CYCLOXYDIM (179)

EXPLANATION

Cycloxydim was reviewed for the first time by the 1992 JMPR but the time available did not allow adequate evaluation of the extensive residue data provided. This monograph addendum therefore deals only with the evaluation of these data.

RESIDUES RESULTING FROM SUPERVISED TRIALS

Supervised trials have been carried out in 15 countries on over 40 commodities. However, many were single trials providing only limited data. MRLs have been established in several countries, ranging from 0.05 to 5 mg/kg according to crop (FAO/WHO, 1993a).

Summaries of data from the trials, which were designed to be according to recommended use patterns, are given in Tables 1 to 4.

Fruits - See Table 1.

Citrus fruits. Trials in South Africa on grapefruit showed no residues above 0.05 mg/kg after 102 days. On lemons, residues of 0.12 and 0.13 mg/kg were found after application at either 0.4 or 0.8 kg ai/ha; however, untreated crops showed a similar level of cycloxydim in these limited trials.

Pome fruits. Following treatment in South Africa at the maximum surface application rate of 0.4 kg ai/ha, residues of <0.05 and 0.15 mg/kg were found in apples and pears respectively. When sprayed on to the fruits instead of using the recommended surface application, residues of 0.08 and 1.3 mg/kg were found on apples; residues in pears remained below 0.05 mg/kg under these conditions.

Stone fruits. In one trial on peaches in South Africa a residue of 0.1 mg/kg was found after 27 days. Trials on plums showed no residue above 0.05 mg/kg. However, residues of 2.5 and 3.1 mg/kg were found on peaches when the spray was applied to the fruits rather than using the recommended surface application.

Berries and other small fruits. On grapes, trials in South Africa yielded residues up to 0.58 mg/kg after 29 days. In France, residues were less than 0.05 mg/kg after 80 to 141 days.

In trials on strawberries in The Netherlands, residues ranged from 0.13 to 0.45 mg/kg (mean 0.33 mg/kg) at 21 days following treatment at 0.2 kg ai/ha. At three times this rate of application, residues ranged from 0.85 to 1.51 mg/kg (mean 1.20 mg/kg). In later trials in the UK residues were up to 0.21 mg/kg after 32 days but were below 0.05 mg/kg after 42 to 70 days.

Tropical fruits with inedible peel. All trials were carried out in South Africa. Residues in avocado were below 0.05 mg/kg after 43 days. On mangoes, residues were below 0.05 mg/kg 43 days after treatment at either 0.4 or 0.8 kg ai/ha. Residues in papaya were below 0.05 mg/kg after 40 days in two trials.

Following treatment of pineapples at the recommended rate of 0.4 kg ai/ha, residues were below 0.05 mg/kg from 22 to 104 days later. Treatment at 0.8 kg ai/ha showed residues of 0.09 mg/kg at 22 days but 0.05 mg/kg or less from 46 to 104 days after treatment.

Table 1. Residues of cycloxydim in fruit from supervised trials. All trials used EC; mostly 200 g/l, a few 100 g/l.

Crop	Country /'Year	Appl. kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
Grapefruit	S Afr. '86	0.4	1	<0.05 (102)	87/119E
		0.8	1	<0.05 (102)	87/120E
Lemon	S Afr. '86	0.4	1	<0.05 (102) High blanks	87/29E
		0.8	1	<0.05 (102) High blanks	87/30E
Apple	S Afr. '87	0.4	2	<0.05 (27), <0.05 (49)	87/9E,11E
		0.8	2	<0.05 (27), <0.05 (49)	87/10E,13E
Pear	S Afr. '87	0.4	2	0.06 (35), 0.15 (27)	87/3E,6E
		0.8	2	<0.05 (27,35)	87/4E,8E
Peach	S Afr. '87	0.4	1	0.10 (27)	87/94E
		0.8	1	<0.05 (27)	87/96E
Plum	S Afr. '87	0.4	1	<0.05 (27)	87/137E
		0.8	1	<0.05 (27)	87/138E
Grape	France '86	0.4	3	<0.05 (80, 105, 141)	86/82-84E
		0.6	4	<0.05 (80, 94, 112, 119)	86/78-81E
	'87	0.6	2	<0.05 (71, 95)	87/150,151E
	S Afr. '85	0.4	1	0.14(7),0.2(15),0.14(22),0.13(29)	86/53A
		0.8	1	0.55(7),0.42(15),0.44(22), 0.58(29)	86/54A
	'87	0.4	1	0.37 (27)	87/1E
		0.8	1	0.27 (27)	87/2E
Strawberry	N'lands'88	0.2	1	0.13 to 0.45, mean[8] 0.33 (21)	88/17-20,25-28E
		0.6	1	0.85 to 1.51, mean[8] 1.2 (21)	88/21-24,29-32E
	UK '89	0.2	2	0.10 (65), <0.05 (70)	89/42,48A
		0.45	2	0.20 (65), <0.05 (70)	89/43,49A
		0.45+0.2	2	0.40 (35), <0.05 (42)	89/44,50A
		0.45+0.2	2	0.20 (22), 0.11, 0.15, 0.16, 0.21 (32)	89/46,47A
		0.9+0.2	2	0.60 (35), <0.05 (42)	89/45,51A
Avocado	S Afr. '87	0.4	1	<0.05 (43)	87/72E
		0.8	1	<0.05 (43)	87/73E
Mango	S Afr. '86	0.4	1	<0.05 (43)	87/152E
		0.8	1	<0.05 (143)	87/153E
Papaya	S Afr. '86	0.4	1	<0.05 (40)	87/15E
		0.8	1	<0.05 (40)	87/16E
Pineapple	S Afr. '86	0.4	1	<0.05 (22 to 104)	86/55A
		0.5	1	0.09(22),0.05(46),<0.05(75), 0.05 (104)	86/56A

