



# X-CHANGE®



# Protecting Herbicide Performance



Clean Water.  
Clean Kill.  
Every Time.

## Water Quality: It's Not Just About Glyphosate

Much of the focus on water quality has centred on glyphosate – and rightly so. But the **same principles apply to many other susceptible herbicides** used across arable and grassland systems.

Performance in hard water conditions can be reduced, particularly where target weeds **show only moderate susceptibility, or where uptake and translocation are critical** to activity.

*Water quality is one of the most controllable factors influencing herbicide performance, yet it is often overlooked or treated as optional.*

One way to identify the herbicides most at risk is to look at their **pKa** – a measure of how acidic a herbicide is. In simple terms, the **lower the pKa, the more likely it is to interact with** calcium and magnesium ions in **hard water**.

When this happens, the herbicide can form salts or complexes that are less biologically active and less readily absorbed through the leaf.

Even subtle reductions in uptake can result in slower activity, less consistent control, and increased variability across fields.

## Which Herbicides are Susceptible?

Water quality can influence a wide range of systemic herbicides:

- Glyphosate
- Sulphonylureas
- ACCase inhibitors (dims)
- Phenoxies
- Group 4 herbicides (auxin mimics)

These herbicides rely on uptake and translocation, making them particularly sensitive to reductions in absorption.

## Examples of Susceptible Herbicides

Active Ingredient	pKa Value
clopyralid	2.01
propoxycarbazone-sodium	2.1
imazamox	2.3
glyphosate	2.34
aminopyralid	2.56
halauxifen-methyl	2.84
fluroxypyr	2.94
mesotrione	3.12
iodosulfuron-methyl-sodium	3.22

## The Hidden Cost of Poor Water Quality

Hard water rarely causes total failure. Instead, it often produces **sub-optimal performance**:

- Slower weed control
- Greater reliance on follow-up treatments

These subtle losses can quietly erode spray programme effectiveness if not addressed.

For a more extensive list of susceptible herbicides, scan the QR code:



# Steps to Protect Herbicide Performance

## Step 1. Test Water Regularly



Water hardness varies by source, location, and season. Regular testing allows you to:

- Understand the level of risk
- Adjust conditioning rates
- Make informed spray decisions

Even within the same farm, water quality can change, making routine testing essential.

## Step 2. Condition Before Adding Herbicides



Conditioning before adding herbicides prevents cations from deactivating herbicides.

A true water conditioner:

- Binds calcium, magnesium, iron, and aluminium ions
- Acts sacrificially to protect herbicides in solution
- Keeps active ingredients available for absorption

This ensures susceptible herbicides remain fully effective.

## Step 3. Dose Based on Water Hardness

Water Hardness (TDS ppm)	X-Change Rate	Spray Volume
<150	0.10%	
<225	0.15%	
<300	0.20%	
<375	0.25%	
<450	0.30%	
<525	0.35%	
<600	0.40%	
<675	0.45%	

Water conditioning is strongly recommended for susceptible herbicides: Glyphosate, sulphonylureas, dimes, phenoxies, and other Group 4 auxin mimics.

Even small, repeated reductions in uptake can reduce reliability and control.

## X-CHANGE®

### Protect Herbicide Performance With X-Change

X-Change is a true water conditioner designed to neutralise hard water cations before herbicides are added.

By conditioning water first, X-Change ensures herbicides – including glyphosate and other susceptible actives – remain fully available for absorption, maximising uptake and consistency.

## PROTECTS EVERY SPRAY



Binds calcium and other polyvalent cations contributing to water hardness to prevent deactivation



Buffers pH to around 5, stabilising weak-acid herbicides



Humectant maintains droplet hydration to reduce precipitation on the leaf



Built-in anti-foam for cleaner, more efficient spraying

TEST WATER > CONDITION FIRST > DOSE CORRECTLY > EVERY SPRAY