

Hummingbird
Technologies



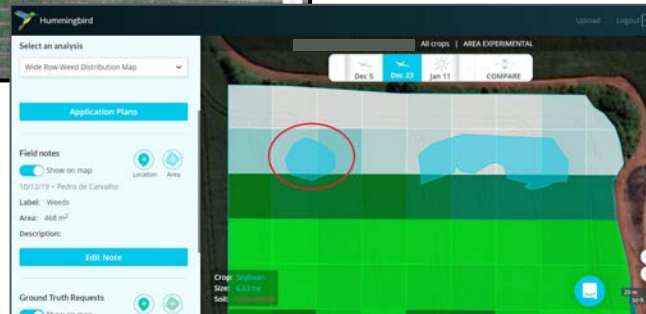
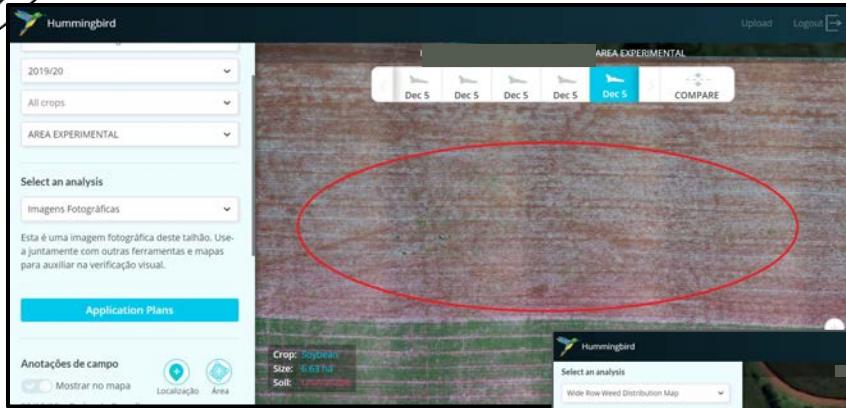
Weed mapping Soybean - Brazil

Accurate weed mapping

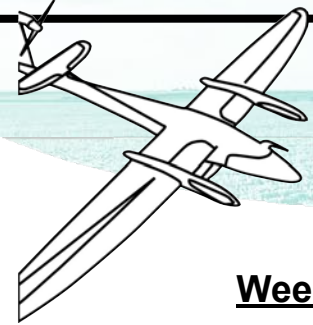
Date: Dec 2019
Location: .
Field: Area experimental
Field size: 6.6 Ha
Crop Type: Soybean



**Average weed
plant count =
1.12 /M2**



Accurate weed mapping



Weed distribution map

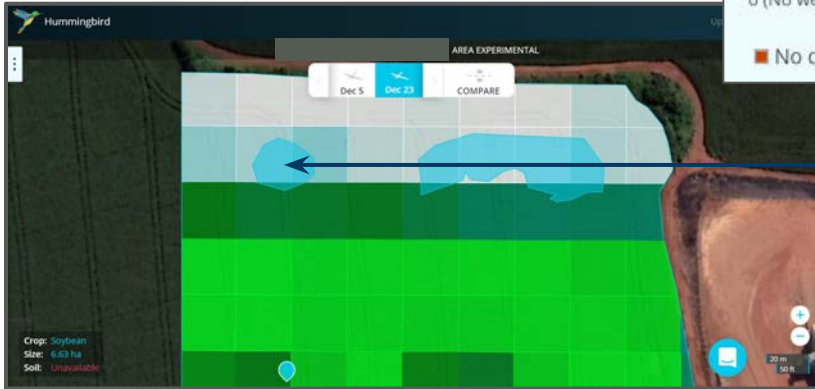
Spot Spray Post Emergence Herbicide plan settings

Percentage of inter row weed distribution in this field.

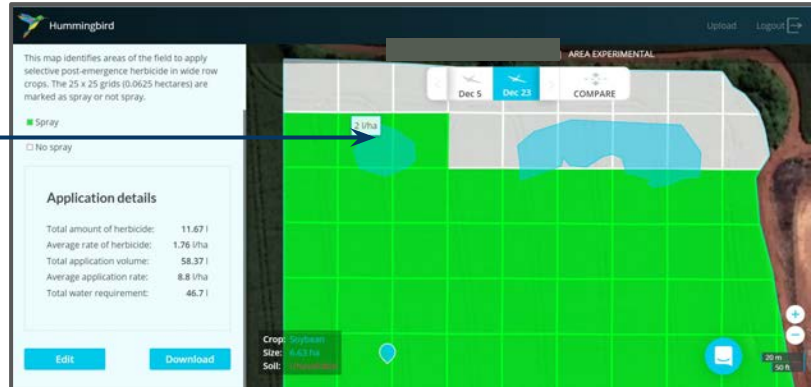
0 (No weed) % 100 (Weed)

