



Meeting customer needs with delivery systems

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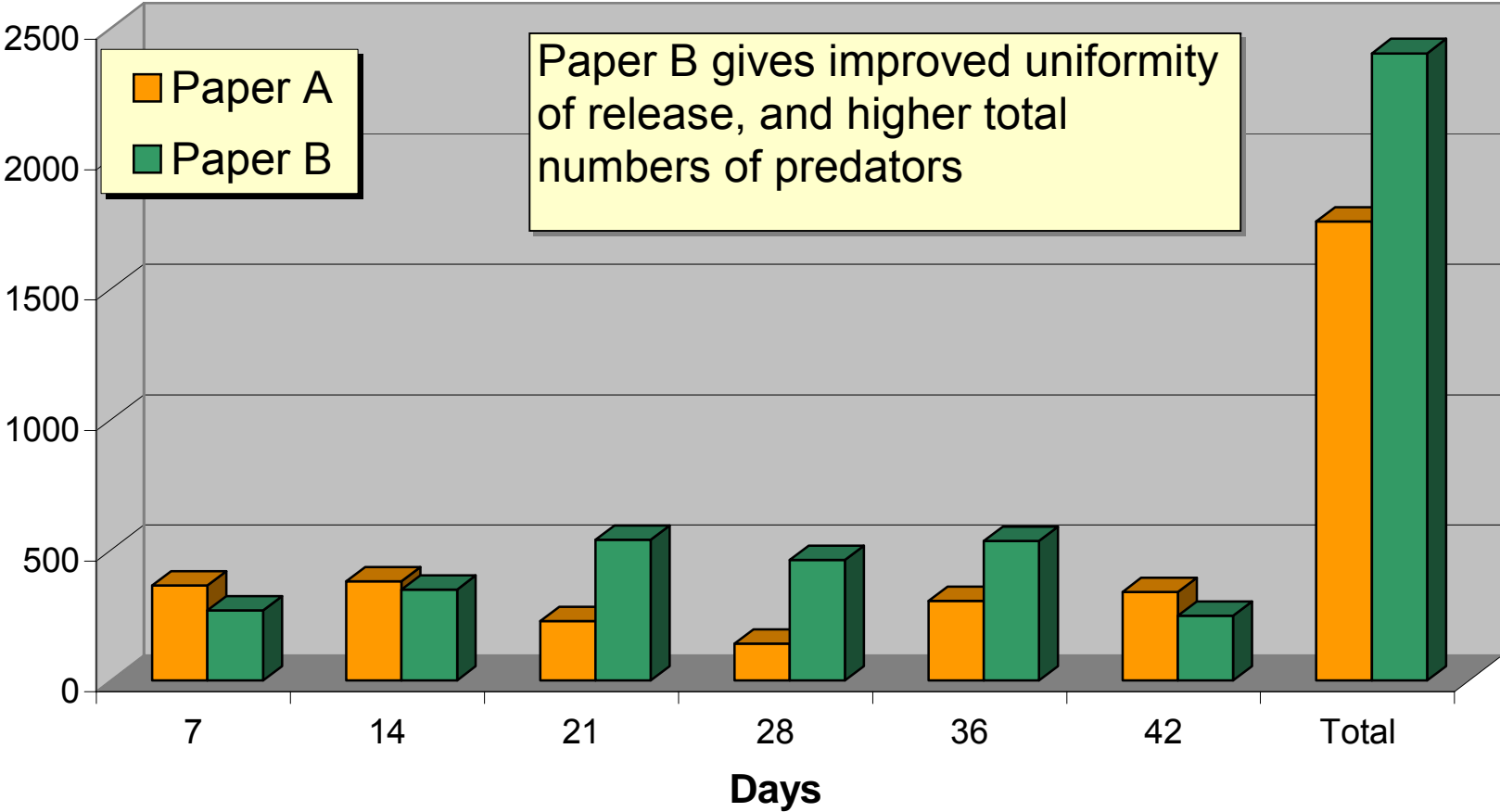
Development of a Biological control product Amblyline cu CRS



