HGCA

PROJECT REPORT No. 104

REDUCED COST APPROACHES TO HERBICIDE AND FUNGICIDE USE ON CEREALS IN SCOTLAND

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REDUCED COST APPROACHES TO HERBICIDE AND FUNGICIDE USE ON CEREALS IN SCOTLAND

by

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Reduced cost approaches to herbicide and fungicide use in cereals

A report from SAC to the Home-Grown Cereals Authority

ABSTRACT

Many trials took place in the arable areas of Scotland for harvest in the years 1990 to 1992. The fungicide trials used a range of varieties and tested a range of programmes with low dose fungicide mixtures on winter wheat and spring barley. The herbicide trials used a range of products or tank mixes, alone or in sequence and at a range of doses.

On winter wheat, a half dose programme based on prochloraz products for the early sprays and a triazole-protectant mix for the later sprays was consistently cost effective for Hornet and Riband. A low dose of morpholine was added when mildew or yellow rust threatened. For Hornet, this was estimated to be more cost-effective than the full dose programme in 94% of the situations represented by the trials. For Apollo, a cheaper half dose programme primarily aimed at mildew was estimated to be more cost effective than the full dose in 70% of Scottish situations.

For spring barley, a quarter dose mixture of fenpropimorph with either propiconazole or flusilazole and applied twice was more cost effective than two full doses of morpholine in 64 to 97% of situations, depending on variety. Success of the low dose programme depends on the applications being made early in the development of mildew.

Excellent broad-leaved weed control in winter cereals was achieved by a quarter dose of a product with diflufenican or pendimethalin applied in the autumn, followed by a quarter dose of mecoprop (or mecoprop P) in spring. The second dose was not needed in more than half of the trials. The quarter dose sequence was successful in 82% to 92% of situations.

A high level of weed control was less easily achieved for spring barley. The most effective products tested were a tank mix of metsulfuron-methyl with mecoprop and a propietary mix of ioxynil, bromoxynil and fluroxypyr. These had a success rate of 55% at the quarter dose but did not always leave a clean crop when the full dose was used. Despite being weedy, the highest yields of spring barley were at the quarter or half dose.

The results reported here have had a major influence on advice given to farmers by SAC and other Advisers in Scotland and our Current Advice is summarised.

1. INTRODUCTION

1.1 Objectives

At the time this project was proposed, there was an awareness that farmers were using low doses of herbicides and fungicides but very little field trials evidence to support or refute the practice or to define the conditions where it might be cost-effective. The objectives as originally stated were:

i. To determine the effect of weather factors on the stability of weed and disease control using low cost approaches

ii. To examine the effect of strategic timing, tank-mixing and sequential use of low doses of herbicide and fungicide

iii. To continue building experience of low-cost approaches with a view to improved advice to farmers wanting to improve the cost-effectiveness of their spray treatments and/or reduce the environmental hazards associated with sprays.

In the course of the work, the second and third of these objectives have remained very much to the forefront but the first has been modified as we have realised that the weather is only one of many factors influencing the effectiveness of low dose applications. If we were now to redefine that objective it would state:

> To ascertain the probability of successful control using low cost approaches and to define the field situations which indicate that a more expensive option (full dose or more effective material) would be appropriate.

1.2 Review of the literature pre-dating field work.

Wale (1990) summarised the Scottish work on low dose fungicide mixtures for spring barley which preceeded this project. He suggested that success depended on timely (which means early) application and careful selection of fungicide mixture. For Golden Promise in 1985, the highest yield and gross margin was obtained by spraying three times with quarter dose propiconazole and tridemorph and this controlled mildew better than the full dose of either fungicide. In 1986, mildew failed to develop and the unsprayed treatment had the highest gross margin. Another trial ran from 1987 to 1989 with Golden Promise and Golf. Except in 1989, the quarter dose mix had a better gross margin than standard treatments for both varieties but in 1989 under high mildew pressure the standard treatments were superior.

Gilmour et al. (1986) used a multiple product mix at full, quarter and half dose for three applications on winter barley in 1985. Yields fell progressively as dose was reduced: at one site the quarter dose yielded 0.5 t/ha less than than full dose and at the other, 0.3 t/ha. However, a six-application programme with quarter dose each time was only 0.3 t/ha lower yielding at the first site and yielded more, though not significantly more, than three full doses at the other site.

Davies et al (1990) reviewed the yield responses to weed control in Scotland which have generally been small and not well related to weediness in winter wheat and spring barley. They pointed out that the weeds may have deleterious effects on crop quality or ease of combining but nevertheless considered that there was scope for using lower doses and tolerating some weeds in cereal crops. Whiting and Davies (1990) reported on HGCA-funded

work where they obtained adequate control of chickweed in winter wheat using as little as one eighth dose of autumn herbicide or half dose of spring herbicide. For the spring herbicide, the mean yield from six sites rose from 8.31 t/ha at full dose to 8.52 t/ha at eighth dose, suggesting that higher doses of herbicide were damaging to the crop in that instance.

In Scandinavia and as a result more of political pressure than of farm management considerations, research and advisory interest in low doses began earlier than in UK. Thonke (1988) claimed that 250 field trials in Denmark and Sweden had shown that "adequate weed control in spring cereals treated with hormone and hormone+ioxynil compounds could be achieved with half or less than half of the normal dosages if the application was done under the optimum spraying conditions". Subsequently these optimum conditions were defined and incorporated into a computer program. Pessala (1990) reported that Scandinavian experience suggested that reduced doses of herbicide were preferable to leaving large areas unsprayed.

1.3 Experimental approach

As originally defined "low cost approaches" included either the selection of cheaper herbicide or fungicide options or the reduction in the dose of the more expensive ones. As the project has progressed, it has been found that low doses of the more effective products were more cost effective than full doses of the poorer products. An example is that fenpropimorph has tended to be better than tridemorph on spring barley. The later experiments have therefore tended to concentrate on achieving economies through reduced doses.

The approach has been to run many but fairly simple field trials in environments representative of the Scottish arable areas. For fungicides, the most important criterion and the variable that synthesises the effect of all the diseases that may occur is the yield response. For that reason, we have measured yield in most trials. It was known from variety trials that the disease resistance characteristics of varieties is a major determinant of the fungicide response and it was therefore necessary to include several varieties with contrasting spectra of disease susceptibility in all trials. The confirmation early in the life of the project of the very good results on barley mildew from mixtures of a triazole and a morpholine fungicide raised the question of how general a finding this was. A larger range of possible combinations at a range of doses were therefore tested in screening trials, purley for their effect on mildew.

For herbicides, the yield response is far less important and was already known to be small in Scottish winter wheat and spring barley crops. Yield was therefore not measured at every site. What was considered important was to achieve a level of weed control with which the farmer would be comfortable and which would not cause trouble in future years by adding to the weed seedbank. Over the course of the project, a ground cover of 5% by broad-leaved weeds in the summer has come to be defined as a criterion for the success of any treatment. In most trial sites, this has been a cover of low-growing weeds not visible above the canopy. It is an arbitrary criterion, but is intended to err towards providing a stringent test of the lower cost herbicide options. On the more weedy sites and/or sites with uncompetitive crops, it was not always possible to achieve 5% even with the full dose. For the risk analysis approach, it is better to set a target which is independent of the weediness intrinsic to the site rather than to have a target percentage control. The approach is again conservative, favouring the higher dose to achieve a low weed ground cover on a weedy site but allowing a low dose on a less weedy site where a high percentage control of a low weed population is an unnecessary luxury.

2. MATERIALS AND METHODS

2.1 Fungicide trials

Table 1. Fungicide products used in the trials with active ingredients and manufacturers' recommended dose.

Product name	Active ingredients	Full dose
Alto 100 SL	100 g/l cyproconazole	0.8 l/ha
Bavistin FL	500 g/l carbendazim	0.5 l/ha
Bayfidan	250 g/l triadimenol	0.5 l/ha
Calixin	750 g/l tridemorph	0.7 l/ha
Corbel	750 g/l fenpropimorph	1.0 l/ha
Dorin	125 g/l triadimenol + 375 g/l tridemorph	1.0 l/ha
Early Impact	94 g/l flutriafol + 150 g/l carbendazim	1.25 l/ha
Fusion	160 g/l flusilazole + 350 g/l tridemorph	1.0 l/ha
Glint 500EC	125 g/l propiconazole + 375 g/l fenpropimorph	1.0 l/ha
Impact Excel	47 g/l flutriafol + 375 g/l chlorthalonil	2.0 l/ha
Patrol	750 g/l fenpropidin	1.0 l/ha
Punch C	250 g/l flusilazole + 125 g/l carbendazim	0.8 l/ha
Sanction	400 g/l flusilazole	0.4 l/ha
Sportak	400 g/l prochloraz	1.0 l/ha
Sportak Delta 460	320 g/l prochloraz + 48 g/l cyproconazole	1.25 l/ha
Sprint	225 g/l prochloraz + 375 g/l fenpropimorph	1.75 l/ha
Tilt 250EC	250 g/l propiconazole	0.5 l/ha
Tilt Turbo 475 EC	125 g/l propiconazole + 350 g/l tridemorph	1.0 l/ha

The fungicide trials were split plot designs with variety as the main plot and fungicide programme as the split plot. There were four replicates and the plot size was about 40 m2. The fungicides were applied by conventional hydraulic sprayer in volumes of 190 to 250 litres of water per hectare. Dates of application, weather conditions at spraying, disease levels at spraying and other site-specific details are given in the Appendices. Table 1 gives a list of the products used, their active ingredients and the manufacturers' recommended dose. Foliar diseases were normally assessed in the field: the average percentage of leaf infected by each disease was estimated for the whole plot.

The unyielded fungicide screen trials were laid down in alternating 40m2 strips of resistant and susceptible varieties and each strip was split into a smaller plot of about 2.5 x 2 m. Each small plot was sprayed with the appropriate fungicide or tank mix at each of 1/8, 1/4, 1/2 and full recommended dose. A number of additional tank-mixes were applied at 1/4 dose only.

2.2 Herbicide trials

Table 2. Names, active ingredients and manufacturers' recommended dose of the herbicides used in the trial series.

Product	Active ingredients	Full dose
Advance	100 g/l bromoxynil + 100 g/l ioxynil + 90 g/l fluroxypyr	1.5 l/ha
Ally	200 g/kg metsulfuron-methyl	30 g/ha
Asset	50 g/l benazolin + 125 g/l bromoxynil + 62.5 g/l ioxynil	2.0 l/ha
Banlene plus	18 g/l dicamba + 252 g/l MCPA + 84 g/l mecoprop	4.0 l/ha
CMPP	570 g/l mecoprop - salt	3.75 l/ha
or Duplosan	600 g/l mecoprop-P	2.0 l/ha
Condox	112 g/l dicamba + 265 g/l mecoprop	5.0 l/ha
Coupler SC	60 g/l clopyralid + 350 g/l cyanazine	O.7 l/ha
Encore	250 g/l pendimethalin + 125 g/l isoproturon	4.0 l/ha
Fortrol	200 g/l cyanazine	0.5 l/ha
Harmony M	70 g/kg metsulfuron-methyl + 680 g/kg thifensulfuron-methyl	60 g/ha
Ipso	19 g/l isoxaben + 450 g/l isoproturon	4.0 l/ha
Lontrel Plus	15 g/l clopyralid + 420 g/l dichlorprop + 175 g/l MCPA	4.0 l/ha
MCPA	500 g/l MCPA	1.5 l/ha
Panther	50 g/l diflufenican + 500 g/l isoproturon	2.0 l/ha
Quiver	200 g/l cyanazine + 300 g/l isoproturon	2.5 l/ha
Redipon Extra	350 g/l dichlorprop + 150 g/l MCPA	5.6 l/ha
Treflan	480 g/l trifluralin	2.0 l/ha
Starane 2	200 g/l fluroxypyr	0.75 l/ha
Stomp 330	330 g/l pendimethalin	3.0 l/ha

For winter wheat, pre-emergence or early post-emergence herbicides alone have been tested, spring herbicides or tank-mixes alone and sequences of autumn and spring herbicide. For winter barley, it was already known that autumn control was desireable and so these did not include spring only treatments. For spring barley, a wide range of old and new herbicides and tank mixes have been tried. The products used are shown in table 2.

Sites were chosen which did not have known infestations of wild oats, cleavers or sterile brome. Plot size was either 24 x 2 m in sown trials, 24 x 3 m in superimposed trials or 8-12m x 2m in unyielded trials. In each randomised block trial, three to seven herbicide combinations were compared. Most commonly the treatments included the manufacturers' recommended dose (full dose) of each product in the sequence or mixture, one half, one quarter and one eighth of that dose. There was an untreated control in every trial. The ground cover of each weed species at a date in June or July was assessed over the whole plot.

The weed cover estimates from these trials were fitted to the logistic response curve used by Streibig (1989), assuming parallel but displaced response curves for different herbicide combinations in the same trial. The weed ground covers shown in the tables are the fitted values at one quarter of the recommended dose in each trial. Since not all herbicides were tested in all trials, the adjusted mean for each herbicide was calculated by least squares fitting. For comparison, we show the adjusted mean for the full dose.

3. RESULTS AND DISCUSSION

3.1 Winter wheat fungicide trials.

3.1.1 The 1990 trials

The 1990 trials compared two three-spray programmes, one based on Sportak Delta, Sprint and Impact Excel and one based on Punch C, applied three times. Each had full dose (A,D) and half dose (B, E) treatments and there were also two-spray and four spray programmes (table 3). All treatments yielded significantly higher than the unsprayed control, even in the relatively resistant variety, Apollo and the Sportak and Impact Excel programme outyielded the one based on Punch C at full and half dose in the the three-spray programme and in the four-spray low dose programmes (F, G). The half-dose Sportak-Impact Excel programme (B) and the four-spray programme (G) were most cost effective on both varieties. There was little difference in specific weight or thousand grain weight between the treatments but the untreated plots had lower specific weights and thousand grain weights.

Mildew and yellow rust occurred on Hornet at all sites and mildew on Apollo at one site but both of these were well controlled by all treatments. Similarly, Septoria tritici, though only a problem on Hornet at one site was well controlled. Common eyespot was not a problem but sharp eyespot was seen on more than 80% of tillers at two sites. Severe infections were generally less common on Sportak-Impact Excel programmes than on Punch C. Possibly because of this, lodging was reduced in all of the programmes based on Sportak and Impact Excel but was worse in the Punch C treatments than in untreated controls.

3.1.2 The 1991 trials

The 1991 trials had the same full and half dose programmes based on Sportak Delta and Impact Excel or on Punch C, together with treatments based on low dose sequences of the different fungicides (table 4). As in 1990, the Sportak-Impact Excel treatments outyielded the Punch C at full (A, C) and half dose (B, E). However the 3 low doses of Punch C, followed by Impact Excel (E) was among the most cost effective programmes, along with the similar 3 low doses of Sportak followed by Impact Excel (F). The low dose programmes controlled yellow rust well on both varieties, mildew on Hornet and Septoria tritici on Apollo. The full doses were best for controlling mildew on Apollo and Septoria tritici on Hornet.

3.1.3 The 1992 trials

The 1992 trials compared flag leaf and head spray doses and timing. Except for treatments G, P and Y, which had two low doses at GS 30 and 32, all plots had a commmon first node treatment of Sportak Delta at one third to three quarter dose depending on the eyespot risk as assessed at the time.

Table 3. Winter wheat fungicide trials: yields, quality characters and lodging, mean of three trials, 1990

Treatment: Code		Yield in t/ha at 15% moist.		Thousand grain weight, grams		Specific weight kg/hl		Lodging %	
		Hornet	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet	Apollo
U	Untreated	5.17	7.06	42.2	44.8	64.6	71.3	11.8	6.6
A	Full Sportak Delta/Sprint/Impact Excel	9.53	8.38	53.7	50.4	69.8	72.5	4.7	1.0
B	Half dose of A	9.31	8.09	52.0	48.1	69.8	71.9	9.0	1.9
C	Two spray Sportak Delta/Impact Excel	8.63	8.11	51.4	48.7	69.9	72.5	6.9	2.3
D	Full Punch C/Punch C/HPunch C	9.25	7.96	51.7	49.1	69.7	72.0	13.5	4.2
E	Half dose of D	8.37	7.73	50.7	47.2	69.0	71.9	27.6	3.1
F	Four spray Punch C	8.90	7.96	51.4	47.4	69.4	71.9	18.6	4.1
G	Four spray Sportak/Impact Excel	9.26	8.09	52.6	49.5	70.0	72.4	6.4	1.7
	SE difference	0.165	1.05	0.49	3.09				

A: Sportak Delta + half Corbel at GS31, Sprint at GS39-49, Impact Excel + half Patrol at GS59-69.
B: Half dose of A: half dose main product plus quarter dose Corbel or Patrol
C: Sportak Delta + half Corbel at GS32, Impact Excel + half Patrol at GS59-69
D: Punch C + half Corbel at GS31, GS39-49 and at GS59-69
E: Half dose of D: ie half dose Punch C plus quarter dose Corbel
F: 1/4 Punch C + 1/4 Corbel at GS30 and GS32, 1/2 Punch C + 1/4 Corbel at GS39-49 and GS59-69.
G 1/3 Sportak + 1/4 Corbel at GS30, GS32, and GS39-49, 1/2 Impact Excel + 1/4 Patrol at GS59-69.

Table 4. Winter wheat fungicide trials: yields and thousand grain weights (3 sites), foliar disease in July (mean of 2 worst-affected sites), and lodging (one site) in 1991.

Code	Treatment	Yield t/ha at 15%		Thousand grain weight grams %		Mildew %		Septoria tritici %		Yellow rust %	Lodging %
		Apollo	Hornet	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet	Hornet	Hornet
U	Untreated	5.91	4.95	44.8	37.9	21.1	10.1	4.1	12.3	18.6	22.5
A	Full Spor fb IE	7.29	8.45	50.0	51.1	5.0	5.7	1.0	2.0	4.5	0.1
B	1/2 Spor fb IE	7.01	8.11	49.6	51.3	8.8	4.3	1.6	4.5	1.4	4.5
C	Full Punch C	6.91	8.15	49.0	49.6	3.2	4.5	1.3	1.2	0.8	12.0
D	1/2 Punch C	6.71	7.67	48.7	48.5	5.0	4.8	1.3	2.6	1.2	11.8
E	3 x Pun C fb IE	6.95	8.15	48.6	50.3	6.0	3.0	1.0	1.9	1.0	13.3
F	3 x Spor fb IE	6.97	8.14	49.4	49.4	9.5	4.7	1.4	3.3	4.3	5.8
G	Spor D fb PC fb IE	7.07	7.90	49.6	49.3	5.2	4.8	1.3	2.1	1.7	2.0
SED		0.156		0.893		1.81		0.95		1.96	6.6

A: Full dose Sportak Delta at GS31, Sprint at GS39 and Impact Excel at GS59
B: Half dose equivalent of A
C: Full dose Punch C at GS31, GS 39 and GS 59
D: Half dose equivalent of C
E: Quarter dose Punch C at GS30 and 32, quarter dose Punch C at GS39, half dose Impact Excel at GS 59.
F Third dose Sportak at GS30, 32 and 39, half dose Impact Excel at GS59
G Third dose Sportak Delta at GS31, third dose Punch C at GS39, half dose Impact Excel at GS 59.
All treatments up to and including GS39 had quarter dose of Corbel added. GS 59 had quarter dose Patrol.

Table 5. Mean yield and disease on the flag leaf of winter wheat in 1992 fungicide trials (mean of 2 sites).

Code	Fungicide application Stem extension	Flag leaf	Head spray	Yield t/ha	% flag leaf infected
Apollo					Mildew
U	nil	nil	nil	8.22	27.7
A	GS31-32	3/4 @ 39	3/4 @ 59-64	9.69	8.2
B	GS31-32	1/2 @ 39	1/2 @ 59-64	9.61	10.1
C	GS31-32	1/3 @ 39	1/3 @ 59-64	9.55	14.6
D	GS31-32	1/3 @ 45	1/3 @ 59-64	9.51	6.2
E	GS31-32	1/3 @ 49	1/3 @ 59-64	9.54	8.6
F	GS31-32	nil	1/2 @ 59-64	9.06	20.4
G	GS30 & 32	1/3 @ 39	1/3 & 59-64	9.46	9.5
Hornet					Yellow rust
U	nil	nil	nil	7.19	38.0
H	GS31-32	1 @ 39	1 @ 59-64	10.51	0.2
J	GS31-32	1/2 @ 37	1/2 @ 59-64	10.42	1.8
K	GS31-32	1/2 @ 39	1/2 @ 59-64	10.48	0.2
L	GS31-32	1/2 @ 45	1/2 @ 59-64	10.34	0
M	GS31-32	1/2 @ 49	1/2 @ 59-64	10.27	2.0
N	GS31-32	1/2 @ 39	1/2 @ 55	10.60	0.6
P	GS30 & 32	1/2 @ 39	1/2 @ 59-64	10.74	0.6
Riband					S. tritici
U	nil	nil	nil	8.53	46.2
R	GS31-32	1 @ 39	1 @ 59-64	11.45	0.5
S	GS31-32	1/2 @ 37	1/2 @ 59-64	11.30	1.9
T	GS31-32	1/2 @ 39	1/2 @ 59-64	11.39	0.9
V	GS31-32	1/2 @ 45	1/2 @ 59-64	11.05	4.4
W	GS31-32	1/2 @ 49	1/2 @ 59-64	11.32	0.5
X	GS31-32	1/2 @ 39	1/2 @ 55	11.30	1.1
Y	GS30 & 32	1/2 @ 39	1/2 @ 59-64	11.28	2.0
	SED			0.243	

GS30 to GS32 sprays were based on Sportak Delta, using 1/3 dose (0.42 l/ha) at one site and 3/4 dose (0.94 l/ha) at the other. The split dose treatment had 2 x 1/4 dose (0.31 l/ha) or 2 x 1/3 dose (0.42 l/ha). Flag leaf and head sprays for Apollo were based on Sanction plus Corbel: 3/4 = 0.3 + 0.5, 1/2 =0.2 + 0.35, 1/3 = 0.13 +).25 l/ha. Flag leaf and head sprays for Hornet and Riband were based on Impact Excel at the full dose of 2.0 l/ha or half dose of 1.0 l/ha. Patrol was added at full (0.5 l/ha) or half (0.25 l/ha) except for Riband at one site where no mildew or yellow rust occurred.

The priority for Apollo was to control mildew and a mix of Sanction and Corbel was chosen and the timing varied for applications at one third dose. The effect of dose rate (A v B v C) was consistent (table 5) but the response to the higher dose was not sufficient to offset fungicide costs. The treatment ommitting the flag leaf spray (F) was low yielding at both sites and this was associated with a high level of mildew on the flag leaf and with high Septoria tritici at one site. There was little difference from the different timings of the "flag leaf" treatment (C v D v E) and splitting the stem extension treatment (G) gave lower yields but not significantly lower than the equivalent single dose treatment (C).

For Hornet and Riband, the priorities were yellow rust and Septoria tritici and the chosen fungicide was Impact Excel with Patrol added where mildew or yellow rust was present. The extra yield from the full dose (H, R) compared with half dose (K,T) was not economic. Early timing of the flag-leaf spray (GS37-39, J,K,S,T) was preferable on balance to late timing (GS45-49, L,M,V,W) which was probably a result of better timing in relation to disease development. The treatment with an earlier "head" spray performed well in Hornet (N) but not so well in Riband (X), despite high mildew and Septoria at one site. Best of all in Hornet was the four-spray programme (P) which gave good early control of yellow rust.

3.1.4 General discussion of disease control on winter wheat

The sequence of prochloraz-based products (Sportak, Sportak Delta or Sprint) and flutriafol+chlorothalonil (Impact Excel) has worked very well and consistently on the yellow rust and Septoria susceptible varieties (Hornet and Riband) in all trials. The 1991 results suggest that the Impact Excel may be the product which gives this programme the edge but the ability of early prochloraz treatments to reduce lodging is also important. It is not clear whether this is an effect on stem base disease or a growth regulatory effect. Neither can it be determined from these trials whether the good performance of Impact Excel could be achieved by any mix of triazole and protectant. If there is established mildew or yellow rust, adding in a morpholine (Corbel, Mistral, Patrol) or using a triazole-morpholine mix is clearly desireable.

Attempting to reduce below three the number of application dates does not seem to be the way forward for fungicide-responsive varieties in Scotland. However, the full dose programme works out very expensive, about £115 per hectare at current costs. The full-dose programme was cost-effective compared with the untreated, always on Hornet and usually on Apollo but only rarely as cost effective as the half-dose three-spray treatment. The extra response to a full dose compared with the half on Hornet has averaged 0.22 t/ha with a range from -0.10 to 0.51 t/ha and on Apollo, averaged 0.27 t/ha with a range from -0.04 to 0.50 t/ha. On average, therefore, the full dose is not justified for either variety. If the saving is reckoned to be £50 per ha (0.5 t/ha of wheat) for Hornet and £35 per ha for a cheaper programme for Apollo and the distribution of the yield differences in eight trials is assumed normal, then the full dose would appear to be more cost effective than the half dose in only about 6% of Scottish situations for Hornet and about 30% for Apollo.

3.2 Spring barley fungicides

3.2.1 Yield response trials

For 1990 and 1991 harvests, these trials had three varieties ranging from the very mildew-susceptible Golden Promise, through Golf to the relatively resistant Blenheim. In 1992, we concentrated on Blenheim using a wider range of triazole-morpholine mixes which had looked good in the 1991 screen. Brown rust and Rhynchosporium were seen in several trials but only at low infections. Mildew was the disease of overriding importance in these years.

Table 6. Adjusted mean yields and mildew levels for spring barley fungicide programmes on three varieties, 1990-1992.

		Golden Promise			Golf			Blenheim		
		No of trials	Yield t/ha	Mildew %	No of trials	Yield t/ha	Mildew %	No of trials	Yield t/ha	Mildew %
U	Untreated	8	3.85	50.0	8	5.06	30.1	11	5.10	20.9
A	Full Calixin / full Corbel	8	4.95	11.2	8	5.95	6.7	11	5.94	2.2
B	1/4 Calixin + 1/4 Tilt, twice	8	4.70	23.8	8	5.95	8.1	11	5.79	4.1
C	As B but with 1/4 Bavistin	5	4.76	20.2	5	6.12	9.6	5	5.70	4.2
D	1/4 Corbel + 1/4 Tilt, twice	8	5.02	15.5	8	6.09	7.6	11	5.97	2.3
E	1/4 Corbel + 1/4 Sanction, twice	3	5.18	10.3	3	6.15	7.7	6	5.92	4.7
	SE mean yields 3 trials			0.099						
	5 trials			0.077						
	8 trials			0.061						
	11 trials			0.052						

The first spray was applied when mildew was first seen on the most susceptible variety. The second spray followed 4 to 5 weeks later and was usually applied soon after flag leaf emergence.

Table 7. Yields, mildew and margin over fungicide cost for spring barley in three trials with Blenheim in 1992.

Code		Mean yield t/ha	Mildew %	Margin £/ha
U	Unsprayed	5.04	18.7	
A	Full Calixin / full Corbel	5.72	2.4	29
B	1/4 Calixin + 1/4 Tilt, twice	5.73	7.4	51
D	1/4 Corbel + 1/4 Tilt, twice	5.70	3.2	42
E	1/4 Corbel + 1/4 Sanction, twice	5.61	4.6	34
F	1/4 Corbel + 1/4 Punch C, twice	5.53	4.0	24
G	1/4 Corbel + 1/4 Alto, twice	5.37	3.5	8
H	1/3 Corbel + 1/3 Sanction, twice	5.85	2.4	50
J	1/4 Corbel + 1/4 Sanction / 1/2 Corbel + 1/4 Sanction	5.89	3.2	55
K	1/2 Corbel, twice	5.74	4.7	45
	SED 0.186			

First application / second application

Barley valued at £100 per tonne
Full dose costs per hectare as follows:
Calixin £14 ; Corbel £25; Tilt £23; Sanction £22 ; Punch C £25; Alto £25

The standard treatment (A), common to all trials was a full dose of Calixin when mildew first appeared, followed by a full dose of Corbel when mildew reappeared, usually at about the flag leaf stage. The quarter dose mix of Calixin and Tilt, applied twice (table 6, treatment B) did not give good control of mildew in any of the varieties and yielded 0.25, 0 an 0.15 t/ha less than A in Golden Promise, Golf and Blenheim respectively. Adding Bavistin in 1990 (C) did not serve any useful function in a year when Rhynchosporium was not important. The quarter dose of Corbel + Tilt (D) actually outyielded the standard by 0.07, 0.14 and 0.03 t/ha respectively and Corbel + Sanction was even better still on Golden Promise and Golf but not on Blenheim.

