Measuring droplets and deriving VMD and NMD

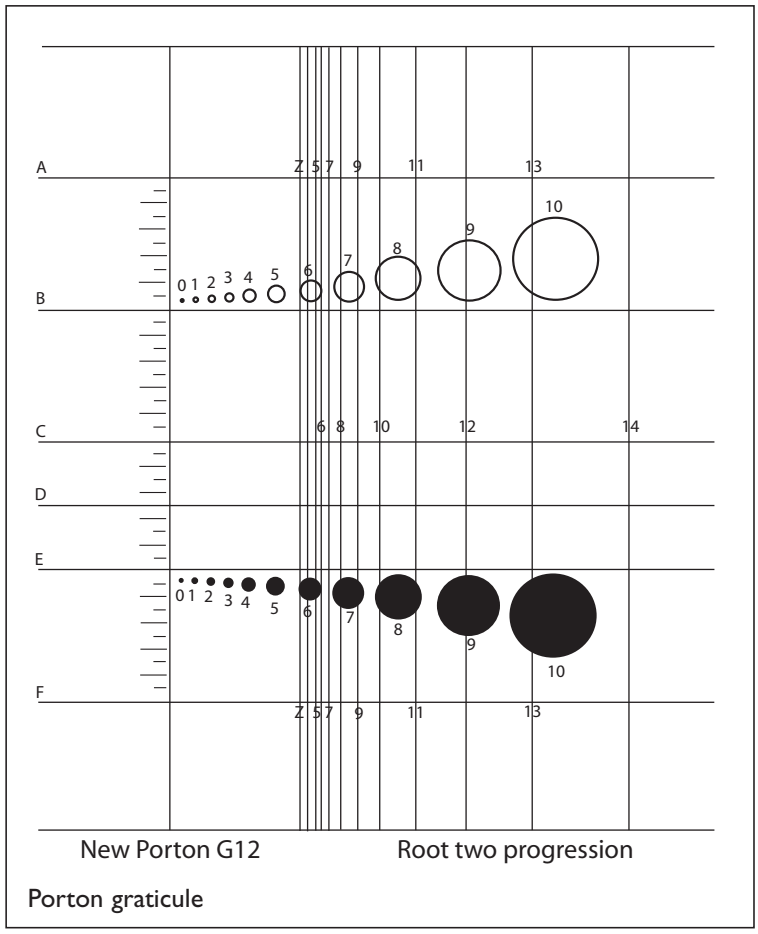
DON'T FORGET

EQUIPMENT: Microscope; stage micrometer; Porton graticule; sampling surfaces (MgO slides) with deposited spray; droplet sizing form; graph paper (VMD/NMD computer program or spreadsheet).

GRATICULE CALIBRATION AND FORM PREPARATION

Method

- Use the stage micrometer to measure the size of one of the larger circles on the Porton graticule.
- Calculate all other upper size class limits using the root 2 progression and enter them in column 2 of the droplet sizing form.
- Correct these class sizes in column 3 of the droplet sizing form for spread factor on the sampling surface. In the case of MgO, this means multiplying by 0.86. In the case of other sampling surfaces, this factor may vary with different size classes – refer to previous calibration of that sampling surface/spray formulation combination.
- Calculate the geometric mean of the size class (square root of upper limit x lower limit) and enter into column 4. The table is now ready for data entry.