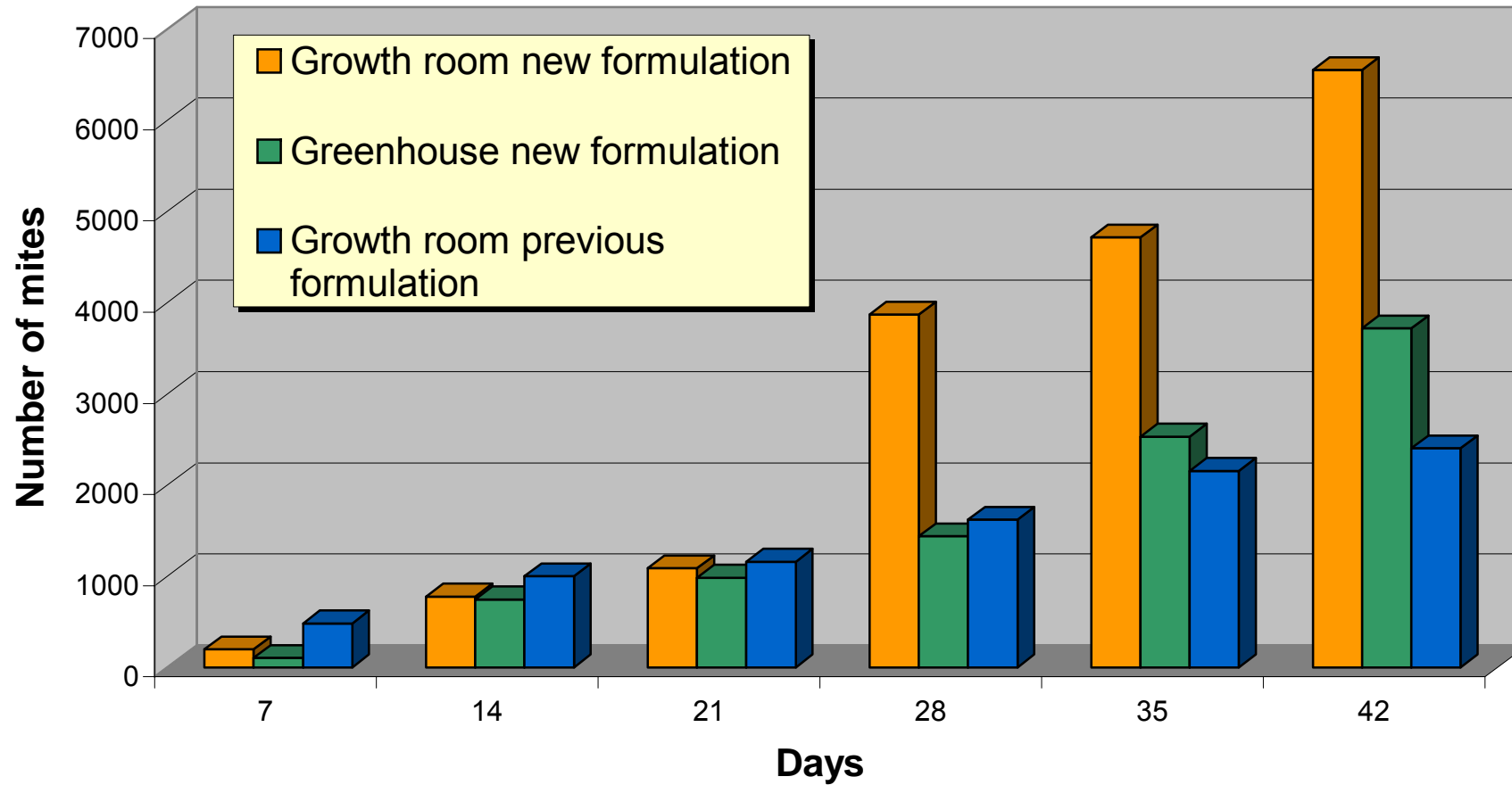
- 1990 - Development and introduction of 'CRS' sachet by Bunting Biological Control
 - Unique product giving continuous release of mites over 6 weeks - predator does not need to establish
 - Competitor copies within 6 months - no IP
 - No market recognition of the difference between products: "It's all *Amblyseius cucumeris*"



