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DJI AGRICULTURE

Case Studies



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DJI AGRAS T16 SPRAYED APPLE IN SERBIA

Apple production in Serbia has been traditionally successful, while in the last decade it is the fastest growing agribusiness in all agriculture. Most of production is exported to Russia and the EU. Yield per hectare is from 50 to 70 tons. All varieties of apple are produced and in order to achieve the best yields and fruit quality, all agro technical measures are applied. One of those measures is fruit thinning, which we carried out by drones

PURPOSE OF THE SPRAY

Treatment was a part of recommended technology in apple production. Main goal was to achieve fruit number reduction on fruit branches, fruit size incensement and better coloring and quality of fruits.







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INFO OF THE ENVIRONMENT

Date of Spray	May 5th 2020, May 8th 2020	Location	Ogar, Srem region, Serbia
Type of Terrain	Flat land w. gentle slope changes (+/- 5m on 200m section)	Temperature($^{\circ}$ C)	13-25
Total sprayed Area(ha.)	10 ha	Humidity	45-60%
Wind speed (m/s)	2-4 m/s	Wind direction	SE

The effect of the chemical we used changes with the temperatures, as well as spraying efficiency which drops in higher temperature due to mid-air evaporation, so we chose to work in the morning while below 30C. Attention to the wind intensity was necessary, as spraying above Beaufort level 2 can lead to uneven spraying deposit and contamination of neighboring plots.

OPERATION PARAMETERS

Type of Drone	DJI Agras T16	Firmware Version	v02.01.0312
Operation mode	Intelligent route planning w. manual override	Operation Speed	2.5 m/s
Operation height (from the top of the crop)	2.5 m	Line spacing/width	3.2 m
Liquid amount sprayed per hectare	60 lit/ha	Nozzle type	XR11001VS

The spacing coincides with the spacing in the rows of plantations, as it was important for the chemical to reach each fruit branch. Therefore, flight was performed over each row and used a slightly larger amount of liquid for this mode of operation.

INFO OF CHEMICALS





BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT IN THIS CASE.

Main advantage of drone application is precise deposition on top and middle sections of the fruit tree with targeting areas of fruit branches, next to avoidance of spraying punching trough rows. That was important because different clones with different demand for chemical treatment are planted every four rows. Mode of action of hormonal chemicals used for fruit drop is based on chemically induced decrease of plant physiological activity. That is the reason why this operation is critical and has to be maintained by care. If the dosage is over the limit all the fruits will drop, if it is under-dosed fruits will not drop but pygmy fruits with poor calibration and quality will occur. Consequence of temporary physiological decrease is that fruit branches that have 5 fruits differently sized will drop smallest fruits. King fruit as well as, usually, by size, two following King fruit, persist on the branch. Result is that all the fruits on the branch are very similar in size/calibration, color and quality.

At preparation stage, we performed geodetic and multispectral scanning of the orchard, using DJI Matrice M210 RTK V2 w. D-RTK2, X4S and third party six channel camera. Produced orthomosaic multispectral maps were valuable for fruit tree classification. DJI Terra v.2.1 successfully produced RGB geodetic products from X4S images, while "Fruit tree" automatic missions generation resulted in flight lines of changing altitude, based on terrain and orchard lines. As there were no waypoint and flight path inspection tools in DJI Terra v.2.1, we couldn't assure that calculated flight path considered thin obstacles (wires, poles, and branches) and varying density of the canopies. Therefore, we decided to perform radar-based altitude guidance and calibration point orientation for each spraying section w. operator supervision and manual override where necessary. Sections and calibration points were defined in DJI Terra "Field" mode, flight lines direction and spraying width were set manually per section to correspond to calibration point and orchard lines, as line by line had to be treated with specific treatment (each 4 lines of orchard, approx. 1ha per section). Altitude guidance based on radar was tricky to perform, as objects underneath the aircraft had very variable height (ground, trees, poles and cables), while canopies were of variable density (so radar picked up very varying reference and obstacles) – therefore constant observance and manual correction of flight altitude by the operator were necessary.

Regardless of the before mentioned challenges, spraying operation was performed much more precisely and much faster than it could be done with alternative classic machinery. Potential of drone-based spraying to quickly stop and precisely continue its operation, to swiftly vary spraying path, altitude and spraying rate based on environmental/canopy changes, provided drone spraying with much more precision that it is available with classic machinery. DJI Agras T16 homogenous spraying density was of great benefit in this application, so we find that this task could hardly be accomplished with drones of previous generations (without airflow consistency). Therefore, this challenging spraying mission was performed with top quality and precision, what was unachievable until advent of T generation of spraying drones.

CONCLUSION

Fruit number reduction is very delicate operation. Large number of variables can influence treatment performance. Temperature, insolation, humidity, cloudiness, biological stage of fruit trees, susceptibility of clones to chemical treatment are some of them. Main benefit of drone treatment was precise application, avoiding contact of non-tolerant apple clones with non-adequate active ingredients, as well as large benefit in logistics and efficiency. Fruit number reduction was successful.

Selection of chemicals as well as dosages and the moment of the treatment is based on huge experience and large number of trials that were done during last decades. There are lot of critical parameters in this treatment and interaction between all of them is crucial to success. Fruit clone sensitivity and relation between chemical dosage and climate parameters have to be monitored all the time and the team have to be ready to react in the moment when even one of parameters go out of the order.



SERVICE TEAM INFO

The AGRODRON team is the first company in Serbia and the region to deliver professional UAS spraying technology and its regular application in the protection of agricultural crops using own fleet of DJI Agras T16 aircraft. Team gathers experienced drone operators, agronomist, mechatronics, sensing and data specialist and trainers. In our work so far, we have been very successful in treating all types of orchards that are represented in region, all with the aim of promoting new technology and the benefits it brings.

Contact persons: Momir Alvirović, Goran Iskić, Zoran Stojanović. Contact info: info@agrodron.rs

LINK OF PICS OR VIDEOS:

https://youtu.be/vP31WATypjE https://youtu.be/8PRwleeYlZ4



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SPRAYING BANANAS IN DAK LAK PROVINCE, VIETNAM USING DJI AGRAS T16

Apple production in Serbia has been traditionally successful, while in the last decade it is the fastest growing agribusiness in all agriculture. Most of production is exported to Russia and the EU. Yield per hectare is from 50 to 70 tons. All varieties of apple are produced and in order to achieve the best yields and fruit quality, all agro technical measures are applied. One of those measures is fruit thinning, which we carried out by drones



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PURPOSE OF THE SPRAY

Vietnam is a tropical country and also home of many precious banana plants. Banana plants are cultivated in large area with high yield. Area under banana cultivation accounts for 19% (2018) of the Vietnam's total fruit plant area with annual output of about 1.4 million tons. In Dak Lak provinces of Vietnam, Cao Nguyen Iflight Service Center belonging to AgriDrone Viet Nam (AgriDrone.vn) has sprayed 50 ha of bananas for Dakruco Company from in Gia Lai, Vietnam.



INFO OF THE ENVIRONMENT

Date of Spray	28/08/2020	Location	Gia Lai
Type of Terrain	Intercropping with rubber	Temperature($^{\circ}$ C)	30℃
Total sprayed Area(ha.)	50 ha	Humidity	N/A
Wind speed(m/s)	N/A	Wind direction	N/A

OPERATION PARAMETERS

Type of Drone	MG-1P	Firmware Version	0012
Operation mode	Effective	Operation Speed	100%
Operation height	2.5m	Line spacing/width	5m
Liquid amount sprayed per hectare	20L	Nozzle type	XR110015VS

Suitable for the current weather conditions, which greatly increases the efficiency when combined with the drone.

INFO OF CHEMICALS (IF YOU COULD)

Chemical commercial name	Formulation	Active ingredient and the percentage	Chemical amount (g or ml) used per hectare/
Mexyl MZ		Metalaxyl: 8% w/w Mancozeb: 64% w/w Carriers, additives	500g/20l/ha
Permecide	P A	ermethrin: 200g / lite dditive enough 1 lite	r 480ml/20l/ha r
Senca Fertilizer	N	Protein (Nts): 11% lagnesium (MgO): 16 Humidity: 1%	% 1kg/20l/ha



BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT IN THIS CASE (COST, EFFECT, OR EFFICIENT, ANY ADVANTAGES...)

The use of famer workers to spray the bananas has some difficulties such as: In the rainy season, it is difficult to find workers to spray chemicals. The control of pests and diseases has to be more effective in the evening. Small banana trees can spray easily, but it is difficult to spray them when they are growing. The higher of banana is up to 3m and the foliage is dense, so spraying is difficult to ensure effective prevention. In addition, banana trees are grown with high density and growers need weekly use pesticides, fungicides. That's why DJI AGRAS MG-1P is not only responding to prevention requirements but also improves performance dramatically. DJI AGRAS MG-1P is equipped with 4 water pumps and 8 nozzles, outstanding at the flow rate and the penetration rate of the droplet. For fruit trees like banana, there is a good pest control effect after spraying.

CONCLUSION

We have tested spraying and after seeing the effect, farmers are convinced by the clever and precise spraying ability that we have shown them.

SERVICE TEAM INFO

Service team name is Cao Nguyen Iflight SC, belonging to AgriDrone Viet Nam (AgriDrone.vn) Our Service team operates in the Central Highlands region of Vietnam. The establishment time up to now is about 4 months. The team has 7 members. Total sprayed Area is over 1000 hectares.

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THE AGRAS T16: AN APPEALING SOLUTION FOR BANANA PEST CONTROL

DJI agricultural drones have been widely recognized in pest and disease control for rice, wheat, cotton, peanut, and other field crops. With the release of the Agras T16, what can this new drone do for controlling pests in fruit trees?



On March 28, 2019, a spraying team in Hainan, China used two T16 drones to tackle the spread of thrip and the black Sigatoka leaf spot throughout 16 hectares of banana trees in Dongfang City.

"For fruit trees such as bananas, the spraying flow and droplet sedimentation of the T16 meet control requirements, as well as greatly improve the efficiency of operation," Said Yang, an operational pilot on the scene.

The successful operation ran through March 2017, using the parameters listed below:

INFO OF THE ENVIRONMENT

Land Type	Flat	Location	Basuo County, Donfang, Hainan
Wind	Lv. 3	Temperature & Weather	Sunny, 23°C-30°C

OPERATION PARAMETERS

Flight Mode	Route Operation	Flight Speed	4.5 m/s
Flight Altitude	2.5 m	Route Spacing	5.5 m
Volume per Hectare	174.2 ml	Nozzle Type	XR110015VS

The banana trees were rooted in a flat terrain with regular land parcels, which is suitable for Route Operation mode (fully automatic). Since banana trees are tall and have multiple canopy layers, the team flew the T16 slowly to ensure adequate coverage of the sprayed solution. To guarantee the spraying effect and maximize the work efficiency, the team set the dosage per hectare to 174 ml and the flight speed to 4.5 m/s.

PESTICIDE AND FUNGICIDE INFORMATION

Pesticide/ Fungicide Name	Туре	Concentration of Active Ingredient	Amount per Hectare
Taosiben	Emulsifiable Concentrate	45% Dursban	1.34 ml
Zhengmeng	Microemulsion	450 g/L Imidacloprid	0.87 ml
Xianliang	Emulsifiable Concentrate	40% Difenoconazole Pyraclostrobin	1.68 ml
Caiyoule	Water Dispersible Granule	40% Spinetoram∙ Sulfoxaflor	0.27 ml

The purpose of this operation is to prevent the spread of thrip and the black Sigatoka leaf spot disease. The pesticides and fungicides mentioned above are recommended by chemists and are mixed and made suitable for aerial spraying.



CONCLUSION

The Agras T16 is equipped with four pumps and eight nozzles for outstanding spraying flow and droplet settling. For treating fruit trees such as bananas, its spraying performance is effective in treating pests and diseases.

"Like many other teams, this is also our first time using T16 to spray banana trees," shared said Liang, head of the plant protection team. "In terms of operation results, the T16 brought us a lot of surprises. The improvement of efficiency and spraying effect also makes us more confident for future operations. Next time, we will use T16 with the Orchard mode with the Phantom 4 RTK to spray bananas trees."

SPRAY TEAM INTRODUCTION

Hainan Zhongnong Aviation Service Technology Co., Ltd. is located in Cangzhou City, Hainan Province, as of June 2016. It has 80 UTC-certified professional pilots, as well as service centers in Yinzhou, Changjiang, Dongfang, Ledong, Chengmai, Sanya, and Qionghai, providing local farmers with accurate, efficient, low-cost, and low-residue aerial spraying services.



The team has conducted spraying for over 300,000 hectares of fields, covering a wide range of crops and plants, including rice, pumpkin, banana, corn, green soybean, mango, grapefruit, Curcuma zedoary, coconut, and betel nut.

PEST CONTROL CASE STUDY — CHERRY TREES

As a valuable plant with tremendous economic benefits, cherry trees mature early and produce abundant fruit. However, they are often exposed to a variety of pests and diseases, with their trunks, foliage, flowers, and fruits susceptible to pests and germs. Therefore, learning how to repel these threats efficiently is something that must be seriously considered as the growing season continues.



SPRAYING TEAM INTRODUCTION

Dalian Yitian Aviation Technology Co., Ltd has five core members, two agricultural technicians, and several drone pilots and ground staff members. The company has cooperated with more than 30 drone pilots and has established the Yitian Spray Alliance (YSA). The team provides dedicated spraying plans for a variety of different plants, such as wheat, rice, corn, soybeans, peanuts, green onions, horseradish, cherries, apples, filbert, and other gardening plants. Today, their total spraying area covers over 4.2 million acres of land (1.74 million hectares).

Dalian is home to over 2.4 million acres of cherry trees, which requires at least nine spraying operations each year. Realizing this, YSA reached out to farmers for cooperation. Initially, the local community was skeptical of YSA's services. Most stated that "a cherry tree is about 4 meters high, and since its leaves are often thick, spraying should be done by hand, not drones."

To alleviate these doubts, YSA staff member Liu Hongyu contacted Ye Hang, who has sprayed more than 47,000 acres of cherry trees in Shaanxi. After much consultation, Liu Hongyu sprayed 13 acres of cherry trees as a way of demonstrating the value of drone technology for pest control. The farmers were convinced and placed an order for an additional 2,000 acres to be sprayed. Below is an overview of how this order was fulfilled.



ENVIRONMENT INFORMATION

Operating Date	2018.05.19	Location	Dalian, Shandong, China
Terrain Type	Hill	Temperature and Wind	Lv. 3 South Wind

OPERATION PARAMETERS

Operation Mode	Route Operation	Flight Speed	3.1 m/s
Flight Altitude	1.5 m	Route Spacing	5 m
Volume per hectare	0.1 L	Nozzle Type	Fan-shaped nozzle

Before spraying begins, it is important to determine the spacing of the rows of cherry trees. Since cherry trees are often planted relatively far from each other, typical spacing between rows is about 5 m. Consequently, agriculture drones must fly above each row while spraying to maximize the use of pesticides.



These pesticides were provided by farmers for pest control and should be mixed according to the directions printed on the label. After the Route Operation has finished, remember to fly the drone along the edges of the field and spray the trees there as well.

SPRAYING TEAM INTRODUCTION

Farmers were delighted with the spraying result and said they would continue using the T16 for spraying in the future. Throughout this operation, we discovered the best weather for spraying cherry trees is in a windless setting, or when wind speed is under 3 m/s. Route Operation mode is recommended to avoid repetition or omission in spraying. It is also recommended to turn off the high-precision terrain detection radar, and use the barometer to set the height. Remember to fly the drone at a height of approximately 1.5 m over the crops, and since some plants are four or five meters high, pilots need to fine-tune when necessary.

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PESTICIDE INFORMATION

Pesticide Name	Туре	Effective Composition and Content	Dosage/ha
Lambda- cyhalothrin	Microemulsion	2.5%	3.35 ml
Zineb	Dissolvable Powder	65%	4.69 g
Triflumizole, Trifloxystrobin	Suspension Concentrate	42.8%	2.01 ml
Spreader	Emulsifiable Concentrate	1	1.68 ml

* Dissolvable powder was used in this case. Next time, communicate with farmers in advance and try to avoid such agents, as they might block the spray system and affect the spraying results.

EFFECT OF SPRAYING



Leaves seriously harmed by pests (L)

Leaves with droplets evenly sprayed on (R)

After spraying, farmers physically examined the field to obtain relevant results. Since the Zineb used that day was blue (by containing blue vitriol), it was easy for them to see that the droplets were evenly and densely sprayed all over the leaves.

