Insecticide Resistance Action Committee

46th Meeting of IRAC International, Brussels, Belgium

March 30th, 2011

EU Resistance Action Groups Overview

Resistance Action Group reports

- Germany: Udo Heimbach
- UK: Ralf (on behalf of Bill Parker)
- Benelux: Guy Smagghe
- Italy: Emanuele Mazzoni
- NORBARAG: Ralf (on behalf of Nina Johansen)
- Austria: Udo Heimbach (for Gabriele Kovacs)

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Update on ECPR-I Germany Activities

Udo Heimbach (Chair)

Julius Kühn-Institut
Bundesforschungsinstitut für Kulturpflanzen

Expert Committee on Pesticide Resistance - Working Group Insecticides, Acaricides ECPR - I

www.jki.bund.de/resistenz-insekt.html

Udo Heimbach

ECPR - I

ECPR – I (founded in 2005)

<u>Aim: sustainable use of insecticides and acaricides</u>

Create a platform for discussion of resistance issues of insecticides and acaricides in Germany

Raise awareness for resistance topics for all parties; advisors, farmers, retailers, regulators, companies

Transfer knowledge and initiate discussions on resistance issues

Early detection of resistance development and support decisions when to name reduced sensitivity “resistance”

Harmonisation of resistance test methods

Develop and harmonise resistance avoidance strategies

Supporting for regulatory decisions

Practical support for resistance monitoring projects

ECPR - I

Participation

from German language areas (mainly DE, some participation from CH, AU and LUX)

Participation limited as far as practical for scientists of:

Industry: focus on those carrying out research or advising farmers, preferable no “marketing persons”

Advisory services of the federal countries in Germany and prvate advisors e.g. from large retailers

Regulatory authorities

University and other resistance research

ECPR - I

Products

Protocols and Agenda are published on the web page

Most presentations are exchanged between participants

Resistance strategies are discussed and published on the web page

Method discussions are protocoled

Joint working program started e.g. on pollen beetle and other OSR pest monitoring programs

joint *Trialeurodes* test program started

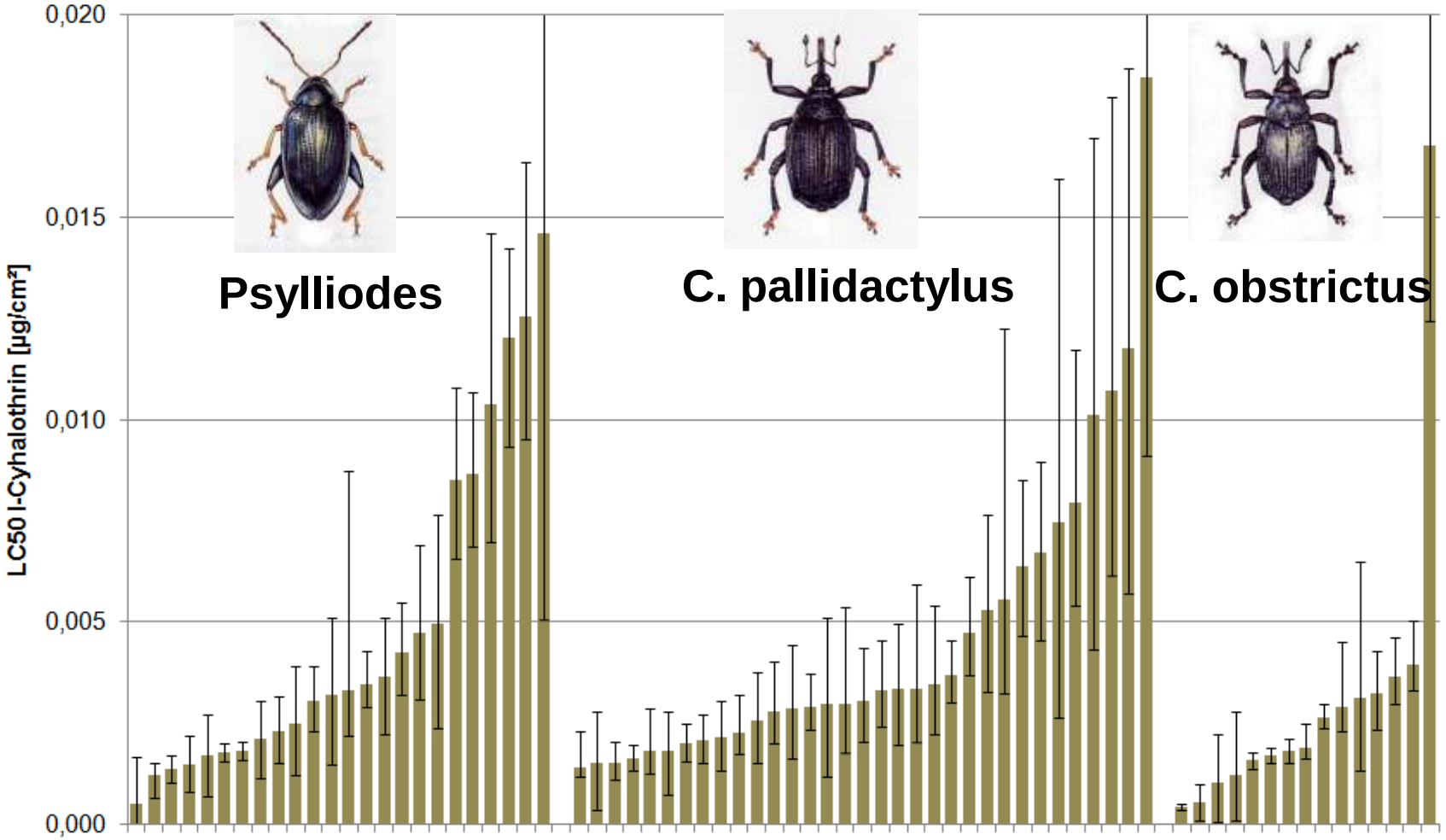
program to make aware and improve hygiene measurement for glasshouse crops was developed

% of Pollen Beetle populations in resistance classes in Germany 2005 – 2010 (lambda-cyhalothrin)

