Click here for previous

Orga 3045 is flupropanate-sodium,
HZ 52.112 is credazine,
Pronamide is propyzamide,
R 12001 is S-isopropyl 5-ethyl-2-methylpiperidine-1-carbothiolate (Stauffer)

Comments on results

1. Haloxydine is active at low doses, giving control of Stellaria media and Amaranthus retroflexus and vigour reduction of 50% or more with white clover and the Avena sp., oat and wild oat, at 0.0625 lb/ac. The learlier Initial Activity Test showed that incorporation into the soil lowered the activity and this should be borne in mind when considering these results.

2. No specificity for a particular category of plants was found, severe effects occurring against perennial rhizomatous species as well as small and large seeded annual species. The effect on Agropyron repens was particularly noteworthy as all aerial shoots, rhizomes and roots were eventually killed by 7 weeks after application of 0.25 lb/ac.

3. The weed spectrum is very similar to that found for the chemically related pyriclor in an earlier test of this type, the degree of phytotoxicity being almost the same for both herbicides. Symptoms on affected plants were also similar, a progressive dieback occurring from an early growth stage following severe chlorosis. However the chlorosis resulting from haloxydine, although severe, is without the 'bleaching' effect caused by pyriclor.

4. The results of this experiment lend support to the suggested selectivity in kale, this crop being unaffected at 0.25 lb/ac. In an earlier post-emergence experiment kale was also tolerant to a foliar spray at the same rate, while there was a high level of activity against broadleaved weeds. From the present test good control of grasses and of Stellaria media is probable with pre-emergence treatments. Selectivities in other Brassicae seem probable, swede being tolerant at 0.06 lb/ac and reduced in vigour by only 30% at 0.25 lb/ac.

5. Some variation in susceptibility between the cereals is evident, with oat (and Avena fatua) more affected than wheat or barley.

6. Maize, groundnut and cotton tolerated 0.25 lb/ac but, among the tropical weed species in this experiment only Amaranthus retroflexus was controlled at this dose.

7. Cyperus rotundus was not controlled at 0.25 lb/ac but 1 lb/ac caused severe suppression lasting for a full 3 months. C. esculentus and Cynodon dactylon were similarly suppressed at this dose.

8. From results so far available a long period of persistence for haloxydine in the soil is indicated. When the soil was assayed three months after treatment using Avena fatua as test species, plants were reduced to 50% of fresh-weight of control at 0.25 lb/ac and killed at 1.0 lb/ac indicating very little, if any, breakdown in this period. This potential for persistence, coupled with a high water solubility and a proneness to leach as suggested by the manufacturer, may be of advantage for weed control in non-crop situations, but may be a disadvantage when used in annual crop rotations.

TRIAL NUMBER 511

SPECIES	TREATMENTS HALOXYDINE 0.0625 LB/AC		HALOXYDINE 0.2500 LB/AC		HALOXYDINE 1.0000 LB/AC	
WHEAT	88	xxxxxxxxxxxxxxxxxx	80	xxxxxxxxxxxxxxxx	7	x
(1)	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx	7	x
BARLEY	105	xxxxxxxxxxxxxxxxxxxx+	56	xxxxxxxxxxx	7	x
(2)	79	xxxxxxxxxxxxxxxx	36	xxxxxxx	7	x
OAT	100	xxxxxxxxxxxxxxxxxxx	6	x	0	
(3)	50	xxxxxxxxxx	7	x	0	
PER RYGR	83	xxxxxxxxxxxxxxxx	66	xxxxxxxxxxxxx	3	x
(4)	93	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
DWF BEAN	100	xxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	43	xxxxxxxxx
FLD BEAN	106	xxxxxxxxxxxxxxxxxx+	53	xxxxxxxxxx	71	xxxxxxxxxxxxx
(10)	79	xxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
PEA	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(11)	100	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	36	xxxxxxx
W CLOVER	62	xxxxxxxxxxx	0		0	
(12)	43	xxxxxxxxx	0		0	
KALE	104	xxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxx+	75	xxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
SWEDE	117	xxxxxxxxxxxxxxxxxx+	117	xxxxxxxxxxxxxxxxxx+	13	xxx
(17)	93	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	14	xxx
CARROT	135	xxxxxxxxxxxxxxxxxx+	39	xxxxxxxx	10	xx
(18)	86	xxxxxxxxxxxxxxxx	36	xxxxxxx	14	xxx
LETTUCE	130	xxxxxxxxxxxxxxxxxx+	78	xxxxxxxxxxxxxxx	26	xxxxx
(20)	93	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	29	xxxxxx
SUG BEET	127	xxxxxxxxxxxxxxxxxx+	50	xxxxxxxxxx	0	
(21)	93	xxxxxxxxxxxxxxxxx	36	xxxxxxx	0	

