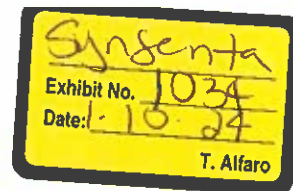




**Submission in opposition proceedings
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Proprietor/representative's reference

C426430EP

The information given below is pertaining to the following patent in opposition proceedings:

Patent No.

EP3073826

Application No.

EP14865506.1

Date of mention of the grant in the European Patent Bulletin (Art. 97(3), Art. 99(1) EPC)

30 October 2019

Title of the invention

A METHOD FOR CONTROLLING SOYBEAN RUST

Proprietor of the patent

UPL Limited

Requests:

• See attached written submissions

Documents attached:

	Description of document	Original file name	Assigned file name
1	Auxiliary request in opposition	APP - AR1 (clean) Jul 2023 C426430EP.PDF	AUXREQ-1.PDF
2	Auxiliary request in opposition	APP - AR2 (clean) Jul 2023 C426430EP.PDF	AUXREQ-2.PDF
3	Auxiliary request in opposition	APP - AR3 (clean) Jul 2023 C426430EP.PDF	AUXREQ-3.PDF
4	Auxiliary request in opposition	APP - AR4 (clean) Jul 2023 C426430EP.PDF	AUXREQ-4.PDF

C426430EP

Page 1 of 17

SYNGENTA EXHIBIT 1034
Syngenta v. UPL, PGR2023-00017

5	Auxiliary request in opposition	APP -AR5 (clean) Jul 2023 C426430EP.PDF	AUXREQ-5.PDF
6	Auxiliary request in opposition	APP -AR6 (clean) Jul 2023 C426430EP.PDF	AUXREQ-6.PDF
7	Auxiliary request in opposition	APP -AR? (clean) Jul 2023 C426430EP.PDF	AUXREQ-7.PDF
8	Auxiliary request in opposition	APP -AR8 (clean) Jul 2023 C426430EP.PDF	AUXREQ-8.PDF
9	Auxiliary request in opposition	APP -AR9 (clean) Jul 2023 C426430EP.PDF	AUXREQ-9.PDF
10	Auxiliary request in opposition	APP - AR10 (clean) Jul 2023 C426430EP.PDF	AUXREQ-10. PDF
11	Auxiliary request in opposition	APP - AR11 (clean) Jul 2023 C426430EP.PDF	AUXREQ-11.PDF
12	Auxiliary request in opposition	APP - AR1 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-12.PDF
13	Auxiliary request in opposition	APP - AR2 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-13. PDF
14	Auxiliary request in opposition	APP - AR3 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-14.PDF
15	Auxiliary request in opposition	APP - AR4 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-15. PDF
16	Auxiliary request in opposition	APP - AR5 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-16. PDF
17	Auxiliary request in opposition	APP - AR6 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-17.PDF
18	Auxiliary request in opposition	APP - AR? (tracked) Jul 2023 C426430EP.PDF	AUXREQ-18. PDF
19	Auxiliary request in opposition	APP - AR8 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-19. PDF
20	Auxiliary request in opposition	APP - AR9 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-20. PDF
21	Auxiliary request in opposition	APP - AR10 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-21.PDF
22	Auxiliary request in opposition	APP - AR11 (tracked) Jul 2023 C426430EP.PDF	AUXREQ-22. PDF
23	Any annexes (other than citation) to an opposition letter - Written submissions	Written submissions 17 Jul 2023 C426430EP.PDF	OTHER-1.PDF
24	Any annexes (other than citation) to an opposition letter - Annex	ANNEX July 2023 C426430EP.PDF	OTHER-2.PDF

Payment

1	Method of payment	Not specified
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Signatures

Place

Date:

18 July 2023

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C426430EP

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Capacity:

(Representative)

ANNEX

Additional experimental evidence

D58, D59 and D69 describe experiments which test the presence of synergy, using the Colby formula, for a variety of compositions according to the claims having different ratios of active ingredients. These are briefly summarised below.

