



PRODUCT MANUAL

2007/2008



ACTIVATOR 90

AWAKEN

BLUE
MARKER DYE

BOND

CROPSPRAY 11-E

DESIGNER

DRILL

FIGHTER-F

Li-700

PHASE-II

ROUTE

SILWET L-77

SPRAYMAC

T-80

T&E CLEANER

TORPEDO-II

TUFF TRAX

X-CHANGE

YIELD PLUS

Researched Technology for progressive farming

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Introduction to the De Sangosse Product Manual

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**ALWAYS READ THE PESTICIDE AND
ADJUVANT LABEL BEFORE USE.**

USE PESTICIDES SAFELY

Product Ready Reckoner

In this section you will find a series of tables that will enable you to calculate the right amount of adjuvant for the sprayer volume and area to be sprayed, and also the number of packs required for this.

Adjuvant Need based upon Sprayer Volume

Adjuvants are mainly used as a % of the spray volume.

To use the Ready Reckoner:-

1. Define your sprayer volume.
2. Decide the adjuvant use rate.
3. Cross reference the table below.

e.g. for a 1500 litre sprayer using Torpedo-II at 0.1% spray volume you will need 1.5 litres of Torpedo-II.

	Sprayer Volume			
	1000 litres	1500 litres	2000 litres	2500 litres
Adjuvant rate %	Adjuvant amount per spray tank (litres)			
0.025%	0.25	0.38	0.50	0.63
0.05%	0.50	0.75	1.00	1.25
0.10%	1.00	1.50	2.00	2.50
0.125%	1.25	1.88	2.50	3.13
0.14%	1.40	2.10	2.80	3.50
0.20%	2.00	3.00	4.00	5.00
0.25%	2.50	3.75	5.00	6.25
0.50%	5.00	7.50	10.00	12.50
1.00%	10.00	15.00	20.00	25.00

Hectare Coverage of Adjuvants by Pack Size

To use this Ready Reckoner:-

1. Decide your spray volume per hectare and choose the appropriate table:-

Table 1 = 100 l/ha

Table 2 = 150 l/ha

Table 3 = 200 l/ha

2. From the desired Adjuvant rate % and Pack size, cross reference the hectare coverage e.g. spraying at 150 l/ha (Table 2) with a 5 litre pack of Li-700 to be used at 0.5% spray volume will give a hectare coverage of 6.7 hectares.

Table 1:	Pack size			
100 litres/ha	1 litres	2.5 Litres	3 litres	5 litres
Adjuvant rate %	Hectarage cover per pack			
0.025%	40	100	120	200
0.05%	20	50	60	100
0.10%	10	25	30	50
0.125%	8	20	24	40
0.14%	7.1	17.9	21.4	35.7
0.20%	5	12.5	15	25
0.25%	4	10	12	20
0.50%	2	5	6	10
1.00%	1	2.5	3	5

Table 2:	Pack size			
150 litres/ha	1 litres	2.5 litres	3 litres	5 litres
Adjuvant rate %	Hectarage cover per pack			
0.025%	26.7	66.7	80	133.3
0.05%	13.3	33.3	40	66.7
0.10%	6.7	16.7	20	33.3
0.125%	5.3	13.3	16	26.7
0.14%	4.8	11.9	14.3	23.8
0.20%	3.3	8.3	10	16.7
0.25%	2.7	6.7	8	13.3
0.50%	1.3	3.3	4	6.7
1.00%	0.7	1.7	2	3.3

Table 3:	Pack size			
200 litres/ha	1 litres	2.5 litres	3 litres	5 litres
Adjuvant rate %	Hectarage cover per pack			
0.025%	20	50	60	100
0.05%	10	25	30	50
0.10%	5	12.5	15	25
0.125%	4	10	12	20
0.14%	3.6	8.9	10.7	17.9
0.20%	2.5	6.3	7.5	12.5
0.25%	2	5	6	10
0.50%	1	2.5	3	5
1.00%	0.5	1.3	1.5	2.5

Why use an Adjuvant?

Adjuvants work by altering the physical properties of:-

- Spray Solutions - to increase wetting and spreading
- Spray Droplets - to maximise retention
- Target Surfaces - to maximise uptake/penetration

They are management tools to optimise your pesticide applications.

Application Problems

Problem	Required Adjuvant Property
Catchy weather	Sticking
Dense canopy	Wetting / spreading
Deposition / retention	Sticking / wetting
Pesticide lock up	Water conditioning
Poor uptake	Penetrant
Spray drift	Reduction of fine droplets
Waxy / hairy targets	Wetting / spreading

Adjuvants perform specific functions to minimise spray problems. However no single adjuvant can perform all these functions.

Adjuvant Properties

The following table highlights the properties and benefits of the De Sangosse range of adjuvants. It can be used to help identify the appropriate adjuvant for the specific job you have to do.

	Activator 90	Bond	Cropspay 11E	Designer	Drill	Li-700	Phase-II	Silwet L-77	Spraymatic	T-80	Torpedo-II	* X-Change
Non-Ionic Wetter/Spreader	V	E	-	V	V	V	V	E	E	V	-	-
Cationic Wetter	-	-	-	-	-	-	-	-	V	-	-	-
Super-Wetter	-	-	-	E	-	-	V	-	-	-	-	-
Soil Wetter	-	-	-	-	-	-	V	-	-	-	-	-
Adjuvant Oil	-	-	V	-	V	E	V	-	-	-	-	-
Retention Aid/Rainfastness	S	V	-	V	-	E	-	-	-	-	-	-
Translocation Agent	-	-	-	-	-	V	-	-	-	-	-	-
Water Conditioner	-	-	-	-	-	V	-	-	E	E	S	V
Acidification	-	-	-	-	-	V	-	-	V	-	-	V
Low Spray Volume Enabling	-	-	-	V	-	S	-	V	-	-	S	-
Penetration-Cuticle Disruption	-	-	V	-	E	-	E	-	-	V	V	-
Penetration-Cuticle Hydration	S	-	-	-	-	V	-	-	-	-	E	V
Humectant	S	-	-	S	-	S	-	-	-	-	E	E
Drift Reduction	E	E	E	V	V	V	V	V	-	-	V	-
Good in Tank Mix	E	E	-	V	V	V	V	V	E	-	V	V

* X-Change is not an adjuvant

S Some Effect
 E Effective
 V Very Effective

Justification for Adjuvant Use

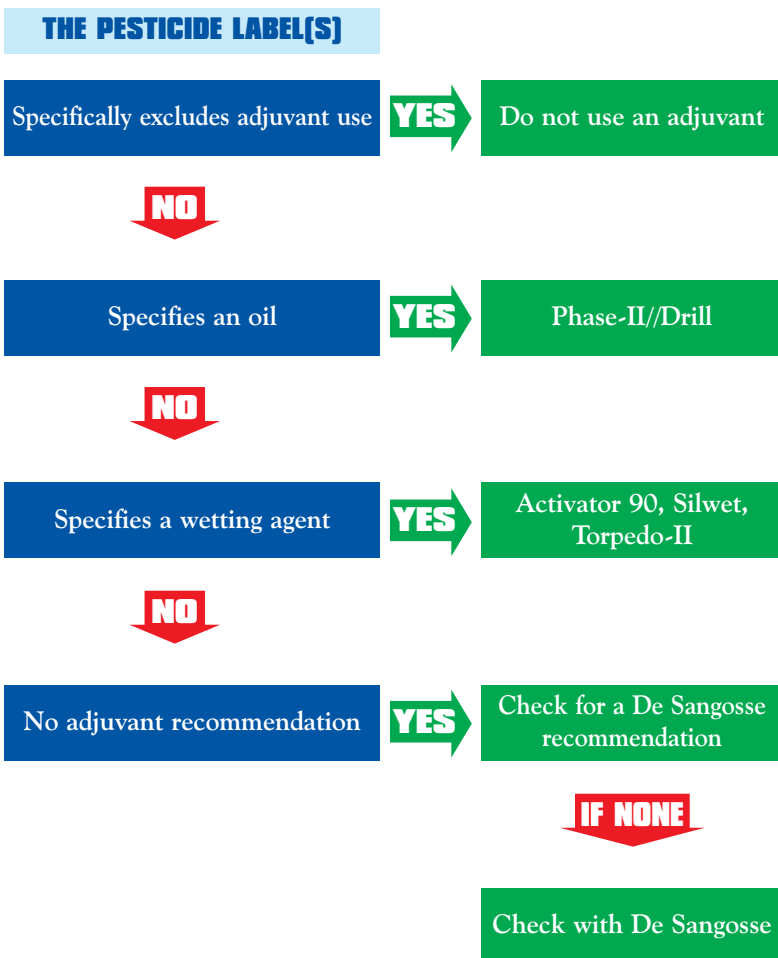
The table above shows that not all adjuvants are alike, but there is a clear technical justification for using the RIGHT adjuvant within its authorisation, e.g:-

1. The Pesticide label specifies the need for an adjuvant.
2. You can clearly identify specific problems that will reduce pesticide efficacy unless you use an adjuvant.
3. There is reliable data showing an economic benefit.

How to choose the right Adjuvant

All adjuvant use must be in accordance with both the partner pesticides approval and the adjuvant authorisation.