DJI AGRAS T16 SPRAYED MAIZE IN SERBIA

Maize is the most common crop in Serbia and many base seed production and breed selection companies work on producing quality seeds for the region. About 1 million hectares are sown annually and the average yield is approx. 6.5 tons per hectare, while top-tier growers produce more than 10t/ha. Most remain in domestic market; still significant volume is exported. In order to achieve the highest possible yields, full spectrum of agro technical measures is necessary. Fighting pests that attack in late stages of growth was dependent on heavy expensive machinery that hardly could reach the fields and not possible without partial damage to crops until the advent of drones.

PURPOSE OF THE SPRAY

Treatment was a part of recommended technology in selection of maize seed lines and base seed production for the Maize institute Zemun Polje, Serbia. In the same period, we have delivered same treatment to test production crops of Corteva/Pioneer, KWS, AgriReserach in our region. Purpose was protection from Corn borer (Ostrinia nubilalis). Two treatments were done. First one in the first decade of July, and another one at the beginning of August, targeting two different generations of Corn borer.

Characteristic of these treatments in institute environment was that they were performed on large number of small plots, from 0.4 to 6 ha each.

INFO OF THE ENVIRONMENT

Date of Spray	July 7 th 2020	Location	Zemun polje, Srem region, Serbia
Type of Terrain	Flat land	Temperature($^{\circ}\!$	20-28
Total sprayed Area(ha.)	23 ha in 19 plots	Humidity	65-55%
Wind speed(m/s)	1,5-4 m/s	Wind direction	W

Date of Spray	August 6 th 2020	Location	Zemun polje, Srem region, Serbia
Type of Terrain	Flat land	Temperature($^{\circ}\!\!\mathbb{C}$)	20-29
Total sprayed Area(ha.)	23.2 ha in 18 plots	Humidity	50-55%
Wind speed(m/s)	1,5-3 m/s	Wind direction	SE

Drone based spraying efficiency can drop significantly in higher temperature due to mid-air evaporation of small droplets, as well as chemical efficiency that can drop with temperature as well, so we chose to work in the morning while below 30C.

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PARAMETERS

Type of Drone	DJI Agras T16	Firmware Version	v02.01.0312
Operation mode	Intelligent route planning, A-B route	Operation Speed	4.7 m/s
Operation height(from the top of the crop)	2,2 m	Line spacing/ width	6m
Liquid amount sprayed per hectare (or per MU)	15 lit/ha	Nozzle type	XR11001VS

We have used standard flight parameters in order to achieve maximum efficiency and cover the entire corn tree with the treatment.

INFO OF CHEMICALS

Chemical commercial name	Formulation	Active ingredient and the percentage	Chemical amount(g/ml) used per hectare
Coragen 20 SC	SG	Rynaxypir	4.7 m/s
Trend 90	SL	Adjuvant	6m

Based on the research and the testing, only two pesticides are adequate for Corn borer treatment. Both of them are based on Rynaxypir (Chlorantraniliprole). Coragen 20 SC is single active ingredient safe for bees and predatory insects so it was logical to choose it for the treatment.

BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT IN THIS CASE.

Height of the maize in the moment of first treatment was approx. 1.10-1.20m, and in second treatment it was over 2.50 m so as an alternative to treatment with high clearance sprayer treatment with DJI Agras T16 was done. Main advantage was that drone application provided treatment that is efficient and with no damage to the crops. Significant advantage of drone-based spraying was much shorter reaction time (from conditions met and order placed to the delivery of the treatment) and easier machinery manipulation due to the fact that treated plots are small and therefore it is hard to manipulate mechanization in it. Using classical mechanization, even when treatments are performed with care, makes damage to the crops. Selection line production and base seed production is very expensive and the fact that drone application makes no damage to the crop is one great advantage.





CONCLUSION

Treatment was efficiently done and provided crop was protected from pests. No damage on the crops was observed. Main recommendation is to take care about temperatures to avoid pesticide premature evaporation or enslavement of treatment solution in inversion layer of air.

SERVICE TEAM INFO

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Contact persons: Momir Alvirović, Goran Iskić, Zoran Stojanović. Contact info: info@agrodron.rs

LINK OF PICS OR VIDEOS:



Warm prompt: the content and parameters provided here are just for reference. You should adjust the operation mode and the parameters and use a correct way to spray your field according to the different weather, the crop characters, the habit or history of using chemicals(you could change other chemicals in case that the resistance occurs), etc. If you are not sure what operation parameters you will choose or not sure about the spraying efficacy, then you should firstly do a small plot test in this field before a big area spray.

DJI AGRAS T16 SPRAYED MAIZE IN SERBIA

Maize is the most common crop in Serbia. About 1 million hectares are sown annually and the average yield is approx. 6.5 tons per hectare while top-tier growers easily produce more than 10 t/ha. Most remain in domestic market; still significant volume is exported. In order to achieve the highest possible yields, full spectrum of agrotechnical measures is necessary. Fighting pests that attack in late stages of growth was dependent on heavy expensive machinery that hardly could reach the fields and not possible without partial damage to crops until the advent of drones.

PURPOSE OF THE SPRAY

Treatment was a part of recommended technology in maize production. Purpose was protection from Corn borer (Ostrinia nubilalis) as well as application of foliar fertilizer.

INFO OF THE ENVIRONMENT

Da Sp	te of iray	August 4 th 2020	Location	Adrojan-Kanjiza, Vojvodina region Serbia
Type of	fTerrain	Flat land	Temperature($^{\circ}$ C)	20-24
Total s Area	sprayed a(ha.)	23	Humidity	65%
W spee	ind d(m/s)	1,5-5 m/s	Wind direction	SW

Attention to the wind intensity was necessary, as spraying above Beaufort level 2 can lead to uneven spraying deposit and contamination of neighboring plots.

OPERATION PARAMETERS

Type of Drone	DJI Agras T16	Firmware Version	V02.01.0312
Operation mode	Intelligent route planning	Operation Speed	4.7 m/s
Operation height(from the top of the crop)	2 m	Line spacing/ width	6m
Liquid amount sprayed per hectare (or per MU)	20 lit/ha	Nozzle type	XR11001VS

We used standard height and spacing and speed parameters to achieve maximum efficiency and cover the entire corn tree with treatment. Slightly larger liquid volume per hectare was chosen due to combination of chemicals.



INFO OF CHEMICALS

Chemical commercial name	Formulation	Active ingredient and the percentage	Chemical amount(g/ml) used per hectare
Coragen 20 SC	SG	Rynaxypir	0.15 l/ha
Basfoliar 36 Extra	SL	Foliar fertilizer 27% N	3 l/ha
Trend 90	SL	Adjuvant	0.015 l/ha

Based on the research and the testing only two pesticides are adequate for Corn borer treatment. Both of them are based on Rynaxypir (Chlorantraniliprole). Coragen 20 SC is single active ingredient safe for bees and predatory insects so it was logical to choose it for the treatment.

BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT IN THIS CASE.

Height of maize in the moment of application was cca 1.1-1.2 m so as an alternative to treatment with high clearance sprayer treatment with DJI Agras T16 was done. Main advantage was drone application provided treatment in the exact moment when it was needed, due to the fact that common mechanization was not able to do the treatment because of soil moisture (saturated after extensive precipitation).



CONCLUSION

Treatment was efficiently done. Crop was protected from pests and application of foliar fertilizer was done too.

CASE STUDY: CONTROLLING CORN BORERS IN XINJIANG PROVINCE

At the end of June 2017, Bole City, located in Xinjiang, China suffered an outbreak of corn borers. In order to control the outbreak, the Xi'an based Tianyi Aviation Technology Co., Ltd. sent out an agriculture service team that traveled 3,100 kilometers to conduct aerial spraying for affected cornfields covering 2,735 acres.



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SERVICE TEAM INFO

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DJI MG-1S DURING OPERATION

Upon arrival, the team assessed the situation and found that roughly 50-55% of the corn had been affected. Borers had severely damaged the young cobs and leaves of the corn, and the situation was deteriorating.



SPRAYING CONDITION

The weather was ideal for aerial spraying, with calm winds and mild temperatures. The team decided to start its operation on June 25.

Operation	25/6/2017-	Location	Bole City, Xinjiang
Time	13/7/2017		Province, China
Terrain	Dry lands	Environment & Weather	Sunny (16°-26°C) Level 2 winds

DOSAGE

The team decided to use multiple pesticides to achieve optimal results. Detailed information is as follows:

Pesticide	Dosage Form	Effective Component and Concentration	Dosage (per acre)
Beta-cyfluthrin	Suspending agent	10%	40.24 ml
Chlorpyrifos	Emulsifiable Concentrate (EC)	45%	610 g
Profenofos & Phoxim	EC	Total: 40 Phoxim: 34% Profenofos: 6%	121 ml

OPERATION PARAMETERS

Operation Mode	Intelligent Operation Mode	Flight Speed	4.5-5 m/s
Flight Altitude	2.5 m	Working Interval	5 m
Dosage (liters per acre)	1	Nozzle Type	Fan shape XR11001

PEST CONTROL EFFECT

Random sampling before spraying showed that, on average, there were 30 borers per 50 plants. That figure dropped to 6 borers per 50 plants after spraying, meaning the borers' mortality rate was about 80%.



RESULT

The spraying proved to be highly effective in controlling pest infections.



Contact: Xi'an Tianyi Aviation Technology Co., Ltd. Zhang Shiwei: 181-8913-0399 Wang Ke: 136-1921-8757

CASE STUDY | MG-1S ENABLES EFFICIENT SPRAYING FOR EUCALYPTUS

Eucalyptus is one of the fastest-growing trees in the entire world and remains lush and green throughout the year. Capable of natural regeneration from sprouts and improving marshland conditions, it is widely used in many regions of the world.



Eucalyptus is usually attacked by a variety of insects, including white ants, grubs, mole crickets, cutworms at the roots, Buzura suppressaria Guenee and eucalyptipsyche citriodorae on the leaves, crickets, grasshoppers at the tips, woodworms and bark beetles at the trunks, and more. In the past, pest control was mainly realized through traditional air duct operations as eucalyptus is normally planted on the mountains where manual spraying has a number of disadvantages including access, low efficiency, and waste. Eucalyptus is also quite tall, so pesticides are typically sprayed upwards, which means workers responsible for the spraying will be exposed to hazardous pesticides that can be harmful to their health.

In order to strengthen the pest control for Eucalyptus and achieve the goal of rapid production increase, Zhanjiang Shuoke Agriculture Technology Co., Ltd. applied the MG series agricultural drones to spray 329.5 acres.

TEAM INTRODUCTION

Zhanjiang Shuoke Agriculture Technology Co., Ltd. has 20 professional drone pilots. It also has UAV plant protection teams in Zhanjiang, Leizhou, Hainan, Suzhou, and Sinkiang. Since being founded, it has provided UAV services for roughly 33,000 acres of land. The main plants that it has protected include rice, corn, banana, wheat, cotton, eucalyptus, mango, lychee, betel nut, and more.

Operation Dates	May 2-5, 2018	Location	Suixi, Zhanjiang
Land Type	Plain	Conditions	No no-fly zone, closely grouped land

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TEAM INTRODUCTION

Flight Mode	Flight Route Planning	Flight Speed	4 m/s
Flight Altitude	2-2.25 m	Route Spacing	4 m
Amount Per Acre	10.8 L	Nozzle Type	XR11001VS

We used flight route planning for the dense eucalyptus area. With two MG-1S units, we can spray about 50 acres per day. It is recommended to avoid spraying operations during midday, or on rainy days; otherwise, the spraying effects will be diminished.

PESTICIDE INFORMATION

Pesticide Name	Туре	Concentration of Active Ingredient	Amount per acre
Abamectin	Emulsifiable Concentrate	5% abamectin	360 ml
Beta- cypermethrin	Emulsifiable Concentrate (EC)	4.5%	390 ml
/	Emulsifiable	beta- cypermethrin	/



The pesticide used in this operation was made using two types and featured broad-spectrum insect killing effects. The amount of pesticide used during this operation is relatively high due to the serious prevalence of insect damage. It is recommended that users select appropriate pesticide(s) and amounts according to observable conditions.

SPRAYING EFFECT



A large number of insects and pests died within one hour of spraying.

CONCLUSION

Eucalyptus can be up to 16 meters tall, so it is important to pay special attention while selecting the takeoff point and the position of the pilot. Since the area's overall height was relatively uniform, and obstacle-obtaining radar was not available during this operation, our pilots took extra care to pay attention to the process to ensure spraying efficiency and safe operation.



Users have tried plant protection drones from other brands before. However, due to uneven, overlapping, and inefficient spraying, the insect problems were not solved effectively. After cooperating with DJI, users were very satisfied as we used Flight Route Planning together with manual spraying route planning to avoid redundancies and inefficient spraying. The growers also expect to adopt our solutions for subsequent UAV spraying operations.

SPRAYING VINES IN SWITZERLAND USING DJI AGRAS

Switzerland contains a total vines area of 14712 ha. The annual turnover of the grape growers in Switzerland is approximately CHF 550 million.

For the optimisation of the grape harvest, viners treat the plants with pesticides, multiple times per season. Traditionally, this work is mostly performed manually or with specialized machines, which is physically very demanding on the one hand and can be time-consuming on the other. 8-10 treatments are applied, which gives a rhythm of about 10 days for the repetitive spraying with pesticides. A mildew attack does not only destroy the actual harvest in the worst case, it even has negative effects for the following years.

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On very steep slopes, there is a big risk of accidents with the vehicles, as these can overturn. Numerous deaths from the past years testify to this.

For the winegrowers, treating the vines from the air with an agricultural drone brings clear operational advantages. Some winegrowers have already had some experience with this and there is a certain acceptance of the new technology.

PURPOSE OF THE SPRAY

Crops: vines (seedlings, young plants, grown up plants)

Diseases: powdery mildew, Downy mildew, other fungal diseases

INFO OF THE ENVIRONMENT

Date of Spray	2020.6.2-3 2020.6.8 2020.6.16, Repeat every week	Location	Hallau, Switzerland
Type of Terrain	Flat & Steep	Temperature($^{\circ}\!$	15 – 25°C
Total sprayed Area(ha.)	3.5 ha. of young plants 4 ha. of adult plants	Humidity	different



OPERATION PARAMETERS

Type of Drone	MG-1P & T16	Firmware Version	T16: V02.01.0312 MG-1P: V02.01.0012
Operation mode	Intelligent route planning	Operation Speed	T16: ~3m/s MG-1P: ~1.5m/s
Operation height(from the top of the crop)	3m	Line spacing/ width	3m/4m (according to the planning line width)
Liquid amount sprayed per hectare	100 l / ha	Nozzle type	XR110015VS
	A 3	A	



Chemical commercial name	Formulation	Active ingredient and the percentage	Chemical amount(g/ml) used per hectare
Folpet	WG	Folpet 80%	1.2kg/ha
Booster	SC	Kaliumphosphonat 51.7%	1 L/ha
Celos	WG	Schwefel 80%	2.4 kg/ha

INFO OF CHEMICALS



CONCLUSION

A lot of vines are sprayed in Switzerland with drones. This client is special because we spray young plants for him, which are especially sensitive and valuable. Manual spraying is done with tractor, but they have lots of problems in steep hills.

The drone spraying application is very dense monitored by the customer who is a country widely-known specialist for young vines. He built up special landing platforms for the spraying drone.

Spraying in vines is mostly for preventing against the disease happening.



Downey mildew happens if no spraying.



Healthy plants after spraying

The client actively compares drone spraying with earlier tractor spraying. The client is happy with drone spraying, reasons:

- No personal contact to pesticides
- Same speed in flat terrain as tractor, however, in steep terrain the DJI Agras has a much higher efficiency.
- No phytotoxicity happens.



SERVICE TEAM INFO

Our company name is Remote Vision. And we started spraying since 2016 for vines, crops, vegetables, and more. We actually have 3 spraying teams.

Contact person: Ueli Sager Contact info(phone or email)ueli.sager@remotevision.ch

Warm prompt: the content and parameters provided here are just for reference. You should adjust the operation mode and the parameters and use a correct way to spray your field according to the different weather, the crop characters, the habit or history of using chemicals(you could change other chemicals in case that the resistance occurs), etc. If you are not sure what operation parameters you will choose or not sure about the spraying efficacy, then you should firstly do a small plot test in this field before a big area spray.

DJI AGRAS MG-1P CONTROLLED ANTHRACNOSE AND INSECTS ON LOTUS IN AN GIANG PROVINCES VIET NAM

Switzerland contains a total vines area of 14712 ha. The annual turnover of the grape growers in Switzerland is approximately CHF 550 million.

