

Spray Adjuvants

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READ SAFETY DIRECTIONS BEFORE OPENING OR USING

PROWET 1040

SURFACTANT

ACTIVE CONSTITUENT: 1040g/L OCTYL PHENOL ETHOXYLATE

NON-IONIC SURFACTANT FOR USE WITH ROUNDUP® CT BROADLEAF HERBICIDE, ROUNDUP® DRY HERBICIDE, ROUNDUP® HERBICIDE, NUFARM GLYPHOSATE CT HERBICIDE AND WEEDMASTER® DUO HERBICIDE WHEN TREATING ANNUAL RYEGRASS, SILVERGRASS AND PERENNIAL GRASSES.

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Adjuvants can be extremely confusing

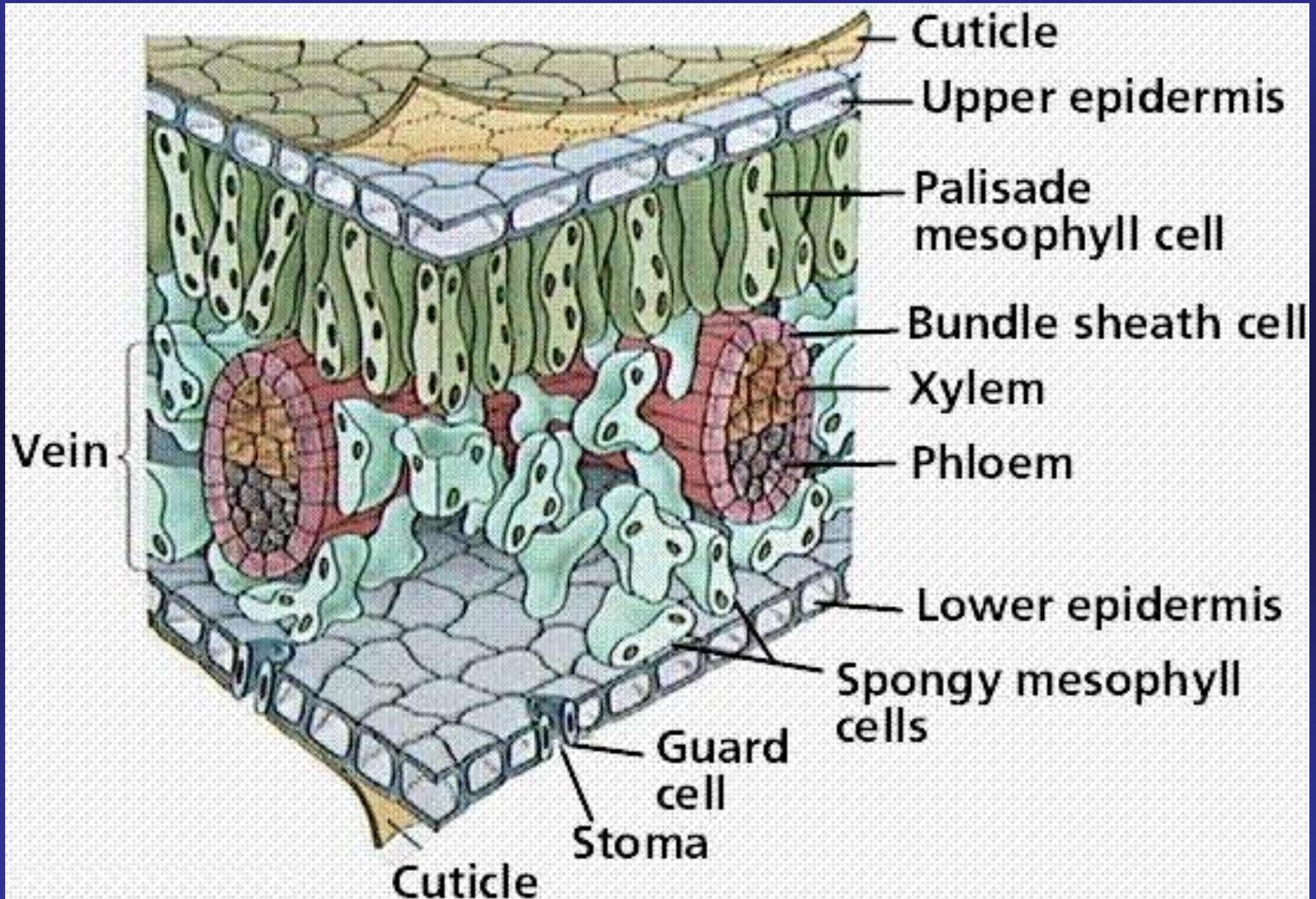
- Dozens of manufactures
 - Dozens of different product names
- Dozens of types
 - What do I use when?
- Make a large difference in effectiveness
- Many claim very lofty results
 - Allows reduced rates, reduces regrowth, etc.