TRIAL NUMBER 511 — TREATMENTS

SPECIES	HALOXYDINE 0.0625 LB/AC		HALOXYDINE 0.2500 LB/AC		HALOXYDINE 1.0000 LB/AC	
AVE FATU	68	xxxxxxxxxxxxxx	0		0	
(26)	43	xxxxxxxxx	0		0	
ALO MYOS	107	xxxxxxxxxxxxxxxxxxxx+	37	xxxxxxx	33	xxxxxxx
(27)	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	21	xxxx
POA ANN	81	xxxxxxxxxxxxxxx	5	x	0	
(28)	64	xxxxxxxxxxxxx	14	xxx	0	
SEN VULG	121	xxxxxxxxxxxxxxxxxxx+	102	xxxxxxxxxxxxxxxxxxx	5	x
(34)	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	21	xxxx
CHEN ALB	93	xxxxxxxxxxxxxxxx	31	xxxxxx	0	
(39)	57	xxxxxxxxxx	36	xxxxxxx	0	
STEL MED	0		0		0	
(40)	0		0		0	
AG REPEN	100	xxxxxxxxxxxxxxxxx	40	xxxxxxxx	10	xx
(47)	100	xxxxxxxxxxxxxxxxxxx	21	xxxx	14	xxx
ALL VIN	94	xxxxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxxx+	94	xxxxxxxxxxxxxxxxx
(49)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	43	xxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxx
(58)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	50	xxxxxxxxxx
SORGHUM	100	xxxxxxxxxxxxxxxxx	63	xxxxxxxxxxxx	0	
(59)	66	xxxxxxxxxxxxxx	50	xxxxxxxxx	0	
RICE	85	xxxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxx	96	xxxxxxxxxxxxxxxxxx
(60)	86	xxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	21	xxxx
GRNDNUT	91	xxxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxx
(64)	86	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	29	xxxxxx
SOYABEAN	140	xxxxxxxxxxxxxxxxxxx+	120	xxxxxxxxxxxxxxxxxxx+	40	xxxxxxxx
(65)	86	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx

TRIAL NUMBER 511

SPECIES	TREATMENTS					
	HALOXYDINE 0.0625 LB/AC		HALOXYDINE 0.2500 LB/AC		HALOXYDINE 1.0000 LB/AC	
COTTON	91	xxxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxxx+	78	xxxxxxxxxxxxxxx
(66)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	43	xxxxxxxxx
KENAF	102	xxxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	0	
(68)	64	xxxxxxxxxxxx	57	xxxxxxxxxxx	0	
ECH CRUS	84	xxxxxxxxxxxxxxxxx	33	xxxxxxx	0	
(75)	79	xxxxxxxxxxxxxxxx	36	xxxxxxx	0	
AMAR RET	9	xx	0		0	
(78)	21	xxxx	0		0	
CYP ROTU	100	xxxxxxxxxxxxxxxxxxx	90	xxxxxxxxxxxxxxxxx	70	xxxxxxxxxxxxx
(86)	100	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	43	xxxxxxxxx
	*99	xxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	8	xx
POL LAPA	89	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	61	xxxxxxxxxxx
(35)	71	xxxxxxxxxxxxxx	64	xxxxxxxxxxxx	36	xxxxxx

HISTOGRAMS BASED ON VIGOUR SCORES ONLY

CIRS ARV	64	xxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxx
(50)						
TUS FARF	93	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx	29	xxxxx
(51)						
CONV ARV	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxx	14	xxx
(52)						
RUM ACET	93	xxxxxxxxxxxxxxxxx	43	xxxxxxxx	36	xxxxxx
(53)						

* Based on fresh weight of foliage as a percentage of untreated control three months after treatment.

RESULTS AND COMMENTS: Pre-emergence selectivity experiment G.69.37 (511)

HZ 52.112

Code number: HZ 52.112 Suggested common name: credazine

Chemical name: 3-(2-methyl phenoxy) pyridazine

Other designations:

HER 52.112	RZ Si 1197
H 722	SW 6701
ASS-722	SW 6721
	130-547

Source: Sandoz Ltd.,
3090 Agro Research,
CH-4002 Basle,
Switzerland.

Originally developed by Sankyo in Japan.

Technical information available:
Sandoz preliminary Data Sheet dated 15.5.70

Manufacturers suggestions for principal uses:
Pre-emergence control of annual grasses and some dicotyledonous species in a variety of crops including potato, sugar beet, fruit crops and many leguminous crops.

Other W.R.O. experiments: Initial Activity Test G.69.21

Formulation used: 80% w/w wettable powder

Doses:

lb/ac	0.5	2.0	8.0
kg/ha	0.56	2.24	8.97

Spray volume: 338 l/ha (30.1 gal/ac)

Summary of results:

Full results are given in the histograms and are summarised in the selectivity table below.

RATE lb/ac (kg/ha)	CROPS: vigour reduced by less than 15%	WEEDS: vigour reduced by more than 70%
0.5 (0.56)	Dwarf French bean	Poa annua Chenopodium album Stellaria media Allium vineale Rumex acetosella

Comments on results

1. A high level of activity was found, with control of Poa annua, Chenopodium album, Stellaria media, Allium vinealle and Rumex acetosella at the low dose rate of 0.5 lb/ac. Twenty one of the other crop and weed species tested were reduced in vigour by 50% or more at this same rate, eleven of these being grasses and ten being broadleaved species. In the earlier Initial Activity Test symptoms of damage were found on the grasses at dose rates as low as 0.2 lb/ac.

2. The histograms show that for many broadleaved species such as Chenopodium album, and Stellaria media the vigour of surviving plants is the same at all doses. In these cases plants had reached the cotyledon leaf stage, these being fully opened and green, but the main bud was severely inhibited. The cotyledons usually remained green for a considerable time before eventual necrosis. However, with the grasses, inhibition of the main shoot usually accompanied by a mild chlorosis of all leaves, had progressed to the death of all tissue by the time of assessment. These symptoms above ground were associated with and at least to some extent a result of severe inhibition of root growth. Plants with moderately healthy shoots were sometimes found to have a very stunted root system.

3. The effects described above are comparable to those obtained with chlorfenac and the spectrum of susceptibility is much the same with a few exceptions including Convolvulus arvensis. The latter is generally considered susceptible to chlorfenac but was apparently tolerant of HZ 52112. However the C. arvensis in this experiment had very poorly developed roots even in the controls and the HZ 52112 did not therefore have the opportunity to secure such marked effects on the plant by way of root inhibition.

