



REQUIEM[®]

Integrated Crop Solutions with Requiem™ A New BioInsecticide from Bayer

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Biological Insecticides

ABIM – Basel, October 2015



Agenda

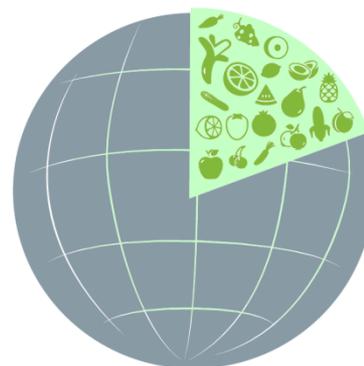
- + Introduction
- + Integrated Crop Solutions ICS
- + Requiem™
- + Country examples of ICS
- + Conclusion

Introduction

We see further growth in the market for fruit and vegetables due to increasing demand for healthier food



- + Consumers and food chain companies demand high quality fruit and vegetables framed by high quality standards, which translates in produce with an appealing look and low residues.
- + Integrated Crop Solutions (ICS) utilizing the benefits of both chemical and biological crop protection products aim to achieve high quality harvests.
- + ICS concept provides growers with tools to meet market requirements both in terms of quantity and quality.
- + ICS featuring Requiem is one of the very first examples developed by Bayer CropScience in Fruits & Vegetables

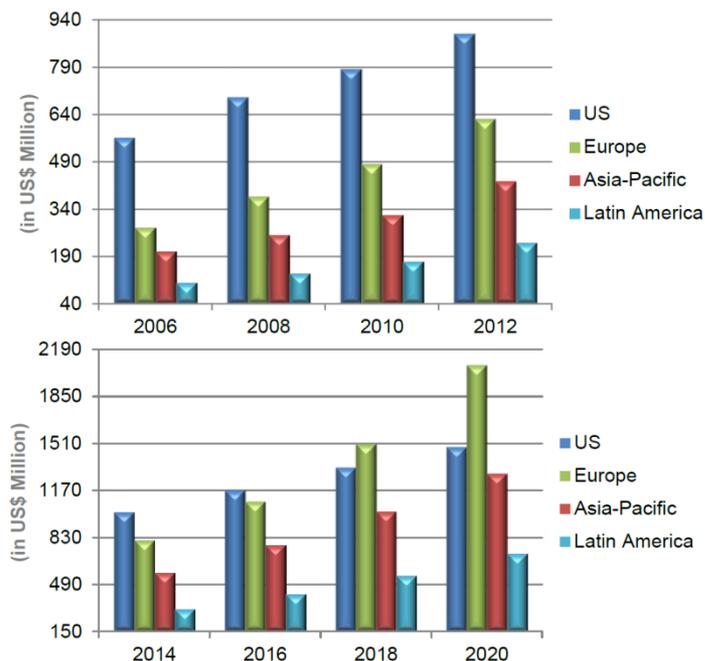


FRUIT AND VEGETABLES
ARE GROWN ON ABOUT

240
MILLION
HECTARES

OF LAND WORLDWIDE.

Biologicals are in demand !



Source: BIOPESTICIDES - A GLOBAL STRATEGIC BUSINESS REPORT 06/14
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Short term (<3 years)

- + Food (Value) Chain demands
- + Sustainable Use Directive EU
- + Country low chem programs (e.g. France)
- + New Biological product introductions
- + Faster track registration (e.g. EU and Brazil)
- + Increasing demand for Biological solutions in emerging markets (Brazil)

Mid term (>5 years)

- + Increasing demand for Biological solutions in emerging markets (China and India)
- + Sustainable growth of Biological solutions in the US, EU and Brazil
- + Investments BASF, Syngenta, Bayer, etc.