- **Adjuvant** is any substance that has no pesticidal activity applied alone but when added to the formulation or the spray tank can improve pesticidal activity or application characteristics.

Adjuvants

- What do they do?
 - Improve weed control
- Why do we use them?
 - \$\$\$\$\$\$\$\$\$

Why use surfactants?



2 classes of adjuvants

- Activators
 - Improve performance
- Utility
 - Improve ease of application

2 classes of adjuvants

Activators

- Wetter-spreader
 - Non-ionic surfactant
 - Silicone surfactant
- Penetrate
 - Crop oils
 - Basal oils
- Sticker

Utility

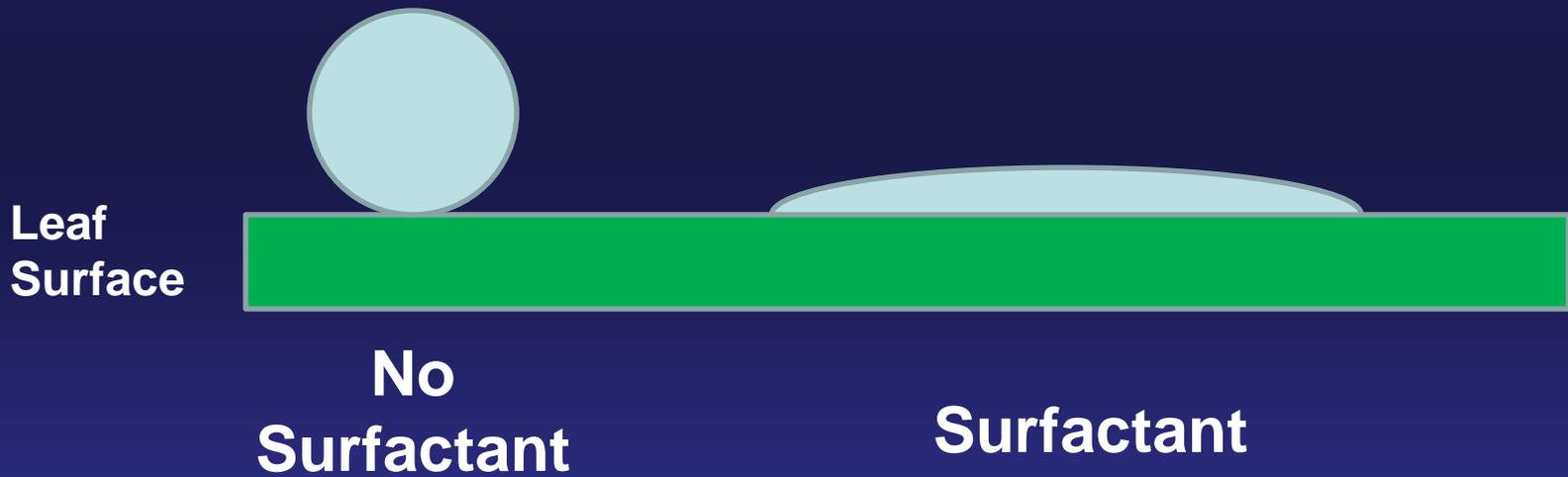
- Compatibility agent
- Defoamer
- Anti-drift
- Water Conditioner
- pH modifiers
- Polymers

