

## Pesticide Detection and Identification at Illegal Marijuana Grows



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### Introduction

Despite the increasing trend of marijuana legalization across the globe, the illegal marijuana market continues to thrive. Criminals are becoming more adept at growing cannabis in their market, reducing the need to smuggle finished product across borders, and ultimately reducing their operating costs and risk of being interdicted by law enforcement. Often, growers will establish operations on public lands such as national and state forests. Here they can manage their grow site outside the purview of the public and law, reducing their chance of being discovered. These “trespass grows” are becoming increasingly more common.

The hope of marijuana legalization reducing consumer reliance on the black market appears, at the very least, to be taking longer than anticipated. Illegal growers circumvent laws and regulations which, in the legal market, ensure the health and safety of consumers. Aside from the obvious threat illegal marijuana poses to consumers, the trespass grows are devastating to the environment. Siphoning water from natural sources to grow sites, an increased risk of forest fires, and toxic pesticides killing wildlife, poisoning water supplies, and endangering those tasked to remediate sites, are all consequences of these trespass grows.

According to a report by the United States Forest Service (USFS), over 1,000 marijuana cultivation sites had been dismantled between 2017-2020.<sup>3</sup> A single site cleanup by USFS resulted in more than 11,000 lbs of trash, 1,250 lbs of fertilizer, and numerous toxic chemicals.<sup>4</sup> The immense amount of trash generated by these sites is a result of cultivation operations and makeshift camps for those running the sites. Miles of irrigation piping can run from nearby water sources to the grow site to provide water for plants. Bags and buckets of fertilizers and pesticides often litter the area after their contents are emptied. Assorted food trash, generators, fuel cans, and other living necessities, are evidence of the workers that remain on site to tend to the plants.

Individuals tasked with running the site are often exploited to run the grows and live in appalling conditions. Termed “narco-slavery,” these workers are often trapped in these conditions due to intimidation by organized crime organizations or are being exploited by their debt, language barriers, or labor status.<sup>5</sup>



### Trespass Grow Operations

In Europe, marijuana accounts for approximately 38% of the market for illicit drugs.<sup>1</sup> In the United States, marijuana is the most used drug and continues to be the most seized drug at border crossings.<sup>2</sup> With the prevalence of usage, illicit marijuana cultivation offers criminals a lucrative business opportunity.



## Pesticide Use at Trespass Grow Sites

Pesticides are used in a variety of agriculture applications to control insect infestation and diseases from affecting crops. Due to their hazardous properties and potential to pose a significant threat to public health, pesticide use is heavily regulated by organizations like the United States Environmental protection Agency (EPA), the European Commission, and the European Food and Safety Authority. Illegal marijuana cultivators will often use these pesticides in extremely high concentrations to prevent wildlife from interfering with their growing operations. The most toxic pesticides, many of which are banned outright, are smuggled across borders and brought to grow sites for use. In 2019, The Border Pesticide Initiative group was formed in the United States to combat a rise in injuries to law enforcement officers exposed to pesticides during counter-trespass grow operations.<sup>6</sup> Last year, Europol conducted an operation resulting in the seizure of 1,203 tons of illegal pesticides and 12 arrests.

With pesticides posing an imminent danger for wildlife in the area, responding law enforcement also find themselves potentially exposed to the hazardous chemicals

With only marijuana plant yield in mind, cultivators use dangerous amounts of pesticides at grow sites with often devastating results. Animals that happen upon these grow sites only need to ingest a small, sometimes just a few drops, of these pesticides for it to be fatal. A study in California documented that of 58 dead fisher cats, 79% had been exposed to toxicants used at trespass grow sites.<sup>7</sup> With pesticides posing an imminent danger for wildlife in the area, responding law enforcement also find themselves potentially exposed to the hazardous chemicals. In California in 2020, law enforcement personnel encountered hazardous materials in nearly every illegal grow site they responded to.<sup>8</sup> Presence of these chemicals complicates the clean up process after illegal marijuana grows have been seized. Many sites are in difficult to access areas, making remediation efforts time consuming and costly. Often times, helicopters must be used to air-lift garbage, irrigation piping, and other refuse from sites. With the presence of

pesticides, hazardous materials protocols must be followed to properly identify, dispose, and clean waste at sites. At an average cost of \$40,000 for site cleanup,<sup>9</sup> before hazardous material disposal, properly identifying hazardous materials is important not only for safety, but for efficiently using funds for cleanup efforts.