Vegetables - see Table 2.

Bulb vegetables. Trials in France on leeks gave residues of about 0.1 mg/kg at 55 and 60 days after treatment at recommended levels. Similarly, residues from trials in The Netherlands reached 0.20 mg/kg at 42 days. In one trial in Norway residues were below 0.05 mg/kg after 76 days.

Trials on bulb onions were carried out in Italy, Norway, The Netherlands, South Africa and the UK. Residues at harvest were generally below the high limit of determination of 0.5 mg/kg. Trials on salad onions in the UK showed residues around 0.1 mg/kg or lower.

Brassica vegetables. Trials were carried out on Brussels sprouts, cabbage (white and Savoy) and cauliflower. Residues were very variable, ranging from less than 0.05 to over 1 mg/kg at harvest.

Fruiting vegetables, Cucurbits. Residues on melons in Italy were below 0.05 mg/kg 52 days after application. In a second trial, residues reached 0.40 mg/kg at 30 days. Similar treatment of watermelons gave residues of 0.11 and 0.17 mg/kg after 29 days. Pumpkins treated in South Africa showed no residues above 0.05 mg/kg after 55 to 74 days.

Fruiting vegetables other than Cucurbits. Sweet peppers treated in Italy yielded residues ranging from 0.15 to 0.56 mg/kg from 13 to 35 days after application at recommended rates. Tomatoes in trials in South Africa and Italy showed no residues above 0.05 mg/kg from 53 to 76 days after treatment.

Leafy vegetables. Residues on endive and lettuce treated in Italy were below 0.05 mg/kg; trials on lettuce in France showed up to 0.18 mg/kg after 15 days. One trial on radicchio in Italy gave a residue of 0.67 mg/kg after 11 days.

Legume vegetables. Trials on dwarf beans in the UK showed residues up to 0.37 mg/kg in the pods after 34 days. Green beans were also treated in France, Italy, The Netherlands and South Africa, residues in pods reaching up to 1.4 mg/kg after 27 days.

Treatment of field beans in Great Britain gave rather variable results; residues of 2.5, 0.19, 0.31 and <0.05 mg/kg being found in the dry beans 69, 104, 129 and 162 days, respectively, after application at recommended rates.

Trials on peas were carried out in 5 countries. Maximum residues in the pods and/or seeds at harvest were also variable, ranging up to 6 mg/kg, though most residues were below 1 mg/kg in the whole pods.

Soya bean trials in France, Italy and South Africa showed residues ranging from 0.05 to 0.96 mg/kg after about 100 days. However, trials in Brazil gave residues up to 10 mg/kg after about 50 days.

Root and tuber vegetables. In residue trials on carrots in 4

countries, residues at harvest, 42 to 97 days after treatment, ranged from <0.05 to 0.34 mg/kg. Three trials on parsnips were carried out in the UK. At harvest, 97 to 110 days after treatment, residues were below 0.5 mg/kg.

Extensive residue data were collected from treatments of potatoes in 9 countries. At PHIs of 42 to 120 days, maximum residue levels ranged from <0.05 to 1.6 mg/kg but the majority of results were below 0.5 mg/kg/

Trials on sugar beet in 8 countries provided a lot of data which showed that residues at harvest were at or about the limit of determination, 0.05 mg/kg, with only one or two results reaching the maximum of 0.07 mg/kg. Some trials showed that the tops could yield over 1 mg/kg.

In trials on swedes in Sweden, residues did not exceed 0.05 mg/kg in the seed. Trials on turnips in Norway, Sweden and the UK showed residues in the roots under 0.1 mg/kg at harvest (60 to 108 days) in most cases, although two samples from Sweden showed 0.54 and 0.56 mg/kg at 93 and 101 days after application respectively.

