Results of Recent Agronomy Trials on Oilseed Rape in England

P. Bowerman

Agricultural Development and Advisory Service (ADAS),
Brooklands Avenue, Cambridge CB2 2R

Summary

In comparisons between TCA and fluazifop-butyl in mixtures or sequences with various herbicides there was a yield advantage of 0.11 t/ha to fluazofop-butyl and TCA was less consistent in controlling volunteer cereals and grass weeds.

The most consistent control of *Stellaria media* was achieved with pre-emergence applications of tebutam or metazachlor or post-emergence treatment with carbetamide with dimefuron. *Matricaria* spp were best controlled by metazachlor.

Spring applications of plant growth regulators have given variable yield responses.

Harvesting following swathing or desiccation has not resulted in higher yields than harvesting direct.

Yield losses from single passes through the crop with sprayer wheels at mid-flowering, late flowering and desiccation stage were less than 1.0 %, about 3.0 % and 1.5 % respectively.

Introduction

Recent ADAS trials have evaluated varieties, herbicides, use of growth regulators at present commercially available for cereals, harvesting systems and the loss in yield resulting from the use of tractors to apply sprays between mid-flowering and just before harvest.

Herbicide trials 1983 and 1984

Comparisons between TCA and fluazifop-butyl in mixtures or sequences with various herbicides were made in ADAS trials in 1983 and 1984. The results will be presented in a paper at the British Crop Protection Conference-Weed at Brighton in November 1985 by J.T. Ward, ADAS, Shardlow Hall.

The following treatments were applied in 200 l/ha water at 2.0 bar pressure :

a. TCA at 10.5 kg ai/ha as 11.0 kg/ha product incorporated into soil before sowing.

b. Fluazifop-butyl at 0.25 kg ai/ha as Fusilade at 1.0 l/ha with Agral when grass weeds had 2-3 leaves.

1. Napropamide at 0.94 kg ai/ha as Devrinol at 2.1 l/ha tank mixed with trifluralin at 1.1 kg ai/ha as Treflan at 2.3 l/ha incorporated into soil before sowing.
2. Tebutam at 3.6 kg ai/ha as Comodor at 5.0 l/ha applied within 48 hours of sowing.
3. Metazachlor at 1.25 kg ai/ha as Butisan S at 2.5 l/ha applied pre-emergence of the crop.
4. Carbetamide and dimefuron at 2.8 kg ai/ha as Pradone Plus at 4.0 kg/ha applied from 4 true leaf stage of the crop.
5. Propyzamide + clopyralid as Matrikerb at 1.63 kg/ha applied from 3 true leaf stage of the crop.
6. Benazolin plus clopyralid as Benazalox at 1.0 kg/ha applied from crop 4 true leaf stage and weeds emerged.

TCA v Contact grass herbicides

Exact figures for areas treated with different herbicides against grass weeds and volunteer cereals are not available but an estimate is that in autumn 1983 about 40 % was treated with TCA, and a little more with contact grass herbicides ("graminicides"). The trend is for an increase in the proportion treated with a graminicide.

In the fourteen trials there was a small but consistent yield advantage (0.11 t/ha) to using fluazifop-butyl, table 1.

Table 1 – Sequences or mixtures of TCA and fluazifop-butyl.
Seed yields in t/ha at 92 per cent dry matter

Herbicides in mixture or sequence	TCA	Fluazifop-butyl
Trifluralin + napropamide	3.34	3.49
Tebutam	3.39	3.47
Metazachlor	3.36	3.47
Propyzamide + clopyralid	3.32	3.42
MEAN	3.35	3.46

In eleven trials volunteer cereals had either been sown in the trial area or there were a sufficiently indigenous population to make assessments of levels of control. TCA was less consistent in controlling volunteer cereals and grass weeds, table 2.

