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Protecting Crops with Climate Changing

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The use pesticides to protect crops from damage caused by insect pests, fungi and weeds, really began back around 1890, when some farmers splashed some copper sulphate to stop people pinching their grapes in France, that was soon followed when Professor Millardet at Bordeaux University noticed that the Copper sulphate had reduced the fungus on the vines. He introduced his Bordeaux mixture which was sprayed using the first knapsack sprayers [1]. At the same time in the USA, knapsack sprayers were introduced to treat potatoes with Paris green to control the Colorado beetle that had spread from Mexico.

Spraying crops spread during the early part of the 19th Century, but with the development of the insecticide DDT and its use to control mosquitoes during the Second World War, it was soon used on crops, such as cotton and many other new pesticides were developed. Spraying was now with tractor sprayers and aircraft using mostly hydraulic nozzles that produce a cone or fan of spray with a range of droplets that varied in size. In consequence the smallest droplets were carried by any wind. Spray drift, especially from sprays applied from aircraft which resulted in adverse effects such as the impact on birds that led to the banning of DDT as it was detected that it was a persistent organic pollutant in the environment [2]. The trend towards warmer weather had been noted, but was relatively more recent, that countries decided to determine why the Global temperature had been increasing and that rainfall had increased as more water had risen as the temperature of the oceans had increased.

The Carbon Network is the first solution that enables businesses to exchange primary data from suppliers across value chains and access climate expertise from consultants and service providers like Nordea, PwC1 and Zurich Insurance Group. It facilitates a shift in how large businesses approach carbon management from merely complying with mandatory legislation to making real reductions based on actionable value chain insights.

Farmers growing different crops around the World have the problem of changes where and when rain is falling where important crops are being grown. One immediate factor is that where insect and other pests are present in different crops around the world, the amount of rain affects not only affects crop growth, but also the extent to which the rain removes any pesticide that has been applied on a crop.

From the original use of water to spray vineyards to control a disease, stated that when it rained the vineyard would need to sprayed again [1]. With more rainfall, what is really needed is to stop using water and develop formulations that include an oil, so that the droplets are not washed off plants by rain, removing most from the upper leaf surface. (see figure 1) More rain can also affect sprays deposited also on the underside of the foliage.

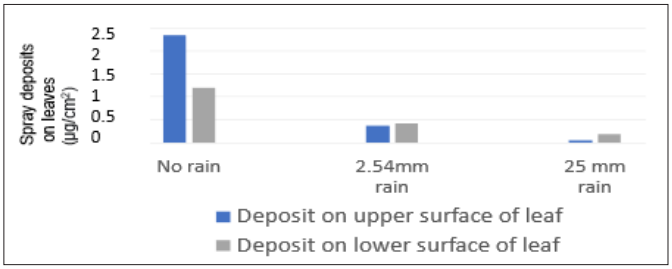

Figure 1: Impact of Rain on Spray Droplets on Leaves

Figure 2: Sprayer with Rotary Nozzle to apply ULV Spray with the Spray Moving Downwind and into a Cotton Crop in Malawi, That Obtained a Yield of Cotton Similar to Using a Large Volume of Water Sprayed Using a Knapsack Sprayer [3].

Ultra-Low Volume spraying was initially used to control Locusts in East Africa [4]. Ultra-low volume sprays [Less than 5 litres/hectare] and in some situations using an electrostatic sprayer to improve the distribution of droplets on the crop.

In Somalia following the arrival of Locusts from 2019 a biopesticide *Metarhizium acridum* mixed in an oil was used to control the locusts using ULV spray [5].

The pesticides washed off the crop enter the soil and can be moved eventually into streams and rivers, but some may be absorbed by the roots of other crops, which has led to concern about pesticides detected in harvested crops. According to Pesticide Action Network [PAN]. Per- and Polyfluorinated Substances (PFAS) a large percentage of samples of crops can contain PFAS (Table 1) As pesticides washed off plants by rain can pollute soils where food crops are grown, it is increasing important that ULV spraying using a formulation that is not easily removed by rain.

Table 1: Extracted from an Email Received from PAN UK

Produce that contained PFAS	Number of Samples Tested by UK Government	Percentage of samples containing PFAS Pesticides
Strawberries	120	95%
Grapes	109	61%
Cherries	121	56%
Spinach	96	42%
Tomatoes	96	38%
Peaches/ nectarines	97	38%
Cucumber	96	22%
Apricots	97	20%
Beans	96	15%
Spices	72	8%
Cabbage	96	7%
Lettuce	97	7%
Potatoes	145	2%
Apples	96	2%

References

1. Lodeman EG (1896) The Spraying of Plants, a succinct account of the history, principles and practice of the application of liquids and powders to plants, for the purpose of destroying insects and Fungi. Macmillan London. https://www.biodiversitylibrary.org/bibliography/42093.
2. Carson R (1962) Silent Spring. Houghton Mifflin. Cambridge Massachusetts https://library.uniteddiversity.coop/More_Books_and_Reports/Silent_Spring-Rachel_Carson-1962.pdf.
3. Matthews GA (1973) Ultra-low volume spraying of cotton in Malawi. Cott.Gr Rev 46: 242-267.
4. Maas W (1971) ULV Application and Formulation Techniques NV Philips Gloeilampenfabrieken. Eindhoven NL 165.https://en.wikipedia.org/wiki/Ultra-low_volume.
5. Ower A, McRae HD (2022) Desert locust control in Somalia between 2019 and 2021. International Pest Control 64: 256-259.