Read the pesticide label(s) for any adjuvant recommendations:-



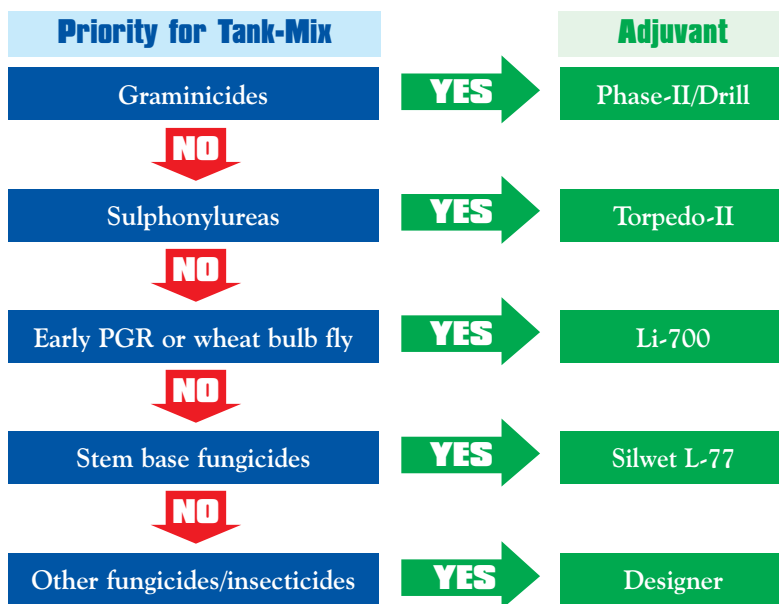
Having evaluated the restrictions on the pesticide label and chosen the adjuvant, confirm this choice by referring to the specific adjuvant recommendations by crop.

Adjuvant Recommendations by Crop

1. Cereals (General)

The following chart is a general guide to which adjuvant to use in a cereal tank-mix situation.

Stop at first 'YES' and use the specified adjuvant.



1. Cereals (Specific)

Pesticide		Adjuvant	Adjuvant Rate ml per 100 l/ha
chlorpyrifos -soil pests	→	Silwet L-77	100 ml
stem base fungicides	→	Silwet L-77	50 ml
T2, T3 fungicides	→	Designer	125 ml
glufosinate	→	X-Change	250 ml
glyphosate - all formulations	→	X-Change	250 ml
graminicides	→	Drill	500 ml
Grasp + Output	→	X-Change	250 ml
PGRs *	→	Li-700	500 ml
pyrethroids, pirimicarb	→	Designer	125 ml
sulphonylureas	→	Torpedo-II	100 ml
wheat bulb fly - dead heart	→	Li-700	500 ml

* not Moddus + chlormequat on oats or Satellite

2. Cereals - Soil Acting Herbicides

Pesticide		pre-em*	peri-em post-em*
Crystal/Ice/Trooper	→	Silwet	Silwet
CTU	→	Silwet	None
IPU	→	None	Drill or Silwet
Lexus 50	→	None	Drill
Liberator	→	Drill or Silwet	None
Panther	→	None	Drill
pendimethalin	→	Silwet	Silwet
trifluralin	→	Silwet	Silwet
Uranus	→	None	None

* Use Silwet at 200 ml per ha

* Use Drill at 500 ml per 100 l/ha

3. Field Beans and Dried Peas

Pesticide		Adjuvant	Adjuvant Rate ml per 100 l/ha
Aramo	→	X-Change	250 ml
Checkmate, Laser	→	Phase-II	500 ml
diquat	→	Activator 90	100 ml
fungicides	→	Designer	125 ml
glufosinate	→	X-Change	250 ml
glyphosate - all formulations	→	X-Change	250 ml
OP insecticides	→	X-Change	250 ml
pyrethroids, carbamates	→	Designer	125 ml
soil pests e.g. leatherjackets	→	Silwet L-77	100 ml

4. Linseed

Pesticide		Adjuvant	Adjuvant Rate ml per 100 l/ha
Ally, Eagle	→	Torpedo-II	100 ml
Aramo	→	X-Change	250 ml
Checkmate, Laser, Pilot	→	Phase-II	500 ml
diquat	→	T-80	500 ml
glufosinate	→	X-Change	250 ml
glyphosate - all formulations	→	X-Change	250 ml

5. Maize

Pesticide	Adjuvant	Adjuvant Rate ml per 100 l/ha
Jester, Titus / Tarot	Activator 90	250 ml
OP insecticides	X-Change	250 ml
soil pests e.g. leatherjackets	Silwet L-77	100 ml

6. Oilseed Rape

Pesticide	Adjuvant	Adjuvant Rate ml per 100 l/ha
Aramo	X-Change	250 ml
Checkmate, Laser, Pilot	Phase-II	500 ml
diquat	Activator 90	100 ml
Falcon	Silwet L-77	100 ml
fungicides	Designer	125 ml
glufosinate	X-Change	250 ml
glyphosate - all formulations	X-Change	250 ml
insecticides	Designer	125 ml
soil pests e.g. leatherjackets	Silwet L-77	100 ml

7. Oilseed Rape Soil Acting Herbicides

Pesticide	pre-em*	post-em*
Butisan S	Drill or Silwet	None
Centium	Drill	None
Katamaran	Drill or Silwet	None
Kerb	None	Silwet
trifluralin	Drill or Silwet	None

* Use Silwet 200 ml per ha

* Use Drill at 500 ml per 100 l/ha

8. Potatoes

Pesticide		Adjuvant	Adjuvant Rate ml per 100 l/ha
Checkmate, Laser	→	Phase-II	500 ml
fungicides	→	Bond	140 ml
glufosinate	→	X-Change	250 ml
OP insecticides	→	X-Change	250 ml
pyrethroids, carbamates	→	Bond	140 ml
soil pests	→	Silwet L-77	100 ml
Titus / Tarot	→	Torpedo-II	100 ml

9. Sugar Beet

Pesticide		Adjuvant	Adjuvant Rate ml per 100 l/ha
all other herbicides	→	Phase-II	500 ml
Aramo	→	X-Change	250 ml
OP insecticides	→	X-Change	250 ml
pyrethroids, carbamates	→	Designer	125 ml
soil pests	→	Silwet L-77	100 ml



AWAKEN, YEALD Plus and ROUTE are specific growth promoter formulations all based on the patented ZC-Technology. ZC treatment improves the growth of plants resulting in greater yield, quality of yield and/or speed to maturity.

This is achieved by supplying Zinc in the most effective form, maximising the response of plants to the Zinc, which they need to:-

- Strengthen cell wall structure – to retain and translocate absorbed nutrients and water.
- Improve auxin production – to maximise root development.
- Improve photosynthetic activity – from increased chlorophyll concentration.

Stronger Cell Wall Structure

ZC increases retention of all nutrients by the plants, including those essential for photosynthesis.

ZC-Technology - Increases Nutrient Uptake								
Treatment	%				PPM			
	N	P	K	Mg	Mn	Fe	Cu	Zn
ZC-Technology (70 g Zn/ha)	4.5	0.25	3.8	0.4	100.9	103.8	7.9	41.4
Formulated Zinc (269 g Zn/ha)	4.4	0.23	3.1	0.37	87.9	97.9	7.7	36.5
ZC Benefit	+2%	+9%	+22%	+8%	+15%	+6%	+2%	+13%
					Essential for Chlorophyll			

Foliar samples taken 28 DAT - Mean of 8 replicated trials on wheat, maize, potatoes and sugar beet.

ZC - Increases Auxin Production

Auxin promotes root development; number, mass and depth. A better root system can access nutrients and water more effectively, improving growth and reducing stress.

In trials the ZC formulation gave the highest level of auxin of all treatments.

Effect on Auxin Levels

Treatment	Auxin (pico g/g fresh weight)
Control (Water)	264
Zinc Sulphate	396
Zinc Nitrate	430 (significant)
ZC	620 (significant)
LSD	138.7

Source: Dr M Leitch - University College of Wales - Aberystwyth

Effect on Rooting

Crop	ZC-Product	% Increase in Root Dry Weight	Days After Treatment	Source
Wheat	Route	+ 19	42	UC Wales
Oilseed Rape	Route	+ 11	60	SAC
Potato	YEALD Plus	+ 9	14	UC Wales
Sugar Beet	YEALD Plus	+ 12	246	Morley Research Station
Carrots	Awaken	+ 7	30	Levington Agriculture
Broccoli	Awaken	+ 6	28	HRI - Kirton
Cauliflower	Awaken	+ 23	28	HRI - Kirton

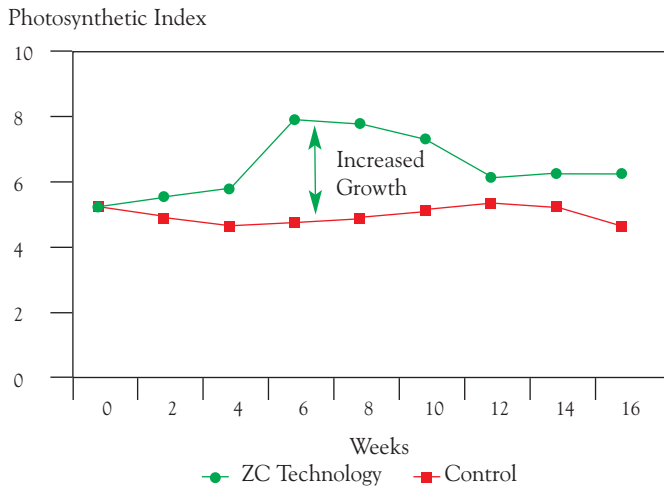
The larger root mass consistent across all species tested is characteristic of ZC treatment and enables treated crops to access all nutrients needed for healthy growth.

Example of Greater Root Structure in Cereals



Improved Photosynthetic Efficiency

Using chlorophyll fluorescence measurements, the photosynthetic index (efficiency) was measured over time:-



ZC treated plants consistently show increased efficiency as a consequence of higher concentrations of Chlorophyll and Carotenoids.

