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Sprayer Calibration Using the 1/128th Method for Handheld Spray Gun Systems

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Calibrating spray equipment is an important step in applying crop-protection chemicals to a targeted area. Proper calibration will help ensure accurate spray coverage (usually measured in gallons per acre, or GPA). The 1/128th method of sprayer calibration is a simplified way to calibrate most hand spray systems. It is based on the ratio of 1 gallon, or 128 fluid ounces, to 1/128th of an acre, or 340 square feet (sq ft).

The 1/128th calibration method is a fast, easy way to compute the gallon-per-acre rate (GPA). Under-application of crop-protection chemicals can result in pest-control and pest-resistance issues. Over-application of crop-protection chemicals can lead to human, legal, and environmental issues and crop injury, i.e., phytotoxicity. It is important to know the calibrated spray volume (GPA) and the amount of pesticide to be mixed with that calibrated spray volume to accurately apply crop-protection chemicals. Always read the pesticide label and follow its instructions.

Simplified 1/128th Calibration Conversions

128 fluid ounces = 1 gallon

1 fluid ounce = 1/128th of a gallon

340 sq ft = 1/128th of an acre

Based on the 1/128th calibration method, each ounce of water collected during calibration corresponds to 1 gallon of spray mix per acre.

1 fluid ounce collected → 1 gallon per acre (GPA)

This 1/128th calibration method requires almost no calculations. The number of fluid ounces of spray mix you apply to a 340 sq ft area corresponds to the estimated number of gallons of spray mix per acre. The accuracy of delivery is only as good as the consistency of application in the test area.

Key Spray Variables to Consider for Spray Gun Application

- Properly maintained spray equipment
- Spray pump pressure
- Spray nozzle pressure; e.g., length and size of hose
- Spray aperture setting
- Spray nozzle orifice size
- Target pest
- Pest incidence
- Crop height
- Crop density
- Wind speed, direction
- Field terrain; e.g., slope, weeds, etc.
- Sprayer's walking speed; e.g., energy level, arm motion, etc.

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Calibrating Your Sprayer Gun Using the 1/128th Calibration Method

Step 1

Measure a test area equal to 1/128th of an acre (340 sq ft) (Fig. 1a, b). Example: It may be 18.5 ft by 18.5 ft or 10 ft by 34 ft. (Fig. 1c). Note that you do not need to use the exact dimensions provided in the example above. What is important is to establish a 340 sq ft area, or 1/128th of an acre.

For best results, measuring the area in the field to be sprayed is ideal, as crops vary in height and density. Selecting a good representative crop area for calibration purposes will help ensure that the correct amount of chemical is applied to the actual target area.

Step 2

Spray water on the plants in a comfortable, consistent motion to get the best spray coverage of the targeted 340 sq ft area (Fig. 2a).

Take into account the height and fullness of the developing crop during calibration (Fig. 2b, c). As plant density increases, it may take more spray volume, a longer time, or both to spray a given area.

Step 3

Measure the time it takes you to spray the targeted area (Fig. 3).