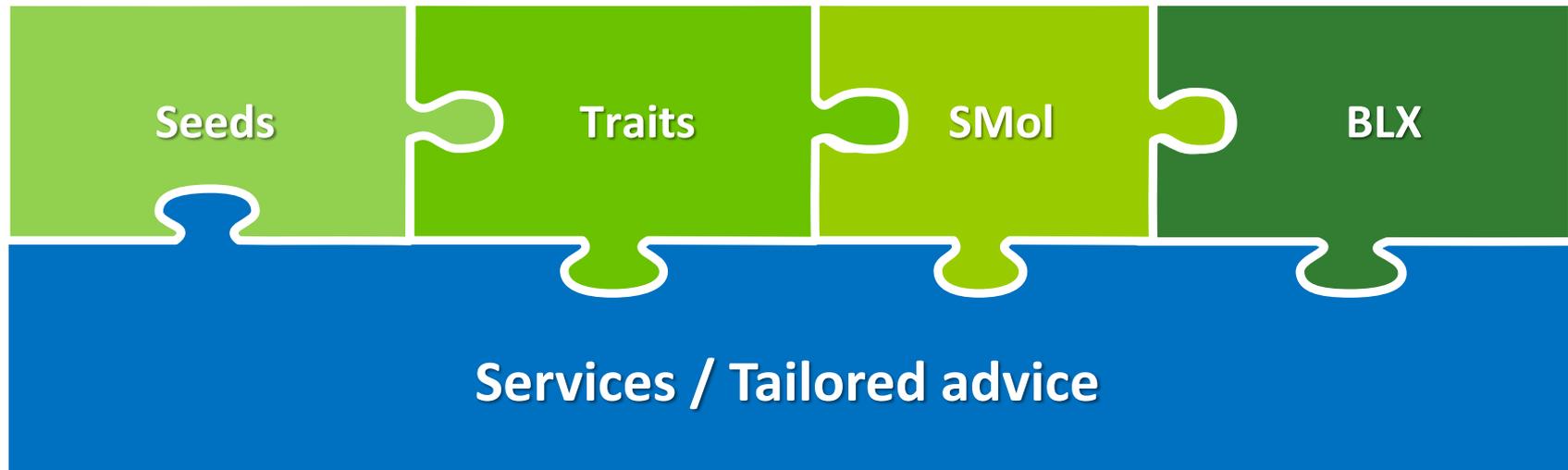
Long term (>10 years)

- + Introduction of new Biological technologies

- Average Market Growth (2005-2012): 10,3 % Biologicals
- Anticipated Market Growth (2012-2020): 12,3% CAGR vs. Chemical ≈ 5% CAGR
- Biologicals Market (2006-2010-2020): 1.3 - 2,0 - 6.2 bn. US\$ (0,9 - 1,5 - 4,6 bn. €)

What are Integrated Crop Solutions (ICS)

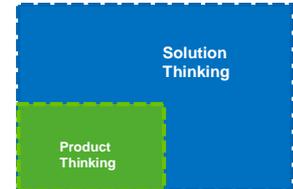
- + **Integrated Crop Solutions** are offers of any combination of Seeds, Traits, Synthetic Molecules, **Biologicals** and Services **that are tailored** towards our target customers and **create sustainable value** for them and the value chain





Biologicals Improve Integrated Crop Solutions and Solve Unmet Needs of Growers Worldwide

From Products → Integrated Crop Solutions



<i>Benefits of Biologicals</i>	<i>How Biologicals Contribute to ICS</i>
<ul style="list-style-type: none"> ✓ Management of Residues ✓ Reducing loss 	Enable Global Trade & address needs of Food Chain
<ul style="list-style-type: none"> ✓ Short re-entry and pre-harvest intervals ✓ Few limitations on labels 	Flexibility in Spray Programs
<ul style="list-style-type: none"> ✓ Addressing low chemical needs ✓ IPM / ICM components 	Sustainable Agriculture
<ul style="list-style-type: none"> ✓ Plant health/yield enhancement ✓ Control of secondary pests ✓ Resistance Management 	Improved Performance

Terpenoid Blend QRD 460 : Nature Inspired Innovation



- Requiem is a blend of 3 natural plant-derived terpenes modeled after a plant extract of *Chenopodium ambrosioides* near *ambrosioides** that has a valuable contact insecticide/acaricide activity.
- Requiem controls sucking insects on protected/glasshouse and field fruits and vegetables, some row crops and plantations.