Stalk and stem vegetables. Residues in artichokes and asparagus from trials in Italy were below 0.05 mg/kg. Treatment of celery in France yielded residues up to 0.28 mg/kg.

Table 2. Residues of cycloxydim in vegetables from supervised trials. All trials used EC; mostly 200 g/l, a few 100 g/l.

Crop	Country/ year	Appl., kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
Leek	France '86	0.3	1	0.07 (60)	86/76E
		0.6	1	0.07 (60)	86/77E
	'87	0.3	1	0.14 (55)	87/90E
		0.6	1	0.10 (55)	87/91E
	N'lands '89	0.6	4	0.07, 0.12, 0.17, 0.20 (42)	89/30,31,75,76
	Norway '87	0.6+0.4	1	<0.05 (76)	87/136E
Onion	Italy '88	0.3	1	<0.5 (80)	88/130E
(bulb)		0.5	1	<0.5 (80)	88/131E
	'89	0.2	1	<0.5 (43)	89/37E
		0.3	1	<0.5 (23-45)	89/23A
		0.5	2	<0.5 (23-45)	89/24A,38E
	'90	0.6	1	<0.5 (13-59)	90/3,4A
	N'lands '88	0.6	1	0.59, 0.60, 0.63, 0.75 (21)	88/51-54E
		0.6	1	<0.5 (21)	88/55-58E
	Norway '86	0.6+0.4	2	<0.5 (38-56)	87/131,132E
	S Afr. '88	0.2	1	<0.5 (32-65)	88/35A
		0.4	1	<0.5 (32-65)	88/36A
	UK '86	1+0.6	1	<0.5 (21-49)	86/64-65A
Onion	UK '86	0.25	1	<0.05 (50)	88/37A

Crop	Country/ year	Appl., kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
(salad)		0.45+0.2	1	<0.05 (36)	88/40A
		0.5+0.2	1	0.08 (30)	88/38A
		0.9+0.4	1	0.11 (30)	88/39A
Brussels	Norway '86	0.4	1	1.1 (118)	86/90E
sprouts		0.6	1	1.3 (118)	86/91E
	UK '86	0.5+0.3	1	0.98, 1.0, 1.0, 1.0 (129)	86/60A
		0.45+0.2	1	<0.25 (65)	87/40A
	'87	0.45+0.2	1	<0.25, <0.25, 0.30 (78)	88/34A
Cabbage	Italy '88	0.3	2	<0.05 (77)	88/128,133E
		0.5	2	<0.05 (77)	88/129,132E
	Norway '87	0.4	1	0.39 (50)	87/141E
		0.6	1	0.39 (50)	87/142E
	UK '86	0.5+0.3	1	<0.05, <0.05, 0.15 (29)	86/63A
	'87	0.45+0.2	1	0.09, 0.23, 0.37 (29)	87/38A
	'88	0.25	1	0.06 (46)	88/28A
Cabbage	UK 88	0.45+0.2	1	0.41 (21)	88/29A
		0.9+0.4	1	1.1, 1.2 (21)	88/30A
Cauliflower	Italy '88	0.3	1	<0.05 (64)	88/126E
		0.5	1	<0.05 (64)	88/127E
	S Afr. '88	0.2	2	<0.5 (15-60)	88/46,47A
	UK '86	0.5+0.3	1	<0.05, <0.05, 0.48 (29)	86/59A
	'87	0.45+0.2	1	0.3 (27)	87/41A
	'88	0.25	1	<0.05 (55)	88/31A
		0.45+0.2	1	0.41 (30)	88/32A
		0.9+0.4	1	0.67 (30)	88/33A
Melon	Italy '88	0.3	1	<0.05 (52)	88/88E
		0.5	1	<0.05 (52)	88/89E
	'90	0.3	1	0.62 (7), 0.16 (15), 0.05 (30)	90/15A
		0.6	1	1.45 (7), 0.66 (15), 0.40 (30)	90/16A
Pumpkin	S Afr. '86	0.12	1	<0.05 (55-74)	86/57A
		0.24	1	<0.05 (55-74)	86/58A
Watermelon	Italy '90	0.3	1	0.16(0), 0.42(7), 0.22(15), 0.11(29)	90/11A
		0.6	1	0.10(0), 0.72(7), 0.49(15), 0.17(29)	90/12A
Pepper (sweet)	Italy '89	0.3	1	0.15 (13), 0.15 (20), 0.38 (35)	89/17A
		0.5	1	0.27 (13), 0.44 (20), 0.56 (35)	89/18A
Tomato	Italy '88	0.3	1	<0.05 (57-76)	88/96,98,100E
		0.5	1	<0.05 (57-76)	88/97,99,101E
	S Afr. '86	0.12	1	<0.05 (53, 61)	86/66A
		0.24	1	<0.05 (53, 61)	86/67A
Endive	Italy '89	0.2	1	<0.05 (43)	89/25E
		0.5	1	<0.05 (43)	89/26E

