

# **INTERACTION BETWEEN AIR SPRAY DRIFT AND CLIMATIC CONDITIONS CREATING DRIFT MAP RELATED TO THE AERIAL APPLICATION OF PESTICIDES USING LOW VOLUMES IN BRAZIL**

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## **ABSTRACT**

Spraying drift mixtures containing oil can travel over long distances, once the evaporation is reduced. The purpose of this work was to create a map showing the spray drift related to the aerial application of pesticides using low volumes in the Brazilian “cerrado” condition. The map was obtained by the use of passives samples, which recovered the sprayed solution with a chemical tracer dye quantified in lab condition. The method allowed the creation of the map which illustrated the spray drift over the surrounding areas. The spray drift traveled into the wind direction to a distance of 2 km. The absence of the wind during the spray application increased the spray drift.

**Keywords:** spray drift, precision farming, contamination.

## **INTRODUCTION**

Miller (1993) showed an interaction in between spray drift and wind speed. This author also related that a tracer dye can be used to quantify spray drift generated by sprayer’s experiments. Palladini et al. (2005) showed that the acid yellow 23 tracer dye was stable after five hours of solar exposition. The purpose of this work was to create a map showing the spray drift related to the aerial application of pesticides using low volumes in the Brazilian “cerrado” condition.

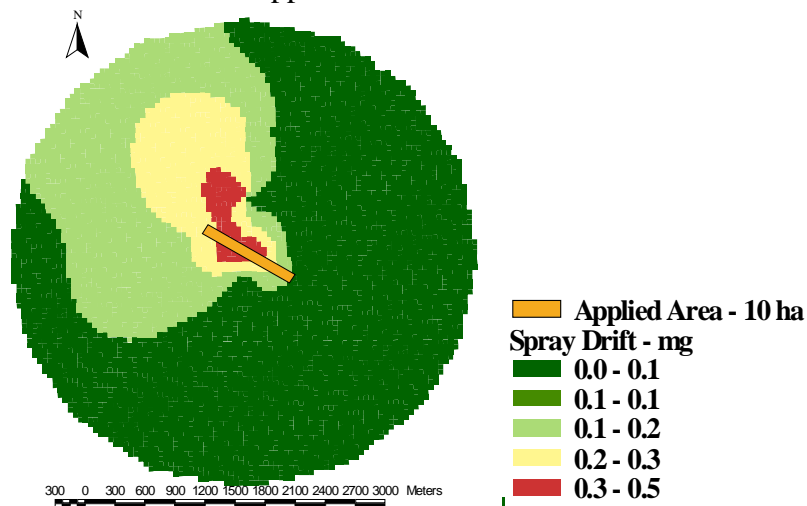
## **MATERIAL AND METHODS**

This work was accomplished in a 10 ha area cropped with corn with 10 days after emergence, located on the Brazilian cerrado region. It was used 72 passives samplers, which was made with nylon fibers vertically positioned at four meters above the ground, surrounding the target area concentrically, within all Cartesian directions and within six distances (10 to 2000 m). The GIS SSToolbox was used during all stages. The localization of the samplers on the field was made with the aid of 4 GPS GeoExplorer Trimble. The spray application was performed by an

airplane Embraer Ipanema. It was used Nimbus mineral oleo on the solution tank with  $1 \text{ L}\cdot\text{ha}^{-1}$ . The tracer dye used to build the drift map was the acid yellow 23 with a concentration of 1500 ppm. The applied volume was  $15 \text{ L}\cdot\text{ha}^{-1}$ . The sprayer was equipped with Micronair nozzles. The drop size was monitored by the use of hydro-sensible papers, and the e-Sprinkle software. Meteorological conditions were recorded during the period. The tracer dye quantification was made with the spectrophotometer Varian Cary 50.

## RESULTS AND DISCUSSION

The average meteorological condition during the application was  $23.8^\circ\text{C}$ , 85% of relative humidity and the wind speed with  $0.04 \text{ km}\cdot\text{h}^{-1}$  to the NW. Until after 2 hours of the application, the average meteorological condition was  $28.3^\circ\text{C}$ , 69% of relative humidity and the wind speed with  $3.2 \text{ km}\cdot\text{h}^{-1}$  to the NW. The volumetric median diameter of the drops was classified as fine. It can be observed that the wind speed was very low during the application period, facilitating the spray drift, once the drops stayed in suspension on the air. The Figure 1 illustrates the spatial variability of the spray drift, which reach 2 km surrounding the applied field. Only in the map region between 0.3 e  $0.5 \text{ mg}\cdot\text{m}^{-2}$  of concentration represents 13.3% of spray drift related to the total applied volume. which should remain on the field.



**Fig. 1.** Spray drift map showing the tracer dye concentration ( $\text{mg}\cdot\text{m}^{-2}$ ).

## ACKNOWLEDGMENT

Financially supported by CNPq, and Tenoar Aerial Sprayer Company by the aerial application.

## REFERENCES

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