* American wormseed

Terpenoid Blend QRD 460 approved in Europe

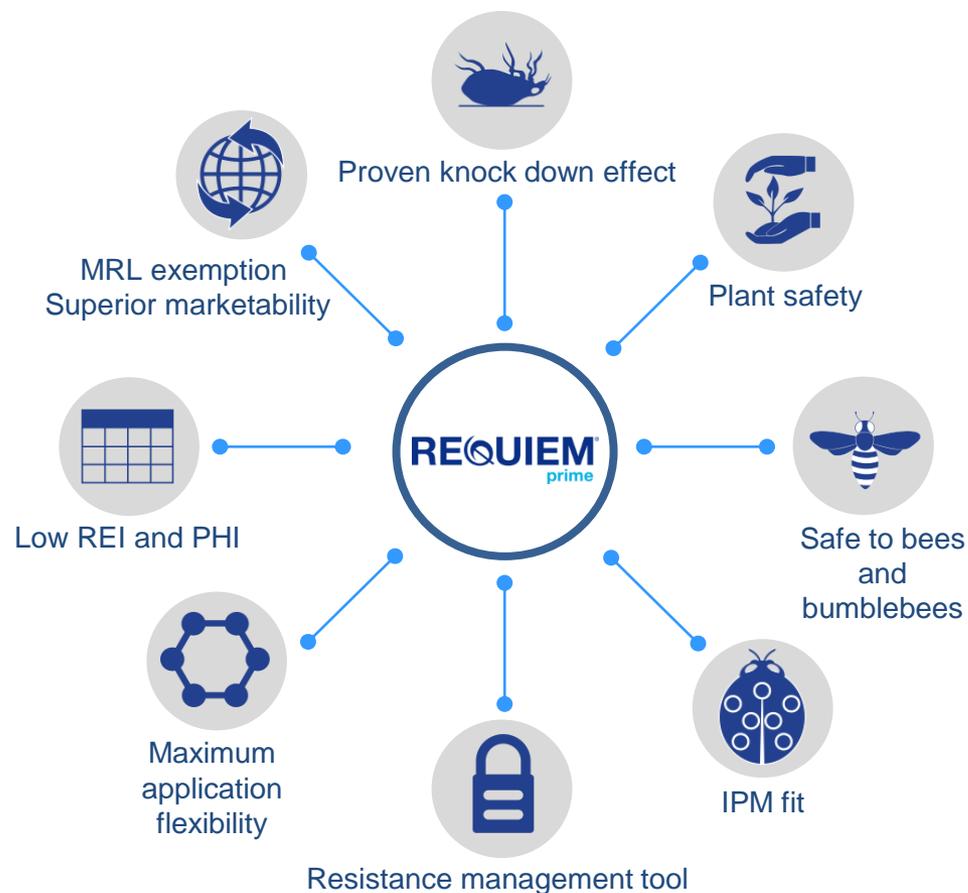
- + On May 29th, 2015 the EU Commission approved Bayer's active substance Terpenoid Blend QRD 460 in accordance with Regulation (EC) No 1107/2009 of the European Parliament.
- + Specific blend of three separate components could be considered as a single active substance
- + This marks the first new active substance from Bayer to be approved under 1107/2009 which went into effect June 2011.





Product Description

REQUIEM is a tool for sustainable farming that helps growers by improving programs through resistance management, MRL exemption, IPM compatibility & workforce management.