Combination	Mancozeb (g/Ha)	Strobilurin (g/Ha)	Conazole (g/Ha)	Reference
(i) mancozeb, trifloxystrobin, prothioconazole	1125	60	70	D58, para. 21, row no. 2
	1125	60	70	D59 table, rows 10, 20, 27
	1125	60	70	D69 p3, 5
(ii) mancozeb, picoxystrobin, tebuconazole	1125	60	100	D59 table, row 12
	1125	60	100	D69 p3
	998	68	84	D69 p10-11 (row 8 of table)
(iii) mancozeb, picoxystrobin, cyproconazole	1125	60	24	D58, para. 21, row no. 3, 14
	1125	36	60	D59 table, rows 4, 14, 22, 29
	1125	36	60	D69 p3, 5
(iv) mancozeb, azoxystrobin, cyproconazole	1125	60	24	D58, para.21, row no. 5, 13
	1125	60	24	D59 table, rows 6, 16
	1125	60	24	D69 p3

Thus, synergy for differing absolute quantities and ratios of components has already been demonstrated for combinations (ii) and (iii), as defined in claim 1.

The following is a summary of additional experiments performed by UPL Brazil to assess the efficacy of combinations as defined in claim 1 as the ratio of the active ingredients therein is varied from that utilised in the examples given in the application as originally filed. The combinations concerned are three of the four recited in claim 1:

- (i) mancozeb, trifloxystrobin and prothioconazole;
- (ii) mancozeb, picoxystrobin and tebuconazole; and
- (iv) mancozeb, azoxystrobin and cyproconazole.

These ratios are summarised in the table below, and the details of each of experiments 1-8 (all performed on soybean plants) are provided hereafter. In each case, it is confirmed that the ternary combination shows synergistic control of soybean rust.

Combination	Mancozeb (g/Ha)	Strobilurin (g/Ha)	Conazole (g/Ha)	Experiment number, below
(i) mancozeb, trifloxystrobin and prothioconazole	1050	70	85	1
	1300	80	101	2

(ii) mancozeb, picoxystrobin and tebuconazole	900	48	80	3
	900	60	75	4
	1000	67	83	5
	1835	275	480	6
(iv) mancozeb, azoxystrobin and cyproconazole	1194	94	53	7
	1350	60	60	8

Synergy of the ternary combination in all the following experiments is assessed in all cases using the standard Colby formula:

$$\text{Expected control (E)} = A + B + C - \frac{(AB + AC + BC)}{100} + \frac{ABC}{10000}$$

Experiment 1

This test was carried out in Lucas do Rio Verde - MT in field conditions in the 2020/21 harvest. The culture variety was Monsoy 8372 IPRO. A spacing between lines of 0.45 m was used. To enable comparison, a variety of different sprays were used; each spray was applied to a test patch in the field, in accordance with the following protocol.

Location	Lucas do Rio Verde - MT
Coordinates	S -12,999194 W -55,9702222
Company	UPL Brasil
Cultivar	Monsoy 8372 IPRO
Sowing date	12-12-2020
Spray volume (L/ha)	150
Condition	Field
Replications	4
Replication	1 plot of 3 m x 6 m = 18m ²
Plants/replication	NA
Sprays	3
BBCH stage at first spray	40
Date of first spray	28-01-2021
BBCH stage at second spray	54
Date of second spray	11-02-2021
BBCH stage at third spray	68
Date of third spray	25-02-2021
<i>Phakopsora pachyrhizi</i> inoculation	Natural occurrence
Statistical analyses	Duncan 5%

The eight different sprays used were as follows. The "methyl soya" element is a methyl ester of soybean oil.

Spray no.	Product	Formulation type	Active ingredient	Cone. (g/L)	Dose (g/Ha)
1	Control		N/A		
2	Flint	WG	Trifloxystrobin	500	70
2	Strides	EC	Methyl soya	720	270
3	UPL 2030 FP	SC	Prothioconazole	480	85
3	Strides	EC	Methyl soya	720	270
4	Unizeb Gold	WG	Mancozeb	750	1050
4	Strides	EC	Methyl soya	720	270
5	Flint	WG	Trifloxystrobin	500	70
5	UPL 2030 FP	SC	Prothioconazole	480	85
5	Strides	EC	Methyl soya	720	270
6	Flint	WG	Trifloxystrobin	500	70
6	Unizeb Gold	WG	Mancozeb	750	1050
6	Strides	EC	Methyl soya	720	270
7	UPL 2030 FP	SC	Prothioconazole	480	85
7	Unizeb Gold	WG	Mancozeb	750	1050
7	Strides	EC	Methyl soya	720	270
8	Flint	WG	Trifloxystrobin	500	70
8	UPL 2030 FP	SC	Prothioconazole	480	85
8	Unizeb Gold	WG	Mancozeb	750	1050
8	Strides	EC	Methyl soya	720	270

Thus, spray 8 contained a ternary combination (i).

