

with 10% of the volume under this value  
DVO.5: Diameter of the droplets with 50% of the volume under this value  
DVO.9: Diameter of the drops with 90% of the volume under this value

When the values for VMD and NMD are very similar, this confirms excellent uniformity of the droplet size. The value Dvo.1 is a good indicator for the risk of drift, when this value is under 100 microns there is a high risk of spray drift. On the other hand when the value for Dvo.9 is very high [above 400 microns for fungicides and or insecticides] the application is very inefficient and will give poor crop penetration.



Wilhelm Froese, [Owner] Alan McCracken, John Dueck,[pilot] Benny Dueck [pilot] in their hangar beside their new Air Tractor AT-402B equipped with ASC Rotary Atomizers.



Photo taken using a GroPro camera attached to the end of the spray boom of the AT-402B applying fungicides to corn. This photo clearly illustrates that no sign of any product entering the wingtip vortices, confirming that the atomizers were installed in the correct position.

# McCracken evaluates Mexican AT-402B spray pattern

by Alan McCracken

The following is a report on a recent visit to the region of Cuauthemoc, Chihuahua Mexico to provide technical support to Benny Dueck for operation of their new Air Tractor AT-402B with the company Bodegas Graneleras.

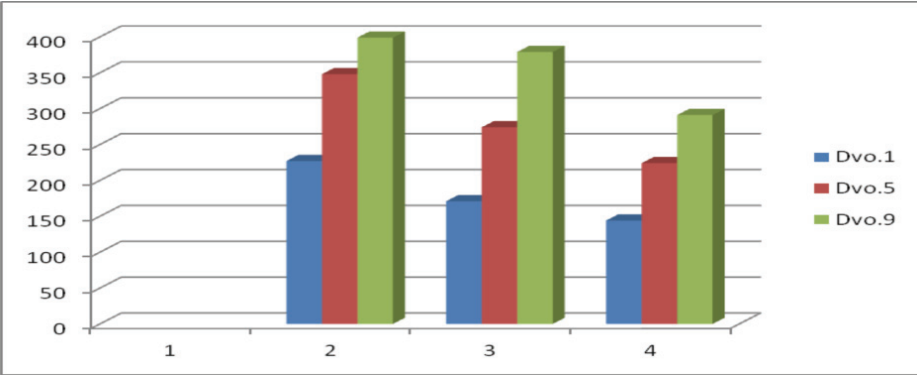
When most people hear the name Chihuahua, they think of the smallest breed of dog. However, Chihuahua is a state in Mexico with a colorful history of Spanish, French and American occupation. The region of Cuauhtémoc is a beautiful open plain famous for apple production and more recently the production of corn utilizing the latest technology complete with irrigation and agricultural aircraft for the control of pests and diseases. It is the third largest city of the state at an altitude of over 6400 ft MSL and is located 103 km (64 mi) west of the state capital. Most of the modern

farming is conducted in various Mennonite colonies surrounding the city.

This report deals with a technical visit to calibrate an AT-402B, sold by Lane Aviation and to determine the optimum settings for the ASC Rotary Atomizers supplied by Encap-it. A number of flight tests were made to evaluate the droplet spectrum with emphasis on obtaining a narrow droplet spectrum with a

minimum of very small droplets that could be lost to drift and also a minimum of large droplets that result in poor crop coverage.

The world of agricultural aviation is like an extended family for me since I had previously met John Dueck during one of my regular visits to Bolivia where I regularly train agronomists and pilots on how to obtain better results using lower spray volumes. John solicited my help



Results of tests made using the ASC Rotary Atomizers. Graph showing the effect of blade angle 2,3 and 4 on droplet size: Volume 20 liters/hectare [water]

