CEREALS / SEED TREATMENT TRIALS
EFFICACY OF SEED TREATMENT FUNGICIDES IN SPRING BARLEY AND SPRING WHEAT

Study director: Marja Jalli

Trial ID	Crop	Variety	Location	Experimental starting and completion
F-12-226-05	Spring barley	Rolfi	Jokioinen	May 23rd and August 27th 2012
F-12-227-05	Spring wheat	Bjarne	Jokioinen	May 16th and September 4th 2012

Purpose of trials: Evaluate the biological efficacy of seed treatment fungicides against leaf stripe and net blotch in spring barley and Fusarium root rot in spring wheat

SUMMARY

The efficacy of the seed treatment fungicide **Baytan Trio** (*fluopyram* 5 g/l, *fluoxastrobin* 25 g/l and *triadimenol* 150 g/l) was tested in one spring barley and one spring wheat trial at MTT Agrifood Research Finland in 2012. The field trials were located in Jokioinen and they were carried out according to GEP standards and relevant EPPO guidelines.

The efficacy of the fungicides against leaf stripe (*Pyrenophora graminea*) and net blotch (*Pyrenophora teres*) was tested in the spring barley trial F-12-226-05. The treatments in the trial were Baytan Trio at rates 100 ml and 150 ml per 100 kg seeds, **Baytan Universal** (*triadimenol* 75 g/l, *fuberidazol* 9 g/l and *imazalil* 10 g/l) 300 ml/100 kg, **Raxil Star** (*fluopyram* 20 g/l, *prothioconazole* 100 g/l and *tebuconazole* 60 g/l) 50 ml/100 kg, **Zardex G** (*cyproconazole* 5 g/l, *imazalil* 20 g/l) 200 ml/100 kg and **Lamardor FS 400** (*tebuconazole* 150 g/l and *prothioconazole* 250 g/l) 20 ml/100 kg. In the spring wheat trial F-12-227-05, the efficacy against Fusarium root rot was tested. The treatments were the same as in the barley trial, with the exception of the Zardex G, that was replaced with **Celest Formula M** (*fludioxonil* 25 g/l) at rate 150 ml/100 kg. An untreated control was included in both trials.

The season 2012 was cool and humid. In the end of August, the temperature sum was 5 days behind the long term average (1981-2010). The precipitation in May-July was 27 mm above the average. The season was favourable for leaf spot diseases. The rotation of dry and rainy days in July promoted also powdery mildew (*Blumeria graminis*) infection. In either of the trials no phytotoxicity symptoms or lodging was observed.

The trial F-12-226-05 was sown with a spring barley cultivar Rolfi (germination 94 %, tkw 40.2 g, *P. graminea* infection 24 %) on May 23rd. The emergence of the seedlings was counted twice. 13 days after the sowing, the number of emerged seedlings in the untreated plots was 186/m^2. At that time, the highest density was in the Raxil Star 50 ml/100 kg treated plots (211 seedlings/m^2) and the lowest in the Baytan Universal 300 ml/100 kg treated plots (168 seedlings/m^2). Ten days later, at BBCH 21, the density in the untreated plots had increased to 354 seedlings/m^2. The best emergence was in the Baytan Trio 150 ml/100 kg treated plots (114 % compared to the untreated) and the lowest in the Baytan Universal 300 ml/100 kg treated plots (84 % compared to the untreated). Also, the density in the Lamardor FS 400 20 ml/100 kg treated plots was significantly lower than in the untreated control (92 % compared to the untreated). The visual observations on density were made at BBCH 30, and at that time there were no differences between the treatments (93.8-96.3 % density in all treatments, including the untreated control). The level of the seed borne net blotch infection was low in the trial. At BBCH 21, 1 % of the seedlings in the untreated plots were infected by net blotch. In the fungicide treated plots, the infection level was 0.1-0.5 %. In Baytan Trio 100 ml/100 kg, Zardex G 200 ml/100 kg and Lamardor FS 400 20 ml/100 kg treated plots, the infection level was slightly higher than in other fungicide treated plots. One month later, at BBCH 59, the net blotch level in the untreated plots was 2.25 % and in the fungicide treated plots 1.13-1.75 %. The final net blotch observations were made at BBCH 82 when the infection level in the untreated plots was 18.3 % and 15-17.3 % in the fungicide treated plots. The lowest infection level was in the Zardex G 200 ml/100 kg and Lamardor FS 400 20 ml/100 kg treated plots. The barley leaf stripe infection was counted at BBCH 59 when the frequency of infected plants in the untreated control was 26.7 %. In a heavy infection pressure, all treatments had an excellent control effect on leaf stripe (83-96 % efficacy). The best efficacy was achieved with Baytan Universal 300 ml/100 kg. The efficacy of Baytan Trio treatments was 90-92 %. Also, 1.1 % loose smut (*Ustilago nuda*) infection was observed in the untreated plots. All the treatments had excellent (96-100 %) efficacy against the low loose smut infection. At heading, powdery mildew attacked the trial. The infection level in the trial was 4.5 – 9 % with