■ No data available

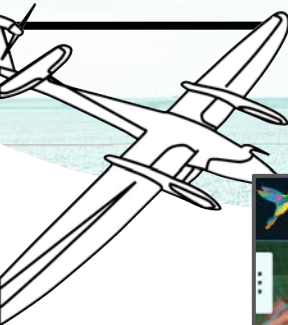
Date: Dec 2019
Location: [Redacted]
Field: Area experimental
Field size: 6.6 Ha
Crop Type: Soybean



Herbicide VR spray plan



Weed mapping case study



Date: Dec 2019
Location: [Redacted]
Field: [Redacted]
Field size: 79.93 Ha
Crop Type: Soybean



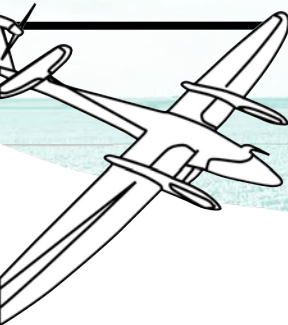
Spot Spray Post Emergence Herbicide plan settings

Percentage of inter row weed distribution in this field.



No data available

Herbicide resistant weed management

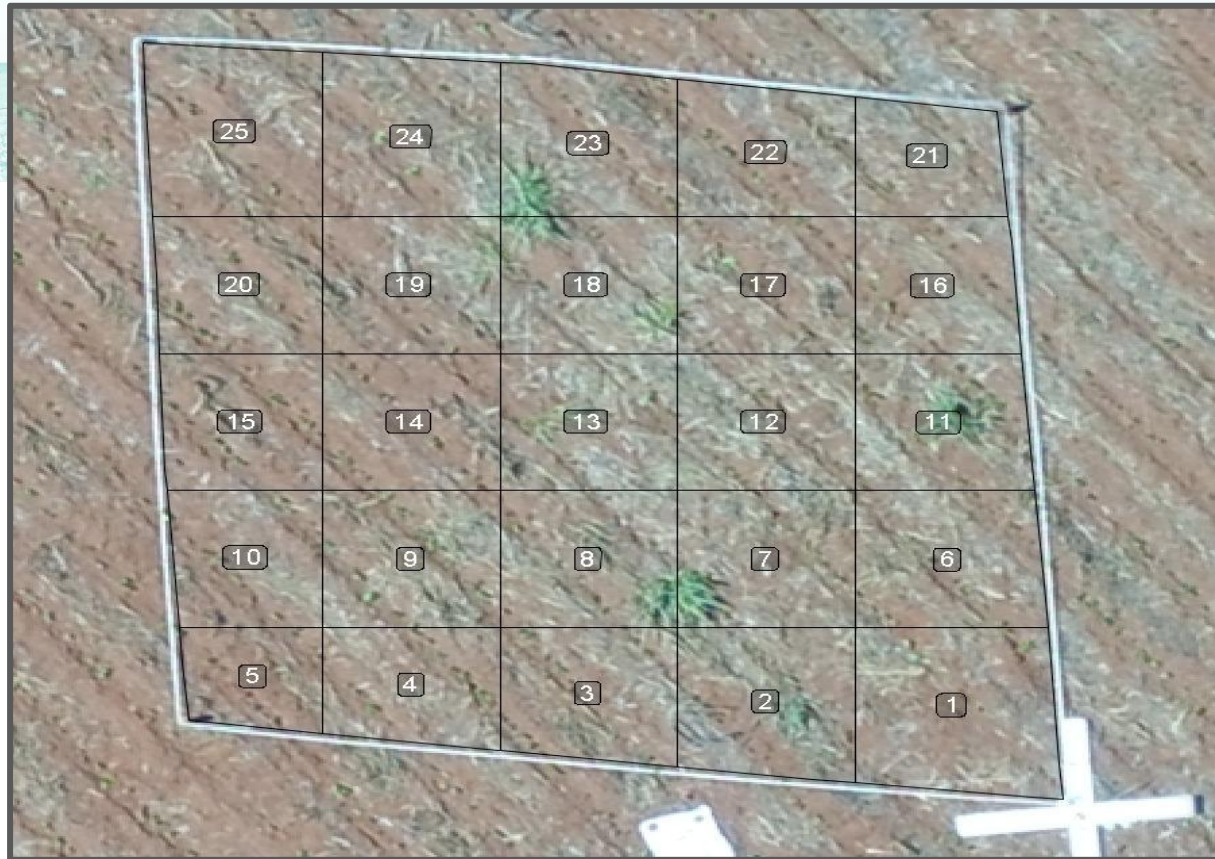
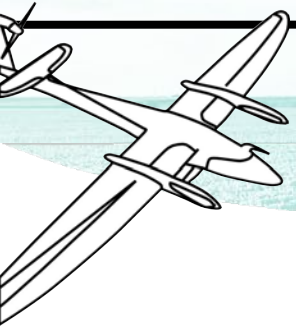


