Commonly used adjuvants with different crop protection product types – insecticides, fungicides, herbicides, PGRs

Selchuk Kurtev, Zest Sustainable ICM

What I will cover

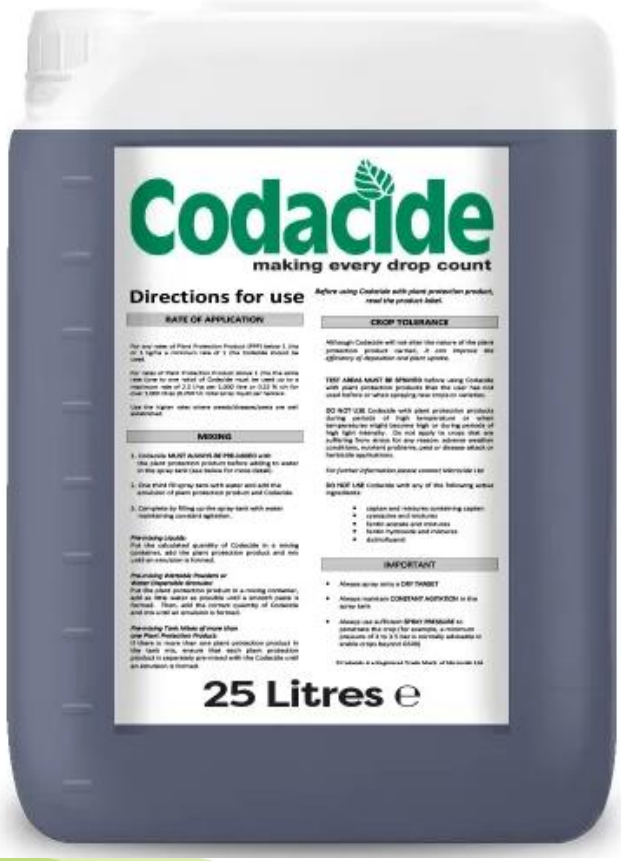
- **Insecticides**
- **Fungicides**
- **Herbicides**
- **Plant growth regulators (PGRs)**

Insecticides

- Small target = smaller droplets and better coverage
- 80% of the insecticides are contact mode of action
- Requirement for fast acting and complete kill
- Applied to crop canopies in the rapid growth stage and during flowering
- Mostly liquid formulations but a few are solid formulation – Mainman, Aphox, Mainspring etc.
- Some insecticides can be damaging to crops at different stages – Decis Protech, Batavia, Spruzit and others
- Bio-insecticides exclusively have a contact mode of action

Insecticides - oils

- Oil adjuvants carry a risk
- Mainly used in autumn and winter
- Pest morphology changes
- Some anecdotal evidence of virus reduction
- Mainly with contact mode of action products
- Can leave oily deposits
- High concentrations



Sustainable ICM

Insecticides – super spreaders

- Pure and diluted versions
- Many of the diluted versions can have phytotoxic effects
- Cost indication provides clues about the purity
- Many adjuvants not on the official list!
- Many claim insecticidal effect??
- Some can cause foaming

Sustainable ICM

Insecticides – water conditioners and stickers

- Weather condition related
- Some anti-transpirant effect
- Water conditioning adjuvants are mostly safe
- More expensive but effective
- Can have issues with incompatibilities

Sustainable ICM

Insecticides – non-ionic and cationic

- Mostly safe with some concerns over tank cleaning effects
- Use in main season when soft growth is present
- Do not leave overnight in tank

Sustainable ICM

Fungicides

- Many DO NOT require adjuvants, especially liquid formulations
- Contact mode of action products will need an adjuvant unless otherwise stated
- Water conditioners are not popular, but are very useful
- Tank mixture issues with fungicides is a big problem
- Non-ionic wetters and super spreaders are recommended
- Plant leaf morphology is very important
- Root zone applications often fail due to target zone moisture levels
- Water volumes are crucial here, especially where high water volumes are required
- Many fungicide groups require adjuvant at all time to aid penetration – CAA fungicides

