Control of codling moth and oriental fruit moth with MADEX® TWIN

a recently selected CpGV isolate

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ABIM 2011




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CpGV, *Cydia pomonella* Granulovirus

- First isolated in Mexico in 1964
  → CpGV Mexican isolate
- Kills the larvae by ingestion
- > 100.000 ha sprayed every year in Europe
- Excellent population control
- No negative effects on non-target organisms

- Narrow host-range

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Oriental fruit moth (OFM) a major pest in stone and pome fruit

- A key pest in commercial stone fruit
- Frequent migration to pome fruit orchards
- Ability to complete the life cycle on secondary hosts such as apple and pear in some regions

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Overview

- Selection of a new isolate in the laboratory
- Testing and validation of Madex Twin: Field trial examples
- Average performance of the product in two field trial seasons
- Application strategies
- Conclusions

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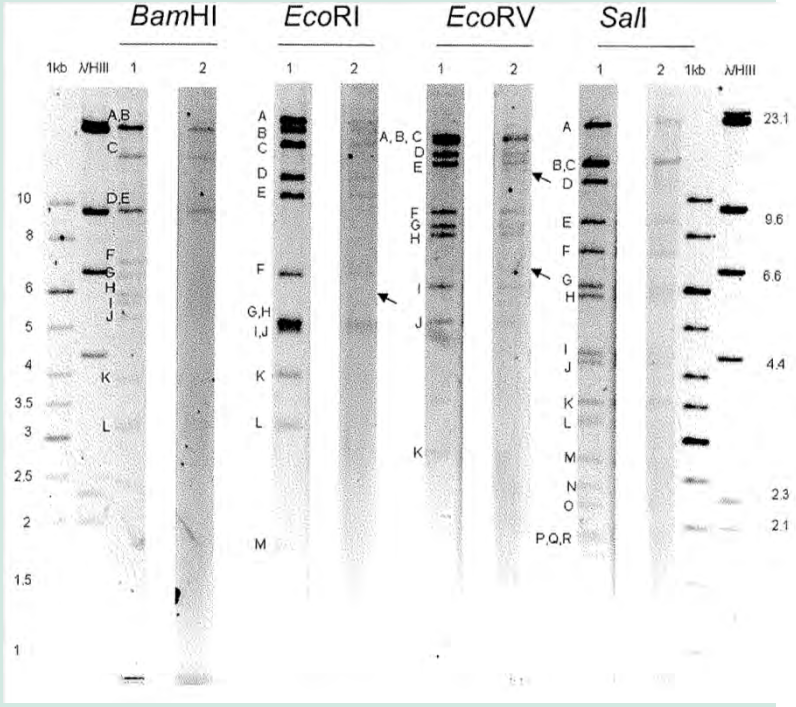
Development of a new CpGV isolate effective against OFM and CM

- **Selection on *Grapholita molesta* using a confidential, internal selection process**
- **REN profile of ABC V22 is similar to CpGV-M with additional faint submolar bands**
- **ABC V22 is a CpGV-M like genome type and a second genome type is visible in some parts of the sequence**
- **Patent for ABC-V22 is submitted**



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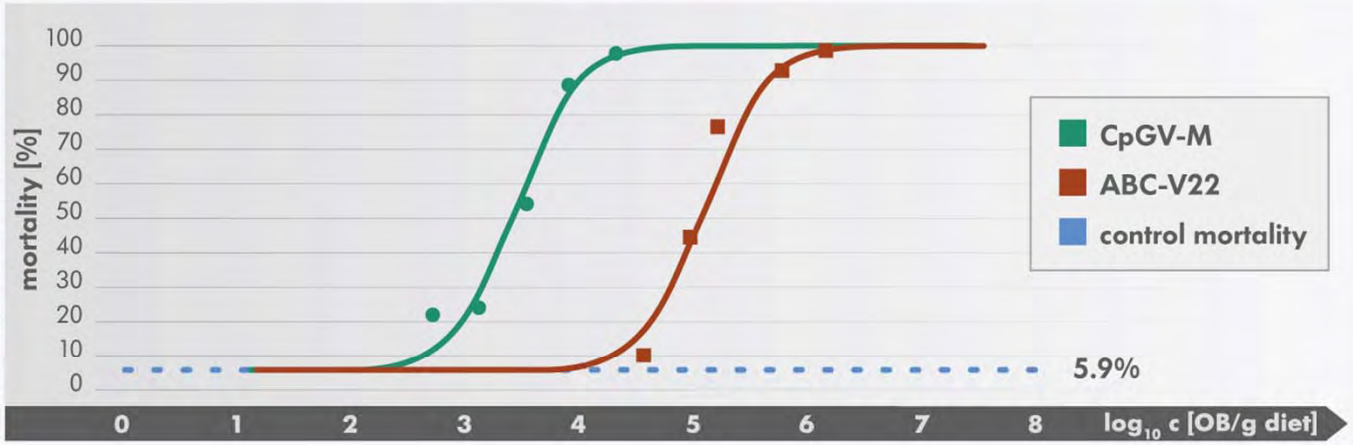
Bioassay on *Grapholita molesta*