Effects on Chlorophyll, Carotenoid and Photosynthetic Index

Crop	Chlorophyll Content ($\mu\text{g/g}$) Fresh Weight		Carotenoid Content ($\mu\text{g/g}$) Fresh Weight		Photosynthetic Index	
	Control	ZC	Control	ZC	Control	ZC
Wheat	72.0	115.0	4.1	4.4	12.2	13.4
Potato	38.5	43.0	2.8	3.0	6.2	6.9
Sugar Beet	43.2	50.6	3.1	3.2	6.3	7.0

The increase in Chlorophyll content enables plants to convert more sunlight into growth. The increase in Carotenoids reduces stress. These, together with a larger root system and improved nutrient uptake enable ZC treated plants to produce a higher yield with improved quality.

ZC-Technology - Summary

Independently researched and proven nutrient formulations working with the plant to *naturally* increase:-

- Chlorophyll content of leaves
- Photosynthetic efficiency
- Protein and auxin synthesis
- Root vigour and size (mass and length)
- Stress resistance - increases the plants ability to scavenge for water and nutrition
- Yield potential (no other limiting factors)

Proven to be the most effective growth promoter formulations on the market.

Activator 90

WETTING AGENT

ACTIVATOR 90



Authorisation

1. Field of use

For use only as an agricultural/horticultural/forestry wetting agent.

2. Status

Activator 90 can be used with the full approved rate of the pesticide within the restrictions of the “Crop Growth Stage Table” - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

Activator 90 is a superior non-ionic wetter which lowers the surface tension of the spray solution increasing the wetting and spreading of pesticides on the target.

It is a 900 g/kg emulsifiable concentrate containing 750 g/kg Alcohol Ethoxylates and 150 g/kg fatty acids. Activator 90 has a “built in” anti-foam/defoamer. Activator 90 does **not** contain volatile solvents.



Main Recommendations for the Use of Activator 90

Activator 90 can be used on all edible and non edible crops with all approved pesticides that have a recommendation for use with a non-ionic wetter. Activator 90 can be used to reduce drift.



Compatibilities

There are no recommended tank-mixes where the addition of Activator 90 makes them physically or biologically incompatible.



Rate of Use

Activator 90 is used at a rate of 0.1% of the final spray solution.
The maximum authorised concentration is 0.1% of the final spray solution.

Water Volume (l/ha)	Required Quantity of Activator 90 @ 0.1%
70	70 ml
100	100 ml
200	200 ml



Mixing Sequence

Half fill spray tank with water and start agitation.

Add the pesticides as directed.

Add the required quantity of Activator 90 and top up spray tank.

Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R22 : Harmful if swallowed.

R38 : Irritating to skin.

R41 : Risk of serious damage to eyes.



Number of Applications

Activator 90 may be used as often as required on a crop, provided that the terms of the authorisation of Activator 90 and the terms of approval of the partner pesticide are followed.



Pack Size

Activator 90 is supplied in 2.5 litre and 5 litre packs.

Awaken

ZC-TECHNOLOGY FOR VEGETABLES



Authorisation

1. Field of use

Awaken is a growth promoter for use in horticulture.

2. Status

Awaken is a nutrient solution. The Pesticide Safety Directorate do not classify Awaken as an adjuvant or as a pesticide. It is therefore not subject to COPR legislation and is not included in any approved pesticide or adjuvant listing by PSD or others e.g. supermarkets.



Formulation

Awaken is a patented, soluble concentrate nutrient solution including nitrogen and zinc complexes plus essential trace elements.



Main Recommendations and Use Rates for Awaken

Awaken is absorbed both through the foliage and the roots, therefore it should be applied as an overall spray at the rates and timings given in the table below :-

Crop	Rate of use (l/ha)	Optimum application timing
Brussels Sprout, Cabbage, Calabrese, Cauliflower	2.5	Apply 2-7 days post-transplanting
Bulb or Spring Onions, Carrots, Leeks	2.5	Apply at the 2-4 true leaf stage
Lettuce (outdoor)	2.5	Apply at the 4-6 true leaf stage

Awaken must only be applied to crops during periods of active growth i.e. not drought stressed, otherwise activity may be reduced. Plants should be turgid (not wilting) at treatment.



Compatibilities

Awaken is physically and biologically compatible with approved pesticides and approved tank-mixtures provided that all product recommendations are followed.



Mixing Instructions

If Awaken is applied alone add Activator 90 as a wetting agent at 200 ml per 200 litres of water.

The addition of Activator 90 is not required if Awaken is applied as a tank mix.

Awaken may be applied in water volumes between 100 to 400 l/ha using a medium or fine spray quality.

Ensure spray tank is thoroughly cleaned before adding Awaken, or herbicide residues in the spray tank may be transferred onto susceptible crops.

Do not allow Awaken and pesticide concentrates to mix directly together e.g. in induction bowls.

Half fill the spray tank with water and begin agitation.

Add required quantity of Awaken and top up the tank.

If spraying Awaken as a tank mix with a pesticide, follow the recommendations on the pesticide label including the addition of an adjuvant oil or non-ionic wetter where recommended.

Add each product to the spray tank separately taking note of any instructions regarding order of mixing.

Efficient agitation is essential to ensure full physical compatibility, and all mixes should be used **immediately** after mixing.



Hazard Warnings

R36/37/38 : Irritating to eyes, respiratory system and skin.



Number of Applications

One per crop.



Pack Size

Awaken is supplied in 5 litre packs.

Blue Marker Dye

SPRAY DYE



Authorisation

1. Field of use

For use in agriculture/horticulture/forestry as a spray dye.

2. Status

Blue Marker Dye is a spray dye and not an adjuvant so is not subject to The Pesticide Safety Directorate adjuvant authorisation.



Formulation

Blue Marker Dye is a soluble liquid concentrate, non-permanent blue dye.



Main Recommendations for the Use of Blue Marker Dye

Blue Marker Dye is safe to use with all approved pesticides where treated areas need to be clearly identified to prevent repeat treatment or misses during application.



Compatibilities

With all pesticide formulations except mineral acid e.g. sulphuric acid or alkalis e.g. sodium hydroxide.



Rate of Use

The rate will be within the range of 50-200 ml per 100 litres. The rate will vary depending on target colour, height and spray application rate. For knapsack application use up to 40 ml per 5 litres (operators may need to adjust rates from those suggested to achieve desired degree of marking).



Mixing Instructions

Start with the lowest rate of Blue Marker Dye. Add more product as required for easy identification of treated area. The more Blue Marker Dye you use, the darker your marking.



Hazard Warnings

No significant hazard.



Number of Applications

Blue Marker Dye may be used as often as required on a crop provided the terms of approval of the partner pesticide are followed.

It is not advisable to use Blue Marker Dye near the harvest date of any vegetable crop where the dye colour may be visible at harvest.



Pack Size

Blue Marker Dye is supplied in 1 litre packs.

Bond

STICKER / WETTER



Authorisation

1. Field of use

For use only as an agricultural/horticultural/forestry sticking, extending and wetting agent.

2. Status

Bond is authorised for use with the full rate of all potato blight fungicides up to their latest approved timing. In addition, Bond can be used with the full approved rate of the pesticide within the restrictions of the “Crop Growth Stage Table” - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

Bond is a unique non-ionic co-polymer latex sticker. Bond does not ‘bind to’ or ‘seal over’ pesticides and therefore will not restrict their uptake or efficacy.

Bond is a 55% emulsifiable concentrate containing 45.0 % w/w styrene-butadiene co-polymer and 10.0 % w/w alcohol alkoxyate.



Main Recommendations for the use of Bond

Bond is recommended for use in all situations where rainfastness is a concern e.g.:-

- Potatoes - full rates of all blight fungicides at all approved timings.
- Other Crops
 - With all formulations of glyphosate and glufosinate.
 - Fungicides, Insecticides.
 - To reduce drift.



Compatibilities

There are no recommended tank-mixes where the addition of Bond makes them physically or biologically incompatible. Bond is not recommended with Satellite, products containing fluoroglyphofen, bifenox, difenzoquat or cyanazine; or diclofop-methyl on barley.



Rate of Use

Bond is used at a rate of 0.1% of the final spray solution in normal conditions and 0.14% in difficult conditions. In practice, due to the UK weather patterns, 0.14% is the most commonly used rate.

Water Volume	0.10% Bond	0.14% Bond
70	70 ml	98 ml
100	100 ml	140 ml
200	200 ml	280 ml

The maximum authorised concentration is 0.14% of the final spray solution.



Mixing Sequence

Half fill spray tank with water and start agitation.

Add pesticides as directed.

Top up the spray tank and then add the required quantity of Bond.

Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R36/37/38 : Irritating to eyes, respiratory system and skin.



Number of Applications

Bond may be used as often as required on a crop, provided that the terms of the authorisation of Bond and the terms of approval of the partner pesticide are followed.



Pack Size

Bond is supplied in 1 litre and 5 litre packs.

Newman Cropspray 11-E

MINERAL OIL



Authorisation

1. Field of use

For use as an agricultural/horticultural adjuvant oil (ground and aerial application).

2. Status

Cropspray 11-E is authorised for use with the listed approved herbicides on cereals, sugar beet, oilseed rape, fodder beet, mangels and red beet as detailed in the following table:-

Crop	Pesticide	Maximum oil concentration (% of spray solution)
Cereals	Approved salt formulations of MCPB, 2,4-D	1.25
Oilseed Rape	Approved post-emergence pesticides recommended for use with an adjuvant oil	1.25
Sugar Beet Fodder Beet Mangel Red Beet	Approved formulations of phenmedipham and 'Goltix WG'	2.5

Other specific restrictions: 'Cropspray 11-E' in tank mixture with 'Roundup' must only be used for the treatment of stubbles.