Porton graticule

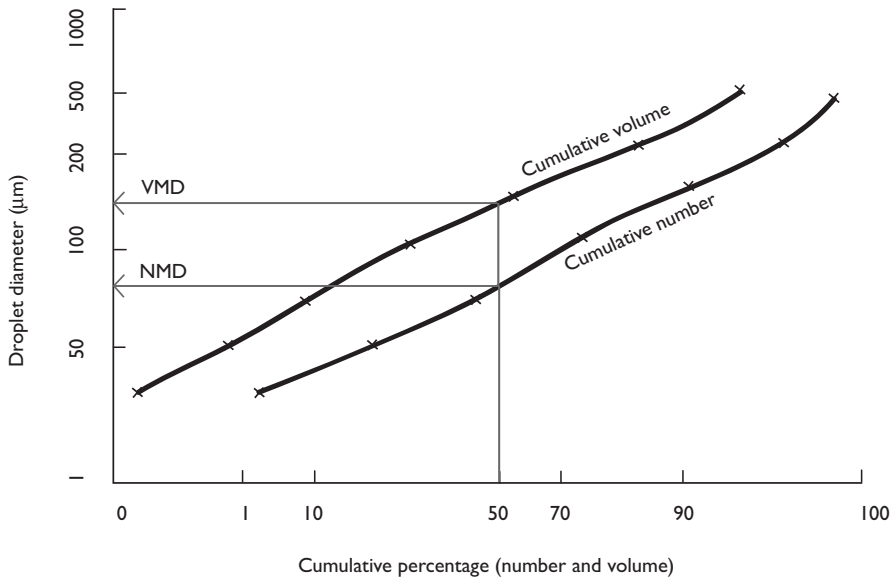
MEASURING DROPLETS

Method

- Examine an MgO slide that has been exposed to spray droplets under the microscope (transmitted light). It is best to sweep right across the full width of any sampling surface since the sizes of droplets can vary depending on where they are; more of the smaller droplets are usually found near the edges of vertical samplers. Begin to assign size classes to droplets. Each droplet can either be compared with the black circles, the empty circles or the distances between the lines on the Porton graticule. A droplet is assigned to size class 5 if it is **less than** the upper limit of the size class, i.e. if a droplet is very slightly larger than black circle number 5, it should be assigned to size class 6.
- The process is easiest if two people work together; one measures and calls out the data while the other records the data on the form.
- Measure at least 100 droplets, preferably more.
- Measure droplets on several sample slides if a more representative sample of the whole deposited spray is required. In general, examine 5–10 slides to get an accurate sample.

- Make the calculations required on the spray sizing form until data are complete in columns 6 and 9. Plot these data on graph paper using axes of droplet size and cumulative percentage. There will be one line for cumulative percentage number and one line for cumulative percentage volume. Normal graph paper is satisfactory, but using log probability graph paper gives straighter lines which are easier to interpret.
- Read off the graph paper the droplet diameter corresponding to the cumulative 50% point for number and volume to derive the NMD and VMD respectively.
- An alternative to graphing is to use a BASIC computer program or a custom Microsoft Excel spreadsheet (both available from the authors) to calculate the VMD and NMD.

Plot of cumulative number and volume on log probability graph paper



DROPLET SIZING FORM

Name	Date	Test liquid
Sprayer type	rpm/pressure:	
Sampling surface	Spread factor:	

1	2	3	4	5	6	7	8	9
Porton graticule size class number	Class upper size limit (MgO)	True upper size limit (MgO x 0.86)	Geometric mean of true size class root of upper x lower)	Number of drops in class	Accumulated percentage of total number	Drop volume (4/3 pi r^3	Number x volume	Accumulated percentage of total volume
Units	μm	μm	μm		%	μm^3	μm^3	%
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
			Total number			Total volume		

rpm = revolutions per minute

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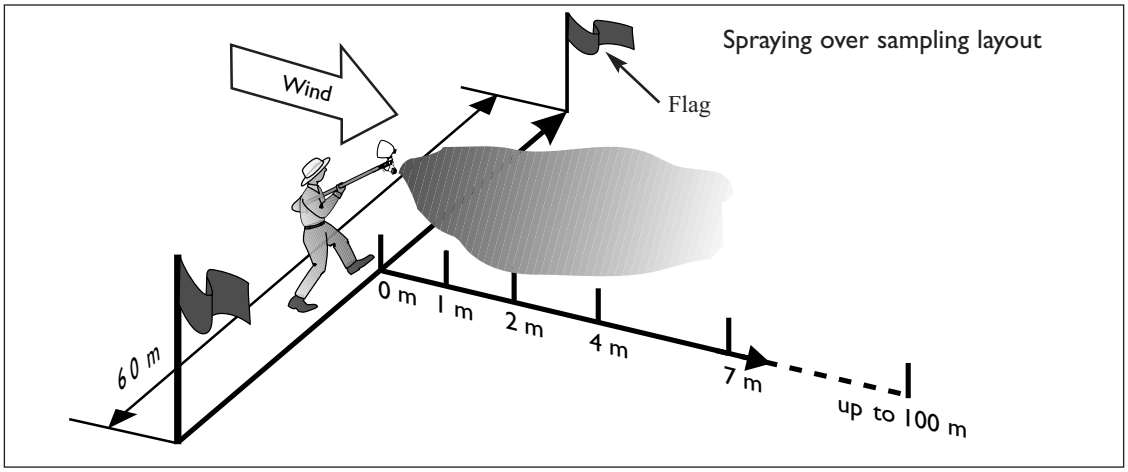
Measuring swath width of ULV sprayers

DON'T FORGET

EQUIPMENT: Sprayer; oil formulation; fluorescent tracer; oil-sensitive paper; glue or sticky tac; sticks to mount papers; protective clothing; nitrile gloves; tape measure; bucket; clip-board; flags; anemometer (or Beaufort scale sheet); thermometer; ultraviolet lights; counting templates; hand lens.

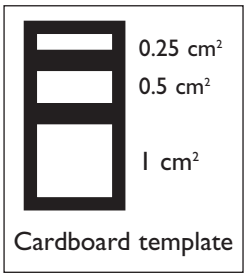
Method

- Find the direction of the wind and using flags, mark out a spray line at least 60 m along the proposed path of the spray operator at 90° to the wind direction. Put out a line (or several lines) of poles running downwind from the spray line at the distances indicated below. If aerial or vehicle spraying is being monitered, the distance between lines of poles needs to be greater, e.g. 500 m–1 km.



