

Report of the Control Strategies Subgroup meeting on 15 May 2019

RUAIRIDH BAIN

SRUC, John Niven Building, Auchincruive Estate, Ayr, Scotland KA6 5HW, UK

1. ALTERNARIA BLIGHT

Initially there was a combined meeting of the Alternaria Subgroup and the Control Strategies Subgroup to resolve an issue with the early blight fungicide efficacy ratings protocol. After a prolonged discussion the following changes to the protocol were agreed. In the efficacy ratings trials the early blight test fungicides should be applied only until the percentage of early blight reaches 10 to 15% in the untreated control (Agreed). Weekly disease assessments should continue until desiccation but only those made up to 4 weeks after the last application of the test fungicides will be included in the calculation of ratings (Agreed). The strategies programmes and their efficacy ratings should be removed from the early blight fungicide table (Agreed). Alternaria Subgroup members departed at this point to hold a separate meeting, leaving 34 to take part in the specific meeting of the Control Strategies Subgroup.

2. PHYTOPHTHORA BLIGHT

2.1 Changes to the late blight fungicide efficacy table

Prior to the York workshop Corteva asked that the EuroBlight fungicide experts give non-decimal ratings (zero to three yellow dots) for the co-formulation of oxathiapiprolin + famoxadone (Zorvec Encantia) based on the experts' experience with this product and also information provided by Corteva. The product is now registered in Ukraine as a co-formulation. These ratings were added to the table.

The following changes were made to the table between September 2017 and May 2019.

Fungicide	Dose rate (kg or l/ha)	Change to table
fluazinam + azoxystrobin	0.5	Leaf rating of 3.6 added
(zoxamide + mancozeb) + cymoxanil	1.8 + 0.2	Leaf rating of 3.4 added
benthiavdicarb	0.5	Leaf rating of 4.2 added
(zoxamide + cymoxanil) + fluazinam	0.45 + 0.4	Leaf rating changed from 4.3 to 4.0 (additional trial data)
(zoxamide + dimethomorph) + fluazinam	1.0 + 0.4	Provisional leaf rating (4.6; 5 trials) changed to full rating (4.2; 6 trials)
(pyraclostrobin + dimethomorph) + adjuvant	2.5 + 1.0	Leaf rating of 4.0 added
oxathiapiprolin + famoxadone	0.5	Leaf rating 4.9 added Tuber rating 4.1 added Non-decimal ratings added
oxathiapiprolin + amisulbrom	0.15 + 0.3	Leaf rating 4.9 added
propamocarb + fluopicolide	1.6	Mobility changed from S+T to S+C/T

At the 16th EuroBlight workshop (Aarhus) a request to include tank mixes of fungicide plus adjuvant in the late blight fungicide efficacy table was not agreed. The recent inclusion of (pyraclostrobin + dimethomorph) + adjuvant (2.5 + 1.0) in the table was questioned at the York workshop. This is the only listing that includes a tank-mixed adjuvant. It was agreed in York that for a tank mix of fungicide product plus adjuvant to be included the adjuvant should be specified on the product label. The regulations for adjuvants should be consistent with those previously agreed for tank-mix fungicide partners (Agreed). At the 13th EuroBlight Workshop (St Petersburg) the following was stated 'To be included in the EuroBlight table the tank mix has to be registered in at least one country in Europe, i.e. the tank mix is included on the product label (Agreed). The product label has to mention the specific tank mix partner (Agreed).'

The column of non-decimal ratings for protectant activity should be removed from the table because the highest rating (three yellow dots) now includes too many fungicides (Agreed).

In the fungicide table co-formulations are distinguished from tank mixes by the stated fungicide dose information only. It was agreed that in the table clearer distinction was now required. Jens Grønbech Hansen should be consulted on the most appropriate way to display this information in the website table (Agreed).

2.2 Ratings trials

Up to the time of the York workshop there were no reports made by advisers to EuroBlight of reduced efficacy for specific fungicides in relation to their EuroBlight ratings. As intimated previously, any future reports should be addressed to Huub Schepers and include supporting evidence.

The suggestion was made that because of new dominant genotypes in Europe, i.e. 36_A2, 37_A2 and 41_A2, fungicides with existing decimal leaf blight ratings should be retested (Not agreed). The three main reasons for rejection of this suggestion were: 1) the relative ratings for fungicide efficacy are unlikely to change (except of course if there is resistance to a target site), 2) more new genotypes are likely in the future and it's impractical to retest efficacy for every new genotype, 3) 36_A2, 37_A2 and 41_A2 are not yet in all European countries.

