

AERIAL SPRAYING RULES OF THUMB

By Dr. Dennis Gardisser

Doubling diameter of a droplet increases water content 8 times – not really a ROT I know, but I think the regular person would say it doubles.

Droplet volume change is a cube root function. 2 x bigger is $2 \times 2 \times 2$ or 8 times larger.

3 times is $3 \times 3 \times 3$ or 27 times larger volume

Main idea: any relative change in volume may be cubed to get the difference in water volume in a droplet size.

If nozzles under the belly – $\frac{1}{2}$ as many spacing works.

If regular spacing is 12" can do 24" under the belly

Use $\frac{1}{2}$ as many nozzles under the belly of the aircraft as along the boom. These nozzles should be biased toward the torque side. On a 502 for example: one on far right side, one just left of the tee section, and the third would be $\frac{1}{2}$ way between these two – for a right hand torque aircraft.

Dominant tool to control droplet size is....

Pressure is dominant up to ~ 120 mph

Speed /Air shear is dominant in airplanes flying faster than 120.

But Air shear, nozzle angle, is the best tool to change droplet size at any speed.

Does your spray system have a Smiley face?

The idea is to get the nozzles out of the prop wash effect as much as possible. Start dropping the nozzles just behind each main gear tire and continue to lengthen the drops moving toward the center of the aircraft. This will form a smiley face shape under the belly. Center nozzles should be as low as operational factors, grass, rocks, etc., allow.

Optimum spray release height for fixed wing aircraft

NASA studies indicate minimum optimum droplet release height for fixed wing aircraft = 25% of Wingspan; 50 foot wingspan = 12 feet.

Minimum operating pressure

Should be ~ 30 psi to make sure all diaphragms are opening properly and not restricting flow.

Crosswinds have an effect on spray swath width.

For winds less than or equal to 5 mph – no change is really needed.

For winds above 5 mph – reduce swath width by 1 foot for each 1 mph above 5.

ie. If normal swath is 60 feet at 5 MPH or less then utilize 55 mph at 10 MPH.

Use same technique for dry materials, but... break point is at or above 10 mph instead of 5 mph.

Nozzle outlets and end of the booms

On the end of the boom – every inch that the nozzle outlet is dropped (in relation to the trailing edge) is equal to a 3 inch shorter boom in terms of drift potential, within reason of course.

Once below ~ 22 inches the gain gets less and less effective.

Do the nozzles need replacing

A reasonable way to determine if a nozzle is worn enough to need replacing is if the nozzle's flow has increased 10-20%. Flat fans will wear faster than others because the initial orifice is an elliptical shape and wear will change the orifice in the outer edges.

Calibration Clinic Preparedness

Watch this video on the NAAA website on tips of how to be ready for calibrating your plane
<http://www.agaviation.org/content/operation-safe>

Some thoughts on legal encounters:

Dennis has appeared in court numerous times as an Expert Witness in Aerial Application cases. Here are a few of his notes based on this experience.

If you use smoke as an indicator of wind direction and speed

But if you do not write it down – it never happened!

If you accept a job on one day but postpone it

For some # of days to wait for optimum weather but do not write that on the record sheet – it never happened!

They will say you were just too busy to get to it since you probably did jobs in between.

Records should stand alone and tell the story of any application

Without the applicator having to add facts verbally.

Don't be afraid to say no

This might just allow you to keep some profits at the end of the year.
One mistake can eat up all profits!

About this material

Over the years Dennis has done many presentations which I have learned a great deal from. I always come away with a quick reference or a Rule of Thumb, if you will. I asked Dennis to compile a list of these Rules and he gratefully obliged and allowed me to share this material with you.

Updated: February 2017 following NAAA convention



Written by:

Dennis R. Gardisser
WRK of Arkansas LLC
153 92nd W
Lonoke, AR 72086
(501) 676-1762
(888) 806-1924 fax
dgardisser@wrkofar.com
www.wrkofar.com

Provided to you by:



We're There to Keep You in the Air