The percentage severity of *Phakopsora pachyrhizi* was observed at 28-DAC (that is, 28 days after the third application, also called application "C") and the results are tabled below.

Spray no.	Active ingredient	Severity (%)	Control observed (%)	Expected Colby Control(%)	Conclusion
1	Untreated	60.0	0.0	-	
2	Trifloxystrobin	44.9	25.2	-	
3	Prothioconazole	34.4	42.6	-	
4	Mancozeb	35.6	40.6	-	
5	Trifloxystrobin + Prothioconazole	30.5	49.3	57.1	Antagonism

6	Trifloxystrobin + Mancozeb	27.5	54.3	55.6	Antagonism
7	Prothioconazole + Mancozeb	25.4	57.7	66.0	Antagonism
8	Trifloxystrobin + Prothioconazole + Mancozeb	14.1	76.5	74.6	Synergy

Experiment 2

This test was performed at ARDS - Ituverava - SP in a vegetable house in 2021. The variety of the crop was 64H0133 IPRO. Two plants per pot were used, each pot with 5 liters of soil capacity. The first spray (application "A") was carried out in the development stage of the HARVEST 60 (R1) BBCH. The incidence of the disease was measured before the first spray, spray A, and 14 days after the second spray (14 DAB). To enable comparison, a variety of different sprays were used; each spray was applied in accordance with the following protocol.

Location	Ituverava - Sao Paulo
Coordinates	S -20,3243611 W -47,8088333
Company	UPL Brasil
Cultivar	64H0133 IPRO
Sowing date	27-04-2021
Spray volume (L/ha)	150
Condition	Greenhouse
Replications	6
Replication	1 pot of 5 L with 2 plants
Plants/replication	2
Sprays	2
BBCH stage at first spray	60
Date of first spray	21-06-2021
BBCH stage at second spray	67
Date of second spray	05-07-2021
<i>Phakopsora pachyrhizi</i> inoculation	25-06-2021
Statistical analyses	Duncan 5%

The eight different sprays used were as follows.

Spray no.	Product	Formulation type	Active ingredients	Cone. (g/L)	Dose (g/Ha)
1	Control (untreated)				
2	Flint	WG	Trifloxystrobin	500	80
2	Strides	EC	Methyl soya	720	270
3	UPL 2030 FP	SC	Prothioconazole	480	101
3	Strides	EC	Methyl soya	720	270
4	Unizeb Gold	WG	Mancozeb	750	1300
4	Strides	EC	Methyl soya	720	270
5	Flint	WG	Trifloxystrobin	500	80
5	UPL 2030 FP	SC	Prothioconazole	480	101
5	Strides	EC	Methyl soya	720	270
6	Flint	WG	Trifloxystrobin	500	80
6	Unizeb Gold	WG	Mancozeb	750	1300
6	Strides	EC	Methyl soya	720	270
7	UPL 2030 FP	SC	Prothioconazole	480	101
7	Unizeb Gold	WG	Mancozeb	750	1300
7	Strides	EC	Methyl soya	720	270
8	Flint	WG	Trifloxystrobin	500	80
8	UPL 2030 FP	SC	Prothioconazole	480	101
8	Unizeb Gold	WG	Mancozeb	750	1300
8	Strides	EC	Methyl soya	720	270

Thus, spray 8 contained a ternary combination (i).

The percentage severity of *Phakopsora pachyrhizi* was observed at 14-DAB (that is, 14 days after the second application, also called application "B") and the results are tabled below.