In addition Cropspray 11-E can be used with the full approved rate of the pesticide within the restrictions of the "Crop Growth Stage Table" - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

A high quality emulsifiable concentrate containing 99% w/w highly refined paraffinic oil.



Main Recommendations for the Use of Cropspray 11-E

Cropspray 11-E is recommended for use with herbicides/graminicides in a wide range of crops e.g. sugar beet, cereals, maize etc., whenever an adjuvant oil is required by the partner pesticide.



Compatibilities

Cropspray 11-E is compatible in all situations where an adjuvant oil is recommended or required.



Rate of Use

Cropspray 11-E should be used at the rate directed on the partner pesticide. It is normally used at 1% of the spray solution.

Water Volume (l/ha)	1.0% Cropspray 11-E
70	700 ml
100	1000 ml
200	2000 ml

The maximum authorised concentration is 2.5% of the final spray solution.



Mixing Sequence

Three quarters fill the spray tank with water and start agitation.
 Add the required quantity of Cropspray 11-E.
 Add pesticide(s) as directed.
 Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R22 : Harmful if swallowed.



Number of Applications

Cropspray 11-E may be used as often as required on a crop, provided that the terms of the authorisation of Cropspray 11-E and the terms of approval of the partner pesticide are followed.



Pack Size

Cropspray 11-E is supplied in 5 litre packs.

Designer

SUPER WETTER / STICKER



Authorisation

1. Field of Use

For use only as an agricultural/horticultural/forestry sticker/extender and wetting agent.

2. Status

Designer can be used with the full approved rate of the pesticide within the restrictions of the “Crop Growth Stage Table” - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

Designer is a unique non-ionic formulation of a sticker and super wetter.

Designer does not 'bind to' or 'seal over' pesticides and therefore will not restrict their uptake or efficacy.

Designer is an emulsifiable concentrate containing styrene-butadiene co-polymer and polyalkylene oxide modified heptamethyl trisiloxane.



Main Recommendations for the Use of Designer

Designer is recommended for use when superior spread, coverage and retention are required e.g.

- Cereals - all fungicides and insecticides.
- Pulses - all fungicides and insecticides.
- Designer enables the use of lower water volumes where approved e.g:- 100 l/ha for cereals.
- Designer can be used to reduce drift.



Compatibilities

There are no recommended tank-mixes where the addition of Designer makes them physically or biologically incompatible. Designer is not recommended with Satellite, products containing fluoroglyphofen, bifenox, difenzoquat or cyanazine; or diclofop-methyl on barley.



Rate of Use

Use Designer at 125 ml/ha or as per the following table:-

Disease Pressure	Amount of Designer to use per Ha	
	100 l/ha Spray Volume	200 l/ha Spray Volume
Low/Normal	125 ml	125 ml
High	125 ml	250 ml

The maximum authorised concentration is 0.13% of the final spray solution.



Mixing Sequence

Half fill spray tank with water and start agitation.

Add pesticides as directed.

Top up the spray tank and then add the required quantity of Designer.

Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R36/37/38 : Irritating to eyes, respiratory system and skin.



Number of Applications

Designer may be used as often as required on a crop, provided that the terms of the authorisation of Designer and the terms of approval of the partner pesticide are followed.



Pack Size

Designer is supplied in 1 litre packs.

Drill

ACTIVATED METHYLATED RAPESEED OIL

DRILL



Authorisation

1. Field of use

For use only as an agricultural/horticultural adjuvant oil.

2. Status

Drill can be used with the full approved rate of the pesticide within the restrictions of the “Crop Growth Stage Table” - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

Drill is an emulsifiable concentrate adjuvant containing 63.34 % w/w esterified rapeseed oil and an optimised wetting system containing 15.0 % w/w alcohol ethoxylate and 7.5 % w/w natural fatty acids.



Main recommendations for the use of Drill

Drill is specifically recommended for use with cereal graminicides and is backed by the leading manufacturers.

Manufacturer	Product
Bayer CropScience	Amazon, Attribut, Cheetah-S, Puma, Triumph
Dow	Boxer
DuPont	Lexus 50, Lexus Millenium (alone and in mixture with Topik, Hawk, Stomp & approved formulations of trifluralin)
Makhteshim Agan	Falcon Strimma
Monsanto	Monitor
Syngenta	Hawk, Topik

Drill can also be used with specified residual herbicides as specified on page 9 and 10.

Drill can be used to reduce drift.



Compatibilities

Drill is compatible in all situations where an adjuvant oil is recommended or required.



Rate of Use

Drill is authorised for use up to a maximum concentration of 1.0% dilution of the final water volume. In most situations the normal recommended rate for Drill is 0.5% eg.

Susceptible Blackgrass Situations	
Water Volume	Required Quantity of Drill
70 litres	0.5 litres
100 litres	0.5 litres
200 litres	1.0 litres

Drill must never be used at less than 0.5 litres per hectare.

Resistant Blackgrass Situations	
Water Volume	Required Quantity of Drill
70 litres	1.0 litres
100 litres	1.0 litres
200 litres	1.0 litres



Mixing Sequence

Three quarter fill the spray tank with water and commence agitation. Add the required quantity of Drill.

Add pesticide(s) as directed.

Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R41 : Risk of serious damage to eyes.



Number of Applications

Drill may be used as often as required on a crop, provided that the terms of the authorisation of Drill and the terms of approval of the partner pesticide are followed.



Pack Size

Drill is supplied in 5 litre packs.

Fighter-F

ANTI-FOAM / DE-FOAMER



FIGHTER-F



Authorisation

1. Field of use

For use in agriculture/horticulture/forestry as an anti-foam/de-foamer.

2. Status

Fighter-F is an anti-foam/de-foamer and not an adjuvant so is not subject to The Pesticide Safety Directorate adjuvant authorisation.



Formulation

Fighter-F is a silicone based anti-foam and de-foamer containing 10% dimethylpolysiloxane.



Main Recommendations for the Use of Fighter-F

As an anti-foam to prevent foam forming or as a de-foamer to quell existing foam.



Compatibilities

Fighter-F is compatible with all approved pesticide formulations.



Rate of Use

The rate of Fighter-F depends on the degree of the problem and also whether it is an anti-foam or de-foaming situation.

Generally the rate will be in the range 15-75 ml per 200 litres spray solution.



Mixing Instructions

Fighter-F should be added to the spray tank before a pesticide which is known to foam, as it will prevent the build up of foam.

Alternatively, if foaming is already a problem in the tank add Fighter-F with agitation and the foam will be quickly quelled.



Hazard Warnings

No significant hazard.



Number of Applications

Fighter-F may be used as often as required on a crop provided the terms of approval of the partner pesticide are followed.



Pack Size

Fighter-F is supplied in 475 ml handy-packs.

Li-700

PENETRANT / WETTER / ACIDIFIER



Authorisation

1. Field of use

For use only as an agricultural/horticultural/forestry wetting agent and adjuvant oil.

2. Status

Li-700 is authorised for use with:-

All cereal plant growth regulators applied up to GS 52 ($\frac{1}{4}$ inflorescence).

All approved morpholine fungicides on cereals; and with three quarters rate iprodione on brassica crops.

All approved pesticides that recommend the addition of a wetting agent or adjuvant oil.

In addition Li-700 can be used with the full approved rate of the pesticide within the restrictions of the "Crop Growth Stage Table" - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

Li-700 is a unique formulation with penetrating, translocating, wetting and acidifying properties.

Li-700 is an emulsifiable concentrate formulation containing 35.0 % w/w lecithin, 35.0 % w/w propionic acid and 9.39 % w/w alcohol ethoxylate.



Main Recommendations for the Use of Li-700

Li-700 is recommended with:-

- Cereals
 - All plant growth regulators e.g. chlormequat, Cyclade, Meteor, Moddus, Terpal etc (except Moddus + chlormequat on oats or Satellite).
 - Deadheart wheat bulb fly sprays (dimethoate and/or chlorpyrifos).
- OSR - fungicides (e.g. Folicur and Punch).
- All approved formulations of glyphosate.
- Li-700 can be used to reduce drift.
- Li-700 can be used as an acidification/water conditioning agent.



Compatibilities

There are no recommended tank-mixes where the addition of Li-700 makes them physically or biologically incompatible. Li-700 is not recommended with Satellite, products containing fluoroglycofen, bifenox, difenzoquat or cyanazine; or diclofop-methyl on barley.



Rate of Use

Li-700 should normally be used at a standard dilution of 0.5% of spray solution - except with glyphosate for example:-

Water Volume (litres/hectare)	0.5% Li-700 Standard Rate	0.25% For glyphosate only
70	350 ml	175 ml
100	500 ml	250 ml
200	1000 ml	500 ml

The maximum authorised concentration is 0.5% of the final spray solution.



Mixing Sequence

Half fill spray tank with water and start agitation.

Add required quantity of Li-700 before any pesticide.

Add pesticide(s) as directed.

Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R36/38 : Irritating to eyes and skin.



Number of Applications

Li-700 may be used as often as required on a crop, provided that the terms of the authorisation of Li-700 and the terms of approval of the partner pesticide are followed.



Pack Size

Li-700 is supplied in 5 litre packs.

Phase-II

METHYLATED RAPESEED OIL



Authorisation

1. Field of use

For use only as an agricultural/horticultural adjuvant oil.

2. Status

Phase-II can be used with the full approved rate of the pesticide within the restrictions of the “Crop Growth Stage Table” - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

Phase-II is a high quality methylated seed oil (MSO) derived from oilseed rape, formulated as an emulsifiable concentrate containing 95% w/w (842 g/l) esterified rapeseed oil.