no statistically significant differences between the treatments. The grain yield in the untreated plots was 3 822 kg/ha. All fungicide treatments increased the yield (6-16 %). The highest increase was achieved with Baytan Trio 100 ml/100 kg and Raxil Star 50 ml/100 kg. However, the differences were not statistically significant due to the variation between the replicates.

The trial F-12-227-05 was sown with a spring wheat cultivar Bjarne (germination 70 %, tkw 35.22 g) on May 16th. 19 days after the sowing, the number of emerged seedlings in the untreated plots was 508 / m^2. The stem disease infection level was observed from 100 seedlings per plot at BBCH 22. The amount of completely healthy stems was low in the trial. In the untreated plots, the frequency of healthy plants was 5.3 % and in the fungicide treated plots 6.3-14.3 %. The stem disease index in the untreated plots was 32.63 and on the same level or slightly lower in the fungicide treated plots (26.35-32.65).

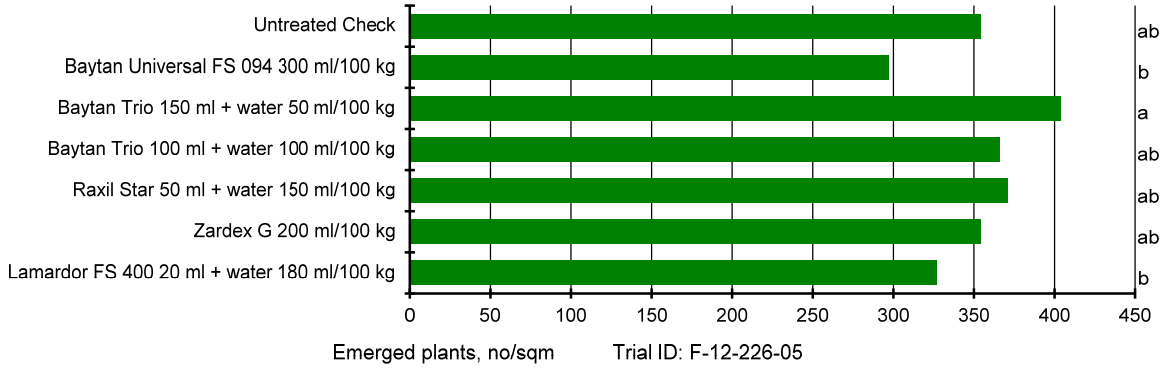

Figure 1. In the barley trial, the emergence of the seedlings was highest in the Baytan Trio 150 ml/100 kg treated plots.

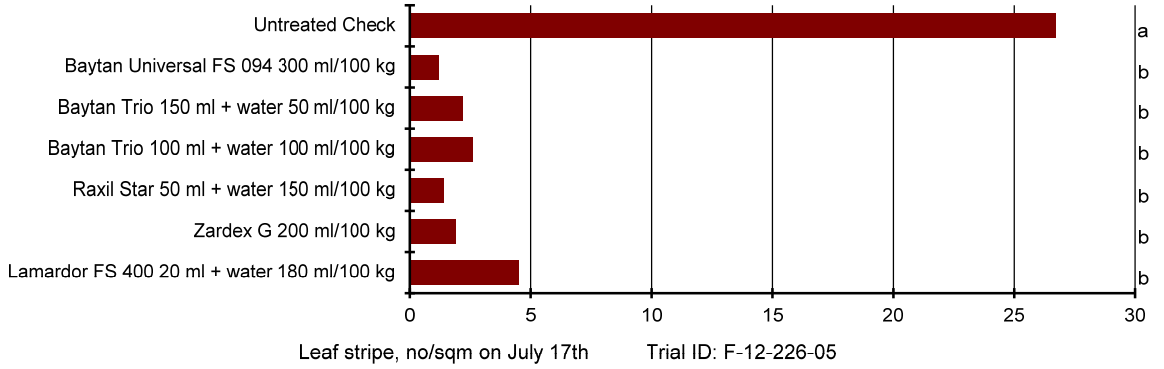

Figure 2. In the barley trial, all treatments had an excellent control effect on leaf stripe.