	LC 50 [OB/g_{diet}]	95% lower limit	95% upper limit	relative potency	95% lower limit	95% upper limit
CpGV-M	130 190	81 686	199 530	1	0.7	1.5
ABC-V22	2 892	1 799	4 444	45	29.5	69.1

Laboratory bioassay, Andermatt Biocontrol

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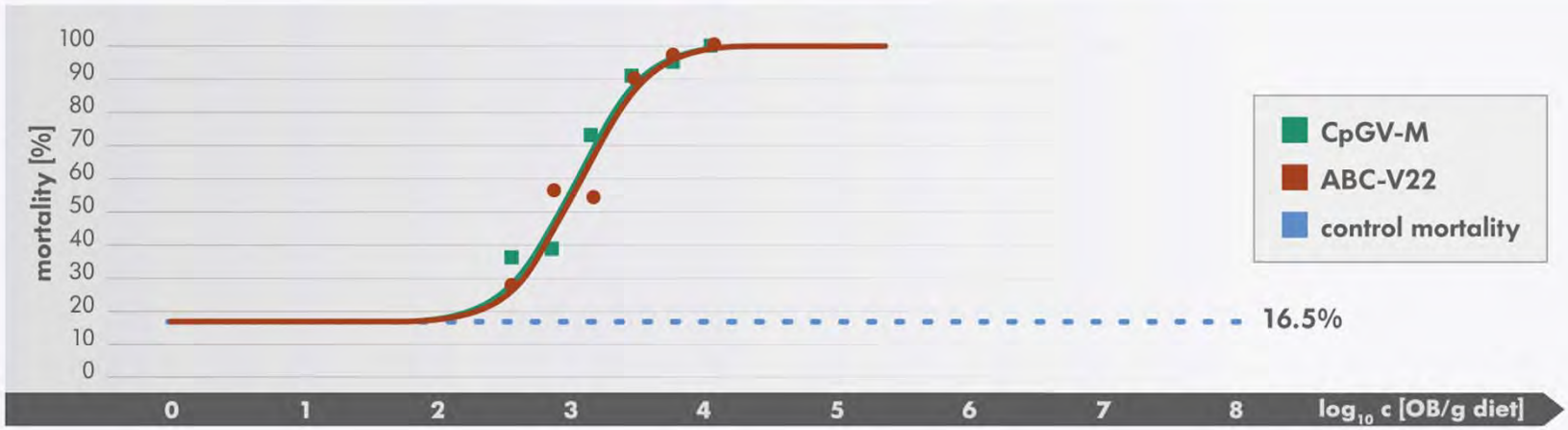
Bioassay on *Cydia pomonella*



	LC 50 [OB/g_{diet}]	95% lower limit	95% upper limit	relative potency	95% lower limit	95% upper limit
CpGV-M	1 058	824	1 322	1	0.73	1.37
ABC-V22	1 107	863	1 382	0.96	0.7	1.31

Laboratory bioassay, Andermatt Biocontrol

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Product testing and validation of MADEX® TWIN