Activators

Wetter-Spreader

- Flattens out the spray drop
 - Leaves are covered with wax
 - Wax repels water
 - Surfactants overcome the repulsion
- Reduces bounce
- These are non-ionic surfactants

Reduction of Droplet Surface Tension



Sticker

- Improves retention of chemical on leaf
- May reduce wash-off from rain

But

- Most liquid formulations contain these
- Good for WP formulations
 - Few herbicides are WP formulations
 - A NIS will also act like a sticker

Penetrants

- Improve herbicide uptake by driving the herbicide into the leaf
- Actually dissolve the waxes on the leaf
- These are oil based adjuvants
 - Crop oils and MSO
 - Crop oil also has spreader activity (they contain 5 – 20% surfactant)
 - Crop oils increase injury

Utility adjuvants

Compatibility Agent

- Ensures a uniform spray mixture
- Non-compatibility is most common with low spray volumes



Compatibility Agent

- Ensures a uniform spray mixture
- Non-compatibility is most common with low spray volumes
- Increase carrier volume
- Use high quality surfactants
- If you are not having compatibility problems, you probably don't need these.

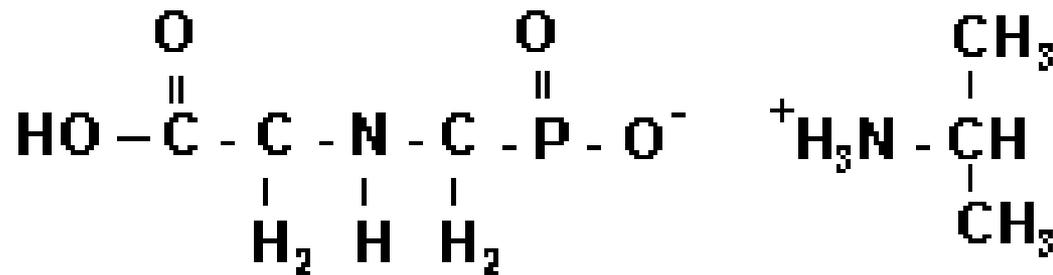
Defoamer

- Eliminates foam when refilling tanks
- Everyone needs a bottle of this!
 - Especially when spraying glyphosate
- A little goes a long way

Water Conditioner

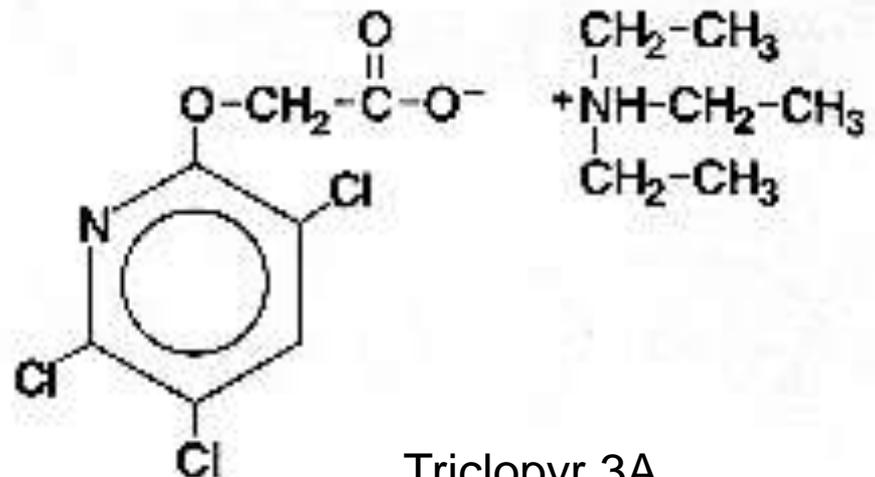
- Necessary if dealing with hard water
- Particularly beneficial with glyphosate
- Most useful is ammonium sulfate

Most herbicides are salts (have positive and negative parts)