4. Crop tolerance is very low for both herbicides, many graminaceous crops in particular being very sensitive. The anomalous species is dwarf french bean which was tolerant of 0.5 lb/ac. In the earlier Initial Activity Test it was tolerant to 1 lb/ac, again with incorporation into the soil, while there was only 21% reduction in vigour with surface application at this rate. Considerable tolerance was found with post-emergence foliar sprays and soil drenches even at 5.0 lb/ac. In this same Initial Activity Test incorporation of 1 lb/ac reduced the vigour of Agropyron repens by more than 60%. In the present experiment only one plant of A. repens in each replicate pot ultimately survived treatment with 0.5 lb/ac. With the possibility of control of a number of other assorted species it would seem worthwhile to investigate further its possible use in dwarf bean to evaluate its merits in comparison with dinoseb acetate - monolinuron mixtures.

5. Groundnut and kenaf were the tropical crops showing the best tolerance to 0.5 lb/ac, with cotton, maize and soyabean also showing partial tolerance. The tropical grass species were mostly controlled by 0.5 lb/ac but there is no very promising margin of selectivity for general weed control.

6. Cyperus rotundus showed prolonged suppression by 0.5 lb/ac (75% reduction in fresh weight at 3 months). Symptoms of reduced root development and weak, narrow foliage were very reminiscent of those caused by chlorfenac. 8 lb/ac caused complete suppression of growth of both Cyperus species but by transfer of C. esculentus tubers from this treatment to clean soil it was shown that the tubers were not killed and that continued suppression depended on persistence of the herbicide in the soil. The root development of Cynodon dactylon was completely prevented at 0.5 lb/ac. Possible selective control of Cyperus in groundnuts is indicated at 0.5 lb/ac.

7. From the results so far available a long period of persistence seems probable. Using perennial ryegrass as a test species, plants were reduced to only 5% of the fresh weight of the controls when soil was bicassayed 3 months after treatment at 0.5 lb/ac.

8. The results obtained against perennial species, together with the capacity to persist in soil suggest the possible use of this herbicide in non crop situations.

TRIAL NUMBER 511

SPECIES		TREATMENTS HZ52.112 0.5000 LB/AC		HZ52.112 2.0000 LB/AC		HZ52.112 8.0000 LB/AC
WHEAT	73	xxxxxxxxxxxxxxx	0		0	
(1)	43	xxxxxxxxx	0		0	
BARLEY	91	xxxxxxxxxxxxxxxxxx	0		0	
(2)	29	xxxxxx	0		0	
OAT	75	xxxxxxxxxxxxxxx	6	x	0	
(3)	36	xxxxxxx	7	x	0	
PER RYGR	3	x	0		0	
(4)	14	xxx	0		0	
DWF BEAN	100	xxxxxxxxxxxxxxxxxxx	67	xxxxxxxxxxxxx	0	
(9)	100	xxxxxxxxxxxxxxxxxxx	36	xxxxxxx	0	
FLD BEAN	141	xxxxxxxxxxxxxxxxxxx+	18	xxxx	0	
(10)	50	xxxxxxxxxx	14	xxx	0	
PEA	43	xxxxxxxxx	14	xxx	0	
(11)	64	xxxxxxxxxxxx	14	xxx	0	
W CLOVER	95	xxxxxxxxxxxxxxxxxx	84	xxxxxxxxxxxxxxxx	40	xxxxxxxx
(12)	29	xxxxxx	29	xxxxxx	29	xxxxxx
KALE	104	xxxxxxxxxxxxxxxxxxx+	110	xxxxxxxxxxxxxxxxxxx+	92	xxxxxxxxxxxxxxxxx
(15)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
SWEDE	91	xxxxxxxxxxxxxxxxx	117	xxxxxxxxxxxxxxxxxx+	111	xxxxxxxxxxxxxxxxxx+
(17)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx
CARROT	97	xxxxxxxxxxxxxxxxx	19	xxxx	0	
(18)	29	xxxxxx	7	x	0	
LETTUCE	98	xxxxxxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxx	78	xxxxxxxxxxxxxxx
(20)	36	xxxxxxx	29	xxxxxx	21	xxxx
SUG BEET	105	xxxxxxxxxxxxxxxxxx+	86	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx
(21)	43	xxxxxxxxx	29	xxxxxx	29	xxxxxx

TRIAL NUMBER 511

SPECIES		TREATMENTS HZ52.112 0.5000 LB/AC		HZ52.112 2.0000 LB/AC		HZ52.112 8.0000 LB/AC
AVE FATU	53	xxxxxxxxxx	7	x	0	
(26)	36	xxxxxx	14	xxx	0	
ALO MYOS	40	xxxxxxxx	0		0	
(27)	36	xxxxxx	0		0	
POA ANN	7	x	0		0	
(28)	29	xxxxxx	0		0	
SEN VULG	68	xxxxxxxxxxxxxx	15	xxx	19	xxxx
(34)	36	xxxxxx	29	xxxxxx	7	x
CHEN ALB	103	xxxxxxxxxxxxxxxxxxx+	52	xxxxxxxxxx	72	xxxxxxxxxxxxx
(39)	29	xxxxxx	29	xxxxxx	29	xxxxxx
STEL MED	98	xxxxxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxxx	85	xxxxxxxxxxxxxxxx
(40)	29	xxxxxx	29	xxxxxx	29	xxxxxx
AG REPEN	20	xxxx	0		0	
(47)	43	xxxxxxxxx	0		0	
ALL VIN	111	xxxxxxxxxxxxxxxxxx+	60	xxxxxxxxxxx	17	xxx
(49)	29	xxxxxx	29	xxxxxx	21	xxxx
MAIZE	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	67	xxxxxxxxxxxx
(58)	71	xxxxxxxxxxxxx	57	xxxxxxxxxx	29	xxxxxx
SORGHUM	50	xxxxxxxxx	13	xxx	0	
(59)	43	xxxxxxxxx	21	xxxx	0	
RICE	102	xxxxxxxxxxxxxxxxxx	11	xx	0	
(60)	43	xxxxxxxxx	21	xxxx	0	
GRNDNUT	104	xxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxx+
(64)	79	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
SOYABEAN	120	xxxxxxxxxxxxxxxxxx+	120	xxxxxxxxxxxxxxxxxx+	120	xxxxxxxxxxxxxxxxxx+
(65)	71	xxxxxxxxxxxx	57	xxxxxxxxxx	29	xxxxxx

