

Efficient and Effective Application of Pesticides

When developing an integrated pest management strategy, it is important to know the target pests, their economic threshold levels, and multiple control strategies that can minimize pesticide inputs. However, in many cases, pesticides need to be applied as a last resort to reduce pest infestations and optimize crop production. Accurate application rates and effective pest control can be difficult to maintain with poorly maintained or incorrectly calibrated sprayers.

Calibration is an efficiency tool often overlooked and under used by many producers. Over time, all types of nozzles are impacted by wear and tear, and the nozzle orifices get bigger, increasing the desired or calibrated output. Uneven wear can lead to poor spray patterns and uneven control or even crop damage within a field. Calibrating a sprayer a couple of times a season, under heavy usage, can allow a producer to be more accurate with application rates, waste less chemical and get the desired pest control. This not only saves the producer money but shows due diligence when it comes to environmental stewardship.

In many cases, weed escapes and crop damage can be traced back to application errors and extremes in environmental conditions. For example, a poorly calibrated sprayer that over applies a herbicide, like atrazine on corn, can lead to increased carryover effects in sensitive rotational crops the following year, especially when applied during a dry growing season.

Before calibration is begun, make sure the tank and hoses on the sprayer are clean of residues and excess spray from any previous applications. Residues left in the tank can severely impact the efficacy of any product and can also adversely affect crop safety. A sprayer that has multiple uses should be cleaned very carefully. Herbicide residues can cling to the inside of a plastic spray tank and water rinses will not completely remove them. If an insecticide is placed in this tank, the nature of most insecticides will lift the herbicide residues from the tank wall and put them in the spray solution. Crop damage has been noted on crops like soybeans that were being treated for flea beetle where the sprayer had previously applied MCPA and was not cleaned properly.

Once properly cleaned, calibration should begin by measuring the time it takes a tractor, with a half tank full of water and with the P.T.O. running at a desired rpm, to travel 50 meters. This should be done at least three times with an average time taken. In a stationary position, using the same rpm, adjust the pressure gauge on the sprayer to the desired target pressure. Measure the output (ml) from each nozzle by collecting the output of water for the same number of seconds it took to travel 50 meters. Replace any nozzles that are more than 10 per cent off of the average of all the nozzles.

To calculate the total calibrated output, divide the average output per nozzle by the distance in meters between the nozzles and then multiply by a 0.2 conversion factor to get liters per hectare (L/Ha). Here is the proper calculation: $\text{output/nozzle (ml) nozzle spacing (m)} \times 0.2 = \text{L/Ha}$. If you prefer to work in liters per acre (L/ac), simply multiply by 0.4. ($\text{L/Ha} \times 0.40 = \text{L/acre}$) For a more detailed explanation refer to the General Pesticide

Safety Manual (Nova Scotia Department of Environment and Labor) which is used as a reference book for the Nova Scotia Pesticide Applicators Certification exam.

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