The range of products tested was extended in 1992 but quarter doses of Corbel+Punch C and Corbel+Alto gave lower yields than the mixes of Corbel with Tilt or Sanction (table 7). Raising the Corbel component to half dose in the mixture with Sanction for the second application was the most cost effective of all treatments.

The number of trials where the quarter dose mix of Calixin and Tilt was uneconomic because it fell more than 0.20 t/ha below the standard was acceptably small for Golf but not for Golden Promise and Blenheim. Only in one trial and only for Golden Promise, did the slightly more expensive quarter dose mix of Corbel and Tilt prove less cost effective than the standard. The quarter dose mix of Corbel and Sanction was less cost effective than the standard in one out three trials with Golden Promise, in none of the three trials with Golf and with three of the six

trials with Blenheim. Normal distributions fitted to the yield differences show that the probabilities of the quarter dose not being cost effective were as follows:

	Yield difference required to offset extra cost of full dose	Probability that treatment was less cost-effective than the standard full dose treatment		
		Golden Promise	Golf	Blenheim
1/4 Calixin+Tilt x 2	0.20 t/ha	58%	25%	42%
1/4 Corbel+Tilt x 2	0.15 t/ha	20%	12%	23%
1/4 Corbel+Sanction x 2	0.15 t/ha	6%	3%	36%

Table 8. Mildew records (% of leaf infected) for Golden Promise at approximately 4 weeks after spraying for the quarter dose and other selected treatments in the screening trials (mean of 3 sites).

Material	Dose	Mildew %	
Untreated		29	
Morpholines:			
Calixin	1/4	21	
Corbel	1/4	16	
Calixin	1/2	20	
Corbel	1/2	14	
Calixin	Full	17	
Corbel	Full	10	
Formulated mixes:			
Tilt Turbo	1/4	19	
Glint	1/4	16	
Sprint	1/4	19	
Dorin	1/4	17	
Mean of formulated mixes			18
Tank mixes:			
Calixin + Tilt	1/4+1/4	14	
Corbel + Tilt	1/4+1/4	13	
Corbel + Punch C	1/4+1/4	13	
Corbel + Sportak	1/4+1/4	18	
Corbel + Bayfidan	1/4+1/4	12	
Corbel+ Early Impact	1/4+1/4	11	
Corbel + Sanction	1/4+1/4	11	
Calixin + Punch C	1/4+1/4	13	
Mean of tank mixes			13

For Corbel+Tilt and Corbel+Sanction, the probability of losing money by opting for a low dose was acceptable but does not seem to be much related to the mildew-susceptibility of the varieties. The most important factor determining the success of the low-dose programme appears to be the stage of development of the mildew at application. If the advice is followed to increase the morpholine component when the mildew is well established at spraying, then the probability of losing money is likely to be further reduced.

3.2.2 Spring barley fungicide screen.

The mildew levels in the very susceptible Golden Promise, four weeks after spraying with a quarter dose were similar for morpholine products and formulated mixes (table 8). The formulated mixes, designed primarily for wheat generally contain too little morpholine relative to the triazole for control of mildew in barley. The tank mixes gave better control except for Corbel+Sportak and were similar to a half dose of Corbel.

Six weeks after spraying at the Edinburgh site, the quarter dose mix treatments had much less mildew from the early spray than from the late on both varieties (table 9). For the full doses there was not much difference between early and late sprays. Early application is clearly vital for the succesful use of low doses against barley mildew.

Table 9 Comparison of early preventative and late curative sprays on the mildew levels (% of leaf area, +/- SE mean) six weeks after the early spray and five weeks after the late spray (Edinurgh 1991).

	Blenheim		Golden Promise	
	Early	Late	Early	Late
Untreated	9	9	42	42
Mean of 1/4+1/4 tank mixes	2	12	12	32
	+/-0.8	+/-1.2	+/-2.9	+/-3.6
Mean of full doses	1	2	7	8
	+/-1.0	+/-1.4	+/-3.3	+/-4.1

3.3 Winter cereal herbicides

In the winter cereal trials (Table 10), autumn Panther alone at quarter dose achieved 5% weed cover or less in 11 of 13 trials, the exceptions being WW9002 where both chickweed and fumitory escaped control and WB9002 where only chickweed escaped. Overall, Stomp and Encore gave control almost as good as Panther, but chickweed escaped in WW9202 and WB9002. Ipso did not perform as well as the other three autumn herbicides either at quarter or full dose and was particularly weak on chickweed and hempnettle in WW9103.

Following up with a quarter dose of CMPP in the spring controlled all the weeds that escaped Panther but did not fully control chickweed after Stomp in WW9002 or chickweed and hempnettle after Ipso in WW9103. Overall, the combinations of Panther, Stomp or Encore followed by mecoprop, all at quarter dose were highly effective and much better than either autumn or spring herbicides used alone.

Table 10. Ground cover (%) by broad-leaved weeds in summer in winter cereal trials at quarter dose of the herbicides specified.

Trial:	WW 90 01	WW 90 02	WW 90 01	WW 91 01	WW 91 02	WW 91 03	WW 91 04	WW 91 05	WW 91 06	WW 92 01	WW 92 02	WW 92 03	WW 92 04	WW 92 05	WB 90 01	WB 90 02	WB 91 01	WB 91 02	WB 91 03	No of trials	Adjusted mean ground cover % Quarter dose	Full dose
Panther / nil	1	50	3	3						2	5	3	0		0	26	0	2	2	13	6.2	0.7
Ipso / nil				4	15	54	23	2	1											6	18.4	3.1
Encore / nil										5	17	10		0			1	2		6	8.0	1.0
Stomp / nil	1		3												2	36				4	8.7	1.0
Quiver / nil																	1	4	4	3	6.0	1.1
Panther / CMPP	0	1	2	2											0	5	0	1	2	9	0	0
Ipso / CMPP				3	5	11	7	1	0											6	6.2	0.9
Stomp / CMPP	0	31	1												3	5				5	1.1	0
Quiver / CMPP																	1	2	1	3	4.4	0.3
Encore / CMPP																	0	1		2	4.6	0.4
Nil / CMPP			15	8	5	35			1	7	26	10	1	0			1			11	11.7	1.9
Nil / Ally+CMPP	0	42	6		8	6	6		0	1		13								9	6.7	1.0
Nil / Coupler+CMPP				7	8	16	7	0	1											6	8.2	1.3
Nil / Harmony+CMPP										1	16									2	7.1	0.7

Note: / denotes autumn herbicide followed by spring herbicide

Spring only treatment with a quarter dose of CMPP failed to reduce weeds to 5% ground cover in 6 of 11 trials with chickweed escaping in WW9003, chickweed, forgetmenot and pansy in WW9101, chickweed and hempnettle in WW9103, chickweed and forgetmenot in WW9201, pansy in WW9202 and shepherd's purse in WW9203. Overall, the quarter dose of Ally tank-mixed with CMPP gave better control but pansy and fumitory escaped in WW9002, chickweed in WW9003, speedwell in WW9102, chickweed and fumitory in WW9103, forgetmenot in WW9104 and shepherd's purse in WW9203. Other spring-only treatments were tried in only a few trials but did not generally perform better than Ally with CMPP.

The variation of weed covers at quarter dose over the different trial sites followed a log normal distribution (ln(x+1) considered normal) with a standard deviation greater for the autumn-only treatments (1.20) and spring only treatments (1.18) than for the sequences (0.92). This allowed estimates of probabilities of weed control failure using treatment means adjusted for the difference between trial sites. They were as follows:

Estimated probability (%) of ground cover by broad-leaved weeds in excess of the stated values for quarter dose of the specified herbicide

Ground cover	5%	10%	20%	40%	80%
Panther / nil	30	15	6	2	<1
Ipso / nil	64	45	25	11	4
Encore / nil	48	29	14	5	1
Stomp / nil	42	24	11	4	1
Panther / CMPP	8	2	<1	<1	<1
Ipso / CMPP	34	14	4	1	<1
Stomp / CMPP	18	6	1	<1	<1
Nil / CMPP	57	37	19	7	2
Nil / Ally+CMPP	36	19	8	2	<1
Nil / Coupler+MCPA	45	26	12	4	1

The mean yields of winter wheat were highest at the quarter or half dose but the reduction at full dose was not statistically significant (table 11). Yields of winter barley increased with dose rate up to the full dose but the half dose was the most cost effective.

There was no evidence for either crop of any significant difference in the mean yields for the different herbicides (table 12). For winter wheat, the overall mean for the sequential treatments was greater than the spring only treatments but not quite significantly so. For winter barley the mean for the sequences was just significantly greater than the mean for the autumn only treatments.

Autumn herbicides based on diflufenican (Panther) or pendimethalin (Stomp, Encore) at quarter dose, control the autumn-germinating weeds in most Scottish situations and provide a robust starting point for a weed control programme. The quarter dose of autumn herbicide was all that was required for 60% of the time with Stomp and 70% of the time with Panther but this does assume that autumn herbicide is applied in good conditions when the weeds are small. Where weeds did escape, they were reliably controlled by a quarter dose of mecoprop. The few exceptions were in uncompetitive crops of wheat in weedy fields and these situations are easily spotted before the spring herbicide is applied. In most trials, the weed control achievable with spring herbicide alone was nowhere near as reliable as for the best low dose sequences

which also gave good yields on average. In these particular years, there was little evidence of high doses or of any herbicide product being damaging to yield.

Table 11. The effect of dose rate on the yields of winter cereals in tonnes/ha. The mean of all herbicides and all trials where yield was measured.

	Winter wheat	Winter barley
No of trials	8	5
Untreated	8.43	6.72
Eighth dose	8.90	7.30
Quarter dose	8.98	7.47
Half dose	8.98	7.62
Full dose	8.75	7.68
SED	0.292	0.089

3.4 Spring barley herbicides

For spring barley (Table 13), Ally + CMPP, Advance or Harmony M + CMPP all gave relatively good results at quarter dose and were better than Redipon or Coupler + MCPA. Ally + CMPP at quarter dose failed to achieve 5% weed cover in 7 out of 22 trials, Advance in 6 out of 14 and Harmony M + CMPP in 3 out of 10. In SB9003, chickweed and pansy escaped. In SB9104, hempnettle, mayweed, fumitory, pansy and knotgrass all escaped. In SB9105, knotgrass and pansy escaped and in SB9109, chickweed and fat hen.

As for the winter cereals, weed ground cover at quarter dose was log normal in its distribution, yielding the following probabilities:

	Estimated probability (%) of ground cover by broad-leaved weeds exceeding the stated value for quarter dose of the specified herbicide				
Ground cover	5%	10%	20%	40%	80%
Ally + CMPP	45	27	13	5	1
Redipon	62	43	25	11	4
Advance	46	28	14	5	2
Coupler + MCPA	63	46	25	12	4
Harmony + CMPP	37	21	9	3	1
Ally + Advance	25	12	5	1	<1
Lontrel	41	24	11	4	1
Fortrol + CMPP + MCPA	66	48	28	13	5
Quiver	65	46	27	13	5
Starane + CMPP	57	38	21	9	3
Asset + CMPP	34	19	8	3	1

Table 12. Adjusted mean yields at half dose for the herbicides tested in the winter cereal trials.

	Winter wheat		Winter barley	
Autumn / spring treatment	No of trials	Yield SE	No of trials	Yield SE
Panther / nil	5	9.22+/-0.12	5	7.62+/-0.06
Ipso / nil	3	9.64+/-0.26		
Encore / nil	2	9.01+/-0.18	2	7.55+/-0.10
Stomp / nil	1	9.32+/-0.26	2	7.51+/-0.10
Quiver / nil			3	7.54+/-0.08
Treflan / nil			1	7.21+/-0.14
Panther / CMPP	3	9.40+/-0.15	5	7.67+/-0.06
Ipso / CMPP	3	9.48+/-0.15		
Stomp / CMPP	2	9.57+/-0.18	2	7.66+/-0.10
Quiver / CMPP	3	7.64+/-0.08		
Encore / CMPP	2	7.64+/-0.10		
Treflan / CMPP	1	7.72+/-0.14		
Nil / CMPP	7	9.42+/-0.10		
Nil / Ally + CMPP	5	9.07+/-0.12		
Nil / Coupler + MCPA	3	9.23+/-0.15		
Nil / Harmony + MCPA	1	8.93+/-0.26		
Mean of autumn only		9.31+/-0.078		7.54+/-0.039
Mean of autumn-spring sequence		9.47+/-0.092		7.66+/-0.039
Mean of spring only		9.25+/-0.065		

The highest yields were obtained at quarter or half dose on average but there was no significant effect of dose on spring barley yield (table 14). Neither was there any significant effect of the herbicide (table 15).

Table 13. Ground cover (%) by broad-leaved weeds in summer in spring barley trials at quarter dose of the herbicides specified.

	SB 9001	SB 9002	SB 9003	SB 9004	SB 9005	SB 9006	SB 9007	SB 9008	SB 9101	SB 9102	SB 9103	SB 9104	SB 9105	SB 9106	SB 9107	SB 9108	SB 9109	SB 9201	SB 9202	SB 9203	SB 9204	SB 9205	SB 9206	SB 9207	No of trials	Adjusted mean ground cover, % Quarter dose	Full dose
Ally+CMPP	7	4	36	8	2	1	8	2	1		2	28		1	5	1	67	3	9	2	3	0	0	1	22	9.5	3.2
Redipon	13	18	45	6	1	5			3	9	44	53	57		5	3	87		6				1	3	17	18.2	8.6
Advance									4	7	4	51	36	0	3	1	48		6	2	7		0	0	14	9.7	2.8
Cou.+MCPA	14	24		18	3				5	5	21	70	34	0	4	3	86								13	18.5	9.0
Harm.+CMPP	8	5	32	4	0	1	4			1			38							2					10	8.9	4.0
Ally+Advance									1		1			0			25			1	1				6	0.2	0
Ally+Fortrol	6	1	43		2															3					5	10.1	3.1
Banlene	15	13		16	3	3																			5	16.1	7.0
Lontrel											32	40		1			88								4	20.1	12.1
Fort.+CMPP+MCPA											16	60		0			81								4	19.3	7.8
Quiver		1				1					6	42													4	6.1	2.0
Condox														0			75								2	16.2	2.5
Starane+CMPP																				3	3				2	7.6	2.1
Asset+CMPP																				2	3				2	6.8	1.7

Cou. + Coupler; Harm. = Harmony M; Fort. = Fortrol.

Table 14. Effect of dose rate on mean yields over all herbicides in 14 spring barley trials.

Dose	Mean yield, tonnes/ha
Nil	6.05
Eighth	6.20
Quarter	6.22
Half	6.22
Full	6.13
SED	0.073

Achieving a weed ground cover less than 5% proved much more difficult for spring barley than for the winter cereals. Even the full dose was not effective in all trials. On the other hand, for rather more than half of the trials with the better materials, 5% weed cover was attainable. There is clearly therefore a greater need with spring barley to walk the fields at spraying time and assess the dosage needed. From experience in the trials, the vigour of the crop is as important a factor as the weediness. Paradoxically, poor crops require more expenditure on herbicide if weeds are not to be allowed to dominate the crop, create harvesting problems and increase weed seedbanks. Despite more weeds surviving at the lower doses, the effect of dose on yield was very small.

Table 15. Adjusted mean yields for the different herbicides in spring barley trials.

Herbicide	No of trials	Mean yield +/- SE tonnes/ha
Ally + CMPP	13	6.13 +/- 0.05
Redipon	12	6.04 +/- 0.06
Advance	8	6.15 +/- 0.07
Harmony + CMPP	7	6.12 +/- 0.07
Coupler + MCPA	7	6.07 +/- 0.07
Banlene Plus	3	6.01 +/- 0.11
Ally + Fortrol	2	6.41 +/- 0.14
Quiver	1	6.07 +/- 0.19
Advance + Ally	1	6.13 +/- 0.19

4. CURRENT ADVICE

This section of the report summarises the advice currently being given by SAC staff to farmers who express a wish to use low doses and accept the risk of so doing. It has not been possible to trial more than a small selection of all available active ingredients, even less all the products,

but policy is to give a choice of active ingredients where there is no reason to believe that one is better or worse than another. Where a specific active ingredient is mentioned, it is either because it is the only one available or because there is evidence (not necessarily from the trial series reported here) that it is better than alternatives which may claim to control the weeds or diseases specified.

It is perfectly possible to achieve increased cost effectivenes from low doses with normal hydraulic farm sprayers and without the use of adjuvants. SAC generally advises against the latter because the limited trials evidence indicates that they are not predictable and can reduce effectiveness of the active ingredient in some situations or add to crop damage. There are spray application techniques, especially sleeve-boom sprayers, which can reduce drift but the effect of these on the dose required is negligeable.

No claims are made for the applicability of this advice outside Scotland.

4.1 Winter wheat fungicides

On susceptible varieties such as Riband, a three-spray programme is needed in most years in Scotland and the first spray is usually required between stem extension (GS30) and second node (GS32). If eyespot is seen on more than 20% of tillers, then a full dose of prochloraz is needed. If eyespot is not a problem than a low dose of prochloraz can still sometimes prevent lodging. If yellow rust or mildew are present, a morpholine should be added: at a quarter dose if the mildew or yellow rust is only just appearing or at half dose if either is well-established. If no prochloraz is used, higher doses of morpholine are needed. Apart from application costs, there is no disadvantage in splitting this early spray.

A fungicide application at the flag leaf stage (about GS39) is cost effective in Scotland on all varieties. A tank or proprietary mix of triazole and protectant works well. On very responsive varieties, a full dose may be needed in high risk situations but on average the half dose is more cost effective. If yellow rust or mildew are present, a quarter to half dose of morpholine should be added or a triazole+morpholine product used.

Under Scottish conditions with a long and frequently wet ripening phase, an additional fungicide application to the ear is cost effective more often than not. A half dose of triazole+protectant is appropriate where the main risk is from Septoria diseases. Where mildew is present a half dose of triazole+morpholine is more appropriate.

4.2 Spring barley fungicides

Examine the crops frequently for disease and particularly from the onset of tillering.

Apply a quarter dose tank mix of morpholine and triazole (eg fenpropimorph with propiconazole or flusilazole) when active mildew is found on 75% of plants and/or Rhynchosporium is found on 25% plant and/or brown rust is found on 75% of plants.

If, by the time of spraying, mildew is present on all plants and covers more than half of one leaf on most plants, increase the morpholine component of the mixture.

If, by the time of spraying, Rhynchosporium or brown rust are in excess of the above thresholds, increase the triazole component of the mixture.

Continue to examine crops frequently and repeat the quarter dose mixture if the same thresholds are exceeded up to ear emergence. If mildew pressure is high, increase the morpholine component to half dose.

4.3 Winter cereal herbicides for the control of broad-leaved weeds, excluding cleavers.

If the opportunity arises in the autumn, apply a low dose of a product with diflufenican or pendimethalin. If the seedbed is fine and moist, then this can be applied pre-emergence but early post-emergence application is preferable in most years.

If the weeds are small at the time of application, then a quarter dose may be sufficient. If the weeds are beyond the 1-2 leaf stage, then use half dose. If beyond the 2-4 leaf stage, then add a low dose of mecoprop or other appropriate herbicide for the weed species present.

Examine the crop in the spring at the earliest opportunity after the flush of spring-germinating weeds:

If weeds are few and the crop canopy is almost closed then no herbicide is needed

If there are weeds but the crop canopy is almost closed then use a quarter dose of a herbicide that will control the species present

If the crop is very open, then increase to half dose

If the ground cover by weeds exceeds that of the crop, then use a full dose of an appropriate herbicide.

4.4 Spring barley herbicides

Examine the crop at about the three leaf stage. Note the weed species present and choose a herbicide or compatible tank-mix that will control them.

If the ground cover by weeds is much less than by the crop, then use a quarter dose.

If the ground cover by weeds and crop are about equal, then use a half dose.

If the ground cover by weeds exceeds that of the crop, or spraying has been delayed so that weeds are large, then use a full dose.

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APPENDIX I

FUNGICIDE TRIALS FOR 1990 HARVEST

SPRING BARLEY

Introduction

Six identical trials were conducted in Scotland during 1990. Each trial consisted of 3 varieties (Golden Promise, Golf and Blenheim). Five fungicide treatments were imposed on each variety.

Trial	A1	Sunnybrae Farm, Craibstone Estate, Bucksburn
	A2	Evanton, Easter Ross
	E1	Ploughlands
	E2	Bush Estate, Midlothian
	W1	Ladykirk Estate, Ayrshire
	W2	Crichton Royal Farm, Dumfries

TREATMENTS

	First application	Second application
A	nil	nil
B	Calixin	Corbel
C	¼ Calixin + ¼ Tilt	¼ Calixin + ¼ Tilt
D	¼ Calixin + ¼ Tilt + ¼ Baviston	¼ Calixin + ¼ Tilt + ¼ Bavist
E	¼ Corbel + ¼ Tilt	¼ Corbel + ¼ Tilt

	W1	W2	E1
Date:	January 1990	January 1990	
PH	6.3	6.5	6.4
P mg/kg	26 (mod)	200 (high)	52 (mod)
K mg/kg	69 (low)	374 (high)	61 (low)
Mg mg/kg	206 (high)	279 (high)	149 (mod)
S mg/kg	-	-	4.2 (low)
Seedbed Fert:	600 kg/ha NPK 22:11:11	320 kg/ha 22:11:11	70:70:100 kg/ha
Top dressing (N)	Nil	Nil	60 kg/ha
Seed rate			
GP)			
Golf)	190 kg/ha	190 kg/ha	188 kg/ha
Blenheim)			
Drilling date:	23 April	31 March	19 March
Plot size:	20 m x 1.68 m	20 m x 1.68 m	
Herbicide:	Advance (2.*l*/ha) 21/5	Ally (15 g/ha) 14/5 + CMPP (1-4 *l*/ha)	
Harvest date:	27 August	17 August	13 August

	E2	A1	A2
Site:	Crofts Boghall Farm Edinburgh	Drummond Evanton Inverness-shire	Sunnybrae Farm Buckstoun Aberdeenshire
Grid Ref:	NT 246 651	NH 598 653	NJ 875 114
Soil type:	Loam	Sandy loam	Sandy loam
Previous crop:	W Wheat	W Wheat	Grass
Soil analysis			
Date		February 1990	December 1989
PH	6.0	6.3	6.2
P	88 mg/*l*	96 mg/*l* (high)	Mod
K	88 mg/*l*	150 mg/*l* (mod)	V low
Mg	194 mg/*l*		Mod
Seedbed Fert: NPK	0.65:65 kg/ha	400 kg/ha 20:14:14	67 kg/ha Muriate of Potash 350 kg/ha 15:15:20
Topdressing N)	60 kg/ha (4 Apr) 60 kg/ha (30 Apr)	50 kg/ha	Nil
Seed rate			
GP)			180 kg/ha
Golf)	188 kg/ha	400 viable seeds m+-2	244 kg/ha
Blenheim)			212 kg/ha
Drilling date:	30 March	9 April	29 March
Plot size:	22 x 2 m	20 x 2.1 m	20m x 2.06 m
Herbicide:	Ally (30 g/ha) Duplosan (2.0 *l*/ha) Starane (1.02 *l*/ha)		
Harvest date:	28 August	27 August	23 August

TRIAL A1

First assessment, 29 May, GS 30-31

	% Mildew
Golden Promise	0.53
Golf	0.45
Blenheim	0.19

Second assessment, 29 June, GS 61 (Golden Promise)
GS 68 (Golf and Blenheim)

Treatment	% Mildew		
	GP	Golf	Blenheim
A	18.3	6.6	1.8
B	1.6	0.7	0.2
C	4.4	1.4	0.1
D	2.1	0.7	0.1
E	1.5	0.5	0.1
Sed (45 df)		1.91	

Third assessment, 17 July, GS 75

Treatment	% Mildew		
	GP	Golf	Blenheim
A	27.1	20.4	10.5
B	2.5	2.5	1.5
C	7.6	2.6	1.2
D	4.6	1.6	6.2
E	2.6	1.1	1.1
Sed (45 df)		4.85	

Thousand grain and specific weights

Treatment	Thousand grain weight (g)			Specific weight (kg/hl)		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	36.2	46.3	46.1	51.3	53.8	55.7
B	37.5	47.9	46.7	52.0	55.0	60.0
C	36.2	48.8	46.6	51.8	55.6	58.4
D	37.3	48.3	46.6	52.6	55.2	55.2
E	37.9	48.3	47.9	52.7	55.1	55.2
Sed (45 df)		0.91			0.99	

Yield

Treatment	Yield (tonnes/ha)			
	GP	Golf	Blenheim	Mean
A	4.88	6.42	6.34	5.88
B	5.68	6.98	6.76	6.47
C	5.52	6.83	6.67	6.34
D	5.55	7.07	6.62	6.42
E	5.99	6.96	6.78	6.56
Sed (45 df)		0.151		0.087

Brackling

Treatment	% Brackling		
	GP	Golf	Blenheim
A	71.3	25.0	1.3
B	47.5	12.0	0.8
C	55.0	10.8	1.3
D	43.8	11.3	0.3
E	43.8	13.8	1.0
Sed (45 df)		5.58	

TRIAL A2

First assessment, 24 May, GS 30

	% Mildew
Golden Promise	4.8
Golf	2.9
Blenheim	0.2

Second assessment, 14 June, GS 40

Treatment	% Mildew		
	GP	Golf	Blenheim
A	29.6	37.6	5.8
B	12.0	16.2	0.8
C	14.5	8.4	1.4
D	21.0	11.7	1.4
E	9.5	6.9	0.8
Sed (45 df)		4.43	

Third assessment, 17 July, GS 83

Treatment	% Mildew			%Brown Rust		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	74.3	61.4	32.7	0.2	3.2	0.0
B	24.4	23.1	0.3	0.0	0.0	0.1
C	47.2	24.2	4.2	0.6	0.0	0.0
D	39.0	30.5	6.9	0.2	0.0	0.0
E	36.3	23.3	2.0	0.2	0.0	0.0
Sed (45 df)		8.20			1.21	

Tillers and grains per ear

Treatment	Fertile tillers/m drill			Number of grains per ear		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	105	110	99	22.7	19.8	24.3
B	118	117	117	24.4	21.7	23.9
C	123	114	109	23.7	20.7	24.2
D	115	117	103	23.0	21.3	24.0
E	125	120	108	23.2	21.2	24.3
Sed (45 df)		7.4			0.85	

Thousand grain and specific weight

Treatment	Thousand grain weight (g)			Specific weight (kg/h*l*)		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	24.0	35.8	38.5	54.3	59.1	60.9
B	30.5	39.6	42.0	60.1	62.6	61.8
C	36.1	40.7	40.6	57.9	61.5	60.9
D	29.2	40.3	40.8	58.2	61.9	61.9
E	31.4	40.4	42.0	59.7	61.2	62.0
Sed (45 df)		3.09			0.77	

Yield

Treatment	Yield (t/ha @ 15% mc)			
	GP	Golf	Blenheim	Mean
A	2.85	3.97	5.03	3.95
B	4.90	5.96	6.47	5.78
C	4.32	5.66	5.86	5.28
D	4.44	5.84	6.06	5.45
E	5.01	5.96	6.39	5.79
Sed (45 df)		0.190		0.110

TRIAL E1

First assessment, 4 May, GS 21

	% Mildew
Golden Promise	1.5
Golf	0.5
Blenheim	0.5

Second assessment, 24 May, GS 32

Treatment	% Mildew			% Rhyncho		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	26.7	15.0	21.7	0.0	0.0	0.0
B	3.7	0.0	0.7	0.0	0.0	0.0
C	9.3	0.4	2.0	0.0	0.03	0.0
D	7.0	0.4	3.0	0.0	0.03	0.0
E	3.3	0.1	1.0	0.0	0.0	0.0
Sed (45 df)		2.71			0.008	

Third assessment, 13 June, GS 51

Treatment	% Mildew		
	GP	Golf	Blenheim
A	61.7	41.7	45.0
B	0.1	0.0	0.0
C	3.7	0.4	0.7
D	3.4	0.7	1.4
E	2.0	0.1	0.1
Sed (45 df)		1.81	

Fourth assessment, 10 July, GS 75

Treatment	% Mildew		
	GP	Golf	Blenheim
A	98.3	83.3	78.3
B	25.0	8.3	8.3
C	90.0	18.3	5.0
D	58.3	23.3	16.7
E	60.0	25.0	5.0
Sed (45 df)		10.26	

