CN Davies Annual Report 2018

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The objective of my PhD research is to evaluate occupational exposure to pesticides among amenity horticulturalists using aerosol technologies. A pilot study conducted in 2015, had a geometric means (geometric standard deviation) of 0.66(1.11) µg L^{-1} and 0.29 (1.69) µg L^{-1} for glyphosate and fluroxypyr, respectively (Connolly *et al.* 2017).

To further investigate occupational exposure to pesticides, a biomonitoring study was completed by analysing urine samples collected over a 24 hour period (Figure 1), alongside a dermal exposure study and a potential contaminated surface study, from September 2016 – September 2017. A total of 125 urinary samples and 351 samples in the dermal and contaminated surface study was collected. The arithmetic mean of the peak urinary exposure value is 2.53 µg L^{-1}, with a maximum value of 7.36 µg L^{-1}. Gloves analysed in the study showed contamination, lower contamination levels were also found on workers hands (all workers used gloves during the study) and the perioral region (1cm around the mouth). Surface contamination were found on pesticide product containers, steering wheels of work vehicles and mobile phones of workers. In parallel, a human biomonitoring study of glyphosate to the non-occupationally exposed population of 50 adults in Ireland, from June – August 2017, had a median value of 0.87 µg L^{-1}, with only 20% of the samples with detectable levels.

Future research includes analysing data from the biomonitoring, the dermal and surface contamination study. In addition, a fluorescent dye study will be conducted during the spraying season of 2018 to create images which will be used as a qualitative exposure tool.

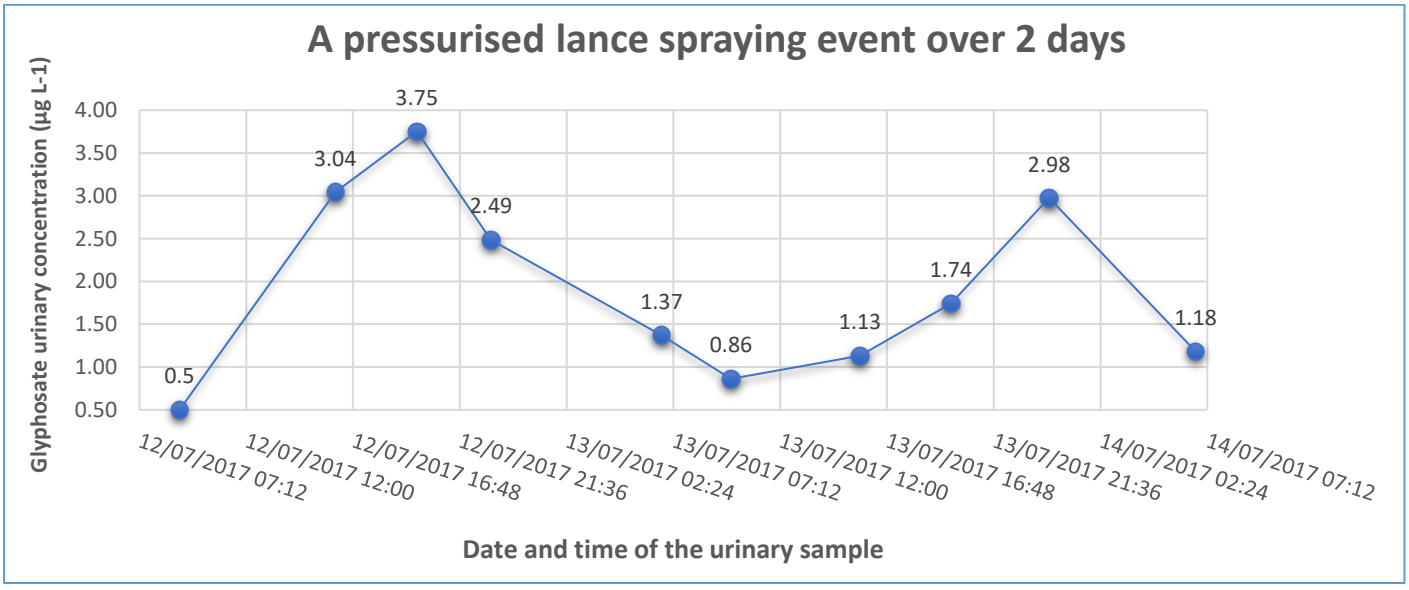

Figure 1: Urinary samples of a work task over two days spraying glyphosate using a pressurised knapsack with a handheld lance. The work task started at 8am and finished at approximately 4pm on both days. *The first data point is a non-detectable values and the vertical axis starts at the limit of detection value of 0.5 µg L^{-1} value.

References:

Connolly, A., Jones, K., Galea, K. S., Basinas, I., Kenny, L., McGowan, P. and Coggins, M. (2017) 'Exposure assessment using human biomonitoring for glyphosate and fluroxypyr users in amenity horticulture', *International Journal of Hygiene and Environmental Health*, 220(6), 1064-1073.