For the optimisation of the grape harvest, viners treat the plants with pesticides, multiple times per season. Traditionally, this work is mostly performed manually or with specialized machines, which is physically very demanding on the one hand and can be time-consuming on the other. 8-10 treatments are applied, which gives a rhythm of about 10 days for the repetitive spraying with pesticides. A mildew attack does not only destroy the actual harvest in the worst case, it even has negative effects for the following years.



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PURPOSE OF THE SPRAY

Agricultural drone DJI Agras MG-1P was used to spray anthracnose and insect chemicals on the lotus. Anthracnose(for example) damages most of the lotus feces such as leaves, cotton, and seeds. The disease is initially small round spots or no certain shape, light brown under leaves, then dark brown with a red border or yellow halo spreading around. When the disease is severe, the lotus leaves will be rotten and dry.



INFO OF THE ENVIRONMENT

Date of Spray	25/08/2020	Location	Tân Châu, An Giang
Type of Terrain	delta	Temperature($^\circ\!\!\!C$)	25℃ - 30℃
Total sprayed Area(ha.)	6.0 ha	Humidity	70%
Wind speed(m/s)	N/A	Wind direction	N/A

INFO OF CHEMICALS

Chemical commercial name	Formulation	Active ingredient and the percentage	Chemical amount(g/ml) used per hectare
Antracol 70WG	/	Propineb 700g/kg	1kg/ha
Confitin 50EC	EC	Abamectin 48.5g/l Chlorfluazuron 1.5g/l	1,5l/ha
LKSET-UP 75WP	/	Nitenpyram 50% Pymetrozine 25%	240g/ha



Protect trees with zinc armor, prevent pests and aphids.

OPERATION PARAMETERS

Type of Drone	MG-1P	Firmware Version	0012
Operation mode	Effective	Operation Speed	100% (6,9m/s)
Operation height (from the top of the crop)	2m	Line spacing/ width	4m
Liquid amount sprayed per hectare (or per MU)	20L	Nozzle type	XR110015VS

Suitable for the current weather conditions, which greatly increases the efficiency when combined with the drone

BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT IN THIS CASE.

It is very hard and toxic for manually swimming, canoeing, and wearing a heavy sprayer. Using agriculture drones, people just need to stand on the field rice shore, plan the flight and spray automatically, save time and effort.



CONCLUSION

According to farmers, spraying by agriculture drone on a lotus is 20-30% more effective than by hand. Effective prevention of pests and diseases when using aircraft spraying is clear. Farmers praised a lot for its effectiveness and safety.

SERVICE TEAM INFO

Service team name is Can Tho SC, belonging to AgriDrone Viet Nam (AgriDrone.vn). Our Services team operates in the West of Vietnam. The establishment time up to now is about 5 months.

Contact person: Nguyen Van Thien Vu Contact info: contact@Agridrone.vn Hotline: 07 9955 8855 Website: https://agridrone.vn/ YouTube: https://www.youtube.com/c/MayBayNongNghiepDJI/videos

CASE STUDY | MG-1P SPRAYING FOR MANCHURIAN CATALPA

Manchurian catalpa has high ecological and economic value. It is mainly distributed in the Yellow River and Yangtze River regions of China, as well as the northern provinces of Zhejiang and Anhui. Manchurian catalpa grows fast and are known for having elongated trunks and beautiful blossoms.



Common pests threatening Manchurian catalpa include Plautia, Basiprionota bisignata Boheman, nun moths, Edessena gentiusalis Walkers, hawk moths, Dictyoploca japonica Butler, Omphisa plagialis wileman, and Cicadella viridis. Common diseases are anthracnose and rootknot nematode. To prevent pests and diseases, the Timely Rain Aerial Plant Protection Specialized Cooperative in Hubei Province's Shishou City used DJJ's MG series plant protection drones this past May to carry out spraying operations over an area of 500 mu.

TEAM INTRODUCTION

The Timely Rain Aerial Plant Protection Specialized Cooperative in Shishou City offers drone plant protection services for large farming cooperatives and households, with the principle of "quality service, efficient operation, low price, and sincere cooperation." Drones owned by Timely Rain have increased from three DJI MG-1s to 15 plant protection drones (models include MG-1, MG-1S, and MG-1P) operated by 20 professional drone pilots.



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The cooperative can operate up to 6,000 mu* per day and has so far sprayed 130,000 mu of crops and plants, including reeds, wheat, soybeans, paddy, lotus root, corn, poplar, and more. Highly acclaimed by customers, their operations extend from local towns to surrounding counties, cities, and provinces.

ENVIRONMENT INFORMATION

Operating Date	May 01, 2018	Location	Shishou City, Hubei Province in Central China
Land Type	Plain	Environment	Safe surroundings, with some obstacles around the field

The Manchurian catalpa pest control operation, in this case, covers 500 mu.



OPERATIONAL PARAMETERS

Flight Mode	Manual	Flight Speed	3 m/s
Flight Altitude	3 m	Route Spacing	4 m
Volume per Mu	2L	Nozzle Type	XR110001 VS

HERBICIDE INFORMATION^[1]

Herbicide Name	Туре	Concentration of Active Ingredient	Amount per Mu
Prochloraz + Epoxiconazole	EW	45% Prochloraz + 12.5% Epoxiconazole	140 g
Lv Zhi Yi	Aqueous solution agent	10% Amino acid + 6 essential trace elements	100 g
Liang Tai	Suspending agent	6% Avichlorobenz	80 g

DIRECT RICE SEEDING TEST

Direct rice seeding allows you to sow seeds directly into fields without needing to cultivate and transplant sprouts.

In the past, the task of sowing seeds has been done manually. However, as the agricultural population shrinks and the existing workforce ages, replacing manual work with machines is becoming a trend. With the increasing development of drone technology in agriculture, direct seeding is now possible.



The MG Spreading System is designed specifically for MG series agricultural aircrafts, which can be replaced with tanks on MG series agricultural aircrafts and are perfect for spreading seeds, fertilizer, solid chemicals, fodder, and more. Recently, the DJI MG plant protection team conducted a direct rice seeding test with the MG Spreading System.



Because the trees in this case were around 7-8 years old and had lush leaves, the amount of herbicide per acre and water used in this operation is above average.

5.CONCLUSION

The operation was quite effective as pests and diseases were controlled, the difficulty of operation over tall crops resolved, and toxicity incidents avoided. Plant protection via drone has proven to be an efficient method for Manchurian catalpa and has earned the approval and acclaim of customers.

Annotation: *mu: Chinese area unit, 1 mu=1/15 hectares.

ENVIRONMENT INFORMATION

Time: May 2018 Location: Dawa District, Panjin, Northeastern China Terrain: Plain Weather: Sunny, 22°C with a gentle breeze from the southwest

When sowing seeds directly into the fields, we need to ensure the field is flat, the mud has sunk down to the bottom, and water remains at the surface.



Conditions for paddy fields when sowing rice seeds.

PARAMETERS

Flight Mode: A-B Route Operation Mode Flight Speed: 1.2 m/s Flight Altitude: 1.5 m Spreading Space: 2.5 m Rice Type: Yanfeng No. 47 Seeding Quantity per Acre: 447 g / 522 g/ 597 g Spreading Area: 80.4 acres Spinner Disk Rotating Speed: 520 rpm Hopper Outlet Size: 60%

We divided the field into three groups. The spreading area of each group was 26.8 acres, the total spreading area was 80.4 acres, and we used rice seeds that were soaped for three days but hadn't sprouted. Seeding quantity for each group was 447 g, 522 g, and 597 g respectively.

SPREADING EFFECT

The MG Spreading System spreads seed evenly in the field, and also ensures a high survival rate. The images below show the seeds sprouting well in the first month.



Rice seeds sprout after direct seeding with the MG Spreading System.

PARAMETERS

Farmers are very satisfied with the results that the MG Spreading System provided. By comparing the results of the three groups, we found the ideal seeding amount was 447g for one acre; the density would be too high if 522g or 597g of seeds are sowed per acre. The pilot Dagang Wang who helped in this test said that it's very convenient to use the MG Spreading System to sow seeds. Both the hopper outlet size and the spinning disk's rotating speed can be adjusted on a case-by-case basis to ensure even sowing. The history of sowing parameters can also be saved for future use or another operators' reference.

MG SPREADING SYSTEM: WHAT YOU NEED TO KNOW

In this case study, we're going to examine several questions relating to MG-1S and how it performs when spreading granular materials. Farmers in particular have a high demand for spreading pesticides, fertilizers, seeds, feed, snow melting agents, and more. Although DJI's MG spreading system was built to do precisely that, numerous parameters must be set which can vary the user results.

On June 20, 2018, Professor Song from China Agricultural University led his team out into the field to test DJI's

MG-1S spreading system. We followed along to observe and document the results.

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To evaluate the spreading system, we generally focused on the following questions:

- What is the optimal flight altitude when spreading material?
- What is the optimal flight speed and spinner disk rotation speed?
- What is the optimal spreading width?

- Is there any relationship between the stability of the payload flow and the opening width of the hopper gate?

-How evenly will payloads be distributed?

TEST METHODS AND MEASUREMENTS

In this experiment, Professor Song tested the performance of the MG spreading system using Syngenta granulated herbicide; a long-granule herbicide often used on rice fields.

The test was conducted in an open area using an MG-1S. Professor Song arranged forty-five blue boxes in a straight line, which spanned a total length of 13.5 meters. The MG-1S flew over the boxes in a straight line while distributing materials at different heights, speeds, and other parameters to discover any resulting differences. The boxes were changed after each flight, and the test was repeated several times. The granules in each box were weighed to measure spread flows and distribution.

WHAT EFFECT DID FLYING HEIGHT HAVE ON SPREADING WIDTH?

When testing flight heights, Professor Song used a flight speed of 4.5 m/s, which fell inside the 4-6 m/s recommended range for general flight operations. Professor Song then measured the effect of height on spreading width by experimenting with three flight heights: 1.5 m, 2 m, and 2.5 m. Other parameters remained constant, such as rotational speed, and an opening ratio of 25%.





As this table shows, when the flying height was 1.5 m, the spreading width was more unstable than at 2 or 2.5 m. The table also suggests that spreading width remains relatively similar in the 2-2.5 m range. Since the difference is not significant, 2 m would appear to be an optimal flying height, especially due to the slight increase in energy efficiency.

So why is there a U-shaped distribution? As a result of the spinner disk's centrifugal force, the boxes on each end of the line received more material than those in the center. During non-linear application, however, partial overlap of flight routes will offset some of these differences and result in a more even overall distribution.

THE EFFECTS OF ROTATIONAL SPEED

When we refer to the spreading system's "rotational speed," we're referring to the RPM (revolutions per minute) of the spinner disk. Theoretically speaking, the faster the rotational speed, the greater the centrifugal force, and the larger the resulting width of material spreading should be.

Professor Song experimented with the spreading effects when using speeds of 800, 1069, and 1200 RPM. Other parameters remained constant during this test, such as a height of 2.5 m, a speed of 4.5 m/s, and an opening ratio set at 25%. An interesting phenomenon was discovered: although the spreading width was slightly larger at 1200 RPM,

the effective spreading width of all three speeds was relatively equal (about 7.2 meters). These results suggest that RPM has little effect on spreading width. However, there were cases of uneven spreading at all three speeds. One possible reason was that material from the right side of the MG tank appeared to be distributed at a higher rate than the material on the left side, something that should be further explored by DJI.

Of the three rotational speeds observed, data suggests that 800 RPM was the least stable, while 1069 RPM was the most. This tells us that setting too low of a rotational speed may result in uneven distribution, while setting it too high may result in a waste of material.

WHAT IS THE SUITABLE OPENING RATIO OF THE SPREAD TANK?

Flow can be controlled by changing the opening ratio of the spread tank on the MG App. For example, 100% is completely open and 25% means 1/4 open. The larger the opening ratio, the more material is spread. Testing showed that when the opening was 100%, the flow rate averaged 3.7 kg/min, and when the opening was 25%, the flow rate averaged 1.7 kg/min.





So, does the opening ratio have an effect on the spreading width of materials? Professor Song tested two cases with opening ratios of 25% and 100% at a height of 2.5 m, a speed of 4.5 m/s, and a rotational speed of 1069 RPM.





As this table shows, when the opening ratio is 100%, the spreading amount is greatly increased (compared to 25%), but the spreading width is not significantly increased. The effective spreading width at 25% was 7.2 m, and at 100% it was 7.5 m. This suggests that the opening ratio function should not be used to regulate spreading width, and instead should only be used to affect distribution per unit area.

CONCLUSION

For the material used in this test, optimal conditions were as follows: a spread amount of 6.07 kg/acre, a flight height of 2 m, a speed of 4.5 m/s, a rotational speed of 1069 RPM, and an opening ratio of 25%. These settings resulted in a spreading width of 7.2 m.

Although the above data is valid only for this test, and individual results may vary, it should be noted that arbitrarily increasing rotational speed does not appear to improve work efficiency in any way. When it comes to actual application and use, it is recommended that pilots and farmers conduct tests according to their working environments, materials, and needs in order to optimize the effectiveness of DJI's MG spreading system.

MG SPREADING SYSTEM CASE STUDY | SPREADING PESTICIDE AND FERTILIZER IN LINYI, SHANDONG

Flowing through China's northeastern city of Linyi, the Yi river is the main waterway of the region, irrigating over 131 thousand acres of rice paddies.



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The treatment of these fields traditionally involves manual topdressing and pest control at the later stage of the rice planting process. This labor-intensive process is often inefficient, and any delays would prove a detriment to the harvest. Recent years have also seen a decrease in labor opportunities in rural areas and an increase in operational costs, further restricting seasonal profits.

Improving rice yield requires multiple factors such as reducing pesticide application at the late stage of rice growth, lowering labor costs, increasing worker motivation. To accomplish these, Jiajian Agriculture Co., Ltd began exploring methods of efficiency, including a method that combines pesticide and fertilizer distribution into one process.

With local conditions in mind, liajian Agriculture decided to employ drone technology to distribute a new mixture of fertilizer, slowrelease urea, and thiamethoxam. This mixture promotes crop growth with a mixture of nitrogen, zinc, magnesium, and boron, as well as controls pests such as planthoppers.

Jing Yang, business manager for Jiajian Agriculture, has extensive experience mixing agricultural materials, and has long considered a mixture of pesticide and fertilizer. Unfortunately, limitations in equipment prevented him from distributing the combination evenly. That is until he found out about the DJI MG series. With its official launch, Jing Yang was finally able to put his theories into practice.

Learning about the specifications of the MG series, Jing Yang contacted the Shandong dealer for DJI Agriculture, who arrived to conduct an aerial spraying of the pesticide and fertilizer mixture.



After the demonstration, Jing Yang explained the results in detail.

In this demonstration, Jing Yang selected a 0.66-acre rice field in the Xu-Tai-Ping Village of Hedong District, used the Linyi No. 16 rice and transplanted them for 10 days, starting on July 5, 2018.

Shanghai Yue-Wei Plant Nutrition Technology Co., Ltd developed the special fertilizer, which supplements the elements that are easily missing during rice planting, according to the characteristics of rice growth. Luxi Chemical Corp. developed the urea, a slow-release type that can effectively and continuously supplement nitrogen. Shanghai Hulian Bio-Pharmaceutical Co., Ltd developed the thiamethoxam, which can effectively control pests such as rice planthoppers.

Materials	Туре	Dosage per acre
Dao Feng Fertilizer	Particles	3 kg
Urea	Particles	9 kg
Dao Huang Jin	Particles	200 g



THE FERTILIZER AND PESTICIDE MIXTURE

The spraying specifications below are in accordance with the characteristics of the rice field and pesticide/fertilizer mixture

Dosage per acre	15 KG	Flight Altitude	2 M
Flying Speed	4 m/s	Horizontal distance	5 M
Spraying opening	50%	Rotary speed	700 rpm



DISTRIBUTION IN THE FIELD AFTER SPRAYING



After the spraying was complete, the farmers satisfied to see the particles distributed evenly in the field. Jing Yang concluded that UAV spraying can greatly reduce labor and operation costs. Long-term effects are subject to further observation. If it is possible, he plans to apply aerial spraying in all his fields next year.

WEEDING DIRECTLY SEEDED RICE FIELDS

https://agms.dji.com/h5/agro-information-detail/250

The direct seeding of rice fields saves time and labor by eliminating the need to cultivate the seedlings before transplanting them. Also, it prevents injury to the plants during the transplanting process and reduces the time it takes for rice plants to mature. The simplicity and convenience of the direct seeding method are driving its increasing popularity among farmers.

However, this process makes weeding more difficult. In directly seeded fields, the rice and weeds sprout at about the same time, so weed growth becomes a more serious problem. This means weed control is critical for directly seeded fields.



