

## A Pilot and Operator's Guide for Magnet Application



Figure 1 – AT802 applying Magnet to a cotton crop \*note the low rate and single Bickley boom.

### General information

Magnet insect attractant is a blend of several plant volatiles developed to attract lepidopteran pests including *Helicoverpa* spp. in a wide range of crops, including cotton. When combined with an insecticide, Magnet can control up to 90% of a moth population.

Using Magnet eliminates the requirement for post-harvest pupae busting or cultivation, enabling earlier starts to planning for winter crop rotations, preserving subsoil moisture, and reducing erosion and soil compaction.

Magnet is mixed with an insecticide and applied by air using a single modified nozzle, with the aim of producing raindrop sized droplets in a single band 10-50cm wide, 72m apart at 500mls/100m of row (which at 1 row in 72 is **0.694 Lt/Ha**)

The moths will smell the Magnet product on the leaf and are attracted towards it. They feed on the droplets whereupon they are killed by the insecticide. It is crucial for the droplets to be large so that they are easily found by the moths, as well as to prolong the accessibility of the product, which may last up to 6 days post-application.

## General information

Magnet itself is a moth attractant, it is not a poison.

It must be mixed with insecticide before application. The insecticide is the toxicant that provides the "kill" when moths feed on Magnet deposits. Insecticide will be provided separately from the Magnet product, and should be added immediately prior to application and mixed through thoroughly.

- **Jemvelva / Success Neo (Spinetoram)**  
@ 5.5ml/ha

## Jemvelva™ active

It is important that your loading system does not allow any water into the mixture, and that you lose minimal product in the loading process. For this reason, traditional vat setups may not be appropriate.

Only mix enough Magnet/insecticide mix for use that day – if there is excess of the mixture at the end of the application window period this should not be put back into storage. Magnet needs to be stored in specially lined fluorinated containers for long term storage.

Once the three applications are complete, all unused or part shuttles that the Magnet was delivered in can be stored or returned to AgBiTech.

**It is important not to store or return Magnet that has had insecticide added to it as there are major legal and WHS issues relating to unlabeled pesticides and transport.**



Figure 3 – A *Helicoverpa* moth ingesting Magnet on a cotton leaf

## Aircraft Setup

Your goal is to disperse a single line of ultra-course droplets (0.5 – 1.25 cm in diameter) of Magnet/insecticide mixture across a field maintaining a spacing of 72 meters between each row. Traditional multi-nozzle booms may not achieve this, and micronairs might not be compatible.

If a Bickley boom is accessible, this option may be effective to achieve the best outcome. You will only need one to be mounted. Modifying a smaller nozzle tip might be necessary.

Mount the nozzle in a location with minimal turbulent flow, away from propeller slipstream and wing-related turbulence. This has been achieved by placing the nozzle lower than a typical boom nozzle. This ensures placement is in 'clean air' out of propeller slip stream and minimizes turbulence and prevents droplet shattering, ensuring larger droplet size.