Requiem mode of action (MoA)

Contact insecticide

Requiem has a non-toxic mode of action affecting fundamental soft-tissue structure

Requiem acts to :

- degrade the soft insect cuticle
- disrupt insect mobility
- disrupt respiration

→ leading to targeted insect death

Requiem has also

- contact/vapor activity
- anti-feeding properties

Resistance management tool

Requiem is a biological insecticide with a non-specific mode of action to be used in rotation with synthetic insecticides for resistance management purposes

- unique biological partner for resistance management strategies
- building block in IPM, designed to delay the development of insecticide resistance to synthetic insecticides specified by a single mode of action
- no cross-resistance issues reported
- multiple applications possible without risk of resistance development

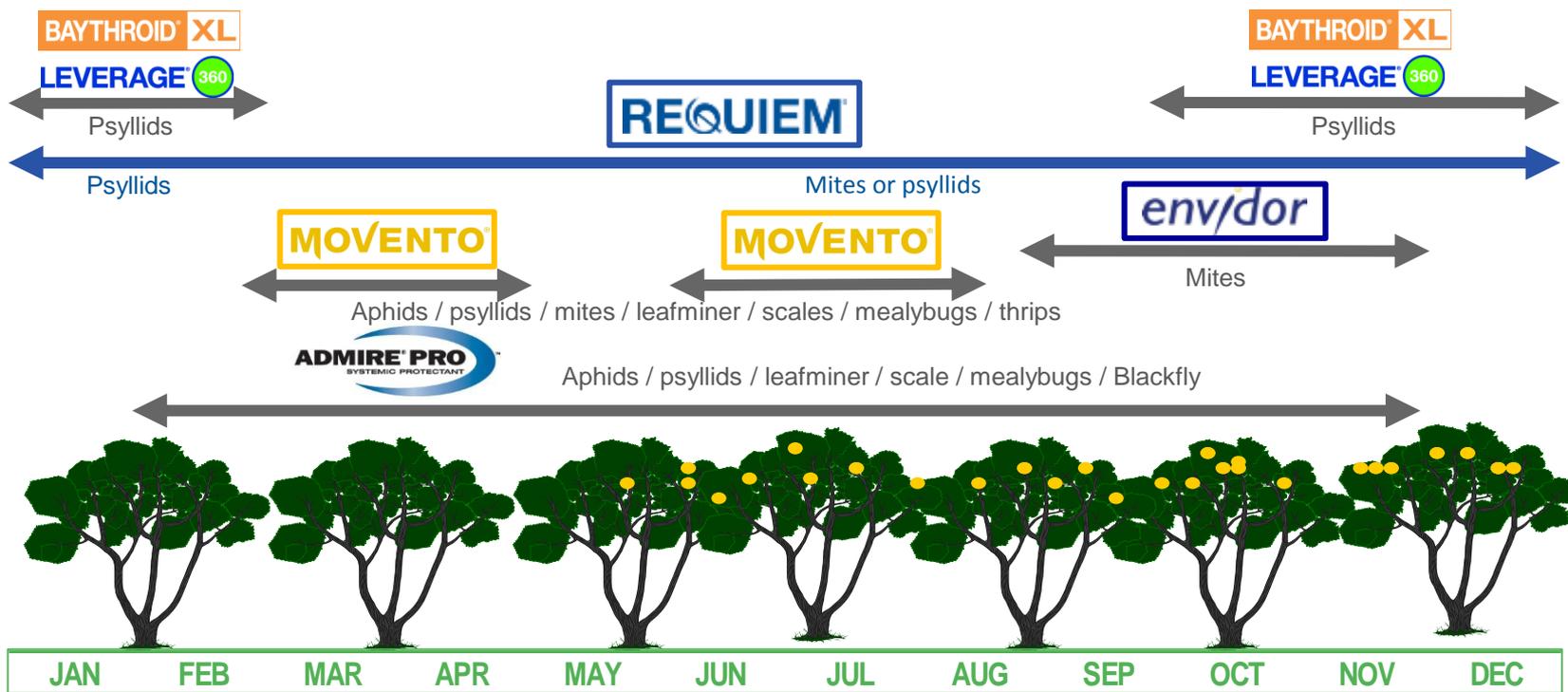


Requiem in ICS example (1)