Table 2 – Sequences or mixtures of TCA and fluazifop-butyl.
% Control volunteer cereals and grass weeds

Herbicides in mixture or sequence	TCA	Fluazifop-butyl
Trifluralin + napropamide	80	99
Tebutam	93	100
Metazachlor	91	99
Propyzamide + clopyralid	98	98
MEAN	90	99

Broad Leaf weeds

There were fewer sites with the common broad leaf weeds, namely common chickweed *(Stellaria media)*, speedwell spp *(Veronica* spp*)* and mayweed *(Matricaria* spp*)*. In addition there were three sites with charlock *(Sinapsis arvensis)* in 1984. The mean levels of control of these weeds by various herbicides applied in combination with TCA or fluazifop-butyl are shown in tables 3 and 4. Results were selected from trials with either over 10 per cent ground cover or more than 10 plants per square metre of the specific weeds. Therefore the numbers of trials for each herbicide varies and the levels of control are not strictly comparable.

Table 3 – Level of control of *Stellaria media* and *Veronica* spp.
Mean of sequences or mixtures with TCA or fluazifop-butyl.
(Number of trials in parentheses)

Herbicides	Per cent control	
	Stellaria media	Veronica spp
Trifluralin + napropamide	86 (7)	97 (7)
Tebutam	93 (8)	97 (7)
Metazachlor	92 (8)	98 (7)
Carbetamide + dimefuron	92 (4)	96 (5)
Propyzamide + clopyralid	74 (8)	68 (7)
Benazolin + clopyralid	72 (4)	48 (2)

Table 4 – Level of Control of *Matricaria* spp and *Sinapsis* arvensis.
Mean of sequences or mixtures with TCA or fluazifop-butyl.
(Number of trials in parentheses)

Herbicides	Per cent control	
	Matricaria spp	Sinapsis arvensis
Trifluralin + napropamide	64 (5)	18 (3)
Tebutam	64 (6)	20 (3)
Metazachlor	80 (6)	61 (3)
Carbetamide + dimefuron	57 (3)	86 (3)
Propyzamide + clopyralid	49 (6)	56 (3)
Benazolin + clopyralid	62 (3)	–

Control of the broad leaf weeds was consistently better (about 5 %) where the broad-spectrum herbicides were used in tank mixture or sequence with TCA than where they were applied in sequence with fluazifop-butyl.

The most consistent control of *Stellaria media* was by pre-emergence applications of tebutam or metazachlor or post-emergence treatment with carbetamide with dimefuron.

Very good control of *Veronica* spp was achieved by trifluralin plus napropamide, tebutam, metazachlor and carbetamide with dimefuron. *Matricaria* spp were best controlled by metazachlor. *Sinapsis arvensis* was most consistently controlled by carbetamide with dimefuron but there were occasions where propyzamide plus clopyralid gave good control.

Plant growth regulators

Since 1981 ADAS has done trials to evaluate the use of chlormequat at 1.25-2.25 kg ai/ha, mepiquat chloride at 0.76 kg ai/ha with 2-(chloroethyl) phosphoric acid at 0.39 kg ai/ha, and 2-(chloroethyl) phosphoric acid at 0.48 kg ai/ha.

Autumn and/or spring applications of chlormequat did not affect yields significantly and spring applications reduced crop height by 5 cm.

Spring applications of the growth regulators containing 2-(chloroethyl) phosphoric acid have given variable yield responses and abortion of flower buds particularly in the hot, dry conditions of 1984. Crop height was reduced by 10-15 cm.

In the majority of trials there was little or no leaning or lodging of the crops.

Harvesting Methods

Traditionally winter rape is either swathed or desiccated before combining to overcome uneven ripening. Modern varieties now have less vegetative growth, pods higher up the plant and more even ripening.

Recent Experimental Husbandry Farm trials at High Mowthorpe (varieties Rafal or Bienvenu), Boxworth (Jet Neuf) and Bridgets (Jet Neuf or Bienvenu) have shown no consistent yield advantage from desiccation with diquat (Reglone) compared with direct combining without desiccant, table 5.