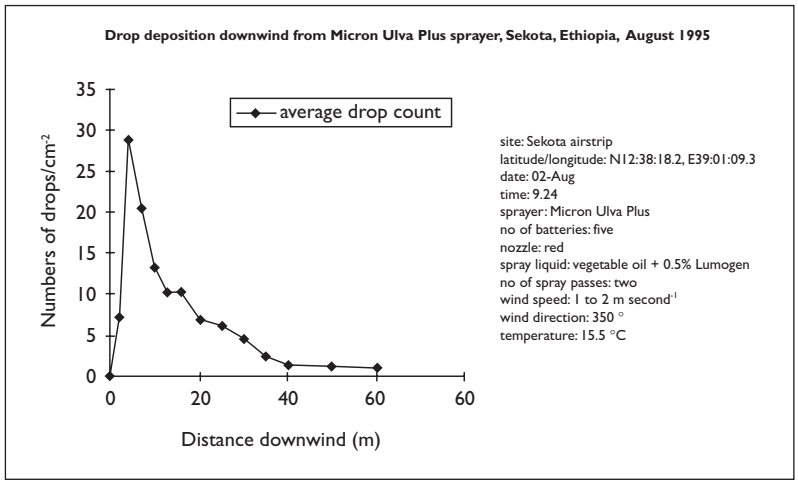
- The poles should be set at distances of 0, 1, 2, 3, 5, 7, 10, 15, 20, 30, 50, 80 and 100 m downwind (see illustration on MgO rotary sampler method sheet). These distances are appropriate for hand-held sprayers, but if vehicle-mounted sprayers or aerial sprayers are being studied, distances over which the poles are spread should be accordingly larger, perhaps covering a maximum distance of 200 m and 500 m respectively, but intervals between samplers set proportional to those given above.
- Take care with the sensitive paper because it can easily be marked if handled roughly, and any fingerprints on the 'sensitive' surface can make counting drops difficult. Only the shiny side is sensitive. **Tip**: *Wear nitrile gloves.* Handle the paper only by the ends of the strips and do not touch the middle. Attach the papers near the top of the poles (using pins, gum or 'bluetac') facing into the wind, with the sensitive side of the paper on the outside.
- The sprayer operator should then go ahead with the sprayer application exactly as they would for a normal spray operation.
- Record the wind speed and direction during the spraying.
- After spraying, the papers should be collected as soon as possible, labelled with the distance and the treatment they have been given, and stuck on to a piece of paper with glue (a glue stick is convenient). Do not allow anything to touch the surface of the papers as the drops may get smudged and difficult to count. **Note**: Wear protective clothing and nitrile gloves as surfaces will be contaminated with pesticide.
- In the laboratory use a counting template (shown below), ultra-violet lamp and hand lens to count the number of droplets on the papers. If there are many droplets, count the number seen in the 0.25 cm^2 template and multiply by 4 to give the number of droplets cm^{-2}. If there are very few droplets, use the 1 cm^2 template and no mathematical correction is necessary to give number of droplets cm^{-2}.
- Plot a graph of number of drops cm^{-2} (on the vertical or *y* axis) against distance downwind (on the horizontal or *x* axis).

Droplet counting template



Cardboard template

Layout of swath profile graph



Note: The true volume distribution is likely to be somewhat different from this number distribution since the droplets counted near to the sprayer are usually larger than those collected further downwind.

OTHER CONSIDERATIONS

If calibrating a sprayer, the sprayer operator should make 3 spray passes with the sprayer along the same line. This is not normal operational spraying practice but it helps to smooth some of the natural variation in deposition encountered in the field.
If no anemometer is available, record wind speed on Beaufort scale.
Droplets should be counted as soon as possible otherwise they may fade. Counting **must** be done with 2–3 hours.
Use a form like the one shown to record the data (Droplet Counting Form).

FORM FOR DATA ENTRY DURING DROPLET COUNTING

Sampler		Date
Spray details:	Spray time	Sprayer operator
	Pesticide	Wind speed during spray
	Formulation	

Distance downwind (m)	Area used on template (0.25, 0.5 or 1 cm^2)	Number of drops (4 counts)	Average number of drops	Average number of drops per cm^2
0				
1				
2				
4				
7				
etc.				

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The loss technique for flow rate measurement

DON'T FORGET

EQUIPMENT: Notebook; pen; stop-watch or watch with a second hand; measuring cylinder (100 ml or 500 ml); protective clothing; soap and water; sprayer; insecticide with label.

For use when the spray liquid cannot be collected easily as it is emitted.

Method

- Fill the sprayer up to a known level with insecticide (either completely full or to a marked level) and spray over the target area using your normal spraying technique for a measured number of minutes (*M*); 10 min is usually sufficient.
- Use a measuring cylinder to measure the amount of insecticide required to refill the sprayer back to its original level. This will give the volume in litres emitted (*E*).
- Calculate the flow rate (*F*) in l min^{-1} by using the formula below and adjust the sprayer to achieve the required value:

$$F\ (\text{l min}^{-1}) = \frac{E\,(\text{l})}{M\,(\text{min})}$$

- When the required flow rate has been achieved, repeat the flow rate check two more times to be sure there have been no errors in measurement.

