

## **Increase Efficiency with Low Volume application**

### Contact Action Requires Superior Coverage of the crop

The application techniques of pesticides has unfortunately not been developed to the same extent as the pesticides themselves. This became apparent with the pyrethroid insecticide's that only have contact action requiring 24 hours or more for complete control of insects when applied with high volume, yet give 100% control within one hour or less when applied with small droplets and low volumes. It is well known and recognized that pyrethroid insecticides work by contact and ingestion action and no vapor effect, which means that for good results they must be delivered to the target insect. The alternative is to obtain poor crop coverage and wait for the insects to find the chemical.

Firstly let us examine WHY we apply agrochemicals. The answer although obvious is not always appreciated: to kill insects, control diseases or weeds etc! Therefore, our objective should be to deliver the chemical product to the target insect or disease. This means by definition that any product collected on horizontal collection devices at ground level within the crop is chemical wasted and may cause contamination of the soil, or the atmosphere.

*Asian Rust in Soybeans:* Today we are experiencing a similar scenario with the application of fungicides for the control of *Phakopsora pachyrhizi* Asian rust in Brazil. In many cases the fungicides have not been performing as well as expected, especially so when applied according to label recommendations with high volumes of 50 lts/hectare, [5 gals/acre] with large spray droplets. For adequate control of Asian rust it is necessary to obtain maximum penetration of the crop and this is only feasible with small droplets.

The most efficient method of obtaining good crop coverage is by using small spray droplets obviously in balance with minimizing "off-target" deposition through wind displacement.

### **Spray Volume**

In seeking to obtain increased spray coverage it is far more important and more economical to decrease the droplet size than to increase the spray volume.

Many entomologists/agriculturalists have always thought that higher volumes mean better coverage; this is erroneous and has led to the following:

- Poorer coverage of crop and pests as large droplets fail to penetrate dense foliage.
- A slower rate of work by the equipment often resulting in spraying being conducted under adverse weather conditions in order to cover the area.
- Less penetration of the spray within the crop due to inadequate atomization of the high volumes, often due to mechanical limitation in atomization.
- Major problems with soil contamination especially so when farmers apply 1000 liters or more of water per hectare as in the case of citrus.
- Increased application costs.

### **What are the advantages of lower spray volumes?**

- Lower volumes are more effective for several reasons, however the most important is probably that the chemical ingredient is more concentrated enabling higher efficacy, such that one spray droplet may be adequate to kill a particular insect.
- For mechanical reasons it is easier to atomize a lower volume of liquid using smaller spray nozzles. For improved crop coverage reduce the nozzle size and increase the spray pressure to produce smaller droplets for better penetration of the crop.
- Higher productivity of the sprayer as less time is wasted refilling with water.

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- Lower volumes means higher productivity in terms of hectares/hour, so spraying can often be finished before mid-day when the weather is usually less favorable.

#### **How can we achieve such increases in efficiency?**

In my next reports I propose to address how we could change the mindset and to develop ideas together with the chemical companies and applicators to design formulations complete with precise application parameters for each product instead of prescribing volumes/acre.