TRIAL NUMBER 511

SPECIES		TREATMENTS HZ52.112 0.5000 LB/AC		HZ52.112 2.0000 LB/AC		HZ52.112 8.0000 LB/AC
COTTON	91	xxxxxxxxxxxxxxxxxx	143	xxxxxxxxxxxxxxxxxxxx+	143	xxxxxxxxxxxxxxxxxxx+
(66)	57	xxxxxxxxxxx	64	xxxxxxxxxxxxx	43	xxxxxxxxx
KENAF	96	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	26	xxxxx
(68)	79	xxxxxxxxxxxxxxxx	57	xxxxxxxxxxx	29	xxxxxx
ECH CRUS	28	xxxxxx	0		0	
(75)	36	xxxxxxx	0		0	
AMAR RET	78	xxxxxxxxxxxxxxxx	61	xxxxxxxxxxxx	35	xxxxxxx
(78)	36	xxxxxxx	29	xxxxxx	14	xxx
CYP ROTU	100	xxxxxxxxxxxxxxxxxxx	60	xxxxxxxxxxxx	0	
(86)	50	xxxxxxxxx	43	xxxxxxxxx	0	
	*27	xxxxx	2	x	0	
POL LAPA	100	xxxxxxxxxxxxxxxxxx	106	xxxxxxxxxxxxxxxxxx+	67	xxxxxxxxxxxx
(35)	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	57	xxxxxxxxxx

HISTOGRAMS BASED ON VIGOUR SCORES ONLY

CIRS ARV	57	xxxxxxxxxx	29	xxxxxx	0	
(50)						
TUS FARF	57	xxxxxxxxxx	57	xxxxxxxxxx	0	
(51)						
CONV ARV	71	xxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
(52)						
RUM ACET	0		0		0	
(53)						

* Based on fresh weight of foliage as a percentage of untreated control three months after treatment.

RESULTS AND COMMENTS: Pre-emergence selectivity experiment G69.37 (511)

PRONAMIDE

Code number: RH 315

Chemical name: N-(1,1-dimethylpropynyl)-3,5-dichlorobenzamide

Trade name: 'KERB'

Source: Lennig Chemicals Ltd.,
17 Ware Road,
Hertford

as agents for Rohm & Haas,
Philadelphia,
U.S.A.

Technical information available:
Rohm & Haas Technical bulletin dated September 1969.
Proceedings 3rd E.W.R.C. Symposium on New Herbicides 1969, 249-259.

Manufacturers' suggestions for principal uses:
Pre-emergence and early post-emergence control of a wide range of seedling grass and dicotyledonous weeds, and of Agropyron repens. Selective in new plantings of small-seeded legumes and in lettuce, with additional possibilities in leguminous and composite crops. Agropyron repens control when land is out of crop.

Other W.R.O. experiments:
Initial Activity Test G.69.16

Formulation used: 75% w/w wettable powder

Doses:

lb/ac	0.25	1.0	4.0
kg/ha	0.28	1.12	4.48

Spray volume: 338 l/ha (30.1 gal/ac)

Summary of results

Full results are given in the histograms and are summarised in the table below.

RATE lb/ac (kg/ha)	CROPS: vigour reduced less than 15%	WEEDS: vigour reduced by more than 70%
4.0 (4.48)	lettuce	Echinochloa crus-galli Convolvulus arvensis + species below
1.0 (1.12)	As above + field bean pea white clover swede carrot groundnut soyabean cotton	Chenopodium album Stellaria media Polygonum lapathifolium Amaranthus retroflexus Rumex acetosella + species below
0.25 (0.28)	as above + kale sugar beet maize *sorghum rice kenaf	Avena fatua Alopecurus myosuroides Poa annua Agropyron repens

* But note some reduction in stand

Comments on results

1. A high level of activity was found with control of all the main annual and perennial grass weeds at 0.25 lb/ac, and five dicotyledonous weeds at 1.0 lb/ac. The type of activity was similar to that found with other amides and carbamates. Grasses either failed to emerge from the soil, or died back at an early growth stage before or soon after emergence from the coleoptile. Foliage often became a much darker green colour. This latter effect was also seen with some of the dicotyledonous species. Stellaria media plants were seen to have shortened, swollen internodes. Stems of sugar beet and swede were also swollen below their cotyledons. With Agropyron repens, rhizome fragments were still firm six weeks after treatment but growth of buds had been completely prevented at all doses. In other pot experiments with perennial grasses, swollen internodes and apical shoots have been found on rhizomes, symptoms very similar to those produced by dichlobenil. The swelling of stem internodes of dicotyledonous species has been observed with another amide, carbetamide (RP 11561) especially on Polygonaceae.

