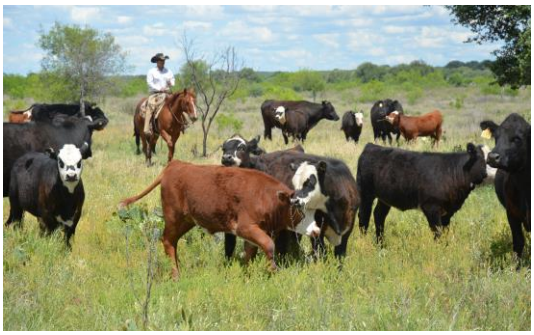


Result Demonstration Report

2023 Pasture Weed Control with Aerial Drone vs Commercial Ground Application

Gabriel Ranch
Cooperator

Clint Perkins, Stephen Gowin, Tommy Phillips, & Allison Morrow
Texas A&M AgriLife Extension Service County Agents for Smith, Rains, Kaufman & Van Zandt Counties

Patrick Sutton, Colton Spencer & Benny Martinez, Corteva Agriscience

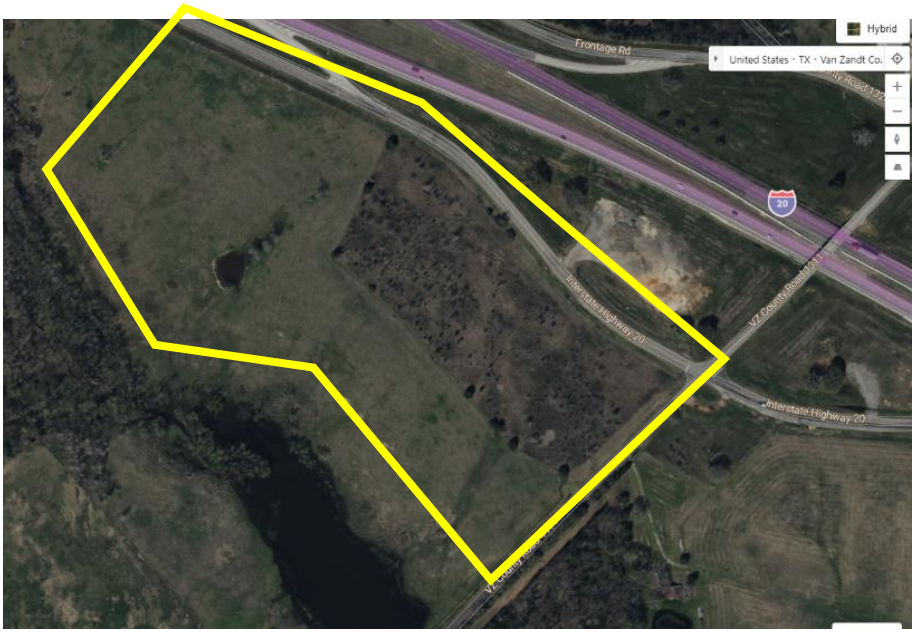
Darren Rozell & Kevin Proctor, Rozell Sprayers & Manufacturing

