



SCEPTRE+ ornamentals - Pathology

Dr Catherine Eyre, RSK ADAS Ltd., Horticulture

Confidential (optional)

www.adas.uk

SP33 – Evaluating the crop safety of promising downy mildew products on ornamental plants

SP32 – Control of fungal diseases in ornamental plants

SP42 – Control of white mold and smoulder in Narcissus (year 1 and 2)

SP47b – Powdery mildew control in protected ornamentals

[SCEPTREplus - Research for sustainable plant protection products for use in horticulture | AHDB](#)

<https://horticulture.ahdb.org.uk/cp-165-sceptreplus-research-for-sustainable-plant-protection-products-for-use-in-horticulture>

7 of the products tested in the following trial have EAMUs and there are several under discussion.

Authorised:

Ranman Top

Amylo X WG

Frupica SC

Luna Privilege

Prolectus

Sercadis

Sonata

Pipeline:

AHDB 9926 – EAMU submitted

Prev Gold – authorisation expected

AHDB 9863 – EAMU in discussion

SP33 – Evaluating the crop safety of promising downy mildew products on ornamental plants

- Oomycetes or water moulds
- Very host specific
- Infect almost all ornamentals
- Invades tissues under wet conditions, resulting in internal browning/white fuzzy lesions followed by spore release.

Symptoms: yellow/light green irregular leaf lesions → purple/dark brown and delimited by leaf veins.

In humid conditions: sporulation → downy growth on underside of leaves



Downy mildew symptoms on Lamium

Objective: Assess phytotoxicity of applied products



Treatments (10):

- 6 conventional fungicides, 2 biopesticides
- Standard: Fubol Gold (Mancozeb + metalaxyl-M)
- Untreated control
- 4 spray repeated programme, 10 day intervals as foliar sprays.
- Mid Nov – Mid Dec 2018.

AHDB 9959, AHDB 9958, AHDB 9963, AHDB 9962 – shown efficacy in previous work on downy mildew in lettuce (SP07).

Species	Cultivar
Buddleja	Buzz Velvet
Aquilegia	Red Hobbit
Digitalis	Pam's Choice
Lamium	Beacon Silver
Veronica	Ionian skies
Monarda	Fireball
Potentilla	Scarlet Star

Assessments:

- Plant vigour: 1-5, 1 = very poor, 5 = excellent.
- Phytotoxicity: 0-10, 0 = no damage, 10 = dead



Phytotoxicity

No phytotoxicity or any visible residues on plants.

Date	Phytotoxicity score			
	13-Nov	23-Nov	04-Dec	14-Dec
Treatment				
Untreated	0	0	0	0
Fubol Gold	0	0	0	0
AHDB 9959	0	0	0	0
AHDB 9958	0	0	0	0
AHDB 9963	0	0	0	0
AHDB 9962	0	0	0	0
AHDB 9870	0	0	0	0
AHDB 9883	0	0	0	0
AHDB 9967	0	0	0	0
AHDB 9885	0	0	0	0
Not significantly different from untreated control ($p>0.05$)				



White residue left by AHDB 9963 on plastic liner tray but none visible on plants.



Cyazofamid – FRAC code 21, Quinone inside inhibitor.

Activity against oomycetes, resistance management required

No phytotoxicity in any of species tested.

Max 6 treatments in a 12 month period.

Prev Gold

Biological product.

Orange oil.

Contact product

Dries the cuticles of insects as well as the cells walls or phospholipid layer of fungal

Authorisation expected for ornamentals in short term.

At least two other products
AHDB 9959 and 9962 in
discussion for authorisation

SP32 – Control of fungal diseases in ornamental plants



Target: Botrytis

Loss of Rovral® WG – Iprodione

Objective: Identify crop safe alternatives.