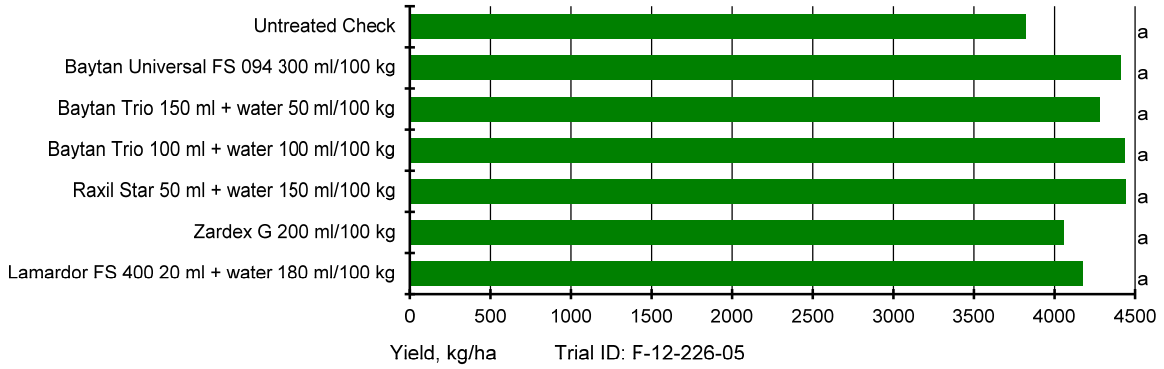

Figure 3. In the barley trial, all seed treatments had a positive effect on grain yield.

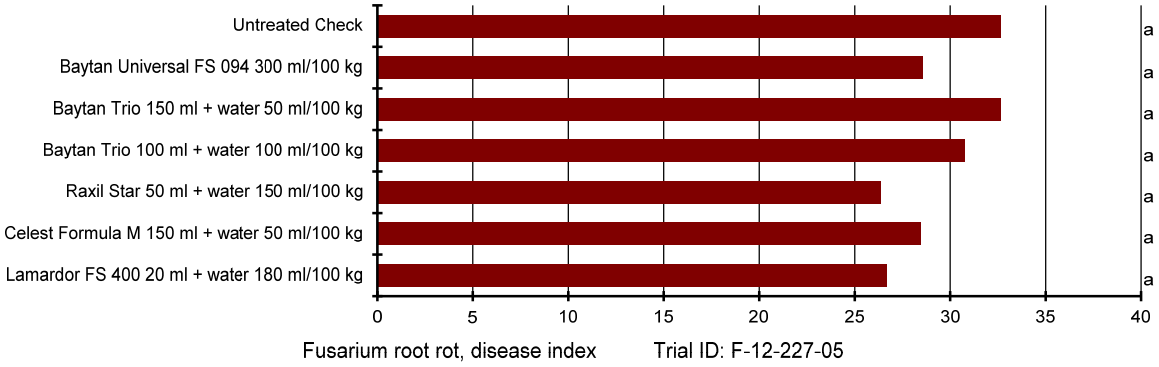

Figure 4. In the spring wheat trial, the stem disease infection was slightly lower in the fungicide treated plots.

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Efficacy of seed treatment fungicides against leaf stripe and leaf blotch in spring barley

Trial ID: F-12-226-05 Protocol ID: F-12-226-05
Location: Jokioinen Study Director: Marja Jalli
Project ID: Investigator: Ulla Heinonen

Trt No.	Treatment Name	Form Conc	Form Type	Lot Code	Rate	Rate Unit	Appl Code
1	Untreated Check						
2	Baytan Universal FS 094	94	FS	2009-001735	300	ml/100 kg	A
	-triadimenol	75			22.5	g AI	
	-fuberidazol	9			2.7	g AI	
	-imazalil	10			3	g AI	
3	Baytan Trio	180	SC	2010-005643*1.0	150	ml/100 kg	A
	-fluopyram	5			0.75	g AI	
	-fluoxastrobin	25			3.75	g AI	
	-triadimenol	150			22.5	g AI	
	water		LS		50	ml/100 kg	A
4	Baytan Trio	180	SC	2010-005643*1.0	100	ml/100 kg	A
	-fluopyram	5			0.5	g AI	
	-fluoxastrobin	25			2.5	g AI	
	-triadimenol	150			15	g AI	
	water		LS		100	ml/100 kg	A
5	Raxil Star	180	FS	2009-006702*0.1	50	ml/100 kg	A
	-fluopyram	20			1	g AI	
	-prothioconazole	100			5	g AI	
	-tebuconazole	60			3	g AI	
	water		LS		150	ml/100 kg	A
6	Zardex G	25	FS	POR0K02441	200	ml/100 kg	A
	-cyproconazole	5			1	g AI	
	-imazalil	20			4	g AI	
7	Lamardor FS 400	400	FS	ECEP000061	20	ml/100 kg	A
	-tebuconazole	150			3	g AI	
	-prothioconazole	250			5	g AI	
	water		LS		180	ml/100 kg	A

