

Spray Application Considerations for Altacor[®] Insecticide

Good spray coverage is vital for getting the best results from Altacor[®] insecticide.

Insect pests must ingest Altacor[®] so if coverage is poor it increases the likelihood that they can feed on parts of the crop that are untreated with the product. These principles also apply to other ingestion type insecticides, such as Steward[®] EC.

The agricultural industry has been very focused on developing new spray technology to reduce the risk of off-target drift. This technology is very important and the widespread adoption of low-drift technology has been very positive. Unfortunately this poses a risk to the performance of products such as Altacor[®].

So what are the important parameters to consider for applying Altacor[®]?

Water volumes

Minimum water volumes of 100 L/ha by ground and 30 L/ha by air are required. Note these are minimum volumes. In some cases these would need to be increased.

Droplet size and number

Spray droplets should be of a medium quality (175-250µm by ASAE S572). Nozzle selection is critical to getting the correct droplet size. Many low drift nozzles produce a coarse droplet, which is not suitable for use with Altacor[®].

Vehicle speed

Speed of operation by ground should not exceed 20 km/h. Modern spray rigs are designed to go faster than this but it will compromise coverage due to spray pattern disruption if this speed is exceeded for an Altacor[®] application.

Crop size and structure

It is critical to consider the size and structure of the

crop because this is the target that we need to cover with spray droplets. A larger and denser crop will require higher water volumes and potentially a different nozzle set-up. The use of twin jet nozzles or 110 degree flat fan nozzles on 25 cm nozzle spacings have proven to be good nozzle arrangements to achieve robust performance of Altacor[®] in large canopy crops.

How do we define “good” coverage?

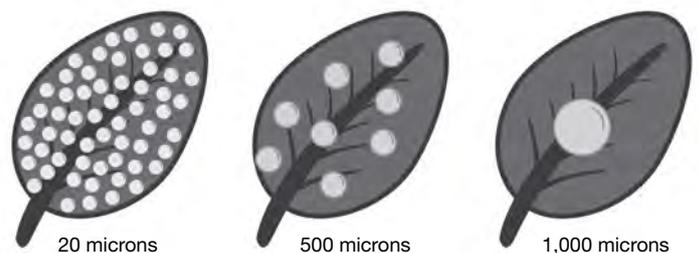
A simple measure is to aim for a minimum of 60 droplets per square centimetre on the target. We can refer to this simply as coverage from now on. This may be an abstract concept to visualise but there are some basic relationships that help us understand this.

The first one is that coverage is increased with increasing water volume. That is logical, more water means more droplets, therefore better coverage.

Secondly, coverage is increased with decreasing droplet size. With a smaller droplet size the total water volume is split into a greater number of droplets. More droplets will result in fewer gaps in coverage of the target. This relationship is not linear. This is because spray droplets are spheres, and to calculate the volume of a sphere: $V = \frac{4}{3} \pi r^3$

So if we increase the diameter of the droplet there is a much greater volume required to produce the same number of droplets.

Droplet Size and Surface Coverage





The third relationship is Leaf Area Index. This is a simple way of measuring the size of the target area on the crop. Leaf Area Index is the total leaf area of the crop divided by the area of ground that it sits on. A Chickpea crop at flowering / podding is likely to have a Leaf Area Index of 2 to 3. A Mung bean crop at early podding stage will have a Leaf Area Index of 4 to 5. A higher Leaf Area Index means that a greater number of droplets are required to achieve coverage of the entire target.

The following table shows the effect of Leaf Area Index on coverage at various water volumes for a 200 µm droplet, (the medium droplet spectrum is 175-250 µm, so this is towards the lower end of the prescribed range).

Water Volume	Droplets Per cm ²			
	Leaf Area Index			
	1	2	3	4
50 L/ha	120	60	40	30
60 L/a	144	72	48	36
70 /ha	8	4	56	42
80 L/ha	192	96	64	48
90 L/ha	216	108	72	54
100 L/ha	240	120	80	60

This simply means that for a larger crop or a denser, leafier crop we need to increase the water volume to achieve the same level of coverage.

For any given crop, we then need to consider the effect of droplet size on coverage. This table shows the effect of increasing droplet size for a crop with a Leaf Area Index of 2.

Water Volume	Droplets Per cm ²		
	Droplet (µm)		
	100	200	400
50 L/ha	477	60	7.5
60 L/a	572	72	9
70 /ha	668	84	10.5
80 L/ha	763	96	12
90 L/ha	859	108	13.5
100 L/ha	954	120	15

There is a dramatic impact on coverage which is not easily rectified by increasing the water volume. The selection of a coarser droplet size, for example using low drift nozzles, will result in greatly compromised coverage of the crop.

Practical Tips for Ensuring that Adequate Coverage is Achieved

Attention to the basic parameters of water volume, droplet size and vehicle speed will ensure that good coverage is achieved with spray application. Water volume and speed are simple to manage. Droplet size is determined by nozzle type and operating pressure.

Avoid using nozzles that produce a coarse droplet.

This means that low drift nozzles, air induction type nozzles are usually unsuitable for applying Altacor®. Make sure that you know what size droplet your nozzle outputs and determine the optimum pressure to run it at. A traditional design flat fan nozzle (110-03) at 3-4 bar operating pressure will produce a suitable size droplet. There are plenty of nozzle types that will do the same job; the key is to understand the droplet size you need and make sure that is what you are getting.

Technology such as air assist can help with getting better spray penetration in dense canopies.

It is important to pay attention to the basic parameters of coverage though. Air assist will not compensate for having inadequate spray droplets for the target.

Consider the weather conditions. The parameters for nozzle selection and spray coverage in general relate to ideal spraying conditions. If conditions are less than ideal you will need to make allowance for the fact that not all of the spray will make it to the target.

Finally, don't forget the size of the target. A bigger crop needs more droplets to achieve adequate coverage. The best and easiest option is usually to increase the water volume.

For further information please visit www.fmccrop.com.au or contact your local representative

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