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Boom Sprayer Calibration Made Easy with an Excel Spreadsheet Program

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Boom Sprayer Calibration Made Easy with an Excel Spreadsheet Program

Abstract

The tool described here is an Excel spreadsheet that is designed to make the computations of boom sprayer calibration easier. Mathematical and human errors are serious concerns in conducting an accurate calibration. The program smoothes out all the bumps so all the operator needs to do is gather the data and enter it into the program. Any adjustments when a nozzle is replaced and re-tested are automatically re-calculated by the program.

Keywords: [calibration](#), [boom sprayer](#), [spreadsheet](#), [sprayer calibration](#), [calibration tool](#)

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Introduction

Public awareness, heightened by media attention, has increased the need for producers to be more exact in their chemical applications. Recent economic conditions have also increased chemical and application costs. These facts help to stress the importance of regular and accurate boom sprayer calibration.

There are several causes for improper chemical application, two of them being:

- Lack of, or inaccurate, sprayer calibration procedures, and
- Mathematical errors in the calibration process.

Boom sprayer calibration should occur at least annually, more frequently for high-use equipment. Records should be kept each time the equipment is calibrated.

Numerous fact sheets address the calibration process and the formulas that should be used. However, they are not extremely helpful for someone who is mathematically challenged—especially if the process needs to be repeated. Beard and Deer (2001) provide some handy charts to "reduce the need for math calculations." Even this method can be cumbersome and does not eliminate all the mathematical calculations needed. Additionally, doing the calculations manually, or looking up values in tables and charts, increases the

opportunity for error and adds greatly to the amount of time spent on the calibration process.

Program

Calibrating a boom sprayer is a tedious process. However, it is critical for proper and uniform chemical application.

- Timed volumes need to be collected from each nozzle.
- The average spray volume and the variation of each nozzle from the average spray volume need to be calculated. As a rule of thumb, the variation of any nozzle should not exceed 10% over or under the average of all the nozzles.
- Every nozzle that is replaced or cleaned will affect the average volume, so the calculations should be done again.
- Each re-calculation presents the opportunity for mathematical error.
- Calculated spray volume per acre is also needed to mix the proper formulation in the tank.

The Boom Sprayer Calibration Spreadsheet was designed to ease the mathematical burden of boom sprayer calibration. The first worksheet of the program provides detailed instructions. Timed measurement from all the nozzles is collected and entered into the program. Worn or clogged nozzles are identified and replaced or cleaned. Once worn or clogged nozzles have been replaced or cleaned, another timed measurement for those nozzle(s) is performed, and the information is entered into the program. The program re-calculates and provides updated information. All producers need to do is collect the data and enter it into the spreadsheet. There is a separate worksheet for either ounces or milliliters.

In addition, by entering the effective spray width of the boom sprayer and the time it takes to move 200 feet, the program will also calculate the time it takes to cover one acre and how many gallons are applied per acre.

There are five pieces of information that need to be entered into the program for the calculations:

- Length of collection time in seconds (same for each nozzle)
- Number of nozzles tested
- Total boom sprayer width

- Time (in seconds) required to travel 200 feet with the spray rig

Conclusion

This Excel spreadsheet program described here is a practical tool to help reduce the tedium of, and possibility of mathematical errors in, the calibration process. Many people now have laptop computers they use for production management, so it would be an easy step to include the Boom Sprayer Calibration Spreadsheet into the toolbox. There are two versions of the spreadsheet, one for small boom sprayers (20 nozzles or less) and one for large boom sprayers (up to 120 nozzles). The spreadsheet can be downloaded at http://extension.usu.edu/carbon/gardening_horticulture/sprayer_calibration.

Reference

Beard, F. R., & Deer, H. (2001). Calibration of boom sprayers using charts to reduce math calculations. *Journal of Extension* [On-line], 39(1) Article 1TOT6. Available at:
<http://www.joe.org/joe/2001february/tt6.php>

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