Citrus in Texas, USA

DRIVERS for use of REQUIEM against Mites and Psyllids

- 1 Improved performance by mix or alternation, resistance management
- 2 Flexibility (REI, PHI, and wide application window)
- 3 Worker safety



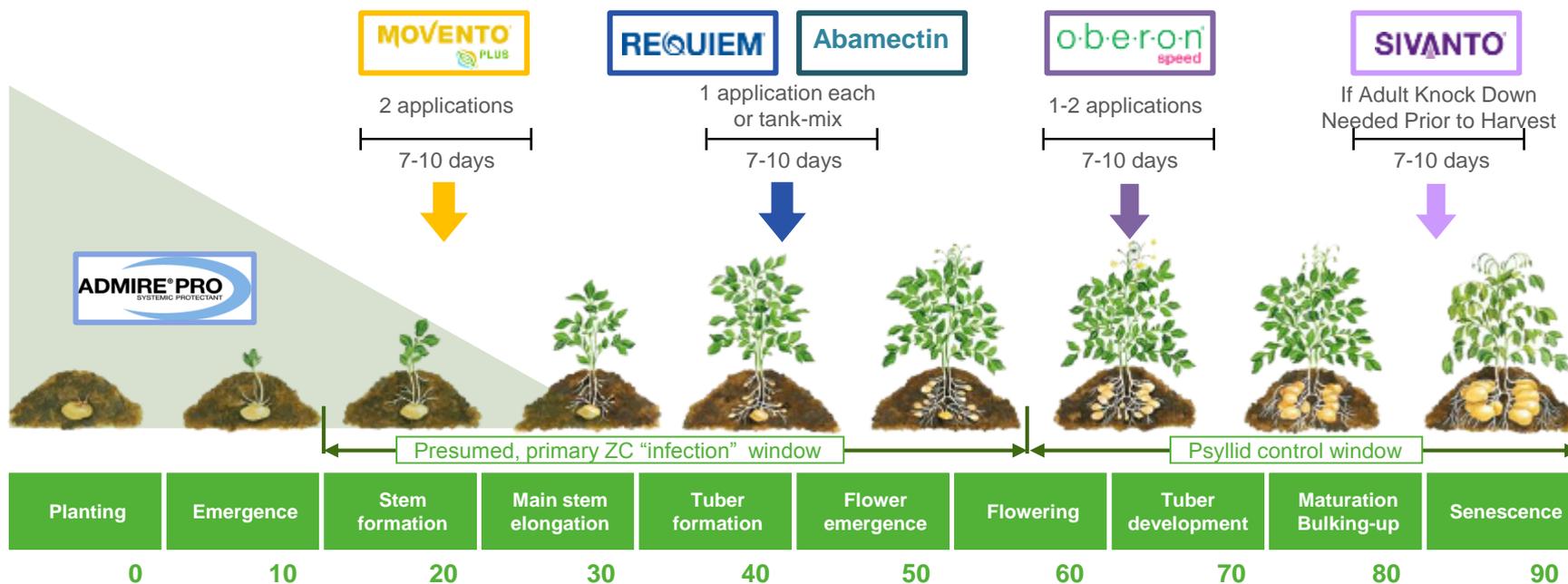


Requiem in ICS example (2)

Potato in Texas, USA

DRIVERS for use of REQUIEM against Psyllids & Zebra Chip disease

- 1 Improved performance on a difficult to control insect
- 2 Resistance prevention (*alternation program*)
- 3 Synergistic effect (*knock-down – REQUIEM & residual compounds – keteonols*)
- 4 Fit in IPM program (*treatment following monitored flight of adults*)

