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#### Further information

Project Report 408 (2007). Spray behaviour and efficacy of herbicides and fungicides applied to wheat at reduced volumes. HGCA

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**Nozzle selection  
chart**

2010

# Nozzle selection

## for conventional boom sprayers treating cereals and oilseed rape

Nozzle type	Air induction		Conventional				Low drift (pre-orifice)		
	Flat fan	Flat fan	Flat fan	Hollow cone	Flat fan	Deflector			
Likely spray quality	Small droplet	Large droplet	Fine	Medium	Coarse	Fine	Medium	Coarse	Medium
<b>Soil-acting herbicides</b>									
Pre- and early post-emergence	▲	▲*		▲	▲		▲	▲	▲
<b>Foliage-acting herbicides</b>									
Grass weeds – 3 leaves or less			▲▲	▲*		▲	▲		
Grass weeds – more than 3 leaves	▲*		▲	▲▲	▲*			▲	
Broad-leaved weeds – up to 2cm across			▲▲	▲	▲*				
Broad-leaved weeds – 2–5cm across	▲*		▲	▲▲		▲		▲	
Broad-leaved weeds – more than 5cm	▲▲*		▲	▲▲		▲	▲	▲	
Non-selective (eg glyphosate)	▲▲	▲*		▲▲	▲		▲▲	▲	▲
<b>Cereal plant growth regulators (PGR) and eyespot fungicides</b>									
Up to GS32	▲*			▲▲			▲		▲
After GS32	▲▲*			▲▲			▲		▲
<b>Cereal fungicides</b>									
Up to GS23	▲*		▲	▲▲			▲		▲
Up to GS24–49	▲▲	▲*	▲	▲▲			▲		▲
After GS50 (ear spray)	▲▲*			▲▲			▲		
<b>Cereal insecticides</b>									
Cereals: autumn spray	▲*		▲	▲▲			▲		
Cereals: ear spray			▲▲	▲*		▲	▲		
<b>Oilseed rape fungicides</b>									
Vegetative stage	▲*		▲	▲▲			▲		▲
From green bud	▲▲*		▲	▲▲			▲		▲
<b>Oilseed rape insecticides</b>									
Vegetative stage			▲	▲▲*			▲		
From green bud			▲▲	▲*		▲	▲		
<b>Key</b>	▲ = nozzles offering acceptable efficacy		Nozzle selections indicated are based on spray volumes of 100-200 l/ha and forward speeds of 8–16km/h and using a typical range of pressures for each nozzle design. Generally, higher spray pressures give a smaller droplet size distribution therefore, a finer spray; wider spray angles give a finer spray.						
	▲▲ = preferred nozzles for efficacy								
	* = nozzles offering best drift control								

### Spray deposits and efficacy

#### Timing

Application timing is critical for high levels of efficacy. Timeliness is related to work rates that, in turn, depend on:

- Application volume
- Sprayer speed
- Boom width
- Sprayer filling time.

#### Application volume

For a given dose, higher volumes tend to deposit less active ingredient particularly on small plants. Hence, many products give improved control at low volume. However, higher volumes suit those products requiring greater leaf coverage (eg protectant fungicides).

When choosing an application volume, important sources of information are:

- Product label
- Code of Practice for Using Plant Protection Products
- Chemical manufacturers'/suppliers' websites or other information
- A qualified agronomist.

### Nozzle colour

Industry standards specify that nozzles are colour-coded by flow rate.

Colour	Flow rate at 3.0 bar pressure, l/min	Common designation
Orange	0.4	'01'
Green	0.6	'015'
Yellow	0.8	'02'
Lilac	1.0	'025'
Blue	1.2	'03'
Brown-red	1.4	'035'
Red	1.6	'04'
Brown	2.0	'05'
Grey	2.4	'06'
White	3.2	'08'

### Spray drift

The risk of drift is mainly related to:

- **Boom height** – for 110° nozzles, the boom should be stable and 500mm or less from the top of the crop.
- **Nozzle type, size and pressure** – LERAP star ratings indicate if a nozzle is capable of operating with less drift than the conventional reference '03' nozzle.
- **Wind speed** – at boom height should be between 2.0–9.6km/h (0.5–2.6m/s).

Further graphs for nozzle sizes 025 and 05 are available on the HGCA website [www.hgca.com/nozzlechart](http://www.hgca.com/nozzlechart)

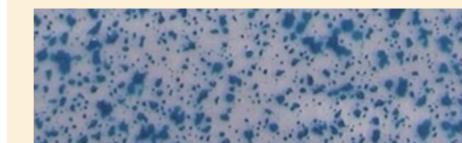
Droplet size

### Nozzles and droplet size

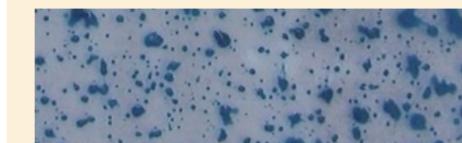
Different commercial designs of air induction (AI) nozzle produce different droplet sizes. Those giving a small droplet size will often give higher levels of efficacy, but can also produce more drift than those generating a large droplet size. Recommendations are therefore given on the main chart (left) for AI nozzles giving small or large droplets.