Crop	Country/ year	Appl., kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
Lettuce	France '86	0.3	1	0.05 (20)	86/63E
		0.6	1	0.09 (20)	86/64E
	'87	0.3	1	0.13 (15)	87/98E
		0.6	1	0.18 (15)	87/99E
	Italy '88	0.3	1	<0.05 (30)	88/108E
		0.5	1	<0.05 (30)	88/109E
	'89	0.3	1	<0.05 (43)	89/19E
		0.5	1	<0.05 (43)	89/20E
Radicchio	Italy '88	0.3	1	0.32 (11)	88/110E

Crop	Country/ year	Appl., kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
		0.5	1	0.67 (11)	88/111E
Beans	France '86	0.3	1	<0.05 (30)	86/74E
(dwarf &		0.6	1	<0.05 (30)	86/75E
green)	Italy '88	0.3	2	<0.05 (26 & 49)	88/70,72E
		0.5	2	0.24 (26), <0.05 (49)	88/71,73E
	'89	0.2	1	<0.05 (40)	89/24E
		0.3	2	<0.05 (52-80)	89/16,27E
		0.5	3	<0.05 (40-80)	89/17,23,28E
	N'lands '88	0.6	1	<0.05, <0.05, <0.05, 0.06, 0.07 (35)	88/41-45E
		0.6	1	0.16, 0.24, 0.25, 0.31, 0.31 (42)	88/46-50E
	'90	0.6	1	1.0, 1.2, 1.3, 1.4 (27)	90/3E
		0.6	1	0.64, 0.67, 0.72, 0.90 (23)	90/4E
	S Afr. '86	0.4	1	0.09 (28)	86/20A
	UK '86	0.5+0.3	1	0.37 (34)	86/19A
	'88	0.45+0.2	1	0.17, 0.18, 0.18 (38)	88/1A
(field &	S Afr. '86	0.12	1	<0.05 (65)	86/11A
dry)		0.25	1	<0.05 (65)	86/12A
	UK '86	0.5+0.5	1	2.4, 2.4, 2.7 (69)	86/50A
	'88	0.25	1	<0.05 (162)	88/21A
		0.45+0.2	2	0.14, 0.19, 0.23 (104), 0.32 (129)	88/24, 22A
		0.9+0.4	1	0.86 (129)	88/23A
Peas	France '86	0.3	1	0.55 (44) (Shelled, green)	86/25E
		0.6	1	0.87 (44) (Shelled, green)	86/26E
	Italy '88	0.3	2	<0.05 (42, 44) (Pods)	88/76,78E
		0.6	2	<0.05 (42, 44) (Pods)	88/77,79E
	N'lands '87	0.6	1	1.1, 1.2, 1.3, 1.3 (55) (Dry peas)	87/64-67E
		0.6	1	2.6, 3.0, 3.7, 4.2 (56) (Dry peas)	87/68-71E
	'88	0.6	1	4.3-6.0, mean[8] 5.5 (21) (Pods)	88/33-40E
	'88	0.6	1	0.09, 0.17, 0.18, 0.19 (90) (Dry peas)	88/59-62E
	'90	0.4	1	0.54, 0.65, 0.67, 0.83 (42) (Pods)	90/5E
		0.4	1	0.15, 0.25, 0.28, 0.28 (58) (Pods)	90/7E
		0.4	1	0.26, 0.34, 0.35, 0.35 (42) (Pods)	90/9E
		0.4	1	0.16, 0.24, 0.29, 0.38 (54) (Pods)	90/11E
		0.6	1	0.19, 0.27, 0.33, 0.37 (42) (Pods)	90/6E
Peas cont.		0.6	1	0.13, 0.23, 0.26, 0.26 (58) (Pods)	90/8E
		0.6	1	0.07, 0.08, 0.18, 0.26 (42) (Pods)	90/10E
		0.6	1	<0.05, 0.07, 0.07, 0.08 (54) (Pods)	90/12E
	Sweden '87	0.4	2	0.38 (89); 0.46 (92) (Dry peas)	87/60,62E
		0.6	2	0.68 (89); 0.69 (92) (Dry peas)	87/61,63E
	'89	0.6	4	0.74-7.1 (61-84) (Shelled, green)	89/14-17E