GT_area	Grid_ID	nb_Bulva	nb_Capim_Amargoso	nb_Volunteer_corn	nb_other
A	1		0		1
A	2		1		
A	3		1		10
A	4		0		2
A	5		4		
A	6		3		
A	7		4		
A	8		4		
A	9		2		
A	10		2		
A	11		2		
A	12		1		
A	13		3		
A	14		3		
A	15		0		
A	16		1		
A	17		2		
A	18		2		
A	19		0		
A	20		2		
A	21		1		
A	22		1		
A	23		8		
A	24		2		
A	25		1		

Ground truthing results

**Average weed plant
count = 2.52 /M2**

Sampling square A

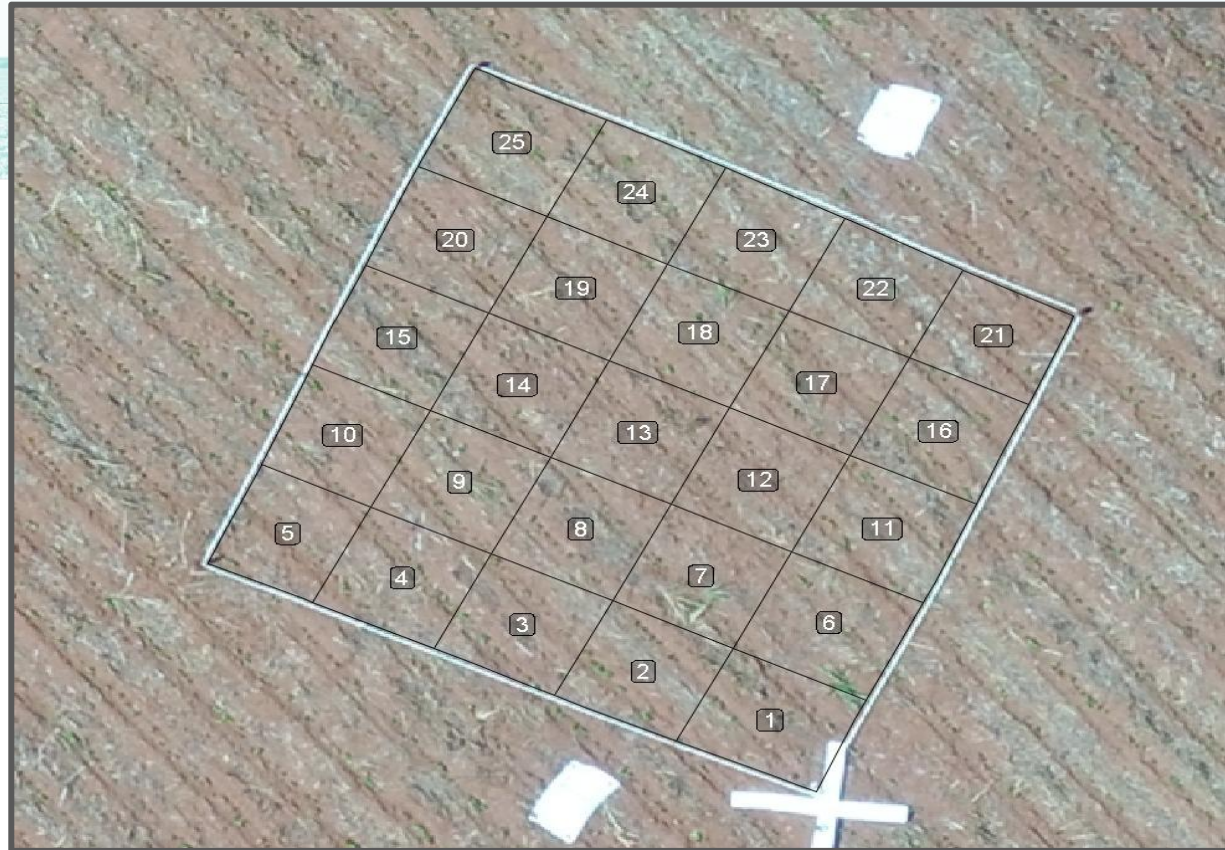
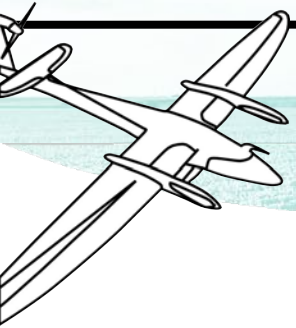


GT_area	Grid_ID	nb_Bulva	nb_Capim_Amargoso	nb_Volunteer_corn	nb_other
B	1		2		
B	2		0		
B	3		1		
B	4		0		
B	5		0		
B	6		1		
B	7		2		
B	8		0		
B	9		0		
B	10		0		
B	11		0		
B	12		0		
B	13		4		
B	14		1		
B	15		0		
B	16		1		
B	17		1		
B	18		1		
B	19		0		
B	20		1		
B	21		3		
B	22		3		
B	23		1		
B	24		3		
B	25		0		