OTHER CONSIDERATIONS

The manufacturer's manual should be consulted before setting flow rates for the first time. It usually gives calibration information which provides a starting point for the flow rate settings.
A running check can be kept on flow rate (especially in the case of aircraft) by recording the time spent spraying and the amount of insecticide being used. If the amount of insecticide being used seems too great or too small the flow rate should be measured and reset if necessary.

Collection technique for measuring sprayer flow rate

DON'T FORGET

EQUIPMENT: Notebook; pen; stop-watch or watch with a second hand; measuring cylinder (100 ml or 500 ml); bucket; protective clothing; soap and water; sprayer; insecticide with label.

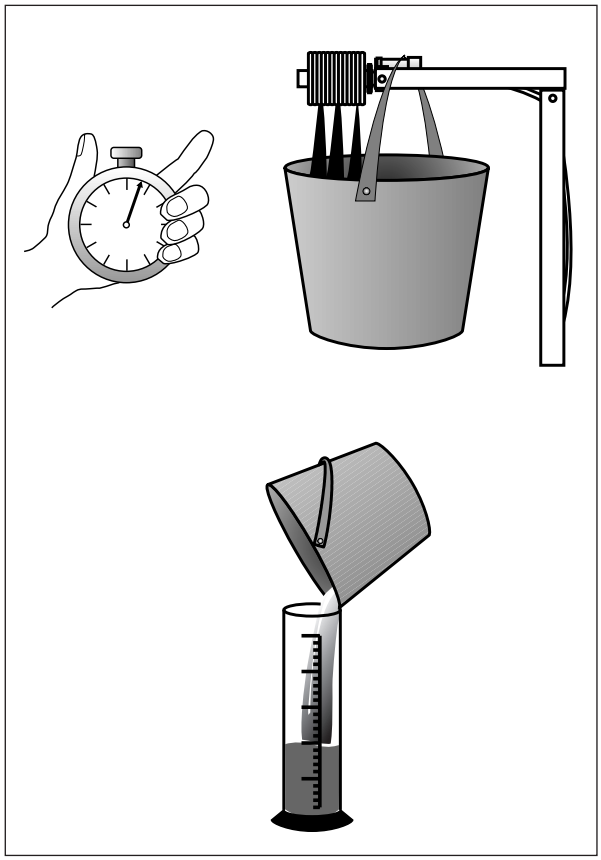
This technique is for use when spray liquid can be collected easily as it is emitted.

Method

- Put on protective clothing.
- Fill the sprayer and position it to deliver insecticide into a bucket.
- Allow the insecticide to flow from the sprayer into the container for a measured number of minutes (M). Generally 3 min is sufficient.
- Decant the contents of the bucket into the measuring cylinder to measure the number of litres emitted and collected (*E*).
- Calculate the flow rate (*F*) in l min^{-1} by using the formula below:

$$F\ (\text{l min}^{-1}) = \frac{E\,(\text{l})}{M\,(\text{min})}$$

- Adjust the flow rate of the spray equipment by twisting the nozzle or making other adjustments (see manufacturer's manual) to bring it closer to the required value and check it again. Keep altering and checking until the required flow rate has been achieved.
- When the required flow rate has been achieved, repeat the flow rate check two more times to be sure there have been no errors in measurement.



OTHER CONSIDERATIONS

The manufacturer's manual should be consulted before setting flow rates for the first time. It usually gives calibration information which provides a starting point for the flow rate settings.
A running check can be kept on flow rate (especially in the case of aircraft) by recording the time spent spraying and the amount of insecticide being used. If the amount of insecticide being used seems too great or too small the flow rate should be measured and reset if necessary.

Calibration of ULV sprayers

DON'T FORGET

EQUIPMENT: Notebook; pen; stop-watch or watch with a second hand; measuring cylinder (100 ml or 500 ml); bucket; protective clothing; soap and water; sprayer; pesticide with label; tape measure; flags or other markers; diesel fuel or kerosene.

BASIC STEPS FOR CALIBRATION

- **Identify the dose (g a.i. ha^{-1}).** Identify the pesticide active ingredient you are using and determine the recommended dose for the pesticide in g a.i. ha^{-1}.
- **Convert the dose to a volume application rate (l ha^{-1})**. Read the pesticide formulation concentration in g a.i. ha^{-1} from the pesticide label and use the VAR formula below to calculate the volume application rate (VAR) in l ha^{-1}.
- **Calculate the required flow rate (l min^{-1})** Use the flow rate formula below to calculate the flow rate required to achieve the VAR (using some sensible figures for track spacing and forward speed – described below).

