

# Glyphosate - Past, Present & Future

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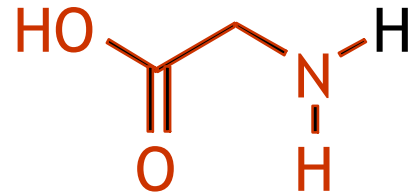
# 1974

- ▶ And staying with the American theme...
- ▶ US chemical company Monsanto, known at the time for nylon and other synthetic fibres, launched a new weedkiller in the UK.
- ▶ Roundup® was a non-selective herbicide containing a brand new active ingredient called glyphosate.



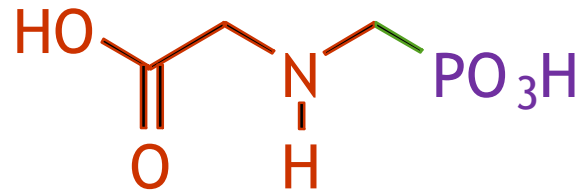
# Such a simple molecule...

- ▶ Glycine is a naturally occurring amino acid.
- ▶ It is the simplest amino acid
- ▶ It is one of the protein-creating amino acids.
- ▶ Colourless, sweet-tasting, crystal



Glycine

- ▶ A phosphoryl group is attached to the glycine to make glyphosate.
- ▶ Phosphorylation of amino acids occurs very widely in nature.
- ▶ Estimated that 156,000 protein phosphorylation sites exist in humans.



Glyphosate

[N-(phosphonomethyl) glycine]

Phosphorylation

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# Roundup® herbicide

- ▶ 360g ae/l glyphosate
- ▶ Present as IPA (isopropylamine) salt
- ▶ Adjuvant system based on tallow amines
- ▶ Non-selective total herbicide with systemic action
- ▶ Non-residual
- ▶ Amenity rate was 3½ pints an acre.
- ▶ Launch Price: £55/5L  
(Average weekly wage: £54; Pint of beer 20p)

The image shows the Roundup logo, which consists of the word "Roundup" in a bold, white, sans-serif font, set against a red, rectangular background that is slightly tilted.

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# 1987

- ▶ **Roundup Pro** introduced.
- ▶ Specially labelled for the industrial and amenity sector.
- ▶ Wide range of specialist uses developed.
  - ▶ Forestry
  - ▶ Stump treatment
  - ▶ Chemical thinning
  - ▶ Aquatic
  - ▶ Invasive species control



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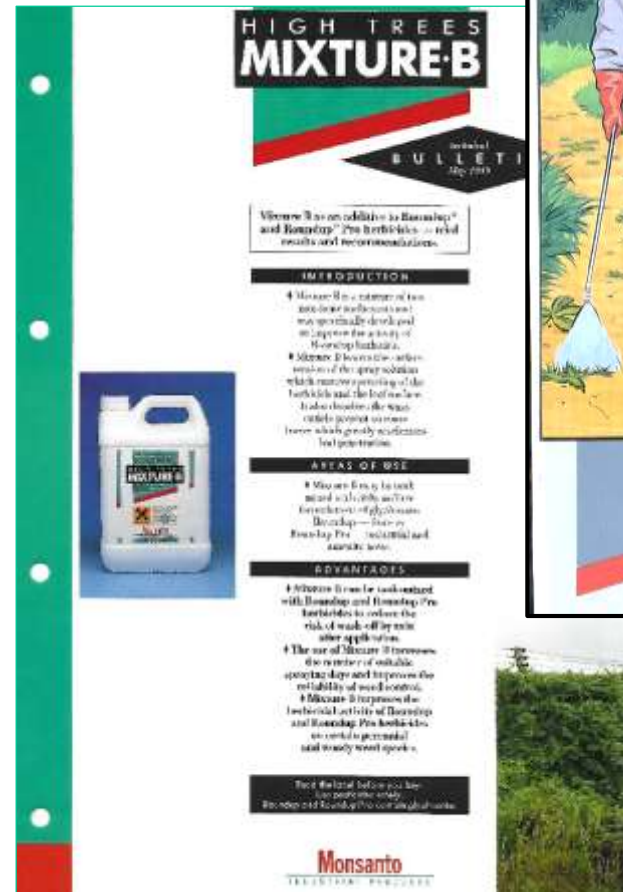
# 1989

## ▶ RIVAL®

- ▶ Glyphosate + simazine
- ▶ Contact and residual in one product
- ▶ Complete weed control in one pack

## ▶ MIXTURE B™

- ▶ Mixture to two non-ionic surfactants
- ▶ Improved activity on certain perennial and woody weed species, especially those with waxy leaves.