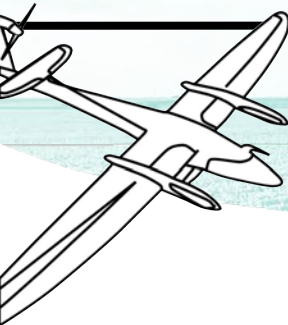
Ground truthing results

**Average weed plant
count = 1/M2**

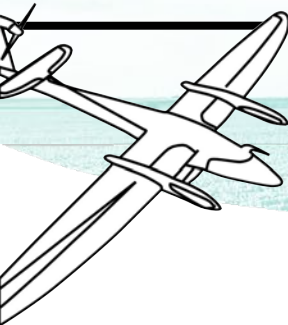
Sampling square B




VARI comparison analysis




SOYBEAN HERBICIDE CASE STUDY



 Hummingbird Upload [Logout](#)

Percentage of inter row weed distribution in this field.


0 (No weed) % 100 (Weed)

■ No data available

Enter the product rate and the application rate.


Product rate i
 l/ha

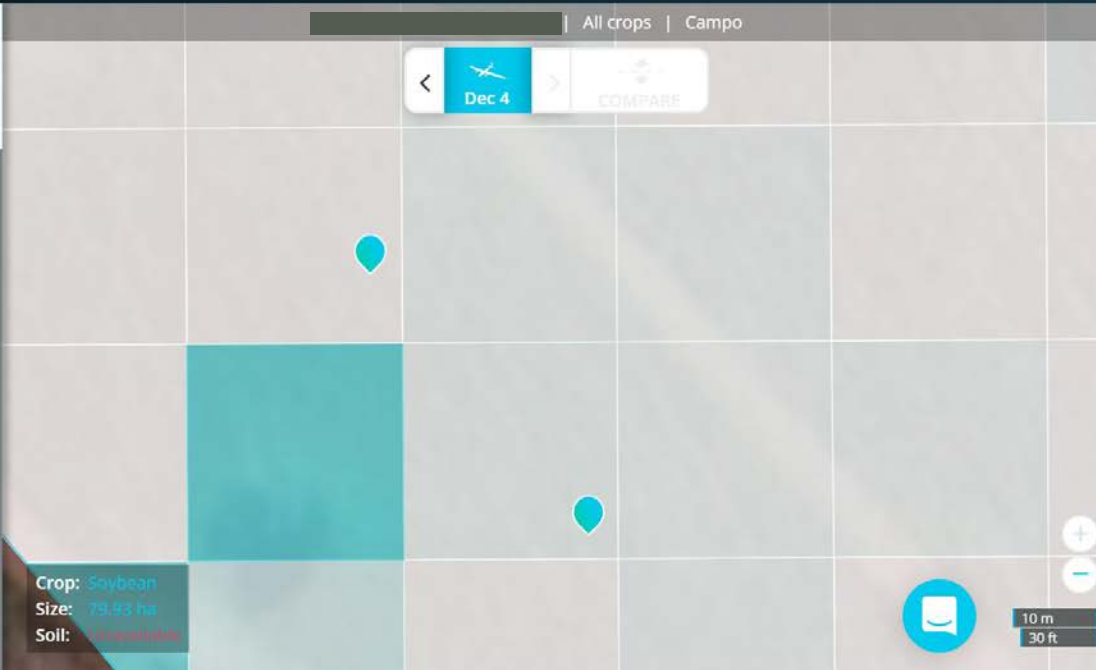
Application rate i
 l/ha

Rate to apply under area of cloud i
 l/ha


[Preview](#)