How to calculate the volume application rate (VAR) to achieve the recommended dose

$$\text{Volume application rate (l ha}^{-1}\text{)} = \frac{\text{recommended dose (g a.i. ha}^{-1}\text{)}}{\text{formulation concentration (g a.i. ha}^{-1}\text{)}} \quad \textbf{(VAR formula)}$$

For example, if we have a formulation of bendiocarb containing 200 g a.i. l^{-1}, we find the recommended dose for bendiocarb is 100 g a.i. ha^{-1} and we calculate the VAR as:

$$\text{VAR (l ha}^{-1}\text{)} = \frac{\text{100 g a.i. ha}^{-1}}{\text{200 g a.i. l}^{-1}} = \text{0.5 l ha}^{-1}$$

How to calculate the sprayer settings to achieve the correct volume application rate (VAR)

To apply this correct volume application rate (which will deliver the correct dosage), adjust three spraying factors.

1. Track spacing (the distance between spray passes). If track spacing increases, VAR decreases.

How to decide what track spacing to use

- Choose a track spacing according to the manufacturer's literature, the wind conditions and users' experience of the sprayer. Typical track spacings are 10 m for hand-held spinning disc sprayers, 25 m for vehicle-mounted drift sprayers and 100 m for aircraft sprayers.
- The track spacing is determined by the type of sprayer and the wind conditions during spraying – track spacing must be large enough to allow target areas to be sprayed quickly, but not too large otherwise the pesticide will not cover the area between the spray passes evenly enough.

2. Forward speed. If forward speed increases, VAR decreases.

How to decide what sprayer speed to use

- Check the speed of the sprayer using a marked out distance and a stop-watch and use that in the calculations. For aircraft, consult the pilot to check at what speed he normally flies while spraying.
- The forward speed is mainly determined by the speed at which the sprayer can move, i.e. the speed a man can comfortably walk (typically 90 m min^{-1}), or the speed a vehicle can safely drive over rough ground (typically around 7 km h^{-1}), or the aircraft's normal flying speed (between 140 and 200 km h^{-1}).

3. Flow rate of the sprayer (also called emission rate). If flow rate increases, VAR increases.

How to decide what flow rate to use

- Apply the formula to determine what the correct flow rate should be

$$\textbf{Flow rate (l min}^{-1}\textbf{)} = \frac{\textbf{VAR (l ha}^{-1}\textbf{) x speed (km h}^{-1}\textbf{) x track spacing (m)}}{\textbf{600}} \quad \textbf{(Flow rate formula)}$$

The flow rate is usually the easiest of these factors to adjust, and must be set so that when using your chosen track spacing and forward speed, the correct VAR (and dose) is applied. Use the procedure given in the method sheet on measuring sprayer flow rate to measure and set the flow rate.

An example

If you are controlling locust hopper bands with a vehicle-mounted sprayer using the pesticide bendiocarb as a 20% formulation, travelling at 4.8 km h^{-1} and using a 25 m track spacing, the flow rate can be calculated using this formula as below. **Note**: We have already calculated that the required VAR to apply the recommended dose of this pesticide formulation is 0.5 l ha^{-1}.

$$\text{Flow rate (l min}^{-1}\text{)} = \frac{0.5 \text{ l ha}^{-1} \times 4.8 \text{ km h}^{-1} \times 25 \text{ m}}{600} = 0.1 \text{ l min}^{-1}$$

This formula can also be turned round if necessary to calculate any of the other factors:

$$\textbf{VAR (l ha}^{-1}\textbf{)} = \frac{\text{flow rate (l min}^{-1}\text{) x 600}}{\text{speed (km h}^{-1}\text{) x track spacing (m)}}$$

$$\textbf{Speed (km h}^{-1}\textbf{)} = \frac{\text{flow rate (l min}^{-1}\text{) x 600}}{\text{VAR (l ha}^{-1}\text{) x track spacing (m)}}$$

$$\textbf{Track spacing (m)} = \frac{\text{flow rate (l min}^{-1}\text{) x 600}}{\text{VAR (l ha}^{-1}\text{) x speed (km h}^{-1}\text{)}}$$

Calibration of high-volume sprayers

DON'T FORGET

EQUIPMENT: Notebook; pen; measuring cylinder or cup (20 ml); protective clothing; soap and water; sprayer; pesticide with label; tape measure; flags or other markers; diesel fuel or kerosene.

Before the user can be sure he/she is using the correct dose of pesticide on a particular crop, the VAR must be determined

MEASURING VOLUME APPLICATION RATE

Method

- From a selected starting point within the crop (select one at random, but away from the field edge), take 5 large paces and place a stick in the ground at the end of your toe. Turn through 90° and take 5 large paces. Place a stick into the ground at your toe. Repeat a third time. This will give an area of approximately 25 m^2 or 1/400th of a hectare, the corners marked with sticks.
- Now put the clean sprayer on a level surface and put water into the tank (no pesticide) up to a level which corresponds with one of the volume markings on the sprayer tank.
- Spray the marked out area of crop with water, as if it is pesticide.
- Put the sprayer back on to the same level surface and, using the volume markings on the sprayer, estimate the volume sprayed on to the crop. Alternatively measure the amount of water needed to fill the sprayer up to its original level.
- If the volume used is 1 litre, this corresponds to a VAR of around 400 l ha^{-1}. If the volume used is 0.5 litre, this corresponds to a VAR of around 200 l ha^{-1}, etc.