**HIGH TREES MIXTURE B**

**BULLET**

Mixture B is an additive to Roundup® and Roundup Pro herbicides to yield results and recommendations.

**INTRODUCTION**

- Mixture B is a mixture of two non-ionic surfactants that was specifically developed to improve the activity of Roundup herbicide.
- Mixture B is a true, water-soluble herbicide that penetrates the bark and the leaf surface. It also breaks the waxy cuticle of some woody trees which greatly facilitates leaf penetration.

**AREAS OF USE**

- Mixture B may be used mixed with the active herbicides of glyphosate: Roundup—Clear or Roundup Pro—residual and aquatic uses.

**ADVANTAGES**

- Mixture B can be tank-mixed with Roundup and Roundup Pro herbicides to reduce the risk of wash-off by rain after application.
- The use of Mixture B increases the number of suitable application days and improves the reliability of weed control.
- Mixture B improves the herbicidal activity of Roundup and Roundup Pro herbicides on certain perennial and woody weed species.

Read the label before you use any pesticide safely.  
Roundup and Roundup Pro are registered trademarks of Monsanto.

**Monsanto**  
INDUSTRIAL PRODUCTS



A glyphosate and simazine herbicide for total weed control in amenity, industrial and forestry areas.

**RIVAL®**

Herbicide by Monsanto.

GLYPHOSATE  
TRANSLOCATES  
TO KILL  
DEEP ROOTS

SIMAZINE  
CONTROLS  
EMERGING  
SEEDLINGS

•  
UP TO 6 MONTHS  
RESIDUAL  
CONTROL

**Monsanto**  
INDUSTRIAL PRODUCTS

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# 1993

- ▶ Amenity uses of atrazine and simazine withdrawn, so RIVAL was lost.

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# 1994

## ▶ Roundup Pro Biactive

- ▶ “Biactivator” formulation technology
- ▶ For the first time... a clean label - No Hazard Rating
- ▶ Improved efficacy especially against perennial broad-leaved weeds
- ▶ Improved rainfastness



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# 2002

- ▶ On 1<sup>st</sup> July 2002 Glyphosate, as an active ingredient, was successfully listed on Annex 1 of Directive 91/414 which concerned the placing of plant protection products on the market in the EU.
- ▶ This meant that Glyphosate was Approved in the EU for 10 years.

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# 2005

## ▶ Roundup Pro-Green

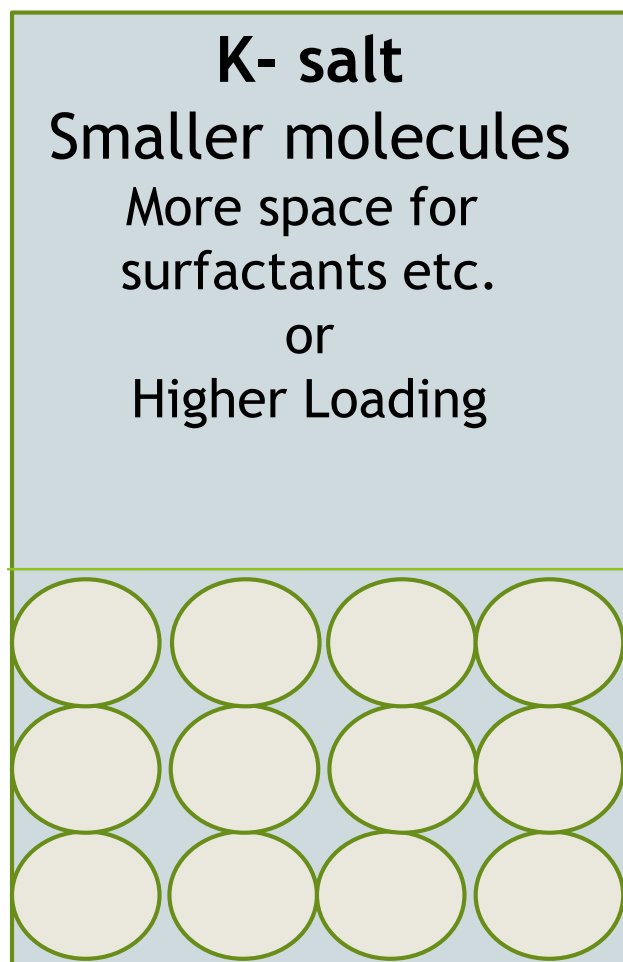
- ▶ New 450g/l high load formulation
- ▶ First amenity Potassium Salt product
- ▶ Formulation based on “Transorb Technology”
- ▶ Extended efficacy, including on tough weeds and in tough conditions, especially in comparison with other glyphosate formulations.
- ▶ Lower viscosity enabling easier pouring and increased rinsing efficiency.