Inoculated trial

- 9 species
- 10 treatments
 - 5 conventional
 - 2 biological
 - 1 plant extract
 - Standard: Signum (Boscalid + pyraclostrobin)
- 4 applications, 4 reps



Botrytis on English Lavender (ADAS)

Trial species



Heuchera



Lavender



Polystichum

	Species	Variety / type
1	Ajuga	'Chocolate Chip'
2	Dryopteris	Dryopteris erythrosora
3	English Lavender	Melisa Lilac
4	Heuchera	'Liquorice'
5	Polystichum	'Scarlet Starlit'
6	Primula	Primula beesiana
7	Rudbeckia	Rudbeckia fulgida var. deamii
8	Sedum	'Bertram Anderson'
9	Vinca	'Bowles Purple'

Treatments and assessments

Treatment	Product / code	a.i / fungicide type	FRAC code
1	Untreated	-	-
2	Signum	Boscalid & pyraclostrobin	7 + 11
3	Amylo X WG	Biological	44
4	Frupica SC	Mepanipyrim	9
5	AHDB9926	Conventional	7
6	Luna Privilege	Conventional	7
7	AHDB9885	Plant extract	46
8	Prolectus	Fenpyrazamine	17
9	Sercadis	Conventional	7
10	Sonata	Biological	44

Submitted for EAMU approval

EAMU gained

Water volume – 500L / ha

Assessments

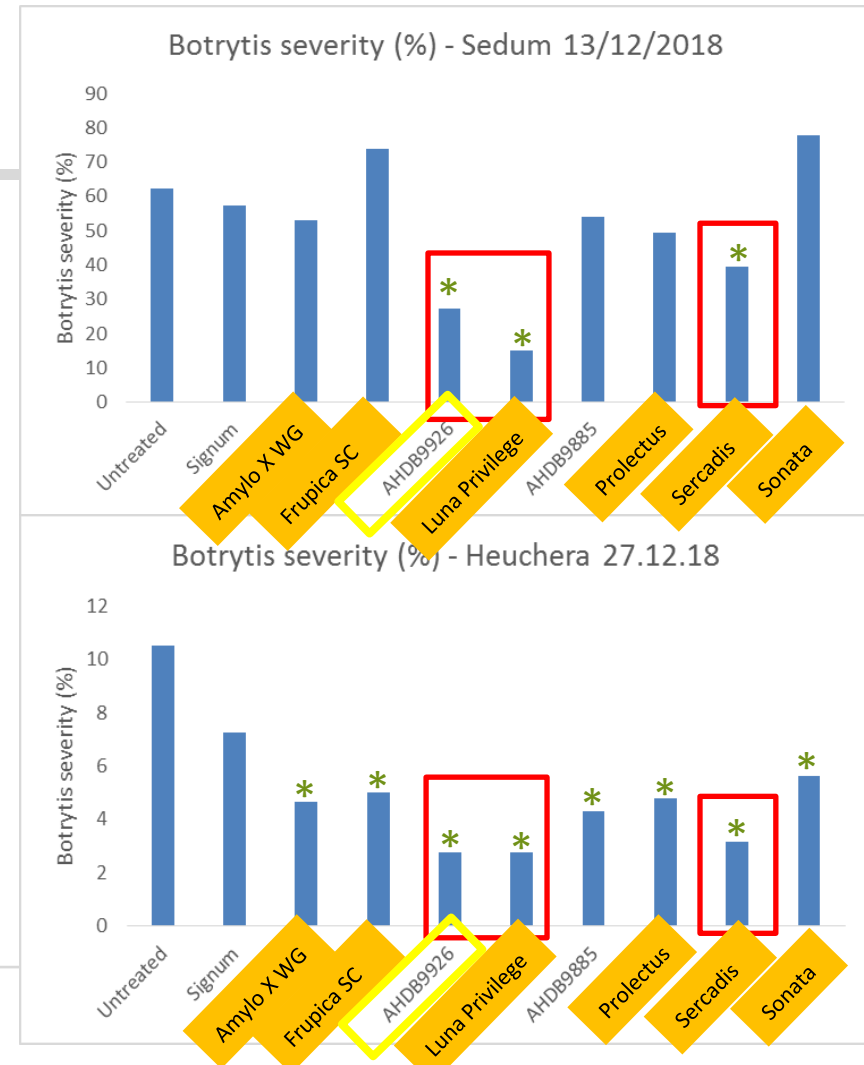
- Botrytis incidence and severity
- Phytotoxicity

Results - efficacy

- Low level of Botrytis in most species
- Significant reductions in diseases severity in Sedum and Heuchera compared to untreated control
- SDHI fungicides (red box)

Results - phytotoxicity

- Slight phytotoxicity – Ferns: Polystichum and Dryopteris
- No phytotoxicity observed - Ajuga, Heuchera, Primula, Sedum, Vinca, Lavender, Rudbeckia
- Commercially acceptable levels.