COMMON RICE FIELD WEEDS

JOB ENVIRONMENT

Job Date	2020/3/22	Job Location	Luzhou, Sichuan
Terrain	Hilly	Wind Speed	Level 1
Weather	Cloudy	Temperature	16-26℃

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For Jing Yang, this demonstration is of great significance. Successful spraying of pesticide and fertilizer can help develop the local rice market and replace traditional manual spraying methods. He is confident about the future application of aerial spraying.

IOB PARAMETERS

Drone Model	T16	Flight Speed	5 m/s
Relative crop height	2.5 m	Row Spacing	5 m
Chemical Volume per 667 sqm	1.3 L	Nozzle Model	XR110010VS
Job Mode		Manu	ual

The terrain of the worksite was uneven and the plot was small. The largest plot was 1.89 acres and the smallest was only 0.2 acres. The job was performed manually, with 37 flights and a total time of 4.6 hours. The work was done at a rate of 7.58 acres per hour.

CHEMICAL INFORMATION

100 ml of Pretilachlor 30% EC, 10 ml of aerial application additives. Pretilachlor is a highly selective herbicide for rice fields. It is safe for rice, but kills a wide range of weeds. Weed seeds absorb the chemical during the germination process, but weed roots have poor absorption. Therefore, this treatment can only be performed on the soil before germination.

Rice is also more sensitive to pretilachlor during the germination period. In order to ensure safety during the early stages of rice growth, safeners are often added to pretilachlor. When using pretilachlor, be sure to promptly sow rice and apply the treatment after the ground is prepared. Otherwise, the weeds will be unearthed, which will affect the efficacy of the treatment. The sown rice should have normal roots and shoots, and must not have shoots without roots. Otherwise, the safener in the herbicide cannot be absorbed, resulting in phytotoxicity.

CAN AGRICULTURAL DRONES FIGHT CITRUS RED MITES? LET THE FACTS SPEAK

https://mp.weixin.qq.com/s/Umjonvrj9tDZgTaeYj1log

In recent years, the widespread application of the Agras T16 agricultural drone, which provides a large payload and heavy flow rate, has allowed for more sophisticated fruit tree spaying practices. Increasingly, orchards are adopting more efficient aerial application practices to replace traditional manual spraying.

However, compared with traditional crops planted in large fields, it is more difficult to control fruit tree pests and diseases, and especially red mites that live on the undersides of leaves. The many farmers who have never used the Agras T16 may question whether aerial application can effectively deal with these difficulties.

RED MITES

Can aerial application protect fruit trees from red mites? Let's look at a real-world example. In July 2019, a red mite outbreak occurred in Mr. Li's citrus orchard in Dayu County, Ganzhou City, Jiangxi Province. When assigned this aerial application task, the Ganzhou Chengfeng Smart Technology Aerial Application Team used its T16 drones to treat the fruit trees. They eliminated the red mites in just two days. Let's see how they did this.

of 60 m. Previously, the orchard used manual pesticide application methods, resulting in low efficiency and poor results.

CASE BACKGROUND

Citrus red mites absorb juices from the leaves and shoots of fruit trees and the skin of fruits. This damages the trees, causing leaves and fruit to fall off. Because the mites generally hide on the backs of the leaves of citrus trees, it is more difficult to treat the problems using aerial application methods.

The orchard treated in this job was located in a mountainous region to the south of Ganzhou, and the terrain was very rugged. The 26.36-acre orchard stretched across three mountains with steep slopes, resulting in altitude differences

Job Date	2019.07.02	Job Location	Dayu District, Ganzhou City, Jiangxi Province
Terrain	Mountainous	Citrus Variety	Newhall navel orange
Tree Height	About 2.5 m	Tree Age	4 years
Temperature	25-30℃	Wind Speed	Level 1

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IOB REVIEW

1. Surveying and Mapping Mapped Twice to Improve Flight Path Precision

When treating fruit trees, the first step is to use the Phantom 4 RTK (P4R) to survey the orchard. First, the team set a fixed flight altitude of 130 m and used the P4R to take high-resolution images of the orchard. Then, they created a map using DII TERRA. Due to the sharp height changes (>40 m) of the mountainous terrain, a second mapping process is required to prevent altitude errors during route planning.

For the second run, the team imported the image created by DJI TERRA into the P4R and had the drone perform a second survey. This survey simulated the flight path of the agricultural drone at an altitude of 70 m. Afterward, they again mapped the terrain with DJI TERRA.

After the mapping process, they planned flight paths on the output image. Due to the large diameter of citrus tree canopies (>4 m), the spray pattern cannot cover the canopies in fixed-point spraying mode, so the team selected the continuous spray mode. Then, they generated a 3D flight path.

2. Formula Selection: A Variety of Agents Are Combined to Ensure Good Performance

When selecting the pesticide formula, the team chose systemic agents with strong conductivity, such as spirotetramat. Such pesticides can effectively reach red mites on the backs of leaves.

The formula to be used each day was prepared in the morning. The team used the secondary dilution method. The pesticides were added to the 240-liter tank in sequence, starting with the insoluble agents and then the easily soluble agents.

The following formula was used for this job: 7 ml of Abamectin 3% + Spirotetramat 12%, 50 ml of Jianxiu mineral oil, and 5 ml of areal application additives per liter of water.

Abamectin is a broad-spectrum insecticide and acaricide toxic through contact and ingestion. Spirotetramat is an ambimobile systemic insecticide, which is effective against piercing-sucking insects, such as mites, aphids, and thrips. In combination, these two insecticides attack the mites in different ways for enhanced acaricidal performance.

The Jianxiu mineral oil evenly adheres to the bodies of the red mites preventing them from performing normal behaviors, such as crawling, feeding, mating, and laying eggs. This reduces the damage the mites can cause and their base population. The aerial application additives are added to improve the spreading effect of the other agents on the surface of the plants.

3. Job Procedure: Low Speed and High Concentration

After programming the flight path on the computer, the operator saved it to an SD card and inserted the SD card in the remote control. Then, the operator set the following parameters to have the drone perform the job completely autonomously.

During aerial application for citrus trees, the flight speed is much slower than for field crops, and the spray volume per area is higher. Given the large size and dense foliage of citrus trees, setting a lower flight speed helps increase then penetration of the pesticides, ensuring they can reach to the base of the tree and the undersides of the leaves. Increasing the amount of pesticide sprayed per unit area can ensure that there is sufficient liquid to reach all the leaves. A low flight speed and high concentration are essential to aerial application for citrus orchards.

Due to the complex terrain of the citrus orchard, the operator needed to pay close attention to the drone's flight status in order to avoid accidents.

LESSONS LEARNED

After one day of treatment, the red mites began to die. After one week, over 90% of the mites had died off. After this job was performed, this orchard did not experience any further damage from red mites in 2019. By studying the results of this job, we identified the key factors for the control of red mites in citrus orchards.

1. Due to the large tree canopies and dense leaves, we must increase the volume of insecticide used and reduce the flight speed to ensure sufficient penetration.

Job Mode	Fruit tree mode 2.0	Spray Type	Continuous spray
Altitude	2 m	Flight Speed	2 m/s
Flow Rate	2.5 L/min	Working Distance	3 m
Chemical Volume per 667 sqm	>4 L	Nozzle Model	XR11001VS

1. Due to the large tree canopies and dense leaves, we must increase the volume of insecticide used and reduce the flight speed to ensure sufficient penetration.

2. When treating navel oranges in southern Ganzhou, we should generally use a flow rate of 2.5 L/min for trees under 4 years old, 3 L/min for trees 4-8 years old, and 3.5 L/min for trees over 8 years old.

3. We should select strongly systemic pesticides.

4. Due to its superior effectiveness, drone-based orchard application does not have to be performed as frequently as manual application. Drones increase the efficiency of pesticide treatment. In 30 minutes, a drone performs the equivalent of a full day's work by a human.

We are grateful to the Ganzhou Chengfeng Smart Technology Aerial Application Team for providing this case study to us.

Fruit trees have always been the most difficult challenge for aerial application. Now, DJI's fruit tree mode provides a safe and efficient solution for aerial fruit tree application. However, for optimal results, operators still need to tailor their approach to local conditions through trial and error. DJI Agriculture will constantly work with users to improve our equipment, learn from experience, and combine products and services into better crop protection solutions for fruit orchards. Through this, we will continue to make new breakthroughs in the aerial application industry and keep moving forward.

WEEDING DIRECTLY SEEDED RICE FIELDS

https://agms.dji.com/h5/agro-information-detail/231

Broccoli is a common vegetable originally from Italy. This biennial plant is a variety of cabbage. Broccoli is characterized by large leaves and a large flower head, green or purplish-green in color, at the top of the main stalk. The surface head is composed of small buds. Flower heads do not develop on peripheral branches.

On February 17, 2020, the vegetable planting base in Dongsheng Town, Shishou City, Hubei Province invited Shishou City's Jishiyu Aerial Application Team to prevent downy mildew on 165 acres of broccoli.

JOB ENVIRONMENT

Weather	Cloudy	Temperature	1-8°C
Wind Speed	Level 1	Terrain	Flat

DISEASE BACKGROUND

When broccoli leaves are infected with downy mildew, the lower leaves have yellow spots with inconspicuous edges that are restricted by the veins, giving them a polygonal or irregular shape. Some leaves have slightly sunken purple-brown or gray-black irregular spots on the leaf surface, with dark brown stains. Sparse white mold can be seen on the back of the leaves when wet. There are also obvious dark brown spots on the diseased spots on the back of the leaves, slightly protruding, with a white layer of mildew. In serious cases, leaves will wither and fall off. When the stalk is affected, the diseased part often falls off.

This disease occurs at temperatures of 16 to 20°C and high relative humidity or when water droplets coat the surface of the leaves. In the north, this disease is more common in spring than in fall, while it commonly occurs in winter and spring in the south. Broccoli is often affected during the period of stalk growth and flower head formation or during periods of sustained rain and low temperatures in the case of off-season cultivation.

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IOB PARAMETERS

Drone Model	T16	Flight Speed	2 m/s
Relative crop height	2.5 m	Row Spacing	6 m
Chemical Volume per 667 sqm	1 L	Nozzle Model	XR11001VS
Job Mode		Flight F	lan

CHEMICAL INFORMATION

40 g/667 sqm Pyraclostrobin + Metiram 60% WG, 30 g/667 sqm Trifloxystrobin + Tebuconazole 30% Metiram is an excellent protective fungicide and a low-toxicity pesticide. It is mainly used to prevent downy mildew, anthracnose, brown spot, and other fungal diseases that affect vegetables. Pyraclostrobin is a new broad-spectrum fungicide, which has protective and curative effects and can penetrate and spread through leaves. It can prevent powdery mildew, downy mildew, leaf spot, sclerotinia, and other diseases. Trifloxystrobin and tebuconazole are efficient broad-spectrum fungicides. They are protective and curative systemic fungicides with sustained efficacy and rain-resistance.

CONTROL OF TEA JASSIDS

https://agms.dji.com/h5/agro-information-detail/191

In August 2019, Longwu Town, West Lake District, Hangzhou experienced an infestation of tea jassids. Zhejiang Nongfeike used the Agras T16 drone to conduct aerial application to excellent effect.

JOB ENVIRONMENT

Job Date	2019/08/23	Job Location	Tongwu Village, Longwu Town, West Lake District, Hangzhou
Terrain	Mountainous	Temperature	26-34℃

CHEMICAL INFORMATION

Dinotefuran 20% SG was used to treat the plants. Dinotefuran is the latest version of neonicotinoid insecticides. This broadspectrum insecticide is toxic through contract or ingestion. It is easily absorbed by the roots of tea plants, takes effect quickly, and provides sustained efficacy for 4-8 weeks (theoretically 43 days). It performs exceptionally well on piercing-sucking insects even at a low dose. The tea jassid is a piercing-sucking insect and, therefore, susceptible to this insecticide.

TEAM INTRODUCTION

Zhejiang Nongfeike started to promote its services in Xihu Chachang Village, Longwu Town, West Lake in 2016. To date, they have served close to 16,474 acres of tea plantations just in Longjing, West Lake. They have also served more than 6,589 acres in Fuyang, Jiande, Chun'an, Yuhang Jingshan, Anji Baicha, Changxing Baicha, Songyang, and other regions. The team has a wealth of experience in crop protection practices for tea plants. At the same time, the team also has experience with citrus, mulberry, hickory, sorghum, rice, wheat, luffa, flowers, chrysanthemum, and other crops.

FROM NORTH TO SOUTH, WHAT HAS BEEN THE **EFFECT OF DIRECT DRONE SEEDING?**

https://mp.weixin.gg.com/s/yhZduo8abngnoTT18dMg1w

Rice is one of the most important food crops in China and sowing is one of the most important steps in the rice cultivation process. The efficacy and efficiency of rice seeding have a direct impact on the cost, yield, and profit of rice cultivation. In many regions in southern China, such as Hunan, Jiangxi, Guangxi, and Guangdong, rice is planted from the end of March to early April. In Heilongjiang, in contrast, rice planting gradually starts from early May. Due to differences in climate, the planting times and methods vary across different regions. ag.dji.com

Drone Model	T16	Flight Speed	2 m/s
Relative crop height	2.5 m	Row Spacing	6 m
Chemical Volume per 667 sqm	1 L	Nozzle Model	XR11001VS
Job Mode		Flight F	lan

IOB PARAMETERS

Parameter Explanation: Manual operation mode was selected due to the complex terrain. The flight speed was maintained below 4 m/s to ensure safety. Due to the dense foliage of the tea plants, 3 L of pesticide was used per 667 sqm.

PEST BACKGROUND

The tea jassid is one of the main pests that affect tea plants. Tea jassids reproduce 8 to 12 generations a year, with an alternation of generations. This pest can cause severe damage to summer and autumn tea crops. The diseased tea buds and leaves curl up and harden. The leaf tips and leaf margins turn reddish-brown, and the bud tips grow slowly. This significantly affects the yield and quality of tea. The tea jassids are most prevalent at two times during the year: from late May to mid to late June and from October to early November. Adults and nymphs are inactive on rainy days and dewy mornings. They most frequently affect overgrown tea gardens where it is alternatively sunny and rainy. The adults mostly live on the leaves of tea bushes and lay their eggs in the first to third young shoots growing under a bud. Each female lays 10 to 30 eggs. Nymphs often live on the back of young leaves.

Currently, the most common rice planting methods include manual sowing, manual direct seeding, and transplanters. Today, we will demonstrate the performance of the T20 spreading system and its usage methods and recommendations.

CASE 1

Seeding Date: February 26, 2020

Operator: Chen Xiaoyun (Kaiping Yonghui Agricultural Machinery Association)

Job Location: Dajiang Agricultural Demonstration Field in Kaiping City, Jiangmen, Guangdong

Drone Model: T20

Area: 49.42 acres

User Comments: The speed and performance of the T20 spreading system is a great surprise for the members of our association. They are relieved that they can use the T20 system to plant more of their fields.

In February of this year, DJI Agriculture planted 3 acres of rice in Jiangmen's demonstration field project, and we joined forces with Southern+ to live broadcast the entire process. The demonstration field is now full of rice and looks to promise a great harvest. Click the video to watch the planting and sprouting of the demonstration field.

Video: Click to watch the seeds planted by the T20 system grow

Seeds are sown evenly across the field

Rice tillering stage

CASE 2

Seeding Date: May 7, 2020 Operator: Han Qingyu (Harbin Sanwo Agricultural Technology Co., Ltd.) Job Location: Bayangang Town, Bayan County, Harbin City, Heilongjiang Province Drone Model: T16 Area: 25.19 acres User Comments: The seeding performance was great. We plan to continue to use DJI drones to seed the next 28 acres. Rice seed germination Seeding with the T16 drone

Rice seeds are evenly sown

RICE SEEDING INFORMATION

1. For seeding jobs, upgrade the agricultural drone firmware to version 0154 or later.

2. After completing seeding, ensure there is at least 1 kg of material remaining in the tank.

3. We suggest keeping the flight speed below 4 m/s.

4. The seeding disk is a consumable part. Promptly replace it when it wears out to avoid uneven seeding. Note: Do not wash the spreading system with water. Instead, wipe it down with a clean, soft, and dry cloth.

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CASE 3

Seeding Date: May 10, 2020

Operator: Wang Conghe and Li Dashuai (Youyi County Dajiang Crop Protection Service Co., Ltd.)