Figure 4 – Modified Bickley boom for application

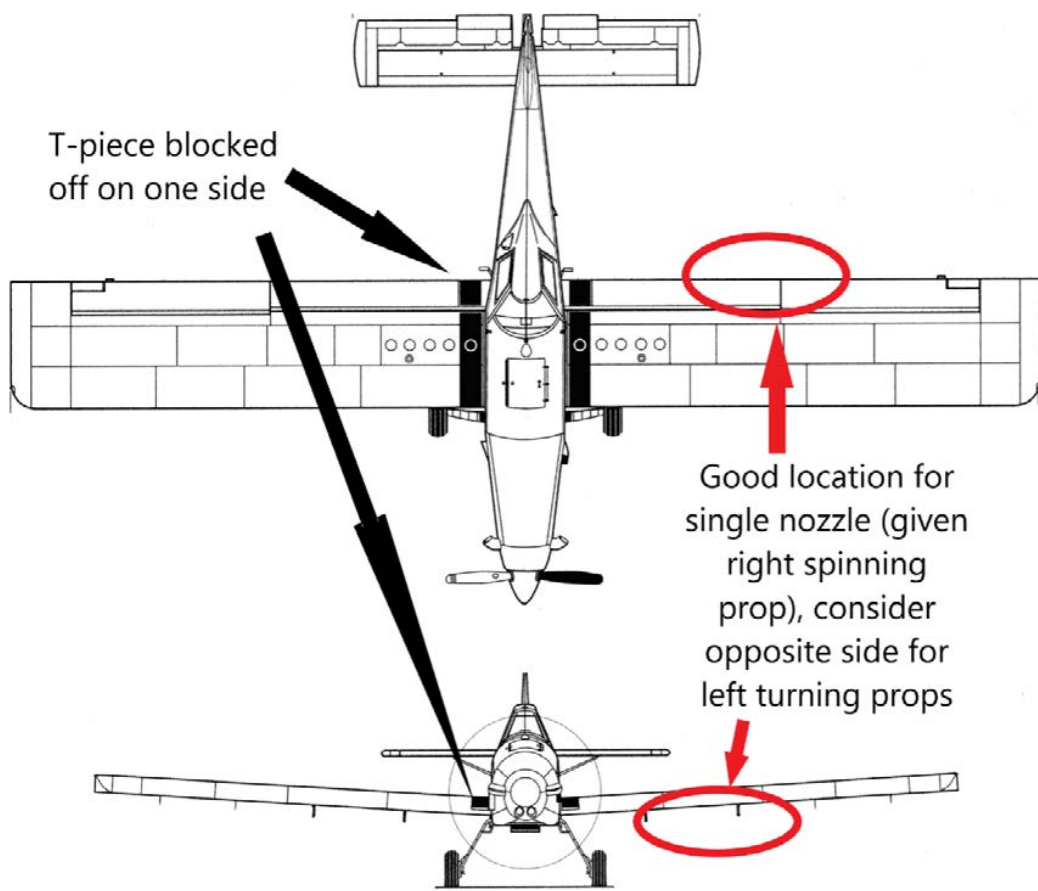


Figure 5– Suggested location of the nozzle

## Aircraft Setup

### Nozzles

Given the very low application rates (694ml/ha of Magnet and 5.5ml/ha spinetoram), nozzle size is crucial. Consider having a variety of nozzle sizes for experimentation in your aircraft.

To find the perfect fit for your aircraft, experimentation is important. For example: some operators have had success using a 4.5mm wide nozzle for an 802 aircraft, achieving the desired flow at a 40-psi boom pressure.

A 5mm nozzle proved too large, while a 4mm nozzle was too small. Precision is a critical factor. Some operators opt to enlist an engineering company to produce varying nozzle tips sizes from nylon blocks, enabling for the most precise adjustments to the check valve.

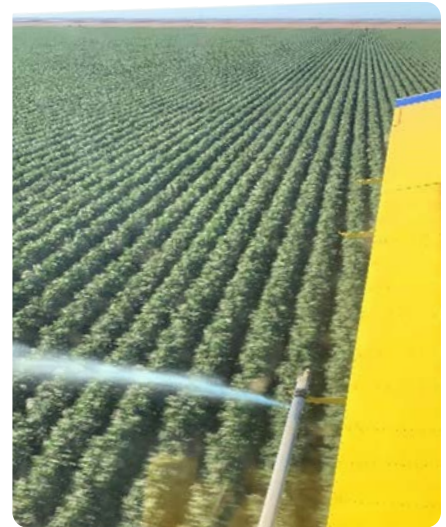


Figure 6– In flight view of Magnet application



Figure 7– Nozzle tips made from nylon block can screw into check valve for easy changeover



Figure 8– Assorted nylon nozzles



Figure 9– The ideal application result –large raindrops

## Drone Setup

### Nozzles

Common setups are open aperture pipe or extremely course nozzle to target 500 ml application per 100 meters of row.

Due to their lower airspeed, drones have less droplet shattering from significantly lower shear forces at the point of leaving the aircraft.

Drone application is able to achieve more precise applications through droplet control when properly calibrated

If your drone is fitted with nozzles, having several different nozzle sizes will be convenient to see which is able to best achieve a droplet diameter of 0.5 to 1.25 cm.

We recommend doing a calibration before application to ensure the optimal droplet size and distribution using the Magnet blank formula (refer to page 7 for recipe) Always refer to the label prior to application.