SP42 – Control of white mold and smoulder in Narcissus



Targets:

- White mould – *Ramularia vallisumbrosae*
- Smoulder – *Botryotinia narcissicola*

Objective: identify crop safe alternatives

2019: Establishment of product efficacy

2020: Optimal programme development



Smoulder (ADAS)

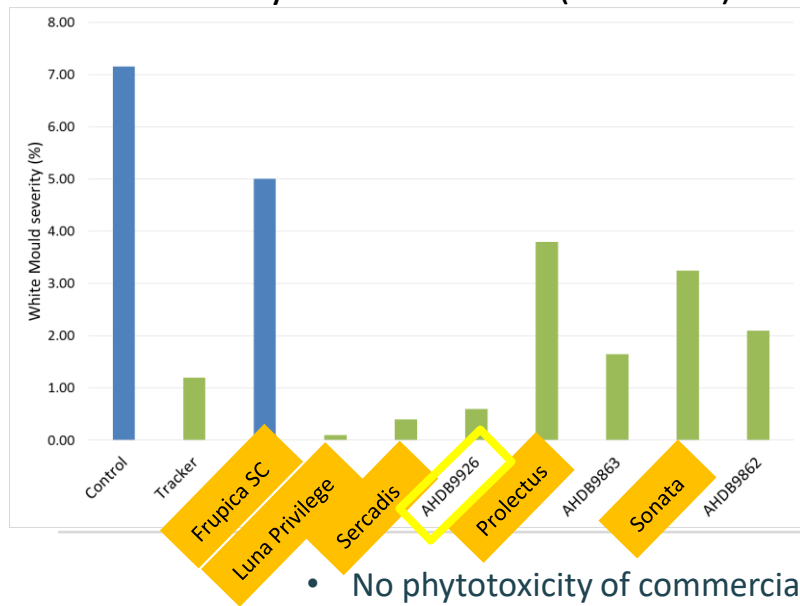


Efficacy trials – year 1

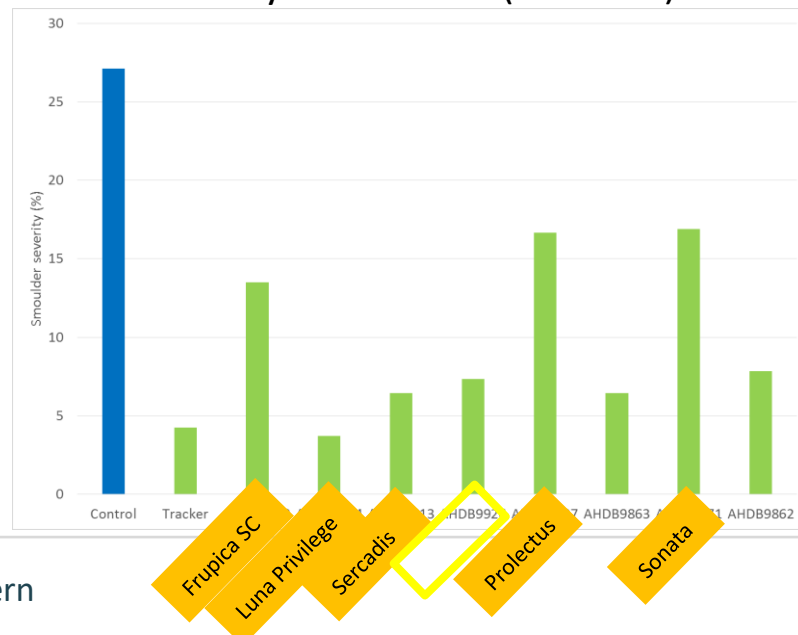
4 treatment applications every 10-14 days

10 treatments: 8 conventional, 1 biological

Severity – white mould (assess. 4)