Replications: 4, Untreated treatments: 1, Conduct under GLP/GEP: Yes (GEP with audit trail), Design: Randomized Complete Block (RCB), Treatment units: Treated 'Plot' experimental unit size, Dry Form. Unit: %, Treated 'Plot' experimental unit size Width: 1.25 meters, Treated 'Plot' experimental unit size Length: 8 meters, Slurry rate: 200 mL/100 kg, Mix size: 1300 g seed, Format definitions: G-All7.def, G-All7.frm

MTT Agrifood Research Finland

Efficacy of seed treatment fungicides against leaf stripe and leaf blotch in spring barley

Trial ID: F-12-226-05 Protocol ID: F-12-226-05
Location: Jokioinen Study Director: Marja Jalli
Project ID: Investigator: Ulla Heinonen

General Trial Information

Study Director: Marja Jalli **Title:** Principal Research Scientist
Investigator: Ulla Heinonen **Title:** Research Scientist

Trial Location

City: Jokioinen **Latitude of LL Corner °:** 60.81193 N
Longitude of LL Corner °: 23.48393 E
Postal Code: FI-31600 **Altitude of LL Corner, Unit:** 98.00 m
Country: FIN Finland
Angle y-axis to North °: 10.00

Conducted Under GEP: Yes

No.	Guideline	Description
1.	PP 1/19(4)	Seed-borne cereal fungi
2.	PP 1/135(3)	Phytotoxicity assessment
3.	PP 1/152(3)	Design and analysis of efficacy evaluation trials
4.	PP 1/181(3)	Conduct and reporting of efficacy evaluation trials including GEP

Objectives:
Studying the biological efficacy of seed treatment fungicides against leaf stripe and leaf blotch in spring barley.

Personnel

Study Director: Marja Jalli **Title:** Principal Research Scientist
Affiliation: MTT Agrifood Research Finland
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Location: Jokioinen, Finland
Postal Code: 31600 **E-mail:** marja.jalli@mtt.fi
Investigator: Ulla Heinonen **Title:** Research Scientist
Affiliation: MTT Agrifood Research Finland
Address: Laboratorium
Location: Jokioinen, Finland
Postal Code: 31600 **E-mail:** ulla.heinonen@mtt.fi

Cooperator/Landowner

Cooperator: MTT
Organization: Maa- ja elintarviketalouden tutkimus
City: Jokioinen
Postal Code: 31600
Country: FIN Egentliga Tavastland

Crop Description

Crop 1: HORVS Hordeum vulgare Spring barley
Variety: Rolfi
BBCH Scale: BCER **Planting Date:** 23/5/12
Planting Method: DRILLE drilled
Depth, Unit: 5 cm
Row Spacing, Unit: 12.5 cm
Seed Bed: CLODDY cloddy
Soil Moisture: WET wet
Harvest Date: 20/8/12 **Harvest Equipment:** Wintersteiger
Harvested Width, Unit: 1.25 m **Harvested Length, Unit:** 8 m
% Standard Moisture: 28.7

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Pest Description

Pest 1 Type: D **Code:** PYRNGR Pyrenophora graminea
Common Name: Leaf stripe of barley

Pest 2 Type: D **Code:** RHYNSE Rhynchosporium secalis
Common Name: Leaf blotch of cereals

Site and Design

Plot Width, Unit: 1.25 m
Plot Length, Unit: 8 m
Plot Area, Unit: 10 m2
Replications: 4
Site Type: FIELD field
Tillage Type: CONTIL conventional-till
Study Design: RACOBL Randomized Complete Block (RCB)
Untreated Arrangement: INCLUDED single control randomized in each block

No.	Previous Crop	Previous Pesticides	Year
1.	spring wheat	Ariane S	2011

Maintenance

No.	Date	Maintenance Treatment Name	Rate	Rate Unit
1.	23/5/12	Pellon Y3 (N:23 P:3 K:8)	437	kg/ha
2.	14/6/12	Ariane S	1.75	l/ha
3.	29/6/12	Ariane S	1.75	l/ha