Spray no.	Active ingredients	Disease Incidence (%)	p<0,05	Observed control (%)	Colby (Expected control)	Conclusion
1	Control	68.8	a	0.0		
2	Trifloxystrobin	66.7	a	3.0		
3	Prothioconazole	60.4	a	12.1		
4	Mancozeb	66.7	a	3.0		
5	Trifloxystrobin + Prothioconazole	62.5	a	9.1	14.8	Antagonistic
6	Trifloxystrobin + Mancozeb	68.8	a	0.0	6.0	Antagonistic
7	Prothioconazole + Mancozeb	58.3	a	15.2	14.8	Synergistic

8	Trifloxystrobin + Prothioconazole + Mancozeb	56.3	a	18.2	17.4	Synergistic
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Experiment 3

The test was performed at ARDS - Ituverava - SP on plants with a sowing date of 15 December 2020. The soybean variety of ADV 4779 I^{PRO} was used for these experiments. The trial was conducted in field conditions. A spray volume of 150 L/ha was maintained in all cases. A first spray (A) was performed at growth stage 65 BBCH (R2). Two subsequent sprays (referred to as "B" and "C") were carried out and evaluation of disease incidence was carried out 14 days and 21 days after the last spray (C).

A consistent row spacing of 0.50 m was maintained. The plot size was 18m².

5 spray compositions were utilised, as follows.

Spray no.	Active ingredients	Dose (g/Ha)
1	Untreated control	N/A
2	Picoxystrobin	48
3	Tebuconazole	80
4	Mancozeb	900
5	Picoxystrobin	48
5	Tebuconazole	80
5	Mancozeb	900

Thus, spray 5 contained a ternary combination (ii).

In view of the severity of soybean rust at 14 and 21 days after spray C, an area under disease progress curve (AUDPC) was calculated. The expected Colby control was calculated both in connection with the severity of disease at 14-DAC, and in connection with the AUDPC. The results are shown in the table below.

Spray No.	Active ingredient	14 DAC results			AUDPC		
		Severity (%)	Observed control (%)	Expected Control (Colby)	AACPD	Observed control (%)	Colby (Expected Control)
1	Untreated	100.0	0.0	-	1750.0	0.0	-
2	Picoxystrobin	82.5	18.5	-	1347.5	23.0	-
3	Tebuconazole	90.0	10.0	-	1417.5	19.0	-
4	Mancozeb	77.5	22.5	-	838.5	49.5	-

5	Picoxystrobin, Tebuconazole +Mancozeb	32.5	67.5	42.5	446.3	74.5	68.5
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By either calculation, the observed control achieved by spray no. 5 exceeded the Colby expected control, indicating the existence of a synergistic effect.

Experiment 4

The test was performed at ARDS - Ituverava - SP on plants with a sowing date of 27th June. The soybean variety of NA 5909 RG was used for these experiments. The trial was conducted in greenhouse conditions. A spray volume of 150 L/ha was maintained in all cases. A first spray (A) was performed at growth stage 16 BBCH and disease incidence (percentage of leaves with symptoms) before the spray and 7 days after spray was noted. The Tukey's test at 5% of probability was used for all statistical analysis.

A consistent row spacing of 0.20 m was maintained with a plant density of 2 plants per pot. A sowing fertilizer dose at 500 kg/ha of formula 04.14.08 (NPK) was initially applied at the moment of sowing, putting the fertilizer below the seeds' positions in mixture with the soil. Plot size was 1 pot.

The eight different sprays used were as follows.

Spray no.	Product	Cone. (g/L)	Formulation type	Active ingredients	Dose (g/Ha)
1	Control				
2	Unizeb Gold	750	WG	Mancozeb	900
2	Strides	720	EC	Methyl soya	270
3	Oranis	250	SC	Picoxystrobin	60
3	Strides	720	EC	Methyl soya	270
4	Tebufort	200	EC	Tebuconazole	75
4	Strides	720	EC	Methyl soya	270
5	Unizeb Gold	750	WG	Mancozeb	900
5	Oranis	250	SC	Picoxystrobin	60
5	Strides	720	EC	Methyl soya	270
6	Unizeb Gold	750	WG	Mancozeb	900
6	Tebufort	200	EC	Tebuconazole	75
6	Strides	720	EC	Methyl soya	270
7	Oranis	250	SC	Picoxystrobin	60
7	Tebufort	200	WG	Tebuconazole	75
7	Strides	720	EC	Methyl soya	270

8	Unizeb Gold	750	WG	Mancozeb	900
8	Oranis	250	SC	Picoxystrobin	60
8	Tebufort	200	EC	Tebuconazole	75
8	Strides	720	EC	Methyl soya	270

Thus, spray 8 contained a ternary combination (ii).