Main Recommendations for the Use of Phase-II

Phase-II is recommended for use with herbicides/graminicides in a wide range of crops e.g. sugar beet, cereals, maize etc., whenever an adjuvant oil is required by the partner pesticide.

Phase-II can be used as an alternative to a mineral oil.

Phase-II can be used to reduce drift.



Compatibilities

Phase-II is compatible in all situations where an adjuvant oil is recommended or required.

Phase-II is specifically backed by the following pesticide manufacturers for use with their cereal herbicides:-

Manufacturer	Product
Bayer CropScience	Amazon, Attribut, Cheetah-S, Puma, Triumph
Dow	Boxer
DuPont	Lexus 50, Lexus Millenium (alone and in mixture with Topik, Hawk, Stomp & approved formulations of trifluralin)
Makhteshim Agan	Falcon
Monsanto	Monitor
Syngenta	Hawk, Topik



Rate of Use

Phase-II is normally used at 0.5% dilution of the final water volume, minimum 500 ml per hectare e.g:-

Susceptible Blackgrass Situations	
Water Volume	Required Quantity of Phase-II
70 litres	0.5 litres
100 litres	0.5 litres
200 litres	1.0 litres

Resistant Blackgrass Situations	
Water Volume	Required Quantity of Phase-II
70 litres	1.0 litres
100 litres	1.0 litres
200 litres	1.0 litres

*The maximum authorised concentration is 1.78% of the final spray solution.
The maximum application rate of Phase-II is 2 litres/ha.*



Mixing Sequence

Three quarter fill the spray tank with water and commence agitation.
Add the required quantity of Phase-II.
Add pesticide(s) as directed.
Continue agitation while topping up the tank and during spraying.



Hazard Warnings

No significant hazard.



Number of Applications

Phase-II may be used as often as required on a crop, provided that the terms of the authorisation of Phase-II and the terms of approval of the partner pesticide are followed.



Pack Size

Phase-II is supplied in 5 litre packs.

Route

ZC-TECHNOLOGY FOR COMBINABLE CROPS



Authorisation

1. Field of use

Route is a growth promoter for use in cereals, grass, linseed, maize, oilseed rape and pulses.

2. Status

Route is certified as a EU fertiliser, it is not an adjuvant or a pesticide. It is therefore not subject to COPR legislation, nor included on any approved pesticide or adjuvant listing by PSD or others e.g. supermarkets.



Formulation

Route is a patented soluble liquid formulation of nitrogen and zinc complexes together with an alkyl polyglycoside wetting agent.



Main Recommendations and Use Rates for Route

Route is absorbed through the foliage and roots and must only be applied as an overall spray to crops during periods of growth.

Crop	Route Rate	PGR Rate	Application timing
Winter and Spring Cereals	0.8 l/ha	-	GS 12 to before GS 30
Winter and Spring Cereals co-application with a PGR	0.6 l/ha	CCC 1.25 l/ha	To before GS 30
		Meteor 1.25 l/ha	
		Moddus 0.20 l/ha	

Crop	Route Rate	Application timing
Oilseed Rape	0.8 l/ha	After 2 true leaves up to a maximum of 6 true leaves
Pulses	0.8 l/ha	
Maize and Sweet Corn	1.2 l/ha	
Linseed	0.8 l/ha	3 - 12 cm high
New Grass	0.8 l/ha	After 2 true leaves up to early tillering (1-2 tillers)



Compatibilities

Route is physically and biologically compatible with the following products provided that all product recommendations are followed e.g. timings, conditions and rates of use.

Cereals: Amistar, Amazon, Ally, Avadex BW, Boxer, Calibre, Caramba, Cheetah S, chlormequat (3C and 5C), chlorpyrifos, chlorotoluron, Corniche, Dagger, Dosaflo, Eagle, Grasp, Harlequin, Harmony M, Hawk, hbns e.g. Oxytril CM, isoproturon, Landmark, Lexus 50, Lexus Class, Lexus Millenium, Meteor, Moddus, Opus, Panther, Patriot, Prochloraz, Puma X, pyrethroids, Quantum, Stomp, Thiovit, Tigress Ultra, Topik, trifluralin, Trump, Triumph, Unix.

Tank mixes of the following products **must** be made in the order shown below:-

Add first	Add second	Add third
Route	Stomp	-
Route	Stomp	Isoproturon
Lexus 50 DF	Route	-

Also, tank mixes of the products below **must** be sprayed in a minimum of 200 l/ha:-

Add first	Add second
Trifluralin	Route
Route	Mecoprop
Route	Hawk
Route	Panther

Linseed: Ally, Aramo, Basagran, Checkmate, Eagle, Falcon, Fusilade Max, Laser, quizalofop-P-ethyl, Vindex.

New Grass: Do not mix any herbicide with Route on establishing grass.

Pulses: Aramo, Basagran, Checkmate, Falcon, Fusilade Max, Laser, pirimicarb, pyrethroids.

Oilseed Rape: Aramo, Butisan-S, Caramba, Dow Shield, Falcon, flusilazole, Flucicr, Fusilade Max, Galtak, Kerb, Laser, MBC, Patriot, Pilot, pirimicarb, Plover, prochloraz, propaquizafop, pyrethroids, Shield, Thiovit, Trifluralin.

Maize: Bromotril, (max dose 1 litre/ha), Jester, Titus.

Trace Elements

Route can be applied with a wide range of trace elements. Route should not be used in place of a zinc trace element treatment.



Mixing Instructions

Ensure spray tank is thoroughly cleaned before adding Route, or herbicide residues in the spray tank may be transferred to susceptible crops.

Route may be applied in water volumes between 80 to 200 l/ha, using a medium or fine spray quality.

Do not allow Route and pesticide concentrates to mix directly together e.g. in induction bowls.

It is important that the spray tank must be at least half filled with the total volume of water to be sprayed before Route and any pesticide are added.

Add required quantity of Route and top up the tank.

If spraying Route as a tank mix with a pesticide, follow the recommendations on the pesticide label, including the addition of an adjuvant oil or non-ionic wetter where recommended.

Add each product to the spray tank separately taking note of any instruction regarding order of mixing (see compatibility section for sequence of addition to cereals).

Efficient agitation is essential to ensure full physical compatibility and all mixes should be used **immediately** after mixing.



Hazard Warnings

R36/37/38 : Irritating to eyes, respiratory system and skin.



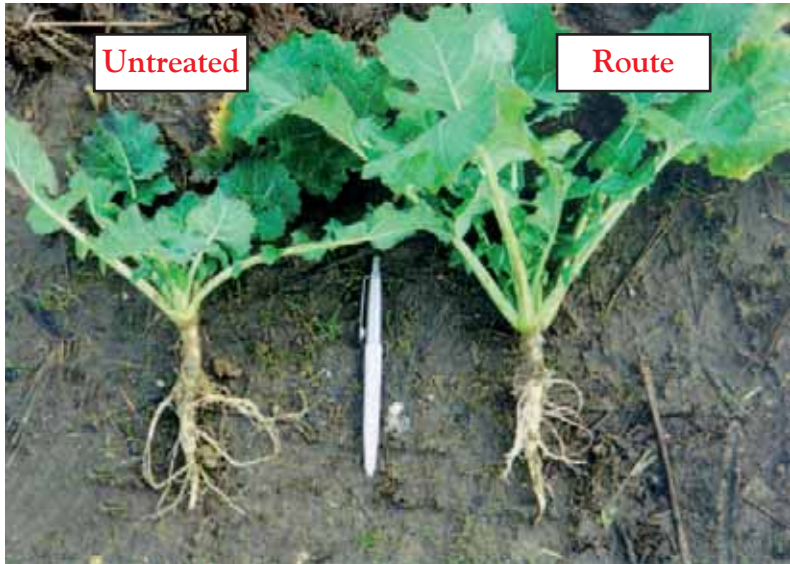
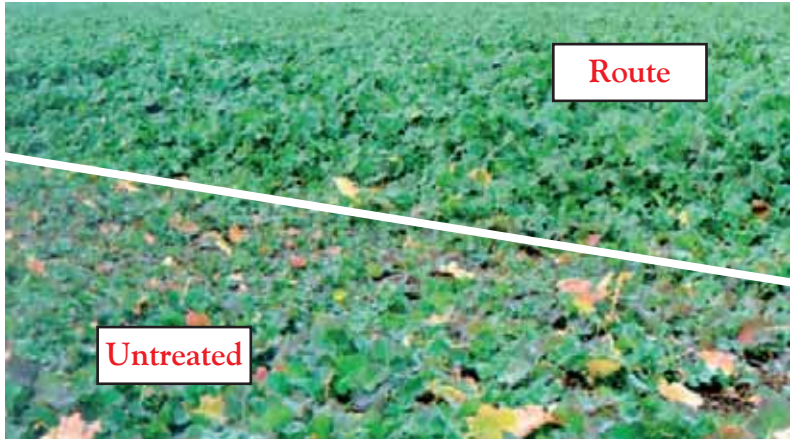
Number of Applications

One per crop



Pack Size

Route is supplied in 5 litre packs.



Silwet L-77

THE SUPER-WETTER



Authorisation

1. Field of use

For use only as an agricultural/horticultural/forestry wetting agent.

2. Status

Silwet L-77 is authorised for use with all fungicides applied to winter and spring sown cereals.

In addition Silwet L-77 can be used with the full approved rate of the pesticide within the restrictions of the “Crop Growth Stage Table” - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

A 100% emulsifiable concentrate containing a minimum of 80% w/w polyalkylene oxide modified heptamethyl trisiloxane and a maximum of 20% w/w allyloxypolyethylene glycol methyl ether.