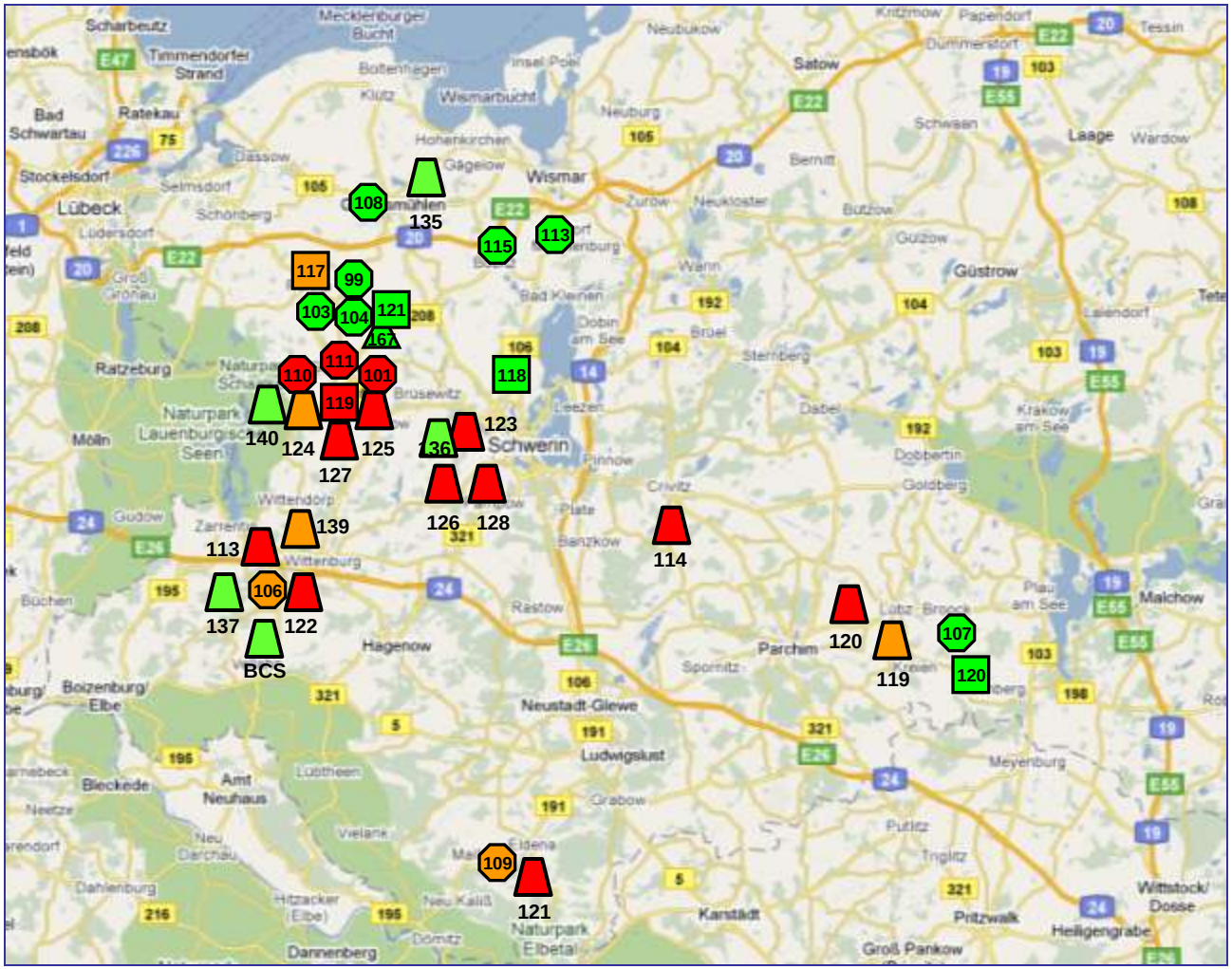
(5 h assessment, control mortality > 20%)

class	2005 N =15	2006 N =103	2007 N = 281	2008 N = 297	2009 N = 267	2010 N = 169
1	33,3	7,0	3,2	0,3	0	0
2	20,0	8,0	5,3	2,4	1,5	0
3	13,3	18,0	19,9	15,8	7,9	5,9
4	26,7	41,0	38,8	40,4	39,7	37,3
5	6,7	26,0	32,7	41,1	50,9	56,8

LC_{50} (95% confidence intervall) of some pest insects in OSR 2005-2010



Locations of Psylliodes populations with resistance in Mecklenburg 2007-2010



2007 2008

2009 2010

Preliminary classification:

mortality [%] at 0,015 µg/cm² or higher:

resistant < 90%

medium > 90%

sensitive = 100%

ECPR - I

Recommended neonicotinoid resistance strategy in potato

Ware potato (max. 3 applications needed, often no or only 1)

If neonicotinoid applied to potato seed tubers:

1st application with other mode of action, max. 1 spray with neonicotinoid

No neonicotinoid applied to potato seed tubers:

Max. 2 sprays with neonicotinoids, at least every 2nd spray with other mode of action

If only 1 application per year, change mode of action between years

Potato Seed production (usually more than 5 applications needed)

If neonicotinoid applied to potato seed tubers:

1st and every 2nd application with other mode of action, max. 2 sprays with neonicotinoids

No neonicotinoid applied to potato seed tubers :

Max. 3 sprays with neonicotinoids, at least every 2nd spray with other mode of action

ECPR - I

Coordinating group of the ECPR – I

To take final decisions on published items if unclear

For industry: Nauen (BAYER), Heger, (BASF), Block (Syngenta)

For advisory services: Burghause (DLR), Schmidt (LallF), Zellner (LFL)

Resistance research: Thieme (BTL)

Pesticide regulation: Waldmann (BVL), Heimbach (JKI), Hommes (JKI), Kovacs (AGES)

Chair: Heimbach (JKI), deputy Hommes (JKI)

Secretary: Nauen (Bayer), deputy Burghause (DLR)

ECPR - I

Regular meetings	special meetings
1. Feb 2005	
2. Dec 2005	
3. Dec 2006	Pollen Beetle test methods, March 2006
	control strategies Pollen Beetle, Aug 2006
4. Nov 2007	Pollen Beetle and CPB test methods, Feb 2007
5. Nov 2008	Pollen Beetle and CPB test methods, March 2008
6. Nov 2009	
7. Nov 2010	cereal aphid pyrethroid test methods, March 2011

Regular meetings with 40 – 50 participants

Test method meetings with 5 – 15 participants

ECPR - I

Main topics of discussions and presentations 2005 - 2010

Pollen beetle and other pest insects in OSR; resistance situation and resistance strategies in OSR

CPB Resistance situation and resistance strategies in potato

***Trialeurodes vaporariorum* resistance situation**

Resistance problems in greenhouses and other horticultural crops

Codling moth resistance situation and strategies

RAG in Austria

Chaired and invited by AGES

Participants:

