

## Report of the Control Strategies Subgroup meeting on 15 May 2013: Discussion and agreements reached

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### CHAIRMAN: HUUB SCHEPERS

Initially members of the Alternaria Subgroup attended a joint meeting with the Control Strategies Subgroup to allow aspects of Alternaria fungicide ratings to be fully discussed.

### 1. ALTERNARIA BLIGHT

#### 1.1 Efficacy rating for Revus Top

Prior to the workshop the rating assigned to Revus Top was undecided but between ++(+) and +++. Consequently it was agreed in Limassol that the full 0 to ++++ rating scale needed to be used. Azoxystrobin and Signum were re-rated as +++(+), allowing Revus Top to be assigned +++. The ++++ rating will be kept in reserve for future products with very high efficacy.

#### 1.2 Protocol for fungicide trials to provide ratings for Alternaria fungicides

Hans Hausladen presented the following outline of the protocol to initiate discussion.

##### Field trial

- Susceptible variety
- Weekly applications of Revus or Ranman Top to prevent late blight
- Two or three applications of Alternaria fungicides (after the meeting this was revised to two to five applications)
- Test fungicides to commence before the start of the epidemic (approximately 7 to 8 weeks after emergence)
- Alternaria test fungicides to be applied at intervals of 14 days and at the highest label dose rate in Europe
- Two or more reference fungicides, i.e. mancozeb (1500 g a.i. per ha), Signum (0.25 kg/ha) and Ortiva (0.5 L/ha)

Proposal: The protocol should be tested in existing trials in 2013 (Agreed)

Proposal: Tuber yield should be assessed (Not agreed)

Proposal: The Alternaria Subgroup should decide when fungicide ratings trials are to start (Agreed)

Proposal: Out of season trials could be outwith Europe, e.g. in South America, to speed up testing of the protocol. The trials would be arranged through the fungicide companies. (Decision deferred pending further discussion at the Alternaria Subgroup meeting later in the day)

### *1.3 Miscellaneous*

The rates of fungicide products have to be included in the Alternaria fungicide table.

Proposal: A disclaimer to cover possible fungicide insensitivity in Alternaria spp. was also required for the Alternaria table (Agreed). The wording should be 'Insensitivity genes have been found in the European population but there has been no loss of efficacy in the field' (Agreed).

## **2. CONTROL STRATEGIES SUBGROUP ALONE, LATE BLIGHT**

There were thirty attendees.

### *2.1 Ratings*

Proposal: From 2013 the 0 to +++ ratings decided by the fungicide experts will be allocated between workshops (Agreed).

All updates of the fungicide ratings table are to be notified by e-mail or by a message on the EuroBlight website.

Proposal: Revus Top is to be included in the table with identical ratings to those for Revus (straight mandipropamid). Revus and Revus Top are to be included on the same row of the table (Agreed).

### *2.2 Fungicide table*

Proposal: The late blight and Alternaria fungicide tables should be combined (Not agreed). There are different rating scales for the two diseases.

Proposal: That the A and B tables should be combined because of the move to objective, trials-based ratings (Agreed).

Proposal: Include in the table the date that a product was first registered in Europe but there is no need to include the country of first registration (Agreed).

Proposal: Products no longer marketed are to be removed from the table (Agreed). The following two products are to be removed: propamocarb + mancozeb and propamocarb + chlorothalonil. The cymoxanil + metiram mixture is to remain, together with chlorothalonil.

Concern was expressed that there are too few products with decimal ratings for tuber blight control compared the number with earlier subjective ratings. Jens G. Hansen has to include a statement on the EuroBlight website that previous 0 to +++ ratings can be obtained from the workshop proceedings.

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Proposal: There should be a disclaimer included with the fungicide table to cover possible fluazinam insensitivity. The disclaimer should read 'Isolates have been found in The Netherlands resulting in lower field efficacy of fluazinam' (Agreed).

Proposal: There should be links from the EuroBlight late blight and *Alternaria* fungicide ratings tables to the FRAC website (Agreed).

### *2.3 Trials*

There will be three EuroBlight leaf blight ratings trials in 2013. However, there will be no EuroBlight tuber blight fungicide rating trials in 2013 due to an insufficient number of new products being put forward.