The following formula can be used to calculate the VAR if the area that has been sprayed is different:

$$\text{VAR (l ha}^{-1}) = \frac{\text{average volume used (l)} \times 10{,}000}{\text{area sprayed (m}^2)}$$

Adjusting volume application rate

- If the VAR is too high, the user should either fit a smaller nozzle to the sprayer or, if the nozzle is already small enough, he/she should modify the spraying technique to apply less spray to each plant, i.e. spend less time spraying it by walking faster.
- After these adjustments for equipment and/or technique, the user should measure VAR again to make sure it is appropriate.
- If spraying equipment is not capable of producing a low enough VAR, e.g. if a smaller nozzle is not available, the user must then make adjustments to the tank dose to compensate for this. For example, if the sprayer is putting a VAR of 800 l ha^{-1} on a medium-sized crop (at least double the volume required), then the tank dose can be reduced to half of what the pesticide label says without any risk of applying too little active ingredient.

Putting in the right tank dose

- Consult the pesticide label for the volume of concentrated spray liquid (or weight of dry powder) to put in each 10 litres of water.
- Once the volume required per sprayer tank has been worked out, use a small measuring cup or measuring cylinder to add the correct amount.

OTHER CONSIDERATIONS

Sometimes, the tank dose advice is given for 15 litre sprayer or for 100 litres of water but the amount required for a particular tank volume can be worked out fairly simply.
A measuring cup should be provided by the shop which sells the pesticide. The cost of a measuring jug or cup is much less than the cost of mistakes in application, i.e. either wastage of pesticide or poor spray results.
If there is a large area of crop to treat, a large batch of spray liquid can be mixed in a drum and then knapsack sprayers filled from that. If the drum is 200 litres, it will fill a 10 litre spray tank 20 times, so add 20 times the amount of concentrate recommended for each 10 litre sprayer tank. Mix only enough for a maximum of 4 h spraying so that the mixture does not have to be left overnight.

Making magnesium oxide-coated slides

DON'T FORGET

EQUIPMENT: Bunsen burner or portable gas burner; magnesium ribbon; glass slides (either 24 mm wide or 6 mm wide); metal rack to hold slides; darkened safety goggles; tongs or pliers; gloves; slide box.

Method

- Place 5 glass slides side by side on a metal rack in a fume cupboard or well-ventilated area (put them tight up against each other). The rack should allow at least the central third of the glass slide to be exposed from below.
- Cut a length of magnesium ribbon about 20 cm long and hold one end in a pair of metal tongs or pliers.
- Put on darkened safety goggles and light the end of the ribbon with the gas burner. Immediately place the burning end underneath the glass slides but keep it at least 5 cm below the slides otherwise the heat will crack them.
- You will probably need to smoke the 5 slides with 3 or 4 lengths of magnesium ribbon.
- When you are sure there is a good layer of MgO on the slides (perhaps 0.5 mm), remove the slides carefully and place in a slide box. **Tip**: *The actual thickness of the MgO layer required will depend on the size of droplets which are to be sampled. If the layer is too thin, the droplets will punch through and shatter on the glass. If the layer is too thick, the craters formed by the droplets will be difficult to see, even with strong transmitted light.*
- The slides must always be carefully handled to avoid contact of the magnesium oxide-coated sampling area with objects and dust or other particles. The slides should be handled by the ends which are not coated with magnesium oxide.
- Slides are best when they are a few hours old. After more than 3–4 days, the MgO begins to harden and a crust forms, causing some droplets to bounce off rather than penetrate.

Use of fibre drift samplers

DON'T FORGET

EQUIPMENT: Wool samplers; foil spills; aluminium storage can; self-adhesive label; wooden crossarms 2.5 x 2.5 x 75.0 cm; wooden post; 2.5 x 2.5 x 200.0 cm; cuphooks; metal; disposable plastic gloves; plastic bag for discarded gloves; heavy hammer and iron bar for driving in the mounting posts; pliers to tighten cup hooks; scissors for cutting wool strands; permanent marker pen; 'Benchkote'; double-sided tape; small wooden block; protective clothing.

Two persons are required for the deployment and collection of the samplers.
Prepare aluminium foil spills by rolling up a piece of clean aluminium foil (30 x 15 cm). These are then placed in labelled aluminium screw-top tubes for storage and transport.
To lessen the risk of cross contamination, collection should begin at the wools having the least deposit, i.e. at the samplers furthest downwind from the spray source.

