Editor's Note: This month we have three articles on pH in your spray solution. Two of our members have written an article on this subject and Dr. Paul Sartoretto has written the third. Each article has something different that none of the others have, so it does make interesting reading.

Effects of pH on Pesticide Sprays

If you have not checked the water you use as a carrier in your spray mixtures lately you might be surprised at what an effect its pH could have on the results of your pesticide sprays, particularly the organo-phosphate, carbamate and synthetic pyrethroid compounds. Fungicides are, generally, not as dramatically affected.

There are many factors that impact the half-life (time for a material to lose 50% of its effectivenesss) of pesticides including: pesticide chemistry, buffer capacity of water, water temperature, time of pestcide exposure in water, concentration of pesticide in water and water pH. Of these factors pH can have the most dramatic effect.

Lake Michigan water ranges between pH 7.5 and 8.5. If your spray water pH is higher than 7.5 it is alkaline enough to negatively affect certain pesticides. These pesticides are decomposed through a process called "alkaline hydrolysis". In short, the alkaline water triggers a chemical reaction that splits the pesticide molecule in half, rendering it ineffective.

In some cases where highly alkaline water is combined with a sensitive pesticide the half-life can be as short as a few minutes. In other words, the chemical can lose its efficacy before it has even been sprayed out of the tank. In addition to loss of pesticide effectiveness all of the metallic salts (example: ferrous sulfate) will, unless chelated, undergo hydrolysis at pH's above 7.0 and end up totally inactive.

The way to alleviate this problem is to determine the pH of your water and then add an acidifying agent to lower the pH to an acceptable level (6.5 - 7.0) that will limit the rate of hydrolysis. Ideally, you should check and adjust your pH prior to adding the pesticide and then recheck pH after the pesticides have been mixed into the tank. These acidifying agents are very useful tools. Some examples are: phosphoric acid, ferrous sulfate, Cleary's acidifier, vinegar.

Although acidifiers will increase the half-life of pesticides while they are in solution they have little or no effect on material once it has reached the target area. One important thing to remember is to never mix an acidifying agent with a post-emergent herbicide. These chemicals are always alkaline, and if acidified they will be converted to useless water insoluable gums.

If you have a question on the effects of your water pH on a specific chemical, call the manufacturer and ask for the time for 50% hydrolysis (half-life value) at that pH.

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Credit: Verdure, 6/87

Effects of pH on Pesticide Half-Life

Common Name	pH	Half-Life Time
Proxol (Dylox)	6.0	89 hr.
	7.0	6.5 hr.
	8.0	63 mins.
Malathion	7.0	7.8 hr.
	8.0	1 hr.
Sevin	7.0	24 - 30 days
	8.0	2 - 3 days
	9.0	3 hrs.
Betasan	7.0	27 plus hrs.
	10.0	21 plus hrs.
Diazinon	5.0	31 days
	7.0	184 days
	9.0	135 days
Dursban	5.0	63 days
	7.0	35 days
	8.0	23 days
Bayleton	7.5	7 days
Oftanol 2	7.5	30 plus days
Chipco 26019	7.0	9 days
	9.0	2 days
Benlate	7.0	1 hr.
	5.6	30 hrs.
Banol	9.0	1000 plus hrs.