Fantic M (benalaxyl-M (4%) + mancozeb (65%)) has been rated for leaf blight control and is therefore to be included in the ratings table. Data to inform subjective ratings for some characteristics need to be obtained from Isagro Ricerca.

Proposal: Leaf blight ratings trials should have more reference products than just mancozeb (Decision deferred until after Huub Schepers and Bert Evenhuis considered this question).

### *2.4 New initiatives and developments*

Huub Schepers outlined the EU-wide population monitoring that was starting in 2013.

He also described the potential role of EuroBlight in the forthcoming ERA-net call.

Proposal: EuroBlight should progress the development of LatinBlight in South America (Agreed). The initial step would be to organise a LatinBlight event as part of the next ALAP meeting in Columbia in 2014.

Fungicide companies are to contact Huub Schepers with details of a local contact in South America (Agreed by all companies present at the meeting that have interests in South America).

Proposal: An App should be developed for the fungicide tables (Not agreed). The tables were not considered to be sufficiently dynamic for an App and access via the EuroBlight website was considered perfectly adequate.

Proposal: That following the increased importance of fungicide curative activity commercially in 2012, especially in the UK, decimal ratings trials should be carried out for curative activity to provide improved information on this property (Not agreed).

## **3. RECORD OF FUNGICIDE TABLES**

The most up to date versions of the late blight and *Alternaria* fungicide tables should be accessed via the EuroBlight website. The fungicides tables in this paper are a record of the tables as at 1 September 2013, prior to the agreements reached above being implemented.

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## **GENERAL COMMENTS ABOUT THE RATINGS TABLES FOR LATE BLIGHT FUNGICIDES (LATE BLIGHT TABLES A AND B)**

The scores for individual products are not additive for mixtures of active ingredients. Inclusion of a product in the list is not indicative of its registration status either in the EU or elsewhere in Europe. The dose rates in brackets are those used in the EuroBlight field trials to determine the leaf blight and tuber blight ratings. Only compounds included in EuroBlight trials are rated for foliar and tuber blight control. Ratings will be lower where fungicide insensitive strains are present.

The ratings given in Table A are for late blight fungicides currently registered in several EU countries and are for commercially available products containing one active ingredient, or two active ingredients as a co-formulated mixture. The ratings are NOT for the active ingredients themselves. Table A lists the commercially available mixtures of active substances. The ratings given are for the highest dose rate registered for the control of *P. infestans* in Europe. Different dose rates may be approved in different countries.

The ratings given in all columns, except those for leaf and tuber blight control, are based on field experiments and experience of the performance of products when used in commercial conditions. Ratings for leaf blight and tuber blight control were calculated from the results of EuroBlight field trials, and only compounds included in a minimum of six of these trials are rated. Ratings, other than leaf and tuber blight control ones, are intended as a guide only and will be amended in future if new information becomes available. Tables A and B are available on the EuroBlight website and the website versions are updated more frequently.

Late Blight Table B gives provisional ratings for recently introduced products and new fungicide formulations. The inclusion of a product in this table is not indicative of its registration status either in the EU or elsewhere in Europe. These ratings are either calculated from dedicated trials (leaf blight and tuber blight efficacy only) or are the consensus view of the Control Strategies Subgroup and are based on information from non-EuroBlight field experiments or minimal practical experience of a product and will be amended at future workshops, as new information becomes available and the body of experience in commercial use increases.

## **DEFINITIONS (REPRODUCED FROM THE TALLINN 2005 PROCEEDINGS)**

### *PHENYLAMIDE RESISTANCE*

The ratings assume a phenylamide-sensitive population. Strains of *P. infestans* resistant to phenylamide fungicides occur widely within Europe. Phenylamide fungicides are available only in co-formulation with protectant fungicides and the contribution that the phenylamide component makes to overall blight control depends on the proportion of resistant strains within the population. Where resistant strains are present in high frequencies within populations the scores for the various attributes will be reduced.

### *NEW GROWTH*

The ratings for the protection of the new growing point (new growth) indicate the protection of new foliage due to the systemic or translaminar movement or the redistribution of a contact fungicide. New growth consists of growth and development of leaves present at the time of the last fungicide application and/or newly formed leaflets and leaves that were not present.