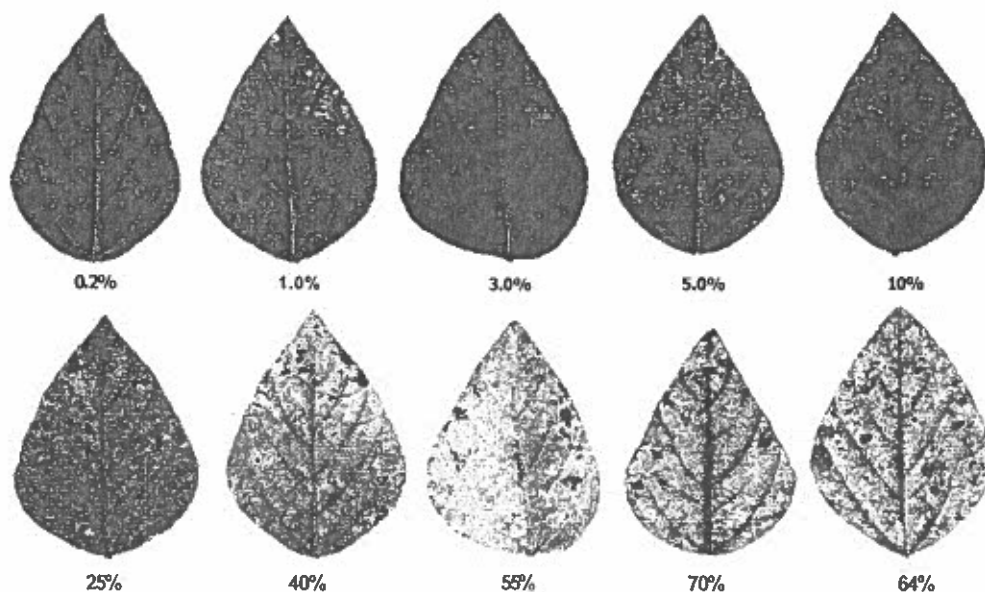
The percentage severity of *Phakopsera pachyrrhizi* was observed at 7-DAA (that is, 7 days after the first application, also called application "A") and the results are tabulated below. The initial disease incidence, at application A, was 0 in all cases.

Spray no.	Active ingredient(s)	Disease incidence (%)	Observed control (%)	Colby (Expected control)	Conclusion
1	Untreated Check	33,3	0,0		
2	Unizeb Gold Strides	35,4	0,0		
3	Oranis Strides	27,1	18,8		
4	Tebufort Strides	29,2	12,5		
5	Unizeb Gold Oranis Strides	35,4	0,0	18,8	Antagonistic
6	Unizeb Gold Tebufort Strides	31,3	6,2	12,5	Antagonistic
7	Oranis Tebufort Strides	35,4	0,0	28,9	Antagonistic
8	Unizeb Gold Oranis Tebufort Strides	22,9	31,2	28,9	Synergistic

Experiment 5

The test was performed at ARDS - Ituverava - SP on plants with a sowing date of 27th June. The soybean crop variety was NA 5909 RG for these experiments. The trial was conducted in greenhouse conditions. A spray volume of 150 L/ha was maintained in all cases. A row spacing of 0.5 m was used. A sowing fertiliser was applied at 500 Kg/Ha.

A first spray (A) was performed at growth stage 16 BBCH (V6) on 7 August. Disease incidence was measured before spray and at 35 days after spray ("35-DAA") was noted according to the following diagrammatic scale:



The eight different sprays used were as follows.

Spray no.	Product	Cone. (g/L)	Formulation type	Active ingredients	Dose (g/Ha)
1	Control (untreated)				
2	Unizeb Gold	750	WG	Mancozeb	1000
2	Strides	720	EC	Methyl soya	270
3	Oranis	250	SC	Picoxystrobin	66.66
3	Strides	720	EC	Methyl soya	270
4	Tebufort	200	EC	Tebuconazole	83.33
4	Strides	720	EC	Methyl soya	270
5	Unizeb Gold	750	WG	Mancozeb	1000
5	Oranis	250	SC	Picoxystrobin	66.66
5	Strides	720	EC	Methyl soya	270
6	Unizeb Gold	750	WG	Mancozeb	1000
6	Tebufort	200	EC	Tebuconazole	83.3
6	Strides	720	EC	Methyl soya	270

7	Oranis	250	SC	Picoxystrobin	66.66
7	Tebufort	200	WG	Tebuconazole	83.33
7	Strides	720	EC	Methyl soya	270
8	Unizeb Gold	750	WG	Mancozeb	1000
8	Oranis	250	SC	Picoxystrobin	66.66
8	Tebufort	200	EC	Tebuconazole	83.33
8	Strides	720	EC	Methyl soya	270

The percentage severity of *Phakopsera pachyrrhizi* was observed at 35-DAA (that is, 35 days after the first application, also called application "A") and the results are tabulated below.