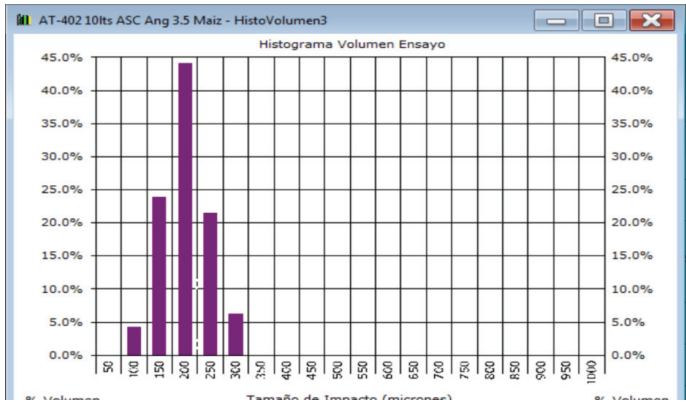
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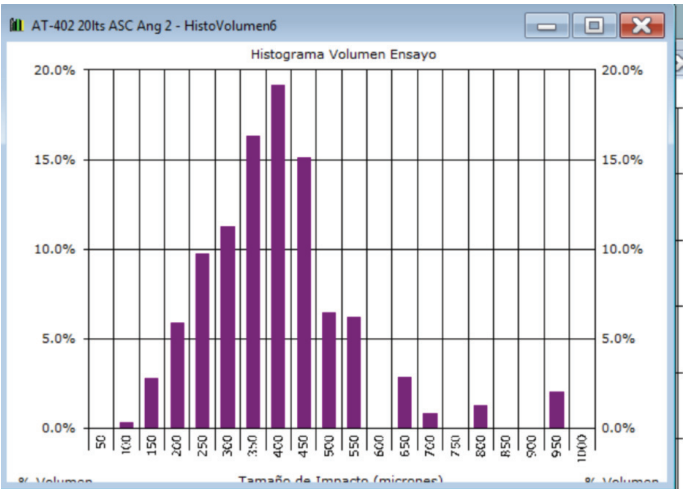
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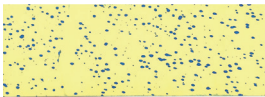


Water, ASC blade angle at 3.5, 10 liters/hectare. Droplet size distribution by % VMD: 122.

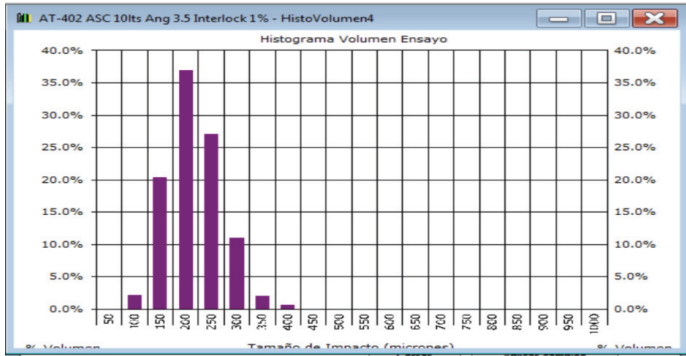
Observation: Note the uniformity of the spray droplets with no droplets under 100 microns and also nothing over 350 microns.



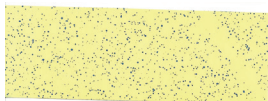
AT-402B — ASC blade angle 2, 20 liters/hectare. Droplet distribution by % VMD: 222 microns.



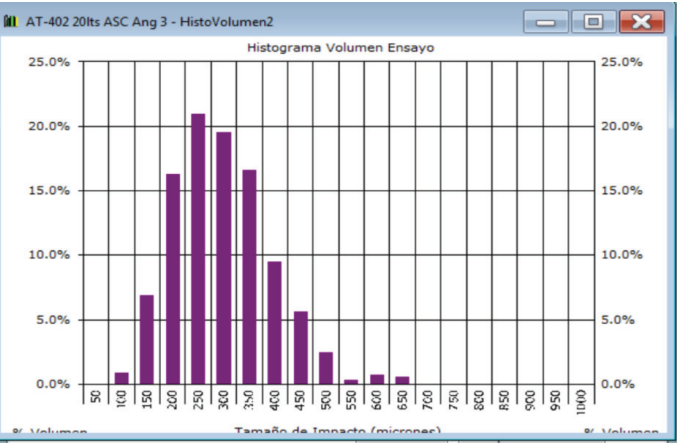
Example of deposit on cards. Observe the large droplet size however still good uniformity. Excellent for the application of herbicides with a minimum risk of drift.



Water + Interlock @ 1%, ASC blade angle 3.5, 10 liters/hectare. Droplet distribution by % VMD: 147 microns.

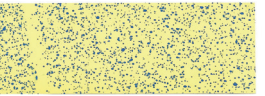


Example of deposition Observation: The addition of Interlock reduced the % volume of very small droplets in the range of 150 and 100 microns indicating that the product could have potential for reducing drift. Note the uniformity of the spray droplets with only a minimum % of volume under 150 microns and also nothing over 400 microns.



AT-402 with ASC atomizers: 20 liters/hectarea. Blade angle.3 Droplet size distribution:VMD:191 microns

Observations: Excellent distribution and uniformity considering the high volumes, with 80% of the spray volume in droplets between 150-350 microns. It is also dramatic in that only about 1% of the spray volume collected was in droplets of under 150 microns.



