Prepping Your Air Blast Sprayer for Spring

Adapted from the Cornell Pest Management Guidelines for Commercial Tree Fruit Production

Sprayers must be regularly checked over to ensure that proper maintenance has been carried out and that no outstanding repairs need to be done. Faulty sprayers contribute to increased drift levels and waste money through inefficiency and overuse of chemicals. Before attempting any work on a machine make sure that it is fully supported on stands and that all necessary protective clothing is on hand.

The cost of replacing a faulty pressure gauge which has been indicating at 15% below the actual pressure is recouped in around two hours' operation. Maintenance measures such as fitting a new set of nozzles at the beginning of each season also save money. Even when there is overdosing by as little as 5%, the cost of a new set of nozzles would be recovered in less than a day's work.

Think About Safety

- Take great care when adjusting a sprayer while the tractor engine is running.
- Always ensure that the fan is stationary before approaching the rear of the sprayer.
- Engage the handbrake when leaving tractor seat.

Fitting the Sprayer to the Tractor

The selected tractor must always be powerful enough to operate the sprayer efficiently under the working conditions that will be encountered. All its external services-hydraulic, electrical and pneumatic-must be clean and in working order. Tractors fitted with cabs must have efficient air filtration systems. All protective guards must be in place. Trailed sprayers are often close-coupled to the tractor, so it is essential that the drawbar and the PTO shaft are correctly adjusted for turning. PTO shafts must be disengaged when making very tight turns.

Checking the Operation of the Sprayer

Partially fill the tank with clean water and move the sprayer to uncropped waste ground. Remove the nozzles. Although not using any chemical at this point, get into the habit of wearing a coverall, gloves and a face visor when working with the sprayer. Engage the PTO and gently turn the shaft, increasing speed slowly to operating revs. Test the on/off and pressure relief valves, and check the agitation system. Flush through the spray lines and then switch off the tractor. Refit the nozzles and check the liquid system again for leaks. It is a valuable exercise to assess the spray deposits at various points in the canopy and on upper and lower leaf surfaces of the trees to be sprayed. This is particularly important if the foliage is dense or if the trees are grown in beds of three or more rows. Water-sensitive papers, food coloring or fluorescent tracers are available for this purpose. An increase in spray volume or adjustment of the nozzles and their locations may be necessary in order to achieve the correct deposits.

Pre-Season Maintenance

Follow the checklists before you begin spraying

Hoses check…

- for splits and cracks
- connections to ensure they are water-tight

- for hose chafe, particularly in routing clips

Filters check…

- for missing filter elements and seals
- for leakage
- for blocked or damaged filters

Tank check…

- for fractures and any other damage
- the tank sits firmly in its mount
- the securing straps are correctly adjusted
- the agitation is working
- the tank is clean

Controls check…

- the control circuitry (electrical, hydraulic or air) for correct operation
- valves for both internal and external leaks

Pump check…

- lubrication levels
- for leaks
- the air pressure in the pulsation chamber (if fitted) is at the recommended level
- the pump rotates freely without friction or noise. Do so by rotating manually or starting at low speed (corrosion may cause seizing up)

Pressure Gauge

The pressure gauge is vital for indicating whether the nozzles are delivering the correct amount of chemical per unit time while spraying. If you have doubts about the pressure gauge, replace it or refer the problem to the manufacturer or supplier.

Nozzles check…

- all nozzles are appropriate for the location on the manifold
- all nozzles are in good condition, with no leaks around the body
- all nozzles are clean and free from obstruction (note: clean with a soft brush or airline – don't damage nozzles by using wires or pins)
- all nozzles deliver to within + or - 5% of the manufacturer's chart value

Using water only, set to 'spray' at the specified pressure and collect the output from each nozzle in turn for a period of 60 seconds. Record each output and replace those outside the 5% tolerance stated in the manufacturer's chart.

Automatic Spray Controllers

Where your sprayer has automatic controllers to monitor the speed of the sprayer and the flow, pressure and area sprayed: check…

- they are in good condition and properly maintained
- they are frequently calibrated for accuracy, leaks, blockages, variations in pressure or any minor damage during spraying

Routine Maintenance

The following checks should be carried out routinely:

- All hoses are tightly connected and free from sharp bends; replace cracked or damaged hoses.
- All controls move freely and are fully adjustable.
- Pressure gauge reads zero.
- Pump can be turned over by hand.
- Fan turns freely and is not obstructed; bearings are sound and lubricated.
- Air pressure in pump accumulator (if fitted) is correctly adjusted.
- Drain plugs and clean filters are in position.
- Tires on trailed machines are sound and correctly inflated; wheel nuts are tight.

Sprayer Calibration Instructions

By H. Russell Holze, M&H Apple Farms LLC

The ideal way to calibrate a sprayer would be to lay out an acre of orchard and directly measure the solution sprayed. However, the measurements outlined below give an easy way to calibrate. In summary, first we measure the sprayer's output volume for one minute, then measure the area that will be sprayer will cover in one minute, and then adjust up to the equivalent of one acre sprayed, and you will know your gallons per acre:

1) Fill the sprayer with water and spray for one minute….refill and measure water. The sprayer does not have to be moving to measure water sprayed. Record the gallons sprayed out.

2) Set the tractor and sprayer in motion and measure the distance in feet traveled in one minute. If this number is greater than 350 pick a slower speed and re-do measurement. 350' per minute = 4 mph, sprayer speeds in the range of 2.5 – 4.0 mph result in better coverage.

3) Measure row width in feet.

4) Multiply (2) by (3) to determine square feet (area) sprayed in one minute.

5) Divide 43560 by the answer in (4). This number should be between 5 and 10.

6) Multiply (1) by (5). This is your gallons of solution sprayed per acre.