Thousand grain and specific weights

Treatment	Thousand grain weight (g)			Bushel weight (kg/h*l*)		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	30.8	48.5	44.1	63.0	66.4	65.7
B	40.6	53.6	48.6	66.7	67.2	66.6
C	37.4	53.1	48.0	64.6	67.7	66.7
D	38.1	53.1	49.8	64.9	67.2	66.6
E	38.5	52.1	48.6	64.6	67.2	66.5
Sed (45 df)		1.31			0.89	

Yield

Treatment	Yield (t/ha @ 15% mc)			
	GP	Golf	Blenheim	Mean
A	4.39	5.92	5.56	5.29
B	6.54	7.45	7.19	7.06
C	5.78	7.36	7.13	6.76
D	5.95	7.51	6.92	6.79
E	6.18	7.58	7.06	6.94
Sed (45 df)		0.157		0.704

TRIAL E2

First assessment, 11 May, Gs 15/24

	% Mildew
Golden Promise	10.0
Golf	3.0
Blenheim	0.1

Second assessment, 31 May, Gs 32-37

Treatment	% Mildew		
	GP	Golf	Blenheim
A	47.5	4.5	2.3
B	12.0	0.2	0.2
C	14.3	0.8	0.6
D	8.5	0.1	0.2
E	9.0	0.1	0.2
Sed (45 df)		2.12	

Third assessment, 14 June, GS 45

Treatment	% Mildew		
	GP	Golf	Blenheim
A	55.0	12.3	5.0
B	1.4	0.1	0.0
C	7.3	0.9	0.7
D	7.5	0.6	0.2
E	2.8	0.2	0.1
Sed (45 df)		3.44	

Thousand grain and specific weights

Treatment	Thousand grain weight (g)			Bushel weight (kg/hl)		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	34.2	50.4	49.0	63.9	66.9	67.2
B	37.8	53.3	49.9	66.1	67.4	67.3
C	37.9	53.0	51.3	65.3	67.1	67.1
D	38.8	54.3	50.3	65.3	67.0	67.3
E	38.1	52.6	51.2	65.1	67.0	67.3
Sed (44 df)		0.93			0.42	

Yield

Treatment	Yield (t/ha @ 15% mc)			
	GP	Golf	Blenheim	Mean
A	4.31	5.16	5.14	4.87
B	5.02	5.96	5.60	5.53
C	4.97	5.88	5.47	5.44
D	5.06	5.89	5.53	5.49
E	5.04	5.88	5.58	5.50
Sed (45 df)		0.200		0.090

TRIAL W1

First assessment, 26 May, GS 30-31

	% Mildew	% Brown rust
Golden Promise	0.10	Tr
Golf	0.06	Tr
Blenheim	0.03	Tr

Second assessment: **15 June, GS 41 (Golden Promise)**
30 June, GS 53 (Golf and Blenheim)

Treatment	% Mildew			% Brown rust		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	4.8	2.1	3.5	0.5	0.9	0.7
B	1.6	0.8	1.6	0.5	1.1	0.8
C	1.4	1.1	1.7	0.3	0.9	0.8
D	2.2	1.6	1.9	0.4	0.9	1.0
E	0.5	1.5	1.9	0.3	0.9	0.8
Sed	0.99 (12 df)	0.50 (27 df)	0.50 (27 df)	0.10 (12 df)	0.08 (27 df)	0.08 (27 df)

Treatment	% Dead Tissue		
	GP	Golf	Blenheim
A	19.4	27.1	21.4
B	8.1	23.8	25.7
C	7.7	27.7	26.0
D	6.4	18.8	12.4
E	4.6	20.5	19.6
Sed	2.58 (12 df)	5.65 (27 df)	5.65 (27 df)

Third assessment: **13 July, GS 59 (Golden Promise)**
23 July, GS 85 (Golf and Blenheim)

Treatment	% Mildew			% Brown rust		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	3.5	2.4	2.5	7.8	1.2	2.2
B	2.3	1.4	0.9	6.6	2.2	1.5
C	1.7	2.0	1.4	5.6	3.6	2.0
D	2.6	1.7	0.8	8.2	1.8	2.6
E	1.5	0.9	1.2	5.9	2.0	1.7
Sed	0.65 (12 df)	0.59 (27 df)	0.59 (27 df)	1.66 (12 df)	0.93 (27 df)	0.93 (27 df)

Treatment	% Dead Tissue		
	GP	Golf	Blenheim
A	59.0	67.1	59.4
B	55.5	41.0	50.6
C	44.6	50.2	50.7
D	41.2	56.3	56.0
E	39.3	50.1	45.3
Sed	4.53 (12 df)	8.32 (27 df)	8.32 (27 df)

Yield

Treatment	Yield t/ha			
	GP	Golf	Blenheim	Mean
A	3.35	4.80	4.29	4.15
B	3.57	4.60	4.35	4.17
C	3.72	5.11	4.59	4.47
D	3.70	5.24	4.32	4.75
E	4.05	5.37	4.81	4.75
Sed (28 df)		0.259		0.150

TRIAL W2

First assessment, 18 May, GS 31-32

	% Mildew
Golden Promise	2.9
Golf	1.0
Blenheim	1.6

Second assessment, 13 June: **GS 45 (Golden Promise)**
GS 49 (Golf)
GS 43 (Belnheim)

Treatment	% Mildew			% Brown rust		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	11.8	3.2	4.7	0.02	0.01	0.03
B	1.3	0.5	0.5	0.02	0.00	0.01
C	4.3	0.8	1.1	0.02	0.0	0.01
D	3.2	0.5	1,5	0.02	0.00	0.01
E	1.2	0.1	0.4	0.06	0.00	0.03
Sed (42 df)		0.52			0.016	

Treatment	% Dead Tissue		
	GP	Golf	Blenheim
A	25.2	12.4	15.4
B	1.6	1.6	0.3
C	7.0	2.3	2.4
D	3.2	2.9	0.8
E	0.9	1.8	0.3
Sed (42 df)		2.06	

Third assessment, 18 July, GS 77

Treatment	% Mildew			% Brown rust		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	0.01	0.05	0.09	0.1	0.1	0.3
B	0.04	0.00	0.03	0.5	0.1	0.5
C	0.01	0.04	0.03	0.3	0.4	0.4
D	0.01	0.01	0.01	0.4	0.2	0.3
E	0.03	0.00	0.00	0.8	0.1	0.5
Sed (42 df)		0.031			0.204	

Treatment	% Dead Tissue		
	GP	Golf	Blenheim
A	97.9	94.7	85.1
B	88.5	85.2	61.4
C	95.3	73.6	69.8
D	92.6	84.3	68.4
E	81.7	82.9	63.5
Sed (42 df)		8.06	

Yield

Treatment	Yield t/ha			
	GP	Golf	Blenheim	Mean
A	3.27	3.97	3.56	3.60
B	4.31	4.98	4.55	4.61
C	4.06	5.01	3.95	4.34
D	4.07	4.65	4.38	4.36
E	5.07	4.58	4.08	4.58
Sed (42 df)		0.403		0.232

SUMMARY OF DATA

Thousand grain weight (g)
(Sites E1, E2, A1 and A2)

Treatment	GP	Golf	Blenheim	Mean
A	31.3	45.3	44.4	40.3
B	36.6	48.6	46.8	44.0
C	36.9	49.1	46.6	44.2
D	35.9	49.0	46.9	43.9
E	36.5	48.4	47.4	44.1
Sed (153 df)	36.5	48.4	47.4	44.1

Specific weight (kg/h*l*)
(Sites E1, E2, A1 and A2)

Treatment	GP	Golf	Blenheim	Mean
A	58.1	61.6	62.4	60.7
B	61.2	63.1	63.9	62.7
C	59.9	63.0	63.3	62.1
D	60.3	62.8	62.8	62.0
E	60.5	62.6	62.8	62.0
Sed (154 df)		0.38		0.22

Yield
(Sites A1, A2, E1, E2 and W1)

Treatment	GP	Golf	Blenheim	Mean
A	3.78	5.25	5.27	4.77
B	5.14	6.19	6.07	5.80
C	4.86	6.18	5.94	5.66
D	4.94	6.31	5.89	5.71
E	5.25	6.35	6.12	5.91
Sed (181 df)		0.0826		0.0477

Sites (A11)

Treatment	GP	Golf	Blenheim	Mean
A	3.69	5.04	4.99	4.57
B	5.00	5.99	5.82	5.60
C	4.73	5.98	5.61	5.44
D	4.78	6.03	5.64	5.48
E	5.22	6.06	5.78	5.69
Sed (228 df)		0.098		0.057

Winter Wheat

	A1	**A2**	**E1**
Site:	Redcastle Muir of Ord Black Isle	Castle of Barra Oldmeldrum Aberdeenshire	Mertoun Estate Ploughlands Maxton St Boswells
Sowing date:	2 October 1989	10 October 1989	6 October 1989
Harvest date:	30 August 1990	12 September 1990	23 August 1990
Treatments			
Applied: GS 30	11 April (GS 30)	18 April (GS 30)	11 April (GS 30)
GS 31	25 April (GS 31)	11 May (GS 32)	18 April (GS 31)
GS 32	7 May (GS 32)	21 May (GS 37)	1 May (GS 39)
GS 39-49	29 May (GS 37)	6 June (GS 47)	24 May (GS 39)
GS 59-69	29 June (GS 65)	25 June (GS 64)	15 June (GS 59-65)

Trial details

	A1	A2	E1
Site:	Redcastle Muir of Ord Black Isle	Castle of Barra Oldmeldrum Aberdeenshire	Mertoun Estate Ploughlands Maxton St Boswells
Grid ref:		NJ 791 259	NT 630 307
Soil type:	Sandy loam	Sandy loam	Loam
Previous Crop:	Spring barley	Winter barley	Spring barley
Soil analysis:	12 September 1989		
PH	6.6	6.0	6.4
P (mg/*l*)	66 (mod)	(mod)	52 (mod)
K (mg/*l*)	104 (mod)	(low)	61 (low)
Mg (mg/*l*)	190 (mod)	(mod)	149 (mod)
S (mg/*l*)	5.6 (low)	-	-
OM (%)	4.2	-	-
Cu (mg/*l*)	1.4 (low)	-	-
Seed Fert.	330 kg/ha 5:24:24	376 kg/ha 5:24:24	30:90:90 kg/ha
N Top dressing (kg/ha)	50 6/4 150	40 5/3/91 160 24/4/91	70 3/3/91 130 13/4/91
Micrountrient	12.5 kg/ha Thiovit 8.0 kg/ha MnSo4 27/4/89 0.75 *l*/ha Vitel Cu 1/5/90 0.375 *l*/ha Vitel Cu 10/5/90	-	-
Herbicide:	Panther 2.01 *l*/ha 30/10/89	Panther 2.0 *l*/ha 14/11/89	Panther 2.0 *l*/ha 19/10/89
Insecticide:	Fastac 150 ml/ha	-	-
Plot size:	20 x 2.1 m	20 x 2.06 m	20 x 2 m
Growth regulat.:	2.5 *l*/ha Arotex 1/5/90	-	1.5 *l*/ha Terpal 18/5/90

Treatments for wheat fungicide trials, 1990 harvest
Sportak (Delta), Sprint, Impact-Excel, Patrol, Corbel, Punch C

	GS 30	GS 31	GS 32	GS 39-49	GS 59-69
A	nil	nil	nil	nil	nil
B		Sportak (Delta) + ½ Corbel		Sprint	Impact-Excel + ½ Patrol
C		½ Sportak (Delta) + ¼ Corbel		½ Sprint	½ Impact-Excel + ¼ Patrol
D			Sportak (Delta) + ½ Corbel		Impact-Excel + ½ Patrol
E		Punch C + ½ Corbel		Punch C + ½ Corbel	Punch C + ½ Corbel
F		Punch C + ¼ Corbel		½ Punch C + ¼ Corbel	½ Punch C + ¼ Corbel
G	¼ Punch C + ¼ Corbel		¼ Punch C + ¼ Corbel	½ Punch C + ¼ Corbel	½ Punch C + ¼ Corbel
H	1/3 Sportak + ¼ Corbel		1/3 Sportak + ¼ Corbel	1/3 Sportak + ¼ Corbel	½ Impact-Excel + ¼ Patrol

TRIAL A1 DISEASE AND OTHER ASSESSMENTS

Hornet

	Mildew %				
Treatment	**24/4/90 (GS 31)**	**7/5/91 (GS 32)**	**29/5/90 (GS 37)**	**29/6/90 (GS 64)**	**17/7/90 (GS 69)**
A	0.00	0.05	0.2	4.1	6.1
B	0.00	0.05	0.1	0.9	0.6
C	0.0	0.05	0.2	1.4	0.9
D	0.0	0.05	0.0	1.4	3.0
E	0.0	0.05	0.1	1.3	1.3
F	0.0	0.05	0.2	1.6	2.4
G	0.00	0.01	0.0	1.0	0.9
H	0.01	0.01		1.1	5.7
Sed	0.005	0.015	0.05	0.62	1.93

Apollo

	Mildew %				
Treatment	**24/4/90 (GS 31)**	**7/5/91 (GS 32)**	**29/5/90 (GS 37)**	**29/6/90 (GS 64)**	**17/7/90 (GS 69)**
A	0.00	0.02	0.1	0.3	2.2
B	0.0	0.02	0.0	0.0	0.2
C	0.0	0.02	0.0	0.1	0.6
D	0.0	0.02	0.0	0.2	0.4
E	0.0	0.02	0.0	0.1	0.0
F	0.0	0.02	0.0	0.1	0.3
G	0.00	0.00	0.0	0.1	0.3
H	0.00	0.00		0.2	0.5
Sed	0.005	0.015	0.05	0.62	1.93

Hornet

	Yellow rust %	
Treatment	**29/6/90 (GS 64)**	**17/7/90 (GS 69)**
A	1.3	8.0
B	0.2	0.2
C	0.1	0.1
D	0.7	0.2
E	0.0	0.0
F	0.0	0.0
G	0.1	0.1
H	0.3	0.6
Sed	0.30	2.08

Apollo

	Yellow rust %	
Treatment	**29/6/90 (GS 64)**	**17/7/90 (GS 69)**
A	0.0	0.2
B	0.0	0.0
C	0.0	0.0
D	0.0	0.1
E	0.0	0.0
F	0.0	0.0
G	0.0	0.0
H	0.0	0.0
Sed	0.30	2.08

Hornet

Treatment	S. Eyespot Incidence (% tiller)	Severe (% tillers with severe infection)
A	92.5	15.0
B	92.5	22.5
C	87.5	5.0
D	97.5	10.0
E	97.5	17.5
F	97.5	17.5
G	92.5	15.0
H	67.5	0.0
Sed	9.64	9.55

Apollo

Treatment	S. Eyespot Incidence (% tiller)	Severe (% tillers with severe infection)
A	90.0	2.5
B	75.0	12.5
C	72.5	17.5
D	75.0	5.0
E	97.5	17.5
F	92.5	10.0
G	80.0	2.5
H	60.0	15.0
Sed	9.64	9.55

Hornet

Treatment	Septoria tritici (%)			
	24/4/90 (GS 31)	7/5/90 (GS 32)	29/6/90 (GS 64)	17/7/90 (GS 69)
A	4.7	0.58	1.0	1.2
B	4.7	0.58	0.1	0.1
C	4.7	0.58	0.0	0.3
D	4.7	0.58	0.4	0.5
E	4.7	0.58	0.1	0.0
F	4.7	0.58	0.1	0.1
G	1.8	0.00	0.3	0.0
H	3.8	0.03	0.2	0.5
Sed	0.29	0.087	0.20	0.20

Apollo

Treatment	Septoria tritici (%)			
	24/4/90 (GS 31)	**7/5/90 (GS 32)**	**29/6/90 (GS 64)**	**17/7/90 (GS 69)**
A	0.0	0.0	0.6	0.1
B	0.0	0.0	0.0	0.1
C	0.0	0.0	0.1	0.1
D	0.0	0.0	0.4	0.3
E	0.0	0.0	0.1	0.0
F	0.0	0.0	0.0	0.0
G	0.0	0.0	0.0	0.1
H	0.1	0.0	0.2	0.1
Sed	0.29	0.087	0.20	0.1

TRIAL A2 DISEASE AND OTHER ASSESSMENTS

Hornet

Treatment	Mildew %				
	8/5/90 (GS 32)	21/5/90 (GS 33)	6/6/90 (GS 49)	25/6/90 (GS 64)	6/7/90 (GS 71)
A	0.02	0.53	0.37	1.98	0.84
B	0.02	0.27	0.14	0.20	0.19
C	0.02	0.28	0.08	0.13	0.31
D	0.02	0.53	0.06	0.60	0.11
E	0.02	0.12	0.14	0.08	0.25
F	0.02	0.23	0.10	0.20	0.83
G	0.00	0.19	0.20	0.13	0.85
H	0.00	0.05	0.15	0.65	0.97
Sed	0.006	0.102	0.151	0.197	0.249

Apollo

Treatment	Mildew %				
	8/5/90 (GS 31)	21/5/90 (GS 33)	6/6/90 (GS 49)	25/6/90 (GS 64)	6/7/90 (GS 71)
A	0.00	0.03	0.10	0.48	0.66
B	0.00	0.03	0.01	0.01	0.04
C	0.00	0.00	0.02	0.05	0.04
D	0.00	0.03	0.04	0.08	0.03
E	0.00	0.07	0.01	0.00	0.00
F	0.00	0.05	0.04	0.01	0.02
G	0.00	0.04	0.05	0.02	0.00
H	0.00	0.02	0.08	0.08	0.26
Sed	0.006	0.102	0.051	0.197	0.249

Hornet

Treatment	Yellow rust %				
	8/5/90 (GS 32)	21/5/90 (GS 33)	6/6/90 (GS 49)	25/6/90 (GS 64)	6/7/90 (GS 71)
A	0.33	0.70	2.45	14.53	59.07
B	0.33	0.15	0.21	0.08	0.28
C	0.33	0.00	0.01	0.25	1.82
D	0.33	-	0.02	2.96	14.47
E	0.33	0.00	0.00	0.03	0.17
F	0.33	0.49	0.01	0.04	0.81
G	0.22	0.03	0.03	0.21	0.53
H	0.05	0.06	0.01	0.48	2.279
Sed	0.137	0.277	0.123	0.604	2.279

Apollo

Treatment	Yellow rust %				
	8/5/90 (GS 32)	21/5/90 (GS 33)	6/6/90 (GS 49)	25/6/90 (GS 64)	6/7/90 (GS 71)
A	0.03	0.00	0.00	0.00	0.10
B	0.03	0.00	0.00	0.00	0.00
C	0.03	0.01	0.00	0.00	0.00
D	0.03	-	0.00	0.00	0.00
E	0.03	0.00	0.00	0.00	0.00
F	0.03	0.00	0.00	0.00	0.00
G	0.01	0.00	0.00	0.00	0.01
H	0.02	0.00	0.00	0.00	0.02
Sed	0.137	0.277	0.123	0.604	2.279

TRIAL A2

Hornet

Treatment	Septoria tritici (%)			
	8/5/90 (GS 32)	**6/6/90 (GS 49)**	**25/6/90 (GS 64)**	**16/7/90 (GS 71)**
A	0.20	0.00	2.27	5.03
B	0.20	0.00	0.00	0.08
C	0.20	0.00	0.00	0.23
D	0.20	0.00	0.22	1.93
E	0.20	0.00	0.00	0.07
F	0.20	0.02	0.00	0.04
G	0.03	0.00	0.24	1.39
H	0.00	0.00	0.10	0.98
Sed	0.044	0.009	0.347	1.006

Apollo

Treatment	Septoria tritici (%)			
	8/5/90 (GS 32)	**6/6/90 (GS 49)**	**25/6/90 (GS 64)**	**16/7/90 (GS 71)**
A	0.01	0.00	0.01	1.57
B	0.01	0.00	0.03	2.35
C	0.01	0.00	0.03	1.09
D	0.01	0.00	0.06	2.08
E	0.01	0.00	0.03	1.14
F	0.01	0.00	0.03	1.47
G	0.00	0.00	0.02	1.80
H	0.00	0.00	0.09	1.50
Sed	0.044	0.009	0.347	1.006

Hornet

Treatment	S. Eyespot Incidence (% tiller)	S Eyespot Severe (% tillers with severe infection)
A	92.5	27.5
B	92.5	0.0
C	82.5	7.5
D	95.0	27.5
E	90.0	27.5
F	92.5	10.0
G	92.5	12.5
H	85.0	7.7
Sed	9.76	7.93

Apollo

Treatment	S. Eyespot Incidence (% tiller)	S Eyespot Severe (% tillers with severe infection)
A	95.0	2.5
B	65.0	2.5
C	95.0	2.5
D	97.5	5.0
E	85.0	2.5
F	72.5	7.5
G	90.0	5.0
H	97.5	7.5
Sed	9.76	7.93

Hornet

Treatment	Grains per ear	Tillers per m of drill
A	35.5	68.0
B	43.5	68.7
C	43.8	79.2
D	46.2	68.0
E	45.5	70.5
F	41.4	64.5
G	44.3	68.2
H	46.1	63.2
Sed	2.792	5.28

Apollo

Treatment	Grains per ear	Tillers per m of drill
A	28.7	75.5
B	30.6	69.5
C	29.6	79.5
D	30.5	73.8
E	28.7	23.7
F	31.2	68.2
G	28.5	75.3
H	27.2	73.2
Sed	2.792	5.28

TRIAL E1 DISEASE AND OTHER ASSESSMENTS

Hornet

Treatment	Mildew %				
	12/4/90 (GS 30)	28/5/90 (GS 39)	6/6/90 (GS 55)	19/6/90 (GS 61/9)	22/7/90 (GS 75)
A	3.3	6.0	2.6	15.7	0.0
B	7.7	3.7	<0.1	0.7	0.0
C	5.0	4.0	0.0	2.0	0.0
D	2.4	1.0	0.1	4.7	0.3
E	4.3	2.0	0.4	0.1	0.0
F	1.7	4.0	0.9	1.3	0.7
G	3.0	0.4	1.1	0.4	0.0
H	2.62	1.32	0.49	4.57	0.0
Sed	2.62	1.32	0.49	4.57	6.2

Apollo

Treatment	Mildew %				
	12/4/90 (GS 30)	28/5/90 (GS 39)	6/6/90 (GS 55)	19/6/90 (GS 61/9)	22/7/90 (GS 75)
A	1.4	7.0	0.6	8.3	40.0
B	2.4	0.4	<0.1	0.0	0.0
C	2.7	1.0	0.3	0.7	0.0
D	2.4	0.4	0.2	1.0	0.3
E	2.7	1.4	0.6	0.3	0.0
F	2.7	2.0	0.5	0.7	0.0
G	0.7	0.1	1.2	0.1	0.0
H	4.3	0.4	0.4	0.7	0.0
Sed	2.62	1.32	0.49	4.57	6.2

Hornet

Treatment	Yellow Rust 9%)			
	28/5/90 (GS 39)	6/6/90 (GS 55)*	19/6/90 (GS 61/9)	22/7/90 (GS 75)
A	7.0	0.0	35.0	36.7
B	0.7	0.0	5.0	3.3
C	1.3	0.0	1.7	0.0
D	0.0	0.0	5.7	7.3
E	1.0	0.0	0.0	0.0
F	0.3	0.0	0.0	1.7
G	0.0	0.0	0.0	3.3
H	0.0	0.0	0.7	0.0
Sed	1.69	7.03	8.0	8.99

Apollo

Treatment	Yellow Rust 9%)			
	28/5/90 (GS 39)	6/6/90 (GS 55)*	19/6/90 (GS 61/9)	22/7/90 (GS 75)
A	0.0	5.5	0.0	31.0
B	0.0	0.5	0.0	0.0
C	0.0	0.2	0.0	0.0
D	0.0	0.3	0.0	0.0
E	0.3	0.1	0.0	0.0
F	0.7	19.2	0.0	0.0
G	0.0	1.2	0.0	0.0
H	0.0	0.9	0.0	0.0
Sed	1.69	7.03	8.0	8.99

Hornet

Treatment	Septoria tritici (%)			
	12/4/90	6/6/90 (GS 55)	19/6/90 (GS 61/9)	22/7/90 (GS 75)
A	31.7	0.0	0.7	16.7
B	28.3	0.0	0.0	0.7
C	40.0	0.0	0.0	4.0
D	20.0	0.0	0.0	9.0
E	13.3	0.0	0.0	0.0
F	40.0	0.0	0.3	2.3
G	21.7	0.0	0.0	1.7
H	31.7	0.0	0.3	3.3
Sed	9.08	-	0.29	6.78

Apollo

Treatment	Septoria tritici (%)			
	12/4/90	6/6/90 (GS 55)	19/6/90 (GS 61/9)	22/7/90 (GS 75)
A	0.4	0.0	0.0	0.0
B	1.7	0.0	< 0.1	0.0
C	3.4	0.0	0.0	0.0
D	0.4	0.0	0.0	9.0
E	1.0	0.0	0.0	0.0
F	1.0	0.0	0.3	2.3
G	0.7	0.0	0.0	0.0
H	10.4	0.0	< 0.1	0.0
Sed	9.08	-	0.29	6.78

Hornet

Treatment	Eyespot (% tillers) 6/6/90 (GS 55)	Sharp Eyespot (% tillers) 6/6/90 (GS 55)	Green leaf area % 6/6/90 (GS 55)	Sooty mould (0-3) 8/8/90
A	1.0	4.0	87.7	2.7
B	5.0	2.7	90.4	1.3
C	2.3	2.7	88.3	1.0
D	2.3	1.7	88.7	0.7
E	3.0	1.0	89.5	0.7
F	3.0	4.0	87.1	1.7
G	2.7	1.0	88.6	2.0
H	3.7	2.3	91.1	1.3
Sed	1.33	1.38	9.04	0.58

Apollo

Treatment	Eyespot (% tillers) 6/6/90 (GS 55)	Sharp Eyespot (% tillers) 6/6/90 (GS 55)	Green leaf area % 6/6/90 (GS 55)	Sooty mould (0-3) 8/8/90
A	2.0	2.0	85.3	2.3
B	0.7	3.3	92.1	1.3
C	2.0	3.0	92.8	1.3
D	0.3	1.0	93.1	1.0
E	1.0	2.3	93.1	1.0
F	1.0	5.0	72.3	1.7
G	1.0	1.3	87.0	1.3
H	1.7	1.7	92.5	1.3
Sed	1.33	1.38	9.04	0.58

YIELD, THOUSAND GRAIN WEIGHT, LODGING AND SPECIFIC WEIGHT

Thousand Grain Weight
Grams

Treatment	Hornet				Apollo			
	A1	A2	E1	Mean*	Al	A2	E1	Mean*
A	41.5	41.1	44.0	42.2	40.3	48.8	45.3	44.8
B	48.9	55.3	56.8	53.7	45.6	51.8	53.5	50.4
C	46.8	52.6	56.4	52.0	43.3	50.6	50.7	48.1
D	47.4	51.2	55.6	51.4	43.1	50.8	52.2	48.7
E	45.7	51.9	57.5	51.7	45.0	50.5	50.3	49.1
F	46.5	51.5	54.0	50.7	40.9	50.5	50.3	47.2
G	46.6	51.4	56.3	51.4	42.7	48.7	50.8	47.4
H	48.0	52.2	57.7	52.6	45.3	51.4	51.7	49.5
Sed	1.96	1.58	1.80	1.05	1.96 (120 df)	1.58	1.80	1.05 (120 df)

Lodging %

Treatment	Hornet				Apollo			
	A1	A2	E1	Mean*	Al	A2	E1	Mean*
A	22.5	1.8	10.0	11.8	0.5	1.5	16.7	6.6
B	2.5	8.0	2.4	4.7	0.0	1.3	0.7	1.0
C	3.8	20.0	2.0	9.0	0.0	1.3	3.3	1.9
D	1.5	16.3	1.7	6.9	0.0	1.0	4.7	2.3
E	3.5	22.5	13.3	13.5	0.5	0.8	10.0	4.2
F	13.8	51.2	16.7	27.6	0.5	0.5	0.7	3.1
G	9.3	31.3	14.0	18.6	0.5	0.5	10.0	4.1
H	2.5	15.0	0.3	6.4	0.0	0.0	4.0	1.7
Sed	1.75	6.82	4.84	3.09 (120 df)	1.75	6.82	4.84	3.09 (120 df)

Specific Weight
kg/h*l*

Treatment	Hornet				Apollo			
	A1	A2	E1	Mean*	Al	A2	E1	Mean*
A	55.9	71.5	66.5	64.6	61.3	77.9	74.5	71.3
B	58.6	76.8	71.3	68.9	62.5	78.3	76.7	72.5
C	58.3	76.1	74.8	69.8	61.1	78.4	76.1	71.9
D	59.2	76.4	73.8	69.9	62.2	78.5	76.5	72.5
E	58.8	75.6	74.5	69.7	61.4	78.5	75.9	72.0
F	57.8	75.4	73.7	69.0	60.7	79.0	75.7	71.9
G	58.6	75.6	73.8	69.4	61.7	78.7	75.2	71.9
H	58.6	76.4	74.8	70.0	61.7	78.7	76.5	72.4
Sed	0.91	0.52	1.13	0.49 (120 df)	0.91	0.52	1.13	0.49 (120 df)

Yield
Tonnes/ha at 15% moisture content

Treatment	Hornet				Apollo			
	A1	A2	E1	Mean*	Al	A2	E1	Mean*
A	6.23	3.90	5.33	5.17	6.67	7.04	7.39	7.06
B	8.98	9.38	10.14	9.53	7.68	7.77	9.61	8.38
C	8.47	9.29	10.06	9.31	7.57	7.48	9.11	8.09
D	8.20	8.27	9.34	8.63	7.51	7.64	9.08	8.11
E	8.24	9.10	10.33	9.25	6.92	7.73	9.13	7.96
F	7.72	7.84	9.46	8.37	6.94	7.63	8.53	7.73
G	7.91	8.65	10.06	8.90	7.20	7.52	9.06	7.96
H	8.57	9.07	10.02	9.26	7.52	7.40	9.25	8.09
Sed	0.311	0.254	0.270	0.165 (120 df)	0.311	0.254	0.270	0.165 (120 df)

*Means are not necessarily the arithmetic averages of all three sites, due to statistical readjustment necessary because Site E1 and 3 replicates and A1 and A2 4 replicates.