Job Location: Heilongjiang Youyi Farm

Drone Model: T20

Area: 24.13 acres

User Comments: We used two T20 units and the farmers were very impressed with the seeding performance. The productivity of this system is superior to traditional machinery and it saves a great deal of manpower (due to the epidemic there is a labor shortage and the cost of labor has doubled). It greatly reduces the labor required and sows seeds much more evenly than humans can.

Seeding by the T20 system

Germinated rice seeds are sown in the field

The aerial seeding performance of DJI's agricultural drones is being demonstrated all over the country. We will summarize the relevant parameters and usage methods below.

High-uniformity operation checklist, suitable for seeding

Row Spacing Seeding Disk Speed Relative Crop Height Volume per 667 sqm	5 m 800 rpm 2.5 m Flight Speed	Opening Size (based on material measurement, adjust the opening percentage to achieve the desired flow rate)
1 kg 2 kg 3 kg 4 kg 5 kg 6 kg 7 kg	4 m/s 3 m/s	1.8 kg/min 3.6 kg/min 5.4kg/min 7.2kg/min 6.8kg/min 8.1kg/min 9.5kg/min
8 kg 9 kg 10 kg 11 kg 12 kg	2 m/s	7.2kg/min 8.1kg/min 9.0kg/min 9.9kg/min 10.8kg/min

RICE SEEDING NOTES

SITE PREPARATION

The field must be level and free of standing water. If the site is not level or not properly drained, water will accumulate in the field, which will affect seedling growth.

SUN EXPOSURE

Sun exposure allows the rice seeds to sprout faster. Generally, seeds should be exposed to sunlight for 6 to 8 hours.

WASHING

Pour the seeds into a container with clean water, so that the seeds are submerged by about 10 cm of water to ensure even water absorption.

SOAKING

After washing the seeds, let them soak in water for 12-24 hours, so that they become saturated.

AIR DRYING NOTES

Grab a large handful of dried seeds in your hands. If you can't feel any obvious moisture and the seeds can fall through your fingers without sticking to each other, the seeds are properly dried. If you do not dry the seeds before putting them in the spreader, they may clump together and fail to be spread evenly.

High-uniformity	operation	checklist,	suitable	for seeding
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Row Spacing Seeding Disk Speed Relative Crop Height Volume per 667 sqm	7 m 1000 rpm 2.5 m Flight Speed	Opening Size (based on material measurement, adjust the opening percentage to achieve the desired flow rate)
1 kg 2 kg 3 kg 4 kg	4 m/s	2.5kg/min 5.0kg/min 7.6kg/min 10.1kg/min
5 kg 6 kg 7 kg	3 m/s	9.5kg/min 11.4kg/min 13.2kg/min
8 kg 9 kg 10 kg 11 kg 12 kg	2 m/s	10.1kg/min 11.4kg/min 12.6kg/min 13.9kg/min 15.1kg/min

SEED DRESSING

The use of a seed dressing agent makes the seeds flow better during drone seeding, ensuring more uniform and smooth sowing.

GERMINATION

Soak them in warm water at $35-38^{\circ}$ for 5-10 minutes. Then, put the pre-heated seeds into baskets or woven bags, and store them in a constant temperature soaking room for germination.

We recommend letting the seeds germinate to no more than 2 mm. If the shoots are too long, they can get entangled, which will affect the evenness of spreading.

AIR DRY

After accelerating germination, the rice seeds should be spread out to dry on a cool and ventilated surface.

The degree of seed moisture will also affect the feed speed, but you can select different opening sizes to compensate.

To improve job performance, refer to the following points:

1. The flight speed should not be too fast.

2. Before returning to reload, ensure a small amount of material remains in the tank. Reload nearby to reduce the maximum flight distance and improve work efficiency.

3. If you soak seeds before seeding, air dry them first to ensure they do not stick together.

4. When performing fertilization, promptly clean out the remaining fertilizer and dust when you are done so it does not cause clumps that may damage the system during future seeding operations.

5. Different materials have different densities. Adjust the opening size to achieve the recommended flow rate in the table above within 1 minute. For high flow rates, you can calculate based on 30 seconds.

6. Before officially starting, we recommend you conduct a trial run. If the actual volume of materials per unit area is larger than expected, you can increase the flight speed and vice versa. However, the flight speed should not exceed 4.5 m/s.

CASES OF AERIAL CITRUS ORCHARD APPLICATION IN SPRING

https://mp.weixin.qq.com/s/VNJOs3W8Olr1_EF1Gxp_kQ

Spring is the start of the agricultural year. For citrus orchards, crop protection in spring is vital for the rest of the year. If you fail to succeed in this critical period, you will have to deal with stunted growth and more pests throughout the year and a consequent drop in production.

There are three main steps in Spring crop protection for citrus orchards: First, in the spring, citrus orchards are faced with pests like red mites, aphids, psyllids and diseases such as scab and citrus melanose that require treatment and control measures. Second, citrus trees begin to flower and bear fruit in spring, requiring the application of foliar fertilizer to promote flower and fruit growth. Third, for species with vigorous spring shoots, a chemical agent should be used to inhibit shoot growth and prevent the excessive growth of citrus plants.

With the growing adoption aerial application for fruit tree orchards, DJI agricultural drones can be seen all over Chinese citrus orchards in the spring. Let's take a look at how DJI agricultural drones help protect citrus orchards in the spring!

FUDING, FUJIAN: PROTECTING POMELO TREES AGAINST CITRUS GREENING DISEASE

The pomelo is a major crop in Qianqi Town, Fuding City, Fujian. The town plants an area of 1655.6 acres and earns over RMB 90 million annually from the crop. However, the local Siji pomelo was threatened by citrus greening disease. This is a devastating disease caused by bacteria. There is no cure for citrus plants after being affected by this disease, so it is called "cancer of citrus". Citrus greening disease is mainly transmitted by citrus psyllids. Therefore, the effective control of the psyllid population can prevent outbreaks of citrus greening disease.

SIJI POMELO

In the middle of March 2020, at the invitation of the local government, a crop protection team from Fujian Dingfei Technology Co., Ltd. used two 1P drones and two T16 drones to control the psyllid population in 230 acres of pomelo in Qianqi Town. They finished their task in four days.

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CITRUS GREENING DISEASE

Parameter Explanation: The total area was large and the plots were dispersed, so a fast and mobile operating method was required. Therefore, the team adopted the manual mode to reduce the planning time required for the different plots. In Qianqi Town, the Siji Pomelo is planted using the dwarfing method, resulting in a thin canopy, fewer leaves, and lower requirements for the penetration of liquid treatments. Therefore, the flight speed can be increased to 4 meters to improve work efficiency. A volume per 667 sqm of 4 L can ensure sufficient coverage.

JOB PARAMETERS

Drone Model	T16	Flight Speed	4 m/s
Relative Crop Height	2.5 m	Row Spacing	4 m
Chemical Volume per 667 sqm	4 L	Nozzle Model	XR11015VS
Job Mode		Flight F	Plan

CHEMICAL INFORMATION

Effective Ingredients and Content	Volume per 667 sqm	Action
Bifenthrin + Spirotetramat 26% SC	20 mL	Insecticide

CITRUS PSYLLIDS

This insecticide is used to keep the citrus psyllids population under control. Bifenthrin is a highly effective broad-spectrum insecticide that is toxic through contact and ingestion. It is used to control various lepidopteran and homopteran pests. Spirotetramat is a powerful systemic insecticide used for piercing-sucking insects. The combination of the two chemicals has high insecticidal activity against psyllids and sustained effectiveness.

RONG'AN, GUANGXI: APHID CONTROL FOR MANDARIN ORANGES

By late March 2020, the spring season was in full swing. In Daliang Town, Rong'an County, Guangxi Province the citrus orchards were budding and flowering. However, the young spring shoots were suffering from aphids. Due to the continuous rain and high temperature, the risk of citrus diseases was high. On March 21, the rain finally stopped after days on end, and a local orchard used this time to carry out pest control on more than 16.5 acres of fruit trees.

JOB PARAMETERS

Drone Model	T16	Flight Speed	2 m/s
Relative Crop Height	2.5 m	Row Spacing	4 m
Chemical Volume per 667 sqm	4.5 L	Nozzle Model	XR11015VS
Job Mode		Fruit tree n	node 2.0

Parameter Explanation: The orchard is located in a hilly area and the terrain is uneven. Therefore, the teams used a P4R drone to map the land. They then used and DJI TERRA to create a map and generate routes. By reducing the flight speed to 2 m/s, the team increased the penetration of the insecticide. A chemical volume per 667 sqm of 4.5 L could ensure sufficient coverage.

CHEMICAL INFORMATION

Drone Model	T16	Flight Speed	2 m/s
Relative Crop Height	2.5 m	Row Spacing	4 m
Chemical Volume per 667 sqm	4.5 L	Nozzle Model	XR11015VS
Job Mode		Fruit tree n	node 2.0

CHEMICAL INFORMATION

Effective Ingredients and Content	Volume per 667 sqm	Action
Beta Cypermethrin + Imidacloprid 7.5% SCC	30 mL	Insecticide
Difenoconazole + Pyraclostrobin 40% SC	25 mL	Fungicide
Organic water-soluble fertilizer	100 mL	Increased nutrition

This treatment is used to control aphids and prevent diseases. Beta cypermethrin is a highly effective broadspectrum pyrethroid insecticide that is toxic through contact and ingestion. It is used to control various lepidopteran and hemipteran pests. Imidacloprid is a systemic pesticide used for piercing-sucking insects. It is an effective agent against aphids. Difenoconazole and pyraclostrobin are both systemic fungicides with protective and curative action. The two fungicides have different actions, so their combination improves the disease prevention and treatment effects.

CITRUS APHIDS

GANZHOU, JIANGXI: PROTECTING THE FLOWERS AND FRUITS OF NAVEL ORANGE TREES

On March 11, 2020, Siji Chengyuan Family Farm in Chongyi County, Ganzhou City, Jiangxi was eager to try out its newly purchased T20. The farm has an 82-acre orange orchard, planted with a variety of orange species. The different species mature at different times, so orange harvesting takes place throughout the year. Under the guidance of the agricultural drone instructor, they used the T20 to apply insecticides and fertilizers on 5 acres of summer oranges and Newhall navel oranges.

THE USER'S NEW T20 SYSTEM

Parameter Explanation: The orchard was planted on farmland and the terrain is flat. Therefore, they chose to use the RTK module on the remote control to plan flight paths for the plots. This allowed them to set flight paths precise to within centimeters. To ensure effectiveness, they reduced the flight speed to 2 m/s, increasing the chemical Volume per 667 sqm to 5 L. This increased the penetration and coverage of the chemicals.

JOB PARAMETERS

Drone Model	T20	Flight Speed	2.5 m/s
Relative Crop Height	2 m	Row Spacing	3 m
Chemical Volume per 667 sqm	5 L	Nozzle Model	XR11001VS
Job Mode		Flight F	Plan

Parameter Explanation: The orchard was planted on farmland and the terrain is flat. Therefore, they chose to use the RTK module on the remote control to plan flight paths for the plots. This allowed them to set flight paths precise to within centimeters. To ensure effectiveness, they reduced the flight speed to 2 m/s, increasing the chemical Volume per 667 sqm to 5 L. This increased the penetration and coverage of the chemicals.

CHEMICAL INFORMATION

Effective Ingredients and Content	Volume per 667 sqm	Action
Beta Cypermethrin 4.5% EC	100 mL	Insecticide
Acetamiprid 70% WG	2 g	Insecticide
Spirotetramat 22.4%	20 mL	Insecticide
Boron Fertilizer	80 mL	Fertilizer
Additives	10 mL	Improves spray performance

This treatment is used to prevent sporadic pest infestations in the orchard and promote flowering and fruit growth. Beta cypermethrin is a broad-spectrum pyrethroid insecticide. It is used to control various lepidopteran and hemipteran pests. Acetamiprid is a systemic pesticide used for piercing-sucking insects. It is mainly used against aphids and thrips in citrus orchards.

Spirotetramat is a powerful systemic insecticide used to protect citrus orchard against aphids, thrips, scale insects, and red mites. It is a very suitable agent for aerial application. Boron fertilizer promotes flowering and fruit growth. The aerial application additives help the treatment liquid spread over the leaves of citrus trees and promote absorption by fruit.

The advent of DJI agricultural drones has opened a new chapter in crop protection for citrus orchards. The flexible operation modes, powerful wind field performance, and large flow of the drones ensure optimal performance. This makes DJI agricultural drones the undisputed leader in aerial citrus orchard application. The upcoming Fruit tree mode 3.0 will further enhance the performance of DJI agricultural drones in fruit tree orchard scenarios.

LOOK! DRONE-FED CRAYFISH ARE DELICIOUS

https://mp.weixin.gq.com/s/VNJOs3W8Olr1_EF1Gxp_kQ

Crayfish are the perfect summer food. However, they can be difficult to peel and might not contain that much meat. This is the result of poor farming methods.

According to data from the Fisheries Administration of the Ministry of Agriculture and Rural Affairs, in 2018, China had almost 2 million acres of crayfish farms and produced 11.3 million tons annually. The value of this industry exceeds RMB 260 billion, and it employs 5.2 million people.

Feeding is the most time-consuming and labor-intensive process involved in crayfish farming. Crayfish need a relatively large amount of feed each day, about 5%-10% of the crayfish's body weight on a daily basis. When the crayfish grow to their largest size, a farm requires about 4 kg of feed per 667 sqm.

Crayfish are generally fed twice a day in the morning and evening. However, When the water temperature is low in early spring and late autumn, they only need to be fed once a day in the afternoon.

CRAYFISH FEEDING

The traditional feeding method is to have workers manually feed the crayfish on foot or in a rowboat. Using this approach, a worker can cover about 5 acres per hour. This method is labor-intensive and results in an uneven distribution of food.

Since the release of the v2.0 for the DJI T system of agricultural drones, farmers everywhere have started using the drones to feed their crayfish. This method saves time, effort, and money.

MR. FANG FROM ZHEJIANG 165 ACRES IN 4 HOURS

Mr. Fang lives in Shaoxing City, Zhejiang. Even though he has only been a crayfish farmer for four years, he has already made a name for himself. He has always thought the crayfish feeding process was a major annoyance. In the past, he hired workers to manually spread feed over his 165-acre farm. Every day, it took ten men all morning to complete the job. During rice planting season, feeding takes even longer and it is easy to trample on the rice seedlings. In addition to the high cost of labor at this time, sometimes there is no one available to work.

The release of DJI's spreading system completely revolutionized his work method.

In March 2020, Mr. Fang started to use the spreader drones on his crayfish and rice fields. The first time he used the drones, he was able to spread feed over 50 acres in just one hour using two drones. Afterward, by having the two drones work simultaneously, he was able to cover the entire 165 acres in under 4 hours. This freed him from reliance on manual labor.

JOB PARAMETERS

Volume per 667 sqm	1.5 kg	Altitude	2.3 m
Opening size	40%	Flight Speed	7 m/s
Disk Speed	1000 rpm	Route Spacing	10 m

MR. TENG FROM SICHUAN 16 ACRES IN ONE HOUR

Mr. Teng from Nanchong, Sichuan is in charge of 16 acres of crayfish and rice fields. In addition, to stocking the rice fields with crayfish and then catching them, he must also feed them. This left him exhausted every day. At the beginning of 2020, through an introduction by a local agent, Mr. Teng learned about the DJI T20 spreading system and immediately thought that it could be used in his crayfish field.

He recently purchased a spreading system. After training, he quickly mastered the use of the spreader drone. On March 8, 2020, he flew the T20 over his fields in Nanchong for the first time, evenly spreading the feed. He was able to spread feed over his 16 acres in less than an hour.

TRADITIONAL CRAYFISH FEEDER

The use of the spreading system greatly reduced Mr. Teng's work time and the intensity of the work. It also allowed him to see greater possibilities for the future. "The spreader saves me a lot of time and gives me the energy to expand my farm."

The T20 spreading system v2.0 has an extra-large 20 L capacity. It can spread solid granular fertilizer, feed, seeds, and other materials. It is suitable for multiple application scenarios such as direct rice seeding, grass replanting, rapeseed sowing, feeding, and fertilization. Compared with traditional feeding methods, the DJI agricultural spreading system is faster, more uniform, and lighter. We expect it to drive a revolution in feeding equipment for the aquaculture industry.

PROTECTING RICE FIELDS AGAINST THE CHANNELED APPLESNAIL

https://agms.dji.com/h5/agro-information-detail/234

The snails originated in the tropical and subtropical regions of Central America, and later invaded countries across North America, Asia, and Africa. It is now an invasive species worldwide.

