

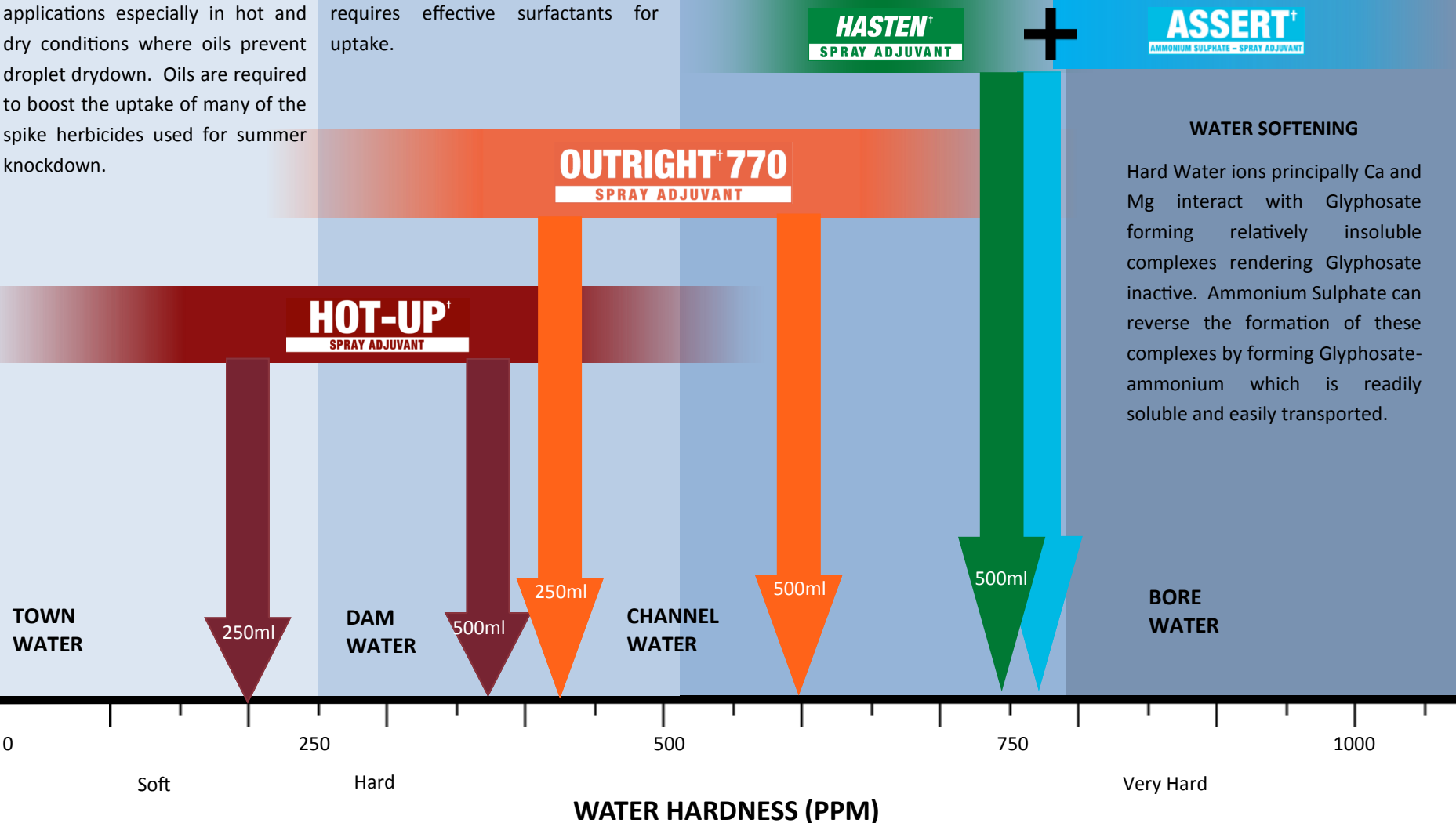
Summer Knockdown Guide

Adjuvants for Hard Water

WEED ABSORPTION
 Oils play an important role in ensuring the best outcome from your summer knockdown applications especially in hot and dry conditions where oils prevent droplet drydown. Oils are required to boost the uptake of many of the spike herbicides used for summer knockdown.

WETTING AND SPREADING
 Surfactants play a vital role in summer knockdown applications by ensuring adhesion and spreading. Glyphosate requires effective surfactants for uptake.