Emergence of *Amblyseius cucumeris* from sachets at 70% humidity



Impact of formulation and environment on emergence of *A. cucumeris* from sachets







Sachets in chrysanthemum crops



Hook flexes and collapses when wet or detaches from sachet



Sachet falls to ground after 2-3 weeks

Sachets fill with water through emergence hole

Water seeps in through edge seals when sachets are wet

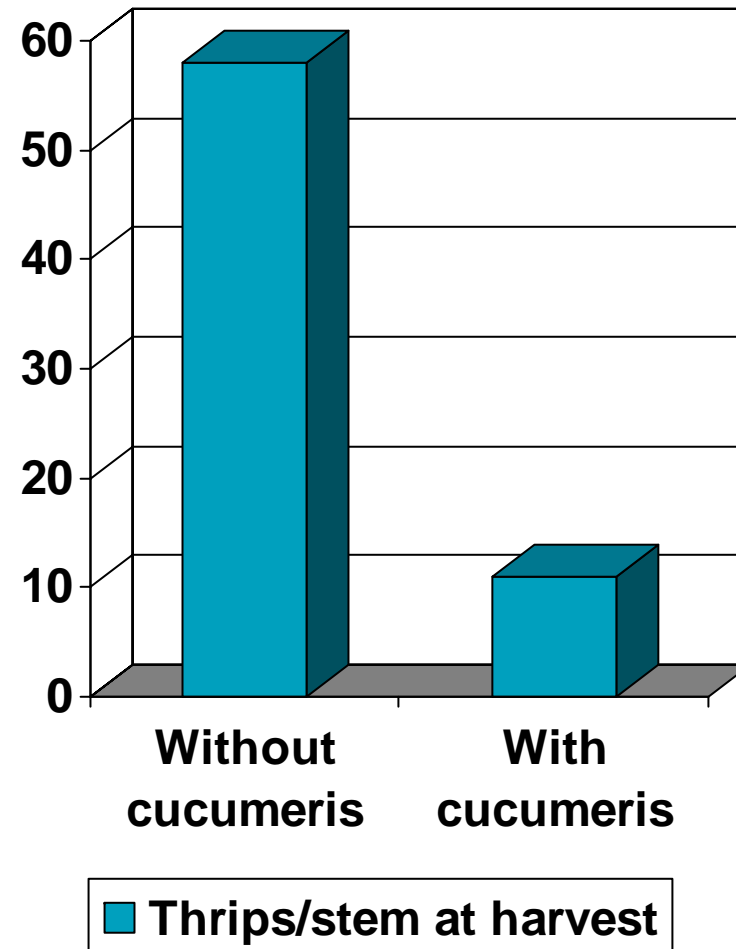
Contents get wet and decay



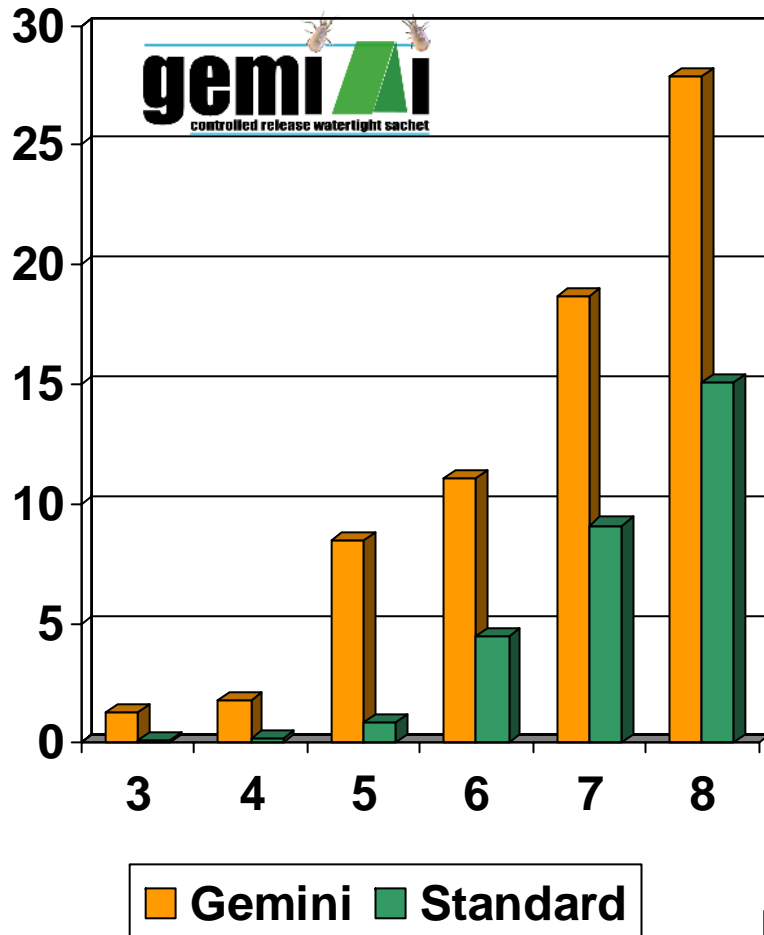
Thrips per stem on chrysanthemums – trials at WUR Horticulture



- Trials by Ellen Beerling at WUR
- Standard Syngenta CRS sachets
- 8 *Amblyseius cucumeris* recovered per stem