WINTER BARLEY TRIAL

Site:	Ploughlands Farm, Maxton, St Boswells
Grid Ref:	NT 630 307
Elevation:	76 m ASL
pH:	6.1; available P 92 mg/*l*; K 62 mg/*l*; 210 mg/
Previous Crops:	1989 Spring barley 1988 Winter oilseed rape 1987 Spring barley 1986 Spring barley
Randomised block design with 6 replicates, 22 x 2 m plots	
Variety:	Magie sown 17 September 89 at 190 kg/ha
Autumn Fert:	90 kg P_2O_5 + 90 kg K_2O/hectare on 19 Sept. 89
Spring Fert:	70 kg N/ha on 7 March 90 at GS 25 110 kg N/ha on 5 April at GS 31
Herbicide:	2 *l*/ha Panther on 19 october at GS 13/21
Overall fung:	1 *l*/ha of Dorin on 26 October at GS 15/22
Insecticide:	200 mls/ha Baythroid on 3 Oct, 23 Oct, 21 Nov
Molluscicide:	5 kg/ha Draza on 27 September
Pest repellant:	3 *l*/ha Hoppit on 15 March and 12 June
Micronutrient:	10 *l*/ha Cutonic manganese on 29 March at GS 30
Experimental fungicide:	see table

Fungicide Treatments (all doses in litres per hectare)

	12 March GS25	**7 April GS31**	**2 May GS45-49**
U	Nil	Nil	Nil
A	Nil	Corbel (1 *l*) + Sportak Alpha (1 *l*)	Tilt Turbo (1 *l*)
B	Corbel (0.5 *l*)	Corbel (0.5 *l*) + Sportak Alpha (1 *l*)	Tilt Turbo (1 *l*)
C	Corbel (0.25 *l*) + Sportak Alpha (0.375 *l*)	Corbel (0.25 *l*) + Sportak Alpha (0.375 *l*)	Corbel (0.25 *l*) + Tilt (0.125 *l*)
D	Corbel (0.25 *l*) + Tilt (0.25 *l*)	Corbel (0.25 *l*) + Tilt (0.25 *l*)	Corbel (0.25 *l*) + Tilt (0.25 *l*)
E	Corbel (0.5 *l*)	Corbel (0.5 *l*) + Sportak Alpha (1 *l*)	Calixin (0.175 *l*) + Tilt (0.125 *l*)

Disease Assessments (plot percentage scores)

	GS 31 on 7 April		**GS 45 on 3 May**	**GS63 on 28 May**	**GS80 on 13 June 1990**		
Trt Code	**Mildew**	**Rhyncho**	**Mildew**	**Mildew**	**Mildew**	**Rhyncho**	**Brown rust**
U	14.0	0.5	8.0	15.0	20.0	0.0	2.5
A	4.0	0.0	0.1	0.1	2.0	0.0	0.2
B	0.2	0.1	0.0	0.2	1.0	0.1	0.0
C	2.0	0.0	0.2	0.2	5.0	0.0	0.0
D	0.2	0.0	0.1	1.0	5.0	0.1	0.2
E	0.1	0.0	0.0	0.2	3.0	0.1	0.2
F	0.2	0.0	0.1	0.2	5.0	0.1	1.0
Sed (30 df)	1.7	0.1	0.8 (18 df)	0.9	1.7	0.02	0.4

Grain Yield and Quality

Trt Code	Yield (t/ha at 85% DM)	T Corn Wt (g)	Specific Wt (kg/hl)
U	7.86	44.3	68.1
A	9.74	47.6	69.8
B	10.06	47.8	69.8
C	9.71	46.8	69.4
D	9.65	46.4	69.5
E	9.77	46.8	69.6
F	9.67	46.6	69.5
Sed	0.080	0.50	0.21

APPENDIX II

HERBICIDE TRIALS FOR 1990 HARVEST

WINTER WHEAT

Main spring weed assessment details and yield data, where relevant, at 85% grain dry matter content.

SUPERIMPOSED TRIAL

Easterside: cultivar Riband sown 19.10.89 WW 9001; Soil - SL; Altitute - 85 m WW9001

Summer weed assessment, 10 July 1990, crop GS 55

		Percentage ground cover		
		Common chickweed	Perennial ryegrass	Total
F Panther	PRE	0.0	0.1	0.1
½ Panther	PRE	0.0	0.7	0.7
¼ Panther	PRE	2.7	2.7	5.4
1/8 Panther	PRE	1.8	1.3	3.2
½ Panther PRE then ½ CMPP	PT	0.0	0.8	0.8
¼ Panther PRE then ¼ CMPP	PT	0.0	1.5	1.5
1/8 Panther PRE then 1/8 CMPP	PT	0.0	1.8	1.8
F Stomp	PRE	0.0	2.0	2.0
½ Stomp	PRE	0.0	2.7	2.7
¼ Stomp	PRE	0.2	1.8	2.0
1/8 Stomp	PRE	4.7	1.8	6.6
½ Stomp PRE then ½ CMPP	PT	0.0	2.5	2.5
¼ Stomp PRE then ¼ CMPP	PT	0.0	1.7	1.7
1/8 Stomp PRE then 1/8 CMPP	PT	0.3	1.8	2.2
F Ally + CMPP	PT	0.0	1.0	1.0
½ Ally + CMPP	PT	0.0	1.4	1.4
¼ Ally + CMPP	PT	0.0	2.5	2.5
1/8 Ally + CMPP	PT	0.2	2.2	2.4
F CMPP	PT	0.0	2.7	2.7
Untreated		15.8	2.7	18.5
SED +				
Herb v herb		4.40	0.79	4.62
Herb v UT		3.59	0.65	3.77

Note: Other weeds included red deadnettle.

F = Full rate; ½ - 1/8 = half rate → eight rate.
PRE = pre-emergence 1.11.89
PT = post-emergence 19.4.90 (GS 30)

YIELDED SITES

Treaton: cultivar Fortress sown 11.10.90; Soil - loam; Altitude - 90 m WW9002

Summer weed assessment, 17 July 1990

		% Ground cover							
		Common Chickweed	**Field Pansy**	**Annual Meadow grass**	**Common Fumitory**	**Scentless Mayweed**	**Charlock**	**Shepherd's Purse**	**Total**
¼ Stomp PRE then ¼ Duplosan	PT3	14.0	11.0	6.5	5.5	0.5	0.0	0.0	38.5
1/8 Stomp PRE then 1/8 Duplosan	PT3	27.5	20.0	9.0	7.5	0.6	0.0	0.0	64.6
F Panther FULL	PT1	1.1	0.1	6.5	12.0	0.1	0.0	0.0	19.8
½ Panther	PT1	4.0	0.0	12.0	27.5	0.0	0.1	0.0	43.6
¼ Panther	PT1	11.5	0.6	15.0	17.5	0.5	0.0	0.0	45.1
1/8 Panther	PT1	37.5	6.5	11.0	30.0	0.1	0.6	0.0	85.7
½ Panther then ½ Duplosan	PT3	0.2	0.1	9.5	0.6	0.0	0.0	0.0	11.0
¼ Panther then ¼ Duplosan	PT3	5.0	0.0	11.0	7.5	0.0	0.0	0.0	23.5
1/8 Panther then 1/8 Duplosan	PT3	27.5	2.5	11.0	16.0	0.1	0.0	0.0	57.2
F Ally + F Duplosan	PT3	0.2	6.5	13.5	0.1	0.0	0.0	0.0	21.3
½ Ally + ½ Duplosan	PT3	0.1	16.0	13.5	3.0	0.1	0.0	0.0	32.2
¼ Ally + ¼ Duplosan	PT3	3.5	30.0	10.0	11.0	0.5	0.0	0.0	59.0
1/8 Ally + 1/8 Duplosan	PT3	15.1	35.0	8.5	7.5	0.5	0.0	0.0	66.6
Untreated		63.5	13.5	7.3	11.3	1.0	4.0	1.0	98.6
SED		3.83	2.99	2.01	2.67	0.31	0.90	0.28	

Note: Other weeds included common poppy, field forget-me-not.

Grain Yield at 31.8.90

		Grain yield t/ha	Dry matter content
¼ Stomp PRE then ¼ Duplosan	PT3	7.89	79.7
1/8 Stomp PRE then 1/8 Duplosan	PT3	7.46	79.0
F Panther then FULL Duplosan	PT1	8.72	80.0
½ Panther	PT1	7.42	78.4
¼ Panther	PT1	7.42	79.3
1/8 Panther then 1/8 Duplosan	PT1	6.83	79.0
½ Panther PT1 then ½ Duplosan	PT3	8.40	79.9
¼ Panther PT1 then ¼ Duplosan	PT3	8.10	79.6
1/8 Panther PT1 then 1/8 Duplosan	PT3	7.63	79.3
F Ally + FULL Duplosan	PT3	8.11	79.4
½ Ally + ½ Duplosan	PT3	7.36	79.2
¼ Ally + ¼ Duplosan	PT3	6.87	79.0
1/8 Ally + 1/8 Duplosan	PT3	6.49	79.0
Untreated		4.81	78.1
SED		0.38	0.5

F = full-rate; ½ - 1/8 = half rate → 1/8 rate
PRE = pre-emergence 12.10.80
PT1 = post-emergence 16.11.89 (GS 12-13)
PT3 = post-emergence 28.3.90 (GS 22-30)
t = then (sequence)

Tilycorthie: cultivar Riband sown 14.10.89 WW 9003
Soil - sandy loam, Altitude - 85 m

Summer weed assessment, 4 July 1990, crop GS 65

		Ground cover (%)		
		Chickweed	**A Meadowgrass**	**Total**
F Panther	PRE	0.0	0.0	0.0
½ Panther	PRE	0.0	0.3	0.3
¼ Panther	PRE	1.3	4.2	5.5
1/8 Panther	PRE	11.0	4.0	15.0
½ Panther PRE then ½ CMPP	PT	0.1	0.7	0.7
¼ Panther PRE then ¼ CMPP	PT	1.7	2.7	4.3
1/8 Panther PRE then 1/8 CMPP	PT	4.7	2.8	7.5
F Stomp	PRE	0.2	0.2	0.3
½ Stomp	PRE	0.3	0.5	0.8
¼ Stomp	PRE	2.7	1.2	3.8
1/8 Stomp	PRE	10.7	4.3	15.0
½ Stomp PRE then ½ CMPP	PT	0.0	0.0	0.0
¼ Stomp PRE then ¼ CMPP	PT	0.7	2.0	2.7
1/8 Stomp PRE then 1/8 CMPP	PT	4.7	4.7	9.3
F Ally + CMPP	PT	3.0	4.7	7.7
½ Ally + CMPP	PT	0.3	6.3	6.7
¼ Ally + CMPP	PT	6.0	7.7	13.7
1/8 Ally + CMPP	PT	11.0	4.7	15.7
F CMPP	PT	3.0	11.3	14.3
Untreated		62.2	0.0	62.2
SED				
Herb v herb		2.97	1.89	3.39
Herb v UT		2.42	1.54	2.77

Grain yield at 15.9.90

		Grain yield t/ha	Grain dry matter (%)
F Panther	PRE	12.73	81.7
2 Panther	PRE	12.12	81.4
¼ Panther	PRE	12.61	81.5
1/8 Panther	PRE	12.09	81.2
½ Panther PRE then ½ CMPP	PT	12.24	81.6
¼ Panther PRE then ¼ CMPP	PT	12.52	81.8
1/8 Panther PRE then 1/8 CMPP	PT	11.94	81.2
F Stomp	PRE	12.38	81.3
½ Stomp	PRE	12.64	81.7
¼ Stomp	PRE	12.64	81.8
1/8 Stomp	PRE	12.30	81.4
½ Stomp PRE then ½ CMPP	PT	12.42	81.6
¼ Stomp PRE then ¼ CMPP	PT	12.76	81.5
1/8 Stomp PRE then 1/8 CMPP	PT	12.68	81.2
F Ally + CMPP	PT	12.73	81.3
½ Ally + CMPP	PT	12.43	81.3
¼ Ally + CMPP	PT	12.84	81.4
1/8 Ally + CMPP	PT	12.72	81.3
F CMPP	PT	12.62	81.6
Untreated		10.92	81.4
SED			
Herb v herb		0.310	0.36
Herb v UT		0.253	0.30

F = full-rate; ½ - 1/8 = half rate → 1/8 rate
PRE = pre-emergence 30.10.89
PT = post-emergence 11.4.90 (GS 30)

WINTER BARLEY

Main spring weed assessment details, and yield data, at 85% grain dry matter content.

Ploughlands: cultivar Magie sown 20.9.89 WB 9001
soil - clay loam; Altitude - 76 m

		Percentage ground cover		
		Common fumitory	**Perennial rape**	**Common chickweed**
F Panther	PT1	0.1	0.0	0.0
½ Panther	PT1	0.1	0.0	0.0
¼ Panther	PT1	0.1	0.1	0.0
½ Panther PT1 then ½ Duplosan	PT2	0.1	0.0	0.0
¼ Panther PT1 then ¼ Duplosan	PT2	0.1	0.0	0.0
1/8 Panther PT1 then 1/8 Duplosan	PT2	0.1	0.1	0.1
F Stomp	PRE	0.0	0.3	0.0
½ Stomp	PRE	0.0	2.0	0.2
¼ Stomp	PRE	0.2	1.1	0.7
½ Stomp PRE then ½ Duplosan	PT2	0.0	1.7	0.0
¼ Stomp PRE then ¼ Duplosan	PT2	0.0	2.3	1.1
1/8 Stomp PRE then 1/8 Duplosan	PT2	0.6	1.7	1.8
Untreated		1.4	2.0	4.2
SED				

Other weeds: Annual meadowgrass, field speedwell, scentless mayweed, groundsel.

F = full-rate; ½ - 1/8 = half rate → 1/8 rate
PRE = pre-emergence 22.9.89
PT1 = post-emergence 15.10.89
PT2 = post-emergence 26.10.89

Grain yield at 22.7.90

		Grain yield t/ha	Dry matter content
F Panther	PT1	9.85	83.4
½ Panther	PT1	9.84	83.2
¼ Panther	PT1	9.87	83.7
½ Panther PT1 then ½ Duplosan	PT2	9.97	84.2
¼ Panther PT1 then ¼ Duplosan	PT2	9.69	83.3
1/8 Panther then 1/8 Duplosan	PT2	9.76	83.5
F Stomp	PRE	9.78	83.5
½ Stomp	PRE	9.78	83.5
½ Stomp	PRE	9.71	84.5
¼ Stomp	PRE	9.82	83.3
½ Stomp PRE then ½ Duplosan	PT2	9.71	82.4
¼ Stomp PRE then ¼ Duplosan	PT2	9.75	84.1
1/8 Stomp PRE then 1/8 Duplosan	PT2	9.81	83.6
Untreated		9.87	83.3
SED		0.11	0.5

Tilycorthie: cultivar Magie, sown 26.9.89 WB 9002
soil - sandy loam; Altitude - 110 m

Summer weed assessment, 18 June 1990; Crop GS 75

		Ground cover (%)				
		Chickweed	**Vol OSR**	**Pansy**	**Annual meadowgrass**	**Total**
F Panther	PRE	0.0	0.1	0.0	0.0	0.1
½ Panther	PRE	8.7	0.0	0.3	3.3	12.3
¼ Panther	PRE	50.0	1.3	0.0	3.0	54.3
F Panther PRE then F CMPP	PT	0.0	0.0	0.0	0.0	0.0
½ Panther PRE then ½ CMPP	PT	0.2	0.0	0.0	0.1	0.4
¼ Panther PRE then ¼ CMPP	PT	5.3	0.0	0.0	3.0	8.5
1/8 Panther PRE then 1/8 CMPP	PT	11.7	0.0	2.0	4.3	18.0
F Stomp	PRE	0.4	0.0	0.0	0.0	0.4
½ Stomp	PRE	19.3	0.4	0.0	0.7	20.4
¼ Stomp	PRE	55.0	2.0	0.0	3.7	61.2
F Stomp PRE then F CMPP	PT	0.0	0.0	0.0	0.0	0.0
½ Stomp PRE then ½ CMPP	PT	0.7	0.0	0.0	0.2	1.0
¼ Stomp PRE then ¼ CMPP	PT	3.2	0.0	1.0	2.7	6.9
1/8 Stomp PRE then 1/8 CMPP	PT	12.3	0.0	2.7	4.7	19.7
F Treflan	PRE	36.7	1.7	0.0	0.7	40.0
½ Treflan	PRE	66.7	0.7	0.0	1.7	69.0
¼ Treflan	PRE	73.3	0.3	0.0	1.3	74.8
F Treflan PRE then F CMPP	PT	0.7	0.0	0.3	0.0	1.1
½ Treflan PRE then ½ CMPP	PT	6.3	0.0	3.3	2.3	12.0
¼ Treflan PRE then ¼ CMPP	PT	7.3	0.0	2.0	4.0	13.3
1/8 Treflan PRE then 1/8 CMPP	PT	7.3	0.0	2.0	2.3	11.7
Untreated		78.9	0.9	0.3	2.9	82.9
SED						
Herb v herb		6.82	0.66	1.02	1.00	7.10
		5.59	0.54	0.83	0.82	5.80

Note: Other weeds included shepherd's purse, forget-me-knot
Full = full rate; ½ - 1/8 = half - eighth rate

Grain yield at 7.8.90

		Grain yield t/ha	Grain dry matter (%)
F Panther	PRE	7.37	81.8
½ Panther	PRE	7.31	81.6
¼ Panther	PRE	7.07	82.9
F Panther PRE then F CMPP	PT1	7.21	82.9
½ Panther PRE ½ CMPP	PT1	7.30	82.6
¼ Panther PRE then ¼ CMPP	PT1	7.28	81.3
1/8 Panther PRE then 1/8 CMPP	PT1	7.23	82.4
F Stomp	PRE	7.47	83.0
½ Stomp	PRE	7.08	83.1
¼ Stomp	PRE	6.85	82.6
F Stomp PRE then F CMPP	PT1	7.17	82.0
½ Stomp PRE then ½ CMPP	PT1	7.56	83.0
¼ Stomp PRE then ¼ CMPP	PT1	7.42	84.0
1/8 Stomp PRE then 1/8 CMPP	PT1	7.19	81.6
F Treflan	PRE	7.17	81.8
½ Treflan	PRE	6.89	81.8
¼ Treflan	PRE	6.62	80.5
F Treflan PRE then F CMPP	PT1	7.25	83.2
½ Treflan PRE then ½ CMPP	PT1	7.17	81.4
¼ Treflan PRE then ¼ CMPP	PT1	7.43	82.6
1/8 Treflan PRE then 1/8 CMPP	PT1	7.38	81.3
Untreated		6.46	80.8
SED			
Herb v herb		0.230	1.04
Herb v UT		0.188	0.85

F = full-rate: ½ - 1/8 = half → eighth rate.
PRE = pre emergence 30.9.89
PT = Post emergence 5.4.90

SPRING BARLEY TRIALS RESULTS

Main weed assessment details, and yield data, where relevant, at 85% grain dry matter content

Superimposed Trials

Catterloch: cultivar Blenheim, sown 14.4.90 SB 9001
Soil - sandy loam; Altitude - 120 m

	Percentage weed ground cover							
	Chickweed	**Fumitory**	**Day-nettle**	**Knot-grass**	**Redshank**	**Pansy**	**AMG**	**Total weeds**
½ Ally + Duplosan	0.0	0.7	0.7	0.0	0.0	2.3	9.3	13.2
¼ Ally + Duplosan	1.0	3.3	0.0	0.0	0.0	2.7	9.3	16.5
1/8 Ally + Duplosan	2.0	2.0	1.0	0.0	0.3	5.7	11.3	23.0
½ Harmony M + Duplosan	0.0	1.0	0.0	0.0	0.0	5.7	8.0	14.7
¼ Harmony M + Duplosan	1.7	1.7	0.0	0.0	0.0	4.3	11.3	19.8
1/8 Harmony M + Duplosan	2.2	0.3	1.0	0.2	0.3	3.0	10.0	17.7
½ Ally + Fortrol	0.0	1.0	0.0	0.0	0.0	2.7	8.7	12.3
¼ Ally + Fortrol	0.4	2.2	0.1	0.1	0.8	3.3	10.1	16.7
1/8 Ally + Fortrol	1.3	2.0	0.3	1.7	0.0	4.7	8.0	18.3
½ Banlene Plus	3.3	3.3	2.3	0.0	1.7	3.0	11.3	25.8
¼ Banlene Plus	4.7	1.7	3.0	0.0	3.7	0.0	11.3	26.2
1/8 Banlene Plus	1.3	2.0	4.0	0.7	2.7	3.7	10.0	25.5
½ Coupler + MCPA	3.0	3.0	1.0	0.0	2.3	3.0	10.0	23.3
¼ Coupler + MCPA	4.3	0.0	1.0	0.0	1.7	3.0	11.3	21.5
1/8 Coupler + MCPA	4.0	4.0	5.3	0.0	3.3	2.7	10.7	31.0
½ MCPA + Dichlorprop	1.7	1.7	2.7	0.0	1.0	3.7	11.0	22.7
¼ MCPA + Dichlorprop	3.0	1.3	3.7	0.0	2.2	3.3	9.3	25.5
1/8 MCPA + Dichlorprop	1.3	0.3	2.0	1.0	1.0	3.8	12.3	23.2
Untreated	7.6	4.2	8.4	0.3	5.0	5.8	10.9	46.4
SED								
Herb v herb	1.42	1.35	2.74	0.49	1.37	2.17	5.43	4.08
Herb v UT	1.16	1.10	2.24	0.40	1.22	1.77	1.17	3.33

Note: Other weeds included paler persicaria, creeping buttercup, clover

AMG = Annual meadowgrass

Treatments applied 30.5.90 (GS 30)

Howmains: cultivar Camargue, sown mid APril 1990 SB 9002
Soil - SL; Altitude - 10 m

Weed assessment on 14.6.90

	PT	Common Chickweed	Annual Meadowgrass	Common Spurrey	Scentless Mayweed	Orache	Redshank
½ Ally + Duplosan	1	0.0	3.7	7.8	0.0	T	0.0
¼ Ally + Duplosan	1	0.0	3.5	8.4	0.0	T	T
1/8 Ally + Duplosan	1	0.2	15.3	0.7	0.0	0.2	0.0
½ Harmony M + Duplosan	1	0.0	12.0	3.5	0.0	T	0.0
¼ Harmony M + Duplosan	1	0.2	11.7	4.3	T	0.3	0.0
1/8 Harmony M + Duplosan	1	T	12.0	5.0	T	3.4	0.0
½ MCPA + Dichlorprop	2	9.0	6.0	6.7	T	0.1	0.0
¼ MCPA + Dichlorprop	2	1.7	5.5	6.7	3.3	1.7	1.7
1/8 MCPA + Dichlorprop	2	15.0	25.0	1.0	5.0	0.4	2.3
½ Quiver	1	0.0	9.3	0.0	0.1	0.0	0.0
¼ Quiver	1	0.0	15.3	0.3	T	0.1	0.7
1/8 Quiver	1	1.8	15.7	T	1.0	0.4	0.1
½ Banlene Plus	3	9.0	7.3	13.3	0.1	0.0	0.0
¼ Banlene Plus	3	3.5	20.3	T	2.3	T	T
1/8 Banlene Plus	3	9.3	2.3	4.3	0.0	T	0.0
½ Ally + Fortrol	1	0.1	10.3	0.0	0.0	0.1	0.0
¼ Ally + Fortrol	1	0.0	16.7	1.0	0.0	0.4	0.0
1/8 Ally + Fortrol	1	0.2	16.7	0.7	T	0.1	0.1
½ Coupler + MCPA	2	12.3	20.3	8.3	4.3	1.7	3.3
¼ Coupler + MCPA	2	17.3	10.0	0.2	5.5	0.1	1.7
1/8 Coupler + MCPA	2	11.7	13.5	5.0	1.0	0	0.1
Untreated		36.7	18.3	20.3	10.0	1.3	1.4

Other weeds: Groundsel, shepherd's purse, *Cerastium* sp, knotgrass, common hempnettle, creeping buttercup.

Weed assessment on 6.8.90

	PT	Percentage ground cover		
		Common chickweed	Annual Meadowgrass	Orache
½ Ally + Duplosan	1	0.0	10.0	0.0
¼ Ally + Duplosan	1	0.0	10.0	0.0
1/8 Ally + Duplosan	1	T	18.3	0.1
½ Harmony m + Duplosan	1	0.0	11.0	0.0
¼ Harmony M + Duplosan	1	0.0	11.7	0.0
1/8 Harmony M + Duplosan	1	0.0	11.0	0.0
½ MCPA + Dichlorprop	2	15.3	6.7	0.0
¼ MCPA + Dichlorprop	2	25.0	15.0	3.3
1/8 MCPA + Dichlorprop	2	26.7	23.3	0.2
½ Quiver	1	T	3.7	0.0
¼ Quiver	1	0.0	18.3	0.3
1/8 Quiver	1	5.2	20.0	0.2
½ Banlene Plus	3	6.9	18.3	T
¼ Banlene Plus	3	1.3	21.7	1.0
1/8 Banlene Plus	3	61.7	6.7	0.0
½ Ally + Fortrol	1	0.0	16.7	0.2
¼ Ally + Fortrol	1	0.0	22.7	1.7
1/8 Ally + Fortrol	1	T	16.7	0.0
½ Coupler + MCPA	2	51.7	10.01	0.1
¼ Coupler + MCPA	2	56.7	13.3	0.0
1/8 Coupler + MCPA	2	66.7	8.7	0.0
Untreated		78.0	11.7	1.0
SED		13.12	7.49	1.138

½ → 1/8 = half → eighth rates. Treatment timings: PT1 = 18.5.90 (GS 14)
PT2 = 28.5.90 (GS 15)
PT3 = 31.5.90 (GS 15)

Treaton: cultivar Carmargue, sown 29.3.90 SB 9003
Soil - sandy loam, Altitude - 90 m

Weed assessment on 17.8.90

	Common Chickweed	Field Pansy	Black Bindweed	Common Fumitory	Fat Hen	Redshank
½ Ally + Duplosan	4.3	11.7	0.2	6.7	0.0	0.0
¼ Ally + Duplosan	21.7	15.0	3.3	2.2	0.2	0.7
1/8 Ally + Duplosan	25.7	16.7	4.0	7.0	0.7	0.0
½ Harmony M + Duplosan	9.3	7.7	0.7	5.2	0.0	0.0
¼ Harmony M + Duplosan	10.0	18.3	0.8	2.0	0.0	0.0
1/8 Harmony M + Duplosan	23.3	23.3	1.2	3.3	0.0	0.0
½ Ally + Fortrol	5.7	11.7	3.2	6.2	0.7	0.0
1/8 Ally + Fortrol	30.0	20.0	2.7	7.3	3.3	1.0
½ MCPA + Dichlorprop	16.7	5.3	0.2	2.3	0.0	0.2
¼ MCPA + Dichlorprop	26.7	10.0	0.0	3.3	0.0	1.3
1/8 MCPA + Dichlorprop	63.3	13.3	0.3	3.3	0.0	0.8
Untreated	81.7	12.5	5.7	3.0	1.5	2.1
SED						

Grain yield at 30.8.90

	Grain Yield t/ha	Dry matter content
½ Ally + Duplosan	4.64	79.4
¼ Ally + Duplosan	4.74	80.0
1/8 Ally + Duplosan	4.25	78.8
½ Harmony M + Duplosan	4.77	79.6
¼ Harmony M + Duplosan	4.44	79.6
1/8 Harmony M + Duplosan	4.13	79.8
½ Ally + Fortrol	4.74	79.0
1/8 Ally + Fortrol	4.85	78.6
½ MCPA + Dichlorprop	3.76	80.7
¼ MCPA + Dichlorprop	3.56	80.1
Untreated	3.13	78.6
SED	0.29	0.62

½ → 1/8 = half → eighth rates
Treatments applied 11.5.90 (GS 15-22)

Yielded Trials

Ploughlands: cultivar Carmargue, sown 19.3.90 SB 9004
Soil - sandy clay loam; Altitude - 76 m

	Ground cover (%)				
	Common Fumitory	Common Chickweed	Fat Hen	Black Bindweed	Vol Oilseed Rape
½ Ally + Duplosan	4.83	0.0	0.1	0.0	0.1
¼ Ally + Duplosan	10.67	0.0	1.5	0.3	0.4
1/8 Ally + Duplosan	15.33	0.0	0.2	0.2	0.5
½ Harmony M + Duplosan	7.83	0.0	0.1	0.0	0.1
¼ Harmony M + Duplosan	10.33	0.0	0.1	0.0	0.3
1/8 Harmony M + Duplosan	16.33	0.0	0.2	0.0	0.0
½ MCPA + Dichlorprop	2.27	0.0	0.2	0.0	0.0
¼ MCPA + Dichlorprop	7.67	0.1	0.0	0.1	0.2
½ MCPA + MCPA	6.67	0.1	0.1	0.1	0.2
1/8 MCPA + Dichlorprop	10.33	0.2	0.0	0.1	0.1
½ Banlene Plus	8.00	0.2	0.3	0.1	0.1
1/8 Banlene Plus	22.33	0.0	0.4	0.0	0.6
½ Coupler + MCPA	6.67	0.1	0.1	0.1	0.2
1/8 Coupler + MCPA	24.33	0.1	0.1	0.0	0.5
Untreated	39.67	1.0	2.7	2.0	3.7
SED	6.18	0.2	0.7	0.4	1.1

Other weeds: field forget-me-not, shepherd's purse, knotgrass.