Soil Description

Texture: HEAVC heavy clay
pH: 6.12

Moisture and Weather Conditions

Closest Weather Station: Jokioinen, Ilmala **Distance, Unit:** 0.9 km

Application Description

	A
Application Date:	26/4/12
Time of Day:	10:00
Application Method:	SEETRE
Application Placement:	SEED
Applied By:	PK

Crop Stage At Each Application

	A
Crop 1 Code, BBCH Scale:	HORVS BCER
Stage Scale Used:	BBCH
Stage Majority, Percent:	00

Pest Stage At Each Application

	A
Pest 1 Code, Type, Scale:	PYRNGR D
Pest 2 Code, Type, Scale:	RHYNSE D

Application Equipment

	A
Appl. Equipment:	Hege 11
Equipment Type:	SEEDDR
Mix Size, Unit:	1300 g seed

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Efficacy of seed treatment fungicides against leaf stripe and leaf blotch in spring barley

Trial ID: F-12-226-05 Protocol ID: F-12-226-05
Location: Jokioinen Study Director: Marja Jalli
Project ID: Investigator: Ulla Heinonen

Trt No.	Treatment Name	Rate	Rate Unit	2	4	7	6	9	14	8
	Pest Code			HORVS	HORVS	HORVS	PYRNTE HORVS	PYRNTE HORVS	PYRNTE HORVS	ERYSGH HORVS
	Crop Code			Rolfi	Rolfi	Rolfi	Rolfi	Rolfi	Rolfi	Rolfi
	Crop Variety			PLAEME -	PLAEME -	PLANT -	PLAEME -	LEAF -	LEAF -	LEAF -
	Part Rated			5/6/12	15/6/12	21/6/12	15/6/12	13/7/12	15/8/12	13/7/12
	Rating Date			COUPLA	COUPLA	DENSTY	COUPLA	DAMDIS	DAMDIS	DAMDIS
	Rating Type			number	number	percent	percent	percent	percent	percent
	Rating Unit			1 sqm	1 sqm	1 plot		1 plot	1 plot	1 plot
	Sample Size, Unit				21	30	21	59	82	59
	Crop Stage Majority				BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
	Crop Stage Scale			T1 APOC	T2 APOC		T3 APC	APC	APC	APC
	ARM Action Codes									
1	Untreated Check			186 a (100%)	354 ab (100%)	96.3 a	1.0 a (0%)	2.25 a (0%)	18.3 a (0%)	9.0 a (0%)
2	Baytan Universal FS 094	300	ml/100 kg	168 a (90%)	297 b (84%)	96.3 a	0.1 b (92%)	1.25 b (44%)	17.3 ab (5%)	5.8 a (36%)
3	Baytan Trio	150	ml/100 kg	182 a (98%)	404 a (114%)	96.3 a	0.1 b (88%)	1.38 ab (39%)	15.8 ab (14%)	6.0 a (33%)
	water	50	ml/100 kg							
4	Baytan Trio	100	ml/100 kg	194 a (104%)	366 ab (103%)	93.8 a	0.5 ab (50%)	1.63 ab (28%)	16.5 ab (10%)	4.5 a (50%)
	water	100	ml/100 kg							
5	Raxil Star	50	ml/100 kg	211 a (113%)	371 ab (105%)	93.8 a	0.1 b (87%)	1.13 b (50%)	17.3 ab (5%)	7.0 a (22%)
	water	150	ml/100 kg							
6	Zardex G	200	ml/100 kg	199 a (107%)	354 ab (100%)	96.3 a	0.5 ab (49%)	1.75 ab (22%)	15.0 b (18%)	5.3 a (42%)
7	Lamardor FS 400	20	ml/100 kg	191 a (102%)	327 b (92%)	93.8 a	0.3 ab (66%)	1.50 ab (33%)	15.0 b (18%)	8.3 a (8%)
	water	180	ml/100 kg							
	LSD (P=.05)			44.3	49.7	3.50	0.52	0.655	1.86	3.49
	Standard Deviation			29.8	33.5	2.36	0.35	0.441	1.25	2.35
	CV			15.68	9.47	2.48	90.68	28.38	7.63	35.91
	Bartlett's X2			5.177	4.433	3.472	7.113	3.32	2.626	7.082
	P(Bartlett's X2)			0.521	0.618	0.748	0.311	0.768	0.757	0.313
	Replicate F			16.121	1.936	13.875	1.654	10.821	11.394	1.217
	Replicate Prob(F)			0.0001	0.1600	0.0001	0.2124	0.0003	0.0002	0.3323
	Treatment F			0.833	4.087	1.286	3.516	2.878	3.909	1.928
	Treatment Prob(F)			0.5601	0.0092	0.3127	0.0176	0.0381	0.0112	0.1310

