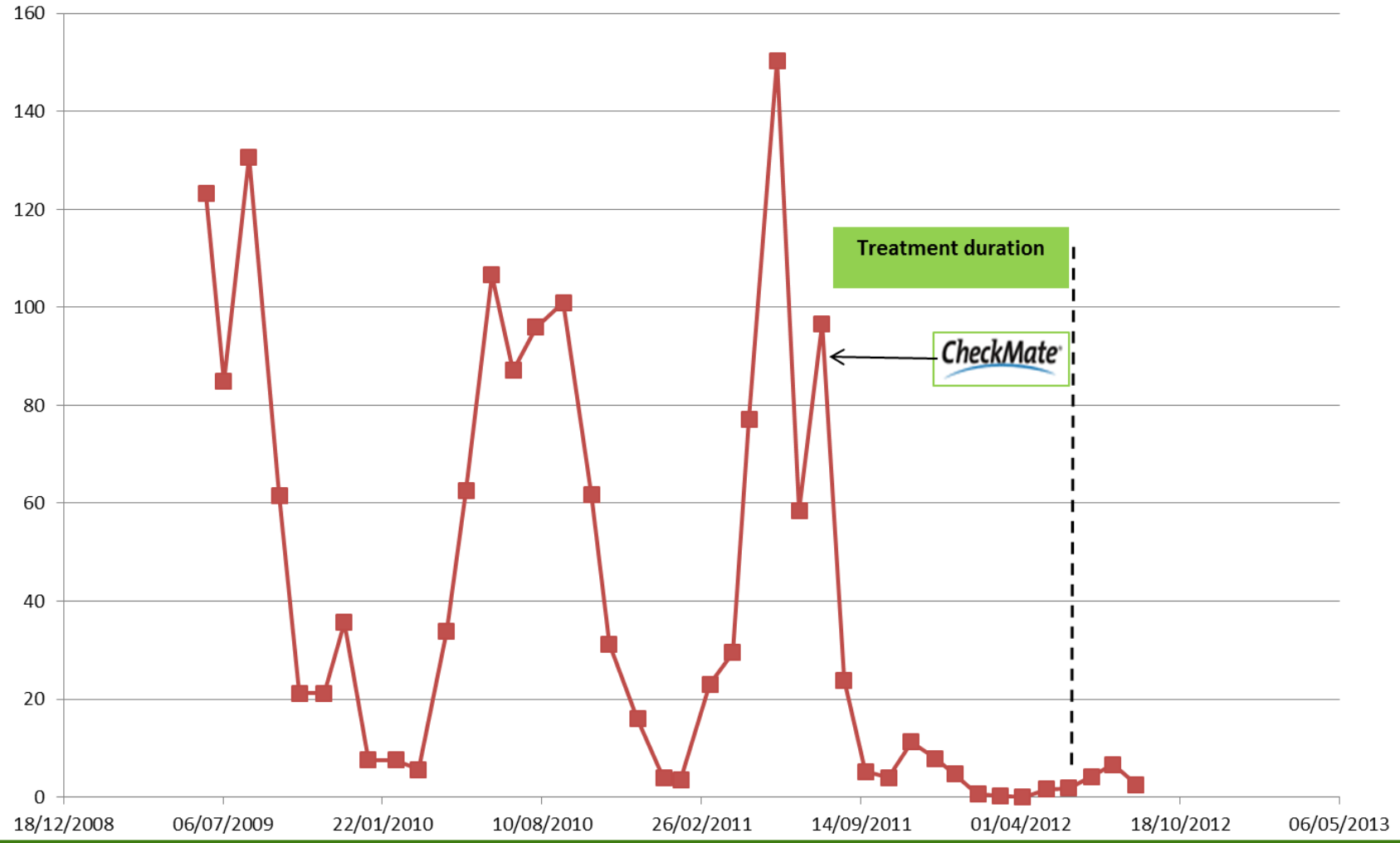
When Checkmate® was removed, trap catches stayed extremely low proving the population was suppressed



If the technology had simply been masking the traps, catches would have shot back up to historical norms once removed. This did not occur.

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CheckMate® SPM Dispenser Experimental Trial Summary

Overall trial conclusion

- Demonstrated within an audited process that 'funnel trap shutdown' correlates to moth suppression.
- Highly effective suppression of the moth population.
- Able to suppress moth populations around areas that are inaccessible to routine housekeeping efforts

Benefits

- Food defect action level: FDA Insect filth (AOAC 965.38)
  - Average is 60 or more insect fragments per 100 grams when six 100-gram subsamples are examined OR Any 1 subsample contains 90 or more insect fragments
- Overall reduction in the use of insecticide treatments.
- One of the 'green tools' in the IPM toolbox.

- The product is currently registered in the US (US EPA registration no. 56336-54).

Registration in USA

- According to Section 3 of FIFRA (Federal Insecticide, Fungicide and Rodenticide Act) *'the term "pesticide" means (1) any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any pest' .*
- There is no specification or distinction on the type of commodity that is protected, this unique piece of legislation covers all uses of pesticides.
- When registering an SCLP-based pesticide in the US, the data requirements for the registration of SCLP-based products (when applied up to a maximum of 370 g a.i./ha/year) are limited to the full package of the chemistry data.
- Efficacy data have to be generated but might not be required.
- The costs are low (ca. $1200 for federal registration) and the timeline reasonable (ca. 6 months for federal registration).

Registration in the EU

- According to Art. 2 and 3 (Scope and Definitions) of Reg. CE 1107/2009, the Plant Protection Product Regulation *'shall apply to products, in the form in which they are supplied to the user, consisting of or containing active substances, safeners or synergists, and intended for one of the following uses: (a) protecting plants or plant products against all harmful organisms or preventing the action of such organisms …'* where *"'plant products' means products of plant origin in an unprocessed state or having undergone only simple preparation, such as milling, drying or pressing, but excluding plants'*.
- If it has been processed it comes under the Biocidal Product Regulation CE 528/2012
  - It's the same pest, controlled by the same product often in the same building!
- The question is: what is exactly intended with the term simple preparation? Could the use of a MD product in a facility that has raw unprocessed materials coming in and finished packed goods going out be entirely covered by a product registration as a PPP?
- Where is the harmonisation and mutual recognition between regulations?

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Thank you for your attention

Any questions?