## Identifying hazardous pesticides at grow sites

The identification of these toxic chemicals at illegal grow sites are critical for several reasons:

- Keeping first responders and remediation personnel safe
  - These incredibly toxic pesticides pose a threat for law enforcement personnel during a seizure and for individuals tasked with cleaning up the site. Knowing which threats are present is critical for safety.
- Determining the extent of pollution to the surrounding environment
  - Knowing which, if any, pesticides are present can drive decision making for clean up efforts. Determining limits of contamination on a site assists in creating a reclamation plan. Pesticides migrate through the soil into the groundwater and into other bodies of water threatening the surrounding communities.
- Categorizing and properly disposing of hazardous waste
  - Waste often needs to be air lifted by helicopter out of the site and special precautions must be taken for hazardous materials. Knowing exactly which waste is contaminated reduces costs for cleanup.
- Providing law enforcement with additional evidence to prosecute growers
  - Proof of toxic pesticide use links growers to environmental damage which can add to the litany of charges they may face with operating a grow site.

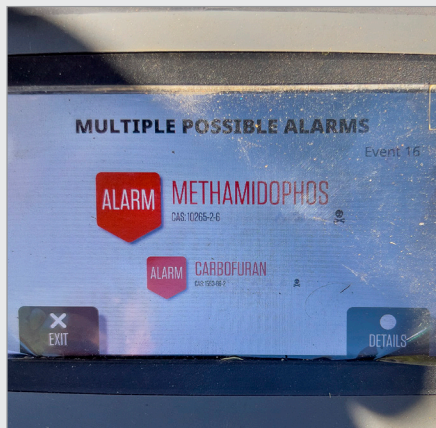


A single drop of Carbofuran is enough to kill an adult human. Here a ~1 liter bottle is found at a trespass grow site.





The small form factor of the MX908 allows it to be easily employed at the point of need, even in difficult to reach areas like trespass grow sites.



The MX908 can detect and identify 8 pesticides including Carbofuran, which the EPA has made ineligible for all uses.



Traditionally, there have been two methods for the detection and identification of these chemicals: colorimetric tests and lab-based mass spectrometry. Colorimetric tests have the benefit of being lightweight and easily transported to the remote locations of trespass grows. However, they lack the accuracy to reliably return confident results to the user. This leads to improper classification of hazardous materials which can increase the costs associated with remediation and, more importantly, pose a risk to personnel on site who are unsure of the actual chemical threats present. Lab-based mass spectrometry provides highly accurate results with exceptional sensitivity. However, sending samples to a centralized laboratory means personnel on site need to take samples, package them, hike them out of the grow sites, send to the laboratory, and wait weeks, or possibly months for results. With a long lead time on results, the trespass grow sits largely untouched. This poses dangers to the public and wildlife, as potential toxic pesticides remain on site.

## Identifying Pesticides with the MX908

The MX908 is a handheld mass spectrometer that has been traditionally utilized by first responders around the globe for field identification of chemicals such as drugs, explosives, chemical warfare agents, and toxic industrial chemicals. In January 2022, 908 Devices announced a collaboration effort with the U.S. Forest Service (USFS) to give USFS personnel a safe and reliable method to conduct pesticide testing at the site of illegal marijuana grows.<sup>10</sup> As a result of this development effort, the MX908 is now capable of providing users with rapid and accurate identification of 8 pesticides on site at illegal grows. Leveraging the power of mass spectrometry in a small (<10 lbs) device, the MX908 gives users lab quality data without the need to wait weeks or months for results. This means illegal grow sites can be restored more safely, quickly, and cost effectively.

## REFERENCES

1. <https://www.europol.europa.eu/crime-areas-and-statistics/crime-areas/drug-trafficking/cannabis>
2. <https://www.cbp.gov/newsroom/stats/drug-seizure-statistics>
3. [https://www.usda.gov/sites/default/files/audit-reports/50301-0001-11\\_FR\\_FOIA\\_508%20%281%29.pdf](https://www.usda.gov/sites/default/files/audit-reports/50301-0001-11_FR_FOIA_508%20%281%29.pdf)
4. <https://www.usda.gov/media/blog/2017/08/21/cleaning-illegal-marijuana-grow-sites>
5. Josephine County, OR Board of County Commissioners Letter to Governor Kate Brown. August 4th 2021.
6. <https://timesofsandiego.com/crime/2021/07/09/more-than-50-people-prosecuted-in-san-diego-for-pesticide-smuggling-at-border/>
7. [https://www.fs.fed.us/psw/publications/thompson/psw\\_2017\\_thompson001.pdf](https://www.fs.fed.us/psw/publications/thompson/psw_2017_thompson001.pdf)
8. [https://www.usda.gov/sites/default/files/audit-reports/50301-0001-11\\_FR\\_FOIA\\_508%20%281%29.pdf](https://www.usda.gov/sites/default/files/audit-reports/50301-0001-11_FR_FOIA_508%20%281%29.pdf)
9. <https://www.nbcnews.com/news/us-news/fire-guns-poison-illegal-marijuana-farms-pose-deadly-risks-californias-rcna7153>
10. <https://908devices.com/news/908-devices-and-u-s-forest-service-announce-development-collaboration/>

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