Fig. 1a


Fig. 1b

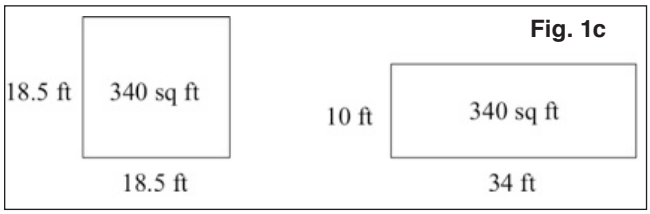


Fig. 1c


Fig. 2a

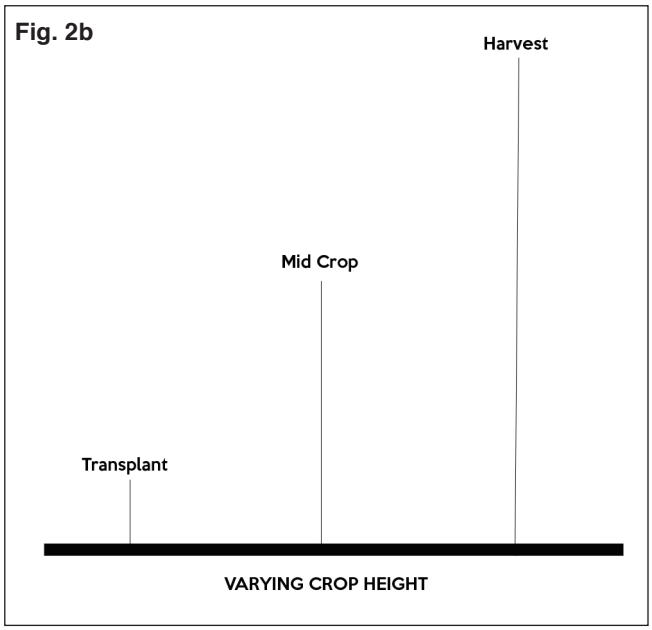


Fig. 2b

Step 4

Repeat Step 3 several times and average the times (Fig. 4). Example: It took an average of 50 seconds to spray the targeted area.

Step 5

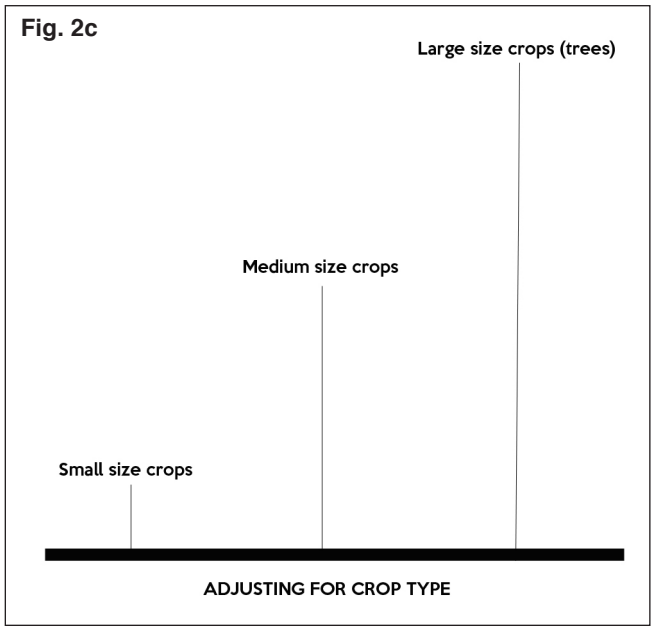
Spray water into a container for the average time it took you to spray the targeted area (Fig. 5a, b). Example: Spray water into a container for 50 seconds, leaving all other spray variables (e.g., spray pressure, nozzle) unchanged.

Step 6

Measure the amount of water collected in fluid ounces (Fig. 6a, b).

Step 7

The amount of water collected in fluid ounces corresponds to your calibrated spray volume in gallons of spray mix per acre. Example: You collected 64 fluid ounces in the time it took to spray the targeted area (340 sq ft). Therefore, based on your calibration, the sprayer output is 64 gallons per acre, or 64 GPA (Fig. 7).



Summary

Proper sprayer calibration is an important step in overall pest management. A change in one aspect of pesticide application (e.g., spray pressure, nozzle type, walking speed, etc.) can drastically influence the results. Spray equipment should be recalibrated at the beginning of each application, as conditions often change. A change in the person spraying, for example, can also affect calibration.

Knowing how much product is applied to your crop is essential. Under-applying chemical products can result in poor pest control and increased pest resistance, as well as increased production costs and financial losses; over-application of chemical products can lead to problems with human health, legal issues, or environmental and crop injury concerns such as phytotoxicity. Remember, always read and follow the label of the pesticide you are applying. For more information, contact the Hawai'i Department of Agriculture Pesticide Branch or the UH CTAHR Extension Service.

Note on Measurements

We use fluid ounces, gallons, ounces, pounds, etc. to correspond with pesticide labels.


Fig. 6a

Fig. 6b

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Fig. 7