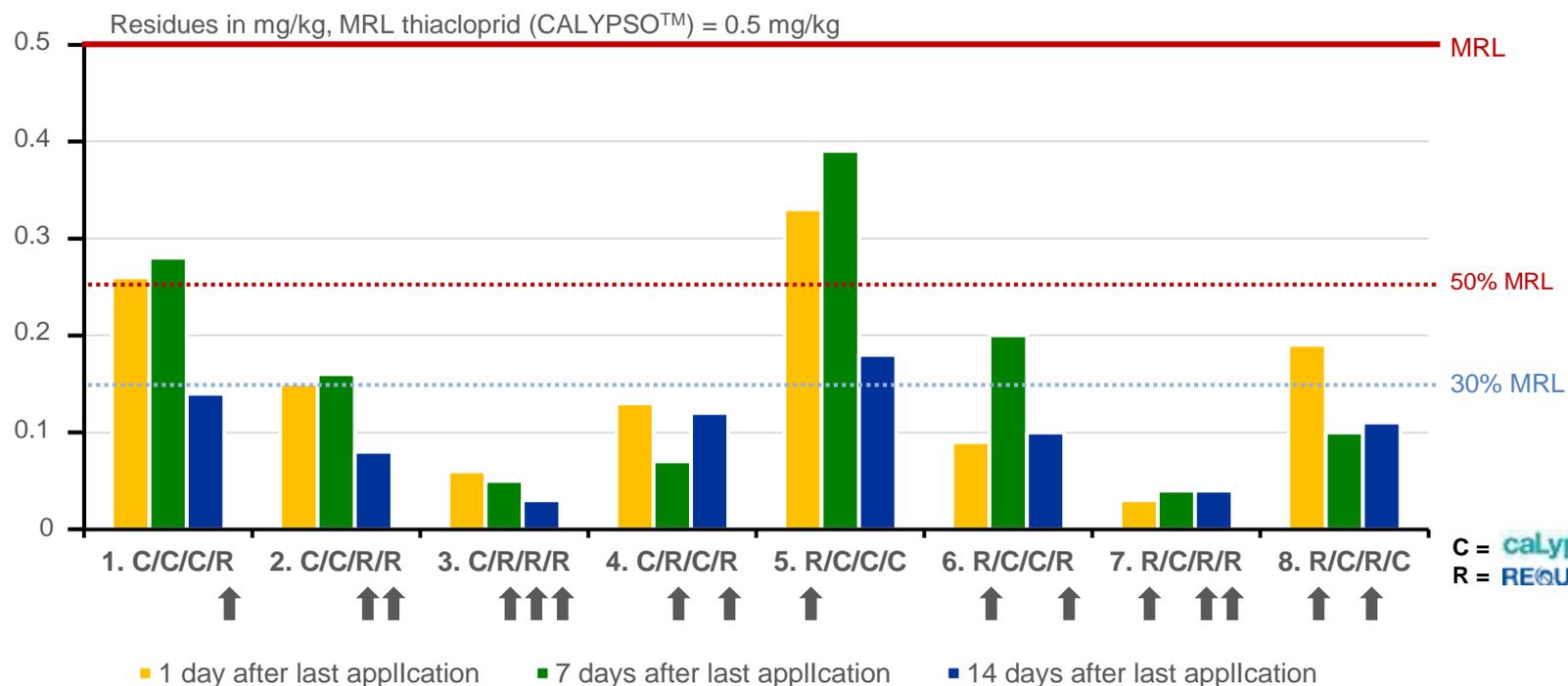


Requiem in ICS example (3)

Tomatoes in the Netherlands

DRIVERS for use of REQUIEM against Sucking Insects

- 1 Enable global trade (residue management and secondary standards)