Weed assessment at 12.7.90

	Ground cover (%)				
	Common Fumitory	**Black Bindweed**	**Knotgrass**	**Fat Hen**	**Common Chickweed**
½ Ally + Duplosan	0.7	1.7	0.0	0.0	0.0
¼ Ally + Duplosan	6.7	6.0	0.3	0.0	0.0
1/8 Ally + Duplosan	9.3	5.0	0.3	0.3	0.0
½ Harmony M + Duplosan	1.0	0.4	0.0	0.0	0.0
¼ Harmony M + Duplosan	6.7	1.33	0.0	0.1	0.0
1/8 Harmony M + Duplosan	9.3	2.7	0.0	0.3	0.3
½ MCPA + Dichlorprop	0.8	0.0	0.0	0.0	0.7
¼ MCPA + Dichlorprop	4.3	1.0	0.1	0.0	2.3
1/8 MCPA + Dichlorprop	9.3	2.0	0.0	0.0	2.3
½ Banlene Plus	6.7	0.4	0.0	0.0	1.7
1/8 Banlene Plus	15.7	5.3	0.3	0.3	4.3
½ Coupler + MCPA	7.3	0.7	0.0	0.0	1.0
¼ Coupler + MCPA	13.0	2.0	0.0	0.0	3.7
1/8 Coupler + MCPA	16.3	4.0	0.0	2.0	5.7
Untreated	25.0	11.0	1.1	3.7	8.8
SED	2.94	1.09	0.3	1.00	0.9

Other weeds: red deadnettle, scentless mayweed, sun spurge.

Grain yield at 21.8.90

	Grain yield t/ha	**Dry matter content**
½ Ally + Duplosan	7.24	79.6
¼ Ally + Duplosan	7.09	78.6
1/8 Ally + Duplosan	7.26	80.2
½ Harmony M + Duplosan	7.15	78.5
¼ Harmony M + Duplosan	7.33	79.5
1/8 Harmony M + Duplosan	7.26	79.1
½ MCPA + Dichlorprop	6.97	80.4
1/8 MCPA + Dichlorprop	7.23	79.3
½ Coupler + MCPA	7.31	80.1
¼ Coupler + MCPA	6.98	80.9
1/8 Coupler + MCPA	7.26	80.4
Untreated	6.97	80.6
SED	0.17	1.0

½ → 1/8 = half → eight rates.
Treatments applied 15.5.90 (GS 15-22)

Sunnybrae: cultivar Carmargue, sown 29.3.90 SB 9005
Soil - sandy loam; Altitude - 80 m

Weed assessment on 9.8.90; Crop GS 83

		Percentage ground cover					
		Chickweed	**Daynettle**	**Knotgrass**	**Redshank**	**AMG**	**Total Weeds**
½ Ally + Duplosan	PT1	0.0	0.0	0.0	0.0	0.6	0.0
¼ Ally + Duplosan	PT1	0.3	0.1	0.1	0.1	0.6	1.2
1/8 Ally + Duplosan	PT1	0.0	0.3	5.0	0.3	0.8	6.5
½ Harmony + Duplosan	PT1	0.0	0.0	0.0	0.0	0.7	0.7
¼ Harmony + Duplosan	PT1	0.0	0.1	0.0	0.0	0.6	0.6
1/8 Harmony + Duplosan	PT1	0.1	0.0	0.0	0.0	0.5	0.9
½ Ally + Fortrol	PT1	0.0	0.0	0.3	0.0	0.7	1.0
¼ Ally + Fortrol	PT1	0.2	0.0	3.7	0.0	0.8	4.7
1/8 Ally + Fortrol	PT1	0.0	0.5	5.7	0.0	0.8	5.7
½ Ally + Duplosan	PT2	0.2	0.0	1.5	0.0	0.8	2.5
¼ Ally + Duplosan	PT2	0.0	0.3	2.3	0.0	1.0	4.0
1/8 Ally + Duplosan	PT2	0.5	0.8	4.0	0.0	1.0	6.3
½ Banlene Plus	PT2	0.1	0.0	0.0	0.0	0.4	0.5
¼ Banlene Plus	PT2	0.7	1.2	1.0	0.0	1.0	3.8
1/8 Banlene Plus	PT2	1.3	2.3	4.0	0.3	1.0	9.3
½ Coupler + MCPA	PT2	0.0	0.2	0.0	0.0	0.7	0.9
¼ Coupler + MCPA	PT2	0.2	0.1	0.5	0.0	0.7	1.4
1/8 Coupler + MCPA	PT2	0.5	2.3	2.5	0.2	1.0	6.8
½ MCPA + dichlorprop	PT2	0.0	0.2	0.0	0.0	0.8	1.1
¼ MCPA + dichlorprop	PT2	0.3	0.7	0.5	0.0	1.0	2.5
1/8 MCPA + dichlorprop	PT2	0.3	1.5	1.5	0.0	1.2	4.5
Untreated		6.7	9.7	12.2	1.3	1.1	31.6
SED							
Herb v herb		0.54	3.53	1.72	0.30	0.24	2.56
Herb v UT		0.44	2.88	1.40	0.25	0.20	2.09

Note: Other weeds included pansy.

Grain yield on 27.8.90

		Grain yield t/ha	Grain dry matter (%)
½ Ally + Duplosan	PT1	5.94	82.1
¼ Ally + Duplosan	PT1	6.00	82.1
1/8 Ally + Duplosan	PT1	5.93	82.0
½ Harmony M + Duplosan	PT1	6.16	82.2
¼ Harmony M + Duplosan	PT1	6.20	81.8
1/8 Harmony M + Duplosan	PT1	5.91	82.1
½ Ally + Fortrol	PT1	6.07	81.9
¼ Ally + Fortrol	PT1	6.03	82.5
1/8 Ally + Fortrol	PT1	6.11	81.6
½ Ally + Duplosan	PT2	5.99	81.7
¼ Ally + Duplosan	PT2	5.94	82.0
1/8 Ally + Duplosan	PT2	6.08	82.3
½ Banlene Plus	PT2	6.08	81.6
¼ Banlene Plus	PT2	5.97	82.3
1/8 Banlene Plus	PT2	5.92	82.6
½ Coupler + MCPA	PT2	5.84	81.7
¼ Coupler + MCPA	PT2	5.88	82.1
1/8 Coupler + MCPA	PT2	6.00	82.5
½ MCPA + Dichlorprop	PT2	6.01	82.4
¼ MCPA + Dichlorprop	PT2	5.96	81.5
1/8 MCPA + Dichlorprop	PT2	6.10	82.4
Untreated		5.88	82.6
SED			
Herb v herb		0.124	0.451
Herb v UT		0.102	0.368

Lochbank: cultivar Carmargue, sown 1.4.90 SB 9006
Soil - SL; Altitude - 50 m

Weed assessment on 15.6.90

	PT	Common Chickweed	Ground cover (%)	
			Annual Meadowgrass	Fat Hen
½ Ally + Duplosan	1	0.0	1.1	0.1
¼ Ally + Duplosan	1	0.0	1.7	0.2
1/8 Ally + Duplosan	1	0.1	1.1	1.2
½ Harmony M + Duplosan	1	0.0	2.3	0.7
¼ Harmony M + Duplosan	1	T	0.4	0.4
1/8 Harmony M + Duplosan	1	0.5	1.5	1.8
½ MCPA + Dichlorprop	2	2.4	0.7	1.7
¼ MCPA + Dichlorprop	2	3.7	1.0	2.0
1/8 MCPA + Dichlorprop	2	3.0	1.2	0.1
½ Quiver	1	0.0	0.4	0.0
¼ Quiver	1	0.2	0.9	T
1/8 Quiver	1	1.7	0.3	2.1
½ Banlene Plus	3	1.3	2.0	0.3
¼ Banlene Plus	3	1.3	2.2	1.7
1/8 Banlene Plus	3	3.0	2.0	0.1
Untreated		6.7	1.2	0.1
SED		1.13	1.03	1.27

Grain yield 14.8.90

	PT	Grain yield T/ha
½ Ally + CMPP	1	5.18
¼ Ally + CMPP	1	5.39
1/8 Ally + CMPP	1	5.15
½ Harmony M + CMPP	1	5.43
¼ Harmony M + CMPP	1	4.99
1/8 Harmony M + CMPP	1	4.90
½ MCPA + Dichlorprop	2	5.34
¼ MCPA + Dichlorprop	2	5.55
1/8 MCPA + Dichlorprop	2	5.47
½ Quiver	1	4.95
¼ Quiver	1	5.66
1/8 Quiver	1	5.06
½ Banlene Plus	3	5.18
¼ Banlene Plus	3	5.01
1/8 Banlene Plus	3	5.18
Untreated		5.71
SED	0.358	

½ - 1/8 = half → eighth rates.

Treatment timing: PT1 = 18.5.90 (GS 14)
PT2 = 28.5.90 (GS 15)
PT3 = 31.5.90 (GS 15)

EFFECT OF HERBICIDE TIMING X RATE ON SPRING BARLEY

Tillyorthie: cultivar Golf, sown 21.3.90 SB 900 7
Soil: SL; Altitude - 100 m

Weed control assessment on 8.7.90 Crop 8.5.69

		Ground cover (%)					
		Chickweed	**Vol OSR**	**Forget-me-knots**	**Daynettle**	**Knotgrass**	**AMG**
F Ally + Duplosan	PT1	0.0	0.0	2.0	0.0	0.0	1.7
½ Ally + Duplosan	PT1	0.0	0.5	2.0	0.0	1.7	1.7
¼ Ally + Duplosan	PT1	0.0	0.8	4.7	0.7	1.2	2.3
1/8 Ally + Duplosan	PT1	2.7	5.0	4.3	2.3	1.0	2.7
F harmony M + CMPP	PT1	0.0	0.0	0.7	0.0	0.0	1.3
½ Harmony M + Duplosan	PT1	0.0	0.0	1.2	0.0	0.0	2.0
¼ Harmony M+ Duplosan	PT1	0.3	0.3	3.0	2.0	0.0	2.3
1/8 Harmony M + Duplosan	PT1	1.0	1.3	2.7	1.7	1.3	3.0
F Ally + Duplosan	PT2	0.0	1.7	0.5	1.3	0.3	1.7
½ Ally + Duplosan	PT2	0.0	2.0	2.0	1.7	0.3	2.3
¼ Ally + Duplosan	PT2	0.0	1.0	3.3	1.7	0.7	1.7
1/8 Ally + Duplosan	PT2	2.0	4.0	3.7	3.7	0.3	2.7
F Harmony M + Duplosan	PT2	0.0	1.3	0.0	0.2	0.0	1.3
½ Harmony M + Duplosan	PT2	0.0	1.2	0.5	1.0	0.3	2.0
¼ Harmony M + Duplosan	PT2	0.3	2.7	1.0	2.0	0.7	2.3
1/8 Harmony M + Duplosan	PT2	1.7	3.3	1.7	2.0	0.7	2.7
Untreated		10.3	10.5	5.3	9.3	3.0	2.3
(No/sq m)		(38)	(41)	(63)	(25)	(20)	(41)
SED							
Herb v herb		1.41	1.30	0.01	1.63	0.58	0.58
Herb v UT		1.22	1.12	0.88	1.41	0.50	0.50

Note: Other weeds included fumitory, redshank, red deadnettle, pansy, mayweed, ivy-leaved speedwell.
AMG = Annual meadowgrass
F = Fullrate; ½ - 1/8 = half → eighth rates.
Treatment timing: PT1 4.5.90 (GS 13), PT2 25.5.90 (GS 30-31)

Grain yield on 24.8.90

		Grain yield t/ha	Grain dry matter (%)
F Ally + Duplosan	PT1	5.99	83.3
½ Ally + Duplosan	PT1	5.47	81.5
¼ Ally + Duplosan	PT1	5.48	82.1
1/8 Ally + Duplosan	PT1	4.96	81.1
F Harmony M + Duplosan	PT1	5.28	81.3
½ Harmony M + Duplosan	PT1	5.47	82.7
¼ Harmony M + Duplosan	PT1	5.12	83.5
1/8 Harmony M + Duplosan	PT1	5.20	83.0
F Ally + Duplosan	PT2	5.27	81.2
½ Ally + Duplosan	PT2	5.42	82.4
¼ Ally + Duplosan	PT2	5.16	82.6
1/8 Ally + Duplosan	PT2	5.15	82.5
F Harmony M + Duplosan	PT2	5.27	84.1
½ Harmony M + Duplosan	PT2	4.78	80.7
¼ Harmony M + Duplosan	PT2	5.14	83.0
1/8 Harmony M + Duplosan	PT2	5.00	80.9
Untreated		4.78	82.2
SED			
Herb v herb		0.350	1.41
Herb v UT		0.303	1.22

APPENDIX III

FUNGICIDE TRIALS FOR 1991 HARVEST

SPRING BARLEY FUNGICIDE TRIALS

The trial sites were:

A1 Drummond Farm, Evanton, Easter Rose (trial)
A2 Sunnybrae Farm, Craibstone Estate, Bucksburn, Aberdeens (screen)

E1 Whitehouse Farm, St Boswells, Roxburghshire (trial)
E2 Fulford Camp, Boghall, Midlothian (screen)

W1 Ladykirk Estate, Ayrshire (trial)
W2 Ladykirk Estate, Ayrshire (Screen)

Dates of treatments and conditions of spraying

	A1	**E1**	**W1**	
First applications				
Date	23.5.91	17.5.91	29.5.91	
GS	15, 22	14, 21	30-31	
Wind speed	5-8	1	3	
Wind direction	W	SW	N	
Temp °C	15	10	>10	
Cloud cover	5/8	98%	3/8	
Comments	Crop and ground dry	40-50% ground cover. Dry humid.	Sunny	
Second application				
Date	28.6.91	14.6.91	19.6 (GP)	20.6
GS	65	39-45	39-41	39-41
Wind speed (m/s)	2.4	2.75	3	3
Wind direction	N	W	W	NW
Temp °C	14.5	14	>10	>10
Cloud cover	7/8	50%	1/8	2/8
Comments	Crop dry, ground damp	Dry	Foliage damp	Crop
Sprayers				
Type	AZO	CP3	AZO compressed air	
Water volume	194 *l*/ha	250 *l*/ha	250 *l*/ha	
Nozzle	SD11002		Teejet 8002VB	

Site details

	A1	E1	W1
Site:	Drummond Farm Evanton Easter Ross	Whitehouse Farm St Boswells Roxburghshire	Ladykirk Estate Ayrshire
Grid ref:	NH 599 655	NT 638 330	NS 388 264
Soil type:	Sandy loan	Sandy clay loam	Sandy clay loam
Previous crop:	Winter wheat	Spring barley	Winter wheat
Soil analysis date:	February 1991	December 1990	January 1991
pH	6.1	6.7	6.0
P	111 (mg/*l*) High	Mod	38 (mg/*l*) Mod
K	117 (mg/*l*) Mod	Mod	119 (mg/*l*) Mod
Mg	243 (mg/*l*) High	High	179 (mg/*l*) Mod
Seedbed Fert: NPK	80:56:56 kg/ha	70:70:70 kg/ha 3 April	130:65:65 kg/ha
Topdressing N:	50 kg/ha (23 Apr)	60 kg/ha (19 Apr)	None
Seed rate:			
GP	175 kg/ha	188 kg/ha	190 kg/ha
Golf	227 kg/ha	188 kg/ha	190 kg/ha
Blenheim	195 kg/ha	188 kg/ha	190 kg/ha
Drilling date:	27 March 1991	30 March 1991	18 April 1991
Plot size:	20 x 2.1 m	20.5 x 2.0 m	20 x 2.0 m
Herbicide:	Ally 20 g/ha Duplosan 0.5 *l*/ha 8 May 1991	Harmony M 30 g/ha Duplosan 1.0 *l*/ha 28 May 1991	Advance 2.0 *l*/ha 17 may 1991
Harvest date:	25 August 1991	25 August 1991	28 August 1991

All trials were of randomised block design with four replicate blocks.

Other sprays: Cutonic Mang. 10 *l*/ha
Cutonic Copper 1 *l*/ha
22 May 1991
Cutonic Mang. 5 *l*/ha
6 June 1991

Treatments

	First application	Second application
A	nil	1.0 ℓ Corbel
B	0.7 ℓ Calixin	0.175 ℓ Calixin
C	0.175 ℓ Calixin + 0.125 ℓ Tilt	0.75 ℓ Calxin + 0.125 ℓ Tilt
D	0.25 ℓ Corbel + 0.125 ℓ Tilt	0.25 ℓ Corbel + 0.125 ℓ Tilt
E	0.25 ℓ Corbel + 0.1 ℓ Sanction	0.25 ℓ Corbel + 0.1 ℓ Sanction

TRIAL A1

First assessment, 23 May 1991, GS 15, 22

	% Mildew		
	Leaf 1*	**2**	**3**
Golden Promise	2.8	1.8	0.5
Golf	1.1	0.9	Tr
Blenheim	0.4	0.7	0.0

*Leaf 1 = first formed leaf

Second assessment, 28 June 1991, GS 65

Treatment	% Mildew		
	GP	**Golf**	**Blenheim**
A	11.4	2.7	3.1
B	2.2	0.8	0.5
C	2.4	0.8	0.8
D	3.1	0.8	0.6
E	2.1	0.7	0.6
SED (42 df)		1.11	

Third assessment, 16 July 1991, GS 83-85

Treatment	% Mildew		
	GP	**Golf**	**Blenheim**
A	48.7	10.4	13.6
B	4.5	1.9	1.3
C	3.4	1.2	2.6
D	2.7	1.2	1.3
E	3.6	1.0	1.3
SED (42 df)		2.87	

Traces of Rhynchosporium (<0.1%) were noted on all three varieties.

Thousand grain and specific weights

Treatment	Thousand grain weight (g)			Specific weight (kg/hl)		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	27.8	37.9	35.7	40.9	43.1	46.2
B	29.6	40.4	38.1	44.3	45.2	47.7
C	30.3	39.7	38.2	44.5	54.4	48.8
D	29.4	39.1	38.5	42.4	49.5	48.6
E	30.0	39.1	38.4	42.0	43.4	47.9
SED (42 df)		0.93			2.16	

Yield

Treatment	Yield (t/ha)		
	GP	Golf	Blenheim
A	4.156	5.248	5.165
B	5.490	5.930	6.263
C	5.259	5.963	6.035
D	5.365	5.791	6.214
E	5.456	5.977	6.380
SED (42 df)		0.1517	
CV%		3.8	

Brackling and Lodging

Treatment	Brackling (%)			Lodging (%)		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	95.0	61.2	57.5	3.7	6.2	0.0
B	93.7	32.5	20.0	1.5	13.0	0.0
C	91.2	25.0	35.0	0.2	18.3	0.0
D	93.7	28.8	28.8	2.5	20.0	0.0
E	91.2	40.0	22.5	1.7	16.3	0.0
SED (42 df)		8.65			5.51	

TRIAL E1

First assessment, 17 May 1991, GS 14, 21

Golden Promise	100%	plants infected
Golf	80%	plants infected
Blenheim	75%	plants infected

Second assessment, 14 June 1991, GS 39-45

Treatment	% Mildew		
	GP	Golf	Blenheim
A	40	25	19
B	15	10	5
C	21	20	10
D	14	13	6
E	20	11	7
SED (12 df)	3.4	2.4	2.9

Third assessment, 5 July 1991, GS 60

Treatment	% Mildew		
	GP	Golf	Blenheim
A	66	36	18
B	24	13	2
C	27	11	2
D	10	4	1
E	11	8	1
SED (12 df)	3.5	2.9	2.5

Thousand grain weight

Treatment	Thousand grain weight (g)			Specific weight (kg/hl)		
	GP	Golf	Blenheim	GP	Golf	Blenheim
A	28.4	41.0	39.3	55.7	58.8	59.3
B	29.6	42.6	40.7	55.7	59.4	59.1
C	29.2	42.3	40.6	55.6	59.3	59.2
D	29.9	44.1	41.8	55.7	59.5	59.9
E	30.7	44.0	41.6	56.1	60.1	59.6
SED (42 df)	0.41	0.74	0.57	0.28	0.34	0.34

Yield

Treatment	Yield (t/ha)		
	GP	Golf	Blenheim
A	3.32	4.46	4.60
B	4.16	5.28	5.54
C	3.84	5.19	5.25
D	4.35	5.63	5.79
E	4.32	5.67	5.56
SED (42 df)		0.142	
CV%		4.10	

TRIAL W1

First assessment, 29 May 1991, GS 30-31

	% Mildew		
	Leaf 1*	2	3
Golden Promise	0.0	1.1	2.3
Golf	0.0	0.1	0.3
Blenheim	Tr	0.5	0.8

*Leaf 1 = top fully expanded leaf

Second assessment, 19 June 1991, GS 39-41

	% Mildew			% Dead tissue		
	Mean of leaves 2 to 4*			Mean of leaves 3 and 4*		
Treatment	GP	Golf	Blenheim	GP	Golf	Blenheim
A	19.0	13.1	21.5	35.2	27.7	39.9
B	7.4	3.6	4.6	8.8	5.9	0.2
C	9.6	6.2	10.2	18.0	15.8	13.1
D	7.4	2.6	5.9	7.6	5.4	1.4
E	4.9	2.1	3.1	2.4	5.3	0.6
SED (42 df)		2.124			7.5	

Flag leaf = leaf 1

Third assessment, 11 July 1991, GS 71-73

	% Mildew			% Dead tissue		
	Mean of leaves 1 to 4*			Mean of leaves 3 and 4*		
Treatment	GP	Golf	Blenheim	GP	Golf	Blenheim
A	24.3	15.3	10.1	51.8	53.4	54.6
B	4.2	2.0	2.2	27.1	18.8	11.3
C	5.8	3.9	4.3	35.6	36.7	29.6
D	6.3	2.8	2.7	35.5	31.3	16.3
E	2.5	1.3	1.3	11.4	13.7	7.8
SED (42 df)		2.51			5.46	

Thousand grain weight

Treatment	Thousand grain weight (g)		
	GP	Golf	Blenheim
A	34.8	46.6	45.2
B	39.3	50.8	46.5
C	38.0	48.2	45.8
D	36.8	48.4	46.4
E	37.6	49.0	49.3
SED (42 df)		0.96	

Yield

Treatment	Thousand grain weight (g)		
	GP	Golf	Blenheim
A	4.10	5.04	4.90
B	4.80	5.95	6.00
C	4.71	6.16	5.52
D	4.72	6.06	5.96
E	5.38	6.43	5.80
SED (42 df)		0.203	
CV%		5.3	

WINTER WHEAT

The three trial sites were:

A1 Redcastle, Muir of Ord, Easter Ross
A2 Tillycorthie Farm, Udny, Aberdeenshire
A3 Whitehouse Farm, St Boswells, Roxburgh

Site details

	A1	A2	A3
Site:	Redcastle Muir of Ord Easter Ross	Tillycorthie Farm Undy Aberdeenshire	Whitehouse Farm St Boswells Roxburghshire
Grid ref:	NH 585 509	NJ 907 228	NT 638 330
Soil type:	Sandy loam	Sandy loam	Sandy clay loam
Prev. Crop:	W oilseed rape	Winter oilseed rape	S barley
Soil analysis date:	2/10/90	22/12/88	
pH	6.1	6.2	6.3
P	Mod (50)	2 (ADAS scale)	Mod
K	Low (45)	2 (ADAS scale)	Mod
Mg	-	2 (ADAS scale)	Mod
Seedbed Fert.	24/25 October	18 October	9 October
NPK	0:63:94 kg/ha	19:90:90 kg/ha	25:70:70 kg/ha
Top dressing N:	60 kg/ha 21/3/91		
	110 kg/ha 12/4/91	50 kg/ha 24/4/91	80 kg/ha 11/3/91
	14 kg/ha 7/6/91	125 kg/ha 8/5/91	120 kg/ha 19/4/91
Seed rate:			
Hornet	250 kg/ha	308 kg/ha	200 kg/ha
Apollo	250 kg/ha	279 kg/ha	200 kg/ha
Drilling date:	Apollo 24/10/90 Hornet 25/10/90	18 October 1990	4 October 1990
Plot size:	12 x 2.1 m Apollo 19 x 2.1 m Hornet	20 x 2.05 m	22 x 2 m
	Harmony M 40 g/ha	Ally 15 g/ha	
	Duplosan 1.0 ℓ/ha 22/4/91	CMPP 2.0 ℓ/ha 8/5/91	10/10/90 Starane 0.75 ℓ/ha 22/5/91
Other sprays:	Stoller Manganese 2.5 ℓ/ha, 22/4/91	-	New 5C Cycocel 2.0 ℓ/ha, 23/4/91
	Artex Extra 2.5 ℓ/ha, 25/4/91	-	Cutonic Mang. 5.0 ℓ/ha, 2/5/91
	Vytel Copper 0.75 ℓ/ha, 29/5/91	-	Draza 4 kg/ha 6/11/90
	Vytel Copper 0.75 ℓ/ha, 7/6/91	-	
Date of harvest:	3 September 1991	11 September 1991	26 August 1991

	A1	A2	E3
GS30			
Date	25/4/91	19/4/91	22/4/91
GS	30/31	30/31	30
Wind speed (m/s)	4-8	17-18	3
Wind direction	S	SE	N
Temperature (°C)	16	16	8
Cloud cover	0/8	6/8	50%
Comments	Crop and ground dry	Gusts up to 25 km/hr. Crop and Ground dry	Dry
GS31			
Date	9/5/91	7/5/91	2/5/91
GS	31	31	31
Wind speed (m/s)	0-1	0-12	3
Wind direction	W	S to N	N
Temperature (°C)	12.5	12	10
Cloud cover	8/8	2/8	50%
Comments	Crop wet, ground damp. Fine drizzle in morning.	Crop and ground dry.	Crop dry.
GS32			
Date	23/5/91	22/5/91	9/5/91
GS	32	32	32
Wind speed (m/s)	0-2	12-15	Gentle breeze
Wind direction	W	WNW	-
Temperature (°C)	20	13	12
Cloud cover	1/8	5/8	20%
Comments	Warm and dry	Crop and ground dry	Dry and sunny
GS 39			
Date	Omitted	20/6/91	5/6/91
GS	-	39/41	39
Wind speed (m/s)	-	3-7	1-9
Wind direction	-	NNW	N
Temperature (°C)	-	14	12.5
Cloud cover	-	8/8	40%
Comments	-	Crop and ground dry	Dry
Date	28/6/91	5/7/91	24/6/91
GS	59	59/61	59
Wind speed (m/s)	12-15	2-4	Very little wind
Wind direction	NW	WSW	-
Temperature (°C)	16	19	16
Cloud cover	8/8	0/8 slight haze	20%
Comments	Crop dry ground wet	Ground damp crop dry	Dry and sunny
Sprayer	AZO	AZO	CP3
Water volume	194 ℓ/ha	194 ℓ/ha	250 ℓ/ha
Nozzle	SD 11002	F 11002/SD 11002	

Treatments

	GS 30-32	GS 39	GS 59-61
A	nil	nil	nil
B	Full Sportak at 31	Full Sprint	Full Impact Excel
C	½ Sprotak at 31	½ Sprint	½ Impact Excel
D	Full Punch C at 31	Full Punch C	Full Punch C
E	½ Punch C at 31	½ Punch C	½ Punch C
F	2 x ¼ Punch C	¼ Punch C	½ Impact Excel
G	2 x 1/3 Sprotak	1/3 Sportak	½ Impact Excel
H	1/3 Sportak Delta at 31	1/3 Punch C	½ Impact Excel

All treatments + ¼ dose Corbel up to and including GS 39, ½ dose Patrol at GS 59-61.