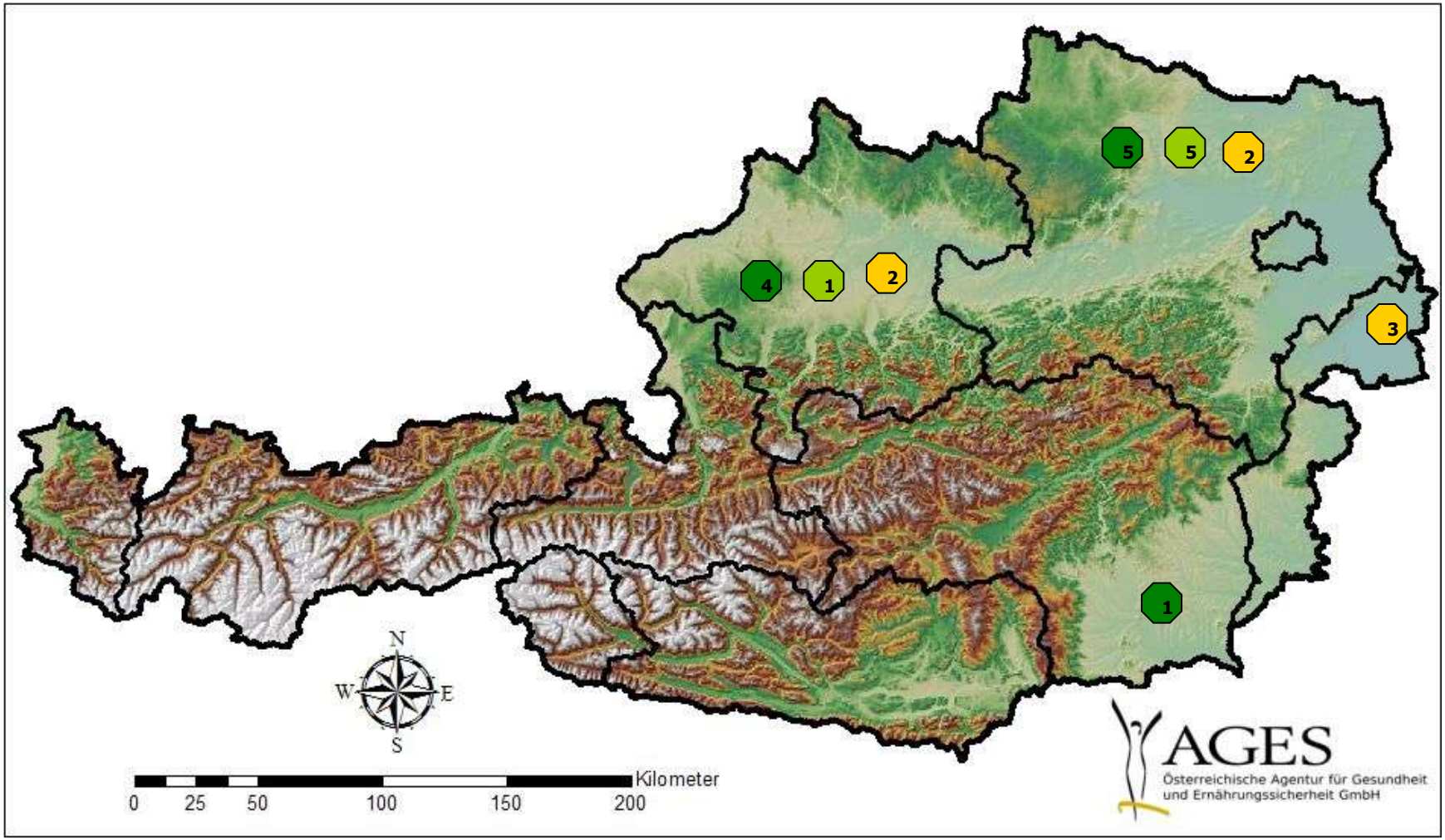
advisors of federal countries in Austria, companies, grower organisations, organisation for integrated crop protection, consultants of field trials

Topics are wide and include any resistance issue of weeds, pathogens and pest insects

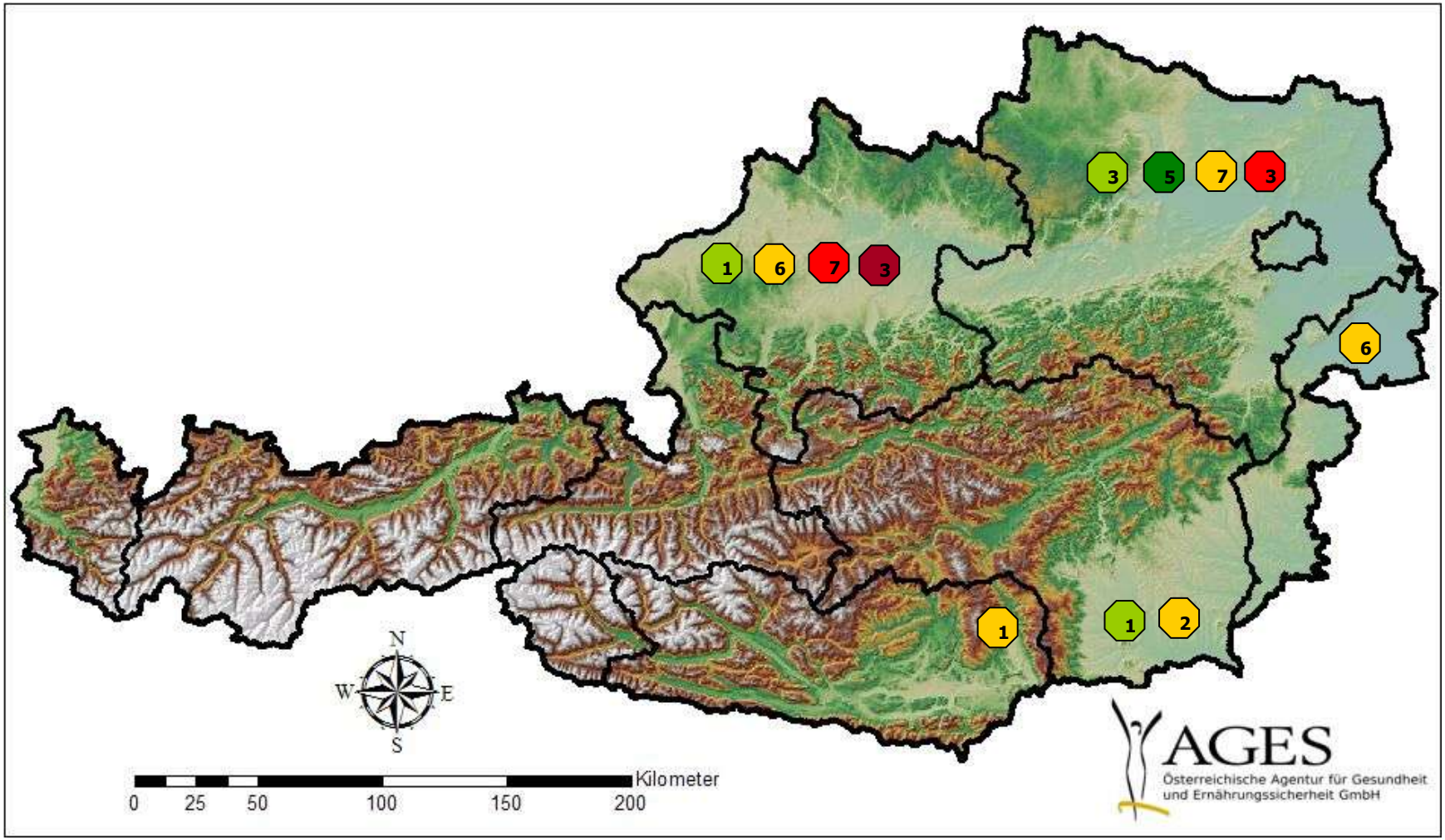
Aims: exchange knowledge and data on resistance, establish and support resistance monitoring, provide information for the regulatory authority AGES, discuss resistance strategies