Field trial examples from 2010/ 2011





✓			
✓	✓	✓	✓

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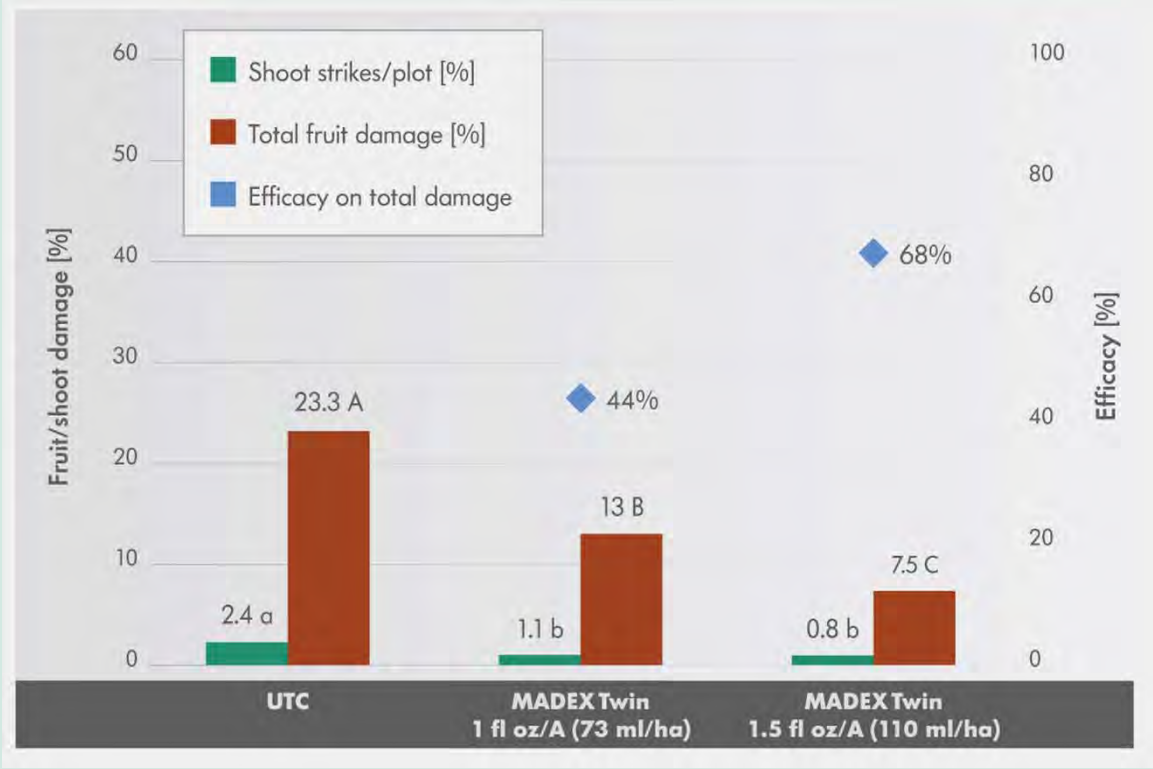
Product testing and validation:
OFM on peach in California, USA 2011



- **2 treatments per generation during 2 generations**
- **fruit assessment before harvest**

Certis USA, 2011

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Product testing and validation:
Field trial examples OFM on peach

No.	Treatment	Applied rate	Application timing				
			11/5	20/5	28/5	15/7	26/7
1	Madex Twin	50 ml/ha	✔	✔	✔	✔	✔
2	Madex Twin	100 ml/ha	✔	✔	✔	✔	✔
3	Madex Twin	200 ml/ha	✔	✔	✔	✔	✔
4	Calypso 480 SC (Thiacloprid)	0.25 l/ha	✔	✔	✔	✔	✔
5	Untreated control						

- **Randomized complete block design, 4 replicates/ treatment**
- **Assessment of damage:**
  - on 100 shoots/plot after 1st OFM generation
  - on 200 fruits/plot before harvest (stopped vs. active damage)