Each year, April-June and August-October are the peak periods during which these snails reproduce. These are also the times when they pose the greatest threat. These snails mainly affect crops such as rice, milkvetch, arrowhead, prickly water lily, sweet potato, vegetables. They cause particularly serious damage to rice throughout all stages of their growth. From the seedling to the tillering stage, the snails feed on the rice leaves and tillers, which will reduce the yield.

BACKGROUND



CHEMICAL INFORMATION

100 g/667 sqm Abamectin 5% EC

Time of channeled applesnail treatment: In direct-seeded rice fields, when the weather is warm, the snails need to be treated with chemical agents after hatching. In transplanted rice fields, treatments must be performed before and after transplanting. When applying pesticides in the field, ensure a shallow water layer of about 5 cm for about 7 days. During this period, try to keep the water as clear as possible to achieve the optimal effectiveness against the snails.

FRUIT TREE MODE 2.0 FOR PEACH TREE PROTECTION

https://agms.dji.com/h5/agro-information-detail/196

The T16's Fruit Tree Mode 2.0 solves the problem solves the difficulties of aerial application for fruit trees. More and more users are using Fruit Tree Mode 2.0 for their orchards. Below we will discuss a case where the T16 fruit tree mode was used to prevent brown rot and gum disease in a peach tree orchard.

BACKGROUND

Job Date	2019.04.30	Job Location	Reshi Town, Taoyuan County, Hunan Province
Terrain	Mountainous	Area	11.5 acres
Peach Tree Height	About 3-3.5 m	Tree Age	6 years

JOB PARAMETERS

IOB PARAMETERS

Drone Model	T20	Flight Speed	5 m/s
Relative Crop Height	2 m	Row Spacing	6 m
Chemical Volume per 667 sqm	1.5 L	Nozzle Model	XR11001VS
Job Mode		Flight F	Plan

CHEMICAL INFORMATION

Difenoconazole 40%, Mancozeb 75%, Thiazole 20% Difenoconazole is a triazole systemic fungicide with protective and curative action. It is widely used to effectively prevent black spot, black pox, white rot, leaf spot, powdery mildew, brown spot, rust, stripe rust, head blight, and other diseases of fruit trees, vegetables, and other crops. Mancozeb is a protective fungicide with a broad insecticidal spectrum. It can also supplement zinc in crop nutrition. Thiazole is a new type of bactericide, which has protective and therapeutic effects. It can prevent most bacterial diseases and some fungal diseases.

DISEASE BACKGROUND

Peach brown rot, also known as sclerotinia, is a fungal disease. The disease can affect peach flowers, leaves, branches, and fruits. When young leaves are affected by the disease, the infected part will become brown and wilt starting from the edges. The diseased leaves will remain on the branches. Infected fruit initially presents round brown lesions on the surface. If the environment is suitable, the lesions can spread to cover the whole fruit within a few days, and the pulp will also become brown and soft. This disease is most serious in environments where a peach tree is exposed to low temperatures and rain when the tree flowers and young fruit grow and then a warm and humid climate when the fruit matures.

Peach gum disease is a fungal disease. This disease mainly infects tree branches, but it can also harm the fruit. One-year-old branches are infected. At first, small verrucous protrusions are produced centered on the lenticels, and then enlarged into tumor-like protrusions, with small black needle-like dots. Then, in May of the following year, the diseased spots expand and crack, overflowing with a soft translucent and viscous glue, which then hardens and turns dark and swells by absorbing water. In severe cases, the branches can die. Physical damage from freezing, insects, disease, hail, and shearing often causes peach gum disease.

SPRAYING PASSION FRUIT TREES IN DAK LAK PROVINCE OF VIET NAM USING DJI AGRAS T16

In recent years, a number of key crops in Dak Lak province such as pepper, coffee ... have been continuously affected by diseases, low prices, affecting the production and life of farmers. Facing such a situation, some households in the Dakruco district of Dak Lak province have planted passion fruit trees as a salvage solution. However, they do not cut down traditional trees but plant passion fruit in the form of intercropping in the orchard. Passion fruit trees have some pests and diseases from the beginning to the end of the season. Below is a case of insecticide spraying for passion fruit trees at a location in the Central Highlands region that we would like to share.



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TEAM INTRODUCTION

Taoyuan County New Sannong Modern Agricultural Service Co., Ltd. was established in July 2016 by the Taoyuan County Supply and Marketing Cooperative and Xinglong Rice Industry Association. This company is working to systemically build a modern agricultural service enterprise with agricultural materials support services, precision planting services, end-to-end services for the new agricultural industry chain, and unified protection and treatment services. The company has a business area of 3,800 sqm and a warehouse area of 2,100 sqm. They have a distribution center for agricultural materials and seven distribution vehicles. It also has a base construction center, an inspection and testing center, and an agricultural technology training center. At the end of 2018, the company had established supply and marketing service joint venture branches to benefit farmers and village-level service stations in 26 towns and villages across the county.

The company has direct links with agricultural goods manufacturers, reducing the cost of agricultural goods by cutting out the middlemen. During the planting process, the company organizes agricultural technology training and provides pre-production, mid-production, and post-production full-industry chain services to help farmers increase their incomes. By helping develop strong production and sales environments for agricultural products, the company has brought profits to the cultivators and benefits to consumers.

ag.dji.com

PURPOSE OF THE SPRAY

The household has 17 ha of passion fruit cultivation. After participating in the workshop organized by AgriDrone Vietnam about the introduction of plant spraying by drones, the household chose to spray on their passion fruit field to prevent pests on passion fruit trees. Besides cultivation methods such as field sanitation, collecting old leaves, destroying crop residues, intervention artillery with chemical spraying drones has been selected to prevent common pests and diseases of passion fruit trees, such as red stink beetle, thrips, pollen, aphids, stem borer, downy mildew, etc. We used DJI Agras T16 to spray for this case.

INFO OF THE ENVIRONMENT

Date of Spray	29, August, 2020	Location	Dak Lak Province
Type of Terrain	Flat, convenient	Temperature(°C)	25°C
Total sprayed Area(ha.)	17	Humidity	N/A
Wind speed(m/s)	N/A	Wind direction	N/A

The condition is favor for spraying. Spraying in the early morning, with cool weather, stable wind direction and no strong winds.

OPERATION PARAMETERS

Type of Drone	DJI Agras T16	Firmware Version	02.01.0402
Operation mode	Intelligent flight planning	Operation Speed	7m/s
Operation height (from the top of the crop)	3 meters	Line spacing/ width/	5 meters
Liquid amount sprayed per hectare (or per MU)	20 liters	Nozzle type	TEEJET XR 11005 VS TIPS GREEN

The parameters we chose are based on the test and experience before, which is suitable for crops, terrain and weather.



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INFO OF CHEMICALS

Chemical commercial name	Formulation	Active ingredient and the percentage	Chemical amount (g or ml) used per hectare
Mexyl MZ	Flat, convenient	Metalaxyl: 8% w/w Mancozeb: 64% w/w Carriers, additives	1.8kg/20l/ha
Mexyl MZ	Flat, convenient	Fe: 54000mg/kg Mn: 50000mg/kg Mo: 4000mg/kg Gu 3000mg/kg Bo: 35000mg/kg Co: 500mg/kg S: 6,98% MMg 1,8% Humidity 1%	1.8kg/20l/ha
Micronutrients Magnesium Zinc	Flat, convenient	MgO: 5% Nts: 2% Zn: 20.000ppm	500ml



SENCA-MICRO HYDRO is a micro-fertilizer product with the ability to dissolve completely and quickly absorbed through the stomata on the leaf surface as well as the suction hairs of the root system, immediately replenishing the deficiency of quality and prevention of yellow leaf, leaf curl, leaf blight, blight, flower loss and young fruit.

BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT IN THIS CASE.

When the technology of spraying by drones was not known, the head of the household used to spray with trucks and extend pipes, which caused difficulties and lack of workers. The spraying by drones has created more convenience and timely care for plants.



CONCLUSION

People have realized many benefits since using DJI Agras for spraying plants: Saving water, not worrying about water sources when spraying in the dry season, saving time, reducing labor, increasing production, saving plant protection chemicals, thereby reducing toxicity to humans and the chemical residues in agricultural products.

SERVICE TEAM INFO

Service team name is Cao Nguyen Iflight SC belonging to AgriDrone Viet Nam (AgriDrone.vn). Our services team operates in the Central Highlands region of Vietnam and the establishment time up to now is about 4 months. The team has 7 members and the total sprayed Area is over 1000 hectares so far.

Information: Contact person: Nguyen Van Thien Vu Contact info: contact@Agridrone.vn Hotline: 07 9955 8855 Website: https://agridrone.vn/ YouTube: https://www.youtube.com/c/MayBayNongNghiepDJI/videos

DJI AGRAS MG-1P SPRAYED RICE HERBICIDE IN VINH HUNG, LONG AN PROVINCE, VIET NAM

Long An is one of the major rice-growing localities in the South in Vietnam. In Vinh Hung district, the current total rice area is 33,780.82 ha. The majority of farmers here cultivate rice and sticky rice. When there is annual inundation of water, conventional rice and sticky rice are mainly due to their salinity tolerance, good adaptation to environmental conditions.

PURPOSE OF THE SPRAY

To prevent pre-germination weeds, in this case, farmers used DJI Agras MG-1P drone to spray herbicide. This is a method of taking care of conventional rice and sticky rice plants recently applied by farmers in Vinh Hung district because of its convenience.

INFO OF THE ENVIRONMENT

Date of Spray	6/05/2020	Location	Vinh Hung district
Type of Terrain	Delta	Temperature($^{\circ}\!$	25°C
Total sprayed Area(ha.)	бha	Humidity	70%
Wind speed(m/s)	N/A	Wind direction	N/A

The condition is favor for spraying. Spraying in the early morning, cool weather, stable wind direction, no strong winds, relative humidity.

OPERATION PARAMETERS

Type of Drone	MG -1P	Firmware Version	0012
Operation model	Effective	Operation Speed	100% (6,9m/s)
Operation height (from the top of the crop)	2m	Line spacing/ width/	4.2m
Liquid amount sprayed per hectare (or per MU)	16L/ha	Nozzle type	XR110015VS

Choosing the above parameters was for the most efficient operation of the aircraft as well as maximum performance to save time and battery life.



INFO OF CHEMICALS

Chemical	Formulation	Active	Chemical amount
commercial		ingredient and	(g or ml) used per
name		the percentage	hectare
Butapro 550EC	EC	Butachlor 275g/liter Propanil 275g/liter Fenclorim 100g / liter Solvent, additive enough 1000 g / liter	1.8kg/20l/ha

Butapro 550EC is a post-sprouting herbicide that has an endospermic effect (drainage), eliminates harmonious grasses, papyrus and broadleaf in rice fields.

BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT IN THIS CASE.

To prevent pre-germination weeds, in this case, farmers used DJI Agras MG-1P drone to spray herbicide. This is a method of taking care of conventional rice and sticky rice plants recently applied by farmers in Vinh Hung district because of its convenience.

CONCLUSION

People have realized many benefits since using DJI Agras for spraying plants: Saving water, not worrying about water sources when spraying in the dry season, saving time, reducing labor, increasing production, saving plant protection chemicals, thereby reducing toxicity to humans and the chemical residues in agricultural products.

CONCLUSION

Service team name is Vinh Hung SC, belonging to AgriDrone Viet Nam (AgriDrone.vn). Our Services team operates in the South of Vietnam. The establishment time up to now is about 10 months. The team has 27 members. Total sprayed Area is over 1000 hectares.

Information: Contact person: Nguyen Van Thien Vu Contact info: contact@Agridrone.vn Hotline: 07 9955 8855 Website: https://agridrone.vn/ YouTube: https://www.youtube.com/c/MayBayNongNghiepDJI/videos

PURPOSE OF THE SPRAY (PLEASE INTRODUCE THE SPECIFIC CROPS AND PLANT DISEASE):

Sugar Cane ripening application. This application is done approximately 8 weeks prior to harvest to enhance sugar production in the plant. Enhanced sugar production means greater profits for the farmer.

INFO OF THE ENVIRONMENT

Date of Spray	06/03/2020	Location	Empangeni, South Africa
Type of Terrain	Uneven hillsides	Temperature($^{\circ}\!$	21°C
Total sprayed Area(ha.)	8.4Ha	Humidity	54.8%
Wind speed(m/s)	0	Wind direction	N/A

OPERATION PARAMETERS

Type of Drone	MG-1S	Firmware Version	4.1.1.0
Operation mode	Intelligent planning system	Operation Speed	5.3m/s
Operation height (from the top of the crop)	2m	Line spacing/ width	3.5m
Liquid amount sprayed per hectare (or per MU)	20L/Ha	Nozzle type	XR110015VS

Sugar cane leaves are not very dense over the top, so the drone is actually about 2 meters above the top of the leaves and the effective spray width we've found is 3.5m. 20L/ha is a bit lower but still acceptable.



DJI AGRAS MG-1S SPRAYED SUGAR CANE IN SOUTH AFRICA

Sugarcane is the 3rd largest full cover food crop in South Africa by area – currently covering around 380,000 hectares and mostly farmed in the KwaZulu-Natal and Mpumalanga provinces. The height and density of sugarcane makes it difficult for labour and tractors to apply the necessary pesticides, therefore the industry relies very heavily on the aerial (aircraft) application of pesticides. Sugarcane in South Africa is mostly grown on hillsides which often makes even traditional aircraft (fixed wing, helicopter and microlight) applications very difficult and imprecise. The DJI Agras spray drones are far more capable of delivering effective precision applications than the traditional aircraft in the technical terrain conditions mostly found in the South African sugarcane industry. The more precise and effective the application, the more revenue realised by the farmer.



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INFO OF CHEMICALS (IF YOU COULD)

Chemical	Formulation	Active	Chemical amount
commercial		ingredient and	(g or ml) used per
name		the percentage	hectare
Orca 125	EC	Fluazifop-p-butyl 125 g/l (12.5%)	330ml/Ha

The active ingredient of Orca 125 is Fluazifop-p-butyl (aryloxyphenoxypropionate). Orca 125 is a selective, systemic emulsifiable concentrate herbicide that is applied as a postemergent spray for the control of annual and perennial grasses in crops as indicated; for the chemical ripening and eradication of sugarcane and also for the sup-pression of seeding and grass growth on verges.

BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT IN THIS CASE.



Bad Quality Spraying from Traditional Aircraft (airplane, helicopter, microlight)

The green parts/stripes are areas that the aircraft have not sprayed with the chemical. The missed green areas mean the farmer will make less money from the crop in these areas. Sometimes these "missed" areas are about 50%-75% of the crop area so it's a lot of money the farmers are missing out on. It also shows uneven application in the middle of the field because the aircraft is not on auto-pilot and doesn't use GPS controlled spraying lines. It's susceptible to human error.



Superior Quality Spraying with Drones (MG-1S / MG-1P / T16)

These pictures show how precise the drones are compared with the aircraft. The drone achieves full coverage of the field and with very even coverage inside the field as well. It is hard for the aircraft to spray these technical hillside fields with the same accuracy, precision and even coverage as the drones.

The quality of drone application is far superior to traditional aircraft (fixed wing plane, helicopter and microlight) application. The DJI Agras is capable of more precise, full cover / even applications in difficult terrain. For this particular sugar cane ripening application – the drone ultimately generates more profits for the farmer than the large aircraft.

CONCLUSION

As per the above – it is proven that the farmers make more money from precise drone sugar cane ripening spraying applications than they do from the larger traditional aircraft.

SERVICE TEAM INFO

Your company or team name: PACSys

PACSys has been DJI's African official distributor since 2017. We have tested DJI Agras in all African crops and sugar cane has been the most successful crops with the drones because the sugar cane farms and fields in South Africa are typically smaller and on steep hillsides which makes it difficult for the larger traditional aircraft to spray. These farms require smaller precision application methods – exactly like the drones are capable of. PACSys started because the farmers came to us asking for solving the problem of bad quality applications from the traditional aircraft on their farms. 3 Years later PACSys is now the drone spraying market leader in Africa. The T16/T20 will open many more markets than sugar cane now. Please see our video link below:

https://www.youtube.com/watch?v=0SNTEeOXU8o

Contact person: Timothy Wise

Contact info (phone or email): +27 76 550 7692 / tim@pacsys.co.za

Warm prompt: the content and parameters provided here are just for reference. You should adjust the operation mode and the parameters and use a correct way to spray your field according to the different weather, the crop characters, the habit or history of using chemicals(you could change other chemicals in case that the resistance occurs), etc. If you are not sure what operation parameters you will choose or not sure about the spraying efficacy, then you should firstly do a small plot test in this field before a big area spray.