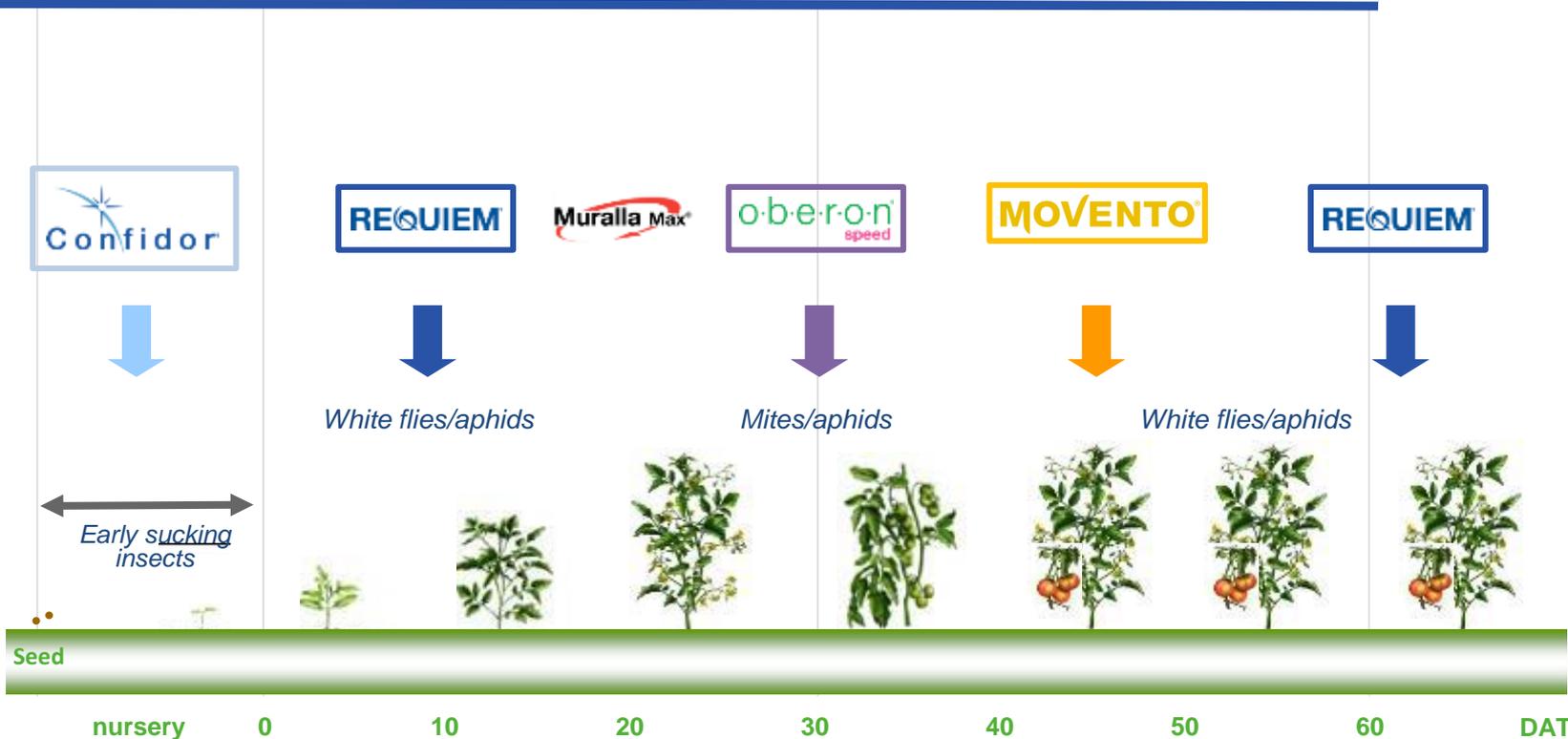
Requiem in ICS example (4)

Fruiting Vegetables in Mexico



DRIVERS for use of REQUIEM against Sucking Pests

- 1 Reliable pest control in program, similar to acetamiprid or flonicamid
- 2 Wide application window, pollinator and beneficial safety
- 3 Residue management, worker exposure





Requiem in ICS example (5)

Cucumber in Spain



DRIVERS for use of REQUIEM against Thrips

- 1 Good performance on difficult to control insect(s), reduced chemical load
- 2 Safe on beneficials/compatible in IPM programs
- 3 Flexibility (short PHI, short REI, wide application window, high number of treatments, etc.)
- 4 Resistance prevention

MOVENTO®

REQUIEM®

Metarhizium

MAIN THRIPS INFESTATION PERIOD



Amblyseius swirskii 50 A. swirskii/m² (repeat 12 weeks later 50 A. swirskii/m²)