- 80% reduction in thrips numbers!



Mites per plant – Gemini sachets



- ✓ More predatory mites, better thrips control
- ✓ Introduction needs 20 hours/hectare

Patented delivery system



Grower reaction?

- Not really impressed
- Too much labour needed for distribution of the product
 - Labour costs are 50% of the total production costs of chrysanthemums
 - Pest control (total) is 2-3% maximum.

An alternative system

Bugline
CU

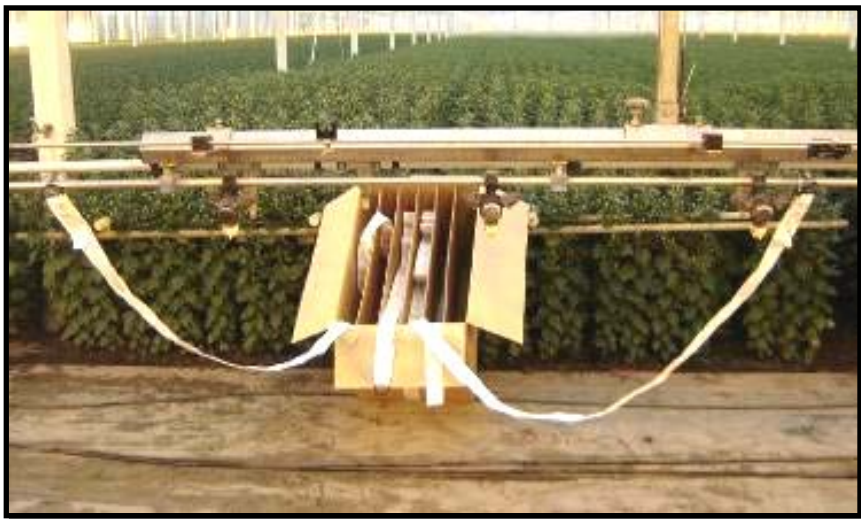


- ✓ 80% reduction in labour
- ✓ Better distribution of the predatory mites
- ✓ No trauma to the mites
- ✓ Water resistant
- ✓ Per crop cycle produces
 - ✓ 8,500 mites/m
 - ✓ 5,000 mites/m²

