CALIBRATION

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Proper calibration of both pesticide application equipment and fertilizer applicators is necessary to ensure that the intended amount of product is actually applied. This is especially important with pesticide sprayers to avoid potential crop injury from over application, to apply sufficient product to affect the target organism, and to avoid the added expense of over application.

Sprayer Calibration

The most convenient sprayer calibration procedure is the "1/128th acre" method. The basic principle is to determine the calibration distance to cover 1/128th of an acre based on the spacing of the spray tips. 1/128th of an acre is chosen because there are 128 oz. in a gallon and this allows for an easy determination of the application rate in gal. per acre with a measured output in ounces.

1/128th of an acre Calibration Procedure

1. Determine the calibration distance to travel according to nozzle spacing from the chart below.

2. Record the travel time over the calibration distance with equipment attached and operating in appropriate field conditions at the desired speed.

3. Collect spray material (water) from a nozzle for the amount of time from step 2. Operate sprayer with the same engine speed as used to determine travel time and the desired sprayer pressure.

Ounces collected per nozzle = gal. per acre

Calibration Distances for Various Nozzle Spacings

Spacing	Distance	Spacing	Distance
10 in.	408 ft.	30 in.	136 ft.
12 in.	340 ft.	36 in.	113 ft.
16 in.	255 ft.	40 in.	102 ft.
18 in.	227 ft.	42 in.	97 ft.
20 in.	204 ft.	44 in.	93 ft.
22 in.	186 ft.	46 in.	89 ft.
24 in.	170 ft.	48 in.	85 ft.

Example – For a broadcast boom with a nozzle spacing of 22 in. the calibration distance is 186 ft. The travel time with the sprayer in the field is found to be 32 seconds. Twenty five ounces of water is collected from one

nozzle for 32 seconds at the desired pressure so the application rate is 25 gal. per acre.

Note 1: When more than one nozzle is used per row with over-the-top applications such as sucker control and insecticide sprays, collect the output from each nozzles per row and combine for a total for the row (this is not a banded application). The nozzle spacing is considered to be the row spacing.

Note 2: For banded applications use the width of the spray band as the nozzle spacing. For example, with a 20 in. band with 48 in. row spacing, the travel distance is 204 ft. The treated acreage will be 42% of the acreage actually traveled (20 in. divided by 48 in. times 100).

Note 3: Transplanters may be calibrated using the 1/128th acre method. Pull the transplanter through the field and record travel time for the calibration distance based on transplanter row spacing, operating at the desired speed. Collect setter water from each unit for the corresponding travel time to determine application rate (ounces collected = gal/ac for setter water application rate).

Note 4: Although the output of individual spray nozzles is collected to determine application rate, the output of multiple nozzles should be collected and compared to each other to verify the uniformity of the spray application. Replace any spray tip that is more that 10% off the average of all the nozzles.

Greenhouse Sprayer Calibration Procedure

1. Determine the appropriate distance to travel for calibration according to nozzle spacing on boom.

Nozzle Spacing	Calibration Distance
12 in.	78 ft.
14 in.	67 ft.
16 in.	59 ft.
18 in.	52 ft.
20 in.	47 ft.
22 in.	43 ft.
24 in.	39 ft.

2. Determine calibration time to travel the distance in Step 1.
3. Collect output from one nozzle for the calibration time.
4. Divide the number of ounces collected by 10 to obtain application rate in gal. per 1000 sq. ft.

Since greenhouse spray booms are typically pushed by hand, it is important to choose a pace that is easy to maintain and duplicate.

Example – A 35 x 250 ft greenhouse (8750 sq. ft) is sprayed with a traveling boom having a nozzle spacing of 20 in. The calibration distance is 47 ft. and the travel time is determined to be 3 min. 45 sec. Water is run through the boom at the desired pressure and 54 oz. is collected from one nozzle. The application rate is 54 / 10 or 5.4 gal. per 1000 sq. ft.

Calibration of Fertilizer Application Equipment

Accurate application of the desired amount of fertilizer is essential to supplying the proper nutrition to a tobacco crop. Proper calibration of application equipment will better ensure that the proper amount of fertilizer is applied. The "1/100 acre" method is one the easiest calibration procedures and does not require calibration charts and calculations.

1) The first step is to determine the appropriate calibration distance based on your row spacing.

Row spacing	Calibration distance
48 in.	109 ft.
46 in.	114 ft.
44 in.	119 ft.
42 in.	124 ft.
40 in.	129 ft.
36 in.	134 ft.
32 in.	139 ft.

2) Collect fertilizer from the applicator over the calibration distance and weigh the fertilizer.

3) Multiply the amount of fertilizer collected times 100 to obtain the fertilizer application rate (lbs/acre).

With two outlets per row, fertilizer should be combined to obtain the application rate for the row.

Fertilizer should be collected separately from each row to determine the actual rate of each row.

Example - With a row spacing of 46 inches the calibration distance in 114 feet. If 7.25 lbs. of fertilizer is collected from both outlets of a row applicator then the application rate is 7.25 times 100 or 725 lbs/acre.

Individual rows of 2- or 4-row applicators should be within a 10 percent range of the intended rate. In the above example with 725 lbs/acre, an acceptable range would be 690 to 760 lbs/acre. Differences between rows

become more important with higher nitrogen fertilizers (8-8-24 vs 6-6-18) or when applying nitrogen sidedress fertilizers.

Plant Population Chart (plants per acre)

Plant Spacing (in.)	Row Spacing (in.)					
	36	**40**	**42**	**44**	**46**	**48**
16	10,890	9,801	9,334	8,910	8,523	8,168
17	10,249	9,225	8,785	8,386	8,021	7,687
18	9,680	8,712	8,297	7,920	7,576	7,260
19	9,171	8,254	7,860	7,503	7,177	6,878
20	8,712	7,841	7,467	7,128	6,818	6,534
21	8,297	7,468	7,112	6,789	6,493	6,223
22	7,920	7,128	6,789	6,480	6,198	5,940
23	7,576	6,818	6,493	6,198	5,929	5,682
24	7,260	6,534	6,223	5,940	5,682	5,445
25	6,870	6,273	5,974	5,702	5,454	5,227
26	6,702	6,031	5,744	5,483	5,245	5,026
27	6,453	5,808	5,531	5,280	5,050	4,840
28	6,223	5,601	5,334	5,091	4,870	4,667
29	6,008	5,408	5,150	4,916	4,702	4,506
30	5,808	5,227	4,978	4,752	4,545	4,356

For example: With a row spacing of 48 in. and a spacing of 22 in. between the plants within the row -- the plant population is 5940 plants per acre.