Concern was expressed over the possible long-term approval status of mancozeb given that it is has until now been the reference treatment in the EuroBlight trials systems to generate leaf blight and tuber blight decimal ratings. It was agreed that if mancozeb does lose EU approval in the future then it would remain the reference treatment through the use of trial permits and product imported into the EU as necessary.

2.3 Action points still outstanding from the Aarhus meeting

The Best Practice guides have still to be revised, for Europe initially. It was agreed in York that the guides should be revised. In May 2017 Ruairidh Bain and Faye Ritchie agreed to assist Huub. There is the possibility that the 2013 document 'Managing the risk of late blight' could be useful as a starting point. The completed European-centred guides, containing more detail and better quality information, will be put on the EuroBlight website.

All of the protocols previously available on the two older European websites still need to be updated if necessary and transferred onto the new EuroBlight website. This is required not only for members of EuroBlight but to facilitate the sharing of protocols with researchers in other blight networks.

Issues remain to be addressed over the links on the EuroBlight website to the websites for Africa Blight, Asia Blight, Tizon Latino and USA Blight and also the amount of information about these four other networks on the EuroBlight website.

2.4 New initiatives and developments

EuroBlight has proposed the co-ordinated testing of bio-rational control agents to generate leaf blight efficacy ratings. The starting point for this initiative is one trial in the Netherlands in 2019. The efficacy ratings generated will be placed in a separate table from the late blight fungicide efficacy one. The reference treatment will be completely untreated. One copper-based fungicide will be included as a treatment. The protocol should be placed on the EuroBlight website (Agreed).

3. RECORD OF FUNGICIDE TABLES

The most up-to-date versions of the late blight and *Alternaria* fungicide efficacy tables should be accessed via the EuroBlight website. The fungicide tables in this paper have been copied from the website on 1 Nov 19 to provide a record of previous versions.

Background information about the tables ('General comments about the ratings table for late blight fungicides', 'General comments about the ratings table for *Alternaria* fungicides' and 'Definitions' is available in the workshop proceedings section of the EuroBlight website (see Bain & Kennedy, 2017).

REFERENCES

Bain, R.A. and C. Kennedy (2017). Report of the Control Strategies Subgroup meeting on 17 May 2017. Proceedings of the Sixteenth EuroBlight Workshop, Aarhus, Denmark, 14-17 May 2017. PAGV-Special Report no. 18, 195-202.

Early blight fungicide table_NEW

Efficacy of fungicides for the control of early blight caused by *Alternaria solani* and *Alternaria alternata*. Updated 31 October 2017.

Report: [Fungicide evaluation to rate the efficacy to control earlyblight for the EuroBlight table January 2018](#)

Product	Efficacy rating ^{1,2}		
	14 day interval	Strategy	7 day interval
Spray interval 14 days			
mancozeb 2.0	1.7	-	-
Spray strategy³			
(zoxamide + mancozeb) ⁴ 1.8 + azoxystrobin ^{5,2} 0.5 ⁴	-	3.7	-
(zoxamide + mancozeb) ⁴ 1.8 + difenoconazole ⁵ 0.5	-	3.9	-
Spray interval 7 days			
mancozeb 2.0	-	-	2.5
(zoxamide + mancozeb) 1.8	-	-	2.8
(fenamidone ⁵) + propamocarb) 2.0	-	-	2.2
(fluazinam + azoxystrobin ⁵) 0.5	-	-	3.1
(dimethomorph + mancozeb) 2.0	-	-	2.9

¹ : Ratings for *Alternaria* are based on results from EuroBlight field trials during 2015-2016, and only compounds included in these trials are rated for *Alternaria*. The scale for *Alternaria* is a 0-5 scale (see technical report to be uploaded soon). ² : The ratings are intended as a guide only and will be amended in future if new information becomes available. ³ : The active ingredients were sprayed in a spray strategy with a 7 day interval (°) or a 14 day interval (°). ⁴ : azoxystrobin was sprayed at label rate which is 0.5 for DK and DE, and 0.25 for NL. ⁵ : *Alternaria solani* isolates that are less sensitive to QoI-fungicides have been isolated from potato plants in Europe. Therefore resistance management strategies should be implemented (see FRAC web site for details). Rating will be lower where fungicide insensitive strains are present.

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 table 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 early blight fungicide appropriate to the country of use before handling, storing or using any early blight fungicide or other crop protection product.

Late blight fungicide table

Updated 6 May 2019 (added tuber blight score for oxathiapiprolin + famoxadone (0.5))

The effectiveness of fungicide products/co-formulations for the control of *P. infestans* based on the **highest** rate registered in Europe. These ratings are the opinion of the Control strategies Sub-Group at the EuroBlight workshop, May 2017 and are based on field experiments and experience of the products performance when used in commercial conditions.