Protocols are confidential for members only, but some publications are planed (e.g. folder on herbicide resistance)

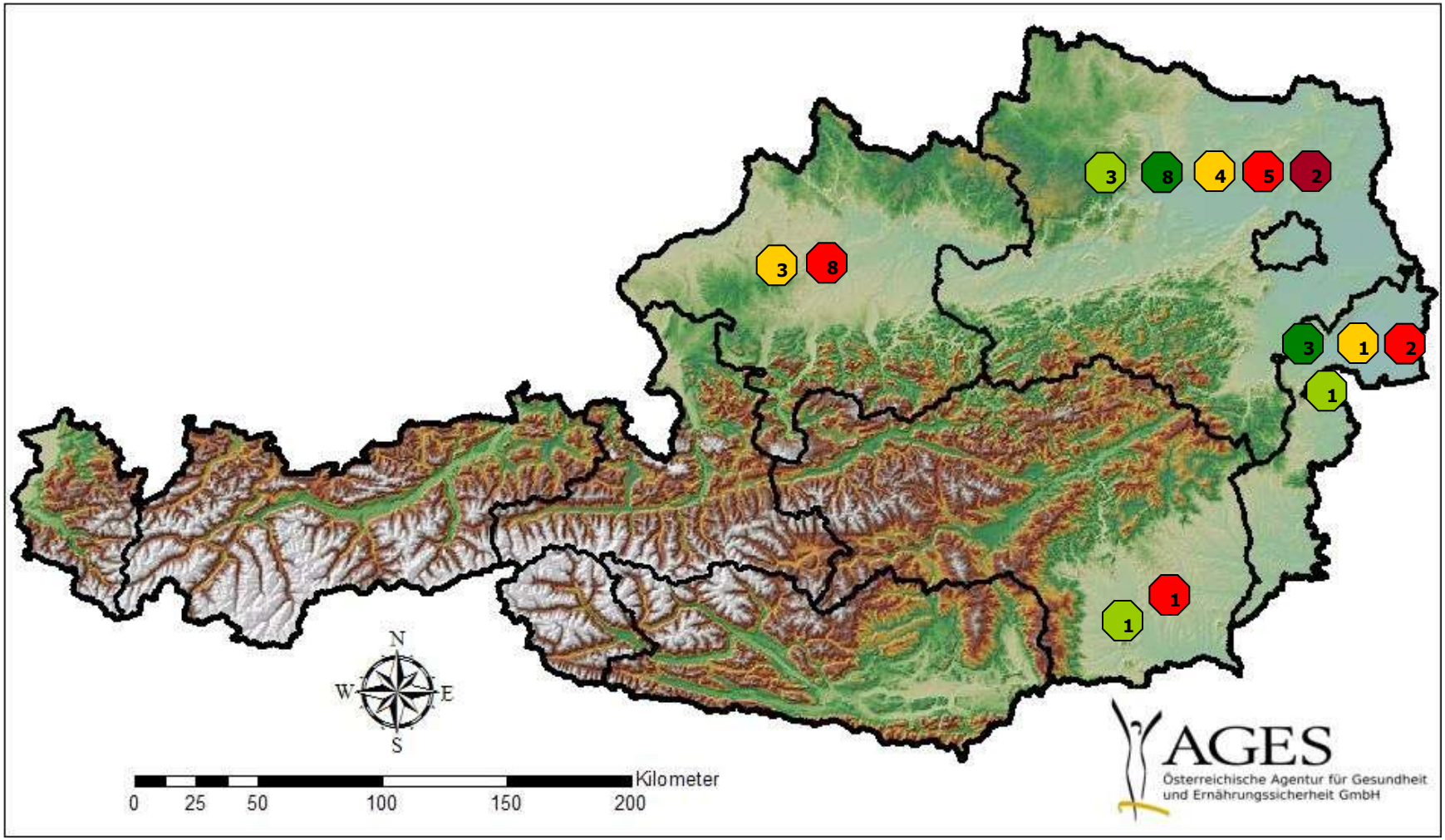
Ages resistance monitoring Pollen beetle 2007



Ages resistance monitoring Pollen beetle 2008



Ages resistance monitoring Pollen beetle 2009



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Update on IRAG-UK Activities

Bill Parker (Chair)

INSECTICIDE RESISTANCE ACTION GROUP

CropLife INTERNATIONAL

IRAC

IRAG-UK

Chairman: Dr Bill Parker

AHDB, UK

IRAG-UK

Insecticide Resistance Action Group – UK

Part of a family of independent UK 'RAG's

Fungicide Resistance Action Group (FRAG)

Herbicide Resistance Action Committee (HRAC)

Insecticide Resistance Action Group (IRAG)

Rodenticide Resistance Action Group (RRAG)

Aims

To provide information on resistance avoidance and management strategies for use by UK farmers and growers, advisers and regulatory authorities by:-

- **Providing an independent forum for the exchange and interpretation of information on insecticide resistance.**
- **Producing guidelines on insecticide resistance and agreed statements to the media.**
- **Identifying knowledge gaps and suggesting research needs to appropriate funding agencies.**
- **Establishing links to exchange information and ideas with similar groups in other countries and with the Insecticide Resistance Action Committee.**

Membership

- Agrochemical Companies
- IRAC representation
- UK Levy Boards (e.g. AHDB)
  - Funders of applied research
- Research organisations (e.g. Rothamsted)
- Consultants/advisors
- Regulatory authorities (CRD in the UK)