Spray No.	Product	Percentage Disease incidence	Percentage Control	Colby predicted Control
1	Untreated check	93.8	0.0	
2	Unizeb Gold Strides	81.3	13.3	-
3	Oranis Strides	70.8	24.4	-
4	Tebufort Strides	79.2	15.6	-
5	Unizeb gold Oranis Strides	64.6	31.1	34.5 (Antagonistic)
6	Unizeb gold Tebufort Strides	72.9	22.2	26.8 (Antagonistic)
7	Oranis Tebufort Strides	68.8	26.7	36.2 (Antagonistic)
8	Unizeb gold Oranis Tebufort Strides	43.8	53.3	44.7 (Synergistic)

Colby ratio

0.90

0.83

0.74

1.19

Experiment 6

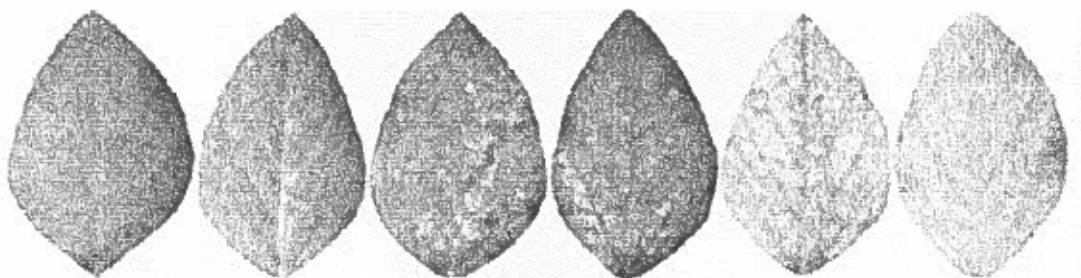
In this test, a randomized block design of experiments was carried out for five differing spray compositions with 4 replications each. A plot size of 5 X 4 sq m. was maintained. The crop variety selected for the experiments was soybean JS 9305. The soil type was black sandy loam. To apply sprays, an irrigation sprinkler was used with backpack knapsack electrical sprayer with a hollow cone nozzle. The amount of water volume used was 500 L/ha.

Two treatments were applied. The first treatment was applied at the onset of disease symptoms. The application dates were 8th September and 20th September respectively. The disease evaluated was Asian soybean rust.

Incidence of soybean rust disease was assessed after the second treatment, according to the following scale.

Disease Scale Rating	Disease Severity	Description
0	--	No lesions/spots
1	1%	leaf area covered with lesions/spots
3	1.1 - 10%	leaf area covered with lesions/spots, no spots on stem
5	10.1 - 25%	leaf area covered with lesions/spots, no defoliation; little damage
7	25.1 - 50%	leaf area covered with lesions/spots; some leaves drop; death of few plants; damage conspicuous
9	50.1 % of Above	More than 50% area covered, lesions/spots very common on all parts, defoliation common; death of plants common; damage more than 50%.

The above scale is exemplified by leaves with the following appearance:



with the leaves representing, left to right, rating 0, 1, 3, 5, 7 and 9.

Having assessed leaves using this scale, the percentage disease index ("PDI") was calculated as follows:

$$PD/= \frac{\text{Sum of all numerical disease ratings} \times 100}{\text{Total no. of leaves observed} \times \text{max. disease grade}}$$

The five spray compositions, and the percentage disease control achieved by each, were as follows.