Main Recommendations for the Use of Silwet L-77

Silwet L-77 is recommended for use whenever increased wetting/coverage is desired e.g.:-

- Leatherjacket control with chlorpyrifos in a variety of crops e.g. oilseed rape, cereals, sugar beet, grassland etc.
- Cereals
 - Fungicides e.g. flusilazole, Landmark, Unix for the control of stem base diseases.
 - Chlorpyrifos for egg-hatch wheat bulb fly sprays.
- Vegetable Crops
 - Fungicides and insecticides e.g. where improved wetting or canopy coverage/penetration is required.
 - Cabbage root fly control.
- Silwet L-77 can be used to reduce spray volume e.g. the lowest approved water volume for the partner pesticide.
- Silwet L-77 can be used to reduce drift.
- Silwet L-77 can also be used with specified residual herbicides as specified on page 9 and 10.



Compatibilities

There are no recommended tank-mixes where the addition of Silwet L-77 makes them physically or biologically incompatible. Silwet L-77 is not recommended with Satellite, products containing fluoroglycofen, bifenox, difenzoquat or cyanazine; or diclofop-methyl on barley.



Rate of use

Silwet L-77 should normally be used at a rate of 0.05%. Use 200 ml/ha with soil applied pesticides.

Use 0.1% when applying with Flex on dwarf french green beans at the recommended 200 l/ha water volume.

Water Volume (litres per hectare)	0.05% Silwet L-77	0.10% Silwet L-77
70	35 ml	70 ml
100	50 ml	100 ml
200	100 ml	200 ml

For water volumes in excess of 400 l/ha the recommended rate of Silwet L-77 is 0.025%.

The maximum authorised concentration is 0.15% of the final spray solution.



Mixing Sequence

Half fill spray tank and start agitation.

Add required quantity of Silwet L-77.

Add pesticide(s) as directed.

Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R20 : Harmful by inhalation.

R36 : Irritating to eyes.

R48/20 : Harmful: danger of serious damage to health by prolonged exposure through inhalation.

R51/53 : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.



Number of Applications

Silwet L-77 may be used as often as required on a crop, provided that the terms of the authorisation of Silwet L-77 and the terms of approval of the partner pesticide are followed.



Pack Size

Silwet L-77 is supplied in 1 litre packs.

Spraymac

ACIDIFIED WETTER



Authorisation

1. Field of use

For use only as an agricultural/horticultural/forestry wetting agent.

2. Status

Spraymac is authorised for use with all approved pesticides that recommend the addition of a wetting agent.

In addition Spraymac can be used with the full approved rate of the pesticide within the restrictions of the "Crop Growth Stage Table" - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

An emulsifiable concentrate formulation containing 350 g/l propionic acid and 100 g/l alcohol ethoxylate.



Main Recommendations for the Use of Spraymac

Spraymac can also be used to acidify water for use with any pesticide, applied within the terms of its approval.



Compatibilities

There are no recommended tank-mixes where the addition of Spraymac makes them physically or biologically incompatible. Spraymac is not recommended with Satellite, products containing fluoroglycofen, bifenox, difenzoquat or cyanazine; or diclofop-methyl on barley.



Rate of Use

Spraymac should be used at a standard dilution of 0.5% of spray solution for example:-

Spray Volume (litres/hectare)	0.5% Spraymac
70	350 ml
100	500 ml
200	1000 ml

The maximum authorised concentration is 0.5% of the final spray solution.



Mixing Sequence

Half fill spray tank with water and start agitation.
Add require quantity of Spraymac before any pesticide.
Add pesticide(s) as directed.
Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R34 : Causes burns.
R41 : Risk of serious damage to eyes.



Number of Applications

Spraymac may be used as often as required on a crop, provided that the terms of the authorisation of Spraymac and the terms of approval of the partner pesticide are followed.



Pack Size

Spraymac is supplied in 5 litre packs.



BENEFITS

Spraymac is a combined non-ionic wetter and acidification agent. Spraymac will acidify alkaline water to around pH 4.2 and will also increase the wetting characteristics of the spray.

Water pH before Spraymac	Water pH with 0.5% Spraymac
8.5	4.2
8.0	4.2
7.5	4.2
7.0	4.0

Newmans T-80

GLYPHOSATE ADJUVANT



Authorisation

1. Field of use

For use only as an agricultural/horticultural/industrial/forestry wetting agent.

2. Status

T-80 may be used at a maximum concentration of 0.5% spray solution on the following crops, with approved pesticides as follows:-

- glyphosate used on all edible crops (stubble), all non-edible crops (stubble), wheat, barley and oats. Consult your grain/seed merchant before treating any crop being grown under contract.
- glyphosate at half or less than half the approved pesticide rate on grassland destruction/renovation, winter and spring oilseed rape, winter and spring field beans, peas, forestry.
- diquat on oilseed rape, linseed, combining peas, field beans.
- paraquat or asulam at half the approved pesticide rate on land not intended to bear vegetation, amenity situations.
- triclopyr or asulam at half or less than half the approved pesticide rate in forestry.



Formulation

A soluble concentrate containing 800 g/l ethoxylated tallow amine.



Main Recommendations for the Use of T-80

T-80 is recommended for use with:-

- All approved formulations of glyphosate.
- Monitor.
- Diquat for linseed desiccation.



Compatibilities

T-80 is compatible with all glyphosate and diquat formulations and their approved tank-mixes.



Rate of Use

The standard rate of T-80 is 0.5% of the spray solution e.g:-

Water Volume (litres/hectare)	Required quantity of T-80 @ 0.5%
70	350 ml
100	500 ml
200	1000 ml

The maximum authorised concentration is 0.5% of the final spray solution.



Mixing Sequence

Fill the bulk of the spray tank with water and start agitation.

Add pesticide(s) as directed.

Add the T-80 and top up spray tank.

Continue agitation while topping up the tank and during spraying.

Note:

T-80 can occasionally form a gel when used with very cold water. Under these conditions remove filter basket before mixing and any gel should disperse with agitation.



Hazard Warnings

R10 : Flammable.

R22 : Harmful if swallowed.

R37/38 : Irritating to respiratory system and skin.

R41 : Risk of serious damage to eyes.

R51/53 : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

R67 : Vapours may cause drowsiness and dizziness.



Number of Applications

T-80 may be used as often as required on a crop, provided that the terms of the authorisation of Newman's T-80 and the terms of approval of the partner pesticide are followed.



Pack Size

T-80 is supplied in 5 litre packs.

Tank and Equipment Cleaner



Authorisation

1. Field of use

For use in agriculture/horticulture/forestry as a sprayer and equipment cleaner.

2. Status

Tank and Equipment Cleaner is a cleaner and not an adjuvant so is not subject to The Pesticide Safety Directorate adjuvant authorisation.



Formulation

Tank and Equipment Cleaner is a dry powder formulation of a mixture of powerful alkaline detergents.



Main Recommendations for the Use of Tank and Equipment Cleaner

Tank & Equipment Cleaner is ideal for cleaning the inside and outside of sprayers.

Tank & Equipment Cleaner will even clean residues of pendimethalin (Stomp) and trifluralin, though some mechanical assistance may be necessary.

Tank & Equipment Cleaner is not recommended for sulfonylurea herbicides. The approved de-contaminant should be used. However, to ensure that oily contaminated deposits are removed from tanks and spray lines so that the equipment is properly cleaned, the initial cleaning of the equipment should be with Tank & Equipment Cleaner and then followed by the recommended de-contaminant for the sulfonylurea.

Tank & Equipment Cleaner can also be used to remove rust or hard water scale leaving a protective film to minimise corrosion during winter storage.



Compatibilities

Tank & Equipment Cleaner **must not** be mixed with any bleach based cleaner.



Rate of Use

Routine cleaning rate	Stubborn stains rate
500 grammes in 500 litres	30 grammes in 10 litres



Mixing Instructions

Flush out sprayer with clean water.

Half fill spray tank.

Slowly add Tank and Equipment Cleaner.

Top up tank and agitate thoroughly.

Open booms and spray out.

With persistent chemicals/end of season storage, allow the mixture to stand overnight before flushing.

Flush out with clean water. However, if the sprayer is to be stored for a period, do not flush out with clean water until just prior to re-use since Tank and Equipment Cleaner will leave a protective film.



Hazard Warnings

No significant hazard.



Disposal of Spray Tank Washings

Under the regulations concerning disposal of spray washings, one way of disposing of washings is to apply them to the crop which has just been sprayed, provided that this does not exceed the total applied dose for that crop.

Tank and Equipment Cleaner is a very effective tank cleaner and as such, when used correctly will remove/dislodge agrochemical residues “held” in the sprayer systems. It should be noted that the agrochemical residues it dislodges may be inappropriate for the crop just sprayed in terms of timing of application, phytotoxicity or approval for use on that crop, etc.

In view of this **be extremely thorough and careful in applying tank washings** following the use of Tank and Equipment Cleaner unless the following guidelines are strictly adhered to :-

1. Start with a clean sprayer. To achieve this the sprayer must be thoroughly cleaned out with Tank & Equipment Cleaner.
2. After each use the sprayer should be cleaned out with Tank and Equipment Cleaner. The spray washings can be safely applied to the crop just sprayed provided that the dose does not exceed total approved dose for the crop.
3. The maximum safe concentration for application to the crop is 0.1% w/v of Tank and Equipment Cleaner i.e. 1 kg Tank and Equipment Cleaner in 1,000 litres of tank washings.



Number of Applications

Tank and Equipment Cleaner may be used as required.



Pack Size

Tank and Equipment Cleaner is supplied in 500 g tubs.

Torpedo-II

THE SULPHONYLUREA SPECIALIST



Authorisation

1. Field of use

For use only as an agricultural/horticultural/forestry wetting agent.