Figure 10 – A drone calibration using the Magnet blank recipe

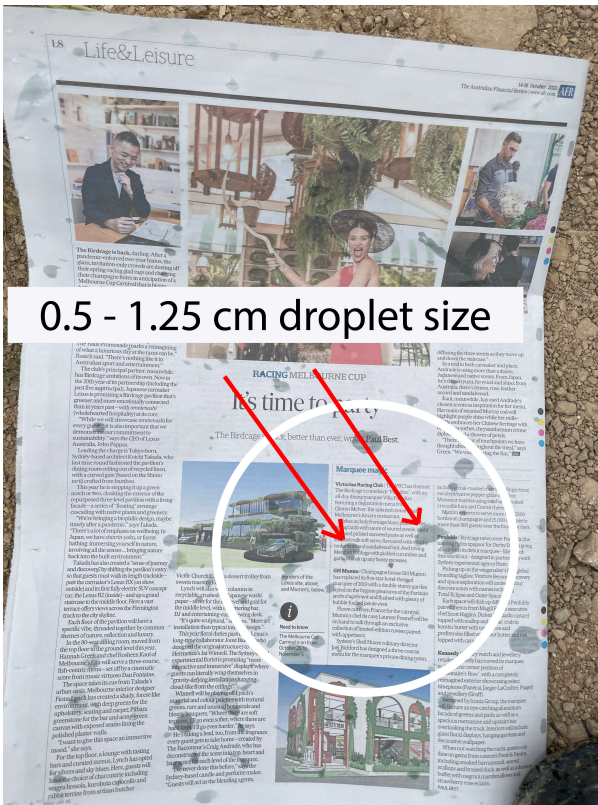


Figure 11 – Ideal droplet size



Figure 12 – Droplet size is too coarse

## Controlling Flow and Flow Rates

### Application Rates

Magnet can be applied at 2 different rates, the 'general rate' and the 'high rate'. For cotton application, the general rate of 500ml per 100 meters is employed.

This corresponds to 0.694 litres per hectare of pure Magnet, accommodating the addition of insecticide.

The overall rate per hectare using Spinetoram is 0.6995L/ha. If your aircraft is equipped with a low volume line, consider using it during this phase.

When adjusting flow rates, particularly for smaller loads, account for the residual unusable volume at the boom's end.

### Flow controllers

Discrepancies in flow controller brands and sizes exist. Some manage light rates while others may exhibit excessive 'hunting.' To enhance performance, switch to 'monitor only' mode and regulate output using the 3-way valve if your flow controller struggles with flow management.

Keep in mind that the small orifice might result in elevated boom pressures. If this is the case, partially closing the 3-way valve could prevent blowout when the flow controller valve is fully open. Consider adjusting the blade angle on your spray pump (if applicable) to a coarser setting, potentially reducing maximum boom pressures.

## Magnet flow rate calculator (aerial application)

**Magnet label for use in Cotton      500mls      Per      100 meters or row**

Applied on 72m spacings, single nozzle, ultra coarse droplets (match head sizer or bigger)

Kts	90	95	100	105	110	115	120	125	130
Km/hr	167	176	185	194	204	213	222	232	241
m/mintue	2,778	2,932	3,087	3,241	3,395	3,550	3,704	3,858	4,013
<b>Magnet fl w rate L/m</b>	<b>13.9</b>	<b>14.7</b>	<b>15.4</b>	<b>16.2</b>	<b>17.0</b>	<b>17.7</b>	<b>18.5</b>	<b>19.3</b>	<b>20.1</b>

Please refer to the Magnet Insect Attractant label for all details.

## Calibrating Your Aircraft

AgBiTech recommend calibrating your aircraft. Several factors underscore the importance of this practice:

### Time efficiency

If left to the application period, there may be limited time to troubleshoot any issues inside the 21-day application window.

### Viscosity

Magnet exhibits significantly higher viscosity than water. If calibration is performed using water, the settings will prove ineffective when dealing with Magnet in the hopper.

### Limited Availability

Magnet is a limited resource, produced in limited quantities per season. Obtaining additional supply could be exceptionally challenging. (it's also a bit messier!)

### No Dilution Tolerance

Magnet must not be diluted with water. Achieving accurate settings is imperative.

To assist in a perfect calibration, AgBiTech have provided a recipe for an economical and straightforward 'blank' Magnet formula for this purpose, which you can find on the next page.

By adhering to this calibration procedure, you ensure the efficacy and accuracy of your application of Magnet ensuring compliance for your growers and control of the pest population.



Figure 13 – A small batch of Magnet blank mixed with red dye being mixed to calibrate for droplet size.

**UNDER NO CIRCUMSTANCES CAN YOU USE THIS FOLLOWING RECIPE IN PLACE OF MAGNET FOR THE ACTUAL APPLICATION – THIS IS FOR CALIBRATION PURPOSES ONLY**

**AgBiTech would like to recognise the significant contribution of Tegan Allott (Agflite) into the creation of the practical pilots's guide.**

## Method: Magnet blank for calibration

### **You will need:**

- Measuring scales
- Measuring cup (kitchen sizes, your 5lt mixing jug will likely be too big)
- A mixing bucket
- An electrical mixing device e.g. paint stirrer attached to a drill. You could also use a blender, but to make a large amount you will need to make many blender-fuls!

