



Technical Note The Effect of Glyphosate + AMS on Water Quality

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It is well known that hard water will adversely affect the herbicidal activity of glyphosate. The presence of di- and trivalent ions, for example, Ca^{++} / Mg^{++} / Fe^{++} results in the tying up of the glyphosate to inactive forms.

Spray water is not the only source of cations. Plant tissue can produce cations that lead into the leaf surface when dew or rainfall wets the leaves. It is thought that this could be one of the reasons why there are variable results in glyphosate + AMS activity.

Glyphosate is very sensitive to dissolved salts in water. The added AMS literally 'overruns' the antagonistic salts. AMS will improve glyphosate activity, however, it is not possible to generalize by what amounts.

Variables and Comments.

- Water quality varies considerably. The greater the 'hardness' the more advantageous the AMS.
- Lower water volumes are desirable
- The influence of salts is reduced in lower water volumes (spray solutions) in that the number of cations are reduced
- AMS is an integral part of the herbicide efficacy package
- Observe mixing sequence - **AMS first**
- Soft water = reduced benefit
- AMS sped up/ increased the glyphosate effect on plant leaf effect - indicating the absorption rate of the herbicide was increased. AMS improved rain fastness

The quality of water is an important factor and should be placed high on the list of considerations in order to optimize weed control. This applies to a range of herbicides and not only glyphosate.

Hard water, which is a common problem adversely affects herbicidal activity, the reason being that hard water contains dissolved salts such as calcium and magnesium. These dissolved salts are positively charged and are soluble in water.

The addition of a negatively charged herbicide will bind to the positively charged salts and results in the herbicide having difficulty in being absorbed into the plant tissue.



This antagonism can be minimized by the addition of ammonium sulphate. Ammonium sulphate has been used successfully over many years. The sulphate combines with the cations in the hard water. The glyphosate combines with the ammonium ion. Glyphosate in this form is readily taken up by plant tissue which aids with rain fastness and speed of action.

The AMS addition is commonplace not only in states such as Western Australia but in other countries such as the USA and I quote from an Extension Bulletin (USA):

“AMS should always be added to all glyphosate products in order to minimize the negative effect of hard water on glyphosate activity regardless of water quality”.

Water Volumes.

Decreasing water volumes have also been found to produce the hard water antagonism of glyphosate, in that the number of antagonistic cations is reduced.

Ammonium sulphate spray grade crystals should be used at 1% which equates to 25kg / 2,500L water. We have received grower reports that 2% and 3% usage rates are more effective. We can see the logic of this claim in the case of hard water but there would be reduced benefit if the water was soft.