2. A wide range of broadleaved weed species was controlled. In common with other amides and carbamates such as carbetamide and chlorpropham, Polygonaceae were very sensitive. Polygonum lapathifolium was controlled at 1.0 lb/ac and although results obtained with Polygonum aviculare were unsatisfactory for processing due to poor germination, plants which did succeed in emerging at the 1.0 lb/ac and 4.0 lb/ac rates died back soon afterwards due to the herbicide. Results obtained with Rumex acetosella confirm the susceptibility of this species found in an earlier experiment. In this test, there was complete absence of bud development on the root fragments treated with 1.0 lb/ac. At 0.25 lb/ac growth of buds on some root fragments was completely inhibited while with others the shoots which

developed showed obvious, although non-lethal effects from the herbicide. In the earlier Initial Activity Test, Polygonum amphibium was controlled at 1.0 lb/ac.

3. The tolerance of lettuce to RH 315 extends to other Compositae thereby creating a gap in the weed control spectrum. The vigour of Senecio vulgaris, Cirsium arvense and Tussilago farfara was relatively unaffected at 4.0 lb/ac.

4. As with some amides and carbamates, crop tolerance was found in many broadleaved species, notably the Leguminosae. The small seeded white clover was tolerant at 1.0 lb/ac lending support to the suggested use in the establishment of small seeded legumes. The tolerance found with field bean at 1.0 lb/ac is important as many problem weeds found in this crop were controlled by RH 315 e.g. Avena fatua, Agropyron repens and Polygonum aviculare. Testing of this herbicide in comparison with tri-allate and simazine for field bean seems desirable. Although simazine is widely used there are still reports of damage when high rainfall and soil type favours leaching. RH 315 would seem to have a greater potential for weed control in winter beans than in spring beans, in view of the reported greater stability and effectiveness under cool moist conditions; it may be particularly relevant where beans are following cereals as a break crop on land infested with couch and other grasses. In a similar way comparison with other herbicides in use for weed control in peas is warranted; in the present experiment this crop was tolerant of 1.0 lb/ac.

5. Lettuce was the most tolerant of all crop species tested, being unaffected at 4.0 lb/ac. Reports elsewhere have shown tolerance to higher doses.

6. Of the Brassica crops tested swede was a little more tolerant than kale at 1.0 lb/ac. The short persistence of the herbicide could prove a disadvantage, although with kale this may be just long enough to control weeds until an adequate foliar canopy is attained.

7. The tropical legumes, groundnut and soyabean together with cotton, tolerated 1 lb/ac, so suggesting the possibility of selective control of annual grasses and some dicots, including Amaranthus. However, it is understood that this compound does not perform so well under hot, dry conditions. Certainly Echinochloa shows less susceptibility than the temperate small-seeded grasses and Cynodon was distinctly less susceptible than Agropyron. In view of the reports of greater effectiveness under cool moist conditions particular care is needed in comparing the susceptibility of species maintained in the greenhouse with the higher temperature with that of species kept at a lower temperature (see Table 1).

8. Cyperus species tolerated 4 lb/ac.

TRIAL NUMBER 511 — TREATMENTS

SPECIES	PRONAMIDE 0.2500 LB/AC		PRONAMIDE 1.0000 LB/AC		PRONAMIDE 4.0000 LB/AC	
WHEAT	0		0		0	
(1)	0		0		0	
BARLEY	84	xxxxxxxxxxxxxxxxx	0		0	
(2)	29	xxxxxx	0		0	
OAT	63	xxxxxxxxxxxx	0		0	
(3)	29	xxxxxx	0		0	
PER RYGR	10	xx	0		0	
(4)	29	xxxxxx	0		0	
DWF BEAN	83	xxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	33	xxxxxxx
(9)	79	xxxxxxxxxxxxxxx	36	xxxxxxx	7	x
FLD BEAN	106	xxxxxxxxxxxxxxxxxxx+	106	xxxxxxxxxxxxxxxxxxx+	106	xxxxxxxxxxxxxxxxxxx+
(10)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	29	xxxxxx
PEA	100	xxxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	71	xxxxxxxxxxxxx
(11)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
W CLOVER	91	xxxxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxx	44	xxxxxxxx
(12)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	29	xxxxxx
KALE	115	xxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxx+	81	xxxxxxxxxxxxxxx
(15)	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	29	xxxxxx
SWEDE	111	xxxxxxxxxxxxxxxxxx+	117	xxxxxxxxxxxxxxxxxx+	65	xxxxxxxxxxxx
(17)	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	29	xxxxxx
CARROT	97	xxxxxxxxxxxxxxxxx	77	xxxxxxxxxxxxxx	68	xxxxxxxxxxxxx
(18)	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	36	xxxxxxx
LETTUCE	143	xxxxxxxxxxxxxxxxxx+	117	xxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx
(20)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
SUG BEET	109	xxxxxxxxxxxxxxxxxx+	18	xxxx	23	xxxxx
(21)	100	xxxxxxxxxxxxxxxxxx	29	xxxxxx	29	xxxxxx