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#### *PROTECTANT ACTIVITY*

Spores killed before or upon germination/penetration. The fungicide has to be present on/in the leaf/stem surface before spore germination/penetration occurs.

#### *CURATIVE ACTIVITY*

The fungicide is active against *P. infestans* during the immediate post infection period but before symptoms become visible.

#### *ANTISPORULANT ACTIVITY*

*P. infestans* lesions are affected by the fungicide decreasing sporangiophore formation and/or decreasing the viability of the sporangia formed.

#### *STEM BLIGHT CONTROL*

Effective for the control of stem infection, either by direct contact or via systemic activity.

#### *TUBER BLIGHT CONTROL*

Activity against tuber infection as a result of fungicide application after infection of the haulm, during mid- to late-season i.e. where there is a direct effect on the tuber infection process. The effect of phenylamide fungicides on tuber blight control was therefore not considered relevant in the context of the table as these materials should not be applied to potato crops if there is blight on the haulm, according to FRAC guidelines. Only the direct (biological) effect of a particular fungicide on the tuber infection process was considered relevant and NOT the indirect effect as a result of manipulation or delay in the development of the foliar epidemic.

#### *DISCLAIMER*

Whilst every effort has been made to ensure that the information is accurate, no liability can be accepted for any error or omission in the content of the tables or for any loss, damage or other accident arising from the use of the fungicides listed herein. Omission of a fungicide does not necessarily mean that it is not approved for use within one or more EU countries.

The ratings are based on the label recommendation for a particular product. Where the disease pressure is low, intervals between spray applications may be extended and, in some countries, fungicide applications are made in response to nationally issued spray warnings and/or Decision Support Systems. It is essential therefore to follow the instructions given on the approved label of a particular blight fungicide appropriate to the country of use before handling, storing or using any blight fungicide or other crop protection product.

**Late Blight Table A.** The effectiveness of fungicide products/co-formulations for the control of *P. infestans* based on the highest dose rate registered in Europe (as at 1 September 2013)

Product [Dose rate (l or kg/ha)]	Effectiveness		Mode of Action				Rainfastness	Mobility in the plant	
	Leaf Blight <sup>3</sup>	New growth	Stem blight	Tuber blight <sup>4</sup>	Protectant	Curative	Anti-sporulant		
Copper			+		+(+)	0	0	+	contact
dithiocarbamates (2.0) <sup>1</sup>	2.0		+	0.0	++	0	0	++(+)	contact
Chlorothalonil			(+)		+++	0	0	++(+)	contact
cyazofamid (0.5)	3.8	++	+	3.8	+++	0	0	+++	contact
fluzinam (0.4)	2.9		+		+++	0	0	++(+)	contact
zoxamide+mancozeb (1.8)	2.8		+ 5		+++	0	0	++(+)	contact+contact
famoxadone+cymoxanil			+(+)		++	++	+	++(+)	contact+translaminar
mandipropamid (0.6)	4.0	++	+(+)		+++	+6	+(+)	+++	translaminar+contact
benthiavalicarb+mancozeb (2.0)	3.7		+(+)+5		+++	+(+)	+	++(+)	translaminar+contact
cymoxanil+mancozeb			+(+)		++	++	+	++	translaminar+contact
cymoxanil+metiram			+(+)		++	++	+	++	translaminar+contact
cymoxanil+copper			+(+)		++	++	+	++	translaminar+contact
dimethomorph+mancozeb (2.4)	3.0		+(+)		++(+)	+	++	++(+)	translaminar+contact
fenamidone+mancozeb (1.5)	2.6		+(+)+5		++(+)	0	+(+)+5	++	translaminar+contact
benalaxyl+mancozeb <sup>2</sup>		++	++		++(+)	++(+)	++(+)	+++	systemic+contact
metalaxyl-M+mancozeb <sup>2</sup>		++	++		++(+)	++(+)	++(+)	+++	systemic+contact
metalaxyl-M+fluzinam <sup>2</sup>		++	++		++(+)	++(+)	++(+)	+++	systemic+contact
propamocarb-HCl+mancozeb		+(+)	++		++(+)	++	++	+++	systemic+contact
propamocarb-HCl+chlorothalonil (2.7)	3.4	+(+)	++		++(+)	++	++	+++	systemic+contact
propamocarb-HCl+fenamidone (2.0)	2.5	+(+)	++		++(+)	++	++	+++	systemic+translaminar
propamocarb-HCl+flupicolide (1.6)	3.8	++	++ 3.9		+++	++	++(+)	++(+)	systemic+translaminar

