

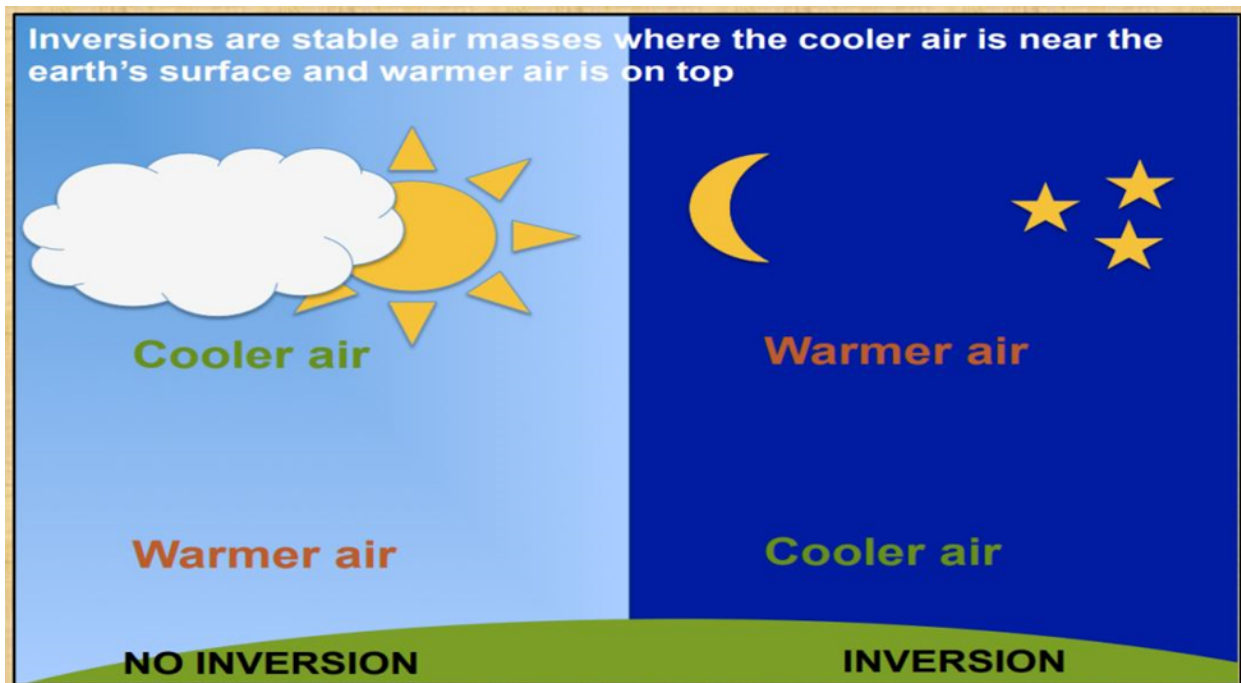
INVERSIONS



Photo by NDSU Ag Hub

As we approach in crop spray season, this seemed like a good time to review something that I see in fields at least 2 or 3 times every year – crop damage caused by inversion drift. Spray drift from temperature inversions seems to create problems for a handful of sprayer operators every year. Pesticides caught up in an inversion often return to the ground far from where they were sprayed, sometimes causing considerable damage to off target crops. And the environmental conditions responsible for inversions are very common here on the Canadian prairies. In a 2018 Top Crop Manager interview Tom Wolf, the lead sprayer technology specialist with Agrimetrix Research said *“I think it is a safe assumption that a temperature inversion on the Prairies will occur every night from one hour before sunset to one hour after sunrise unless there is cloud cover or wind.”*

So what exactly is an inversion and how do we recognize one, so we can avoid having our pesticides cause issues by landing off-target? In the simplest terms, an inversion is when there is a layer of cool air trapped at the surface by a layer of warmer air above it. In most cases the layer of cold air is no more than 2 to 3 metres in height. This cooler air cannot mix with the warmer air above it, so it may flow downhill or move sideways with a very light breeze. If a pesticide is caught up in this cool air, it moves with it, sometimes ending up a long way from where it was sprayed.



So how do we know if we are dealing with an inversion? Theoretically, the surest way to detect one is by measuring the temperature. If the air temperature is higher at 8 to 10 feet above the ground than it is at 1 foot, you are dealing with an inversion. The greater the difference, the more severe the inversion is. However, accurate measurements are difficult to manage with conventional thermometers, so most applicators rely on a couple of warning signs that reliably indicate an inversion.

The first warning sign of inversion conditions generally comes late in the day when the sun is low in the sky. If conditions are calm (less than 3 km/hour wind), and the dust stirred up by vehicles on a grid road tends to just hang in the air or very slowly drift sideways, you are looking at an inversion. Under these calm conditions, you can often hear things at unusual distances or smell things you normally consider too far away to smell. If you encounter these conditions, stop spraying. There is a high risk of spray drift.

The second red flag appears early in the morning. Low lying fog and/or heavy dew are signs of inversions, as they both indicate the air temperature is cooler at ground level. If you are hoping to get in some early morning spraying before the wind picks up, you would be well advised to let the morning sun warm that cold layer of air so it can mix with the warmer air above it before starting.

For a much more in-depth discussion on the phenomenon of inversions, along with excellent tips on controlling drift in general, I highly recommend Tom Wolf's free website *Sprayers 101*. If you are not already familiar with the site, it provides a wealth of information on all things concerning sprayers and spraying. You can also subscribe to the site so all the latest articles they produce will show up in your in-box.

[\(https://sprayers101.com/\)](https://sprayers101.com/)

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