Crop	Country/ year	Appl., kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
		0.6	4	0.22-3.9 (61-84) (Shelled, green)	89/57-60E
	UK '85	0.5+0.5	4	3.4-4.3; mean[4] 3.7 (28-30) (Pods)	85/10,11A
	'86	0.5+0.3	1	1.3, 1.6, 1.6 (21) (Pods)	86/18A
	'87	0.45+0.2	2	0.09 (47), 0.46 (51) (Pods)	87/6,7A
	'88	0.25	2	0.35 (57) 0.49 (43) (Shelled, green)	88/8,10A
	'88	0.45+0.2	2	1.0, 1.6 (43) (Shelled, green)	88/9,12A
Soya bean	Brazil '88	0.1	4	1.4, 2.9, 4.5, 5.3 (49-53)	88/9,11,13,15E
		0.2	4	3.1, 4.6, 9.2, 10.6 (49-53)	88/10,12,14, 16E
	'89	0.1	4	0.44, 0.54 (85), 1.8,1.9 (28)	89/7,11,13,17E
		0.15	2	0.48 (85), 2.1 (28)	89/8,14E
		0.2	4	0.57, 0.70 (85), 2.9, 3.2 (28)	89/9,12,15,18E
		0.3	2	0.80 (85), 4.8 (28)	89/10,16E
	France '85	0.3	2	<0.05 (109)	85/6,7E
	'86	0.3	2	0.11 (120), 0.26 (99)	86/53,55E
		0.6	2	<0.05 (120), 0.35 (99)	86/54,56E
	'87	0.6	2	<0.05 (145), 0.24 (154)	87/102,103E
	Italy '86	0.4	2	<0.05 (108, 130)	86/69,92E
		0.6	2	<0.05 (108), 0.13 (130)	86/70.93E
	'87	0.3	4	<0.05(108), 0.23(106), 0.38(105), 0.96(90)	87/107,109, 111,113E
		0.6	3	0.06 (108), 0.63 (90), 0.64 (106)	87/108,110, 112E
	'88	0.5	2	0.24 (103), 0.30 (95)	88/74,75E
	'90	0.5	2	0.33, 0.35 (90-91)	90/1,2A
	S Afr. '86	0.12	1	<0.05 (87)	86/13A
		0.24	1	<0.05 (87)	86/14A
Carrot	France '86	0.3	2	<0.05 (97), 0.06 (6)	86/57,59E
		0.6	2	<0.05 (97), 0.20 (6)	86/58,60E
	'87	0.3	1	<0.05 (64)	87/100E
Carrot cont.		0.6	1	0.12 (64)	87101E
	Italy '88	0.3	1	<0.05 (52)	88/92E
		0.5	1	<0.05 (52)	88/93E
	'89	0.2	2	<0.05 (51), 0.1 (52), <0.05 (69)	89/12,21A
		0.5	2	<0.05 (51), 0.08 (52), <0.05 (69)	89/11,22A
	N'lands '90	0.4	2	0.07-0.26, mean[16] 0.14 (42,56)	90/4,6A
		0.6	2	0.08-0.34, mean[16] 0.18 (42,56)	90/5,7A
	Norway '87	0.6+0.4	1	0.08 (66)	87/147E
	'88	0.4+0.4	2	<0.05 (62, 68)	88/141,143E
Parsnip	UK '88	0.25	1	<0.5 (110)	88/25A
		0.45+0.2	1	<0.5 (97)	88/26A
		0.9+0.4	1	<0.5 (97)	88/27A
Potato	France '85	0.3	2	<0.05 (106)	85/4,5E