Severity – Smoulder (assess. 5)



- No phytotoxicity of commercial concern

Year 2 - treatment programmes

Programme	Timing A (29-Jan)	Timing B - (06 Mar)	Timing C (27-Mar)	Timing D (09-Apr)
1	Water	Water	Water	Water
2	Switch	Tracker	Amistar + Penncozeb	Tracker
3	Switch	Luna Privilege	Amistar + Penncozeb	Luna Privilege
4	Switch	Sercadis + Prosaro	Amistar + Penncozeb	Sercadis + Prosaro
5	Switch	AHDB 9926 + Prosaro	Amistar + Penncozeb	AHDB 9926 + Prosaro
6	Switch	Frupica SC	Amistar + Penncozeb	Frupica SC
7	Switch	Prolectus	Amistar + Penncozeb	Prolectus
8	Switch	AHDB 9862	Amistar + Penncozeb	AHDB 9862
9	Switch	Sonata	Amistar + Penncozeb	Sonata
10	Switch	Sonata	Sonata	Amistar + Penncozeb

Submitted for
EAMU approval

EAMU gained

EAMU in
discussion

Assessments:

- At each application (x4) and + 14 days
- White mould and smoulder incidence and severity
- Crop safety

Narcissus var.

St. Patrick's Day

Jan-April 2020



White mould

Av. disease severity (untreated) = 8.67%

Incidence: No sig difference between treatments at any time point

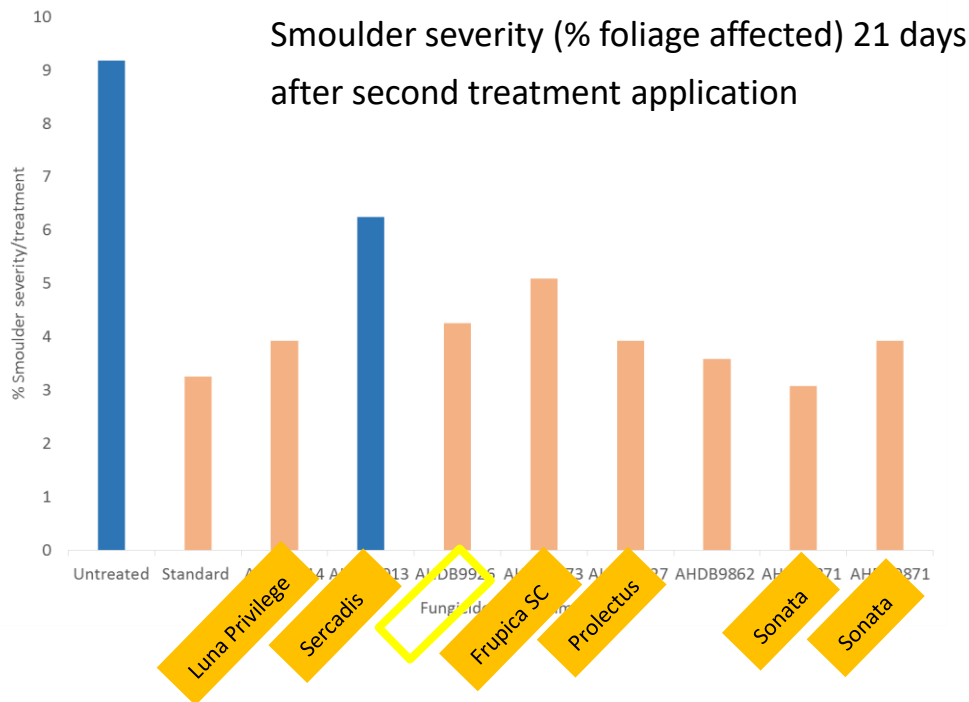
Severity: No sig. difference

Smoulder

Av. disease severity (untreated) = 6.66%

Incidence: No sig difference between treatments at any time point

Severity: At third assessment significantly different for all programmes apart from AHDB 9913 (worse/higher severity).



Orange bars represent severity values significantly lower than the untreated control, $p < 0.05$, L.S.D. = 3.5

Year 1 – Efficacy

- Products reduced incidence and severity of both white mould and smoulder.