2. Status

Torpedo-II can be used with the full approved rate of the pesticide within the restrictions of the “Crop Growth Stage Table” - page 62 and with a 50% or less rate of the pesticide as stated on page 63.



Formulation

Torpedo-II is an emulsifiable concentrate formulation containing 210 g/kg alkoxyated tallow amine 380 g/kg alcohol ethoxylates, 75 g/kg natural fatty acids and 210 g/kg polyalkylene glycol.

This unique combination of components provides excellent retention, spreading and an excellent micro-climate which maximises uptake of pesticides through the waxy leaf surface.



Main Recommendations for the Use of Torpedo-II

Cereals - all applications of sulphonylureas and their tank mix partners including fungicides and plant growth regulators - except chlormequat + Moddus on oats and Satellite. For autumn applications of sulphonylureas e.g., Lexus follow the manufacturers recommendations for adjuvants (normally Phase-II or Drill would be used due to the specific requirements of a herbicide tank mix partner, for example, Hawk).

Monitor - Monsanto support the use of Torpedo-II.

Boxer - Dow AgroSciences support the use of Torpedo-II with 100ml of Boxer to improve the efficacy of Boxer on a wider spectrum of weeds e.g. poppy and to improve overall speed of kill.

Potatoes - Titus/Tarot - Makhteshim Agan support Torpedo-II in place of a non-ionic wetter.

Linseed - Ally, Eagle, Jubilee - Torpedo-II replaces the need for a non-ionic wetter.

Attribut - Follow the adjuvant recommendation as specified.

Torpedo-II can be used to reduce drift.



Compatibilities

Do not use with any sulphonylurea product on Maize. With this exception there are no recommended tank-mixes where the addition of Torpedo-II makes them physically or biologically incompatible. Torpedo-II is not recommended with Satellite, products containing fluoroglycofen, bifenox, difenzoquat or cyanazine; or diclofop-methyl on barley.



Rate of Use

The standard rate of Torpedo-II for all recommended uses is 0.1% of the spray solution e.g.:-

Water Volume (litres per hectare)	Required Quantity of Torpedo-II @ 0.1% dilution
70	70 ml
100	100 ml
200	200 ml

The maximum authorised concentration is 0.1% of the final spray solution.



Mixing Sequence

Add the bulk of the water to the spray tank and commence agitation. Add pesticide(s) as directed. Add the required quantity of Torpedo-II. Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R22 : Harmful if swallowed.
R38 : Irritating to skin.
R41 : Risk of serious damage to eyes.
R52/53 : Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.



Number of Applications

Torpedo-II may be used as often as required on a crop, provided that the terms of the authorisation of Torpedo-II and the terms of approval of the partner pesticide are followed.



Pack Size

Torpedo-II is supplied in 1 litre packs.

Tuff Trax

FOAM BOUT MARKER



Authorisation

1. Field of use

For use in agriculture/horticulture/forestry as a spray bout marker.

2. Status

Tuff Trax is a foam marker and not an adjuvant so is not subject to The Pesticide Safety Directorate adjuvant authorisation.



Formulation

Tuff Trax is a 100% proprietary liquid blend of surfactants. Tuff Trax is a superior spray bout marker. It produces a high quality, thick-bodied long lasting foam.



Main Recommendations for the Use of Tuff Trax

Foam produced from Tuff Trax should be deposited on the ground in large blobs rather than in narrow streaks, this sometimes may necessitate increasing the diameter of the hose extending from the spreading boom. The size of foam blobs is dependent on the pressure and diameter of the boom and end drop hoses. Tuff Trax may be used with all water types.



Compatibilities

Tuff Trax is **not** compatible even with traces of other bout markers. Ensure mixing tank is thoroughly cleaned out and rinsed before use.



Rate of Use

Tuff Trax should be used at a concentration of 1% (e.g. 100 ml in 10 litres water) in a foam generating system.



Mixing Instructions

Foam generating equipment should be cleaned with Tank and Equipment Cleaner before introducing Tuff Trax.

Bottom fill tanks: Add Tuff Trax to clean water at start of filling.

Top filling tanks : Tuff Trax should be added to clean water when tank is half full. The fill hose should be below the water level until filling is completed.

The air pressure (1.0-2.5 bar) should be adjusted to produce thick, fine bubble foam. Should foam produced be too thick, reduce the amount of Tuff Trax added to the water in the next mix. If foam produced is too thin, soft or watery, increase the amount of Tuff Trax used. If foam consistency is poor, check for a malfunction or contamination in the foam generating system.



Hazard Warnings

R36/37/38 : Irritating to eyes, respiratory system and skin.



Number of Applications

Tuff Trax may be used as required.



Pack Size

Tuff Trax is supplied in 3 litre packs.

X-Change

WATER CONDITIONER



Authorisation Status

The Pesticide Safety Directorate has classified X-Change as a water conditioner. It is therefore **not** subject to adjuvant authorisation. X-Change can be used on any crop at any timing, provided that the partner pesticide is used within its label approval.



Formulation

A soluble concentrate formulation containing a proprietary blend of water conditioning agents, acidifying agents, pH buffers and an anti-foam.



Main Recommendations for the Use of X-Change

X-Change softens hard water by completely and irreversibly sequestering harmful cations such as Calcium and Magnesium present in hard water. X-Change also acidifies the pH of water to around 5, which prevents alkaline hydrolysis.

X-Change is recommended with the following products/product groups:-

- All approved formulations of glyphosate.
- Aramo, Grasp/Output, Strimma/Drill and Laser/Oil.
- Nicosoap.
- Organophosphorus insecticides and pyrethroids in vegetable crops e.g. dimethoate, cypermethrin.



Compatibilities

There are no recommended tank-mixes where the addition of X-Change makes them physically or biologically incompatible. X-Change can only be used with Aramo alone. No additional tank-mix partners are supported, including trace elements.



Rate of Use

To determine the degree of water hardness and hence the correct rate of use for X-Change, a test kit is available free of charge from De Sangosse Ltd.

In the absence of a water test, the standard rate for X-Change is 0.25% of the final spray volume e.g.:-

Water Volume (litres/hectare)	Required quantity of X-Change @ 0.25%
70	175 ml
100	250 ml
200	500 ml



Mixing Sequence

IMPORTANT:

X-Change must be added before the pesticide.

Half fill spray tank and begin agitation.

Add the correct quantity of X-Change for the final water volume.

Continue filling the spray tank to the required volume.

Add pesticide(s) as directed.

Continue agitation while topping up the tank and during spraying.



Hazard Warnings

R20 : Harmful by inhalation.

R52/53 : Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.



Number of Applications

X-Change may be used as often as required on a crop, provided that the terms of approval of the partner pesticide are followed.



Pack Size

X-Change is supplied in 5 litre packs.

YEALD Plus

ZC-TECHNOLOGY FOR ROOT CROPS



Authorisation

1. Field of use

YEALD Plus is a growth promoter for use in fodder beet, mangel, potato, sugar beet, swede and turnip crops.

2. Status

YEALD Plus is certified as a EU fertiliser. It is not an adjuvant or a pesticide and is therefore not subject to COPR legislation. It is not included in any approved pesticide or adjuvant listing by PSD or others e.g. supermarkets.



Formulation

YEALD Plus is a patented, soluble concentrate liquid nutrient formulation containing a non-ionic wetter, humectant, nitrogen, zinc and other trace elements (chelated and salts).



Main Recommendations and Use Rates for YEALD Plus

YEALD Plus is absorbed through the foliage and roots and must therefore only be applied as an overall spray **and** must only be applied to crops during periods of active growth.

It should be applied at the rates and timings given in the table below:-

Crop	Rate of use	Application timing	
		Optimum timing	Application window
Potatoes	1.5 l/ha	Stolon elongation	The application window is <i>from</i> when the majority of plants have emerged, with the smallest having a minimum of two leaves, to <i>before</i> tuber initiation
Sugar Beet & Fodder Beet	1.8 l/ha	Majority of crop at 4 true leaf stage	The application window is between 2 - 6 true leaves
Mangels, Swedes & Turnips	1.5 l/ha		



Compatibilities

YEALD Plus is physically and biologically compatible with the following products provided that all product recommendations are followed e.g. timings, conditions of use and rates of use.

Sugar Beet: Aramo, chlorpyrifos, clopyralid, CoPilot, Debut, Decisquick, desmedipham (including formulated mixtures), ethofumesate (including formulated mixtures), Falcon, Fusilade Max, Goltix, Patriot, phenmedipham (including formulated mixtures), pirimicarb, Venzar.

Fodder Beet, Mangels & Turnips: *Aramo, chlorpyrifos, clopyralid, Fusilade Max.*

Potatoes: *Aphox, Aramo, Curzate M68, Decisquick, Dithane, Dithane NT, Electis 445, Evidence, Falcon, Fubol Gold, Fusilade Max, Invader, Laser, Lexone, Patriot, Sencorex, Shirlan, Tannos, Tattoo, Titus, Truстан.*

YEALD Plus should be applied with these products as an overall spray application.

Trace Elements

YEALD Plus can be applied as a tank mix with a wide range of trace elements.

YEALD Plus is **not** a substitute for trace elements applied to correct a known/identified deficiency.



Mixing Instructions

YEALD Plus may be applied in water volumes between 80 to 200 l/ha water, using a medium or fine spray quality.

Do not allow YEALD Plus and pesticide concentrates to mix directly together e.g. in induction bowls.

Ensure spray tank is thoroughly cleaned before adding YEALD Plus, or herbicide residues in the spray tank may be transferred to susceptible crops.

Half fill the spray tank with water and begin agitation.