All crops | Campo

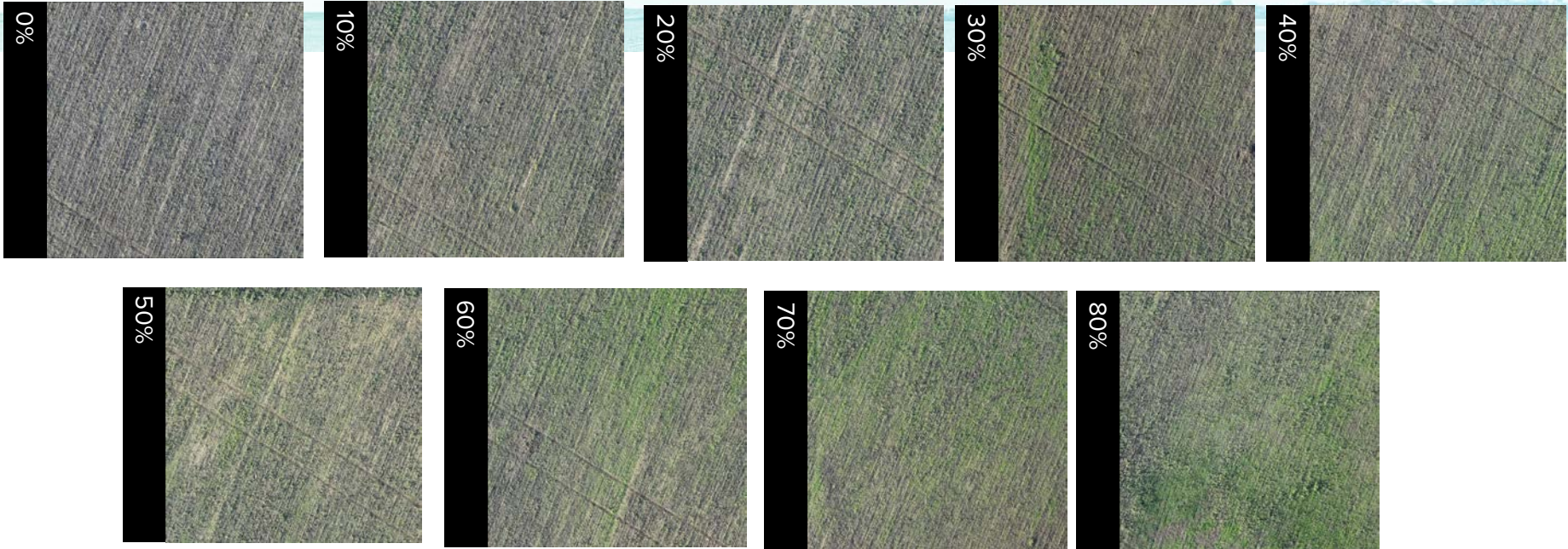

Dec 4 COMPARE



Crop: Soybean
Size: 79.93 ha
Soil: Unavailable


10 m
30 ft

Examples of % Weed Cover



- The above images represent different percentage weed pressure examples. This allows the user to decide what is the threshold to apply a higher rate of herbicide and a lower rate of herbicide. I.e. The user could select to apply a higher rate of herbicide to areas of weed pressure above 20% and a lower rate to any area below 20%.

Demo Video

The screenshot displays the Hummingbird software interface. On the left, a sidebar contains a description of the map, a legend for 'Spray' status, and a table of application details. The main area shows an aerial view of a field with a grid overlay, where green areas indicate spray application. A 'Live 3D' button is visible in the top right of the map area. The bottom right corner includes a 'Crop Size: 500 FT' indicator.

Hummingbird

This map identifies areas of the field to apply selective post-emergence herbicide in wide row crops. The 25 x 25 grid (0.0425 hectares) are marked as spray or no spray.

Spray

0 No spray

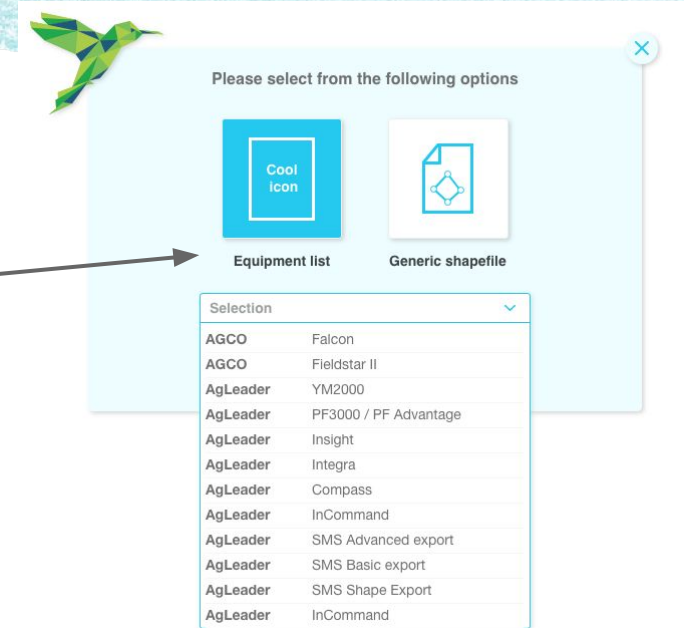
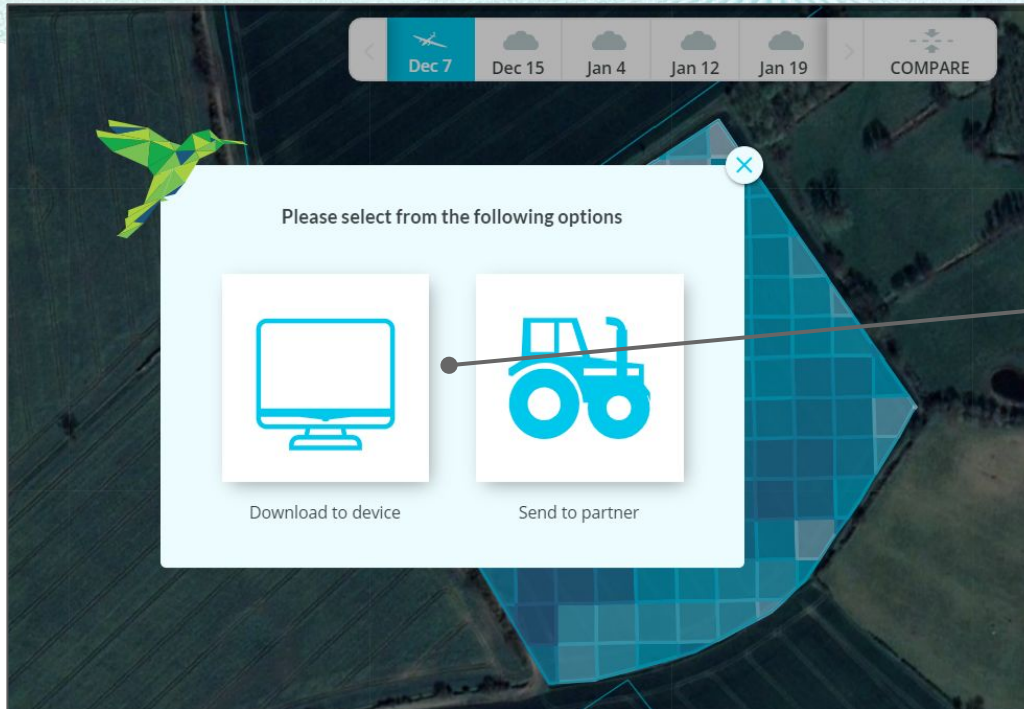
Application details