Introduction

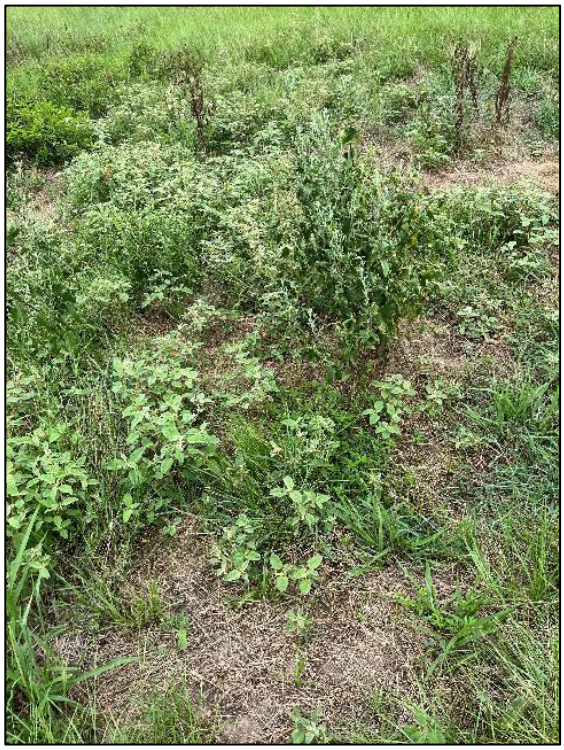
The intent of these trials is to compare the efficacy for targeted weeds and or brush for drone applied technologies compared to conventional sprayer applications. Products are listed in order of importance. Targeted weeds and or bush should dictate product used or not used at the treatment site. All applications will be conducted in accordance with the product label, including application rate and Gallons Per Acre (GPA), for both Ground and Aerial application specifications.

Materials and Methods

The study site was established on June 12, 2023, at County Road 4414 (Tank Farm Road) in Colfax, Texas (Van Zandt County), 0.25 miles south of Interstate 20. The site was established common bermudagrass mixed with bahiagrass. The soils were a Bernaldo fine sandy loam, and a Woodtell loam, 1 to 3% slope.



Location of the results demonstration, Northeast of Colfax, TX (Van Zandt County).



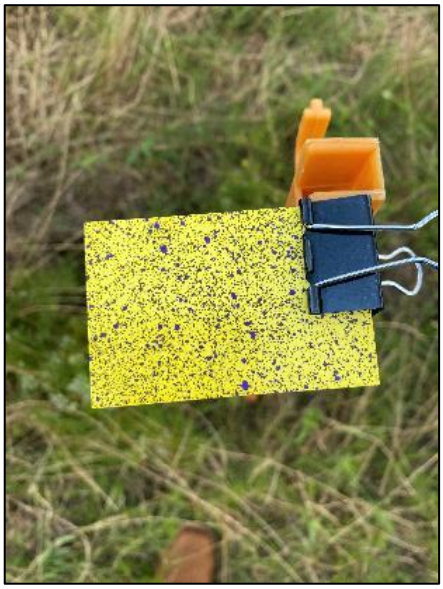
Weed populations at the time of application. (Photos by Clint Perkins)

Plant and pasture conditions at the time of application in June were good to excellent in terms of soil moisture and plant health. Weed species at the Gabriel Ranch treatment area in Colfax, TX included false ragweed (*Parthenium hysterophorus*), goatweed (*Croton capitata*), milkweed (*Asclepias viridis*), blackberry (*Rubus* spp.), ironweed (*Vernonia baldwinii*), and dogfennel (*Eupatorium capillifolium*).

Application Techniques for the Result Demonstration

Application System Data (drone)

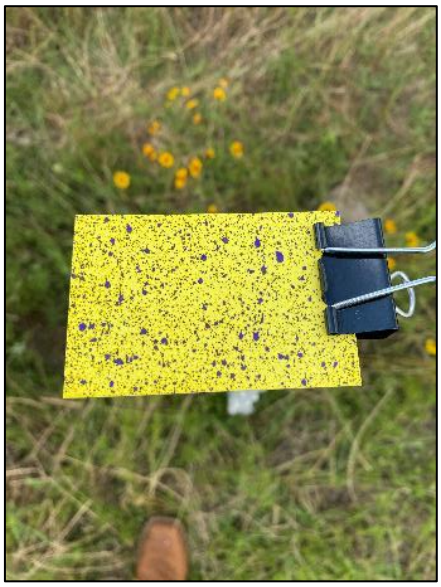
- Aircraft Manufacture and model (DJI-T-40)
- Rotor Width: 9 ft
- Nozzle type: Sprinklers
- Nozzle Angle: Straight Down
- Swath width: 30 ft
- Pressure: 30 PSI
- Application Speed: 22 MPH
- Plot Size: 50 ft x 200 ft (0.23 acres)



Droplet patterns of the aerial drone application.