PREPARATION OF THE SAMPLERS

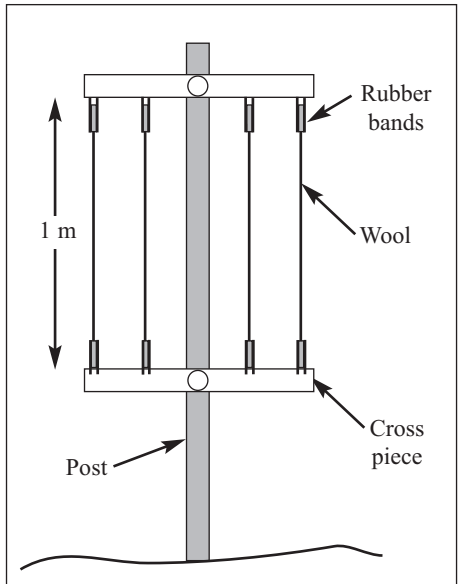
Method

- Cover a convenient bench top with a 1.5 m length of a material such as 'Benchkote'. Remove a ball of wool from its plastic storage bag and take off the manufacturer's label. Place it on the table.
- Tie a small 3 cm loop at one end of the wool strand and place this over a cup hook screwed into a small block of wood stuck to the table surface with double-sided tape at the left-hand end of the 'Benchkote'.
- Tie a knot in the wool about 10 cm from the loop and extend the wool to about 1.25 m. Cut it to this length and tie a rubber band to the end.
- Lightly stretching the wool, tie another knot in the strand to give an inter-knot distance of 1 m.
- Cut off and discard any loose ends.
- Coil the prepared sampler and place in a small envelope or sachet.
- Repeat until the required number of samplers have been prepared.

SAMPLER DEPLOYMENT

Method

- Suspend wool samplers vertically between two horizontal wooden crossarms (2.5 x 2.5 x 75.0 cm) fixed to posts driven into the ground. As many wool samplers as are required are mounted between the crossarms. For most purposes a ground to top crossarm distance of about 1.75 m has been found to be convenient.
- The distance between the crossarms is chosen so as to stretch the wools gently once in place.
- The wool strands are mounted on cuphooks screwed into the crossarms. **Tip**: *To facilitate the transport of the posts and crossarms, the crossarms are fixed to the posts with heavy duty rubber bands.*
- The layout of the posts in relation to the spray source can be varied according to conditions and the objective of the work. For drift over open ground in winds varying from 1.0 to 5.0 m second^{-1}, posts at 10, 25, 50, 100, 200 and 500 m downwind have been successfully used. It should be borne in mind that in terrain including obstacles such as buildings, hedges and trees, drop dispersal will be very variable because of random patterns of wind direction and strength.



Fibre sampler holder

- 'Control' samples should be the first to be put in place and removed shortly before spraying to act as a check on the handling procedure.
- Because the greatest risk of accidental contamination comes from those handling the samplers, a new pair of disposable gloves should be worn at each sampling station during the mounting and removal of the wool samplers.

Deployment

- Remove a sampler from its bag.
- Hook the elastic band over a cup hook on the top crossarm. Stretching the wool strand, hook the loop at the other end over the corresponding cuphook on the lower crossarm. Do not touch the length of wool between the two knots. The strand of wool should now be sufficiently taut to be unaffected by light winds. If it is not, change the position of the crossarms until it is.
- Repeat this for all the other samplers.

Sampler collection

- Remove foil spill from its aluminium container. Twist the foil spill around the mounted sampler just below the lower knot and cut the sampler free from the cuphook with scissors. Wind the sampler on to the spill, keeping the sampler taut by pulling slightly against the elastic band.
- When the upper knot is reached, cut again and place the spill plus wool into a screw-cap aluminium can. The spill should be placed in the can in such a way that the handled ends of the spill can be cut off.
- Screw the top on firmly and label the can immediately with position of sample, pesticide used, date, etc., using a permanent marker pen.
- Repeat for all the other samplers.
- The cans should ideally be placed into some form of chilled container in order to minimize chemical losses by heat degradation or volatilization of active ingredient.

Analysis

Wool samplers can be analysed for active ingredient content in suitable residue analysis laboratories, or if a fluorescent marker dye has been added to the pesticide formulation, samplers can be analysed with a fluorimeter.

OTHER CONSIDERATIONS

In all steps of the process of preparing the wool samplers, the greatest care must be taken to avoid accidental contamination of the wool with pesticides or other chemicals. All hands and surfaces with which the wools may come into contact must be scrupulously clean. Wear nitrile (or disposable) gloves and protective clothing when collecting fibre samplers after spraying.
Two persons, one to roll up the strand and the other to do the cutting and hold the can, make the task of collection easier than one person working alone.

