



Oregon State Legislature
House Committee on Agriculture and Natural Resources
Chairman Brian L. Clem
900 Court Street NE, Room 347
Salem, Oregon 97301

Dear Committee on Agriculture and Natural Resources:

As an aerial applicator, a member of Oregon's robust agriculture industry, I am writing regarding your upcoming hearing on HB 3044 and to inform you of some facts regarding aerial application. This bill unfairly singles out the aerial application industry and is contrary to the latest science and data showing aerial application is a safe, efficient, and invaluable component of the state's agriculture industry.

According to the National Pesticide Applicator Certification Core Manual, spray drift is most impacted by spray droplet size and wind speed and direction. Aerial applicators have the ability to adjust, monitor, and compensate for these factors to a degree equal to if not better than any other type of application.

Aerial applicators can control droplet size through the careful selection of nozzle type, nozzle orifice size, deflection angle, boom pressure, planned airspeed, and other factors that are well known to determine droplet size.

Agricultural aviators are experienced in the use of USDA-ARS Aerial Application Technology Research Unit's spray-nozzle models and AgDISP to assist in setting up their aircraft to minimize drift. The figure below shows an example of the spray nozzle model used to find a nozzle set up that creates an Ultra Coarse droplet spectrum – the largest category in ASABE S572.1 Droplet Spectra Classification Standard.

**USDA ARS Aerial Application
Technology Research Unit High Speed
Spray Nozzle Models**



**STEP 1: SELECT NOZZLE
MODEL USING PULL DOWN
MENU**

CP11TT Straight Stream

VALID FOR AIRSPEEDS FROM 120 to 180 MPH

Aerial Application Technology Research Unit, Agricultural Research Service, U. S. Department of Agriculture, 3103 F&B Road, College Station, TX 77845, USA.

STEP 2: SELECT NOZZLE OPERATING PARAMETERS FROM PULLDOWN MENUS BELOW.

Acceptable Ranges:	Orifice Size 6 to 25	Nozzle Body Angle 0 to 45	Pressure 30 to 90 psi	Airspeed 120 to 180 MPH
	<input type="text" value="8"/>	<input type="text" value="0"/>	<input type="text" value="90"/>	<input type="text" value="130"/>

CAUTION: Do not enter or clear data in the cells in this box!

D_{V0.1} = 318	µm	= Droplet size such that 10% of the spray volume is in droplets smaller than D _{V0.1} .
D_{V0.5} = 769	µm	= Volume median diameter. Droplet size such that 50% of the spray volume is in droplets smaller than D _{V0.5} .
D_{V0.9} = 1462	µm	= Droplet size such that 90% of the spray volume is in droplets smaller than D _{V0.9} .
RS = 1.49		= Relative Span
%V<100µm = 0.01	%	= Percentage of spray volume in droplets smaller than 100 µm diameter.
%V<200µm = 0.89	%	= Percentage of spray volume in droplets smaller than 200 µm diameter.
DSC_{V0.1} = ULT. COARSE		= Droplet Spectra Classification based on D _{V0.1} .
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Aerial applicators routinely participate in Operation S.A.F.E. (Self-Regulating Application and Flight Efficiency) fly-in clinics to evaluate their aircraft set-up, nozzle selection and calibration, boom adjustment, and application efficiency. A fluorometric analysis system is used to measure the spray pattern of the aircraft to verify it is uniform and not releasing spray in a manner that could contribute to drift. Water sensitive paper and a special software is used to measure the spray droplet size to verify it meets the label requirements of the pesticide being applied in a manner that mitigates drift and ensures efficacy.

Agricultural aircraft, like all other aircraft, produce wake vortices and downwash during flight. These wake vortices and downwash move air down and away from the aircraft as it flies. The spray released by an agricultural aircraft is moved in this air down into the target canopy. Thus, by forcing spray with the downward moving air, the downwash of an agricultural aircraft helps to both increase efficacy and mitigate drift.

Additional drift mitigation can be achieved by reducing the length of the boom compared to wingspan. This occurs because the outer edges of the wake vortices commonly referred to as wing tip vortices, produced during flight are spiral in nature and can entrap small spray droplets and propel them into the air instead of pushing them down towards the target. Agricultural aircraft have a boom shorter than the wingspan (or rotor diameter for helicopter) to avoid releasing spray in wingtip vortices. Current research indicates that for certain pesticides and aircraft setups used to apply them, reducing the length of the boom more than the standard amount can further remove spray from these wingtip vortices. AgDISP modeling and drift field trials demonstrate boom length reduction can reduce drift a minimum of 30 percent. The results of this research were distributed in the PAASS program in 2017-2018. The preliminary results from the NAAA's 2019 industry survey show 54 percent of aerial applicators reduce boom length when needed as a drift mitigation technique.

