# What can we do to reduce Spray Drift?

By Alan McCracken for Yorkton Aircraft Service Ltd.

Spray drift has been defined in many ways, but is essentially a loss of product from the target area onto neighbouring fields. Rather than attempt to investigate the past my thinking is that we should pay careful attention to the climatic conditions and adjust our spraying practices accordingly.

## The issue with current spray deposition drift analysis

Most researchers follow the current practice of using horizontal water sensitive paper cards for analysis of the droplet spectrum and subsequent computer calculations to determine the actual amount recovered. From a scientific perspective ALL product collected on horizontal collection devices [water sensitive cards or other mediums] in the base of the crop is a measure of the product LOST, resulting in contamination of the soil, except in the case of a herbicide for incorporation. From my perspective we need to consider volumetric air sampling with subsequent chemical analysis or apply a chemical product and then measure the biological impact of spray drift.

## Adjust the droplet size to compensate for losses due to evaporation is a major step in limiting drift

Most operators recognize that when the temperature increases and the relative humidity decreases the spray droplets decrease in size and therefore are more prone to off target drift. An obvious solution is therefore to adjust the droplet size accordingly. Another even more logical solution is to use spray solutions that do NOT evaporate. For this reason many operators like to add oil or other products to ensure that at least part of the spray solution reaches the target.

## Consistentency of results

The majority of agricultural pilots calibrate their equipment for a specific volume and approximate droplet spectrum and keep spraying from early morning until evening without any adjustment. For this reason many farmers lose confidence in aerial application since the spray deposition can vary more dramatically than that of ground equipment due to the increased losses of evaporation due to the flying height.

A number of high tech users of ground equipment have now adopted a similar strategy, spraying very low volumes when cooler and then increasing the droplet size and spray volumes under warmer conditions to compensate for evaporation losses.

### Important to monitor the weather conditions

Today there are several companies that provide quality equipment complete with the capacity to record all relevant data including: temperature, humidity, dew point, evaporation rate, wind speed, barometric pressure. These can be used as guides as to when to adjust the equipment and by how much and also to keep as a reference database.

### Important to adjust equipment

Conventional hydraulic spray nozzles:

a) Install nozzles that produce larger droplet sizes
b) Change the nozzles size to change volumes and droplet size
c) Adjust the angle of the spray nozzles to reduce wind shear as temperature increases-example as in the photos on the next page of the new JARBA system that enables the pilot to change angle during flight
d) Rotary atomizers –ensure that ALL are spinning at the same speed to produce uniform droplet size and reduce the rpm to increase droplet size as evaporation increases. It can be well worthwhile installing a tachometer to monitor and assist in adjusting all to the same rpm

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|  |  |  |
| Small droplets | Medium sized droplets | Large droplets |

e) .

**Adjust aircraft flying speed**

Field observations with various aircraft indicate that high flying speeds provoke increased spray drift due to droplet shatter; this increases the number of small droplets that subsequently evaporate and drift. This has also been documented in some scientific tests that indicate increased problems with droplet shatter in speeds exceeding 125 mph. A practical solution to this problem is to dedicate the slower flying aircraft for those products that could cause problems with off target drift.

## Final Conclusion

Through utilization of modern weather stations an aerial applicator can consistently produce high quality application and continue to spray for many hours per day provided that he pays attention to the weather conditions and adjusts his equipment accordingly.

This has been demonstrated repeatedly in South America where many applicators are applying herbicides effectively with minimal drift and even challenge their grower customers to divide some areas and compare the overall efficacy and economics of aerial application versus ground equipment.

Even though considerable progress has been made all of us who participate in the chemical application business have an obligation to strive for the best in terms of efficiency and economics of crop production.

Alan McCracken