TRIAL A1

First assessment, 25 April 1991, GS 30

Mean overall infection on top three leaves			
% Mildew		% Septoria tritici	
Apollo	Hornet	Apollo	Hornet
0.0	0.8	0.0	1.5

Second assessment, 9 May 1991, GS 31

Mean disease on top three leaves				
Treatment	% Mildew		% Septoria tritici	
	Apollo	Hornet	Apollo	Hornet
A	0.1	0.5	0.1	1.6
F	Tr	0.1	Tr	0.3
G	Tr	0.2	Tr	0.2
SED (15 df)		0.09		0.43

Third assessment, 23 May 1991, GS 32

Mean disease on top three leaves				
Treatment	% Mildew		% Septoria tritici	
	Apollo	Hornet	Apollo	Hornet
A	0.1	1.5	0.0	0.0
B	0.0	0.2	Tr	0.0
C	Tr	0.3	Tr	0.0
D	Tr	0.4	Tr	0.0
E	0.0	0.3	Tr	0.0
F	0.1	0.7	0.0	0.0
G	Tr	1.0	Tr	0.0
H	Tr	0.3	0.0	0.0
SED (45 df)		0.24		

Fourth assessment, 28 June 1991, GS 59

Mean disease on top three leaves				
	% Mildew		% Septoria tritici	
Treatment	Apollo	Hornet	Apollo	Hornet
A	1.6	4.6	Tr	0.0
B	1.1	2.2	Tr	0.0
C	0.8	1.9	Tr	0.0
D	1.3	2.7	Tr	0.0
E	0.9	2.0	Tr	0.0
F	0.8	2.6	0.0	0.0
G	0.9	2.3	Tr	0.0
H	1.2	3.3	0.0	0.0
SED (45 df)		0.64		-

Fifth assessment, 22 July 1991, GS 83

Mean disease on top three leaves				
	% Mildew		% Septoria tritici	
Treatment	Apollo	Hornet	Apollo	Hornet
A	7.1	7.2	2.7	9.0
B	2.6	3.8	0.7	1.5
C	3.2	2.7	0.1	1.2
D	1.9	4.4	0.7	0.5
E	2.4	5.5	0.3	0.9
F	1.7	2.6	0.7	0.3
G	2.1	4.1	0.4	0.3
H	2.0	3.6	0.3	1.2
SED (45 df)		1.26		0.89

Sixth assessment, 22 July 1991, GS 83

	% Glumes infected by				% surface area of ear infected	
	Mildew		Botrytis			
Treatment	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet
A	0.0	2.5	55.9	55.9	10.6	10.8
B	0.0	0.0	42.2	31.2	10.4	7.4
C	0.0	0.8	33.4	49.6	10.2	11.0
D	0.5	0.3	56.1	37.7	8.7	5.8
E	0.0	0.0	71.4	55.5	12.6	9.4
F	0.4	0.3	34.4	43.7	8.9	7.9
G	0.0	0.0	40.2	39.7	8.2	5.2
H	0.0	0.0	44.9	64.4	6.8	11.7
SED (45 df)		0.92		12.11		2.85

Stem base disease assessments - GS 83

Take all - % plants infected in each category				
	Nil		Slight	
Treatment	Apollo	Hornet	Apollo	Hornet
A	87.0	95.5	13.0	4.0
B	91.0	98.0	9.0	2.0
C	95.0	94.8	5.0	5.3
D	85.0	98.5	13.5	1.5
E	83.8	96.8	15.8	2.8
F	78.3	96.0	19.3	4.0
G	90.8	96.0	9.0	4.0
H	88.5	99.5	11.5	0.5
SED		4.44		4.12

Sharp Eyespot				
Treatment	Index (0-3)		% infected	
	Apollo	Hornet	Apollo	Hornet
A	2.26	1.27	99.5	79.0
B	2.04	1.34	98.0	87.5
C	1.99	1.37	94.0	86.8
D	1.97	1.33	97.5	85.8
E	2.18	1.34	97.5	84.3
F	2.06	1.47	99.0	89.0
G	2.34	1.45	98.0	90.3
H	2.11	1.36	98.0	81.5
SED (45 df)		0.214		5.40

Yield, Thousand Grain Weight and Specific Weight

Treatment	Yield (t/ha @ 15% mc)		Thousand grain weight (g)	
	Apollo	Hornet	Apollo	Hornet
A	5.36	3.66	39.8	33.9
B	6.86	6.10	45.2	43.7
C	6.58	5.89	43.9	42.6
D	6.46	5.86	44.0	42.1
E	6.27	5.40	42.6	41.6
F	6.57	5.61	43.6	43.6
G	6.50	6.02	44.2	41.1
H	6.80	5.51	43.9	41.5
SED (df)		0.165 (45)		1.15 (41)
CV%		3.9		

TRIAL A2

First assessment, 29 April 1991, GS 30

Mean disease on top three leaves % septoria tritici	
Apollo	Hornet
0.1	9.4

Second assessment, 9 May 1991, GS 31

Treatment	Mean disease on top three leaves % Septoria tritici	
	Apollo	Hornet
A	Tr	0.2
F	0.0	0.5
G	0.1	0.2
SED (15 df)		0.15

Third assessment, 22 May 1991, GS 32

	Mean disease on top three leaves			
	% Mildew		% Septoria tritici	
Treatment	Apollo	Hornet	Apollo	Hornet
A	0.1	0.0	2.0	1.0
B	0.0	0.0	0.5	0.7
C	0.0	0.0	0.9	2.2
D	0.0	0.0	0.9	0.4
E	0.0	0.0	1.4	1.1
F	0.0	Tr	1.0	0.5
G	0.0	0.1	1.9	0.9
H	Tr	0.0	2.5	0.8
SED (45 df)		0.04		0.63

Fourth assessment, 20 June 1991, GS 39-41

	Mean disease on top three leaves					
	% Mildew		% Septoria tritici		% Yellow Rust	
Treatment	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet
A	0.2	0.6	Tr	1.3	0.0	0.8
B	Tr	0.3	0.1	0.4	0.0	0.4
C	Tr	0.3	Tr	0.2	0.0	0.1
D	Tr	0.2	Tr	0.3	0.0	0.2
E	0.1	0.3	0.1	0.3	0.0	0.1
F	0.0	0.2	0.1	0.1	0.0	Tr
G	Tr	0.3	0.1	0.2	0.0	0.2
H	0.1	0.3	Tr	0.2	0.0	0.0
SED (45 df)		0.10		0.11		0.30

Fifth assessment, 5 July 1991, GS 59-61

	Mean disease on top three leaves					
	% Mildew		% Septoria tritici		% Yellow Rust	
Treatment	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet
A	0.5	1.8	0.1	4.2	0.1	2.2
B	0.0	0.2	0.0	0.9	0.0	0.6
C	Tr	0.1	Tr	1.1	0.0	0.2
D	Tr	0.1	0.0	0.8	0.0	0.1
E	Tr	0.5	0.0	2.3	0.0	0.1
F	Tr	0.1	0.0	0.1	0.0	0.1
G	Tr	0.8	0.0	0.4	0.0	0.3
H	0.1	0.8	0.0	1.9	0.0	Tr
SED (45 df)		0.21		0.51		0.22

Sixth assessment, 29 July 1991, GS 83

	Mean disease on top three leaves					
	% Mildew		% Septoria tritici		% Yellow Rust	
Treatment	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet
A	2.8	0.1	0.4	0.1	3.1	28.9
B	0.2	0.3	0.0	0.0	1.6	8.9
C	0.7	0.2	0.0	0.2	0.9	2.6
D	0.0	0.4	0.0	0.2	1.6	1.6
E	0.2	0.4	0.0	0.1	1.2	2.3
F	0.1	0.2	0.0	0.0	1.4	1.7
G	0.1	0.3	0.0	Tr	1.5	6.5
H	0.1	0.6	0.0	0.0	1.0	3.1
SED (45 df)		0.49		0.09		3.24

Stem base disease assessment - GS 83

Treatment	Sharp Eyespot Index (0-3)		% Plant infected	
	Apollo	Hornet	Apollo	Hornet
A	1.30	1.55	96.0	96.0
B	1.17	1.43	93.5	94.5
C	1.27	1.63	93.5	98.0
D	1.16	1.55	90.0	97.0
E	1.48	1.58	94.5	99.5
F	1.28	1.84	96.5	99.0
G	1.20	1.57	91.0	97.0
H	1.16	1.64	91.5	97.5
SED (45 df)		0.193		3.59

Yield, thousand grain weight and specific weight

	Yield (t/ha @ 15% mc)		Thousand grain weight (g)		Specific weight kg/ha	
Treatment	**Apollo**	**Hornet**	**Apollo**	**Hornet**	**Apollo**	**Hornet**
A	5.204	4.432	48.5	33.7	78.7	66.5
B	6.213	9.831	52.0	53.3	80.1	75.8
C	6.016	9.390	52.5	53.4	79.6	77.2
D	6.088	9.408	52.5	51.0	79.8	77.0
E	5.893	9.018	52.1	51.5	79.4	76.8
F	6.063	9.694	52.1	54.3	79.5	76.2
G	6.128	9.585	52.1	53.6	79.4	76.5
H	6.046	9.258	52.3	51.6	80.2	77.6
SED (45 df)		0.2330		1.77		0.76
CV%		4.5				

TRIAL E1

First assessment, 13 June 1991, GS 53

	Mean disease on top three leaves					
	% Mildew		% Yellow Rust		% Septoria tritici	
Treatment	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet
A	17.5	13.8	0	1.3	0.3	1.3
B	6.0	6.0	0	0.1	0.0	0.5
C	6.8	4.5	0	0.1	0.5	0.8
D	5.3	6.0	0	0.0	0.5	1.0
E	11.8	5.0	0	0.0	0.5	2.0
F	3.2	4.0	0	0.3	0.1	0.3
G	11.8	3.8	0	1.3	0.1	0.5
H	9.5	4.5	0	0.0	0.0	0.6
SED (21 df)	5.0	2.6	-	0.8	0.27	0.43

Second assessment, 27 June 1991, GS 61-69

	Mean disease on top three leaves					
	% Mildew		% Yellow Rust		% Septoria tritici	
Treatment	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet
A	5.5	7.0	0	0.3	0.8	1.8
B	3.8	1.3	0	0.0	1.0	1.0
C	3.8	2.5	0	0.0	0.3	0.3
D	5.0	2.0	0	0.0	0.3	0.5
E	2.3	1.3	0	0.0	0.5	1.0
F	3.0	1.5	0	0.5	0.1	1.3
G	7.5	3.8	0	2.5	0.3	0.8
H	2.5	2.5	0	0.0	0.5	1.3
SED (21 df)	2.95	1.66	-	1.22	0.53	0.68

Third assessment, 17 July 1991, GS 71

	Mean disease on top three leaves					
	% Mildew		% Yellow Rust		% Septoria tritici	
Treatment	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet
A	35.0	13.0	0	8.3	5.5	15.5
B	7.3	7.5	0	0.0	1.3	2.5
C	14.3	5.8	0	0.1	3.0	7.8
D	4.5	4.5	0	0.0	1.8	1.8
E	7.5	4.0	0	0.0	2.3	4.3
F	10.3	3.3	0	0.3	1.3	3.5
G	16.8	5.3	0	2.0	2.3	6.3
H	8.3	6.3	0	0.3	2.3	3.0
SED (21 df)	4.25	2.24	-	2.21	0.87	2.2

Fourth assessment, 29 July 1991, GS 75

	% Eyespot		% Sharp Eyespot		% Fusariun	
Treatment	Apollo	Hornet	Apollo	Hornet	Apollo	Hornet
A	30	30	53	42	21	12
B	25	15	41	36	8	13
C	12	22	38	29	14	6
D	35	43	54	34	10	10
E	24	27	51	47	4	12
F	24	29	61	50	13	19
G	27	26	36	55	6	14
H	38	37	48	53	3	3
SED (21 df)	9.3	6.0	12.5	11.5	6.6	6.9

Fifth assessment, 13 August 1991

Treatment	% Sooty moulds on ear	
	Apollo	Hornet
A	3.5	4.3
B	2.3	2.8
C	2.5	2.5
D	2.0	2.5
E	2.3	2.8
F	2.1	2.5
G	2.5	2.8
H	2.3	3.0
SED (21 df)	0.29	0.43

Yield and Thousand Grain Weight

Treatment	Yield (t/ha @ 15% mc)		Thousand grain weight (g)	
	Apollo	Hornet	Apollo	Hornet
A	7.17	6.77	46.0	46.1
B	8.80	9.44	53.0	56.4
C	8.43	9.05	52.5	58.0
D	8.20	9.18	50.2	55.9
E	7.97	8.60	51.5	52.4
F	8.23	9.12	50.1	53.2
G	8.28	8.83	51.9	53.4
H	8.37	8.93	52.7	54.7
SED (21 df)		0.245	1.04	1.89
CV%		4.1		

Lodging

Treatment	% Lodging on 13 August	
	Apollo	Hornet
A	0	22.5
B	0	0.1
C	0	4.5
D	0	12.0
E	0	11.8
F	0	13.3
G	0	5.8
H	0	2.0
SED (21 df)	0	6.6

Eyespot assessment, 29 April 1991, GS 30

Eyespot	-	2% penetrating, 18% non-penetrating
Sharp Eyespot	-	30% penetrating

APPENDIX IV

HERBICIDE TRIALS FOR 1991 HARVEST

Grain yield of winter wheat and weed cover in July for the herbicide trial at Tillycorthie Farm, Undy, Aberdeenshire, 1991. WW 9101

Dose and product	Grain yield at 15% t/ha	Common chickweed %	Forget-me-knot %	Field Pansy %	Annual mgrass %
Full Panther	8.35	1.0	0.0	0.0	0.3
½ Panther	7.97	2.3	0.0	1.0	3.0
¼ Panther	8.59	3.1	0.0	0.2	3.0
1/8 Panther	8.59	3.1	0.0	0.2	3.0
½ Panther fb Duplosan	7.94	1.0	1.0	1.7	1.4
¼ Panther fb Duplosan	7.95	0.0	0.2	1.2	1.0
1/8 Panther fb Duplosan	8.31	0.0	0.3	0.7	0.5
Full Ipso	8.56	0.2	0.0	0.2	0.4
½ Ipso	8.11	0.3	2.1	1.3	2.4
¼ Ipso	8.34	3.0	4.1	0.7	1.9
1/8 Ipso	7.98	2.0	2.7	1.2	2.7
½ Ipso fb Duplosan	8.51	0.3	0.0	0.7	1.0
¼ Ipso fb Duplosan	8.46	2.7	1.3	1.3	1.8
1/8 Ipso fb Duplosan	8.49	2.5	1.7	1.7	3.8
Full Coupler + Duplosan	7.98	0.0	0.3	0.7	4.7
½ Coupler + Duplosan	7.82	1.4	3.3	3.1	4.3
¼ Coupler + Duplosan	8.06	3.7	4.3	3.7	2.7
Full Duplosan	8.21	0.3	3.0	0.3	5.0
½ Duplosan	8.12	1.0	2.7	2.3	2.7
¼ Duplosan	8.24	1.0	1.3	2.3	2.7
1/8 Duplosan	8.67	5.7	3.7	2.7	3.3
Untreated	8.19	10.0	7.0	1.9	3.3
SE difference	0.31	1.88	1.9	0.81	0.87

Weed cover in July for the winter wheat herbicide trial at Kinghornie Farm, Inverbervie, Kincardineshire, 1991
WW 9102

Dose and product	Common chickweed %	Field spdwell %	Forget-me-knot %	Volntr OSR %	Annual mgrass %
Full Ipso	0.0	2.3	1.7	0.0	3.3
½ Ipso	0.0	5.3	3.0	1.7	3.7
¼ Ipso	0.3	6.3	3.7	2.0	3.7
1/8 Ipso	4.7	7.3	6.7	3.7	5.3
Full Ipso fb Duplosan	0.0	0.0	0.3	0.0	2.0
½ Ipso fb Duplosan	0.0	1.0	0.7	0.0	2.3
¼ Ipso fb Duplosan	0.0	3.3	3.0	0.0	4.0
1/8 Ipso fb Duplosan	0.1	6.7	8.3	0.1	5.7
¾ Ally + ½ Duplosan	0.0	1.3	1.5	0.0	6.3
¾ Ally + ¼ Duplosan	0.0	2.1	0.7	0.0	7.3
¾ Ally + 1/8 Duplosan	0.0	3.7	0.7	0.0	6.0
½ Ally + ½ Duplosan	0.0	2.3	2.0	0.0	3.7
½ Ally + ¼ Duplosan	0.0	2.0	0.7	0.0	5.7
½ Ally + 1/8 Duplosan	2.0	7.0	3.7	2.7	7.3
¼ Ally + ½ Duplosan	0.0	1.5	0.7	0.0	4.3
¼ Ally + ¼ Duplosan	0.0	5.0	1.7	0.2	4.7
¼ Ally + 1/8 Duplosan	0.0	5.7	2.7	0.0	6.3
Full Coupler + Duplosan	0.0	1.0	0.7	0.0	7.3
½ Coupler + Duplosan	0.0	1.7	3.0	0.0	5.3
¼ Coupler + Duplosan	0.0	4.0	2.7	0.0	5.7
1/8 Coupler + Duplosan	0.7	6.7	4.0	0.0	6.3
Full Duplosan	0.0	0.5	0.3	0.0	4.3
Untreated	8.4	11.2	8.6	8.4	4.3
SE difference	1.52	1.52	1.21	0.87	1.42

Yield of winter wheat and weed cover on 5 July 1991 in the herbicide trial at Bush Estate, Penicuik, Midlothian, 1991. WW 9103

Dose and product	Grain yield at 15% t/ha	Common chickweed %	Common fumtry %	Shepherds purse %	Hemp nettle %	Annual mgrass %
Full Ipso	7.91	6.00	0.00	0.00	0.00	4.33
½ Ipso	8.25	27.67	1.67	0.67	0.00	9.33
¼ Ipso	8.06	46.67	5.33	2.67	1.67	10.00
1/8 Ipso	6.80	58.33	4.33	1.00	9.33	9.33
½ Ipso fb Duplosan	7.73	1.07	0.00	0.00	0.00	1.67
¼ Ipso fb Duplosan	7.89	12.67	0.33	0.00	1.67	6.67
1/8 Ipso fb Duplosan	7.07	35.00	4.33	0.00	7.67	10.00
Full Coupler + Duplosan	8.03	0.33	0.00	0.00	0.00	13.33
½ Coupler + Duplosan	7.81	5.00	0.00	0.00	0.37	15.33
¼ Coupler + Duplosan	6.78	31.00	2.00	0.00	4.67	10.00
1/8 Couplr + Duplosan	7.42	30.67	5.00	0.00	3.00	10.00
Full Duplosan	7.48	0.67	0.00	0.00	5.67	12.67
½ Duplosan	7.92	7.67	1.33	0.00	7.67	13.33
¼ Duplosan	7.38	15.67	0.33	0.00	9.33	11.67
1/8 Duplosan	7.34	34.00	4.33	0.00	11.00	10.00
½ Ally + Duplosan	6.25	0.00	1.33	0.00	0.00	13.33
¼ Ally + Duplosan	7.27	3.33	1.33	0.00	0.13	14.33
1/8 Ally + Duplosan	6.70	24.33	3.33	0.00	2.00	10.00
Untreated	6.54	75.00	5.17	1.67	8.00	7.83
SE difference	0.54	7.59	2.26	0.70	2.29	2.35

Weed cover on 24 May in the winter wheat herbicide trial at Markle Mains Farm, East Lothian, 1991. WW 9104

Dose and product	Volntr OSR %	Forget-me-knot %	Cleavers %	Common chickweed %	Ivy-leaved spdwll %	Annual mgrass %
Full Ipso	0.17	0.00	4.67	0.33	0.00	1.67
½ Ipso	2.33	0.50	2.17	2.33	0.00	5.00
¼ Ipso	5.00	1.00	1.50	11.67	0.33	10.00
1/8 Ipso	14.33	0.00	1.83	26.67	0.00	13.33
Full Ipso fb Duplosan	0.00	0.00	0.00	0.00	0.00	1.33
½ Ipso fb Duplosan	0.03	0.67	0.17	1.67	0.00	2.33
¼ Ipso fb Duplosan	0.33	1.33	0.83	7.00	0.00	12.67
1/8 Ipso fb Duplosan	4.50	0.00	0.67	10.00	0.00	6.67
Full Coupler + Duplosan	0.00	0.00	0.00	0.00	0.0	23.33
½ Coupler + Duplosan	0.00	0.17	0.33	1.67	0.00	15.00
¼ Coupler + Duplosan	0.83	2.67	0.33	2.33	0.33	16.67
1/8 Coupler + Duplosan	1.00	2.00	2.00	13.67	0.00	8.33
¾ Ally + ½ Duplosan	0.17	0.00	1.67	0.00	1.33	15.00
¾ Ally + ¼ Duplosan	0.00	0.00	0.67	0.00	2.33	11.67
¾ Ally + 1/8 Duplosan	1.67	0.00	1.67	1.67	1.00	13.33
½ Ally + ½ Duplosan	0.00	0.00	1.00	0.00	1.17	18.33
½ Ally + ¼ Duplosan	0.17	0.17	0.17	0.00	1.83	10.00
½ Ally + 1/8 Duplosan	0.00	0.50	0.83	0.00	1.33	13.33
¼ Ally + ½ Duplosan	0.00	0.67	0.33	0.00	2.67	16.67
¼ Ally + ¼ Duplosan	0.33	2.67	0.67	0.00	1.00	23.33
¼ Ally + 1/8 Duplosan	0.00	0.33	0.33	0.00	0.83	16.67
Untreated	11.89	0.38	2.17	42.78	0.17	0.48
SE difference	1.64	1.22	1.63	4.21	0.75	5.27

Yield of winter wheat and weed cover on 15 May in the herbicide trial at Whitehouse Farm, St Boswells, Berwickshire, 1991 WW 9105

Dose and product	Grain yield @ 15% t/ha	Common chickweed %	Vol OSR %	Scentless mayweed %	Fat Hen %	Knot-grass %	Cleavers	Annual meadow grass %
Full Ipso	8.84	0.13	0.10	0.00	0.00	0.00	0.27	4.67
½ Ipso	8.48	0.40	0.00	0.00	0.00	0.0	0.33	5.67
¼ Ipso	8.13	1.47	0.00	0.13	0.00	0.00	0.73	11.67
1/8 Ipso	8.62	2.43	0.47	0.13	0.30	0.33	0.17	10.00
Full Ipso	8.39	0.00	0.00	0.00	0.00	0.00	0.00	2.50
½ Ipso fb Duplosan	8.34	0.00	0.00	0.00	0.00	0.00	0.00	5.83
¼ Ipso fb Duplosan	8.52	0.00	0.00	0.00	0.00	0.00	0.00	6.33
1/8 Ipso fb Duplosan	8.42	0.60	0.03	0.03	0.23	0.10	0.10	12.00
Full Coupler + Duplosan	8.30	0.00	0.00	0.00	0.00	0.00	0.00	8.00
½ Coupler + Duplosan	8.31	0.00	0.00	0.00	0.00	0.00	0.00	14.67
¼ Coupler + Duplosan	8.46	0.00	0.03	0.00	0.00	0.03	0.00	13.33
1/8 Coupler + Duplosan	8.49	0.00	0.00	0.03	0.20	0.07	0.40	9.00
Untreated	8.21	7.08	2.00	1.62	0.68	0.47	0.22	18.33
SE difference	0.24	2.63	0.61	0.48	0.16	0.10	0.31	2.63

Yield of winter wheat and weed cover on 23 May in the herbicide trial at Crichton Royal Farm, Dumfries, 1991
WW 9106

Dose and product	Grain yield at 15% t/ha	Common chickweed %	Annual meadow grass %
Full Ispo	8.52	0.4	0.2
½ Ipso	8.00	0.1	0.2
¼ Ipso	8.19	0.4	1.1
1/8 Ipso	7.68	5.0	10.7
½ Ipso fb Duplosan	6.99	0.0	0.4
¼ Ipso fb Duplosan	7.51	0.1	2.2
1/8 Ipso fb Duplosan	7.81	0.2	3.7
Full Coupler + Duplosan	7.47	0.0	16.7
½ Coupler + Duplosan	7.36	0.0	15.7
¼ Coupler + Duplosan	7.25	1.9	14.0
1/8 Coupler + Duplosan	7.42	0.5	11.7
Full Duplosan	7.72	0.0	11.7
½ Duplosan	7.19	0.4	8.3
¼ Duplosan	7.75	0.1	7.7
1/8 Duplosan	7.86	1.8	16.0
½ Ally + Duplosan	7.37	0.0	4.0
¼ Ally + Duplosan	7.42	0.4	9.0
1/8 Ally + Duplosan	7.57	0.2	3.0
Untreated	7.68	18.0	12.2
SE difference	0.503	5.54	4.37

Yield of winter wheat and weed cover in July in the herbicide trial at Tillycorthie Farm, Udny, Aberdeenshire, 1991. WW 9107

Dose and product	Grain yield at 15% t/ha	Common chickweed %	Forget-me-knot %	Hemp-nettle %	Annual mgrass %
F Ally + ½ Duplosan	8.36	0.0	0.2	0.0	2.0
F Ally + ¼ Duplosan	8.22	0.1	0.0	0.0	2.3
F Ally + 1/8 Duplosan	8.18	0.0	0.0	0.0	2.3
½ Ally + ½ Duplosan	7.90	0.0	0.0	0.0	1.7
½ Ally + ¼ Duplosan	8.32	0.1	0.2	0.0	2.7
½ Ally + 1/8 Duplosan	8.07	0.0	0.5	0.0	2.3
¼ Ally + ½ Duplosan	8.36	0.2	0.3	0.2	2.3
¼ Ally + ¼ Duplosan	8.17	0.0	0.5	0.0	2.7
¼ Ally + 1/8 Duplosan	8.38	0.3	0.2	0.0	2.3
1/8 Ally + ½ Duplosan	8.50	0.2	0.4	0.0	2.3
1/8 Ally + ¼ Duplosan	8.57	0.3	0.4	0.1	2.0
1/8 Ally + 1/8 Duplosan	8.35	0.5	0.2	0.0	2.3
Full Duplosan	8.19	0.0	0.1	0.1	2.3
Untreated	8.20	4.0	2.2	0.6	2.5
SE difference	0.27	0.90	1.24	0.39	0.57

Yield of winter barley and weed cover in July for the herbicide trial at Tillycorthie Farm, Udny, Aberdeenshire, 1991. WB 9101