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Column 1: T1 = @SUMSUB([C1])*0.8
Column 2: T2 = @SUMSUB([C3])
Column 4: T3 = [C5]/[C3]*100

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Efficacy of seed treatment fungicides against leaf stripe and leaf blotch in spring barley

Trial ID: F-12-226-05 Protocol ID: F-12-226-05
Location: Jokioinen Study Director: Marja Jalli
Project ID: Investigator: Ulla Heinonen

Trt No.	Treatment Name	Rate	Rate Unit	11	13	16
	Pest Code			PYRNGR	USTINH	
	Crop Code			HORVS	HORVS	HORVS
	Crop Variety			Rolfi	Rolfi	Rolfi
	Part Rated			PLALIV -	EAR -	GRAIN -
	Rating Date			17/7/12	17/7/12	20/8/12
	Rating Type			DAMDIS	DAMDIS	YIELD
	Rating Unit			number	number	kg
	Sample Size, Unit			1 m2	1 m2	1 ha
	Crop Stage Majority			59	59	99
	Crop Stage Scale			BBCH	BBCH	BBCH
	ARM Action Codes			T4 APC	T5 APC	APOC T6
1	Untreated Check			26.7 a (0%)	1.1 a (0%)	3822 a (100%)
2	Baytan Universal FS 094	300	ml/100 kg	1.2 b (96%)	0.0 b (100%)	4411 a (115%)
3	Baytan Trio	150	ml/100 kg	2.2 b (92%)	0.1 b (96%)	4283 a (112%)
	water	50	ml/100 kg			
4	Baytan Trio	100	ml/100 kg	2.6 b (90%)	0.0 b (100%)	4439 a (116%)
	water	100	ml/100 kg			
5	Raxil Star	50	ml/100 kg	1.4 b (95%)	0.0 b (100%)	4443 a (116%)
	water	150	ml/100 kg			
6	Zardex G	200	ml/100 kg	1.9 b (93%)	0.0 b (100%)	4054 a (106%)
7	Lamardor FS 400	20	ml/100 kg	4.5 b (83%)	0.0 b (100%)	4174 a (109%)
	water	180	ml/100 kg			
	LSD (P=.05)			2.95	0.08	410.1
	Standard Deviation			1.99	0.05	276.0
	CV			34.54	30.72	6.52
	Bartlett's X2			38.771	1.623	11.247
	P(Bartlett's X2)			0.001*	0.203	0.081
	Replicate F			0.977	1.209	3.020
	Replicate Prob(F)			0.4253	0.3350	0.0568
	Treatment F			87.360	268.522	2.839
	Treatment Prob(F)			0.0001	0.0001	0.0399

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Column 1: T4 = [C10]/10
Column 2: T5 = [C12]/10
Column 3: T6 = 1000.0*[15]*(100-@AVGSUB([17]))/85

MTT Agrifood Research Finland

Efficacy of seed treatment fungicides against Fusarium root rot in spring wheat

Trial ID: F-12-227-05 Protocol ID: F-12-227-05
Location: Jokioinen Study Director: Marja Jalli
Project ID: Investigator: Ulla Heinonen

Trt No.	Treatment Name	Form Conc	Form Type	Lot Code	Rate	Rate Unit	Appl Code
1	Untreated Check						
2	Baytan Universal FS 094	94	FS	2009-001735	300	ml/100 kg	A
	-triadimenol	75			22.5	g AI	
	-fuberidazol	9			2.7	g AI	
	-imazalil	10			3	g AI	
3	Baytan Trio	180	SC	2010-005643*1.0	150	ml/100 kg	A
	-fluopyram	5			0.75	g AI	
	-fluoxastrobin	25			3.75	g AI	
	-triadimenol	150			22.5	g AI	
	water		LS		50	ml/100 kg	A
4	Baytan Trio	180	SC	2010-005643*1.0	100	ml/100 kg	A
	-fluopyram	5			0.5	g AI	
	-fluoxastrobin	25			2.5	g AI	
	-triadimenol	150			15	g AI	
	water		LS		100	ml/100 kg	A
5	Raxil Star	180	FS	2009-006702*0.1	50	ml/100 kg	A
	-fluopyram	20			1	g AI	
	-prothioconazole	100			5	g AI	
	-tebuconazole	60			3	g AI	
	water		LS		150	ml/100 kg	A
6	Celest Formula M	25	FS	SSP9F549	150	ml/100 kg	A
	-fludioxonil	25			3.75	g AI	
	water		LS		50	ml/100 kg	A
7	Lamardor FS 400	400	FS	ECEP000061	20	ml/100 kg	A
	-tebuconazole	150			3	g AI	
	-prothioconazole	250			5	g AI	
	water		LS		180	ml/100 kg	A