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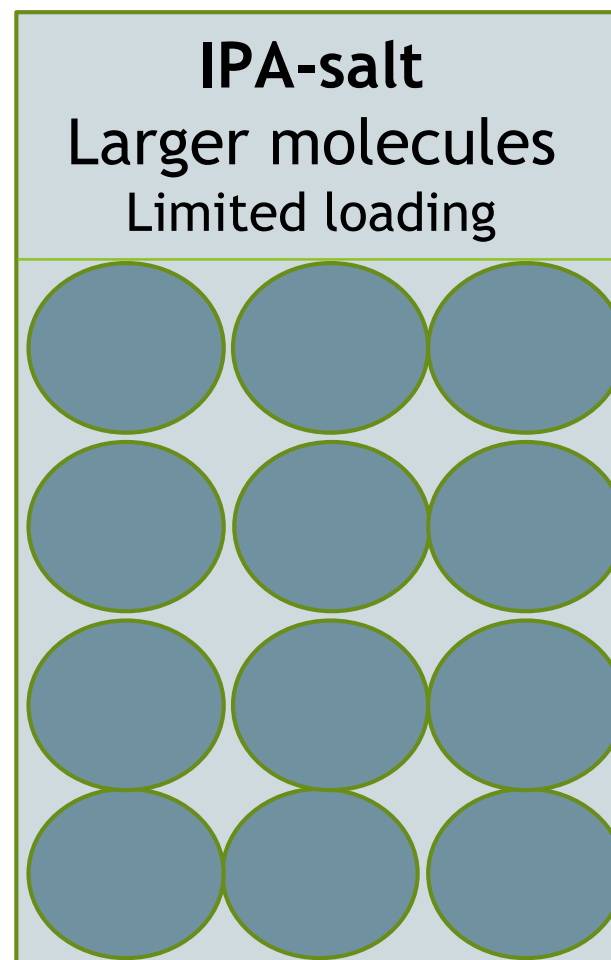


# Comparing salt molecule volumes



Water  
difference

Same total  
volume



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**Roundup**  
VISTA Plus

# 2011

## ▶ **ECOplug Max**

- ▶ New innovative delivery system for glyphosate.
- ▶ No liquids or sprayers to handle.
- ▶ Just drill and tap in!
- ▶ Effective prevention of re-growth from cut stumps of trees and shrubs.



**ECOPLUG®**

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# 2014

- ▶ Roundup ProActive
- ▶ Roundup ProVantage
- ▶ Clean label reinforced
- ▶ Improved rainfastness and speed of uptake
- ▶ Low drift formulation
- ▶ Improved hard water efficacy



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# Today...

- ▶ The re-Approval of glyphosate

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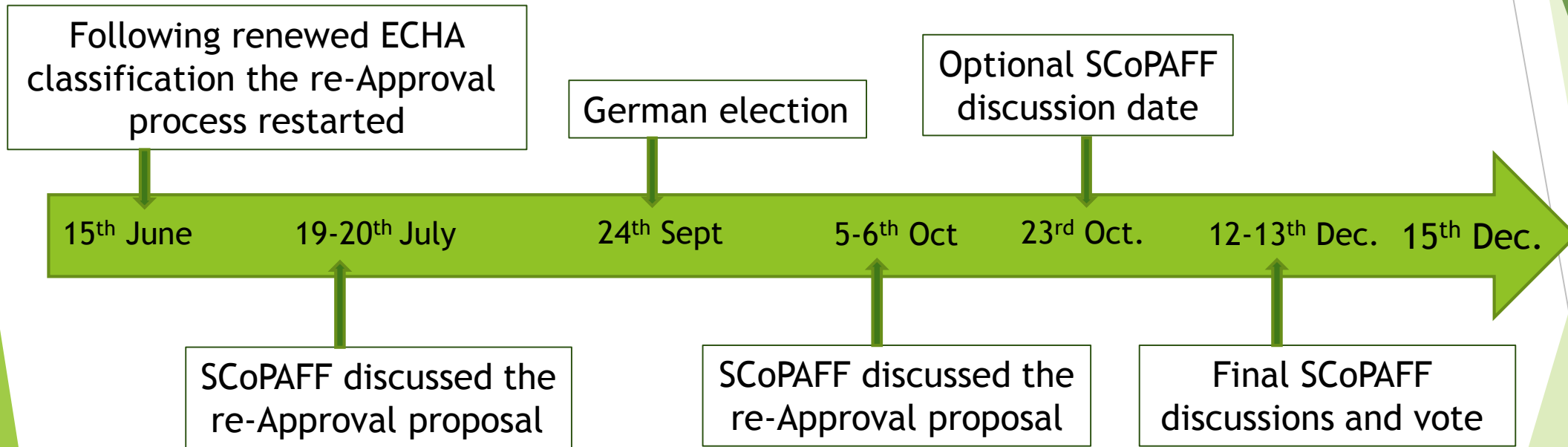