Year 2 – Programme optimisation

- Promising products from year 1 taken forward to year 2 trials
- Disease pressure was low
- No significant differences in white mould control, or smoulder incidence between any programme and untreated control.
- 3rd assessment - All programmes, apart from AHDB9913, reduced smoulder severity, including the biological product AHDB9871 reaffirming its potential for use as a component of an IPM programme.
- No phytotoxicity of commercial concern





Frupica SC

- Mepanipyrin (AP fungicide) FRAC 9. EAMU 1294/2019
- Control of Botryis and powdery mildew
- Limited to 2 applications per crop
- Some limited phytotoxicity in ferns Polystichum and Dryopteris
- Application to outdoor ornamentals must only be made between 15 May and 30 September.
- Application to outdoor ornamentals must only be made after 1st flower (BBCH 49), immediately post trimming .

Frupica SC

- Mepanipyrim (AP)
- FRAC 9
- Botrytis and powdery mildew
- 2 applications per crop
- Outdoor 15 May-30 Sept
- after 1st flower (BBCH 49), immediately post trimming .

Luna Privilege

- Fluopyram
- FRAC 7
- Powdery mildew and botrytis
- Best vs White mould and smoulder
- Max. 2 treatments per year
- Not in areas with stem veg. within 365 days

Prolectus

- Fenpyrazamine
- FRAC 17
- Botrytis
- White mould and smoulder
- Max. 3 treatments per year
- 1 day before harvest
- March-Sept
- Apply protectively
- Low level phytotoxicity on ferns

Sercadis

- Fluxapyroxad
- FRAC 7
- Botrytis, powdery mildew, smoulder (narcissus)
- Outdoor & temporary protection: 1 Apr-30 Sept only

Amylo X WG

- *Bacillus amyloliquefaciens* D747
- EAMU 0428/2019
- Max. dose 2.5 kg/Ha
- Max. 6 treatments per year
- Outdoor - Apply March to October
- Protected – all year. 7 day interval
- *Scerotinia* spp, *Botrytis cinerea*, *Stemphylium* (*Stemphylium botryosum*), Fireblight (*Erwinia amylovora*), *Monilia* spp, Anthracnose (*Colletotrichum spinaciae*), *Cercospora* (*Cercospora beticola*), Bacterial Canker (*Pseudomonas syringae*), Downy mildew, Powdery mildew, Damping off diseases including *Pythium* sp, *Rhizoctonia* sp and *Fusarium* sp.

Sonata

- *Bacillus pumilus* QST2808
- EAMU 0710/2021
- Powdery mildew, white mould and smoulder in narcissus.
- Max. dose 10L/Ha
- Max. 6 treatments per year
- Applications between first true leaf stage (BBCH 11) and full maturity (BBCH 89)

SP47b – Powdery mildew control in protected ornamentals



Stockbridge Technology Centre - Lauren Branfield and Aleana Cairns

Objectives:

- Compare use of biopesticides individually and in combination against a standard fungicide programme.
- **Luna Privilege** has EAMU and AHDB 9926 EAMU submitted
- Biologicals: **Fytosave**, **Romeo**, **Sonata**, **AQ10**

Target pathogen: *Erysiphe lonicerae*, powdery mildew

Species: Susceptible variety of honeysuckle.



Lonicera periclymenum

Trial set up

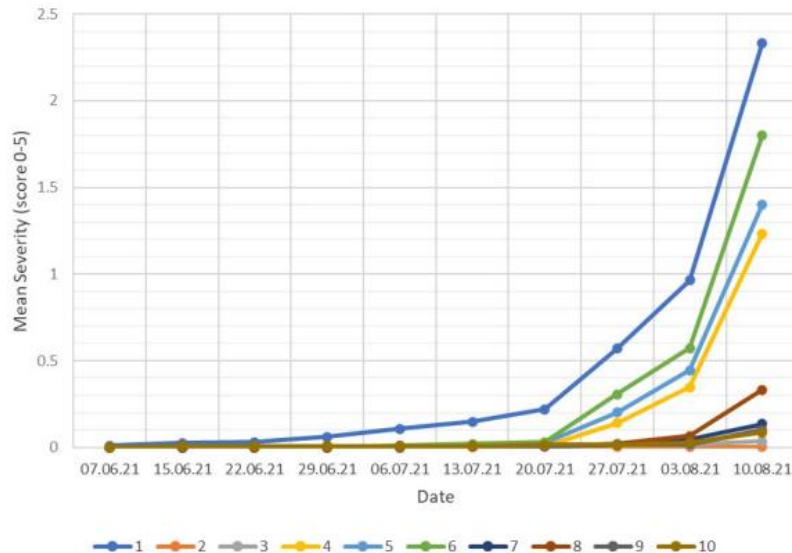
- Inoculated trial – *Erysiphe lonicerae*
- Infector plants dispersed through the trial after first application.
- 9 treatments –
- Assessments
 - Disease severity and incidence (0-5 scale)
 - Phytotoxicity (0-2 scale)