Example of droplet deposition:

for this Menonite project in Cuauhtemoc in Mexico since he knew of my experience in obtaining consistent good results using lower volumes of water. As all pilots are aware conducting spraying operations at altitudes over 6500 feet MSL presents a number of challenges and aircraft can operate with greater safety when carrying lighter loads.

Equipment: An Air Tractor AT-402B XB-WFW, Pilot: Benny Dueck

- Flying speed: 140 mph
- Calibration swath width: 24 meters
- Area sprayed per minute: 140 x 24 /373 = 9.0 hectares/minute
- Flying height: The same for all tests wheels approximately

- 8-10 feet above the ground
- Weather conditions: Dry and sunny with variable medium wind speeds of 4-10 mph, Temperatures 23 --27°C and relative humidity from 35-45%.
- Equipment: 10 ASC Rotary Atomizers mounted under the spray booms.

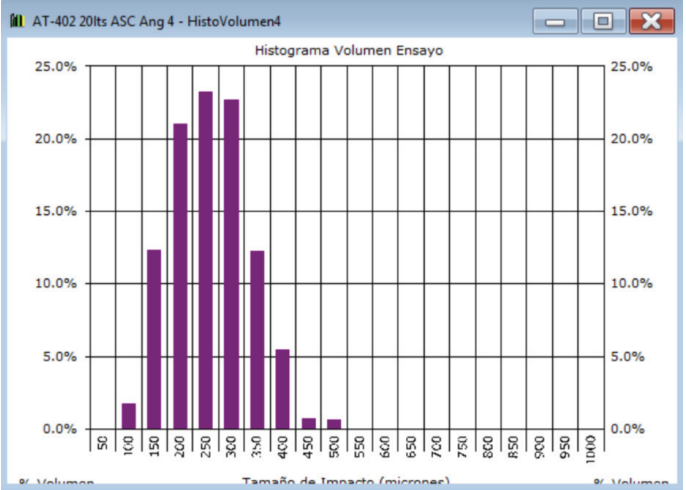
Product: Water was used for all tests

- Droplet collection: Syngenta water sensitive cards 25mm x 75mm at 2-meter spacing mounted at 45 degree angle facing the wind at a height of two feet, with tests being conducted at the end of a runway.
- Droplet Analysis: Conducted using a scanner at 600 dpi and

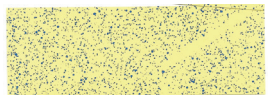
analysis utilizing the program Stainmaster 1.2.7

Observation: With the fan blades at setting 2, the atomizers rotate slowly resulting in the production of larger spray droplets and consequently a lower risk of spray drift. As the atomizer speed was increased the droplet size was reduced as expected. It is worth noting that even with the higher speed at setting 4, the value for Dvo. 1 is still relatively high confirming a low risk of drift.

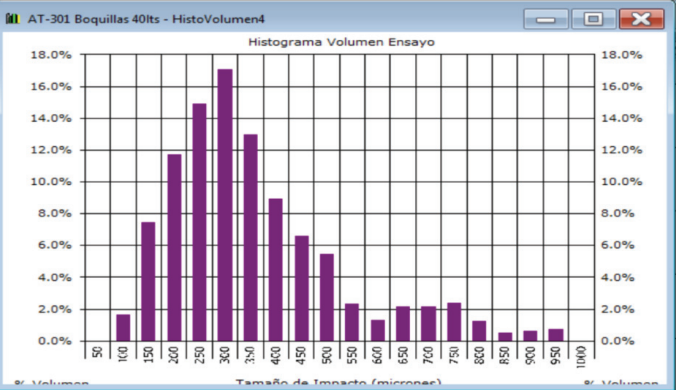
Definitions: NMD: Number median diameter of the drops VMD: Volume median diameter DV0.1: Diameter of the droplets



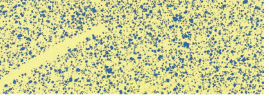
AT-402B — ASC blade angle 4, 20 liters/hectare. Droplet size distribution by % VMD: 161 microns.



Example of droplet distribution on cards;



AT-402B — ASC blade angle 3, 20 liters/hectare. Droplet size distribution by % VMD: 191 microns.



Example of droplet deposition: Observations: Excellent distribution and uniformity considering the high volumes, with 80% of the spray volume in droplets between 150-350 microns. It is also dramatic in that only about 1% of the spray volume collected was in droplets of under 150 microns.