Crop	Country/ year	Appl., kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
	'86	0.3	2	<0.05 (103, 108)	86/15,17E
		0.6	2	<0.05 (103, 108)	86/16,18E
	'87	0.6	1	<0.05 (102)	87/81E
	Germany '86	0.25	5	<0.05-0.29 (42-73), mean[5] 0.11 [Early]	86/35-39A
		0.25	5	<0.05 (68-90) [Middle]	86/40-44A
		0.25	5	<0.05-0.09 (56-108), mean[5] 0.06 [Late]	86/45-49A
	'87	0.25	4	<0.05-0.15 (29-98), mean[4] 0.05 [Early]	87/12-15A
		0.25	4	<0.05 (48-98) [Middle]	87/16-19A
		0.25	4	<0.05 (85-112) [Late]	87/20-23A
	Italy '88	0.3	1	0.08 (85)	88/102E
		0.5	1	<0.05 (85)	88/103E
	N'lands '86	0.6	1	0.70, 0.71, 1.1, 1.5 (51)	86/65-68E
	'87	0.6	1	0.33, 0.44, 0.49, 0.53 (56)	87/74-77E
	'88	0.6	2	<0.05-2.0, mean [8] 1.4 (21)	88/1-8E
	'89	0.6	2	<0.05-0.90, mean [8] 0.5 (20)	89/7,8A
	Norway '86	0.6	2	0.44 (75), <0.05 (119)	86/86,88E
	'87	0.6	1	0.21 (85)	87/143E
	S Afr. '87	0.12	1	0.41 (10), 0.53 (17), 0.46 (31), 0.54 (52)	87/1A
		0.24	1	0.53 (10), 1.5 (17), 0.79 (31), 0.72 (52)	87/2A
	Spain '86	0.2	3	<0.05 (52)	86/71-73E
	Sweden '87	0.4	1	0.29 (91)	87/78E
		0.6	1	0.34 (91)	87/79E
Potato cont.	UK '86	0.3	1	1.6 (68)	86/10E
		0.5	1	0.39 (68)	86/9A
		0.5+0.3	2	0.38 (56), 0.75, 0.82, 0.87 (63)	86/6,7A
	'87	0.45+0.2	2	0.14 (57), <0.05 (100)	87/29,30A
Sugar beet	France '85	0.3	3	<0.05 (124-153) [Root & top]	85/1-3E
	'86	0.3	3	<0.05 (113-145) [Root & top]	86/3,5,7E
		0.6	3	<0.05 (113-145) [Root & top]	86/6,8,10E
	Germany '86	0.5	5	<0.05 (24-132) [Root & top]	86/26-30A
	'87	0.5	4	<0.05 (35-151) [Root & top]	87/8-11A
	Italy '87	0.3	2	<0.05 (84,100) [Root & top]	87/115,117E
		0.6	2	<0.05 (84,100) [Root & top]	87/116,118E
	'88	0.3	1	<0.05 (105) [Root]	88/67E
		0.5	1	<0.05 (105) [Root]	87/68E
	N'lands '87	0.6	2	<0.05-0.08, mean[8] 0.05 (58) [Root] 0.22-0.60, mean[8] 0.38 (58) [Top]	87/33-40E
	Spain '85	0.15	1	0.07 (196)	86/50E
		0.2	1	<0.05 (93)	86/51E
	Sweden '87	0.6	8	<0.05 (82-144)	87/123-30E

Crop	Country/ year	Appl., kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
	Switz. '86	0.5	1	<0.05 (134)	86/48E
	UK '85	0.5+0.5	3	0.22 (30), <0.05 (42), <0.05 (58) [Root] 0.06-2.7 (30), 1.4 (42), <0.05 (58)[Top]	85/1-3A
		0.15	1	<0.05 (114) [Root & top]	86/1E
		0.5	1	<0.05 (88) [Root], 0.06 (88) [Top]	86/2E
		0.4+0.2	2	<0.05 (87) [Root], <0.05, 0.13 (87)[Top]	86/11,12E
		0.5+0.3	2	<0.05 (69) [Root], <0.05-0.38 (69)[Top]	86/2,3A
Swede	Norway '87	0.6	2	0.06 (103), 0.09 (91)	87/149,139E
	UK '86	0.5+0.3	3	<0.05 (20,60,61), 0.46 (53)	86/61,62A
Turnip	UK '86	0.5+0.3	1	0.46 (53)	87/37A
Artichoke	Italy '88	0.3	2	<0.05 (65)	88/122,124E
		0.5	2	<0.05 (65)	88/125,127E
Asparagus	Italy '88	0.3	1	<0.05 (16)	88/90E
		0.5	1	<0.05 (16)	88/91E
	'89	0.2	1	<0.05 (7, 18, 32)	89/14E
		0.5	1	<0.05 (7, 18, 32)	89/13E
Celery	France '86	0.3	1	0.11 (45)	86/61E
		0.6	1	0.28 (45)	86/62E
	'87	0.3	1	0.09 (54)	87/92E
		0.6	1	0.09 (54)	87/93E

Grasses for sugar production

Sugar cane. Cycloxydim is used on sugar cane at a rate of 0.05 kg ai/ha to control the ripening of the crop. In trials in South Africa residues were <0.05 mg/kg at harvest, 56 days after the treatment. A maximum residue of 0.12 mg/kg was found 7 days after application (89/1A; 89/4, 5A).

Nuts and seeds - see Table 3.

Cotton. In trials in South Africa residues in cotton seed were below 0.05 mg/kg 128 days after an early application. However, when applied two months later, residues reached 1.2 mg/kg after 75 days. No data were provided on the content in cotton seed oil.

Linseed. Trials on flax were made in France and the UK and in all cases residues were close to the limit of determination of 0.05 mg/kg after at least 67 days from treatment, the only positive figure being 0.06 mg/kg which resulted from a treatment at the highest level.

Peanut. Two trials in South Africa showed levels of 0.07 and 0.1 mg/kg at 86 days after application.

Rape. Data from many trials of cycloxydim on rape in 7 countries were available. At PHIs ranging from 70 to over 270 days residue levels ranged up to about 2 mg/kg. Some information on processing to rape seed oil was given in the evaluation of the 1992 JMPR.