Replications: 4, Untreated treatments: 1, Conduct under GLP/GEP: Yes (GEP with audit trail), Design: Randomized Complete Block (RCB), Treatment units: Treated 'Plot' experimental unit size, Dry Form. Unit: %, Treated 'Plot' experimental unit size Width: 1.25 meters, Treated 'Plot' experimental unit size Length: 8 meters, Slurry rate: 200 mL/100 kg, Mix size: 1500 g seed, Format definitions: G-All7.def, G-All7.frm

MTT Agrifood Research Finland

Efficacy of seed treatment fungicides against Fusarium root rot in spring wheat

Trial ID: F-12-227-05 Protocol ID: F-12-227-05
Location: Jokioinen Study Director: Marja Jalli
Project ID: Investigator: Ulla Heinonen

General Trial Information

Study Director: Marja Jalli **Title:** Principal Research Scientist
Investigator: Ulla Heinonen **Title:** Research Scientist

Trial Location

City: Jokioinen **Latitude of LL Corner °:** 60.81273 N
Longitude of LL Corner °: 23.47848 E
Postal Code: FI-31600 **Altitude of LL Corner, Unit:** 101.00 m
Country: FIN Finland
Angle y-axis to North °: 185.00

Conducted Under GEP: Yes

No.	Guideline	Description
1.	PP 1/19(4)	Seed-borne cereal fungi
2.	PP 1/135(3)	Phytotoxicity assessment
3.	PP 1/152(3)	Design and analysis of efficacy evaluation trials
4.	PP 1/181(3)	Conduct and reporting of efficacy evaluation trials including GEP

Objectives:
Studying the biological efficacy of seed treatment fungicides against Fusarium root rot in spring wheat.

Personnel

Study Director: Marja Jalli **Title:** Principal Research Scientist
Affiliation: MTT Agrifood Research Finland
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Location: Jokioinen, Finland
Postal Code: 31600 **E-mail:** marja.jalli@mtt.fi
Investigator: Ulla Heinonen **Title:** Research Scientist
Affiliation: MTT Agrifood Research Finland
Address: Laboratorium
Location: Jokioinen, Finland
Postal Code: 31600 **E-mail:** ulla.heinonen@mtt.fi

Cooperator/Landowner

Cooperator: MTT
Organization: Agrifood Research Finland
City: Jokioinen
Postal Code: 31600
Country: FIN Egentliga Tavastland

Crop Description

Crop 1: TRZAS Triticum aestivum (spring) Spring wheat
Variety: Bjarne
BBCH Scale: BCER **Planting Date:** 16/5/12
Planting Method: DRILLE drilled **Rate, Unit:** 500 seed/m2
Depth, Unit: 5 cm
Row Spacing, Unit: 12.5 cm
Seed Bed: CLODDY cloddy
Soil Moisture: DAMP damp
Harvest Date: 30/8/12 **Harvest Equipment:** Wintersteiger
Harvested Width, Unit: 1.25 m **Harvested Length, Unit:** 8 m
% Standard Moisture: 29.0

Pest Description

Pest 1 Type: D **Code:** FUSASP Fusarium sp.
Common Name: Fusarium sp.

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Site and Design

Plot Width, Unit: 1.25 m **Site Type:** FIELD field
Plot Length, Unit: 8 m
Plot Area, Unit: 10 m2 **Tillage Type:** CONTIL conventional-till
Replications: 4 **Study Design:** RACOBL Randomized Complete Block (RCB)

No.	Previous Crop	Previous Pesticides	Year
1.	spring wheat	Ariane S	2011

Maintenance

No.	Date	Maintenance Treatment Name	Rate	Rate Unit
1.	16/5/12	Pellon Y3 (N:23 P:3 K:8)	437	kg/ha
2.	14/6/12	Ariane S	1.75	l/ha
3.	29/6/12	Ariane S	1.75	l/ha

Soil Description

Texture: HEAVC heavy clay
pH: 6.1

Moisture and Weather Conditions

Closest Weather Station: Jokioinen, Ilmala **Distance, Unit:** 1.1 km

Application Description

	A
Application Date:	26/4/12
Time of Day:	9:00
Application Method:	SEETRE
Application Placement:	SEED
Applied By:	PK

Crop Stage At Each Application

	A
Crop 1 Code, BBCH Scale:	TRZAS BCER
Stage Scale Used:	BBCH
Stage Majority, Percent:	00

