



Tip of the Month

August 2019

WATER QUALITY STILL A HUGE CHALLENGE

Water is used as a carrier to apply crop protection products (CPP) uniformly over a certain area. However, water is not always the ideal carrier and has some important physical and chemical limitations. It is important to understand what these limitations are to apply CPP effectively.

Physical properties

The physical challenge that water poses is surface tension. This is the ability of a water droplet to act as if it were enclosed in an elastic skin. The droplet then behaves like a rubber ball and many droplets are lost due to droplet bounce.

Surface tension also limits droplet spreading on the leaf surface. This is one of the reasons for using surfactants or oil adjuvants. These adjuvants decrease the surface tension of water and ensure less droplet bounce and more spreading. The more droplets available on the leaf surface, the greater the chance of higher efficacy. Surfactants and oils don't only reduce the surface tension, but also aid in the absorption process.

Chemical properties

The chemical challenges include dissolved ions and pH. Dissolved cations like calcium, magnesium, sodium and potassium can be antagonistic to herbicides like glyphosate.

In South Africa, sodium (brackish water) is probably the major antagonist solely because it is found at extremely high levels in certain areas. However, calcium and magnesium (hard water) are also important and can limit the activity of salt-sensitive herbicides, mainly because they are divalent cations (double positive

charge). Electrical conductivity is a good indicator of these dissolved antagonistic cations. Please note that soft water (low calcium and magnesium) also has disadvantages like causing excessive foaming with surfactants.

pH antagonizes certain insecticides through a process called alkaline hydrolysis. Alkaline hydrolysis is the degradation of certain insecticides in high pH water. This is the reason why buffers are commonly used with insecticide applications.

Some water sources have a high buffering capacity (alkalinity), so a higher rate of buffer may be needed to acidify these spray solutions. It is important to note that water with a low buffering capacity also has challenges. One of these challenges is that the pH may decrease too much, causing an extremely acidic environment with its own set of challenges like physical incompatibility.

Villa's stance

Water, irrespective of the source or quality, has challenges. A thorough knowledge of water and adjuvants is essential to limit these challenges and to obtain the optimal CPP efficacy.

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