Total amount of herbicide:	609 l
Average rate of herbicide:	0.08 l/ha
Total application volume:	605.8 l
Average application rate:	46.13 l/ha
Total water requirement:	800.77 l

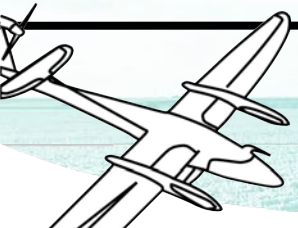
Live 3D

Crop Size: 500 FT

API integration with major machinery equipment

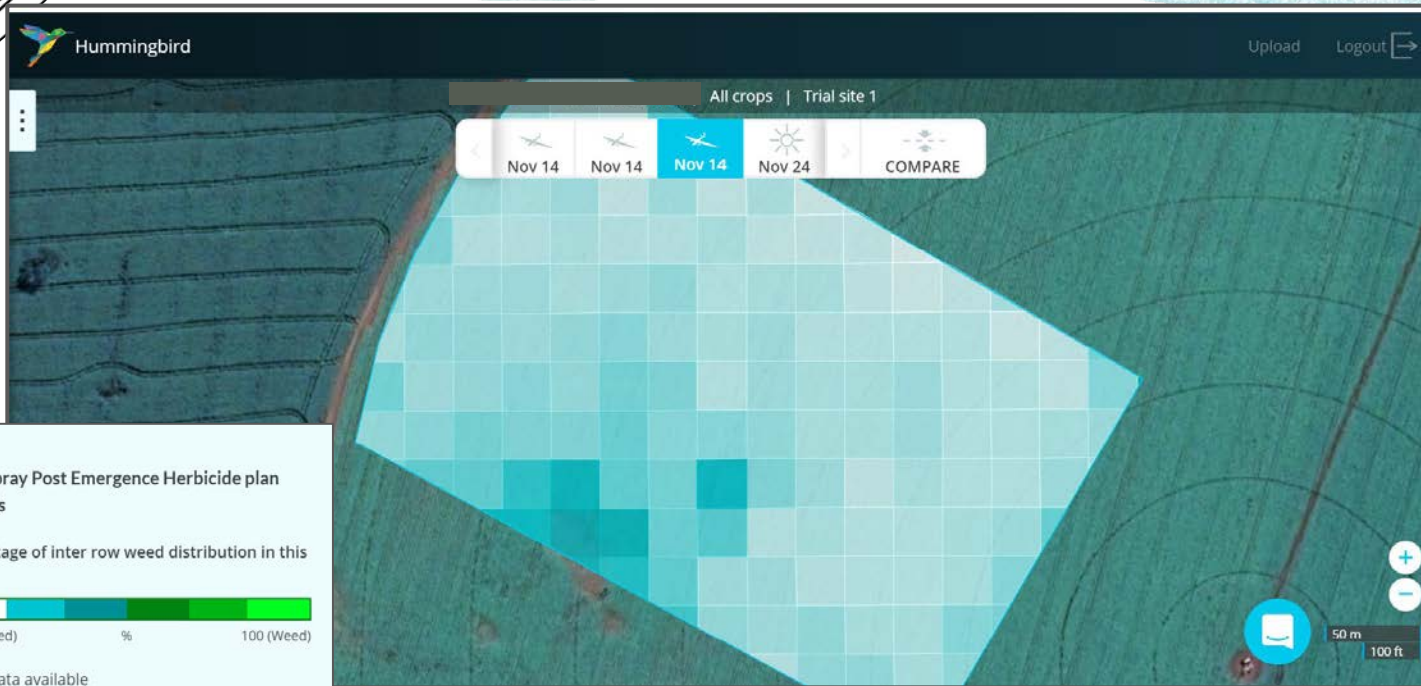


SOYBEAN HERBICIDE CASE STUDY



Date: November 2019
Location:

Field: Trial
Field size: 7.88 ha
Crop Type: Soybean



Field photos



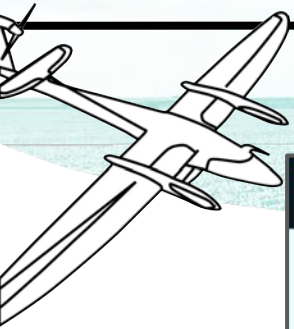
**Average weed plant
per M² = 1.64**

Identified weed type:

- 1. Capim-amargoso
(*Digitaria insularis*)**
- 2. Buva (*Conyza
canadensis*)**
- 3. Beldroefa (Common
Purslane)**



Variable Rate post-emergent Herbicide



Hummingbird Upload Logout

Spot Spray Post Emergence Herbicide Plan Preview

Este mapa identifica áreas do talhão para aplicar o herbicida seletivo pós-emergente em culturas de linhas de plantio com espaçamento largo. A celsa da grade de 25 x 25 (0,0625 hectares) são marcadas como pulverizar ou não pulverizar.

Pulverização

Sem pulverização

Detalhes da aplicação

Quantidade total de herbicida:	21.68 l
Taxa média de herbicida:	2.75 l/ha
Volume total de aplicação:	2709.5 l
Taxa média de aplicação:	343.95 l/ha
Necessidade total de água:	2687.82 l

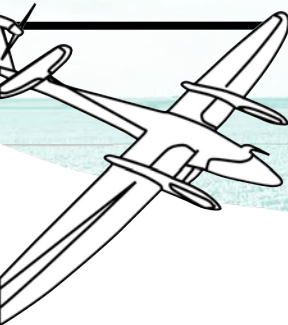
Crop: Soybean
Size: 7.88 ha
Soll: Unavailable

All crops | Trial site 1

Nov 14 Nov 14 Nov 14 Nov 24 COMPARE

50 m 100 ft

ECONOMIC ANALYSIS FOR POST-EM HERBICIDE



Standard Farm Practice Herbicide: Shadow 480 SL = R\$63.6/ha
Average Application Rate: 4 litres/ha flat rate

Hummingbird Weed Control
 Total fixed rate application cost: R\$ 501.17
 Total variable rate cost: R\$ 344.71
 Average Application Rate: 2.75 litres/ha (**saving 1.25 litres/ha)

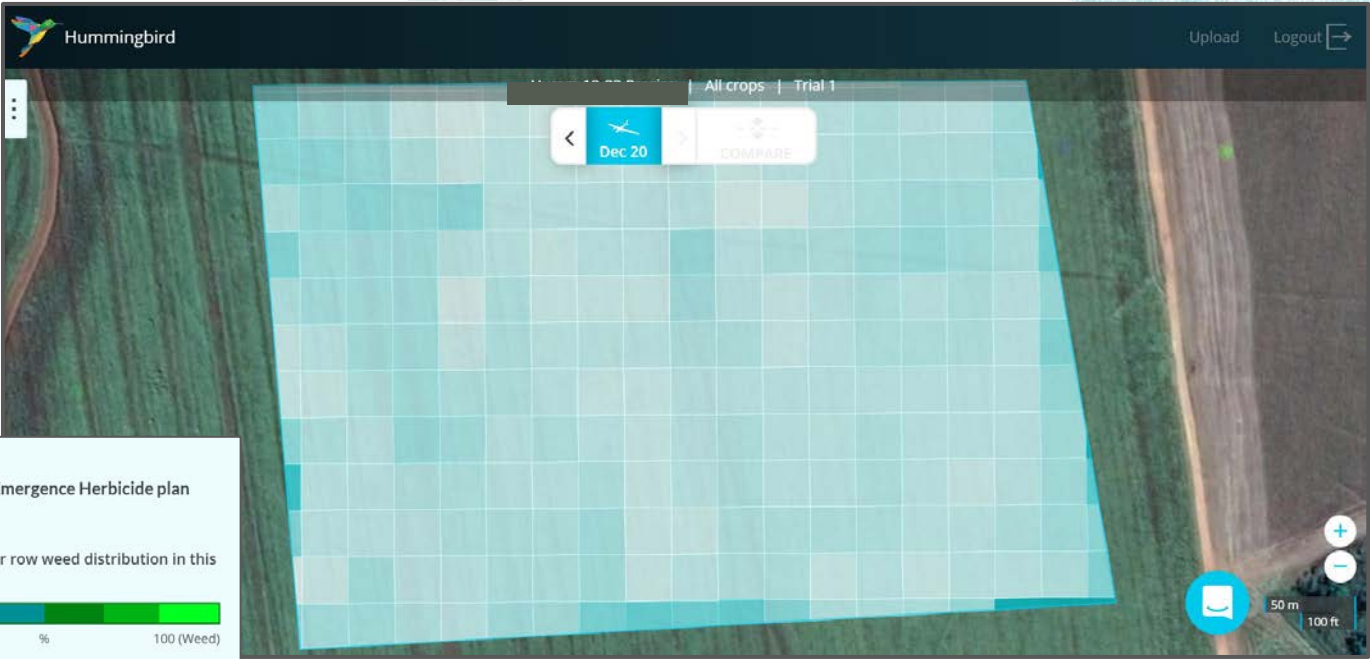
COSTS	STANDARD FLAT RATE WEED CONTROL	HUMMINGBIRD WEED CONTROL
Post-emergence	Yes (100%)	Yes (68.75%)
HERBICIDE COST	= R\$65/ha	= R\$43,73
Hummingbird Weed Analysis (1 flight) R\$8/ha	No	Yes
TOTAL COSTS	R\$65/ha	R\$51.73/ha
TOTAL SAVING: ROI	0%	31.25%