TRIAL NUMBER 511 TREATMENTS

SPECIES	PRONAMIDE 0.2500 LB/AC		PRONAMIDE 1.0000 LB/AC		PRONAMIDE 4.0000 LB/AC	
AVE FATU	23	xxxxx	15	xxx	0	
(26)	21	xxxx	21	xxxx	0	
ALO MYOS	53	xxxxxxxxxxx	10	xx	0	
(27)	29	xxxxxx	7	x	0	
POA ANN	2		0		0	
(28)	14	xxx	0		0	
SEN VULG	92	xxxxxxxxxxxxxxxxx	58	xxxxxxxxxxx	29	xxxxxx
(34)	100	xxxxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
CHEN ALB	119	xxxxxxxxxxxxxxxxxxx+	83	xxxxxxxxxxxxxxxx	41	xxxxxxxx
(39)	93	xxxxxxxxxxxxxxxxxx	29	xxxxxx	29	xxxxxx
STEL MED	57	xxxxxxxxxx	25	xxxxx	30	xxxxxx
(40)	50	xxxxxxxxxx	29	xxxxxx	29	xxxxxx
AG REPEN	0		0		0	
(47)	0		0		0	
ALL VIN	103	xxxxxxxxxxxxxxxxxx+	94	xxxxxxxxxxxxxxxxxx	103	xxxxxxxxxxxxxxxxxx+
(49)	100	xxxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx
MAIZE	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
(58)	100	xxxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	36	xxxxxx
SORGHUM	63	xxxxxxxxxx	42r	xxxxxxx	13	xxx
(59)	93	xxxxxxxxxxxxxxxxx	70r	xxxxxxxxxxxx	7	x
RICE	108	xxxxxxxxxxxxxxxxxx+	108	xxxxxxxxxxxxxxxxxx+	0	
(60)	93	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx	0	
GRNDNUT	104	xxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx	104	xxxxxxxxxxxxxxxxxx+
(64)	93	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxx
SOYABEAN	140	xxxxxxxxxxxxxxxxxx+	120	xxxxxxxxxxxxxxxxxx+	140	xxxxxxxxxxxxxxxxxx+
(65)	93	xxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	50	xxxxxxxxx

TRIAL NUMBER 511

SPECIES	TREATMENTS PRONAMIDE 0.2500 LB/AC		PRONAMIDE 1.0000 LB/AC		PRONAMIDE 4.0000 LB/AC	
COTTON	117	xxxxxxxxxxxxxxxxxxx+	104	xxxxxxxxxxxxxxxxxxx+	157	xxxxxxxxxxxxxxxxxxx+
(66)	93	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
KENAF	96	xxxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxx	32	xxxxxx
(68)	86	xxxxxxxxxxxxxxxxx	57	xxxxxxxxxx	21	xxxx
ECH CRUS	75	xxxxxxxxxxxxxxx	14	xxx	0	
(75)	93	xxxxxxxxxxxxxxxxxx	36	xxxxxxx	0	
AMAR RET	87	xxxxxxxxxxxxxxxxx	9	xx	0	
(78)	100	xxxxxxxxxxxxxxxxxx	21	xxxx	0	
CYP ROTU	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx
(86)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx
	*82	xxxxxxxxxxxxxxxx	87	xxxxxxxxxxxxxxxx	95	xxxxxxxxxxxxxxxxx
POL LAPA	83	xxxxxxxxxxxxxxxx	33	xxxxxx	0	
(35)	57	xxxxxxxxxx	29	xxxxxx	0	

HISTOGRAMS BASED ON VIGOUR SCORES ONLY

CIRS ARV	71	xxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
(50)						
TUS FARF	86	xxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
(51)						
CONV ARV	43	xxxxxxxxx	64	xxxxxxxxxxxx	21	xxxx
(52)						
RUM ACET	71	xxxxxxxxxxxxx	0		0	
(53)						

* Based on fresh weight of foliage as a percentage of untreated control three months after treatment.

RESULTS AND COMMENTS: Pre-emergence selectivity experiment G.69.37 (511)

R 12001

Code number: R 12001

Chemical name: S-isopropyl 1-(5-ethyl-2-methyl-piperidine)carbothioate

Source: Stauffer Chemical Company,
P.O. Box 760,
Mountain View,
California 94040,
U.S.A.

Manufacturers' suggestions for principal uses:
Control of Cyperus species in cotton at 4 lb/ac pre-plant incorporated; also control of other perennial grasses, annual grasses and some broadleaved weeds.

Other W.R.O. Experiments:
Initial Activity Test G.69.27

Formulation used: 90.6% w/w emulsifiable concentrate

Doses:				
	lb/ac	0.5	2.0	8.0
	kg/ha	0.56	2.24	8.97

Spray volume: 338 l/ha (30.1 gal/ac)

Summary of results:

Full results are given in the histograms and are summarised in the table below.

RATE lb/ac (kg/ha)	CROPS: vigour reduced by less than 15%	WEEDS: vigour reduced by more than 70%
2.0 (2.24)	dwarf french bean kale maize	Avena fatua Chenopodium album Stellaria media Allium vineale Amaranthus retroflexus Convolvulus arvensis + species below
0.5 (0.56)	As above + barley oat field bean pea white clover swede groundnut cotton	Alopecurus myosuroides Poa annua Echinochloa crus-galli

Comments on results

1. R 12001 appears to be an active herbicide for the control of annual grasses. Alopecurus myosuroides, Poa annua and Echinochloa crus-galli were all controlled at 0.5 lb/ac. At 2.0 lb/ac a range of broadleaved weeds were controlled as well. Symptoms produced on many plants were typical of those caused by thiolcarbamate herbicides with leaves dark green in colour, wax development affected, leading to sticking together of leaf surfaces during bud expansion, and consequent trapping, deformity and inhibition of shoots. The earlier Initial Activity Test had shown that for pre-emergence treatments, incorporation into the soil was more effective than surface application.

2. Useful effects were found on some of the perennial weeds. With Agropyron repens, treatment at 2.0 lb/ac resulted in 80% plant kill. One plant in each replicate pot managed to survive. Examination of underground systems two months after treatment showed that although buds on the rhizome fragments had sprouted, they were completely inhibited soon afterwards and did not succeed in emerging. Similar effects were seen with Tussilago farfara, controlled at 8.0 lb/ac and Convolvulus arvensis controlled at 2.0 lb/ac. In the latter species there were cases of several buds having sprouted on a root fragment but none succeeded in emerging.