Recent activities

- *Myzus persicae* resistance management guidelines
  - Primarily control on potato, regularly updated
  - Neonicotinoid resistance alert (March 2011)
- Brassica aphid complex control guidelines
- Pollen beetle resistance advice
  - In conjunction with IRAC
  - Fast-changing situation in the UK
  - Regularly updated and communicated to industry
- Watching brief on whitefly resistance to neonicotinoids

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Update on IRAG BeNeLux

Guy Smagghe (Chair)

CropLife INTERNATIONAL

IRAC

Members and some facts

- Started November 2007
- Chair:
  - Prof. Dr. Guy Smagghe, Ghent University, B
- Secretary:
  - Ing. Claudia Jilesen, Ministry of Agriculture, Nature and Food Quality, NL

- Members are representatives of:
  - Government/registration/extension B+NL
  - Industry (incl. chemical and biological) B+NL
  - Research institutes/university B+NL+L
  - Total#: 44 members
- Website: http://www.irag-benelux.ugent.be
- Meetings: 2 times/yr (Spring/Fall); alternating B/NL

Mission statements

1. To collect and interpret information in relation to insecticide resistance and management; with the ambition for achieving a consensus in the Benelux.
2. To promote practical guidelines in relation to status and management of insecticide resistance in the Benelux.
3. To propose and evaluate items/cases in relation to insecticide resistance where R&D is required/necessary.
4. To be an interface for communication between industry (IRAC), government, and independent institutes for training/teaching and for research.
5. To publish, disseminate and promote extension material for obtaining better/more insights in and for reducing insecticide resistance

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Update on IRAG Italy (GIRIF)

Emanuele Mazzoni

CropLife INTERNATIONAL

IRAC

ITALY: ongoing insecticide resistance activities within the Resistance Action Group

Emanuele Mazzoni
Institute of Entomology and Plant Pathology
Università Cattolica del Sacro Cuore – Piacenza
ITALY

ITALY: Insecticide resistance action group (GIRIF)

- at present the activity is very reduced
  - that is… no special meetings, no global coordination activity, and so on
- single member or groups of RAG members are actively working on insecticide resistance
  - academic / agrochemical companies / phytosanitary services
    - research
    - communication of information to agricultural technicians / farmers
    - pest management guidelines

ITALY: Insecticide resistance action group

- specific research activity is going on
  - the most active group(*) is composed by the researchers from the
    - Institute of Entomology and Plant Pathology - Università Cattolica del Sacro Cuore – Piacenza
    - Department of Agricultural and Food Science, Università degli Studi – Reggio Emilia
    - Department of Environmental Agronomy and Plant Production, Università degli Studi - Padova

(*) sorry for this self-citation

APHIDS

- *Myzus persicae*:
  - Significant laboratory collection of strains
  - Studies in progress:
    - Effects of sodium channel mutations on the efficacy of pyrethroid insecticides
    - Characterization of metabolic resistance mechanisms and influence of synergists
    - lab evaluation of neonicotinoids efficacy on recently collected populations
  - a network of contact in most important peach growing area to get news/populations

APHIDS

- *Dysaphis plantaginea*:
  - occasional surveys in response to a few report of insecticide treatment failure
  - difficulties:
    - lab rearing know-how
    - a standard reference strain is unavailable

Lepidoptera

- "hot topic"
  - in the last year some survey/research projects were founded
    - MIUR (Italian Ministry of University and Research)
    - Local regional government
    - Agrochemical companies
  - targets
    - *Cydia pomonella*
    - *Cydia molesta*
    - *Lobesia botrana*
    - *Tuta absoluta*

Cydia molesta

- Resistance (bioassays) to IRAC MOA 15
  - Inhibitors of chitin biosynthesis, type 0
- lab rearings of resistant populations are unavailable

Cydia pomonella

- Resistance (bioassays) to several MOAs
  - virus resistance reported
- results from biological and biochemical data "less conclusive"
- "practically unavailable" lab rearings of resistant populations

other Lepidoptera

- *Lobesia botrana*
  - a few occasional reports
  - biochemical analysis do not show significant differences
    - GSTs (?)
    - work in progress
- *Tuta absoluta*
  - baseline evaluation in progress

Mites

- Biological and biochemical aspects of resistance in
  - *Tetranychus urticae*
  - Phytoseid predatory mites
- Vineyards, apple orchards greenhouses (ornamental/flowers)
- serious problems also in open field herbaceous crops (tomato)

Critical situation

- whiteflies

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Update on NORBARAG

NORBARAG

Nordic-Baltic Resistance Action Group

Leader: Henrik Hallquist

Swedish Board of Agriculture

Fungicide resistance subgroup

L Gunilla Berg Jørgensen

University of Aarhus
Faculty of Agricultural Sciences
Dept. of Integrated Pest Management, DK

Insecticide resistance sub-group

Leader: Nina Svae Johansen

Bioforsk, Norwegian Institute of Agricultural and Environmental Research
Plant health and plant protection, NO

Herbicide resistance sub-group

Leader: Jan Netland

Bioforsk, Norwegian Institute of Agricultural and Environmental Research
Plant health and plant protection, NO

https://portal.mtt.fi/portal/page/portal/www_en/Projects/Norbarag

NORBARAG -
Nordic Baltic Pesticide Resistance Action Group

Invitation to the

3rd NORBARAG-meeting and Nordic-Baltic efficacy data meeting
17-18 November 2010, Ski, Norway
2nd announcement, August 2010

About NORBARAG

- Established in 2008
- Members:
  - Representatives from official research institutes in **Denmark**, **Estonia**, **Finland**, **Latvia**, **Lithuania**, **Norway** and **Sweden** involved in pesticide resistance research and pesticide efficacy evaluation
  - Representatives of the agrochemical companies operating in the Nordic-Baltic region
- Registered as a NJF (Nordic Association of Agricultural Scientists) working group under section IV (plant protection)
  - Contact with HRAC, FRAC and IRAC and EPPO Resistance Panel for Plant Protection Products

NORBARAG Objectives

- Forum for information exchange between people actively involved in research into pesticide resistance and efficacy evaluation of pesticides
- Ensure that cases of resistance in the Nordic-Baltic region is verified and listed
- Discuss strategies to avoid resistance and to manage resistant populations
- Define research needs, discuss test methodologies and agree on standards
- Promote collaboration on resistance screening and other research topics related to pesticide resistance
- Promote awareness on pesticide resistance issues e.g. by producing educational material
- Maintain contacts to similar groups in other countries