Pest Stage At Each Application

	A
Pest 1 Code, Type, Scale:	FUSASP D

Application Equipment

	A
Appl. Equipment:	Hege 11
Equipment Type:	SEEDDR
Mix Size, Unit:	1500 g seed

MTT Agrifood Research Finland

Efficacy of seed treatment fungicides against Fusarium root rot in spring wheat

Trial ID: F-12-227-05 Protocol ID: F-12-227-05
Location: Jokioinen Study Director: Marja Jalli
Project ID: Investigator: Ulla Heinonen

Trt No.	Treatment Name	Rate Rate Unit	8	9	10	11	12	13
	Pest Code		FUSASP	FUSASP	FUSASP	FUSASP	FUSASP	FUSASP
	Crop Code		TRZAS	TRZAS	TRZAS	TRZAS	TRZAS	TRZAS
	Crop Variety		Bjarne	Bjarne	Bjarne	Bjarne	Bjarne	Bjarne
	Part Rated		ROPRIN -	ROPRIN -	ROPRIN -	ROPRIN -	ROPRIN -	ROPRIN -
	Rating Date		18/6/12	18/6/12	18/6/12	18/6/12	18/6/12	18/6/12
	Rating Type		A	B	C	D	E	DAMDIS
	Rating Unit		percent	percent	percent	percent	percent	index
	Sample Size, Unit							
	Crop Stage Majority		22	22	22	22	22	22
	Crop Stage Scale		BBCH	BBCH	BBCH	BBCH	BBCH	BBCH
	Footnote Number		1	2	3	4	5	
	ARM Action Codes		T2 APOC	T4	T5	T6	T3	T7 APC
1	Untreated Check		5.3 a (100%)	54.0 b	39.3 a	1.5 a	0.0 a	32.63 a (0%)
2	Baytan Universal FS 094	300 ml/100 kg	14.3 a (271%)	51.5 b	31.5 a	2.8 a	0.0 a	28.58 a (12%)
3	Baytan Trio	150 ml/100 kg	6.3 a	50.3 b	43.0 a	0.5 a	0.0 a	32.65 a
	water	50 ml/100 kg	(119%)					(0%)
4	Baytan Trio	100 ml/100 kg	7.8 a	54.8 b	35.5 a	2.0 a	0.0 a	30.76 a
	water	100 ml/100 kg	(148%)					(6%)
5	Raxil Star	50 ml/100 kg	13.5 a	56.5 b	28.5 a	1.5 a	0.0 a	26.35 a
	water	150 ml/100 kg	(257%)					(19%)
6	Celest Formula M	150 ml/100 kg	9.8 a	58.8 b	29.3 a	2.3 a	0.0 a	28.49 a
	water	50 ml/100 kg	(186%)					(13%)
7	Lamardor FS 400	20 ml/100 kg	9.0 a	67.3 a	22.8 a	1.0 a	0.0 a	26.68 a
	water	180 ml/100 kg	(171%)					(18%)
	LSD (P=.05)		12.57	7.85	13.39	2.88	0.00	8.044
	Standard Deviation		8.46	5.28	9.01	1.94	0.00	5.414
	CV		90.08	9.41	27.45	117.87	0.0	18.39
	Bartlett's X2		9.575	5.234	11.131	7.97	0.0	9.129
	P(Bartlett's X2)		0.144	0.514	0.084	0.24	.	0.166
	Replicate F		4.098	6.725	2.898	0.267	0.000	3.929
	Replicate Prob(F)		0.0222	0.0031	0.0635	0.8485	1.0000	0.0255
	Treatment F		0.656	4.615	2.354	0.619	0.000	0.933
	Treatment Prob(F)		0.6852	0.0053	0.0743	0.7127	1.0000	0.4954

Means followed by same letter do not significantly differ (P=.05, Student-Newman-Keuls)

Column 1: T2 = [C3]/@SUM([C3].[C7])*100
  Footnote: No symptoms
Column 2: T4 = [C4]/@SUM([C3].[C7])*100
  Footnote: Small spot on coleoptile
Column 3: T5 = [C5]/@SUM([C3].[C7])*100
  Footnote: More attack on coleoptile and some on roots, healthy plants
Column 4: T6 = [C6]/@SUM([C3].[C7])*100
  Footnote: Severe attack on coleoptile and roots, plants depressed
Column 5: T3 = [C7]/@SUM([C3].[C7])*100
  Footnote: Dead plants
Column 6: T7 = ([C4]+2*[C5]+3*[C6]+4*[C7])/@SUM([C3].[C8])*100/4