3. Apart from Polygonum lapathifolium controlled at 8.0 lb/ac, other Polygonaceae showed considerable tolerance. Polygonum aviculare and Rumex autosella survived treatment at this dose. In the earlier Initial Activity Test, Polygonum amphibium was tolerant at 4.5 lb/ac.

4. Several of the leguminous crops were resistant, particularly dwarf french bean which was unaffected at 2.0 lb/ac. At 8.0 lb/ac there was some retardation of growth, while unifoliate leaves became a darker green colour than those of the controls with some marginal necrotic spots. The tolerance level is probably much higher than the 2 lb/ac indicated here, for in the earlier Initial Activity Test, plants were unaffected by pre-emergence treatments at 4.5 lb/ac. Inclusion of this herbicide in field experiments with this crop seems justified.

5. Although kale appears in the histograms and table as satisfying the criteria for selectivity at 2.0 lb/ac there was complete removal of wax from the leaf surfaces with one or two marginal necrotic spots.

6. Although of the temperate cereals, barley and oat were tolerant at 0.5 lb/ac, they were severely reduced at 2.0 lb/ac. As only grass weeds were controlled at the lower rate and incorporation is necessary, this herbicide would not appear to have any advantage over existing herbicides used in cereals.

7. Maize showed a marked tolerance, and this compound seems worthy of comparison with EPTC and butylate for selectivity against annual grasses and Cyperus spp.

8. Groundnut and cotton have a lower tolerance and the selectivity against Cyperus rotundus in cotton, suggested by the manufacturers, is hardly borne out, though there is still some selectivity against annual grasses.

9. Effects on Cyperus species were maintained much more persistently than would be expected of EPTC. There was still 90% suppression of C. rotundus by 2 lb/ac after 3 months. Complete suppression at 8 lb/ac was shown to depend on herbicide persistence in the soil: tubers of C. esculentus regrew on removal to clean soil. Cynodon dactylon was also susceptible at 2 lb/ac.

10. A reasonable period of persistence is apparent, as seen from a test showing that three months after spraying at 2 lb/ac perennial ryegrass plants were still killed.

TRIAL NUMBER 511

SPECIES		TREATMENTS R 12001 0.5000 LB/AC		R 12001 2.0000 LB/AC		R 12001 8.0000 LB/AC
WHEAT	102	xxxxxxxxxxxxxxxxxxx	0		0	
(1)	71	xxxxxxxxxxxxxx	0		0	
BARLEY	98	xxxxxxxxxxxxxxxxxxx	28	xxxxxx	21	xxxx
(2)	100	xxxxxxxxxxxxxxxxxxx	29	xxxxxx	7	x
OAT	100	xxxxxxxxxxxxxxxxxxx	31	xxxxxx	0	
(3)	86	xxxxxxxxxxxxxxxx	36	xxxxxxx	0	
PER RYGR	86	xxxxxxxxxxxxxxxx	34	xxxxxxx	0	
(4)	43	xxxxxxxx	21	xxxx	0	
DWF BEAN	83	xxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx	83	xxxxxxxxxxxxxxxxx
(9)	100	xxxxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxxx
FLD BEAN	141	xxxxxxxxxxxxxxxxxx+	141	xxxxxxxxxxxxxxxxxx+	71	xxxxxxxxxxxxx
(10)	93	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	21	xxxx
PEA	86	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	57	xxxxxxxxxx
(11)	93	xxxxxxxxxxxxxxxxx	14	xxx	14	xxx
W CLOVER	77	xxxxxxxxxxxxxxx	88	xxxxxxxxxxxxxxxxx	11	xx
(12)	86	xxxxxxxxxxxxxxxx	43	xxxxxxxxx	29	xxxxxx
KALE	98	xxxxxxxxxxxxxxxxxx	110	xxxxxxxxxxxxxxxxxx+	92	xxxxxxxxxxxxxxxxx
(15)	86	xxxxxxxxxxxxxxxx	86	xxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
SWEDE	117	xxxxxxxxxxxxxxxxxx+	91	xxxxxxxxxxxxxxxxx	111	xxxxxxxxxxxxxxxxxx+
(17)	100	xxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	50	xxxxxxxxx
CARROT	77	xxxxxxxxxxxxxx	126	xxxxxxxxxxxxxxxxxx+	19	xxxx
(18)	79	xxxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx
LETTUCE	78	xxxxxxxxxxxxx	13	xxx	0	
(20)	71	xxxxxxxxxxxxx	14	xxx	0	
SUG BEET	64	xxxxxxxxxxxx	105	xxxxxxxxxxxxxxxxx+	14	xxx
(21)	79	xxxxxxxxxxxxx	43	xxxxxxxxx	14	xxx