DJI AGRAS T16 SPRAYED SUGAR CANE IN CHIAPAS, MEXICO

En México una de las actividades agrícolas más importantes es la productividad de caña de azúcar la cual ocupa el segundo lugar de importancia tan solo por debajo del Maíz; en el Estado de Chiapas no es la excepción, donde la producción de caña de azúcar ha crecido un 13% durante los últimos 10 años, colocándose en 2020 en el 4to lugar nacional de mayor cosecha con una producción cercana a los 2,362,929 toneladas en 34,392 hectáreas.

(In Mexico, one of the most important agricultural activities is the production of sugarcane, which ranks second in the importance only below Corn; In the State of Chiapas, the production of sugar cane has grown by 13% during the last 10 years, placing in the 4th place in the country with the highest harvest close to 2,362,929 tons in 34,392 hectares, in 2020)



Entre las acciones que se han puesto en marcha para obtener un mayor crecimiento productivo se encuentra el combate a la plaga denominada "Salivazo o Mosca Pinta"; una de las más perjudiciales para la producción de caña de azúcar que puede llegar a reducir la extracción de azúcar hasta en un 60% si no se atiende a tiempo.

(One of the actions that have been put in place to obtain greater productive growth is the fight against the plague called "Spittlebug or Fly Pinta", one of the most damaging for sugarcane production that can reduce sugar extraction by up to 60% if it is not attended on time.)

Para este caso de estudio en Drones Hobbytuxtla tuvimos la oportunidad de ayudar a los agricultores locales que trabajan en el Ingenio de Pujiltic, Chiapas; quienes al ver afectados sus cultivos apostaron por utilizar la tecnología con drones como una solución para exterminar la plaga "Salivazo o Mosca Pinta", ante la falta de opciones para combatirlas con los equipos tradicionales como aeronaves tripuladas, tractor o de forma manual.

(In this case study, we had the opportunity to help local farmers who work in the Pujiltic Sugar Mill, Chiapas. When their crops were affected, they opted to use technology with drones as a solution to exterminate the plague "Spittlebug or Fly Pinta", rather than traditional equipments such as manned aircraft, tractor or manually.)



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PURPOSE OF THE SPRAY

(The purpose is to help farmers to control the insect called "Mosca Pinta" in sugar cane crops, this insect feeds on the plant causing a reduction of up to 60% sugar production.)

INFO OF THE ENVIRONMENT

Date of Spray	July 27, 2020	Location	Pujiltic, Chiapas; México
Type of Terrain	flat	Temperature(°C)	29°C
Total sprayed Area(ha.)	140 ha.	Humidity	60%
Wind speed(m/s)	1.5 m/s	Wind direction	Unknown

The condition is favor for the spraying in sugar cane field.

OPERATION PARAMETERS

Type of Drone	DJI Agras T16	Firmware Version	02030223
Operation mode	Intellegent planing system	Operation Speed	6 m/s
Operation height (from the top of the crop)	3 meters	Line spacing/ width	6 meters
Liquid amount sprayed per hectare (or per MU)	9 Liters/ha.	Nozzle type	XR11001VS

Se realizaron pruebas hasta llegar a esta conclusion, apoyado por las especificaciones de uso del producto

(Tests were conducted to reach these parameters used, supported by the product's usage specifications.)



INFO OF CHEMICALS (IF YOU COULD)

Chemical	Formulation	Active	Chemical amount
commercial		ingredient and	(g or ml) used per
name		the percentage	hectare
ENGEO Syngenta Insecticide	Suspension concentration (SC)	141 Tiametoxam + 106 Lambdacihalotrina	125ml in 9 Liters of water /ha

NGEO® es un insecticida foliar de amplio espectro, integrado por dos principios activos que poseen características complementarias.

El tiametoxam, es un neonicotinoide sistémico de alta residualidad, que controla insectos succionadores, mientras la lambdacialotrina es un piretroide que actúa sobre insectos succionadores y masticadores, otorgando poder de volteo. De esta manera, ENGEO® S se caracteriza por su buen poder de volteo y persistencia de contro

(NGEO® is a broad spectrum foliar insecticide, made up of two active principles that have complementary characteristics.

Thiamethoxam is a high residual systemic neonicotinoid that controls sucking insects, while lambdacialothrin is a pyrethroid that acts on sucking and chewing insects, giving tumbling power. In this way, ENGEO® S is characterized by its good turning power and persistence of control.)

BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT

in this case(cost, effect, or efficient, any advantages...). If any data comparing, it is better.

Problemática en la pulverización manual: El personal humano no puede entrar al cultivo para pulverizar con mochila debido a que el producto es muy tóxico, pone en riesgo la salud y la vida, existe poco personal humano que aceptan pulverizar solo el perímetro sin resultados eficientes y a un alto costo de mano de obra para el agricultor

(As my experience, i share the info as below: Problems in manual spraying: Human personnel cannot enter the crop field to spray with a backpack because the crop puts human health and life at risk. There are few human personnel who accepts to do that, or spray only in the perimeter without efficient results. Besides, spraying manually contributes a high cost of labor for the farmer)

Problemática en la pulverización con helicóptero/avioneta: Las aeronaves como avionetas y helicópteros solo trabajan a partir de una cierta cantidad considerable de hectáreas, dejando fuera al pequeño agricultor, es necesaria una pista extensa o helipuerto, su pulverización no es uniforme y se necesita 200 Litros de agua, una gran cantidad (Problems in spraying with helicopter / light aircraft: Aircraft such as light aircraft and helicopters only work from a certain considerable amount of hectares, leaving out the small farmer. And an extensive runway or heliport is necessary for them. Their spraying is not uniform and 200 Liters of water per hectare is needed.)

Problemática en la pulverización con tractor: En este tipo de cultivos de caña de azúcar no es viable la entrada de tractor

(Problems in spraying with a tractor: In this kind of sugarcane crops, the entry of a tractor is not available.)

DJI Agras T16 logró pulverizar completamente el cultivo sin invadir el suelo, rociar de forma uniforme el insecticida en toda el área en menos tiempo, sin arriesgar la vida o salud de las personas y ahorrando hasta un 90% de agua frente a otros equipos de pulverización tradicionales

(DJI Agras T16 manages to completely spray the crop without invading the soil, evenly spraying the insecticide throughout the area in a higher efficiency, without risking the life or health of people and saving up to 90% of water compared to other traditional spraying equipment.)



SERVICE TEAM INFO

Drones Hobbytuxtla es una empresa mexicana que se especializa en la venta de soluciones con drones desde 2014, comenzamos a usar drones Agras en enero de 2019 debido a la alta demanda de servicios de pulverización, contamos un total de 1950 hectáreas hasta ahora, somos un equipo de 8 personas y tenemos experiencia en cultivos como maíz, caña, agave, etc.

Web: www.hobbytuxtla.com

(Drones Hobbytuxtla is a Mexican company that specializes in the sale of solutions with drones since 2014. We started using Agras drones in January 2019 due to the high demand for spraying services, with spraying a total of 1950 hectares so far. We are a team of 8 people with experience in crops such as corn, sugarcane, agave, etc.Web: www.hobbytuxtla. com)

Contact person: Roberto Robles Contact info (phone or email) Email: info@hobbytuxtla.com

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CONCLUSION (FEEL FREE TO ADD ANY COMMENTS ABOUT SPRAYING EFFECT FROM USER/FARMER SIDE, SUGGESTIONS, ANY IMPRESSIVE STORIES, ETC...)

"Cada año la mayoría de nosotros los agricultores de la caña de azúcar, solo podíamos resignarnos a la pérdida de producción de hasta 6 toneladas por hectárea debido a la falta de soluciones para combatir a la "Mosca Pinta", esta plaga es considerada como la más peligrosa para la caña de azúcar y sin duda amenazaba el presente y el futuro nuestro sector; ahora con la implementación de drones para la pulverización DJI Agras T16, se abren nuevas oportunidades de crecimiento productivo en favor de la agricultura y la sociedad"

("Every year for most of the sugarcane farmers, they could only abandon the loss of production of up to 6 tons per hectare due to the lack of control solutions to combat the" Pinta Fly ". This pest is considered a dangerous pest for sugar cane and without a doubt threatening the present and the future of our sector; Now with the implementation of DJI Agras T16 for spraying, new opportunities for productive growth are opened in favor of agriculture and society ")

LINK OF PICS OR VIDEOS, OR ATTACH THEM IN THE EMAIL(OF FIELD LANDSCAPE, PREPARING WORK, CHEMICAL BOTTLES, AGRAS WHICH IS SPRAYING, SPRAYING EFFECT ON WATER SENSITIVE PAPER OR DEAD PESTS, ETC.): HTTPS://WE.TL/T-DHFLG6CTM8

Warm prompt: the content and parameters provided here are just for reference. You should adjust the operation mode and the parameters and use a correct way to spray your field according to the different weather, the crop characters, the habit or history of using chemicals(you could change other chemicals in case that the resistance occurs), etc. If you are not sure what operation parameters you will choose or not sure about the spraying efficacy, then you should firstly do a small plot test in this field before a big area spray.

SPRAY DESICCANT FOR SUNFLOWER IN UKRAINE USING DJI AGRAS T16

Agriculture in Ukraine is one of the most important branches of its economy due to variety of climatic and demographic reasons. The agriculturally used areas take more than 69% of Ukrainian territory. In 2019 sunflower was grown on the territory of 5.5 million of hectares and was used mostly for the production of sunflower oil. Ukraine is one of the leaders in the production of sunflower oil in the world and this is one of the key export oriented products in Ukrainian Economy. According to the results of 2019, Ukraine ranks first in the world in the export of sunflower oil (4.3 billion USD) and sunflower meal (0,97 billion USD).

DroneUA together with Agrilab at Digitalfield demo field carried out work on desiccation of sunflower by the Agras t16 drone before the actual harvest.

PURPOSE OF THE SPRAY

The purpose of the desiccation work is to dry the weeds, stop the spread of diseases on the crop, such as gray mold, and dry the sunflower before harvest. This procedure was carried out to ensure accelerated ripening of the crop, which made it possible to harvest at an early date.

INFO OF THE ENVIRONMENT

Date of Spray	21.09.2020	Location	Boryspil region, Velika oleksandrivka
Type of Terrain	plain	Temperature(°C)	20°C
Total sprayed Area(ha.)	1,5 m	Humidity	47%
Wind speed(m/s)	1m/s	Wind direction	western





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OPERATION PARAMETERS

Type of Drone	Agras t16	Firmware Version	v02.03.0154
Operation mode	Intelligent Route planning mode	Operation Speed	4.2 m/s
Operation height (from the top of the crop)	1.5 m	Line spacing/ width	5 m
Liquid amount sprayed per hectare (or per MU)	12 l/ha	Nozzle type	XR11001VS



INFO OF CHEMICALS

Chemical	Formulation	Active	Chemical amount
commercial		ingredient and	(g or ml) used per
name		the percentage	hectare
Defenda Diqalan https://defenda. com.ua/en/ product/dikvalan	Active Fraction Content Diquat, 150 g/L	Emulsion Concentrate 25% Contact desiccant, indications for feeding before harvesting cereals, peas, sunflowers, soybeans and other crops.	3L The drug quickly decomposes in the soil, does not affect subsequent crop rotation. Does not affect the quality of seeds, does not change its acid-fat composition



BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT.

Comparison with the traditional inspection method:

The task of the customer's company was to carry out point desiccation at the landfill in 8 different areas of the field with sunflower, with a high concentration of the active substance. To perform such tasks, a ground sprayer is often used, but in this case it would carry out desiccation "in a continuous" along the entire perimeter of the field, which would be inadmissible, most of the sprayers would not pass on height crops, which would break the culture, and the use of more expensive models ground sprayers have made their work more expensive. The aviation method for performing such work also did not fit, for several reasons at once: the location of the field in the closest proximity to the airport, a small area for spraying, using aviation akin to a ground sprayer, can only desiccate around the entire perimeter, incomparably high costs of work. Therefore, in this scenario, it was decided to use the unmanned sprayer Agras t16.

Benefits of using a drone:

The drone will greatly simplify and speed up the task execution time, given proper preparation (namely, having previously prepared data collected using the Phantom 4 RTK drone: the contour of the field and the coordinates of the required areas). It is possible to automatically desiccate in less than an hour. Preparation was carried out successfully in 8 sites, 6 of which automatically and 2 manually due to the fact that the last 2 sections were too small and with automatic introduction the drone did not complete the entire rate, in the new firmware update 02.03.0223 this problem was fixed.

SPRAYING SUNFLOWER IN UKRAINE USING DJI AGRAS T16

Agriculture in Ukraine is one of the most important branches of its economy due to variety of climatic and demographic reasons. The agriculturally used areas take more than 69% of Ukrainian territory. In 2019 sunflower was grown on the territory of 5.5 million of hectares and was used mostly for the production of



CONCLUSION

The work has been done. Excellent feedback from the owner of the field was received - the weed on the plots is dry, the diseases are gone, and the sunflower is dried and ready to be harvested. The active substance of the chemicla rapidly decomposes in plants, therefore, the use of the drug is safe on seed crops.

SERVICE TEAM INFO

My company name is DroneUA.

We do work with drone agriculture implementation for 6 years already. Our team has 33 members, from drone pilots to data science specialists, to solve almost every question regarding drone services or data imagery protection for our clients. Collaboration with big names in agriculture, like Syngenta, Bayer, BASF etc. helps us to start collaboration with decent numbers of agriculture producers and obtains experience from this collaboration. At the same time, we have started to look into Drone spraying opportunities and already have several teams around Ukraine that achieved productivity of 100 hectares of spraying per day per drone.

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sunflower oil. Ukraine is one of the leaders in the production of sunflower oil in the world and this is one of the key export oriented products in Ukrainian Economy, according to the results of 2019, Ukraine ranks first in the world in the export of sunflower oil (4.3 billion USD) and sunflower meal (0,97 billion USD).

Today we intend to introduce you how our partner in Ukraine sprayed chemicals for the sunflower and share with you the details.

PURPOSE OF THE SPRAY

We have used drone spraying for fungicides implementation,

- \cdot rust on sunflower Puccinia helianthi Schw
- \cdot septoria on sunflower
- \cdot sclerotiniosis on sunflower
- \cdot downy mildew on sunflower

Also we separately sprayed microelements (boron) as fertilizers.

INFO OF THE ENVIRONMENT

Date of Spray	26.06.2020	Location	Boryspil region, Velika oleksandrivka
Type of Terrain	plain	Temperature(°C)	25°C
Total sprayed Area(ha.)	2.04 ha	Humidity	54%
Wind speed(m/s)	2m/s	Wind direction	western



OPERATION PARAMETERS

Type of Drone	Agras t16	Firmware Version	2.01.0312
Operation mode	Intelligent Flight Plannig	Operation Speed	6m/s
Operation height (from the top of the crop)	2.5 m	Line spacing/ width	6.5m
Liquid amount sprayed per hectare (or per MU)	5 L	Nozzle type	POca AM. 0075. SB (P. 03. 0.3)

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Notes: Nozzle type of POca AM. 0075. SB (P. 03. 0.3) is not recommended by DJI officially, so the spraying effect should be tested. However, DJI still suggests the user only use the nozzles listed on DJI official website.



INFO OF CHEMICALS

Chemical commercial name	Formulation	Active ingredient and the percentage	Chemical amount (g or ml) used per hectare
Defenda DOT https://defenda. com.ua/en/ product/dot	80 g/L of Cyproconazole; 250 g/L of Propiconazole	Emulsion Concentrate	500
Defenda Stark <u>https://defenda.</u> <u>com.ua/en/pr</u> <u>oduct/stark-ks</u>	Azoxystrobin, 250 g/L	Suspension Concentrate	750
Basfoliar Borough SL https://binfield. ua/en/product/ basfoliar-boro-sl		boron11%	1000

Notes: fertilizer mission of Basfoliar Borough SL was separately sprayed.



BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT. It was impossible to for ground equipment to enter into the field of sunflower since the crops are too high and existing equipment could damage them. Renting of higher equipment was not possible and economically non-effective.

Boron deficiency was found on the sunflower, and drone is used to urgently spray necessary amount of microelement to solve this issue.



CONCLUSION

First and a great feedback from the field owner is that boron deficiency was already solved, and within a weak damaged areas was cleared from the plants. We continued to collect data from the field specialists about signs of damage by fungi, there are no signs.

Field owner agreed on the continue of the drone use and we have already more flights planned with other chemicals and other plants.

PROTECTING SWEET POTATO CROPS WITH DJI'S MG-1P

Known as "longevity food," sweet potato features high and stable yield, wide adaptability, and strong resistance to stress, drought, and other factors. Seasons with abundant rain are the best time to plant sweet potatoes. However, in the process of sweet potato planting, there are many kinds of pests that can be detrimental to this crop. These include stem mites, hawk moths, leafhoppers, leaf beetles, small armors, wireworms, scarabs, mole crickets, cutworms, prodenia litura, aphids, and whiteflies.