Table 5 – Harvesting methods and relative seed yields 1980-84.
Mean yield from desiccation with Reglone taken as 100.
(Number of trials indicated in parentheses)

	Bridgets	Boxworth	High Mowthorpe
Desiccated yield (Reglone)	100 (2)	100 (4)	100 (5)
Relative yield from :			
Direct combining (untreated)	95 (2)	100 (4)	109 (2)
Spodnam DC	96 (1)	104 (2)	107 (3)
Reglone + Spodnam	101 (1)	97 (2)	103 (3)
Reglone after Spodnam DC	–	–	110 (1)
Roundup	101 (1)	100 (2)	102 (2)
Swathing	92 (1)	102 (2)	102 (5)

Yields measured from unwheeled areas on all treatments. In the comparisons with diquat most of the treatments were harvested on the same date.

Other chemicals to aid harvesting have been investigated. Glyphosate (Roundup) has been tested in five ADAS EHF trials over three years as a pre-harvest herbicide. Yields were similar to those given by diquat (Reglone) except in one trial where a 0.2 t/ha yield advantage occurred. Six EHF trials from 1980-82 tested the pod sealant Spodnam tank mixed with Reglone but yields were no better than those from Reglone alone. Di-l-p-menthene (Spodnam DC) has a label recommendation for use as a sealant to prevent pod shatter and to prolong pod fill. It was tested on undesiccated crops in six EHF trials during 1982-84. In every case yields were no better than direct combining without desiccation.

Swathing has not given any consistent yield benefits over desiccation or direct combining at Boxworth or Bridgets but at High Mowthorpe, an exposed, windy site, it has given yield benefits over desiccation in two years out of five, in the range of 11-12 per cent.

Effects on seed quality

Seed oil content was not affected by harvesting method in any trial. Generally there was little difference in seed moisture between crops combined at the same date after swathing or desiccation, except where wet conditions persisted during harvest, when a swathed crop dried out less readily and the seed was considerably wetter. Direct combining with or without pod sealant has given higher seed moistures than desiccation. In 11 EHF trials the average difference was 3 per cent with a range of 0 to 7 per cent.

Wheeling Damage by Ground Sprayers

The benefits of sprays applied from the ground must be considered against the yield losses caused by wheeling through the crop. Recent work at Boxworth and High Mowthorpe EHFs shows that these are not significant during the flowering period but can be appreciable from the end of flowering onwards.

At Boxworth in 1983 (variety Jet Neuf) and 1984 (Bienvenu) a previously unwheeled crop without tramlines was wheeled at the 20 pod stage (1984 only), at the end of flowering or at the timing for Reglone application. The machines compared were a large tractor with mounted sprayer, plastic sheeting for underbody protection and conventional (40 cm wide) tyres and a Highlite self-propelled sprayer with narrow (34 cm) tyres and 100 cm ground clearance. The effects on yield were similar in both years despite differences in crop height and lodging, table 6.

Table 6 – Boxworth EHF : average % yield losses from wheelings on 24 m centres
(crop previously unwheeled)

	Mid-flower	End of flower	Desiccation	End of flower + desiccation
Tractor	0.8	3.3	1.5	4.2
Highlite	0.8	2.8	1.4	3.6

Damage at mid flowering was slight due to compensatory growth and did not add to the damage caused by later wheelings. The greatest damage occurred at the end of flowering. There was only a small benefit from using the high clearance machine.

At High Mowthorpe EHF in 1984 a similar comparison was made between a tractor with trailed sprayer and the Highlite. Both a previously unwheeled crop and a tramlined crop wheeled for herbicide and fertiliser applications were wheeled during and after flowering. The variety was Darmor.

On the previously unwheeled crop there was greater damage from both machines at all timings than at Boxworth, which may have been due to the greater crop height. Again, most damage was caused at the end of flowering. Tramlining followed by early wheelings on 24 m centres reduced yields by nearly 3 per cent compared with an unwheeled crop. However, superimposing later wheelings at mid-flowering or end of flowering with the Highlite caused no extra damage.

Where early wheelings are overgrown during flowering they cannot be followed with any accuracy. Marked damage will therefore occur from ground application of sprays at the end of flowering and desiccation time since wheelings are likely to be made on previously unwheeled crop. However, where tramlines and early wheelings are still visible and can be followed accurately, damage from a high clearance sprayer passing through from mid-flowering onwards appears to be negligible.