Conventional Ground Application System

- Application Type: Conventional ground
- Brand and Model equipment used: Rozell 14‘ Boom Sprayer
- Nozzle Type AI11002
- Nozzle angle for aircraft only: Straight Down
- Pressure: 40 PSI
- Plot Size: 30 feet by 200 feet (0.14 acres)



Droplet patterns of the conventional ground application.

Applicators for the Application Techniques

Aerial Drone Operator- **Kevin Procter & Justin Easley**

Conventional Ground Spray Rig- **Stephen Gowin**

Table I. 2023 Treatments and Rates for the herbicide applications with an aerial drone or conventional ground application.

App Type	Trt. No	Herbicide Trade Name	Rate	Rate Unit
Drone	1	DuraCor	16	fl oz/A
Ground	2	DuraCor	16	fl oz/A
Drone	3	Grazon PD3	20	fl oz/A
Ground	4	Grazon PD3	20	fl oz/A
Drone	5	MezaVue	24	fl oz/A
Ground	6	MezaVue	24	fl oz/A
Drone	7	Chaparral	2.25	oz/A
Ground	8	Chaparral	2.25	oz/A
Drone	9	GrazonNext HL	24	fl oz/A
Ground	10	GrazonNext HL	24	Fl oz/A
Drone	11	DuraCor + Remedy Ultra	16 + 8	fl oz/A
Ground	12	DuraCor + Remedy Ultra	16 + 8	fl oz/A

Table II. 2023 Application information for Result Demonstration

Date	June 12, 2023
Time	10:45 am to 12:15 pm
Air Temp	82 F
RH	68 %
Wind	8 mph E
Soil Temp at 6 in.	79 F
GPA	18 GPA for Ground Sprayer, and 2 GPA for Aerial Drone
Weed size	4-12 inches tall

Herbicide Efficacy Evaluation Details

Simple percent visual control of target species and percent visual desirable grass phytotoxicity (if present) were recorded at monthly intervals post application. Three randomly selected areas of observation per treatment for broadleaves, or three (3) transects of one hundred (100) plant live/dead counts for brush were evaluated and combined into a plot mean. Date of evaluation and a reference to the number of months after applications for weeds and brush were reported.

Table III. 2023 Mean plot efficacy (% Visual Control) of herbicide treatments for the control of weed species in bermudagrass pasture (MAT = Month after treatment).

App Type	Trt No	Herbicide Trade Name	All Weed Control 1 MAT 07/12/23	All Weed Control 2 MAT 08/12/2023
Drone	1	DuraCor	95	99
Ground	2	DuraCor	99	99
Drone	3	Grazon PD3	99	99
Ground	4	Grazon PD3	98	99
Drone	5	MezaVue	99	99
Ground	6	MezaVue	99	99
Drone	7	Chaparral	99	99
Ground	8	Chaparral	99	99
Drone	9	GrazonNext HL	99	99
Ground	10	GrazonNext HL	99	99
Drone	11	DuraCor + Remedy Ultra	99	99
Ground	12	DuraCor + Remedy Ultra	99	99

Conclusion:

Technology is dynamic that is adapting to different farming practices. Very positive results have occurred. Herbicide efficacy in these result demonstration trials we the same. Herbicides have proven to be an effective way of controlling weeds in warm-season forage systems using an aerial drone and a conventional sprayer.

Acknowledgements

A special thanks to the Gabriel Ranch for allowing the result demonstration to be conducted on the property and to Mr. Darren Rozell & Kevin Proctor (Rozell Sprayer and Manufacturing), Mr. Patrick Sutton, Colton Spencer, & Benny Martinez (Corteva Agriscience), Stefan Bush (EGEBIO) for donating the herbicides, surfactant, and drone lock drift control agents that were used in the result demonstration project.