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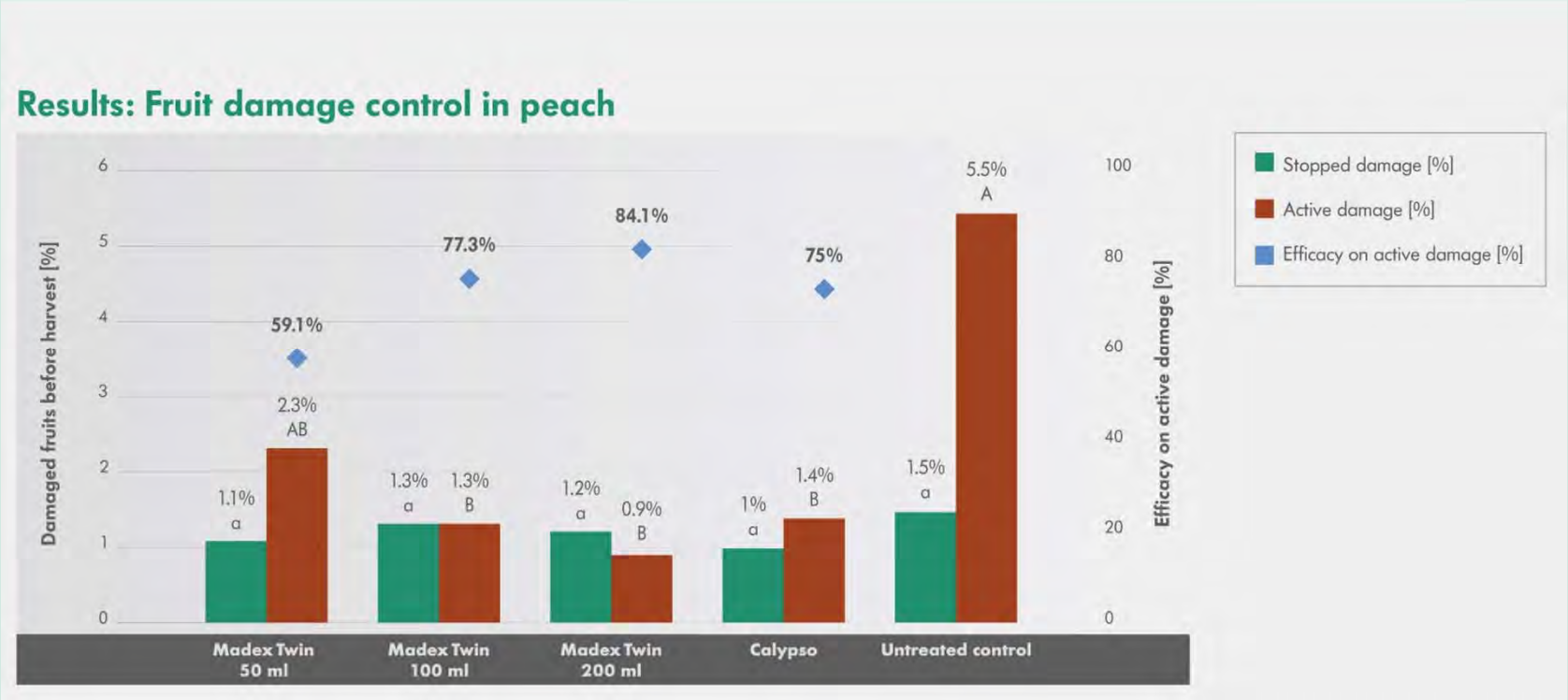
Product testing and validation: Field trial examples OFM on peach



Biocont, Slovakia, 2010

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Product testing and validation: Field trial examples OFM on nectarine

No.	Treatment	Applied rate	Application timing				
			9/6 100% eggs	14/6 Majority egs	17/6 90% eggs, 10% larvae	22/6 70% eggs, 30% larvae	29/6 40% eggs, 60% larcae
1	Madex Twin	100 ml/ha		B		D	E
2	Bt kurstaki	1 kg/ha		B		D	E
3	Prodigy (Methoxyf.) Calypso (Thiacloprid) Trebon Star (Etofenprox)	50 ml/hl 25 ml/hl 700 ml/hl	A		C		E
4	Untreated control						

- **Randomized block design, 5 replicates/treatment**
- **Assessment of damaged fruits at harvest. Exclusion of damage from 1st generation**