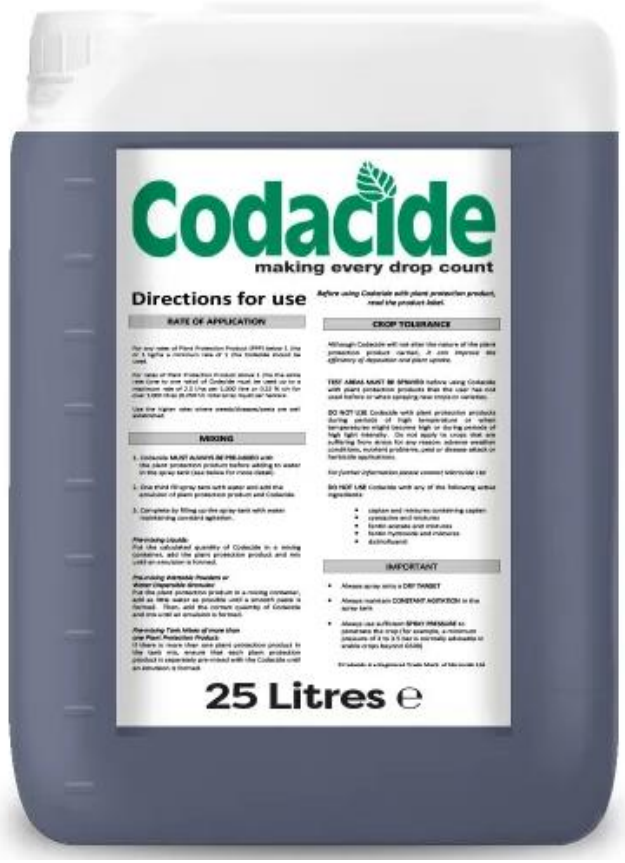
Sustainable ICM

Fungicides – go to products

Herbicides

- Most unknown area of all in ornamentals
- Mainly water conditioners and spraying aids – stickers, acidifiers, markers, drift reducers
- For applications over crops – DO NOT USE ADJUVANTS!
- Pre-emergence herbicides used on seed beds benefit from a sticker adjuvant
- Total weed control products MUST always be used with an adjuvant
- Where volatile active substances are used, stickers can reduce volatility and crop damage
- Oil-based adjuvants tend to be used mostly as ‘enhancers’

Herbicides – go to products



Herbicides – glyphosate!

TRANSACT	Acidifying penetrant wetter.	Acidifies water reducing phytotoxic risks. Improves systemic product penetration. Improves coverage.	General purpose adjuvant and acidification product.	Max 5 lt / 1000 lt Normal rate 1.5 lt / 1000 lt Acidification rate 1 lt / 1000 lt Add to tank last.

Sustainable ICM

PGRs

- Mostly all with adjuvants, especially those applied to crop canopy
- Avoid using silicon-based adjuvants due to phytotoxicity
- Avoid using oil formulations
- Penetrants and spreaders are advisable to use
- For outdoor use consider using stickers and penetrants

General guidelines

Table 1: A quick guide to adjuvant use recommendations based on pesticide mode of action (MOA).

I WANT TO SPRAY...	ANSWER
Herbicide Groups	
A, B, C, G, M	Adjuvants frequently recommended for most products in these groups
F, H, I, J, L, N, Q, R, Z	Some adjuvants required for some products
D, E, K, O, P	No adjuvants recommended
Insecticide Groups	
1A, 1B, 2B, 3A, 5, 6, 7, 10, 11, 12, 13, 1B, 22A, 28	Adjuvants required for some products in some applications
2A, 7, 8, 15, 16, 17, 19, 20, 21, 24, UN	No adjuvants recommended
4A, 9B	Adjuvants mostly recommended
Fungicide Groups	
1, 2, 4, 9, 11, 33, M1, M2, M7, M9	Adjuvants required for some products in some applications
3, 40, M3	Adjuavnts recommended in many situations
5, 7, 8, 12, 13, 14, 17, 20, 28, 29, M, M6, M7	No adjuvants recommended
Plant growth regulators	Adjuvants recommended in many situations
Harvest aid products	Adjuvants recommended in many situations
Foliar nutrients	Adjuvants sometimes recommended

HTA

zest®
Sustainable ICM

General guidelines

Adjuvants

PRODUCT	CLASSIFICATION	ATTRIBUTES	EXAMPLE USAGE	RATE OF USE
ABATE	Silicon based anti-foaming agent.	Tank foaming reduction.	Where high levels of foam are produced in the tank solution.	50-250 ml / 1000 lt. Use low rate to start with and increase as required.
ACTIVATOR 90	Non ionic wetter.	Drift reduction. Spreads up to 7 times more than water. Use where surface wetting is desirable.	Contact insecticides. Broadleaved herbicides. Contact herbicides such as Diquat.	1 lt / 1000 lt Add to tank last.
ALL CLEAR EXTRA	Balanced formulation of sequestrants and surfactants.	Tank cleaner.	After tank use. Good at removing difficult residues like the SU herbicides.	5 lt / 1000 lt Avoid contact with the concentrate on metal.
CROPSPRAY 11E	Mineral oil adjuvant.	Weed control improvement. Reduces drift.	Difficult to control weeds. Difficult spraying conditions.	Max rate 25 lt / 1000 lt Normal rate 7.5 lt / 1000 lt Can have insecticidal use.
ENVIROWET	Silicon based non-ionic wetter and spreading agent.	Drift reduction 'super wetter'.	Improve uptake of foliar nutrients. Improve coverage on difficult targets such as waxy or hairy leaves.	1-2.5 lt / 1000 lt
GATEWAY	Silicone and latex-based sticker, extender and wetter.	Improves wetting, coverage and rainfastness. Increases uptake of systemic products and nutrients. Drift reduction. Frost protection.	Use in difficult weather conditions. On waxy or hairy leaved weeds. Anti transpirant. Difficult target coverage.	1.25 lt / 10 00 lt Add to tank last.
KANTOR	Penetrant wetter and spreading agent.	Improved coverage. Aids systemic product uptake. Mix compatibility.	Reduces the risk of tank mixing issues. Aids difficult canopy management.	1.5-10 lt / 1000 lt

Sustainable ICM

SUMMARY

- READ THE LABELS – PLANT PROTECTION PRODUCT AND ADJUVANT!
- Using lower concentrations of adjuvants poses a lower risk
- Always test on small plots first
- Single purpose adjuvants tend to be safer to crops
- Caution with distributor agronomists
- Adjuvants are there to aid, not to perform MAGIC!
- Do not use aged stock adjuvants for over top of crop applications

Sustainable ICM

NURSERY PRODUCTION

Zest-ICM

0333 005 0167

nurseryproduction@hta.org.uk

Sustainable ICM

Sustainable ICM