Environment Canada / Environnement Canada
Forestry Service / Service des Forêts

1976

NOTES ON OBTAINING AND SUBMITTING SPRAY FLUID SAMPLES FOR "CALIBRATION"

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File Report No. 69 January, 1976

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1. In any experimental or operational spray application for which deposit samples are to be assayed, the spray fluid sample is the key to accurate estimation of spray deposit volume by card or colorimetric assay. The importance of this vital fact should be recognised in the planning stage of any experiment or operation, and due priority assigned to obtaining an adequate and representative sample of the spray mix. Too often the sample is taken as an after-thought, or carelessly, without considering whether or not it is really representative of the whole.

2. When the sample is received by the person who is to "calibrate" its spreading behaviour on paper, or prepare colorimetric standards, he can only assume that it contains the reported quantities of formulation constituents. It is only when obvious anomalies show up that he may suspect that the product "does not conform to advertizers claims!" It is also important that all constituents be fully identified so that the behaviour can be compared and correlated with that of the same, similar or different formulations. The following are examples of anomalies which were observed during the past season:-

(a) The spreading behaviour of a sample of fenitrothion emulsion on Kromekote® paper differed from that expeced from the reported constituents. Orthene, which had been applied to plots in the study area was suspected as a contaminant. Chemical analysis verified its presence, but also disclosed a fenitrothion content of 3 x normal. Besides being contaminated, the sample must have been taken from a "creamed-down" portion of the mix

as actually sprayed.

(b) Another fenitrothion sample, an emulsible concentrate, was received with no identification that it needed to be diluted with water to match the reported final spray formulation. It was also far from homogenous as it separated into three more or less distinct liquid phases and contained a considerable quantity of bundles of fine branched needle-like crystals which were water-soluble. GC analysis showed only half the expected concentration of fenitrothion and a small peak with the same retention time as Orthene. The sample, drawn from a spray concentrate delivery system was apparently diluted with about 50% of some liquid presumably containing the crystals. The contaminant may have been lurking in the plumbing of the concentrate system. The sample was obviously not a sound base for either card or colorimetric assay of deposit samples.

(c) Of two samples from supposedly identical mixes of a suspension of solid material in oil, one had a much thicker layer of sediment.

3. To ensure that the sample is representative it should be drawn from the body of fully mixed and circulating fluid, to eliminate deviations resulting from creaming out, or even breaking of emulsions, or the settling of solids from suspensions. Where it is not convenient to sample directly from the spray tank, but through some auxillary plumbing such as a drain-cock, enough fluid should be run through it to flush out all dead-end residues before the actual sample is taken. This is the most probable point for error introduction. As the draincock is usually at a low point in the system, this is where heavier components and foreign matter are likely to accumulate and seriously alter the constitution of the mix in the small sample.

4. When submitting packages of spray deposit cards for analysis and spray fluid samples for "spread factor" determination, label corresponding samples with the same locality, plot, date, time, toxicant or other agent concentration, and volume application rate information. This will ensure that resulting data cannot be wrongly associated. Inadequate and sloppy labelling have caused much confusion and loss of time, particularly between CCRI and the scanning machine operators at NAE.

5. It should be recognized that the term "spread factor" is an euphemism for the ratio of spot diameter to the size of the drop that made it, and that usually there is no fixed factor for any one spray mix. The ratio varies with drop size, impingement surface (even between lots of the same kind of paper), formulation components, volatility, ambient temperature, humidity, etc. Accordingly, please append all available information on the formulation and its constituents, planned volume application rate, spray equipment and emission data, flight altitude, meteorological data, location, spray time and date. Under "formulation" include toxicant or agent designation, manufacturer, grade, lot number, active ingredient content of the concentrate, and its solvent system (if known), amounts of co-solvents, and diluents, adjuvants, emulsifiers, stickers, etc., dye and its solvent, if liquid. This will permit a replicate sample to be made up fresh in the event that the original should become degraded or lost. Indicate whether percentages are by volume, weight/vol. or wt./wt. Also, please supply a deposit sample card with a typical field applied deposit on it and a couple dozen clean cards from the same paper lot.

6. Attention to these details, recorded on a copy of the attached form or its French equivalent, will ensure the best possible interpretation of the calibration data for analysing deposit sample cards. The completed form, with addition of file numbers and notes, should return the project or study file where it will serve as a cross reference and thumbnail record of the spray operation. The form, adapted from one used at CCRI last year, is "interim". Comments and suggestions for clarifying or increasing the utility of the form or these instructions would be welcomed.