# Where are we up to?

- ▶ Following assessment by both European Food Safety Authority (EFSA) and European Chemicals Agency (ECHA) the European Commission drafted a regulation for the re-Approval of glyphosate in mid-June.
- ▶ The regulation proposes renewal for 10 years.
- ▶ This was submitted to the Standing Committee on Plants, Animals, Food and Feed (SCoPAFF) for discussion and voting.



# Process Moving Forward





# POE-tallowamine Formulations

- ▶ Last March everything was formally tidied up.
- ▶ Last date for sale & distribution was 30/06/2017
- ▶ Last date for disposal, storage & use is 30/06/2018



Health and Safety  
Executive

Pesticides eBulletin

## Plant Protection Products Containing Glyphosate and the Co-Formulant POE-Tallowamine

Regulatory Update: 06/2017

Issued: 17th March 2017

### Background

[Regulation \(EU\) 2016/1313](#) amended the conditions for the EU approval of glyphosate. It includes a requirement that Member States ensure that glyphosate products do not contain the co-formulant POE-tallowamine.

### Current Expiry Dates of UK Products Containing Glyphosate and POE-Tallowamine

There are currently 109 plant protection products which contain glyphosate and POE-tallowamine authorised in the UK.

99 of these product authorisations have the following expiry dates:

- For sale and distribution: on or before **30 June 2017**
- For disposal, storage and use: on or before **30 June 2018**

A further 10 products currently expire at a later date.

Products lists are linked from "Action Required" section below.

### Action required

The [99 products containing glyphosate and POE-Tallowamines which currently expire in June 2017 and June 2018 or earlier](#) (list available at link), as mentioned above, will be allowed to expire on their current expiry dates. A separate withdrawal notice will **not** be published for these products.

For the remaining 10 products, a [Withdrawal Notice](#) has been issued, giving an expiry date of **30 June 2017** for sale and distribution, and **30 June 2018** for disposal storage and use.

# NON-tallowamine Formulations

- ▶ CRD extended the expiry dates for all non-tallowamine glyphosate formulations
- ▶ New dates as follows:

Expiry of authorisation:	31/12/2018
End of sales & distribution of existing stock:	30/06/2019
End of disposal, storage & final use-up:	30/06/2020
- ▶ Authorisations now go to 1 yr after the Annex1 Renewal at EU level should be completed, which is the time limit for product renewals at country level and should save them needing to do any further extensions!



# The Future... of Glyphosate

- ▶ We are already finishing the development of the next Generation Glyphosate product.
- ▶ ‘*ProVantage 2.0*’ will be available in around 2 years
  - ▶ Still greater efficacy
  - ▶ Improved reliability
  - ▶ Clean label
- ▶ Candidates for follow-on formulations are already being screened.
- ▶ Innovation in glyphosate doesn’t stop!

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# 1974 to today and beyond...

- ▶ Glyphosate was first introduced 43 years ago
- ▶ Initially priced at more than a week's wages, the product ushered in cost-effective low hazard amenity weed control.
- ▶ Numerous formulation innovations have resulted in continuous product improvement - efficacy, safety profile, weather, environment
- ▶ Novel uses and delivery systems have continue to provide new approaches to weed control
- ▶ The regulatory situation should hopefully be resolved by the end of the year

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# Thank You!

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