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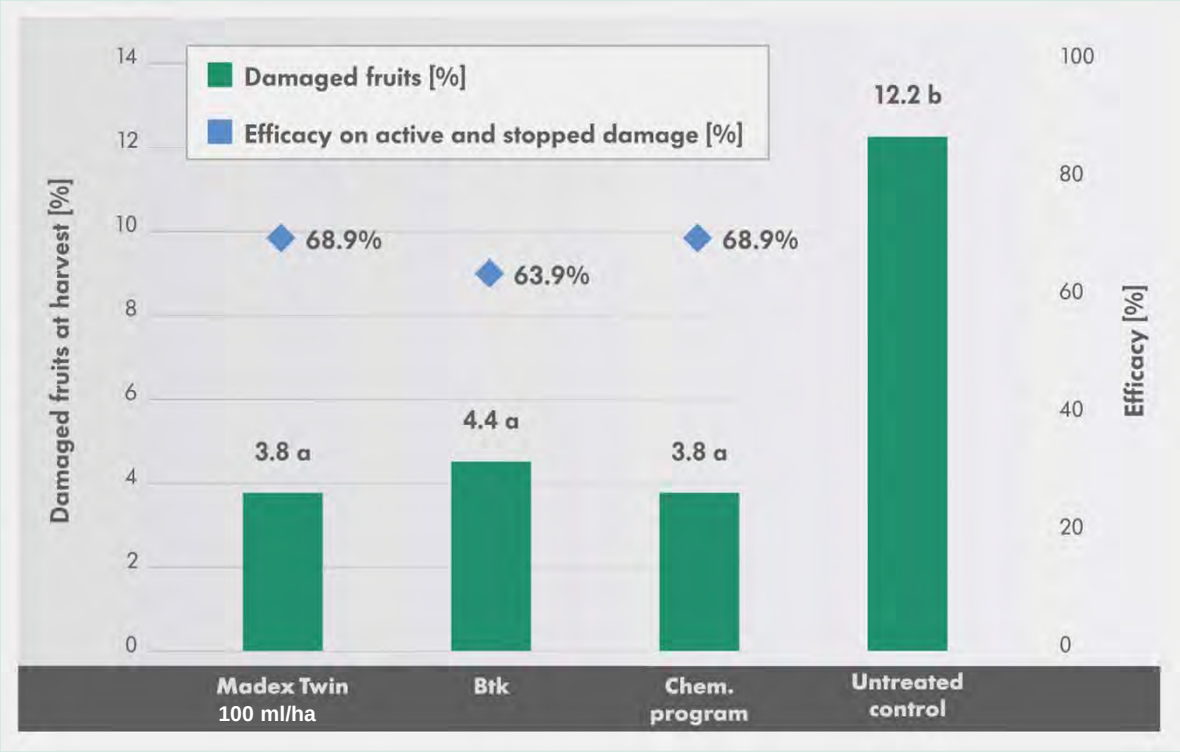
Product testing and validation: OFM on nectarine, Italy 2010



- Assessment of damaged fruits at harvest
- Exclusion of damage from 1st generation
- 3 treatments from G2 to harvest
- Chem. treatment: Thiacloprid, Methoxyfenozide, Etofenprox