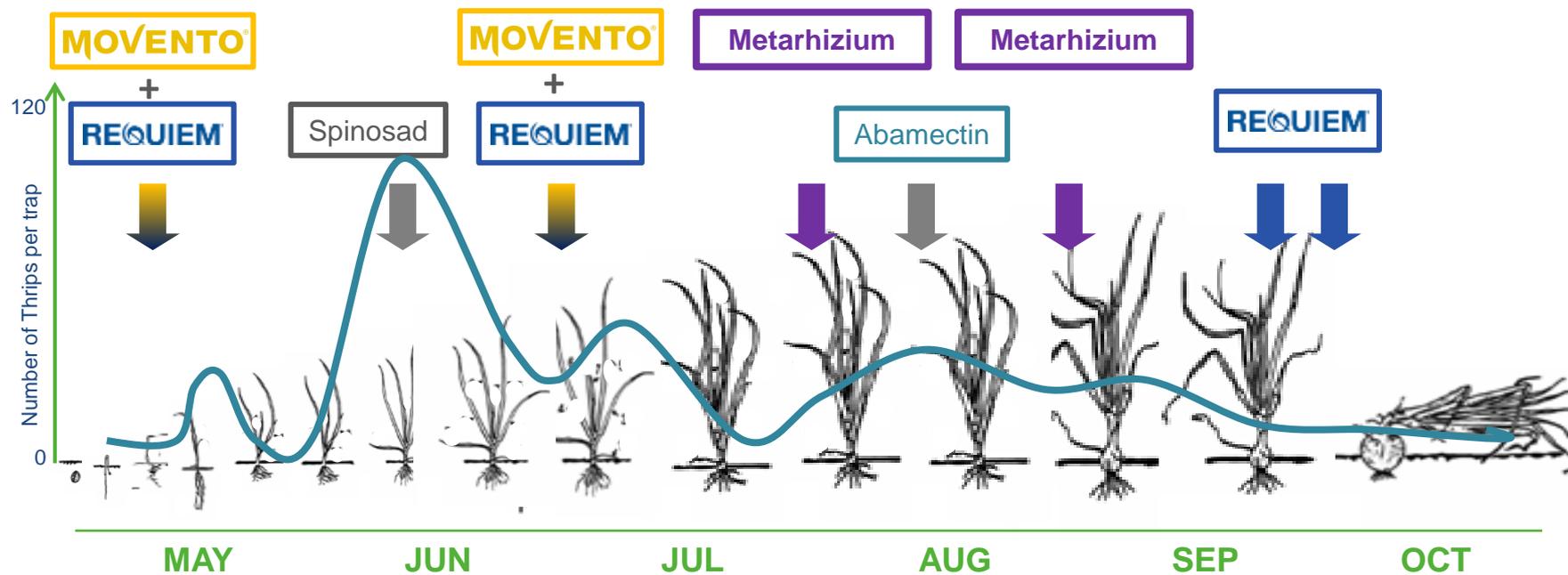
Seed	Planting	Growth	Flowering	Fruiting	harvesting period	
nursery	0	10	20	30	40	50	60	DAT

Requiem in ICS example (6)

Leek / Onion in Northern Europe

DRIVERS for use of REQUIEM against Thrips

- 1 Higher performance due to knock down and long lasting efficacy provided by Movento + REQUIEM
- 2 Residue management towards the end of the program
- 3 Resistance management





Bayer CropScience delivers differentiating solutions

- + Biologicals support sustainable agriculture with excellent integrated pest management (IPM) programs
- + Biologicals are convenient and flexible in use and shorten re-entry and pre-harvest intervals
- + Biologicals provide new resistance management strategies
- + Targeted spray programs combining chemicals and biologicals improve quality, market access and tradeability of fresh produce

By offering Integrated Crop Solutions consisting of seeds, chemical and biological crop protection products and services, we address unmet customer needs



REQUIEM[®]

THANK YOU