Add required quantity of YEALD Plus and top up tank.

If spraying YEALD Plus as a tank mix with a pesticide follow the recommendations on the pesticide label including the addition of an adjuvant oil or non-ionic wetter where recommended.

Add each product to the spray tank separately taking note of any instructions regarding order of mixing.

Efficient agitation is essential to ensure full physical compatibility, and all mixes should be used **immediately** after mixing.

Hazard Warnings

R36/37/38 : Irritating to eyes, respiratory system and skin.

Number of Applications

One per crop.

Pack Size

YEALD Plus is supplied in 5 litre packs.



Molluscicides

De Sangosse is the world leader in bait formulation and slug control, thanks to its research laboratory dedicated to improving bait formulations for pest control and three state-of-the-art production sites.

1: The Bait

Two basic types of pellet are produced i.e. the “wet” or “dry” process. Dry process or mini-pellets use bran and wheat offal, which are bound together in a process similar to animal feed production. Steam is used in the process to improve the binding of the ingredients. However, these pellets are more brittle, and have lower persistence to inclement weather and are inherently less palatable than wet process pellets.

The De Sangosse “wet” process pellets are the highest quality available and use food grade Durum wheat to produce a highly palatable dust-free bait. The wet process allows proteins and gluten molecules in the bait to chemically bind together. This gives the pellets a good elasticity, similar to that of bread dough or pasta. This allows the pellets to swell in humid conditions, not to crumble and so withstand rain. Resistance to rain is critical to ensure the bait continues to protect crops when field conditions turn challenging and slugs are most active. The more persistent the bait, the more time available to destroy the highest number of slugs. Because of the high density/integrity of the wet process fewer pellets break and a more regular spreading pattern is achieved, even up to 24m spread. This gives maximum protection of the crop during its critical establishment phase.

WET process	DRY process
High quality Durum wheat flour (high gluten)	Lower quality whole wheat
Natural chemical binding of gluten	Physical and chemical binders
Elasticity like bread dough (swells and retracts)	Brittle pellets with irregular shape
Dust-free, good spreadability	Dusty, irregular size pellets
Even size pellets	Uneven spreading
Better Persistence and Palatability	Poor persistence and poor palatability. Repeat applications likely

Because crops are at risk for more than a few hours and since a better quality pellet means less applications, the choice of a wet process provides the best value for money ratio and allows considerable time saving from subsequent applications.

2 The active ingredient: Meta Metaldehyde

Metaldehyde is a specific molluscicide. It works by attacking and destroying a slug's mucus producing cell, which is essential to its means of locomotion and digestion. This damage is irreversible and once a lethal dose of metaldehyde has been consumed it is impossible for a slug to recover, even in the wettest conditions. A secondary effect of the Meta metaldehyde is to cause the slug to produce excess mucus which is a sign of irreversible cell damage.

Meta metaldehyde is :

- Highly effective in wet conditions.
- Not compromised by excess moisture.
- Proven to be effective in temperatures as low as 5°C

Meta Metaldehyde - effect on beneficial organisms.

Used in the De Sangosse “wet” process pellets Meta metaldehyde does not cause harm to field beneficials including earthworms, insects, spiders and importantly carabid beetles, known predator of slugs and slug eggs when used as directed

Meta Metaldehyde - environmental fate

Once the pellets have broken down the metaldehyde molecule breaks down into water and carbon dioxide leading to no long term residues in the soil.

Meta Metaldehyde - Product safety:

The addition of a bittering agent, Bitrex, lowers the risk of accidental consumption by mammals.

Always consider the use of molluscicide as part of an integrated control approach and utilize risk assessment methods such as trapping prior to drilling

METAREX

REGEL

CLARTEX

ESP

Q
meta quality®

Micronutrients

We focus on speciality nutrition products and some examples of our range are:

Manganese Extra – a 235 g/l Manganese Nitrate true liquid formulation.

UltraMan 420 – a combined 420 g/l Manganese Sulphate and Nitrate liquid emulsion formulation in which all the Manganese is fully water soluble.

Manganese Ultra – a 500 g/l Manganese Carbonate suspension formulation.

Bac-Up – a novel potato treatment containing Calcium and Boron to minimise Internal Rust Spot.

Seed Treatments

New Manganese Solution

Although foliar application of Manganese is effective at critical stages of growth, spraying cannot take care of the early stages of deficiency when there is insufficient foliage and/or poor spraying conditions.

Treating the seed with New Manganese Solution is the most effective way to protect the cereal crop from early deficiency problems. This unique seed treatment ensures Manganese is immediately available to the germinating seed.

New Manganese Solution is a unique, easy to apply liquid formulation of Manganese which gives uniform coverage and adhesion to seed. Treated seed is free flowing and dust free.



Radiate

A revolutionary Root and Growth enhancing seed treatment for cereals based on the proven ZC-Technology used in Route for foliar applications.

Radiate is absorbed as the seed germinates. It immediately increases the level of root promoting hormones in the growing plant, enhancing rooting and preventing frost heave. At the same time it boosts the plant's ability to capture and utilise sunlight, fuelling and encouraging growth.

Across 54 trials, Radiate has given 0.5 t/ha average yield increases in winter wheat.



Both Radiate and New Manganese Solution can be co-applied with most cereal seed treatments.

Adjuvant Legislation

A. What is an adjuvant?

The Pesticide Safety Directorate (PSD) define an adjuvant as follows:-

'A substance other than water without significant pesticidal properties, which enhances or is intended to enhance the effectiveness of a pesticide, when it is added to that pesticide.'

All adjuvants sold in the UK have to be authorised by PSD. They scrutinise data such as effect on pesticide residues, mammalian and aquatic toxicology, environmental data etc. Provided the information is acceptable, the adjuvant is authorised and given a unique adjuvant (ADJ) number.

B. Additives not defined by PSD as adjuvants or pesticides

There are several classes of “*additives*” which are used together with pesticides which fall outside the PSD definition of either a pesticide or an adjuvant.

For these products there are no statutory restrictions from PSD as to their use, and they are not required to be authorised or approved by PSD e.g.:-

PRODUCT TYPE	EXAMPLE
Water Conditioners	X-Change
Anti-Foaming Agents	Fighter-F
Tank Cleaners	Tank & Equipment Cleaner
Foam-Bout Markers	Tuff Trax
Drift Control Agents	Bond, Torpedo-II, Designer
Spray-Dyes	Blue Marker Dye

C. Where can you use adjuvants?

The area where one may use an adjuvant is defined under the following five headings:-

1st Field of use (defines the use areas):-

e.g. FOR USE ONLY AS AN AGRICULTURAL/HORTICULTURAL/FORESTRY WETTING AGENT

2nd Specific authorised uses for the adjuvant

e.g. Edible and non-edible crops - all approved pesticides whose labels recommend the addition of a wetting agent or adjuvant oil.

3rd With the full approved rate of the pesticide (Crop growth stage table)

When the pesticide product and adjuvant are applied before a significant part of the consumable part of the crop has developed - see table:-

Crop	Growth Stages before which De Sangosse Adjuvants may be used with approved pesticides
1. Combinable crops & maize	
Cereals	up to and including GS 52 (one quarter inflorescence)
Oilseed rape	up to and including 10% potential pods
Broad bean, dwarf French bean, field bean, runner bean	up to and including first pod set
Combining pea and vining pea	up to and including flat pod (non-edible pods only)
Linseed	up to and including 10% capsules formed
Forage Maize	up to and including tip of tassel visible
2. Root crops	
Sugar beet	up to and including 6 fully expanded leaves
Potatoes	up to and including tuber initiation
3. Vegetable crops	
Brussels sprout	up to and including lateral buds begin to develop
Cauliflower	up to and including cauliflower heads begin to form; width of growing tip up to 1 cm ²
Cucumber	up to and including first fruit set
Lettuce	varieties forming heads: up to and including heads begin to form varieties not forming heads: up to and including leaf rosette has reached 30% of the diameter typical for the variety
Edible podded peas	up to and including pod set
Tomato	up to and including first fruit set on first truss

table continued on next page...

4. Fruit and Hops	
Apples/pears	up to and including fruit 5-10 mm
Blackcurrant	up to and including first visible green fruitlet
Cherry, plum, peach, almond and apricot	up to and including first fruit set
Table grapes and wine grapes	up to and including first fruit set
Hops	up to and including cone set
Raspberries	up to and including first fruit set
Strawberries	up to and including first fruit development

4th With up to a 50% rate of the pesticide

All approved pesticides on all edible crops provided that the statutory conditions of use for the pesticide are followed and that the pesticide is not used at more than 50% of the maximum approved rate for that application.

All approved pesticides on all non-edible crops provided that the statutory conditions of use for the pesticide are followed.

5th As directed on the pesticide label

Certain pesticides recommend the use of a specific adjuvant/adjuvant type which may or may not be contained in the above Statutory Conditions of Use.

D. Overlap area (non-statutory conditions of use)

There is an “overlap area” where an authorised adjuvant has properties and uses which are outside the scope of the PSD adjuvant legislation e.g:-

PRODUCT TYPE	EXAMPLE
Water conditioners	Li-700
Acidification agents	Li-700
Improving trace element uptake	Silwet L-77, Li-700
Drift control agents	Bond, Li-700, Silwet L-77, Phase-II

e.g. the use of Li-700 as:-

- (1) Water conditioner
- (2) Acidification agent
- (3) Anti-drift agent
- (4) Improving trace element uptake

These uses are not subject to the PSD Statutory Conditions of Use for Li-700 and as such Li-700 can be used, irrespective of crop or growth stage, providing there is a good reason for doing so.

For the latest information
please see our website

www.desangosse.co.uk

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