SOYBEAN HERBICIDE CASE STUDY



Date: Dec 2019
Location:

Field: Experimental
Field size: 12.59 Ha
Crop Type: Soybean



Spot Spray Post Emergence Herbicide plan settings

Percentage of inter row weed distribution in this field.

0 (No weed) % 100 (Weed)

■ No data available

A color scale legend for weed distribution. It consists of a horizontal bar with a gradient from white to dark green. The left end is labeled '0 (No weed)' and the right end is labeled '100 (Weed)'. A percentage symbol '%' is in the middle. Below the bar, there is a small red square followed by the text 'No data available'.

Field photos



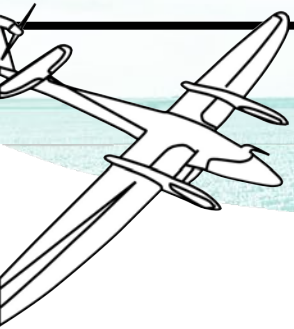
**Average weed plant
per M2 = 0.44**


Identified weed type:

- 1. Capim-amargoso
(*Digitaria insularis*)**
- 2. Buva (*Conyza
canadensis*)**
- 3. Milho voluntario (*Zea
mays*)**



Variable Rate Post-emergent Herbicide



 Hummingbird

Este mapa identifica áreas do talhão para aplicar o herbicida seletivo pós-emergente em culturas de linhas de plantio com espaçamento largo. A celas da grade de 25 x 25 (0,0625 hectares) são marcadas como pulverizar ou não pulverizar.

Pulverização
 Sem pulverização

Detalhes da aplicação

Quantidade total de herbicida:	6.06 l
Taxa média de herbicida:	0.48 l/ha
Volume total de aplicação:	605.83 l
Taxa média de aplicação:	48.13 l/ha
Necessidade total de água:	599.77 l

[Editar aplicação](#) [Baixar arquivo shape](#)

Upload Logout

All crops | Trial 1

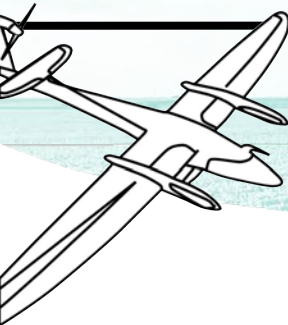
Dec 20 COMPARE

1 l/ha

Crop: **Soybean**
Size: **12.53 ha**
Soil: **Urussatense**

50 m 100 ft

ECONOMIC ANALYSIS FOR POST-EM HERBICIDE



Standard Farm Practice Herbicide: Rotam Freno 240 EC = R\$65/ha
Average Application Rate: 1 litres/ha flat rate

Hummingbird Weed Control
 Total fixed rate application cost: R\$ 818.35
 Total variable rate cost: R\$ 494.67
 Average Application Rate: 0.48 litres/ha (**saving 0.52 litres/ha)

COSTS	STANDARD FLAT RATE WEED CONTROL	HUMMINGBIRD WEED CONTROL
Post-emergence	Yes (100%)	Yes (55%)
HERBICIDE COST	= R\$65/ha	= R\$31.29
Hummingbird Weed Analysis (1 flight) R\$8/ha	No	Yes
TOTAL COSTS	R\$65/ha	R\$39.29/ha
TOTAL SAVING: ROI	0%	60.4%