Main issues – Insecticide resistance sub-group

- Pollen beetle resistance - monitoring
- Identify other resistance risk situations
- Assess need for future monitoring and IRM
  - Some species of concern: *Panonychus ulmi*, *Anthonomus rubi*, *Frankliniella occidentalis*, *Myzus persicae*, *Bemisia tabaci*
- Data base for documented resistance cases
- Insecticide resistance management and guidelines
- Harmonization of resistance information on label
- Resistance risk assessment in the regulation procedure for insecticides
- Information exchange

Email Nina Johansen, March 25th

This is the situation in pollen beetle in the NORBARAG-contries:
3A: Pyrethroid resistance is stable/increasing.
3A: Tau-fluvinate still generally good efficacy in the field. About same level or slightly increasing of resistance.
4A: No sign of resistance to thiachloprid–is test method good not good enough?
22A: Indoxacarb is approved in Norway

This is some of our concerns about resistance per November 2011:
· Fleabeetles in oilseed rape (SE, FI)
Resistance to Pys?
Decreased effect of Neonicotinoids, a question of dose rather than resistance?
· Trioza apicalis in carrot(FI, NO)
· Cabbage rot fly (FI)
· Western flowerthrips and whiteflies in greenhouses(All countries)
Growers complain of low effect to ”all” insecticides.
Do not know which pesticides that works - –imported thrips with possible resistance is also a problem
WFT: Control failure from Spinonsad
Whiteflies: Decreased efficacy of imidachloprid and pyriproxyfen (growers complain), have to save efficacy of Oberon (GWF in FI)

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Update on France

Gerald Huart

Insecticide Resistance Action Committee

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Update on RAG Austria

"Round Table Resistance"

- One Meeting per year
- Last Meeting: *March 2011*
- Participants include authorities, industry, consultants

AGES
Österreichische Agentur für Gesundheit und Ernährungssicherheit GmbH

Vereinfachtes Auswertungsschema:

100 % geschädigte Käfer bei 0,015 µg/cm² = „sehr sensitiv"

„diagnostische" Konzentration 0,075 µg/cm²:

100 % geschädigte Käfer = „sensitiv"

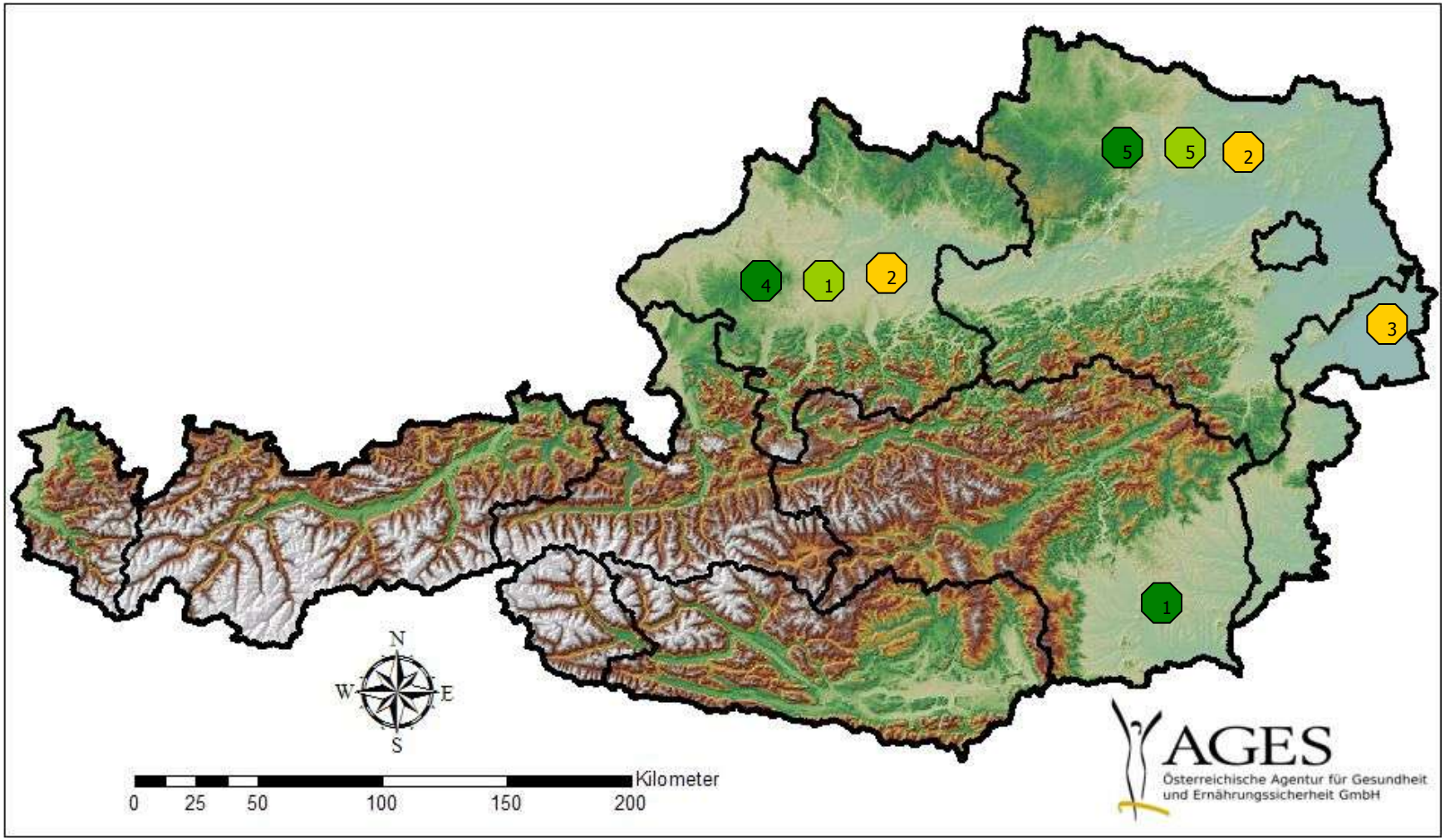
99 - 90 % geschädigte Käfer = „geringe Resistenz"

89 – 50 % geschädigte Käfer = „Resistenz"

49 – 0 % geschädigte Käfer = „hohe Resistenz"