Intrachem Bio Italia, 2010

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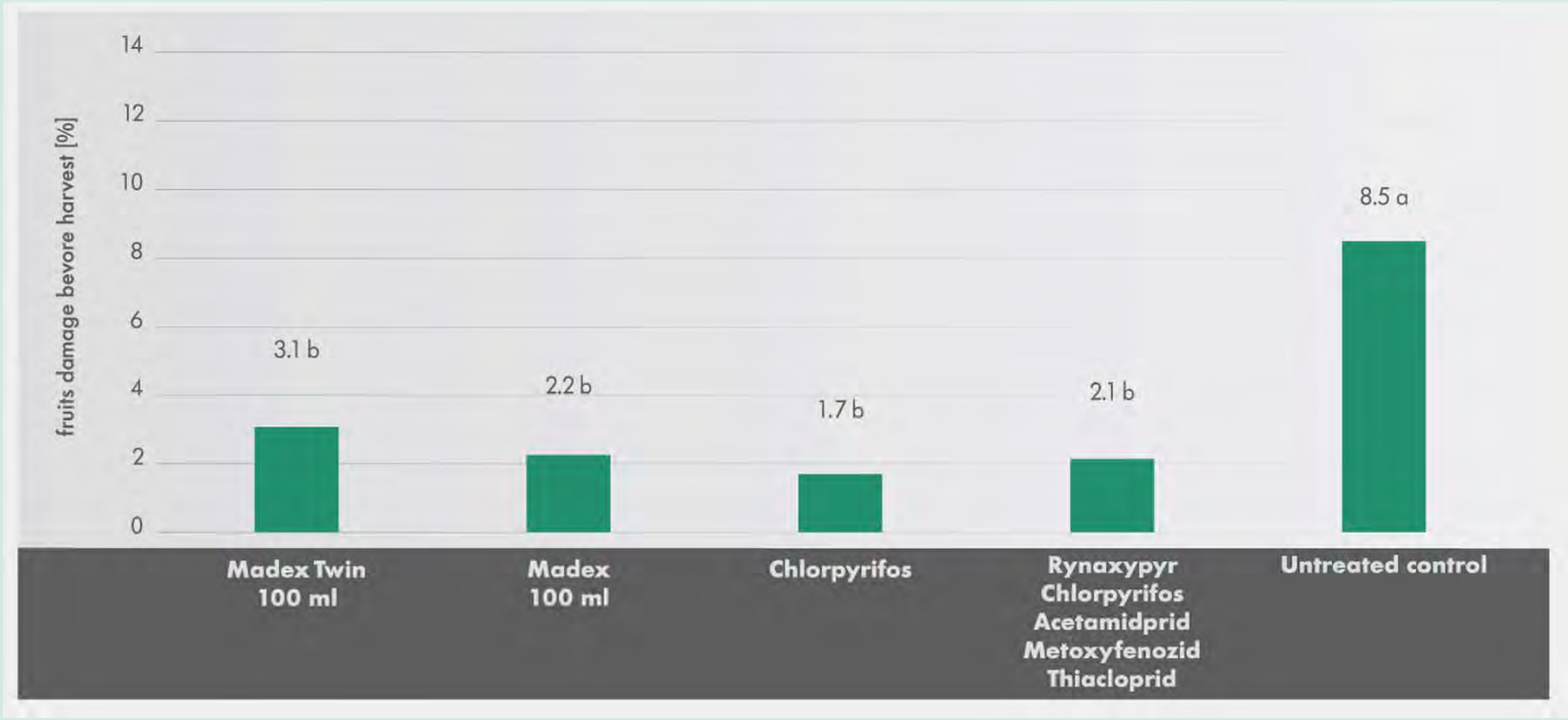

Legende???

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Product testing and validation: Field trial examples CM on apple

No.	Treatment	Applied rate	Application timing					
			4/6	15/6	28/6	5/7	12/7	22/7
1	Madex Twin	100 ml/ha	✔	✔	✔	✔	✔	✔
2	Madex Top	100 ml/ha	✔	✔	✔	✔	✔	✔
3	Madex	100 ml/ha	✔	✔	✔	✔	✔	✔
4	Untreated control							

- **Randomized block design, 4 replications**
- **Assessment of damage:**
  - After G1 on 4.8.2010 active and stopped damage on 200 fruits/plot