Dose and product	Grain yield at 15 % t/ha	Common chickweed %	Hemp-nettle %	Annual meadow grass %
Full Panther	5.11	0.0	0.1	0.0
½ Panther	5.24	0.2	0.2	1.2
¼ Panther	5.17	0.0	0.3	1.4
Full panther fb CMPP	5.23	0.0	0.1	0.1
½ Panther fb CMPP	5.28	0.0	0.1	0.5
¼ Panther fb CMPP	5.38	0.1	0.2	1.3
1/8 Panther fb CMPP	5.26	0.0	0.8	2.7
Full Stomp + Hytane	5.16	0.0	0.1	0.1
½ Stomp + Hytane	5.08	0.3	0.3	0.7
¼ Stomp + Hytane	5.12	0.5	0.2	1.2
Full Stomp + Hytane. fb CMPP	4.99	0.0	0.1	0.0
½ Stomp + Hytane fb CMPP	5.27	0.0	0.2	0.4
¼ Stomp + Hytane fb CMPP	5.32	0.0	0.2	1.1
1/8 Stomp + Hytane fb CMPP	5.04	0.2	0.1	3.3
Full Quiver	5.16	0.2	0.6	0.3
½ Quiver	5.18	0.2	0.1	0.5
¼ Quiver	4.99	0.3	0.3	4.2
Full Quiver fb CMPP	5.03	0.0	0.7	0.1
½ Quiver fb CMPP	5.27	0.0	0.4	0.4
¼ Quiver fb CMPP	5.21	0.0	0.5	1.3
1/8 Quiver fb CMPP	5.16	0.0	0.4	5.3
Full CMPP	5.31	0.0	0.7	11.3
Untreated	5.14	13.4	0.4	20.0
SE difference	0.16	2.23	0.29	1.65

Yield of winter barley and ground cover of weeds on 22 May at the Bush Estate, Penicuik, Modlothian, 1991. WB 9102

Dose and product	Grain yield at 15% t/ha	Common chickweed %	Hemp-nettle %	Common fumtry %	Annual meadow grass %
Full Panther	8.40	0.00	0.10	0.10	0.83
½ Panther	7.66	0.03	0.17	0.10	3.00
¼ Panther	7.49	0.17	0.67	0.97	17.00
Full Panther fb Duplosan	7.92	0.00	0.03	0.00	0.33
½ Panther fb Duplosan	7.93	0.09	0.10	0.00	4.50
¼ Panther fb Duplosan	7.72	0.00	0.17	0.09	14.33
Full Quiver	7.83	0.10	0.33	0.00	0.20
½ Quiver	7.78	0.23	0.73	0.30	9.83
¼ Quiver	7.22	6.17	0.23	0.33	17.00
Full Quiver fb Duplosan	8.00	0.17	0.43	0.10	0.20
½ Quiver fb Duplosan	7.81	0.00	0.10	0.03	1.53
¼ Quiver fb Duplosan	7.80	0.00	0.17	0.00	21.67
1/8 Quiver fb Duplosan	6.96	5.73	0.10	0.03	21.67
Full Stomp + Hytane	7.99	0.03	0.10	0.00	0.53
½ Stomp + Hytane	7.76	0.10	0.07	0.00	11.50
¼ Stomp + Hytane	7.26	1.67	0.77	0.13	19.33
Full Stomp + Hytane fb Duplosan	7.99	0.00	0.00	0.00	0.20
½ Stomp + Hytane fb Duplosan	8.01	0.00	0.10	0.00	5.27
¼ Stomp + Hytane fb Duplosan	7.50	0.33	0.27	0.03	12.00
Untreated	4.50	83.00	0.07	0.52	28.17
SE Difference	0.27	1.80	0.24	0.25	6.19

Yield of winter barley and ground cover by weeds on 23 July in the herbicide trial at Whitehouse Farm, St Boswells, Roxburghshire 1991. WB 9103

Dose and product	Grain yield at 15%	Total broad leaved weeds %
Full Panther	7.73	0.67
½ Panther	7.84	0.67
¼ Panther	7.90	3.00
Full Panther fb Duplosan	7.82	0.33
½ Panther fb Duplosan	7.69	0.67
¼ Panther fb Duplosan	7.62	1.67
1/8 Panther fb Duplosan	7.96	3.00
Full Quiver	7.42	1.67
½ Quiver	8.04	1.67
¼ Quiver	7.81	4.33
Full Quiver fb Duplosan	7.56	0.00
½ Quiver fb Duplosan	8.06	0.33
¼ Quiver fb Duplosan	7.63	1.67
1/8 Quiver fb Duplosan	7.77	2.33
Untreated	7.63	17.67
SE difference	0.21	0.82

Yield of spring barley and weed cover in July in the herbicide trial at Tillycorthie Farm, Udny, Aberdeenshire, 1991. SB 9101

Dose and product	Grain yield at 15% t/ha	Common chickweed %	Knot-grass %	May Weed %	Annual Meadow grass %
Full Advance	5.18	0.3	0.0	0.0	1.5
½ Advance	5.02	0.7	0.7	0.2	2.3
¼ Advance	5.23	2.0	1.1	0.0	2.3
1/8 Advance	5.07	3.3	4.0	1.0	1.7
Full Advance + Ally	4.93	0.0	0.0	0.0	1.2
½ Advance + Ally	5.07	0.0	0.0	0.0	1.7
¼ Advance + Ally	5.23	0.3	0.1	0.0	1.3
1/8 Advance + Ally	5.14	0.7	0.2	0.0	1.3
Full Ally + Duplosan	5.01	0.0	0.00	0.0	1.7
½ Ally + Duplosan	5.10	0.0	0.0	0.0	0.8
¼ Ally + Duplosan	4.98	0.5	0.2	0.0	1.2
1/8 Ally + Duplosan	5.17	0.2	0.0	0.0	1.3
Full Redipon	4.99	0.0	0.0	0.0	1.7
½ Redipon	4.90	1.0	0.7	0.0	2.3
¼ Redipon	5.03	1.3	0.0	0.0	1.7
1/8 Redipon	5.03	5.0	1.7	1.0	2.0
Full Coupler + MCPA	4.98	0.0	0.0	0.0	2.0
½ Coupler + MCPA	5.10	2.3	0.7	0.0	2.3
¼ Coupler + MCPA	5.18	4.0	0.3	0.0	1.5
1/8 Coupler + MCPA	5.01	12.0	3.7	1.7	2.3
Untreated	4.93	24.5	5.0	2.1	2.2
SE difference	0.53	2.13	1.75	0.05	0.45

Yield of spring barley and ground cover by weeds in July at Craibstone Farm, Bucksburn, Aberdeen, 1991. SB 9102

Dose and product	Grain yield @ 15% t/ha	Common chickweed %	Knot grass %	Pineapple %	Redshank %	Hemp nettle %	Annual meadow grass %
Full Advance	5.45	0.0	0.0	0.7	0.0	0.0	2.0
½ Advance	5.31	0.1	0.8	1.0	0.2	0.0	2.7
¼ Advance	5.41	0.3	6.3	1.7	0.0	0.1	1.6
1/8 Advance	5.50	1.3	10.7	2.7	0.0	0.5	2.2
G Harmnoy + F Duplosan	5.34	0.0	0.0	0.0	0.0	0.0	2.0
½ Harmony + ½ Duplosan	5.61	0.0	0.0	0.0	0.0	0.0	1.3
½ Harmony + ¼ Duplosan	5.35	0.0	0.2	0.0	0.0	0.0	2.0
½ Harmony + 1/8 Duplosan	5.05	0.0	0.0	0.0	0.0	0.0	1.7
¼ Harmony + ½ Duplosan	5.44	0.0	0.2	0.0	0.0	0.0	1.3
1/8 Harmony + 1/8 Duplosan	5.48	0.0	0.8	0.3	0.0	0.0	1.7
Full Coupler + MCPA	5.27	0.0	0.0	0.0	0.0	0.00	2.0
½ Coupler + MCPA	5.39	1.0	1.5	0.3	0.0	0.0	2.0
¼ Coupler + MCPA	5.38	0.3	2.7	1.1	0.0	0.0	2.3
1/8 Coupler + MCPA	5.20	2.7	6.7	1.0	0.7	0.7	1.6
Full Redipon	5.42	0.0	0.0	0.7	0.0	0.0	2.0
½ Redipon	5.19	0.7	1.8	1.2	0.0	0.1	2.3
¼ Redipon	5.33	2.7	6.0	2.0	0.0	0.7	2.4
1/8 Redipon	5.26	4.7	11.0	2.7	0.3	1.7	2.4
Untreated	5.28	11.3	21.0	4.5	2.5	2.3	2.3
SE difference	0.13	0.47	1.27	0.68	0.28	2.4	

Weed cover in July in the spring barley herbicide trial at West Newtonlees Farm, Stonehave, Kincardine, 1991. SB9103

Dose and product	Common chickweed %	Hempnettle %	Common fumtry %	Annual meadow grass %
Full advance	0.0	0.0	0.2	1.4
½ Advance	0.3	0.0	0.5	1.5
¼ Advance	2.0	0.3	0.5	1.2
1/8 Advance	8.7	1.7	1.3	0.8
½ Advance + Ally	0.0	0.0	0.0	1.0
¼ Advance + Ally	0.0	0.0	0.1	1.5
Full Ally + Full Duplosan	0.0	0.0	0.0	0.8
½ Ally + ½ Duplosan	0.2	0.0	0.0	1.7
½ Ally + ¼ Duplosan	0.0	0.0	0.2	1.3
½ Ally + 1/8 Duplosan	0.3	0.0	0.7	1.7
¼ Ally + ½ Duplosan	0.7	0.0	0.3	1.3
1/8 Ally + ½ Duplosan	25.2	0.3	0.0	1.0
Full Quiver	0.0	0.0	0.2	0.5
½ Quiver	0.3	0.0	1.7	1.3
¼ Quiver	4.7	0.3	2.2	0.8
1/8 Quiver	11.3	1.0	1.2	1.0
Full Coupler + MCPA	16.7	0.0	0.0	0.8
½ Coupler + MCPA	53.3	1.7	0.7	1.0
¼ Coupler + MCPA	43.3	1.0	0.7	0.8
1/8 Coupler + MCPA	58.3	2.0	0.0	0.7
Full Redipon	7.7	0.5	0.0	1.0
½ Redipon	22.7	1.3	0.3	1.0
¼ Redipon	45.0	2.3	0.0	1.0
1/8 Redipon	66.7	2.0	0.0	1.0
Full Lontrel Plus	15.0	2.0	0.0	0.8
½ Lontrel Plus	17.0	2.5	0.3	1.0
¼ Lontrel Plus	25.0	2.3	1.0	0.7
1/8 Lontrel Plus	33.3	2.3	0.2	1.0
Full Fort + CMPP + MCPA	2.0	0.2	0.0	0.7
½ Fort + CMPP + MCPA	7.7	0.7	0.0	1.0
¼ Fort + CMPP + MCPA	15.0	2.0	0.0	1.0
Untreated	79.6	3.0	0.7	0.9
SE difference	7.91	0.10	0.40	0.8

Weed cover on 25 July in the spring barley herbicide trial at Berryhill Farm, Bankfoot, Perthshire, 1991. SB 9104

Dose and product	Field pansy %	Redshank %	Pineapple %	Common chickweed %	Common fumtry %	Hempnettle %	Knotgrass %	Annual meadow grass %
Full Advance	5.67	1.67	6.67	0.00	0.00	0.00	0.00	8.33
½ Advance	8.00	1.00	9.33	1.00	0.00	5.33	4.33	6.33
¼ Advance	8.67	1.67	9.33	0.67	7.67	16.00	7.00	6.67
1/8 Advance	10.00	2.33	13.00	2.33	9.00	16.67	11.33	5.00
Full Coupler + MCPA	5.67	1.33	10.00	1.67	1.33	4.00	6.33	6.00
½ Coupler + MCPA	10.00	1.33	6.00	10.00	6.00	8.33	7.00	6.00
¼ Coupler + MCPA	11.67	4.67	8.67	11.00	5.67	15.00	11.67	11.00
½ Ally + ½ Duplosan	7.00	0.00	2.33	0.00	0.33	0.00	3.67	10.33
½ Ally + ¼ Duplosan	8.00	0.00	0.00	0.00	0.67	0.00	8.33	6.00
½ Ally + 1/8 Duplosan	7.00	1.00	0.00	0.00	1.67	0.00	7.00	10.00
¼ Ally + ½ Duplosan	7.33	3.33	5.67	0.00	2.67	1.00	11.67	7.33
1/8 Ally + ½ Duplosan	13.00	3.00	4.67	0.00	0.00	2.00	9.33	6.00
Fully Ally + Duplosan	4.00	0.33	0.00	0.00	0.67	0.00	4.33	11.67
Full Lontrel Plus	3.67	0.00	2.00	0.00	1.67	3.33	1.00	8.33
½ Lontrel Plus	5.00	2.00	6.00	0.67	0.33	7.67	6.00	8.33
¼ Lontrel Plus	8.00	1.33	8.33	6.67	2.67	10.00	8.67	8.33
1/8 Lontrel Plus	8.00	1.00	6.00	8.33	2.00	20.00	4.33	5.33
Full Quiver	4.67	0.67	0.33	0.67	0.00	0.00	3.33	0.33
½ Quiver	10.67	2.73	1.67	0.00	0.00	0.00	8.00	4.00
¼ Quiver	13.33	3.67	9.33	2.67	6.33	10.67	10.33	5.00
1/8 Quiver	11.00	4.00	10.00	0.67	3.33	13.33	12.33	6.33
F Fort + CMPP + MCPA	2.33	1.33	8.00	0.00	0.00	5.00	2.33	7.00
½ Fort + CMPP + MCPA	7.67	1.00	4.00	0.00	2.33	6.67	6.67	5.67
¼ Fort + CMPP + MCPA	8.33	2.67	12.67	3.67	6.67	13.33	6.67	11.67
1/8 Fort+CMPP + MCPA	12.33	4.33	9.00	17.67	16.67	24.00	8.67	7.00
Full Redipon	4.33	0.33	7.00	0.67	0.67	1.67	4.33	7.33
½ Redipon	6.67	0.00	8.33	1.67	0.67	7.00	5.33	6.67
¼ Redipon	9.33	1.67	12.33	7.00	4.33	21.00	9.00	5.33
1/8 Redipon	9.00	3.33	11.33	9.00	6.67	17.67	7.67	6.33
Untreated	10.83	6.83	13.33	30.83	5.83	25.00	11.5	8.83
SE difference	2.88	1.71	3.24	4.82	4.28	5.17	3.45	2.82

Yield of spring barley and ground cover of weeds on 25 June in the herbicide trial at Treaton Farm, Mrkinch, Fife, 1991. SB 9105

Dose and product	Grain yield at 15% t/ha	Knotgrass %	Black bndwd %	Field pansy %	Common chickweed %	Redshank %	Annual meadow grass %
Full Advance	6.33	0.00	0.00	14.33	0.00	0.00	6.00
½ Advance	6.13	1.50	0.0	25.33	0.33	0.10	3.67
¼ Advance	6.45	13.40	0.00	20.00	0.10	0.17	1.33
1/8 Advance	6.03	29.67	0.10	31.00	0.00	1.00	5.00
½ Coupler + MCPA	6.22	4.00	0.00	14.00	1.00	0.00	5.00
¼ Coupler + MCPA	5.87	25.67	0.10	19.67	4.67	0.00	5.67
1/8 Coupler + MCPA	6.42	17.67	0.60	16.33	5.33	1.67	3.33
½ Harmony + ½ Duplosan	6.07	14.33	0.33	11.67	0.00	0.00	3.33
½ Harmony + ¼ Duplosan	6.09	13.67	1.17	14.00	0.00	1.00	4.67
½ Harmony + 1/8 Duplosan	6.21	12.00	1.17	5.33	0.00	0.50	2.67
Full Redipon	6.11	9.00	0.17	16.00	5.33	0.00	9.00
½ Redipon	5.65	25.00	0.00	21.33	1.67	0.33	5.67
¼ Redipon	5.95	33.00	0.33	19.00	7.33	1.17	3.67
1/8 Redipon	5.99	32.22	0.17	22.00	3.33	1.17	3.67
Untreated	5.86	55.00	17.17	22.17	12.50	5.00	3.33
SE difference	0.43	14.67	1.45	8.18	3.06	1.35	1.73

Ground cover by weeds on 29 July in the sping barley herbicide trial at Easter Hermiston Farm, Edinburgh, 1991. SB 9106

Dose and product	Forget-me-not %	Hemp-nettle %	Common chickweed %
Full Advance	0.00	0.00	0.00
½ Advance	0.00	0.00	0.00
¼ Advance	0.00	0.00	0.00
1/8 Advance	0.33	0.67	0.00
Full Coupler + MCPA	0.33	0.00	0.00
½ Coupler + MCPA	0.00	0.00	0.00
¼ Coupler + MCPA	0.33	1.00	0.00
1/8 Coupler + MCPA	0.00	0.00	0.00
½ Ally + ½ Duplosan	0.33	0.00	0.00
½ Ally + ¼ Duplosan	0.33	0.00	0.00
½ Ally + 1/8 Duplosan	1.67	0.00	0.00
1/8 Ally + ½ Duplosan	0.40	0.00	0.00
Full Condox	0.00	0.00	0.00
½ Condox	0.07	0.00	0.00
¼ Condox	0.33	0.00	0.00
Full Lontrel Plus	0.00	0.03	0.00
½ Lontrel Plus	0.00	0.03	0.00
¼ Lontrel Plus	0.03	0.00	0.00
1/8 Lontrel Plus	0.67	0.33	0.00
Full Ally + HBN	0.00	0.03	0.00
½ Ally + HBN	0.00	0.00	0.00
¼ Ally + HBN	0.00	0.00	0.00
1/8 Ally + HBN	0.00	0.00	0.00
Full Fort + CMPP + MCPA	0.00	0.00	0.00
½ Fort + CMPP + MCPA	0.03	0.00	0.00
¼ Fort + CMPP + MCPA	0.33	0.33	0.00
1/8 Fort + CMPP + MCPA	0.00	0.70	0.00
Untreated	1.78	4.44	1.00
SE difference	0.46	1.06	0.52

Yield of spring barley and ground cover by weeds on 27 June in the herbicide trial at Whitehouse Farm, St Boswells, Berwickshire, 1991. SB 9107

Dose and product	Grain yield at 15% t/ha	Knot-grass %	Common chickweed %	Common orache %	Vlntr OSR %	Cleavers %
Full Advance	6.83	0.07	0.00	0.00	0.00	0.00
½ Advance	6.87	0.17	0.00	0.00	0.00	0.00
¼ Advance	6.71	1.00	0.27	0.47	0.00	0.00
1/8 Advance	6.96	5.67	0.27	3.77	0.17	0.10
½ Coupler + MCPA	6.98	2.13	0.00	0.00	0.00	0.10
¼ Coupler + MCPA	6.97	3.00	0.00	0.33	0.00	0.27
1/8 Coupler + MCPA	6.93	3.37	1.17	0.33	0.00	0.17
½ Ally + ½ Duplosan	6.84	2.13	0.00	0.00	0.00	0.10
½ Ally + ¼ Duplosan	6.86	4.33	0.00	0.00	0.00	0.17
½ Ally + 1/8 Duplosan	6.90	5.50	0.00	0.23	0.00	0.10
Full Redipon	6.75	1.33	0.00	0.00	0.00	0.00
½ Redipon	6.80	2.33	0.00	0.00	0.00	0.00
¼ Redipon	7.04	4.93	0.67	0.17	0.00	0.00
1/8 Redipon	6.75	4.40	0.27	0.07	0.00	0.33
Untreated	6.85	12.00	2.08	5.50	0.77	0.82
SE difference	0.18	3.12	0.71	1.42	0.27	0.25

Yield of spring barley and weed cover on 26 June in the herbicide trial at Crichton Royal Farm, Dumfries, 1991. SB 9108

Dose and product	Grain yield at 15% t/ha	Common chickweed %	Common fumtry %	Knot-grass %	Annual meadow grass %
Full Advance	6.42	0.00	0.00	0.00	0.43
½ Advance	6.11	0.00	0.43	0.07	0.20
¼ Advance	6.13	0.03	0.70	1.37	0.23
1/8 Advance	6.33	0.00	0.03	0.47	0.27
Full Coupler + MCPA	5.81	0.37	1.23	0.13	0.10
½ Coupler + MCPA	5.96	0.70	0.37	1.70	0.07
¼ Coupler + MCPA	6.40	0.37	0.67	0.37	0.40
1/8 Coupler + MCPA	5.79	0.83	2.67	0.10	0.20
Full Ally + Full Duplosan	6.29	0.00	0.07	0.10	0.20
½ Ally + ½ Duplosan	6.14	0.00	0.10	0.07	0.33
½ Ally + ¼ Duplosan	6.11	0.03	0.07	1.00	0.13
½ Ally + 1/8 Duplosan	6.30	0.00	0.23	0.47	0.27
Full Redipon	6.33	0.00	0.07	0.40	1.00
½ Redipon	6.19	0.43	0.10	0.47	0.10
¼ Redipon	6.16	2.17	0.07	1.77	0.73
1/8 Redipon	6.27	1.38	1.07	1.33	0.27
Untreated	6.27	1.38	0.75	0.60	0.27
SE difference	0.18	0.76	0.67	0.80	

Weed cover on 20 June in the spring barley herbicide trial at Howmains Farm Glencaple, Dumfries, 1991 SB 9109

Does and product	Fat hen %	Common chickweed %	Red shank %
Full Advance	0.0	1.4	0.0
½ Advance	2.7	5.7	0.1
¼ Advance	51.7	33.3	0.4
1/8 Advance	63.3	16.7	0.3
Full Coupler + MCPA	33.3	40.0	0.5
½ Coupler + MCPA	38.3	15.7	0.4
¼ Coupler + MCPA	46.7	45.0	0.4
1/8 Coupler + MCPA	51.7	21.7	0.5
Fully Ally + Full Duplosan	16.7	4.7	0.1
½ Ally + ½ Duplosan	30.0	4.0	0.1
½ Ally + ¼ Duplosan	53.3	16.7	0.1
½ Ally + 1/8 Duplosan	60.0	10.3	0.0
¼ Ally + 1/8 Duplosan	33.3	13.7	0.4
1/8 Ally + Full Duplosan	23.3	10.2	0.1
Full Redipon	16.7	46.7	1.4
½ Redipon	28.3	25.0	0.3
¼ Redipon	56.7	26.7	3.6
1/8 Redipon	56.7	35.0	0.3
Full Condox	30.0	20.0	0.3
½ Condox	43.3	7.0	0.0
¼ Condox	43.3	30.0	0.1
1/8 Condox	56.7	20.7	0.1
Full Lontrel Plus	36.7	26.7	0.4
½ Lontrel Plus	21.7	53.3	1.0
¼ Lontrel Plus	43.3	20.0	0.9
1/8 Lontrel Plus	56.7	35.0	1.3
Full Fort + Duplosan + MCPA	30.0	20.0	1.3
½ Fort + Duplosan + MCPA	43.3	23.3	1.4
¼ Fort + Duplosan + MCPA	58.3	25.0	1.7
1/8 Fort + Duplosan + MCPA	61.7	15.0	1.9
Full Ally + Advance	0.1	1.7	0.0
½ Ally + Advance	0.7	3.7	0.0
¼ Ally + Advance	18.3	6.3	0.0
1/8 Ally + Advance	56.7	20.7	0.0
Untreated	51.0	41.7	1.1
SE difference	9.5	10.8	0.9

Yield of spring barley and ground cover by weeds in July in the herbicide tria at Tillycorthie Farm, Udny, Aberdeenshire, 1991

Dose and product	Grain yield at 15% t/ha	Common chickweed %	Knot-grass %	Hemp nettle %	Annual meadow grass %
½ Ally + 2 Duplosan	5.41	0.0	0.0	0.0	0.0
½ Ally + Full Duplosan	5.50	0.1	0.0	0.0	0.0
½ Ally + ½ Duplosan	5.30	0.3	0.7	0.0	0.0
½ Ally + ¼ Duplosan	5.41	0.0	0.8	0.0	0.0
½ Ally + 1/8 Duplosan	5.43	0.0	0.4	0.0	0.0
½ Ally + 1/16 Duplosan	5.03	0.2	0.3	0.0	0.0
¼ Ally + 2 Duplosan	5.42	0.0	0.2	0.0	0.0
¼ Ally + Full Duplosan	5.22	0.0	0.0	0.0	0.0
¼ Ally + ½ Duplosan	5.33	0.0	0.7	0.0	0.0
¼ Ally + ¼ Duplosan	5.45	0.0	0.3	0.0	0.0
¼ Ally + 1/8 Duplosan	5.53	0.4	2.0	0.0	0.0
¼ Ally + 1/16 Duplosan	5.26	0.2	0.9	0.0	0.0
Untreated	5.23	12.8	5.0	1.0	0.7
SE difference	0.15	1.23	1.12	0.37	0.31

Yield of spring barley and weed cover on 5 August in the herbicide trial at Bush Estate, Penicuik, Midlothian, 1991

Dose and product	Grain yield at 15% t/ha	Vlntr potato %	Common chickweed %	Hemp-nettle %	Scentless mayweed %	Common fumtry %	Annual meadow grass %
½ Ally + 2 Duplosan	7.15	0.17	0.17	0.07	0.00	0.00	4.33
½ Ally + Full Duplosan	7.01	0.33	0.17	0.33	0.00	0.00	4.33
½ Ally + ½ Duplosan	7.03	0.33	2.03	0.17	0.00	0.07	5.33
½ Ally + ¼ Duplosan	6.89	0.33	0.17	0.00	0.00	0.07	4.33
½ Ally + 1/8 Duplosan	7.25	0.33	0.10	0.00	0.00	2.00	4.33
½ Ally	7.18	0.33	0.00	0.17	0.00	1.10	5.33
¼ Ally	6.78	0.50	0.20	0.00	0.00	1.67	4.67
Untreated	5.67	0.93	82.67	10.67	0.17	1.20	5.33
SE difference	0.23	0.38	1.12	0.40	0.08	1.25	1.85

APPENDIX V

FUNGICIDE TRIALS FOR 1992 HARVEST

WINTER WHEAT

Site: Crosshall, Greenlaw, Berwickshire
Sown: 4 October 1991

Most treatments received 0.94 *l*/ha of Sportak Delta (Apollo and Riband) or 0.625 *l*/ha (Harvest) at first rode stage on 20 April 1992.

Treatment U received no fungicide, G P and Y led the same total dose of Sportak Delta - two splits at GS 30 and GS 32.

Full dose for later treatments:

Apollo:	3 *l*/ha Sanction + 0.5 *l*/ha Corbel
Hornet and Riband:	2.0 *l*/ha Impact Excel + 0.5 *l*/ha Patrol.

Crosshall: Treatments, yield and lodging

Variety		GS: 37	39	45	49	55	59	Yield	Lodging
		Date: 26/5	29/5	1/6	4/6	10/6	15/6	*l*/ha	%
Apollo	U	-	-	-	-	-	-	8.12	25.0
	A	-	¾	-	-	-	¾	9.80	6.3
	B	-	½	-	-	-	½	9.85	2.5
	C	-	1/3	-	-	-	1/3	9.83	2.5
	D	-	-	1/3	-	-	1/3	9.71	5.0
	E	-	-	-	1/3	-	1/3	9.85	1.3
	F	-	-	-	-	-	½	9.37	8.8
	G	-	1/3	-	-	-	1/3	9.68	5.0
Hornet	U	-	-	-	-	-	-	7.50	22.5
	H	-	1	-	-	-	1	10.87	23.8
	J	½	-	-	-	-	½	10.86	20.0
	K	-	½	-	-	-	½	10.71	28.8
	L	-	-	½	-	-	½	10.76	26.3
	M	-	-	-	½	-	½	10.82	28.8
	N	-	½	-	-	½	-	10.80	25.0
	P	-	½	-	-	-	½	10.96	25.0
Riband	U	-	-	-	-	-	-	9.20	41.3
	R	-	1	-	-	-	1	11.73	1.3
	S	½	-	-	-	-	½	11.65	1.3
	T	-	½	-	-	-	½	11.84	1.3
	V	-	-	½	-	-	½	11.66	3.8
	W	-	-	-	½	-	½	11.77	0.0
	X	-	½	-	-	½	-	11.64	0.0
	Y	-	½	-	-	-	½	11.89	5.8
SED								0.186	6.91

Crosshall Diseases recording

Variety		Mildew 2/8/92		Yello rust 14/7/92		S. tritici 2/8/92		Eyespot index
		Flag	Leaf 2	Flag	Leaf 2	Flag	Leaf 2	13/7/92
Apollo	U	31.3	27.5					58.7
	A	8.8	13.8					21.7
	B	13.8	35.0					20.7
	C	20.0	17.5					25.7
	D	2.5	10.0					28.0
	E	6.3	0.0					28.7
	F	26.3	30.0					24.7
	G	11.5	32.5					17.3
Hornet	U	0.0	2.5	27.5	17.5			51.7
	H	3.8	0.0	0.0	0.0			28.3
	J	6.3	6.3	0.3	0.3			25.7
	K	0.0	6.3	0.0	0.0			25.3
	L	0.0	6.3	0.0	0.0			26.0
	M	3.8	3.8	1.3	1.5			26.0
	N	0.0	1.3	0.1	0.5			25.7
	P	0.0	3.8	0.0	0.0			22.7
Riband	U					37.5	56.3	23.7
	R					0.0	4.3	9.7
	S					3.8	7.8	9.3
	T					0.5	11.3	7.7
	V					4.5	22.5	11.3
	W					0.3	3.0	10.3
	X					1.5	8.0	9.0
	Y					2.0	6.5	5.7
SED								

Site: Tillycorthie, Udry, Aberdeenshire

Most treatmens received 0.42 *l*/ha Spotak Delta at second node stage on 5 May 1992. U received no treatment, G P and Y had 0.31 *l*/ha Sportak Delta on 22 APril 1992 and 5 May 1992.

