



Tip of the Month

March 2018

EC AND pH - EXCELLENT INDICATORS OF WATER QUALITY

Water quality is the first major hurdle for pesticides as it plays a role from when the product is added to the spray solution, until the droplet dries out on the leaf surface. It is important to know what the water quality is, so that the necessary precautions to protect sensitive pesticides can be made. A full water analysis is obviously the best option, but sometimes a quick EC (electrical conductivity) or pH measurement can supply valuable information. However, please be aware that there are certain aspects of water that cannot be measured by pH or EC and a full water analysis may be required in these cases.

pH
pH is an indication of how acidic or how alkaline water is. pH is measured on a scale from 0 to 14 where values below 7 indicate an acidic environment and values above 7 indicate an alkaline environment. The majority of water sources in South Africa have a pH ranging from 6.5 to 9, therefore more on the alkaline side. The more alkaline the water, the more the pesticide will be antagonized by alkaline hydrolysis. This is the process where pesticides (especially certain insecticides) are degraded in alkaline water. A simple pH measurement will indicate this and the necessary steps can be taken to acidify the spray solution with buffer products. Please note that not all pesticides are antagonized by alkaline water and standard acidification of all spray solutions is not recommended. Only acidify the spray solution when it is beneficial, as certain products like the sulfonylurea herbicides, can be antagonized by an acidic spray solution.

EC
EC is an indication of the salt loading of water. Dissolved ions in water contribute to EC and a high measurement will indicate a high salt content, and potentially antagonistic water. When the EC is high, we can assume that at least one of the major antagonistic cations (calcium, magnesium, sodium and potassium) is high. When salt-sensitive

herbicides like glyphosate are applied, it is essential to add a quality ammonium sulphate adjuvant to address these ions. These adjuvants also have other benefits and glyphosate should be applied with an ammonium sulphate adjuvant as a standard practice. Please take note that EC is measured in different units, namely mS/m; mS/cm or micro-S/cm. Make sure in what unit it has been measured before taking any decisions.

Other factors

Although pH and EC measurements can provide a lot of information about spray water, there are certain aspects that cannot be determined if a full water analysis is not possible. One of these factors is alkalinity or buffering capacity. This is the ability of water to resist a change in pH. Buffers need to be used at higher rates in these water sources to attain the required effect. Alkalinity can only be determined by a water analysis or a titration with a buffer. Another factor that cannot be determined by EC, is iron content. Iron in small quantities can drastically reduce glyphosate weed control. However, because it is encountered at relatively low concentrations, iron may not increase EC drastically. Although iron is seldom encountered at antagonistic levels, please analyse water if a high iron content is suspected.

Villa's stance

It is important to know the quality of water in order to make informed decisions concerning adjuvant choice. A full water analysis is always the first prize. However, EC and pH measurements can give valuable information about water.

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