Nozzles producing small or large droplets can be identified from the bar charts (right). Average droplet sizes from different designs of AI nozzles are shown relative to the same size conventional (flat fan) nozzle.

All measurements were made under standard testing conditions with all nozzles operating at 3.0 bar pressure. In each bar chart small droplet designs appear at the lower end, whereas large droplet designs are in the upper part.



small droplet

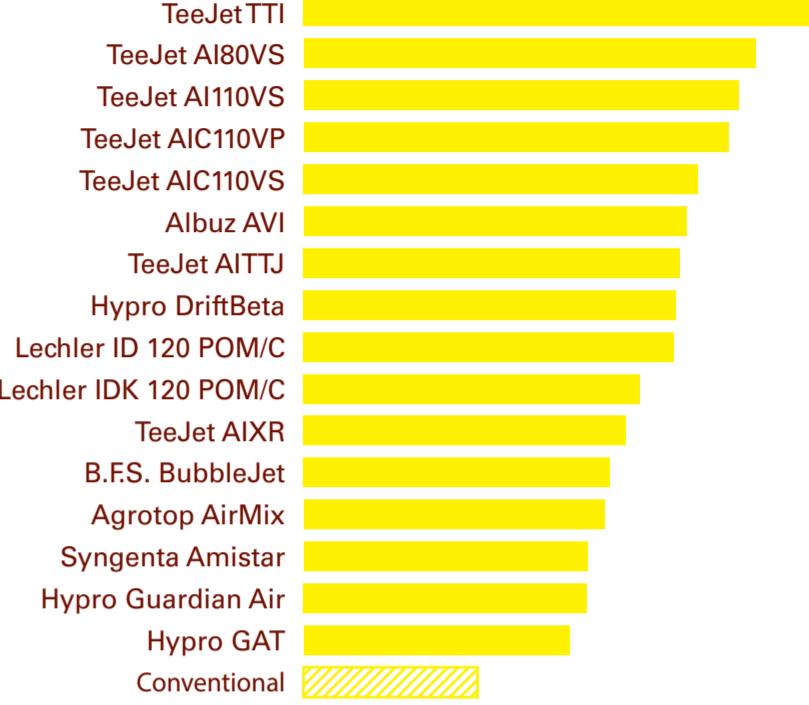


large droplet

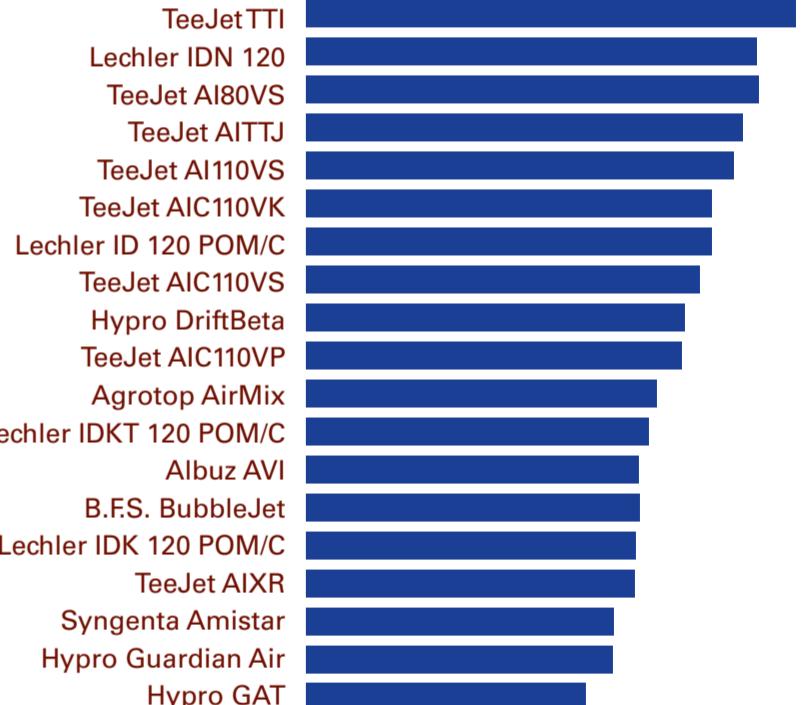


conventional

### 02 air induction nozzles



### 03 air induction nozzles



### 04 air induction nozzles