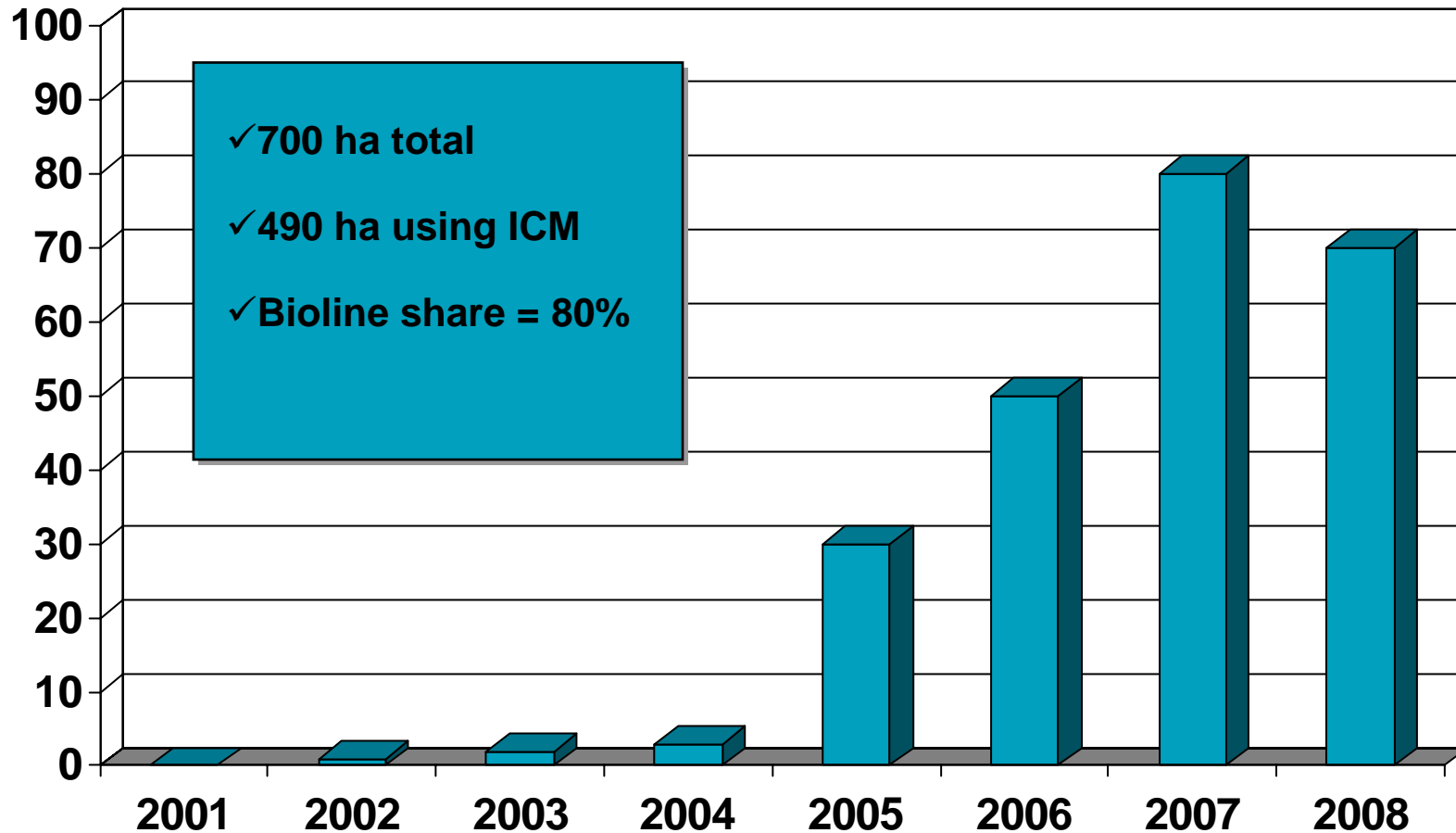


Design is protected by our existing patent!

Introducing Bugline to the crop



Percentage ICM in Dutch chrysanthemums



Summary



- It is possible to take a relatively poor biological control agent and turn it into a good product by appropriate formulation
- Development of good delivery systems is critical to product performance
- Appropriate delivery systems are essential for grower acceptance and use of a product



Thanks for your attention