Careful precautions have to be taken in order to avoid serious losses due to insects. For this type of prevention, let's take a look at how Hainan Zhong-Nong UAV Service Technology Co., Ltd. kept prodenia litura under control with DJI's MG-1P.



SERVICE TEAM INFO

My company name is DroneUA, Aviaplaza.

We do work with drone agriculture implementation for 6 years already. Our team has 33 members, from drone pilots to data science specialists, to solve almost every question regarding drone services or data imagery protection for our clients. Collaboration with big names in agriculture, like Syngenta, Bayer, BASF and etc. helps us to start collaboration with decent numbers of agriculture producers and obtains experience from this collaboration. At the same time we have started to look into Drone spraying opportunities and already have several teams around Ukraine that achieved productivity of 100 hectares of spraying per day per drone.

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TEAM INTRODUCTION

Hainan Zhong-Nong UAV Service Technology Co., Ltd. has over 120 employees, with 80 UTC-certified professional pilots. It has established UAV plant protection centers in Zhangzhou, Changjiang, Dongfang, Ledong, Lingshui, Sanya, and Qionghai, providing local farmers with accurate, efficient, and low-cost plant protection services.



So far, the company has completed work on approxiamtely 658,956.9 acres of different crops, including rice, pumpkin, corn, green soybeans, mango, lychee, grapefruit, medlar, coconut, and betel nut. The spraying operation for this case was handled by the No. 4 Plant Protection Team of the Ledong Service Center. The team currently has eight members, five MG-1S units and one MG-1P unit.

ENVIRONMENT INFORMATION

Operation Date	Land Type	Location	Conditions
March 21, 2018	Mostly flat with a few hills	Haitou County, Zhangzhou City, Hainan Province Southernmost China	Cloudy, 15-24°C, nd high-voltage power line towers in the surrounding area, with wires crossing the field diagonally.

The operation area was approximately 74 acres. The field was divided into two sections by cement pavement that ran between them. The land was mostly flat, with a few hills in the area.

OPERATION PARAMETERS

Operation mode	Intelligent Flight Plannig	Operation Speed	2.8 m/s
Operation height (from the top of the crop)	1.5 m	Line spacing/ width	4 m
Liquid amount sprayed per hectare (or per MU)	12 L	Nozzle type	XR11001VS

* Drone: DJI MG-1S × 1/DJI MG-1P × 1

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Considering the relatively large area and irregular land, we used the MG-1S and MG-1P together. With the MG-1S, we planned the flight route by walking along the boundary of the smaller field. With the MG-1P, we planned the flight route by flying the aircraft over the larger field to mark the waypoints. After the route was set, we edited and uploaded the missions to begin the spraying operation.

Due to hot weather and the severity of insect damage, we enabled Intensive Spraying mode and set the flight speed to 2.8 m/s, to improve operational efficiency and effectiveness.

PESTICIDE INFORMATION

Operation mode	Туре	Concentration of Active Ingredient	Amount per acre
Chlorfenapyr	Aqueous solution	25%	180ml
Helicoverpa armigera nuclear polyhedrosis virus	Aqueous solution	30%	480ml

Our chemist recommended the pesticide used in this case. An aqueous solution was used instead of a dissolvable powder, which is better for spraying with a drone. Additionally, polyhedrosis virus [Are you sure about this name? the word virus in it is a bit strange.]is a new type of pesticide which is incredibly potent and can effectively overcome the pesticide resistance of certain insects.

BEFORE & AFTER DRONE SPRAYING



Before spraying. It is clear that the leaves have been bitten by insects.



Dead insects that fell to the field after spraying.

CONCLUSION

In total, two plant protection drones were used during this operation. The MG-1P supports automatic waypoint marking and flight route planning, which saves a lot of time. From preparation to completion, the operation took only five hours.

Thanks to the pesticide that was useful and suitable for drone spraying, the amount of pesticide sprayed and the flight speed were quite efficient. The results have also verified the effectiveness of our solution. The dead insects on the ground have proven the safety and reliability of DJI's agricultural drones.

This is the first time we have used the MG-1P in spraying operations for sweet potatoes. This case has been an unexpected yet successful result for us. The field planning, upgraded spraying system, visible atomization, and improved spraying effects have been a welcomed result.

DJI AGRAS T16 SPRAYED WHEAT IN SERBIA

In agricultural production of Serbia, wheat is the most represented crop next to corn. It is most important for human nutrition because it is later used to make bread flour. The treatment of wheat in the later stages of development has so far been possible only with high-clearance sprayers (so called "mosquitoes") which themselves have caused damage during operation. Now, with drones, we perform treatments far more efficiently.

PURPOSE OF THE SPRAY

Treatment was a part of recommended technology in wheat production. Purpose was protection from fungal various diseases.

INFO OF THE ENVIRONMENT

Date of Spray	May 15 th 2020	Location	Ovča, Belgrade, Serbia
Type of Terrain	Flat land	Temperature($^\circ\!\!\!C$)	26
Total sprayed Area(ha.)	2	Humidity	45%
Wind speed(m/s)	2,5-4 m/s	Wind direction	SE

Attention to the wind intensity was necessary, as spraying above Beaufort level 2 can lead to uneven spraying deposit and contamination of neighboring plots.



OPERATION PARAMETERS

Type of Drone	DJI Agras T16	Firmware Version	V02.01.0312
Operation mode	Intelligent route planning	Operation Speed	5 m/s
Operation height (from the top of the crop)	2 m	Line spacing/ width	6m
Liquid amount sprayed per hectare (or per MU)	15 lit/ha	Nozzle type	XR110001VS

We used standard flight parameters to achieve maximum efficiency and cover the entire crop with the treatment.

OPERATION PARAMETERS

Chemical commercial name	Formulation	Active ingredient and the percentage	Chemical amount (g or ml) used per hectare
Prosaro 250 EC	EC	tebukonazol 125 g/l, protiokonazol 125 g/l	1.0 l/ha
Dash	EC	Adjuvant	0.5 l/ha

Prosaro 250 EC with two active ingredients is standard choice in integral crop protection plan as well as a part of ant-resistance strategy.

BRIEFLY COMPARE THE DIFFERENCE BETWEEN DRONE, MANUAL, AND OTHER TRADITIONAL EQUIPMENT IN THIS CASE.

Main advantage of drone application is precise deposition as well as treatment without any damage of crops. Possibility to treat wheat in conditions of saturates soil and mud is great advantage. Total time needed for treatment was 20 min, what is much quicker than with conventional machinery. Also, spraying without damage to crop is advantage.



CONCLUSION

After treatment with fungicide no signs of fungal disease on leafs or any other part of plant. Main conclusion is that using adequate fungicide wheat treatment can be done with small amount of water (15 l/ha).

SERVICE TEAM INFO

The AGRODRON team is the first company in Serbia and the region to deliver professional UAS spraying technology and its regular application in the protection of agricultural crops using own fleet of DJI Agras T16 aircraft. Team gathers experienced drone operators, agronomist, mechatronics, sensing and data specialist and trainers. In our work so far, we have been very successful in treating all types of crops that are represented in region, all with the aim of promoting new technology and the benefits it brings.

Contact persons: Momir Alvirović, Goran Iskić, Zoran Stojanović. Contact info (phone or email) info@agrodron.rs

LINK OF PICS OR VIDEOS:

https://youtu.be/-VjYp_ZKzRk

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CROP PROTECTION CASE STUDY – WHEAT FIELDS

As temperatures gradually rise in various regions, wheat begins to grow at a rapid rate, a critical time for weeding. The prevention and control of weeds is essential for increasing yield and ensuring a stable income.

Spring tends to have inconsistent temperature and weather. Additionally, weeds and wheat grow differently. This makes it necessary to select the right herbicides and use them at the right time, to avoid chemical injury to the wheat. MG-1P RTK plant protection drones have been a fast, accurate, and reliable option for weed control. By implementing them during weeding, farmers can ensure they are covering a larger area in a shorter time.



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TEAM INTRODUCTION

Zhucheng Denong Trading Co., Ltd. has operated across 49,000 acres of land since 2017. The team has one leader, three UTC faculty members, and five maintenance professionals. They began using the DJI MG-1 in 2016 and paired drone technology with his extensive experience in crop planting management, crop epidemics, and pest control. On Mar 25, 2018, his team used the MG-1P RTK plant protection drone to spray Arylex across a 400mu wheat field. The charts below show the details of how this process was carried out.

ENVIRONMENT INFORMATION

Operation Date	Mar 25, 2018	Location	Xianggu Farm, Xinxing Town, Zhucheng City, Shandong Province
Land Type	Plain	Temperature and Wind	Sunny, 11-21°C, southwest, level 3 wind speed

Note: The operator should fly upwind, observe the drift of the liquid, and make timely adjustments.



OPERATION PARAMETERS

Flight Mode	Route Planning	Flight Speed	4 m/s
Flight Altitude	1.5 m	Route Spacing	4 m
Volume per Mu	1 L	Nozzle Type	XR110001VS

OPERATION PARAMETERS

Herbicide	Arylex by Dow	Concentration of	10% Diflufenacil,
Name	AgroSciences	Active Ingredient	10% Clopidogrel
Туре	Water dispersible granule	Volume per Mu	5 g

1. Produced by Dow AgroSciences, Arylex is very easy to use and works tremendously on broadleaf weeds. Additionally, normal dosages do not harm wheat. Arylex also comes with additives, making it suitable for drone spraying.



BEFORE AND AFTER THE OPERATION



CONCLUSION

In this 400 mu wheat field weeding operation, the MG-1P RTK plant protection drone can be used to perform efficient and precise spraying. With the use of Arylex, the positive results were apparent on the seventh day, with no harm to the wheat. Here we remind farmers to choose the right herbicide according to their field to ensure their harvest is abundant throughout the growing season.

WEED CONTROL FOR WHEAT WITH DJI'S AGRAS T16

Spring is vital for agriculture, and plowing is carried out all over China. To improve the yield of winter wheat, DJI's Agras T16 is used for pest and weed control.

Differing from the MG Series, the Agras T16 is equipped with four pumps and eight nozzles, with an increased spraying speed of 4.8 L/min, an increased volume of 16 L, and a spraying width of 6.5 m. So, what are the optimal operation parameters when spraying wheat?

In March 2019, a team from Denong Commercial and Trading carried out weed control for 53.3 hectares of wheat using the parameters listed below:

ENVIRONMENT INFORMATION

Land Type	Plain	Location	Xinxing County, Zhucheng, Shandong
Wind	Lv. 3 North Wind	Temperature & Weather	Sunny, 5°-17°C

The operation target is 53.3 hectares of winter wheat in Xiangu Farm of Zhucheng City, Shandong Province. The control target is broad-leaved weeds in wheat fields, mainly composed of flixweed and pickpurse. The weather was sunny, the temperature was 5°-17°C (Note: Spraying effect is susceptible to temperature. It is recommended to spray herbicide when the average temperature is stable at 8-10°C), with a level 3 northern wind which is suitable for spraying operations. (Note: winds stronger than Lv. 3 are detrimental to spraying.)



OPERATION PARAMETERS

Flight Mode	Route Operation	Flight Speed	6 m/s
Flight Altitude	2 m	Route Spacing	6.5 m
Volume per Hectare	67 ml	Nozzle Type	XR11001VS

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HERBICIDE INFORMATION

Herbicide	Arylex by Dow	Concentration of	Amount per
Name	AgroSciences	Active Ingredient	Hectare
Dow AgroSciences	Water-dispersible	Halauxifen-methyl 10%	0.34 g
Ruichaomai	granule	Florasulam 10%	

Weeds affecting local wheat fields are mainly broad-leaved, such as flixweed and pickpurse. The Ruichaomai herbicide of Dow AgroSciences was used for spraying.



Note: When diluting dissolvable granules, make sure to dilute them twice. Mix a certain amount of the herbicide with a small amount of water, and stir evenly until the granules are completely dissolved. Then, add the appropriate amount of water and adjuvant to the concentrate, mix them evenly, and pour into the spraying tank.

CONCLUSION

The results of the spraying were checked ten days after the operation. As you can see, most weeds in the winter wheat field were wilted and twisted. Weeds would turn yellow or die, while the growth of wheat was not affected. This was a successful operation, and the operation parameters and herbicide listed above can be used as a reference for routine weed control of winter wheat.

Before spraying:



SPRAY TEAM INTRODUCTION

Founded in 2017, Deonong Commercial and Trading Co., Ltd. has 12 members and has sprayed a total area of more than 46,000 hectares of wheat, corn, potato, yellow smoke, and general gardens. Apart from spraying services, Deonong has set up more than 70 DJI agriculture drone service outlets in Shandong to provide customers with purchase, training, and maintenance services.

CASE STUDY | WEED CONTROL FOR WINTER WHEAT IN SPRING

As the temperature gradually gets warm after a cold spell in March, the winter wheat begins to grow at a rapid rate as do weeds. It becomes critical to implement weed control.

What kind of weeds are common in wheat fields? How do you choose chemical herbicides? How do you set the parameters of an agricultural drone? What should you pay attention to while spraying with a drone? In this article, you will learn some useful tips on UAV plant protection for controlling weeds for winter wheat.



After spraying:





WEED CLASSIFICATION AND CHEMICAL HERBICIDE SELECTION

To achieve the best results, you should tailor the weed control solution to each specific situation and choose the chemical herbicides according to specific weed species.



Generally, common weeds in winter wheat fields can be divided into two groups: Poaceae weeds and broadleaf weeds.

Common Poaceae weeds include Alopecurus aequalis Sobol., Alopecurus japonicas Steud., Avena fatua L., Sclerochloa kengiana L., Beckmannia syzigachne (Steud.), barnyard grass, Stetaira viridis (L.) Beauv, Poa annua L., and Polypogon fugax Nees ex Steud. For these weed species, you can apply herbicides such as clodinafop-propargyl, pinoxaden, Fenoxaprop-p-ethyl, and mesosulfuron-methyl.

Common broadleaf weeds include Descurainia Sophia, Capsella bursa-pastoris, Galium aparine L. var. tenerum, Veronica didyma Tenore, Euphorbia helioscopia L., Lithospermum arvense L., polyponum, Chenopodiaceae, Stellaria media (L.) Cyr., Lamium amplexicaule L., Silene conoidea L., Vaccaria segetalis (Neck.) Garcke, and Convolvulus arvensis L.

For this type of weed, the herbicides of choice are tribenuron-methyl, bensulfuron-methyl, CORTEVA crop protection herbicides, florasulam, fluroxypyr, carfentrazoneethyl, 2-Methyl-4-chlorophenoxyacetic acid, and 2,4-Dichlorophenoxyacetic acid. Additionally, herbicides such as isoproturon and pyroxsulam are also effective for Poaceae weeds and broadleaf weeds.

OPERATION PARAMETERS

According to the actual operation cases of the MG series in previous years, we have worked out the following operation parameters for your reference.

The operation parameters for the T16 will be available soon. If you have any ideas or suggestions regarding agricultural drone cases or crop protection, please contact us or leave a comment below.

PRECAUTIONS

As herbicides are more likely to cause phytotoxicity than other agents during the application process, here are some precautions to note while spraying chemical herbicides:



1. When the soil is relatively dry, and the wheat is not growing well, the field should be properly irrigated before being sprayed with herbicide.

2. Before or after heavy rain, winds above level 3 and cold weather are not suitable for spraying herbicides. After irrigating the wheat field for 3-5 days, choose a rain-free day for the spraying operation. Spray the herbicides about 1-2 days after heavy rain. Spray any time after a light rain and ensure that there will be no rain for 8-12 hours after herbicide spraying.

3. The best time for spraying is when the weeds are at the 2-3 leaf stage, and the wheat is at the 3-4 leaf stage. It is not recommended to spray herbicides after the wheat enters the elongation period.

4. Considering the impact of air temperature on the efficacy of herbicides, you are recommended to spray the herbicides when the average temperature is stable and at 8-10°C.

5. According to specific weed situations, choose corresponding herbicides and avoid using the same ones that have been used previously. For example, some wheat fields have become resistant to some herbicides due to the regular use of tribenuron-methyl, 2,4-D, dicamba, and others. Therefore, it is recommended to use other herbicides.

Flight Mode	A-B Route Operation Mode	Flight Altitude	1.7-2 m
Flight Speed	4-5 m/s	Route Spacing	4-4.5 m
Dosage	6-9 L/acre	Nozzle Type	XR11001VS