### **Recipe**

- The amount you need will depend on your aircraft and how much testing you intend on doing.
- The following recipe is for 1 litre. The recipe is scalable so just multiply everything by how many litres you need:
- 1lt water – recipe still works even if its dirty water
- 20 millilitres cooking oil – canola, olive or vegetable is fine
- 5 grams xanthan (guar) gum – can be found in most supermarkets in the baking or health food section, it is a commonly used food thickener and is edible. It may need to be ordered in if somewhere very remote.
- Food dye – if you wish to colour it for easy identification of droplets on the ground.

### **GOT QUESTIONS?**

Contact **Caitlin Langley**  
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### **Method**

- Mix the oil and xanthan gum to form a paste, it will not matter if you need to add a little bit more oil to the mix to get it to blend until smooth.
- Once the oil and xanthan is well combined, gradually add the water, you will see the oil does not disperse well in the water, you will now need to mix vigorously to get it to combine, it will thicken as you blend it.
- The mixture will thicken depending on the amount of xanthan gum you use, not how much you stir it. It is not possible to 'overmix', however it is possible to not mix it enough. If this is the case you will see lots of small 'lumps' of extra thick bits and the bulk will still be watery. When it is mixed right it will have an even thickness throughout.
- Once you have the consistency right, you can add the food dye and mix it in to your desired colour.

**NOTE** for best results it is advised to make a day or two in advance, during the vigorous mixing process it is possible for large air bubbles to form in the mix. These will disperse if occasionally gently stirred and the mixture left to sit. The mixture will not go hard, form a crust or 'go off' if left to sit for a few days.

When flying test passes, **putting sheets of newspaper on the ground will really help show the pattern and the size of the drops. Target as big a droplet as you can.** If you are getting pin head size droplets, you may have to adjust the location of the nozzle into cleaner air or it's angle.



## Important Points

- **Magnet itself is just a moth attractant, it MUST be mixed with an approved insecticide**
- You must produce very coarse, rain-like droplets, one band 10-50cm wide and one swath every 72m. **NO MICRONAIRS**
- You must not add water to the mixture – it is sprayed neat at very low rates
- No cleanup runs required
- **Thorough mixing of the insecticide is needed just prior to application. As Magnet is reasonably thick, make sure the insecticide is well mixed through. This requires mechanical stirring in a vat to achieve consistency**
- **There will be a total of 3 applications made on each field, with the first one on or no earlier than the 10th of February and the third one no later than the 1st of March. If this is not achieved, Bayer may review the applications and consider them void, meaning the farmer will have wasted their money and have to pupae bust anyway**
- Calibrate your aircraft first using the “blank mix” as the product is very thick and doesn’t flow like water
- Work out your ‘unusable volume’ this may affect your flow rates enough to warrant a different sized nozzle
- Your flow controller may not work for these low rates – switch to monitor only and use the 3-way valve to restrict flow. Consider moving pump blades to a coarser setting (if applicable)
- After the first application, drop the sump contents and store for adding to the second application and then the same for the third application. After the third application, run the sump contents to waste, remembering that it will contain the insecticide

### *What about skip row crops?*

Magnet label requires application 1 row every 72m (not 72 rows), irrespective of row configuration.

## FAQs

### *Is Magnet toxic to Bees?*

Studies have shown that bees are not attracted to Magnet and may in fact be repelled. A bee must physically land on or eat the Magnet/insecticide droplet to be affected.

### *Do I need to spray refuges?*

No, you do not spray the refuges.

### *Do I need to spray with or across rows?*

As long as there is reasonable row closure, it does not matter which way the aircraft is flown across the paddock. In skip row configurations, you must fly the plant line.

### *Do I need to do cleanup runs?*

No cleanup runs are required.

***When can someone re-enter the crop?*** Always refer to the label of the insecticide being used to determine the correct re-entry period to the crop. Remember that there are variations between brands. Keep in mind, less than 2% of the crop is actually treated and re-entry to untreated areas can be immediate.

### *What is the rain fastness of Magnet?*

If heavy rainfall (15mm or greater) is forecast within the next 24 hours, do not apply Magnet. Light dew or moisture will help to reinvigorate the Magnet.

### *What is the specific Gravity of Magnet?*

1.1 kg/L

### ***The hectares that my farmer/agronomist have given me are different to the hectares quoted by AgBiTech. Which one do I use?***

Use the Hectares quoted by AgBiTech, as these are the correct planted hectares recorded by Bayer, the amount of Magnet provided for each farm will be based on these figures.

### ***Are any crops susceptible to Magnet?***

Under some conditions, superficial phytotoxicity can occur in sweet corn if applied during early growth stages.