Ergebnisse Resistenzmonitoring Pyrethroide RGK 2007

AGES
Österreichische Agentur für Gesundheit und Ernährungssicherheit GmbH



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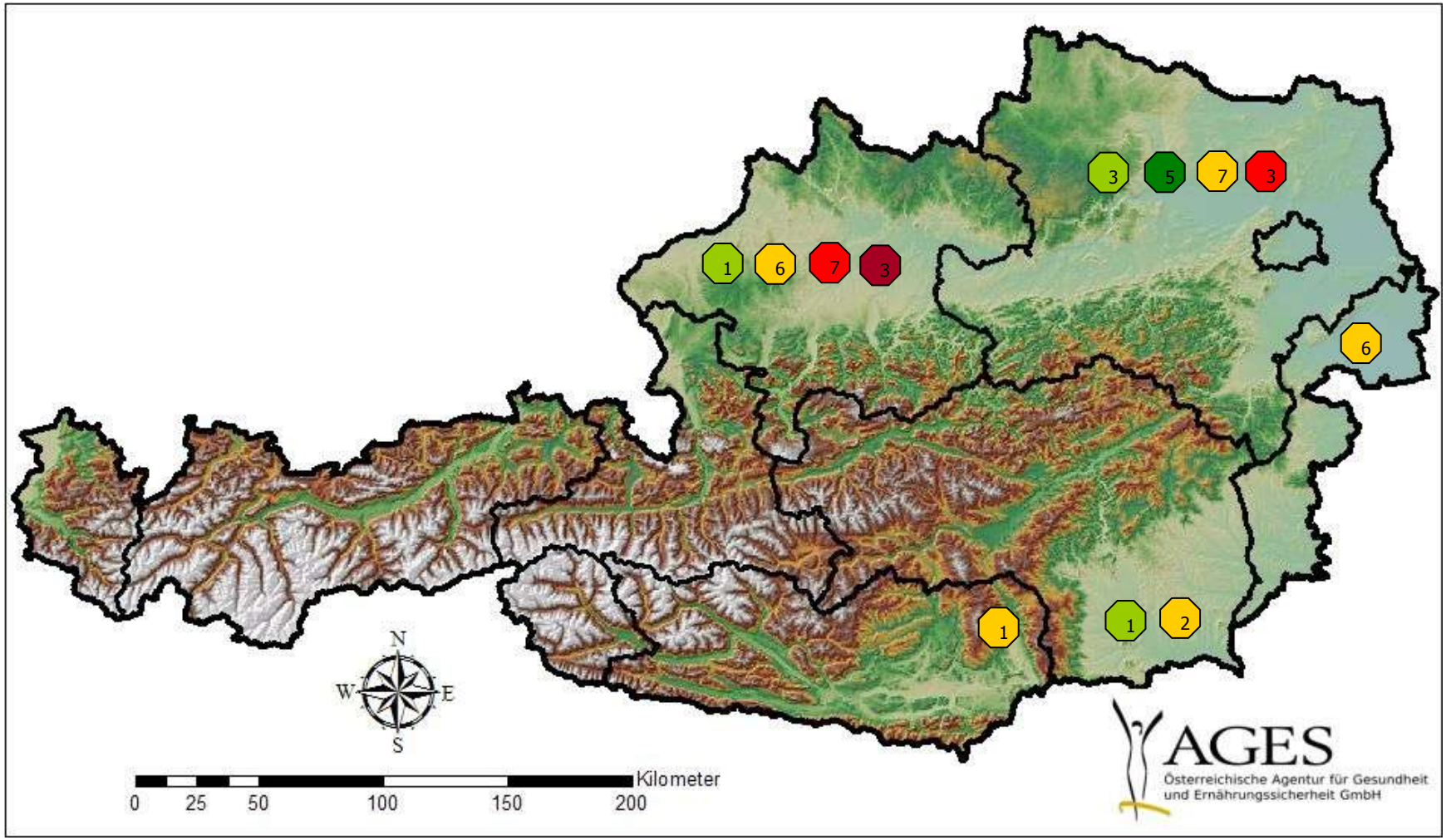

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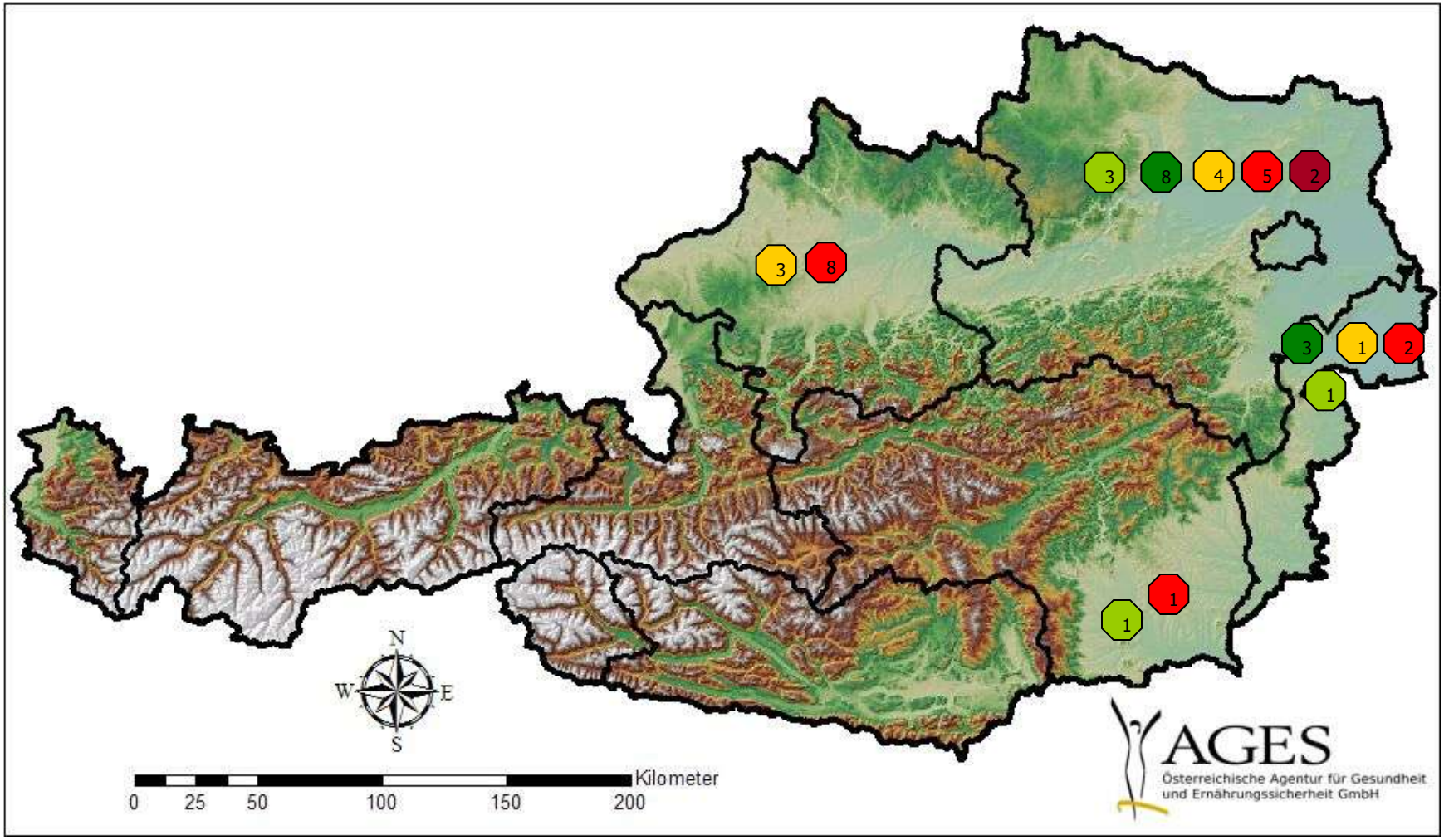