Treatment	Product name/AHDB code
1	Untreated control
2	Amistar, Frupica, Switch, Nimrod, Signum, Switch
3	Luna Privilege
4	AHDB 9926
5	Fytosave
6	Romeo
7	Fytosave, Sonata
8	Romeo, Sonata
9	Fytosave, AQ10+Activator 90
10	Romeo, AQ10+Activator 90

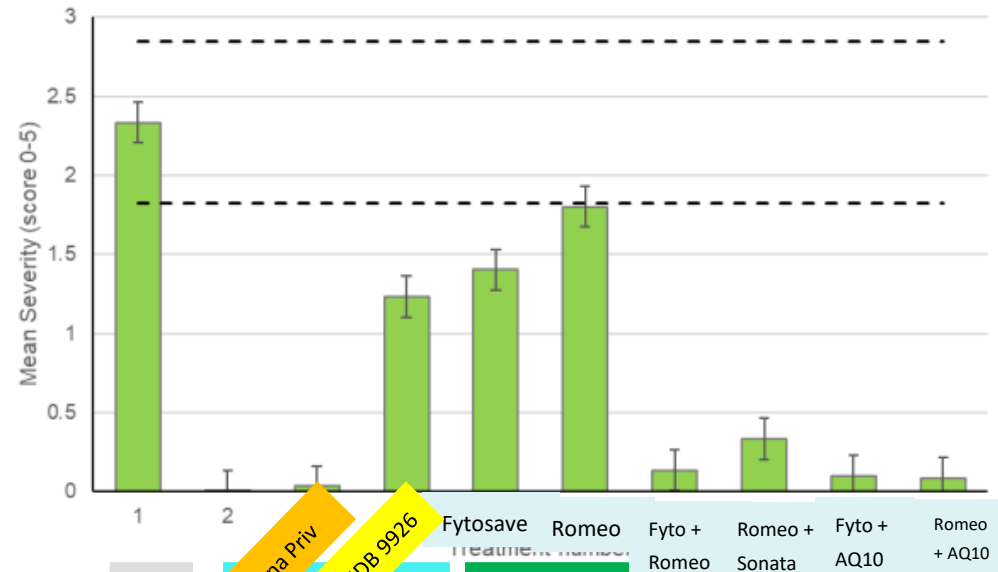
Results

- No phytotoxicity observed during trial.
- Treatments 2-10 significantly different to the untreated control for severity and incidence
- Treatments 4, 5, 6 were sig. different to all the other treatments in the final assessments.

Powdery Mildew Mean Disease Severity Over Time



Powdery Mildew Mean Disease Severity on 10/08/21



Luna Priv

AHDB 9926



Acknowledgements



RSK ADAS team

Agrichem companies

AHDB Horticulture

Wyevale Nurseries

JH Richards and sons.

Stockbridge technology centre - Lauren Branfield and Aleana Cairns



Conclusions

- Products reduced severity of botrytis
- All products reduced severity on Heuchera at last assessment
- AHDB 9926, **Luna Privilege** and **Sercadis** gave best control (SDHIs)
- Only slight commercially acceptable phytotoxicity on ferns
- EAMU status gained for **Luna Privilege**, **Sercadis**, **Sonata**, **Frupica SC** and **Prolectus**
- AHDB 9926 – EAMU submitted