See caveats listed in the section entitled 'General comments about the ratings tables'

<sup>1</sup> Includes maneb, mancozeb, propineb and metiram. <sup>2</sup> See text for comments on phenylamide resistance. <sup>3</sup> Based on EuroBlight field trials in 2006-2011.

<sup>4</sup> Based on EuroBlight field trials 2009-2011 <sup>5</sup> Based on limited data. <sup>6</sup> In some trials there were indications that the rating was +(+) .

Key to ratings : 0 = no effect ; + = reasonable effect ; ++ = good effect ; +++ = very good effect ; Blank = no rating

The scale for leaf blight is a 2 to 5 scale (2=least effective, 5= most effective).

The scale for tuber blight is 0 (no effect) to 5 (complete control).

**Disclaimer :** this is given in the text of this paper.

**Late Blight Table B.** Provisional ratings for the effectiveness of new fungicide products for the control of *P. infestans* in Europe (as at 1 September 2013)

Product [Dose rate (l or kg/ha)]	Effectiveness		Mode of Action				Rainfastness	Mobility in the plant	
	Leaf Blight <sup>1</sup>	New growth	Stem blight	Tuber blight <sup>2</sup>	Protectant	Curative			Anti-sporulant
amisulbrom + mancozeb (0.5 + 2.0)	4.5	+	+	3.7	++(+)	0	?	+++	contact+contact
initium + mancozeb (2.5)	3.7	? <sup>3</sup>	? <sup>3</sup>		++(+)	0	0	+++	contact+contact
dimethomorph + fluazinam (1.0)	3.7			3.3					translaminar+contact
(propamocarb + cymoxanil) + cyazofamid ((2.0) + 0.5))				4.6					(systemic+translaminar)+contact
propamocarb + cymoxanil (2.0)					+(+)	++(+) <sup>4</sup>	++(+)		systemic+translaminar

See caveats listed in the section entitled 'General comments about the ratings tables'

<sup>1</sup>Calculated from EuroBlight trials <sup>2</sup>Based on EuroBlight field trials 2009-2011. <sup>3</sup>Observations from some field trials indicated that both new growth and stem blight efficacy were ++. <sup>4</sup>In some trials the curative activity was +++.

Key to ratings : 0 = no effect ; + = reasonable effect ; ++ = good effect ; +++ = very good effect ; Blank = no rating

The scale for leaf blight is a 2 to 5 scale (2=least effective, 5=most effective).

The scale for tuber blight is 0 (no effect) to 5 (complete control).

**Disclaimer** : this is given in the text of this paper.

**Early Blight Table A.** Efficacy of fungicides for the control of early blight caused by *Alternaria solani* and *Alternaria alternata*

Product	Efficacy
azoxystrobin	+++
fluazinam	(+)
metiram/mancozeb <sup>1</sup>	++
propineb	++
chlorothalonil	+(+)
famoxadone+cymoxanil	++
fenamidone+mancozeb or propamocarb <sup>2</sup>	++
zoxamide+mancozeb	++(+)
pyraclostrobin + boscalid	+++

**Key to ratings :** 0 = no effect ; + = some effect; ++ =reasonable effect ; +++ = good effect ; ++++ very good effect

<sup>1</sup>This rating applies to products containing mancozeb when used at the highest dose rates (>1500 g/ha). This rating may not be appropriate where the rate of mancozeb used is lower, particularly where the second active substance is not effective against *Alternaria*. <sup>2</sup>In some trials there were indications that the rating was ++(+). Ratings will be lower where fungicide insensitive strains are present.

**Disclaimer:** this is given in the text of this paper.