Sunflower. The data on residues in sunflower seed were obtained by a method whose limit of determination was 0.5 mg/kg; only one determination exceeded this level (0.75 mg/kg).

Table 3. Residues of cycloxydim in oilseed from supervised trials. All trials used EC; mostly 200 g/l a few 100 g/l.

Crop	Country/Year	Appl. ai kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
Cotton	S Afr. '86	0.14	1	<0.05 (128)	86/33A
		0.2	1	0.63 (75)	86/31A
		0.24	1	<0.05 (128)	86/34A
		0.4	1	1.2 (75)	86/32A
Linseed	France '86	0.6	1	<0.05 (67)	86/89E
	UK '88	0.25	2	<0.05 (135, 136)	88/41,44A
		0.45+0.2	2	<0.05 (100, 103)	88/42,45A
		0.9+0.4	1	0.06 (100)	88/43A
Peanut	S Afr. '86	0.12	1	0.28 (35),0.18 (50), <0.05 (63),0.07 (86)	86/15A
		0.24	1	0.43 (35),0.28 (50),0.11 (63), 0.10 (86)	86/16A
Rape	France '85	0.3	3	0.06 (279), <0.05 (267), <0.05 (272)	86/19,21,23E
		0.6	3	0.05 (279), <0.05 (267), <0.05 (272)	86/20,22,24E
	Germany '86	0.25	4	0.08-0.53 (83-104), mean[4] 0.28	86/22-25A
	'87	0.25	5	<0.05-0.43 (105-119), mean[5] 0.26	87/24-28A
	Italy '87	0.25	1	0.18 (229)	88/69E
	'90	0.5	1	<0.05 (123)	90/8A
	N'lands '86	0.3	1	<0.05 (304)	86/28-31E
	'87	0.2	2	<0.05 (318, 321)	87/41-44,49-52E
		0.4	2	0.07-0.21 (126), mean[8] 0.13	87/45-48,53-56E
	Norway '87	0.6	1	0.39 (97)	87/122E
	'88	0.4	1	0.18 (70)	88/139E
		0.6	1	0.31 (70)	88/140E
	Sweden '87	0.6	8	<0.05-2.9 (78-111), mean[8] 1.1	87/82-89E
	'89	0.4	1	0.10 (91)	89/6E
		0.6	20	<0.05-0.14 (89-120), mean[20] 0.07	89/3-5,7-12E
					89/40-42,45-47E
					89/51-55E
	UK '87	0.5	3	1.5,1.5,1.8,1.9,2.2 (93), mean[5] 1.8	87/32,34,36A
		0.5+0.5	3	1.4,1.6,1.7,2.0,2.3 (93), mean[5] 1.8	87/31,33,35A

Crop	Country/Year	Appl. ai kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
Sunflower	France '86	0.3	1	<0.5 (120)	86/95E
		0.6	1	<0.5 (120)	86/94E
	'87	0.6	3	<0.5 (125-166)	87/133-135E
	Italy '88	0.3	2	<0.5 (119)	88/104,106E
		0.5	2	<0.5 (119)	88/105,107E
	'89	0.3	1	<0.5 (80)	89/35E
		0.5	1	<0.5 (80)	89/36E
	S Afr. '88	0.1	1	<0.5 (92)	88/136E
		0.2	1	<0.5 (92)	88/137E
		0.4	1	0.75 (92)	88/138E

Animal feed commodities - see Table 4.

Alfalfa. Data on residue trials were provided from Sweden and South Africa. At PHIs from 41 to 138 days, residues ranged from <0.05 to 0.77 mg/kg.

Hay. Residues in hay in The Netherlands were at a maximum of 0.86 mg/kg after 51 days and below 0.5 mg/kg at 264 and 273 days after treatment.

Table 4. Residues of cycloxydim in animal feeds from supervised trials. All trials used EC; mostly 200 g/l, a few 100 g/l.

Crop	Country/ Year	Appl. kg/ha	No. of trials	Residues (mg/kg) at intervals (days) after application	Ref.
Alfalfa	S Afr. '87	0.2	1	3.9 (7), 1.9 (14), 0.70 (28), 0.23 (53)	87/3A
		0.4	1	9.5 (7), 6.3 (15), 3.0 (28), 0.77 (53)	87/4A
		0.8	1	21 (7), 16 (15), 4.4 (28), 0.75 (53)	87/5A
	'89	0.1	1	0.74 (10), 0.70 (20), 0.11 (31), 0.12 (41)	89/1A
		0.2	1	0.57 (10), 0.50 (20), <0.05 (31), <0.05 (41)	89/2A
		0.4	1	6.1 (10), 2.7 (20), 0.82 (31), 0.44 (41)	89/3A
	Sweden '89	0.4	1	1.1 (28), 0.08 (138)	89/10A
		0.6	2	2.9, 3.1 (28); <0.05, 0.07 (138)	89/8,9A
Hay	N'lands '85	0.3	1	<0.5 (264)	86/32-35E
		0.6	1	<0.5 (264)	86/36-39E
	'86	0.3	1	<0.5 (273)	87/17-20E
		0.3	1	<0.5, <0.5, 0.51, 0.77 (57)	87/40-43E
		0.6	1	0.55, 0.73, 0.78, 0.79 (57)	87/44-47E
	'87	0.3	1	<0.5 (51)	87/21-24E
		0.6	1	0.78, 0.80, 0.82, 0.86 (51)	87/25-28E