Full dose:

Apollo:	0.3 *l*/ha Sanction + 0.5 *l*/ha Corbel
Hornet and Riband:	2.0 *l*/ha Impact Excel + 0.5 *l*/ha Patrol

Tillycorthie: treatments, yields and lodging

Variety		GS: Date:	37 4/6	42-45 9/6	47 12/6	49-55 16/6	49-55 17/6	64 1/7	Yield *l*/h	Lodging %	Spec. wt kg/h*l*	TG-W g
Apollo	U		-	-	-	-	-	-	8.32	9.3	73.7	44.9
	A		-	¾	-	-	-	¾	9.58	31.3	74.8	49.2
	B		-	½	-	-	-	½	9.37	30.0	74.9	48.9
	C		-	1/3	-	-	-	1/3	9.14	18.8	74.9	48.2
	D		-	-	1/3	-	-	1/3	9.31	24.3	74.7	48.8
	E		-	-	-	1/3	-	1/3	9.23	14.8	74.8	48.4
	F		-	½	-	-	-	½	8.75	18.0	74.6	47.1
	G		-	1/3	-	-	-	1/3	9.24	15.8	74.8	48.2
Harvest	U		-	-	-	-	-	-	6.89	35.7	65.8	43.6
	H		-	1	-	-	-	1	10.15	68.7	71.4	59.1
	J		½	-	-	-	-	½	9.99	67.5	71.9	57.7
	K		-	½	-	-	-	½	10.25	70.0	70.8	54.9
	L		-	-	½	-	-	½	9.91	67.5	70.2	55.1
	M		-	-	-	½	-	½	9.71	71.2	71.5	54.3
	N		-	½	-	-	½	-	10.39	70.0	71.0	57.5
	P		-	½	-	-	-	½	10.52	71.2	71.6	56.2
Riband	U		-	-	-	-	-	-	11.17	0.0	64.9	42.1
	R		-	1	-	-	-	1	11.7	37.5	70.1	53.9
	S		½	-	-	-	-	½	10.96	42.5	70.2	54.6
	T		-	½	-	-	-	½	10.93	34.5	69.4	54.0
	V		-	-	½	-	-	½	10.43	27.5	70.6	55.4
	W		-	-	-	½	-	½	10.87	43.7	69.5	54.8
	X		-	½	-	-	½	-	10.97	39.2	70.1	56.2
	Y		-	½	-	-	-	½	10.66	32.5	69.9	54.3
SED									0.200	8.37	0.91	

Tillycorthie disease readings

		Mildew					Yellow rust					Septoria tritici				
		9/7 Flag	L2	L3	27/7 Flag	L2	9/7 Flag	L2	L3	27/7 Flag	L2	9/7 Flag	L2	L3	27/7 Flag	C2
Apollo	U	10.6	20.6	25.6	24.1	31.5	0.0	0.3	0.0	0.2	0.2	0.2	0.1	0.0	3.8	20.7
	A	1.3	7.6	6.3	7.5	20.7	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.4	0.2	3.0
	B	3.0	8.1	14.3	6.4	19.2	0.0	0.0	0.0	0.0	0.0	0.0	Tr	Tr	0.3	8.7
	C	3.0	12.0	16.7	9.1	25.0	0.2	0.0	0.0	0.0	0.0	0.1	0.1	0.7	0.5	5.7
	D	3.9	12.3	12.5	9.9	24.0	0.0	0.0	0.2	Tr	0.0	0.0	0.1	0.5	0.7	7.6
	E	4.6	12.4	11.4	10.9	22.1	0.0	0.0	0.0	0.0	0.0	0.0	Tr	0.6	0.7	6.8
	F	5.6	9.5	13.7	14.5	20.0	0.0	0.0	0.0	0.0	0.0	0.1	0.2	0.1	4.2	10.5
	G	3.8	11.5	15.9	7.5	17.9	0.0	0.0	0.0	0.0	0.0	Tr	0.1	0.1	0.4	6.3
Hornet	U	2.9	6.9	3.8	9.9	16.3	12.7	5.8	0.1	48.4	45.1	7.8	19.0	19.5	3.5	0.1
	H	0.9	6.0	8.2	0.4	4.6	0.3	0.9	Tr	0.3	5.5	Tr	0.4	4.2	0.0	0.1
	J	1.4	3.8	7.9	2.6	13.4	1.2	0.1	0.0	3.2	4.1	0.0	0.1	3.5	0.2	Tr
	K	0.8	4.5	9.7	2.3	12.3	0.0	0.6	0.0	0.4	5.8	0.1	0.6	3.6	0.2	0.0
	L	2.0	13.3	12.6	5.8	18.8	0.2	0.3	0.0	0.0	6.8	0.1	1.2	5.7	0.0	0.0
	M	2.8	11.0	12.1	4.2	18.4	0.3	0.6	0.0	2.6	9.7	0.1	1.2	8.6	0.1	0.1
	N	0.1	4.0	12.7	1.2	5.9	0.0	0.1	0.0	1.1	4.0	0.0	0.4	2.8	0.0	0.0
	P	0.5	6.8	10.0	3.8	12.2	0.0	0.9	0.0	1.1	5.8	Tr	1.2	8.0	0.1	0.1
Riband	U	0.1	0.9	1.2	1.3	3.5	0.1	0.0	0.0	0.6	0.3	11.3	15.2	40.1	54.8	63.9
	R	0.2	0.5	0.3	0.7	2.4	0.0	0.0	0.0	0.0	0.0	1.4	1.6	5.4	1.0	5.5
	S	0.2	0.4	1.9	1.2	4.9	0.0	0.0	0.0	0.0	Tr	0.0	0.8	6.2	0.8	5.1
	T	0.1	0.6	2.5	1.3	5.0	0.0	0.0	0.0	Tr	Tr	0.3	1.2	7.0	1.3	6.4
	V	0.2	1.6	6.8	1.4	3.9	0.0	0.0	0.0	0.0	0.0	0.4	2.2	10.0	4.2	14.5
	W	0.2	1.1	4.1	0.6	1.2	0.0	0.0	0.0	Tr	0.0	0.3	2.3	11.5	0.7	7.0
	X	Tr	0.4	1.1	0.6	1.8	0.0	0.0	0.0	0.0	0.0	0.2	0.6	4.4	0.6	4.5
	Y	0.1	1.6	3.4	0.7	2.6	0.0	0.0	0.0	0.0	0.0	0.4	1.2	7.5	1.9	8.6

SPRING BARLEY

Site: Aberdeen
Variety: Blenheim
Date of sowing:
Date of treatment:

		Mildew %	Yield t/ha
U	Unsprayed	11.9	6.26
A	Full Calixin/full Corbel	3.0	6.58
B	¼ Corbel + ¼ Tilt, twice	1.5	6.82
D	¼ Corbel + ¼ Tilt, twice	0.9	6.74
E	¼ Corbel + ¼ Sanction, twice	1.2	6.82
F	¼ Corbel + ¼ Punch C, twice	1.2	6.43
G	¼ Corbel + ¼ Alto, twice	1.1	6.10
H	1/3 Corbel + 1/3 Sanction, twice	1.0	6.45
J	¼ Corbel + ¼ Sanction/½ Corbel + ¼ Sanction	1.6	6.91
K	½ Corbel, twice	3.4	6.81
	SED	0.31	0.298

Site: Auchincruive
Variety: Blenheim
Date of sowing:
Date of treatment:

		Mildew %	Yield t/ha
U	Unsprayed	1.67	3.63
A	Full Colixin/full Corbel	0.93	3.57
B	¼ Calixin + ¼ Tilt, twice	1.09	3.86
D	¼ Corbel + ¼ Tilt, twice	0.78	3.45
E	¼ Corbel + ¼ Sanction, twice	0.94	3.23
F	¼ Corbel + ¼ Punch C, twice	1.02	3.57
G	¼ Corbel + ¼ Alto, twice	0.78	3.34
H	1/3 Corbel + 1/3 Sanction, twice	1.16	4.12
J	¼ Corbel + ¼ Sanction/½ Corbel + ¼ Sanction	0.53	3.80
K	½ Corbel, twice	0.58	3.61
	SED	0.483	0.442

Site: Crosshall, Greenlaw, Berwickshire
Variety: Blenheim
Date of sowing: 16 March 1992
Date of treatment: 13 May 1992, 1 June 1992

		Mildew %	Yield t/ha
U	Unsprayed	42.5	5.22
A	Full Calixin/full Corbel	3.3	7.00
B	¼ Calizin + ¼ Tilt, twice	19.5	6.52
D	¼ Corbel + ¼ Tilt, twice	8.0	6.92
E	¼ Corbel + ¼ Sanction, twice	11.8	6.80
F	¼ Corbel + ¼ Punch C, twice	9.8	6.58
G	¼ Corbel + ¼ Alto, twice	8.8	6.66
H	1/3 Corbel + 1/3 Sanction, twice	5.0	6.97
J	¼ Corbel + ¼ Sanction/½ Corbel + ¼ Sanction	7.5	6.96
K	½ Corbel, twice	10.3	6.80
	SED	3.56	0.151

APPENDIX VI

HERBICIDE TRIALS FOR 1992 HARVEST

WINTER WHEAT

WW 9201

Site: Tillycorthie, Udny, Aberdeenshire
Sprayed: 16 December 1991 at GS 12, weeds 2-4 leaf
5 May 1992 at GS 30-31, chickweed 10-15 cm

Ground cover 19 June
%

Product	Dose	Chickweed	Forget-me-knots	Annual meadowgrass	Yield t/ha
Untreated		23.9	2.6	2.1	9.46
Panther/nil	1 / 0	0.3	0.0	0.0	9.63
	½ / 0	0.7	0.0	0.7	9.74
	¼ / 0	1.7	0.0	1.0	9.92
	1/8 / 0	3.3	0.0	1.0	9.79
Panther/ Duplosan	½ / ¼	0.0	0.0	0.7	9.92
	¼ / ½	0.0	0.0	0.7	9.89
	1/8 / ¾	0.0	0.0	1.0	9.69
Encore/nil	1 / 0	1.0	0.0	0.0	9.53
	½ / 0	1.3	0.0	0.0	9.74
	¼ / 0	4.3	0.0	0.0	9.63
	1/8 / 0	11.0	0.0	0.0	9.63
Encore/ Duplosan	½ / ¼	0.0	0.0	0.3	9.72
	¼ / ½	0.0	0.0	0.7	10.00
	1/8 / ¾	0.0	0.0	0.7	9.63
Nil/Ally + Duplosan	0 / ½	0.0	0.3	1.3	9.97
Nil/Harmony + Duplosan	0 / ½	0.0	0.0	1.3	9.72
Nil/Duplosan	0 / 1	0.7	1.0	1.7	10.29
SED		4.02	0.93	0.54	0.429

WW 9202

Site: Hospitalshields, St Cyrus, Kincardineshire
Sprayed: 20 November at GS 12, weeds 2-6 leaf
6 May at GS 30-31, weeds 5-15 cm

Weed cover 15 June				
Product	**Dose**	**Chickweed**	**Pansy**	**Annual meadowgrass**
Untreated		68.3	4.0	0.0
Panther/nil	1 / 0	0.0	0.0	0.0
	½ / 0	0.0	0.0	0.5
	¼ / 0	3.7	0.2	0.2
	1/8 / 0	18.3	0.3	0.0
Panther/ Harmony + Duplosan	¼ / ½	0.0	0.0	0.2
	¼ + ½	0.0	0.0	0.2
	1/8 / ¾	0.0	0.0	0.5
Encore/ nil	1 / 0	0.0	0.0	0.0
	½ / 0	15.0	0.2	0.0
	¼ / 0	15.0	0.0	0.0
	1/8 / 0	31.7	0.0	0.0
Encore/Harmony + Duplosan	½ / ¼	0.0	0.2	0.0
	¼ / ½	0.7	0.0	0.3
	1/8 / ¾	0.0	0.2	0.3
Nil/Harmony + Duplosan	0 / 1	0.0	1.0	0.3
Nil/Harmony	0 / 1	0.3	1.2	0.3
Nil/Duplosan	0 / 1	0.3	2.3	0.0
SED		4.41	0.69	0.21

WW 9203

Site: Cowfords. Fochabis, Meagohive
Sprayed: 19 November at GS 12, weeds 2-8 leaf
5 May at GS 31-32, weeds 10-20 cm

Weed cover 16 June				
Product	**Dose**	**Chickweed**	**Shepherd's purse**	**Annual meadowgrass**
Untreated		24.4	21.1	6.1
Panther/nil	1 / 0	0.0	0.0	0.7
	½ / 0	0.0	1.7	6.7
	¼ / 0	1.0	1.7	2.0
	1/8 / 0	1.0	4.3	5.0
Panther/Ally + Duplosan	½ / ¼	0.3	0.3	3.0
	¼ / ½	0.0	0.0	3.7
	1/8 / ¾	0.0	0.0	4.3
Encore/nil	1 / 0	0.0	0.0	1.3
	½ / 0	1.0	5.3	3.7
	¼ / 0	0.0	16.7	6.7
	1/8 / 0	1.7	16.7	5.0
Encore/Ally + Duplosan	½ / ¼	0.0	0.0	3.3
	¼ / ½	0.0	1.0	3.0
	1/8 / ¾	2.0	1.7	6.7
Nil/Allly + Duplosan	0 / 1	0.0	0.3	10.0
Nil/Ally	0 / 1	2.0	5.3	4.3
Nil/Duplosan	0 / 1	0.0	1.0	6.7
SED		3.7	3.26	1.76

WW 9204

Site: Crossball, Greenlaw, Berwickshire
Sprayed: 27 November at GS 11-22, weeds 1-3 cm
8 April at GS 30, weeds 8-15 cm

Ground cover 2 July 1992					
Product	**Dose**	**Annual meadowgrass**	**Chickweed**	**Cleavers**	**Yield t/ha**
Untreated		12.5	1.3	0.2	11.22
Panther/Duplosan	1 / 1/8	3.3	0.0	0.0	11.18
	½ / ¼	3.0	0.0	0.0	11.44
	¼ / ½	2.3	0.0	0.0	11.22
	1/8 / ¾	6.7	0.3	0.0	11.47
Panther/nil	1 / 0	2.4	0.0	0.0	11.17
	½ / 0	5.1	0.0	0.0	11.30
	¼ / 0	2.0	0.0	0.0	11.45
	1/8 / 0	8.0	0.0	0.0	11.31
Encore/Duplosan	1 / 1/8	0.0	0.0	0.0	11.23
	½ / ¼	0.0	0.0	0.0	11.22
	¼ / ½	7.7	0.0	0.0	11.02
	1/8 / ¾	4.3	0.0	0.0	11.36
Nil/Duplosan	0 / 1	7.4	0.0	0.0	11.20
	0 / ¾	12.7	0.0	0.0	11.41
	0 / ½	14.0	1.7	0.0	11.48
	0 / ¼	4.3	0.0	0.0	11.25
SED		4.07	0.71		0.19

WW 9205

Site: Panlathy, Muirdrum, Angus
Sprayed: 2 December at GS 11-21, weeds < 1cm
5 May at GS 30-31, weeds 10-15 cm

Weed cover 23 July 1992 %						
Product	**Dose**	**Annual meadowgrass**	**Speedwell**	**Forget-me-knots**	**Chickweed**	**Yield t/ha**
Untreated	0 / 0	1.4	0.3	0.9	0.4	9.66
Panther/Duplosan	1 / 1/8	0.0	0.0	0.0	0.0	9.35
	½ / ¼	0.0	0.0	0.0	0.0	9.65
	¼ + ½	0.7	0.0	0.0	0.0	9.63
	1/8 / ¾	0.3	0.0	0.0	0.0	9.55
Encore/ Duplosan	1 / 1/8	0.0	0.0	0.0	0.0	9.62
	½ / ¼	0.0	0.0	0.0	0.0	9.66
	¼ / ½	0.1	0.0	0.0	0.0	9.71
	1/8 / ¾	0.0	0.0	0.0	0.0	9.66
Encore/nil	1 / 0	0.0	0.0	0.0	0.0	9.41
	½ / 0	0.0	0.0	0.0	0.0	9.52
	¼ / 0	0.0	0.0	0.0	0.0	9.50
	1/8 / 0	0.0	0.0	0.0	0.0	9.61
Nil/Duplosan	0 / 1	0.2	0.0	0.4	0.0	9.75
	0 / ¾	0.8	0.0	0.0	0.0	9.52
	0 / ½	1.8	0.0	0.3	0.0	9.68
	0 / ¼	2.4	0.0	0.1	0.0	9.68
SED		0.86		0.43		0.15

SB 9201

Site: Tillycorthie, Udny, Aberdeenshire

Sprayed:

20 May	GS 13-14	weeds 2-4 leaf
26 May	GS 30	weeds 4-6 leaf
6 June	GS 31-32	weeds 6-8 leaf

All received Allly + Duplosan

		Ground cover, %, 7 July 1992					
Dose	**Date**	**Chickweed**	**Vol. rape**	**Day-nettle**	**Pansy**	**Knot-grass**	**Yield t/ha**
Untreated		21.9	7.2	2.7	2.8	2.7	6.88
1 + 1	20/5	0.0	0.0	0.0	0.2	0.1	7.15
	26/5	0.0	0.0	0.0	0.4	0.0	7.23
	6/6	0.0	0.0	0.0	1.2	0.0	6.68
1 + ½	20/5	0.1	0.0	0.0	0.1	0.2	7.03
	26/5	0.0	0.0	0.0	0.4	0.1	7.07
	6/6	0.0	0.0	0.0	0.7	0.0	7.00
½ + 1	20/5	0.0	0.0	0.0	0.4	0.3	7.08
	26/5	0.0	0.0	0.0	0.7	0.0	7.21
	6/6	0.0	0.0	0.0	1.7	0.0	6.92
½ + ½	20/5	0.3	0.0	0.0	0.8	0.4	7.22
	26/5	0.0	0.0	0.0	0.8	0.1	7.13
	6/6	0.0	0.0	0.0	2.0	0.5	6.01
SED							0.264

SB 9202

Site: Aldroughty, Elgin, Morayshire
Sprayed: 22 May GS 14/24, weeds 2-4 leaf
28 May GS 30-31, weeds 4-8 leaf

Herbicide	Dose	Date	Ground cover, %, 10 July 1992 Knotgrass	Field pansy	Yield t/ha
Untreated			5.3	6.8	6.24
Ally + Duplosan	1	22/5	0.0	0.0	5.94
	1/3	22/5	0.7	1.3	6.06
	1/9	22/5	1.2	2.7	6.27
	1	28/5	0.3	2.7	6.09
	1/3	28/5	2.3	4.3	6.14
	1/9	28/5	4.3	5.7	6.06
Advance	1	22/5	0.0	0.2	6.87
	1/3	22/5	0.3	2.3	6.19
	1/9	22/5	0.3	2.7	6.00
	1	28.5	0.0	2.7	6.23
	1/3	28/5	0.0	4.7	6.12
	1/9	28/5	2.0	5.3	5.94
MCPA + 24 DP	1	22/5	0.2	0.3	6.13
	1/3	22/5	0.0	1.8	5.98
	1/9	22.5	0.7	2.2	5.89
	1	28.5	0.0	1.5	6.02
	1/3	28/5	2.0	3.3	6.23
	1/9	28/5	1.0	5.7	6.09
SED			0.55	0.82	0.162

SB 9203

Site: Pictillum, Kemnay, Aberdeenshire
Sprayed: 4 June 1992, GS 14/22, weeds 2-4 leaf except shepherd's purse 6 leaf, chickweed 5-6 cm

Product	Dose	Ground cover, %, 16 July 1992				
		Chickweed	Day-nettle	Knotgrass	Redshank	Field pansy
Untreated		7.6	4.1	3.6	5.4	2.8
Ally + Duplosan	1	0.0	0.1	0.1	0.0	0.0
	½	0.0	0.0	0.0	0.0	0.0
	¼	0.0	0.0	2.0	0.5	0.0
	1/8	0.5	0.0	0.5	0.2	1.5
Ally + Deloxil	1	0.0	0.0	0.0	0.0	0.0
	½	0.0	0.0	0.0	0.0	0.2
	¼	1.0	0.0	0.2	0.0	1.0
	1/8	0.0	0.5	2.0	0.0	1.5
Ally + Advance	1	0.0	0.0	0.0	0.0	0.0
	½	0.0	0.2	0.0	0.0	0.0
	¼	0.0	0.0	0.0	0.0	0.5
	1/8	0.5	0.2	0.0	0.0	1.0
Ally + Fortrol	1	0.0	0.0	0.5	0.0	0.0
	½	0.0	0.0	1.0	0.0	0.0
	¼	0.0	0.0	2.5	0.0	0.5
	1/8	0.0	0.0	4.5	1.0	0.5
Harmony + Duplosan	1	0.0	0.0	0.5	0.2	0.0
	½	0.0	0.0	0.8	0.2	0.2
	¼	0.0	0.0	2.0	0.6	0.6
	1/8	0.5	0.0	0.5	0.0	1.0
Logran + Duplosan	1	0.0	0.0	0.2	0.0	1.0
	½	0.0	0.2	1.2	0.5	0.8
	¼	0.0	0.5	2.0	1.5	0.5
	1/8	0.0	0.0	3.5	1.5	0.5
Advance	1	0.0	0.0	0.0	0.0	0.0
	½	0.0	0.0	0.2	0.0	0.5
	¼	0.5	0.0	0.8	0.0	1.5
	1/8	0.5	0.5	0.5	0.0	1.0
Starane + Duplosan	1	0.0	0.0	0.4	0.0	0.0
	½	0.0	0.0	0.2	0.5	0.8
	¼	0.0	1.0	0.2	2.5	1.2
	1/8	0.0	0.0	1.5	1.5	0.0
Starane + Fortrol	1	0.5	0.0	0.0	0.0	0.0
	½	0.0	0.0	0.0	0.0	0.5
	¼	0.0	0.0	0.2	0.0	0.0
	1/8	1.0	0.2	0.2	1.5	1.0
Duplosan + Deloxil	1	0.0	0.4	0.2	0.0	0.0
	½	0.0	0.1	0.0	0.2	0.0
	¼	0.0	1.0	0.0	0.0	1.0
	1/8	1.0	2.2	0.5	0.0	1.0
SED						

SB 9205

Site: Crosshall, Greenlaw, Berwickshire
Sprayed: 18 May, GS 15-25, chickweed 3 cm
12 May, GS 30-31, chickweed 12 cm
29 May, GS 31-32, chickweed 12 cm
All: Ally + Duplosan

Dose	Date	Ground cover, %, 2 April 1992						
		Chickweed	Red D nettle	Fat hen	Knotgrass	Bindweed	Redshank	Yield t/ha
Untreated		1.3	0.1	0.1	0.8	0.3	0.1	7.20
1 + 1	18/5	0.0	0.0	0.0	0.1	0.0	0.0	7.33
	26/5	0.0	0.0	0.0	0.0	0.0	0.0	7.00
	29.5	0.0	0.0	0.0	0.0	0.0	0.0	7.32
1 + ½	18/5	0.0	0.0	0.0	0.1	0.0	0.0	7.18
	26/5	0.0	0.0	0.0	0.1	0.0	0.0	7.30
	29/5	0.0	0.0	0.0	0.1	0.0	0.0	7.15
½ + 1	18/5	0.0	0.0	0.0	0.0	0.0	0.0	7.22
	26/5	0.0	0.0	0.0	0.0	0.0	0.0	7.19
	29.5	0.0	0.0	0.0	0.0	0.0	0.0	7.30
½ + ½	18/5	0.0	0.0	0.0	0.1	0.0	0.0	7.21
	26/5	0.0	0.0	0.0	0.1	0.0	0.0	7.12
	29.5	0.0	0.0	0.0	0.0	0.0	0.0	7.17
SED								0.18

SB 9206

Site: Boghall, Penicuik, Midlothian
Sprayed: 18 May, GS 14-23, Daynettle 6 leaf
4 June, GS 31, Daynettle 15 cm

Product	Dose	Date	Ground cover, %, 29 July							
			Annual meadowgrass	Field pansy	Vol potato	Chickweed	Daynettle	Bird weed	Knotgrass	Yield t/ha
Untreated			21.0	1.0	0.1	4.0	2.9	0.2	0.2	6.70
Ally +	1 + 1	18/5	10.7	0.1	0.0	0.0	0.0	0.0	0.0	6.61
Duplosan	1/3 + 1/3	18/5	16.3	0.1	0.0	0.0	0.0	0.0	0.0	6.75
	1/9 + 1/9	18/5	12.3	0.0	0.0	0.1	0.2	0.0	0.0	6.96
Advance	1	18/5	15.0	0.1	0.0	0.0	0.0	0.0	0.0	6.88
	1/3	18/5	15.0	0.2	0.0	0.0	0.2	0.0	0.0	6.38
	1/9	18/5	18.0	0.5	0.0	0.0	1.2	0.0	0.0	6.75
Redipon	1	18/5	17.3	0.0	0.0	0.0	0.0	0.0	0.0	6.74
Ally +	1 + 1	4/6	15.7	0.1	0.0	0.0	0.0	0.0	0.0	6.07
Duplosan	1/3 + 1/3	4/6	14.0	0.1	0.0	0.0	0.1	0.0	0.0	6.46
	1/9 + 1/9	4/6	13.0	0.3	0.0	0.1	0.0	0.1	0.0	6.48
Advance	1	4/6	18.0	0.0	0.0	0.0	0.0	0.0	0.0	6.49
	1/3	4/6	15.7	0.0	0.0	0.0	0.0	0.0	0.0	6.45
	1/9	4/6	15.0	0.2	0.0	0.0	0.2	0.0	0.0	6.89
Redipon	1	4/6	10.0	0.0	0.0	0.0	0.1	0.2	0.0	7.25
SED			3.20							0.27

Site: Panlathy, Muirdrum, Angus
Sprayed: 14 May, GS 14/22, Speedwell up to 3 cm
27 May, GS 30-31, Speedwell up to 8 cm

Product	Dose	Date	Ground cover, %, 23 July 1992						
			Annual meadowgrass	Forget-me-not	Futer speedwell	Knotgrass	Chickweed	Mayweed	Yield t/ha
Untreated			11.0	3.4	1.2	0.3	0.7	0.1	6.85
Ally + Duplosan	1 + 1	14/5	10.0	0.3	0.2	0.0	0.0	0.0	6.82
	1 + 1	27/5	9.0	0.5	0.0	0.0	0.0	0.0	6.87
Ally + Duplosan	1/3 + 1/3	14/5	10.0	1.6	0.1	0.0	0.0	0.0	6.85
	1/3 + 1/3	27/5	12.0	0.6	0.1	0.0	0.0	0.0	6.72
Ally + Duplosan	1/9 + 1/9	14/5	11.0	2.2	1.8	0.1	0.0	0.0	6.81
	1/9 + 1/9	27/5	10.0	1.4	0.4	0.0	0.0	0.0	6.69
Advance	1	14/5	10.3	0.0	0.1	0.0	0.0	0.0	6.76
	1	27/5	12.0	0.0	0.0	0.0	0.0	0.0	6.75
Advance	1/3	14/5	12.7	0.0	0.3	0.1	0.0	0.0	6.80
	1/3	27/5	11.3	0.0	0.6	0.1	0.0	0.0	6.78
Advance	1/9	14/5	10.0	0.2	1.0	0.1	0.0	0.1	6.75
	1/9	27/5	12.7	1.7	1.2	0.6	1.0	0.0	6.65
Redipon	1	14/5	7.3	0.1	0.0	0.0	0.0	0.0	6.80
	1	27/5	9.0	0.8	0.1	0.0	0.0	0.0	6.67
SED			2.11						0.16