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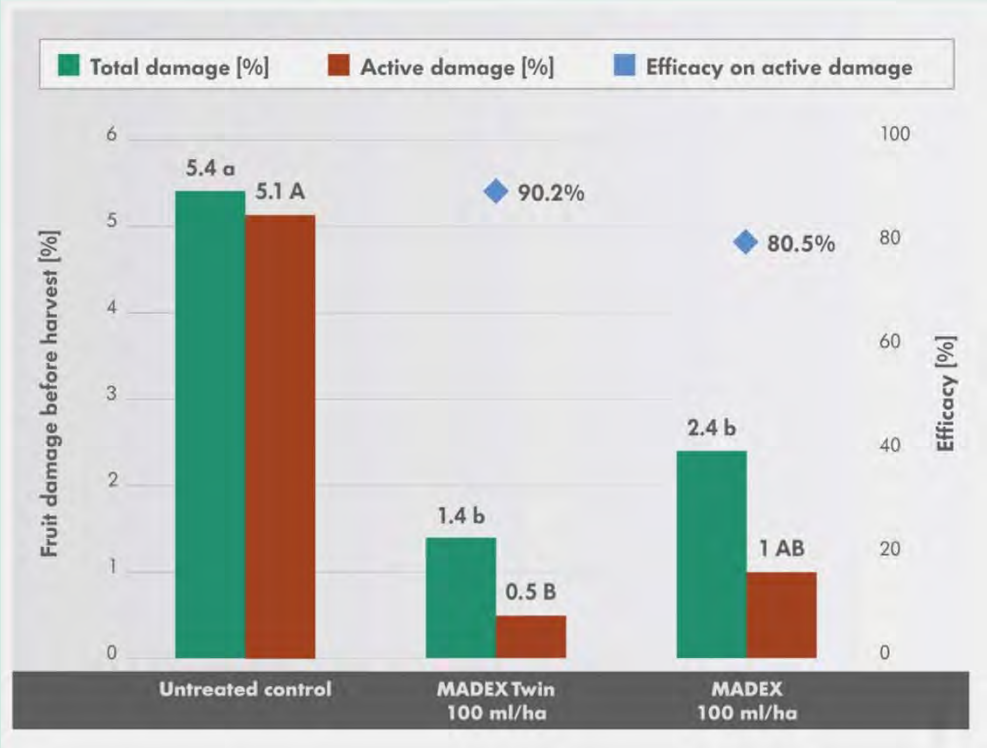
Product testing and validation:
Field trial examples CM on apple, Switzerland 2010



- **assessment of damaged fruits at harvest**
- **6 treatments from G1 to harvest**

Andermatt Biocontrol, 2011

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Product testing and validation
Field trials with MADEX TWIN in 2010/2011

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Product testing and validation
Average efficacy level of Madex Twin, at 100ml/ ha

	Apple CM	Apple OFM	Peach OFM	Nectarine OFM
Average shoot strike reduction	–	–	56% (n=8)	60% (n=2)
Average reduction of fruit damage (stopped and deep damage)	66% (n=5)	76% (n=2)	65% (n=9)	67% (n=3)
Average reduction of deep damage	86% (n=7)	n.d.	85% (n=1)	n.d.




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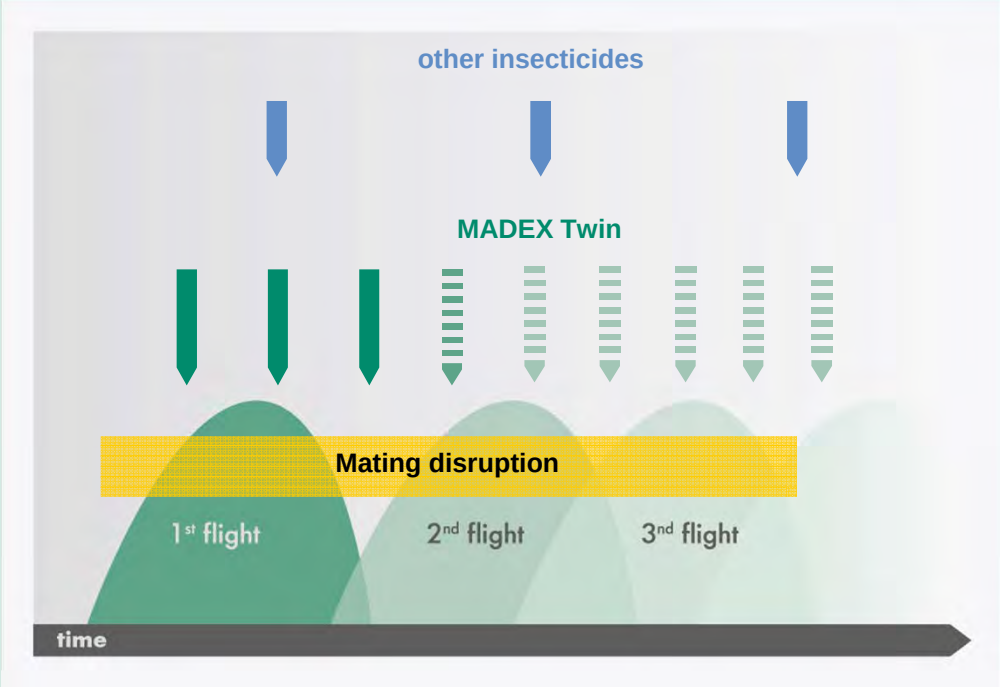
Strategies against OFM in stonefruit