Use **Mouse Over** on header titles to find **explanation** on variables e.g. mobility mode of actions C, T and S. You can click on the header texts to **multiple sort the table** (1. click= Descending, 2nd click=ascending, 3rd click=unsort). Use this [PNG version for mobile phones](#)

Product (Dose rate [litre or kg/ha])	Leaf blight	Tuber blight	New growth	Stem blight	Protectant	Curative	Anti sporulant	Rain-fastness	Mobility	Year
copper				●	●●	0	0	●	C	1900
dithiocarbamates (2.0) ¹	2.0	0.0		●	●●	0	0	●	C	1961
chlorothalonil				●	●●	0	0	●●	C	1964
cyazofamid (0.5)	3.8	3.8	●●	●	●●●	0	0	●●●	C	2001
fluazinam (0.4)	2.9			●	●●●	0	0	●●	C	1992
zoxamide + mancozeb (1.8)	2.8			● ⁵	●●●	0	0	●●	C + C	2001
amisulbrom + mancozeb (0.5+2.0)	4.5	3.7		●	●●●	0	?	●●●	C + C	2007
ametoctradin + mancozeb (2.5)	3.7		‡ ⁸	‡ ⁸	●●●	0	0	●●●	C + C	2011
fluazinam + azoxystrobin (0.5)	3.6								C + C	2016
famoxadone + cymoxanil				●●	●●	●●	●	●●	C + T	1996
(zoxamide + mancozeb) + cymoxanil (1.8+0.2)	3.4								C + T	2001
mandipropamid (0.6)	4.0		●●	●●	●●●	● ⁶	●●	●●●	C/T	2005
mandipropamid + difenoconazole (0.6)	4.0		●●	●●	●●●	● ⁶	●●	●●●	C/T + C	2005
benthiavalicarb (0.5)	4.2								T	2018
benthiavalicarb + mancozeb (2.0)	3.7			● ⁵	●●●	●●	●	●●	T + C	2003
cymoxanil + metiram				●●	●●	●●	●	●●	T + C	1976
cymoxanil + copper				●●	●●	●●	●	●●	T + C	1976
cymoxanil + mancozeb				●●	●●	●●	●	●●	T + C	1976
dimethomorph + mancozeb (2.4)	3.0			●●	●●●	●	●●	●●	T + C	1988
dimethomorph + fluazinam (1.0)	3.7	3.3	●	●	●●●	●	●●	●●	T + C	2012
fenamidone + mancozeb (1.5)	2.6			● ⁵	●●●	0	● ⁵	●●	T + C	1998
(zoxamide + cymoxanil) + fluazinam (0.45+0.4)	4.0								C/T + C	2013
(zoxamide + dimethomorph) + fluazinam (1.0+0.4)	4.2								C/T + C	2015
mandipropamid + cymoxanil (0.6)	4.4		●●	●●	●●●	●●	●●	●●●	C/T + T	2013
(pyraclostrobin + dimethomorph) + adjuvant (2.5+1.0)	4.0 ⁷								C/T + T	2012
benalaxyl-M + mancozeb ²	3.0		●●	●●	●●●	●●	●●	●●●	S + C	1981
metalaxyl-M + mancozeb ²			●●	●●	●●●	●●	●●	●●●	S + C	1977
metalaxyl-M + fluazinam ²			●●	●●	●●●	●●	●●	●●●	S + C	
propamocarb + cymoxanil + cyazofamid ((2.0)+0.5)		4.6							S + T + C	2012
propamocarb + cymoxanil (2.0)					●●	●●● ⁹	●●		S + T	2011
propamocarb-HCl + fenamidone (2.0)	2.5		●●	●●	●●●	●●	●●	●●●	S + T	1998
propamocarb-HCl + fluopicolide (1.6)	3.8	3.9	●●	●●	●●●	●●	●●	●●	S + C/T	2006
oxathiapiprolin (0.15)			●●●	●●●	●●●	●●	●●	●●●	S	2017
oxathiapiprolin + famoxadone (0.5)	4.9	4.1	●●●	●●●	●●●	●●	●●	●●●	S + C	2018
oxathiapiprolin + amisulbrom (0.15+0.3)	4.9								S + C	2018

¹ Includes maneb, mancozeb, propineb and metiram. ² See proceedings for comments on phenylamide resistance. ³ Based on EuroBlight field test in 2006-2015. ⁴ Based on EuroBlight field trials 2009-2012. ⁵ Based on limited data. ⁶ In some trials there were indications that the rating was 1%. ⁷ A provisional rating based on 5 EuroBlight experiments. ⁸ Observations from several trials indicated that both New growth and Stem blight were ++. ⁹ In some trials the curative activity was +++.