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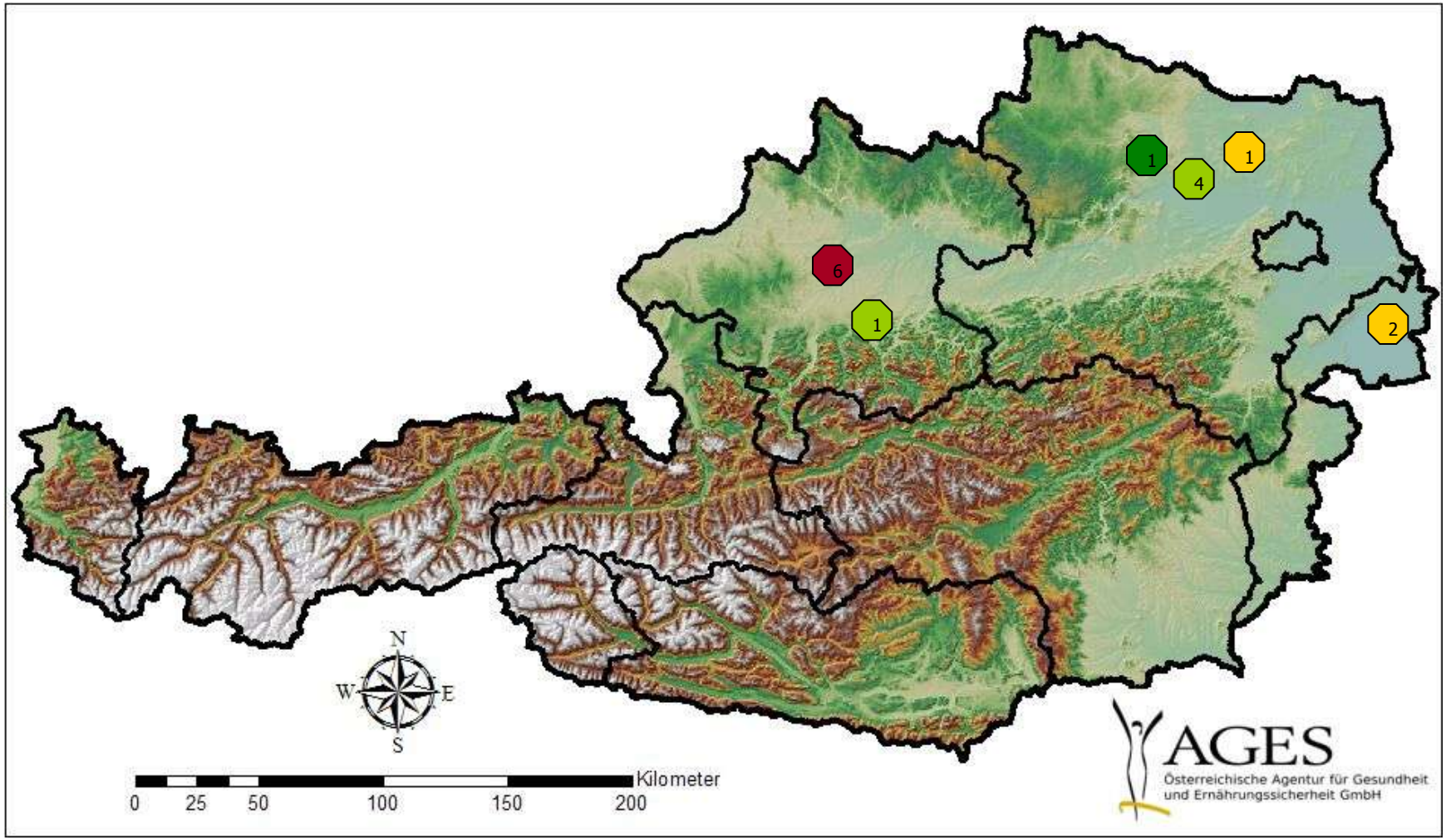

Session 3

International Working Group & Country Group Review

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Wednesday - March 30th, 2011

Discussion on presentations

All

Drafting an EPPO Standard

PSD

DRAFT Efficacy Guideline 607 June 2007

Insecticide Mixtures: Justification for use and implications for resistance management in the United Kingdom

Dear Udo and Ralf,

I know you have been very busy and did not have time to work on insecticide mixtures paper. This is a key area where a common approach across Europe is needed, particularly with zonals system coming up. We really do need a draft for discussion at the resistance panel in September, therefore, my suggestion is that we turn the UK guidance document into 1st draft and circulate it to the resistance panel members for comment. Then you and all other panel members will have a long period to propose modifications and comment on it. Do you agree with this plan?

Regards, Vlasta

March 7, 2011

Ready for mixtures?

CONCLUSION

Resistance Management is an important and crucial objective of any disease control programme and the incorporation of mixture products into the programme is an excellent means of achieving this objective. Mixtures can be designed and used to delay the onset of resistance to any fungicide or, if resistance has appeared, to manage the effects of such resistance. The result is to prolong the active life of a particular fungicide to the benefit of the grower and producer. This document has given practical general advice on how this can be achieved.

Mixture requirements (FAO)

- The components of the mixture are not cross-resistant and individuals with resistance to either component are rare and individuals resistant to both components are extremely rare.
- Each compound should be used at its label rate and equally effective on the pest at the rates used. If the compounds are used at marginally effective rates then the development of resistance to one or both components will be much more likely, because the rate used will be insufficient to kill the heterozygote individuals.
- The residual activity of both compounds should be nearly the same. Otherwise, the compound with the shorter residual activity will degrade and the component with the longer residual will begin selecting for resistance to it.
- The mixtures may be co-formulations or tank mixes. Co-formulations have the advantage that the resistance management is built-in to the mixture by the manufacturer while the use of tank mixes gives the user more flexibility. However, to be successful, the user must be able to design the tank mix correctly.