Another drift mitigation technique involving the boom is half boom shut-off. Depending on the direction in which the propeller spins, either the right hand or left had of the boom is shut off entirely. The spinning action of the propeller creates a "fence" of air that prevents spray from "moving beyond that. Half boom shut off are commonly used when applying to the edges of fields adjacent to sensitive areas.

Aerial applicators also examine various aspect of the pesticide formulation and other components of the spray solution to determine the impact on drift. Drift reduction additives are commonly used to further increase droplet size. The preliminary results from the NAAA's 2019 industry survey show that 90 percent of agricultural aviators uses drift reduction additives. Aerial applicators consider the volatility of the pesticide formulation to be used and whether adjuvants and surfactants are included, which can affect droplet size and rate of evaporation.

Furthermore, aerial applicators have the ability to monitor weather conditions in the cockpit. A smoker injects a small amount of vegetable oil into the aircraft exhaust system that creates smoke, allowing the pilot to determine, by observing smoke movement, the wind direction and an estimate of wind speed. Inversions can be detected by observing vertical smoke movement. The Aircraft Integrated Meteorological Measurement System (AIMMS) provides real-time onboard weather data, including wind speed and direction, temperature, and humidity. The atmospheric data collected by AIMMS is then synchronized with the GPS unit, along with the droplet size data. This enables the pilot to take into account outside wind speed and direction when making every pass, resulting in an even more precise application.

The preliminary results from the NAAA's 2019 industry survey show that 88% of agricultural aviators use smokers to determine wind speed and direction, 69% use smokers to monitor for inversions, and 8% of agricultural aircraft have AIMMS, which highlights aerial application's ability to continuously monitor wind speed and direction and adjust applications as needed throughout the actual application process. Additionally, preliminary results indicate that an aerial applicator uses an average of 8.3 methods to mitigate drift.

Our agricultural aircraft use precise, differentially corrected GPS units to make accurate applications. GPS is used for swath guidance, tracking of the application, and record keeping. These GPS are capable of determining the aircraft's position 20 times per second with an accuracy of less than 1 foot. GPS can be used to automatically turn the spray off when the aircraft enters an area to be excluded from application. The ability to record the application means the pilot can stop the application if weather conditions deteriorate and return later to finish the application. Flow control systems are used to monitor and control the flow of spray from the aircraft. They use data from the GPS to ensure the targeted application rate is applied uniformly across the entire field. Flow control systems are also used for dry applications.

Finally, the Professional Aerial Applicators Support System (PAASS) in an educational program designed specifically for aerial applicators offered annually. One of four hour-long modules is Environmental Professionalism, dedicated to discussing how to make on-target applications. Nearly 100 percent of NAAA's member pilots also participate in the PAASS program to learn positive steps to learn the best techniques to mitigate drift.

In closing, all crop protection products undergo a rigorous federal registration process to ensure the public's safety and are specifically tested to ensure safe aerial applications. There are numerous existing technologies to mitigate off-target drift, and this bill has no scientific basis. I respectfully request the committee reject this legislation.

Respectfully,

Carl Hagglund;operator

CC: Vice-Chair Susan McLain
Vice-Chair Sherrie Sprenger
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PO BOX 734
Madras, OR 97741

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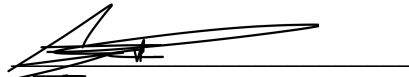
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Respectfully,



Chris A. Tatro, Owner/Pilot
CAT-AG Aviation, LLC

CC: Vice-Chair Susan McLain
Vice-Chair Sherrie Sprenger
Representative Greg Barreto
Representative Sal Esquivel
Representative Caddy McKeown
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Respectfully,

John P. Walther

CC: Vice-Chair Susan McLain
Vice-Chair Sherrie Sprenger
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Representative Sal Esquivel
Representative Caddy McKeown
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Representative Brad Witt

From: [Mary Johnson](#)
To: [Exhibits_HNR](#)
Subject: Opposing bill HB 3044
Date: Friday, March 22, 2019 2:56:54 PM

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John W Shearer
Shearer Sprayers Inc

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