Use of rotary magnesium oxide sampler

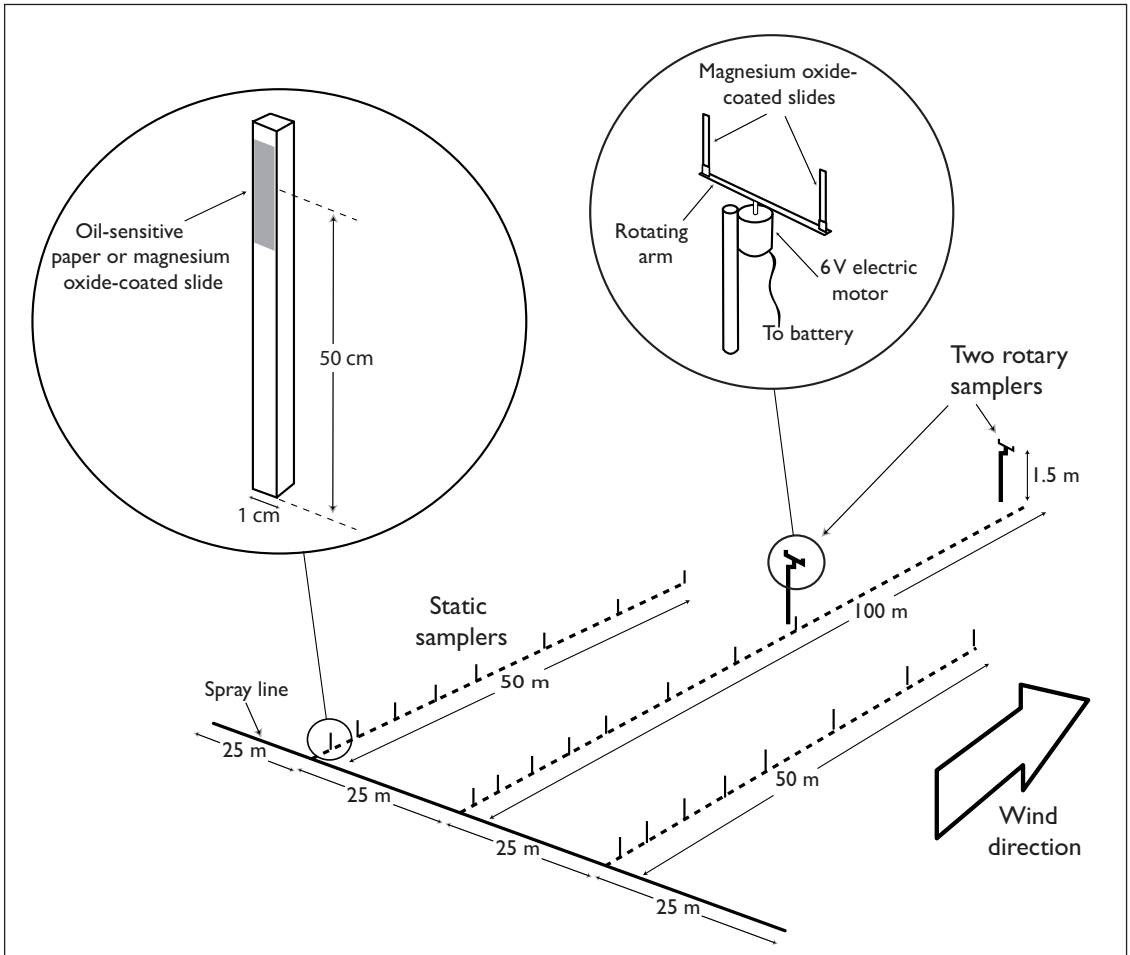
DON'T FORGET

EQUIPMENT: Sampler and battery unit; magnesium oxide slides; slide box; anemometer; fine permanent marker pen; notebook; pencil; microscope; eyepiece graticule (Porton graticule) of diameter to fit microscope eyepiece tube; stage micrometer; calculator or computer.

Prepare magnesium oxide slides in advance using method sheet.

Method

- Fix the sampler to a post using a clip or using adhesive tape, making sure the rotating arms do not foul any vegetation such as long grass. Height above the ground depends on the needs of the sampling exercise, but 1.5 m is convenient.
- Note the date, the features of the location, wind direction, crop (type, height, growth stage), sprayer, liquid being sprayed, time of day, sampling layout, distance from spray source, weather, temperature, duration of sampling period, and wind speed. **Tip**: *A prepared check sheet can make sure you record everything.*
- Load the slides into the slide holder making sure the oxide faces in the direction of rotation. **Note**: Collection efficiency of stationary slides is low, but it is better to load them just before sampling starts.
- Switch on the sampler to start rotation by connecting the battery or using a fitted switch.
- Measure the wind speed throughout the period of sampling using the anemometer.
- After spraying, and after sufficent time for any airborne spray to have deposited or blown out of the sampling area, switch off the rotary sampler.
- Label slides using a permanent marker pen and replace them in the slide box.
- Transport the slide box carefully to the laboratory.
- Proceed with the measurements and calculation using the method sheet on measuring droplets and deriving VMD and NMD.



Droplet sampling layout