Pesticide Drift Monitoring

An Optical Technology Able to Monitor Pesticide Drift in Real Time

Problematics

Pesticide drift towards houses, nearby fields and streams has been a well-known problem for many years. Even with the present technologies available to reduce this problem, until now it was impossible to monitor pesticide cloud progression in real time and to relate it to time and wind velocity.

An instrument dedicated to the follow-up of a pesticide drift from a tractor or a sprayer system has been developed. Compact, light, affordable and meeting the market's needs, this instrument can be fixed on an automatic orientation device or directly onto the spray bar. It is able to scan fields, take measurements at a distance at several points and establish volume mapping, positioning and relative concentration of the pesticide cloud.

Field Tests

The first field tests were conducted to establish mapping of a pesticide cloud drift in real spreading conditions (see the figure below). The signal caused by the backscatter of water droplets vaporized by nozzles was distinctly noticeable. According to observations, the detected water droplets cloud was stationary for 25 s and its average position was approximately 10 m from the instrument. The figure below emphasizes two spatial drifts of the cloud of droplets starting at t = 35 s and t = 50 s.

The first drift, with its signal's pronounced amplitude, was particularly remarkable. During this drift, the cloud progressively backed away from the sensor at an average velocity estimated at 7 km/h. The peak amplitude of the signal drifted on a distance of approximately 10 m during 5 s.

The second drift, starting at 50 s, was less pronounced, as represented by the lowest value of the signal's peak amplitude shown on the figure below. However, this drift covered a distance of approximately 16 m during 6 s indicating an average velocity drift of about 10 km/h. It should be noted that the drift velocity of the droplets cloud was partly affected by the tractor's traveling speed (8 km/h) and the blowing wind velocity at that moment.

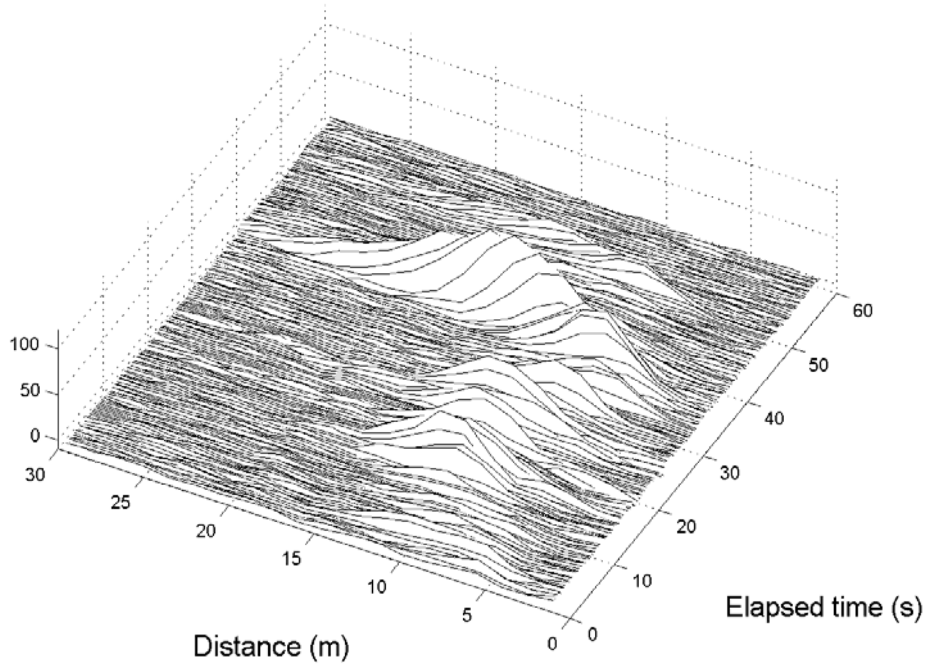

Figure 1: Field tests conducted to establish mapping of a pesticide cloud drift in real spreading conditions.

Conclusion

These results clearly proved the capacity of this technology to detect the drift of a cloud of droplets and to follow its movement on long distances as well as in real time.

Applications for this technology are quite diversified. In the future, it will be possible for various professionals involved in the conception or evaluation of sprayers such as agrologists, engineers, technologists and others, to use that sensor to compare and document the efficiency of different types of nozzles and theoretical models of drift estimation in different conditions. The protection of buffer zones, houses, or cultivated lands from pesticide spreading will be possible, and data from several working days in the fields and orchards will be saved on a USB key.

As soon as a trade agreement and/or technological transfer is concluded, this device will be available on the market.

For more information on this new technology or other INO projects, please visit www.ino.ca