WATER SOFTENING
 Hard Water ions principally Ca and Mg interact with Glyphosate forming relatively insoluble complexes rendering Glyphosate inactive. Ammonium Sulphate can reverse the formation of these complexes by forming Glyphosate-ammonium which is readily soluble and easily transported.



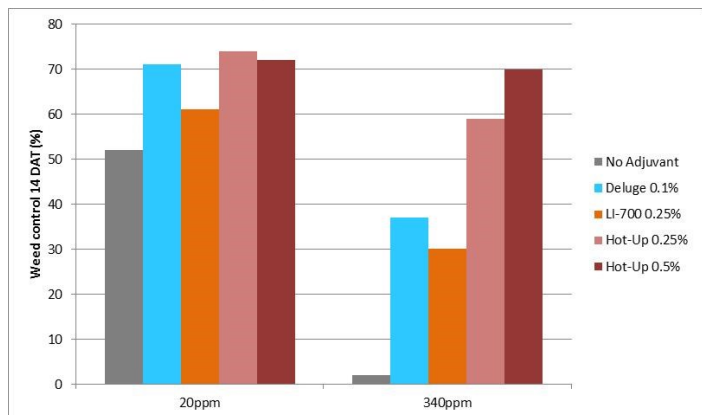
*Adjuvant rates are ml/100L of water



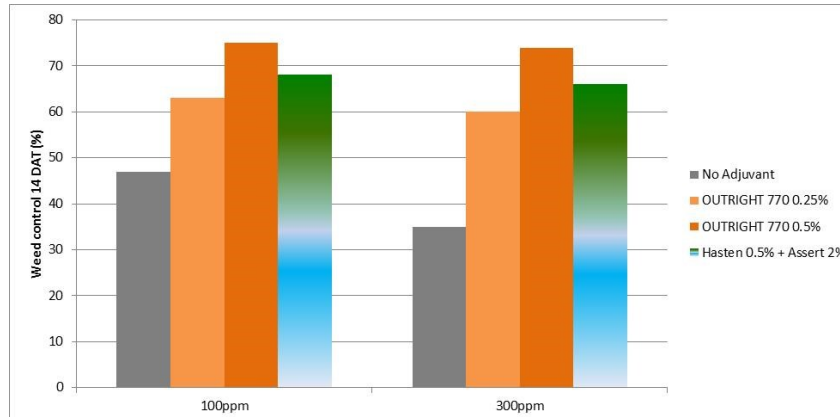
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Trial data for Adjuvants in Hard Water

Hot-Up Glasshouse Trial



Outright 770 Glasshouse Trial



Glasshouse Trial 1:

RoundUp CT applied at 70g a.i./ha with 11001 nozzle @ 145L/ha to Oats at 1-1.5 leaf. Assessment by fresh weight 14 DAT.

Trial 1 shows that the sub-lethal rate of Glyphosate can easily be deactivated by hard water. The addition of wetting agent adjuvants DELUGE 1000 or LI-700 improve the efficacy of Glyphosate in soft water but do not prevent the hard water deactivation. HOT-UP applied at 0.25% works well in soft water and offers partial hard water suppression in the hard water but when applied at 0.5%, HOT-UP protects effectively against the hard water (340ppm hardness)

Recommendation: When using HOT-UP in hard water, use 250ml of HOT-UP for up to 250ppm of Hardness (as CaCO₃) or 500ml of HOT-UP for up to 500ppm of Hardness.

Glasshouse Trial 2:

RoundUp CT applied at 222g a.i./ha with 11001 nozzle @ 64L/ha to Oats at 1.5-2 leaf. Assessment by fresh weight 14 DAT

Trial 2 similarly shows that increased water hardness results in reduced efficacy when Glyphosate is applied without suitable adjuvants. In this trial OUTRIGHT 770 when applied at either 0.25% or 0.5% effectively softens the water and provides the efficacy enhancement from its surfactants and oils. The combination of HASTEN + ASSERT also easily copes with this level of water hardness.

Recommendation: When using OUTRIGHT 770 in hard water, use 250ml of OUTRIGHT 770 for up to 500ppm of Hardness (as CaCO₃) and 500ml of OUTRIGHT 770 for up to 1000ppm of Hardness. HASTEN 0.5% + ASSERT 0.5—2.0% can be used for any commonly encountered Hard Water or where water hardness is not known.



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