TRIAL NUMBER 511

SPECIES		TREATMENTS R 12001 0.5000 LB/AC		R 12001 2.0000 LB/AC		R 12001 8.0000 LB/AC
AVE FATU	68	xxxxxxxxxxxxx	7	x	0	
(26)	57	xxxxxxxxxxx	21	xxxx	0	
ALO MYOS	53	xxxxxxxxxxx	27	xxxxx	0	
(27)	29	xxxxxx	21	xxxx	0	
POA ANN	0		0		0	
(28)	0		0		0	
SEN VULG	82	xxxxxxxxxxxxxxxx	44	xxxxxxxxx	0	
(34)	86	xxxxxxxxxxxxxxxxx	50	xxxxxxxxxx	0	
CHEN ALB	98	xxxxxxxxxxxxxxxxxxx	0		0	
(39)	93	xxxxxxxxxxxxxxxxxx	0		0	
STEL MED	87	xxxxxxxxxxxxxxxx	63	xxxxxxxxxxxx	25	xxxxx
(40)	71	xxxxxxxxxxxxx	29	xxxxxx	29	xxxxxx
AG REPEN	110	xxxxxxxxxxxxxxxxxxx+	20	xxxx	0	
(47)	71	xxxxxxxxxxxx	43	xxxxxxxx	0	
ALL VIN	103	xxxxxxxxxxxxxxxxxxx+	77	xxxxxxxxxxxxxx	26	xxxxx
(49)	71	xxxxxxxxxxxxx	29	xxxxxx	14	xxx
MAIZE	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx
(58)	100	xxxxxxxxxxxxxxxxxx	100	xxxxxxxxxxxxxxxxxxx	64	xxxxxxxxxxxx
SORGHUM	0		0		0	
(59)	0		0		0	
RICE	102	xxxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxx	6	x
(60)	71	xxxxxxxxxxxx	21	xxxx	7	x
GRNDNUT	91	xxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxx	91	xxxxxxxxxxxxxxxxx
(64)	93	xxxxxxxxxxxxxxxxxx	79	xxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
SOYABEAN	120	xxxxxxxxxxxxxxxxxx+	80	xxxxxxxxxxxxxxx	0	
(65)	64	xxxxxxxxxxx	14	xxx	0	

TRIAL NUMBER 511

SPECIES		TREATMENTS R 12001 0.5000 LB/AC		R 12001 2.0000 LB/AC		R 12001 8.0000 LB/AC
COTTON	143	xxxxxxxxxx.xxxxxxxxx+	130	xxxxxxxxxxxxxxxxxxx+	117	xxxxxxxxxxxxxxxxxx+
(66)	93	xxxxxxxxxx.xxxxxxx	71	xxxxxxxxxxxxx	57	xxxxxxxxxx
KENAF	89	xxxxxxxxxx.xxxxxxx	57	xxxxxxxxxx	6	x
(68)	64	xxxxxxxxxx.x	36	xxxxxx	7	x
ECH CRUS	52	xxxxxxxxx	9	xx	0	
(75)	29	xxxxx	14	xxx	0	
AMAR RET	35	xxxxxx	0		0	
(78)	86	xxxxxxxxxxxxxxx	0		0	
CYP ROTU	100	xxxxxxxxxxxxxxxxxx	20	xxxx	0	
(86)	57	xxxxxxxxxx	43	xxxxxxxxx	0	
	*85	xxxxxxxxxxxxxxx	10	xx	0	
POL LAPA	89	xxxxxxxxxxxxxxxx	89	xxxxxxxxxxxxxxxx	44	xxxxxxxx
(35)	86	xxxxxxxxxxxxxxx	64	xxxxxxxxxxx	29	xxxxx

HISTOGRAMS BASED ON VIGOUR SCORES ONLY

CIRS ARV	93	xxxxxxxxxxxxxxxxx	93	xxxxxxxxxxxxxxxxx	71	xxxxxxxxxxxxx
(50)						
TUS FARF	50	xxxxxxxxx	64	xxxxxxxxxxx	21	xxx
(51)						
CONV ARV	71	xxxxxxxxxxxxx	14	xxx	0	
(52)						
RUM ACET	79	xxxxxxxxxxxxxx	79	xxxxxxxxxxxxxx	57	xxxxxxxxx
(53)						

* Based on fresh weight of foliage as a percentage of untreated control three months after treatment.

AGRICULTURAL RESEARCH COUNCIL

WEED RESEARCH ORGANIZATION

Technical reports available

5. A survey of the problem of aquatic weed control in England and Wales. October, 1967. T.O. Robson. Price - £0.25.

6. The botany, ecology, agronomy and control of Poa trivialis L. rough-stalked meadow-grass. November 1966. G.P. Allen. Price - £0.25.

7. Flame cultivation experiments 1965. October, 1966. G.W. Ivens. Price - £0.25.

8. The development of selective herbicides for kale in the United Kingdom. 2. The methylthiotriazines. Price - £0.25.

9. The post-emergence selectivity of some newly developed herbicides (NC 6627, NC 4780, NC 4762, BH 584, BH 1455). December, 1967. K. Holly and Mrs. A.K. Wilson. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.50.

10. The Liverwort, Marchantia polymorpha, L. as a weed problem in horticulture; its extent and control. July, 1968. I.E. Henson. Price - £0.25.

11. Raising plants for herbicide evaluation; a comparison of compost types. July, 1968. I.E. Henson. Price - £0.25.

12. Studies on the regeneration of perennial weeds in the glasshouse: I. Temperate species. May, 1969. I.E. Henson. Price - £0.25.

13. Changes in the germination capacity of three Polygonum species following low temperature moist storage. June, 1969. I.E. Henson. Price - £0.25.

14. Studies on the regeneration of perennial weeds in the glasshouse. II. Tropical species. May, 1970. I.E. Henson. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.50.

15. Methods of analysis for herbicide residues in use at the Weed Research Organization. December, 1970. R.J. Hance and C.E. McKone. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.50.

16. Report on a joint survey of the presence of wild oat seeds in cereal seed drills in the United Kingdon during Spring 1970. November, 1970. J.G. Elliott and P.J. Attwood. Price - £0.25.

17. The pre-emergence selectivity of some newly developed herbicides, Orga 3045 (in comparison with dalapon), haloxydine (PP 493), HZ 52.112, pronamide (RH 315) and R 12001. January, 1971. W.G. Richardson, C. Parker and K. Holly. Price - U.K. and overseas surface mail - £0.25; overseas airmail - £0.50.