APPRAISAL

Cycloxidim, a systemic cyclohexanedione herbicide, was reviewed for the first time by the 1992 JMPR. However, the time available did not allow adequate evaluation of the extensive residue data provided by the manufacturer. These data have been reviewed by the present Meeting.

Residue data were reported from supervised trials of cycloxidim carried out in 15 countries and on over 40 commodities. Although many of these trials were according to registered and/or recommended use patterns, some crop/ application rate combinations were not registered or the resultant data were very limited. In addition, residue data on bulb onions, parsnip, sunflower seed and hay were obtained using an analytical procedure with the comparatively high limit of determination of 0.5 mg/kg while that for Brussels sprouts was 0.25 mg/kg; determinations on all other commodities could be made down to 0.05 mg/kg.

Cycloxidim is applied as a foliar spray directly to the growing crop and also to soil as a surface application. Owing to its systemic properties some uptake and distribution is to be expected although the extent is likely to be variable as it is dependent on the growth stage; this is borne out by the wide variations observed in the residue data presented. As there is little alteration in residue level with time after application,

the PHIs are of little real significance.

These factors combined to make the estimation of suitable maximum residue levels for this compound rather complicated. However, despite these potential drawbacks the residue data were deemed to be sufficient to allow recommendations for MRLs to be made for 16 commodities. They were regarded as being inadequate, for various reasons, to support recommendations for the other commodities for which residue data were available. Data on citrus, pome and stone fruits were sparse, as were those on tropical fruits, cucurbits and some root and stem vegetables. Despite the absence of processing data on grapes, potatoes and sugar beet the Meeting felt able to recommend MRLs for those crops.

Residue data on beans (dry), rape seed and soya bean (dry) were deemed adequate and mutually supportive for a maximum residue level of 2 mg/kg to be estimated for each commodity. Similarly, despite the inherent variability, residue data on Brussels sprouts, cabbage and cauliflower were taken together to estimate a maximum level of 2 mg/kg for brassica vegetables. Data on common bean together with those for peas (in pod) supported a maximum residue level of 1 mg/kg for each, while for shelled peas (green) a level of 2 mg/kg was suggested; for peas (dry) the results were too variable to interpret with any degree of assurance. Residue data on carrot, leek, lettuce (head and leaf) and strawberry were also found to be adequate for the recommendations given in Annex I to be made.

RECOMMENDATIONS

On the basis of the data on residues from supervised trials the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits.

Definition of the residue: sum of 3-thian-3-yl-glutaric acid (TME) and 3-hydroxy-3-thian-3-ylglutaric acid (OH-TME), expressed as cycloxidim.

CCN	Commodity Name	Recommended MRL (mg/kg)		PHI on which based, days
		New	Previous	
VD 0071	Beans (dry)	2	-	-
VB 0040	Brassica vegetables	2	-	-
VR 0577	Carrot	0.5	-	-
VP 0526	Common bean (pods &/or immature seeds)	1	-	-

CCN	Commodity Name	Recommended MRL (mg/kg) New	Previous	PHI on which based, days
FB 0269	Grapes	0.5	-	-
VA 0384	Leek	0.2	-	-
VL 0482	Lettuce (Head)	0.2	-	-
VL 0483	Lettuce (Leaf)	0.2	-	-
VP 0063	Peas	1	-	-
VP 0064	Peas, shelled	2	-	-
VR 0589	Potato	2	-	-
SO 0495	Rape seed	2	-	-
VD 0541	Soya bean (dry)	2	-	-
FB 0275	Strawberry	0.5	-	-
VR 0596	Sugar beet	0.2	-	-
AV 0596	Sugar beet tops or leaves	1	-	-

FURTHER WORK OR INFORMATION

Desirable

1. Residue data from supervised trials on bulb onions, parsnip, sunflower seed and hay, using an analytical procedure with a lower limit of determination of about 0.05 mg/kg.

2. Processing studies on grapes, potatoes and sugar beet treated with cycloxidim in supervised trials.

REFERENCES

All residue data quoted in the Tables were provided by the manufacturer, BASF, Limburgerhof, Germany, and are unpublished. Relevant reference numbers for the many reports are given in the appropriate table or place in the text.