Isopropylamine

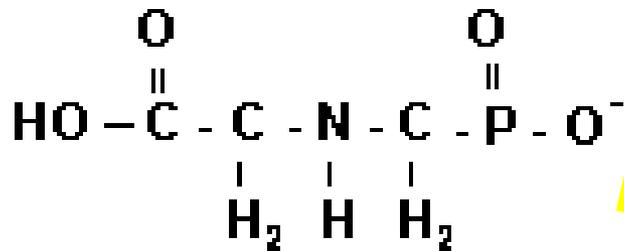
Glyphosate



Triclopyr 3A

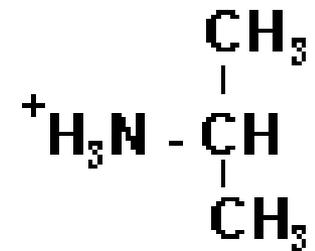
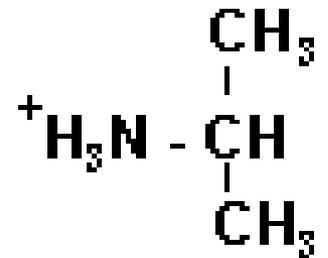
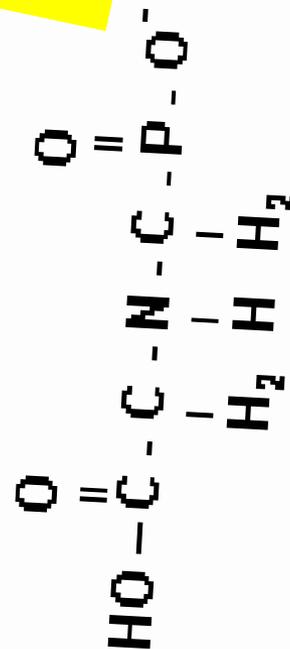
If mineral content is high...

If mineral content is high...



Glyphosate

+Mg+



Water Conditioner

- Particularly beneficial with glyphosate
- Most useful is ammonium sulfate
 - Application rate is 7 to 17 lb/100 gal
 - Use liquid or spray grade AMS
 - **Must be added to tank before herbicide!!**
- Can speed up herbicide action
- Can be corrosive to sprayer parts

Anti-Drift agents

- These are generally polymers
- Increase shear strength of the water
- This forces the droplets to become larger, larger droplets don't drift as easily

But

- Can turn spray solution into “goop”
- Tip clogging is common

Reducing drift

1. Spray closer to target.
2. Lower spray pressure
 - Lower pressure means larger droplets

pH modifiers

- Persistence in water
 - Some herbicides can be degraded in water
- Solubility in water
 - Increase solubility can increase activity

But

- These problems are largely theoretical
 - Don't leave spray in tank for >12h
 - Unless water pH is >8, may not be needed

What Brand of NIS is best?

- I use many brands interchangeably
- Anything with >80% active ingredient will generally be fine.
- But don't routinely buy the cheapest
- The most expensive is not always the best

What rate of NIS is best?

- As a rule of thumb, I use 1 qt/100 gal (0.25% v/v)
- Sometime you see labels for 0.5% v/v
 - Above this does no good.

What about crop-oil?

- Again, most brands will work fine.
- Rate: 1% v/v or 1 qt/acre – you choose.
- Since COC dissolves leaf waxes, high rates can burn plant leaves.
 - NIS does not burn leaves

What about diesel fuel?

- Diesel is a oil and oils dissolve leaf waxes
- Diesel was not designed to be a spray adjuvant
- It removes too much leaf wax and damages the leaf
- Unhealthy leaves to not promote herbicide activity.

What about dish detergent?

- Again, not designed to be an adjuvant
- Excessive foaming
- HIGH cost
- A proper spray adjuvant is cheaper and has a proven track record



Conclusions

- Surfactants make a big difference – regardless of brand
- Ammonium sulfate can enhance glyphosate if you have hard water
- Defoamer can save you a lot of frustration

Beware of these!

- Adjuvants that claim:
 - Equal control at reduced herbicide rates
 - Products that “reduce regrowth”
 - Cocktails (spreader + sticker + compatibility + etc). These are usually more costly and give little benefit.
 - Anything that sounds too good to be true

Lastly

- Stick with what you know
- If you are satisfied with the product you are currently using, don't change.
- If glyphosate is working fine, don't add ammonium sulfate. If it is inconsistent, consider using ammonium sulfate.