Spray no.	Active ingredients	Dose (g/Ha)	Mean percentage disease control (PDC)
T-1	Mancozeb	1835	96.9
T-1	Picoxystrobin	275	
T-1	Tebuconazole	480	
T-2	Mancozeb	1835	72.9
T-3	Picoxystrobin	275	72.2
T-4	Tebuconazole	480	34.7
T-5	Untreated control	N/A	0.0

The expected control was calculated as follows, using the usual ternary Colby formula:

$$\text{Expected control (E)} = A + B + C - \frac{(AB + AC + BC)}{100} + \frac{ABC}{10000}$$

Inserting the values from the table above, this calculation becomes:

$$E = 72.9 + 72.2 + 34.7 - \frac{((72.9 * 72.2) + (72.9 * 34.7) + (72.2 * 34.7))}{100} + \frac{72.9 * 72.2 * 34.7}{10000}$$

leading to an expected control percentage of 95.2. The observed control of 96.9 exceeds this value, confirming that the ternary combination shows a synergistic effect.

Experiment 7

The test was performed in field conditions at ARDS - Ituverava - SP. The soybean cultivar ADV 4681 IPRO was used for these experiments. A consistent row spacing of 0.5 m was maintained. A sowing fertilizer dose at 500 kg/ha was initially applied at the moment of sowing. A first spray (A) was performed at growth stage BBCH 60. Three subsequent sprays (referred to as "B", "C" and "D") were carried out and evaluation of disease incidence was carried out 14 days after the last spray (D). Each spray was applied to a test patch in the field, in accordance with the following protocol.

Location	Ituverava - Sao Paulo
Coordinates	S 20° 19' 42" W 47° 48' 45"
Company	UPL Brasil
Cultivar	ADV 4681 IPRO
Sowing date	06-12-2020
Spray volume (L/ha)	150
Condition	Field
Replications	4
Replication	1 plot of 3 m x 6 m = 18m ²
Plants/replication	NA
Sprays	4

BBCH stage at first spray	60
Date of first spray	27-01-2021
BBCH stage at second spray	65
Date of second spray	10-02-2021
BBCH stage at third spray	70
Date of third spray	24-02-2021
BBCH stage at fourth spray	75
Date of fourth spray	09-03-2021
<i>Phakopsora pachyrhizi</i> inoculation	Natural occurrence

Five different spray compositions were applied. The first was a control, containing no active ingredient. Sprays 2-4 contained individual active components azoxystrobin, cyproconazole, and mancozeb. Spray 5 contained a ternary combination (iv). These compositions, together with the evaluation of disease incidence and efficacy of control at 14-DAD, are tabulated below.

Spray no.	Active ingredient	Dose(g/Ha)	Disease Incidence (%)	Observed control (%)	Expected Colby Control (%)	Conclusion
1	Untreated	-	100.0	0.0	-	
2	Azoxystrobin	94	97.5	2.5	-	
3	Cyproconazole	53	95.0	5.0	-	
4	Mancozeb	1194	70.0	30.0	-	
5	Azoxystrobin + Cyproconazole + Mancozeb	94 + 53 + 1194	32.5	67.5	35.2	Synergistic

Experiment 8

This test was carried out at Itaara - Rio Grande do Sul. The crop variety was BMX Ativa. Pot trials in greenhouse conditions were carried out (1 pot of 5 L with 2 plants, 4 replicates). A single application was carried out at BBCH stage 17 of crop development. The sowing date was 15 July 2023 and the spray date was 1 September 2021. As elsewhere, the target pest was *Phakopsora pachyrhizi*. Inoculation with *Phakopsora pachyrhizi* was performed on 2 September 2021.

The percentage incidence of *Phakopsora pachyrhizi* was observed at 35 days after the last spray (35 DAA).

Five different spray compositions were applied. The first was a control, containing no active ingredient. Sprays 2-4 contained individual active components azoxystrobin, cyproconazole, and mancozeb. Spray 5 contained a ternary combination (iv). These compositions, together with the evaluation of disease incidence and efficacy of control at 35-DAA, are tabulated below.

Spray no.	Active ingredient	Dose (g/Ha)	Disease Incidence (%)	Observed control (%)	Expected Colby Control (%)	Conclusion
1	Untreated	-	39.8	0.0	-	
2	Azoxystrobin	60	22.5	43.4	-	
3	Cyproconazole	60	22	44.7	-	
4	Mancozeb	1350	9.1	77.2	-	
5	Azoxystrobin + Cyproconazole + Mancozeb	60 + 60 + 1350	1.8	95.4	92.9	Synergistic

Summary

It is clear from the above, and the data already on file, that the ratio of active ingredients in combinations (i) to (iv) can be varied while maintaining a synergistic efficacy in the treatment of soybean rust.