100 ml/ha = standard dose

- **From earliest generation on in strong infestation situations**
- **Start from G2 on is possible**
- **Focus on hatching of larvae**
- **In IPM spray programme**
- **In combination with mating disruption**

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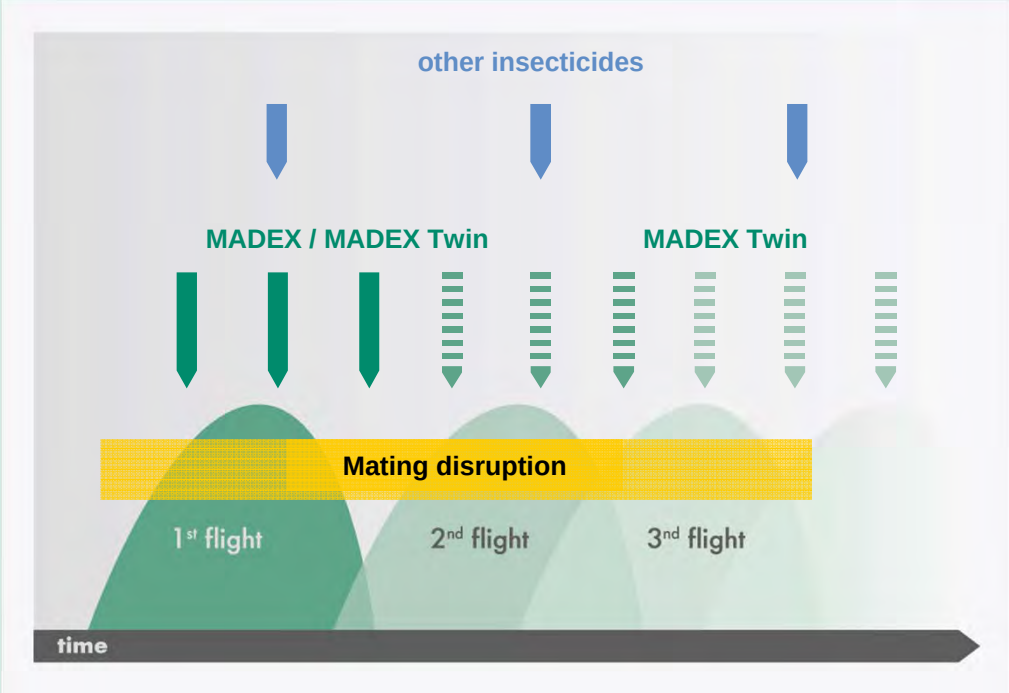
Strategies against CM/ OFM in pome fruit



- Same strategy as with MADEX against CM
- Late season fruit damage of OFM in apple/pear may not be fully prevented. But hibernating larvae are supposedly being reduced.
- In combination with mating disruption
- In alternation with other insecticides

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Spray MADEX TWIN already on the first generation

Application with MADEX Twin on the first generation has the following advantages against oriental fruit moth:

- **First generations of OFM are only attacking twigs**
  ⇨ killing of larva without fruit damage
- **Larva of first generations emerge several times out of twigs**
  ⇨ probability of getting in contact with MADEX Twin is increased
- **Reduction of damage caused by summer generation**
  ⇨ population control

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Conclusions

- **Laboratory bioassays:**
  - ABC V22 > CpGV-M on OFM
  - ABC V22 = CpGV-M on CM
- **REN analysis: ABC V22 similar to CpGV-M**
- **Genome analysis: ABC V22 predominantly a CpGV-M like genome type**
- **The new isolate is patent pending**
- **Inclusion on Annex I ok**

- **Field trials:**
  - ABC V22 effective against CM and OFM at standard CpGV-M rate of 100ml/ha

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Thank you for your attention

Acknowledgement
Intrachem Bio Italia S.p.A.
Agrichem Bio Spain
Biocont
Compo France
Certis USA
Prof Johannes Jehle, JKI
All other partners for trials