



DEPARTMENT OF AGRICULTURE, SOUTH AUSTRALIA

Agronomy Branch Report

DDT ANALYSIS OF OAT SAMPLES

FROM THE UPPER SOUTH EAST OF SOUTH AUSTRALIA



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Report No. 38

SUMMARY:

Analysis of oat samples from four delivery centres in the Upper South East of South Australia showed that DDT used for barley grub control in oat crops prior to harvest can result in DDT residues in delivered grain. The concentrations present in such grain is high enough to result in bulk silo samples with detectable residue levels.

Growers and bulk handling authorities were advised of the results and their implications.

INTRODUCTION:

Following an outbreak of barley grub, Persectania ewingii Westwd., in the Upper South East towards the end of 1970, reports were received that despite Departmental advice and warnings that DDT should not be used in barley grub control in cereal crops, there were many instances of this practice. It was decided that a survey be made to obtain objective information on the extent and effect of this practice.

AIMS:

- (1) To determine to what extent DDT was used to control barley grubs in cereals.
- (2) To determine the effect of such usage on DDT residue levels in grain delivered to silos.

METHODS:

Samples were taken between 5th and 8th January, 1971 from loads of individual growers when they were delivering oats to the silos at Bordertown, Cannawigara, Frances and Wolseley. Samples were also taken from the silo "running samples" at three centres but no "running sample" was available at the time from Bordertown.

Each sample consisted of approximately 66 grams of oats collected in residue-free glass jars supplied by the Department of Chemistry. Contact with the human body and plastics was avoided. Samples were delivered to the Department of Chemistry on 8th January, 1971, and analyses were completed by 22nd January, 1971.

A short questionnaire (Appendix 1) was filled in for each sample to locate the sample and to provide a brief history of insecticide usage on the property.

RESULTS:

Table 1 summarises the results of analyses on grower samples and Table 2 the results on silo "running samples". Detailed results are at Appendix 2.

Table 1: Results of DDT Analysis on Grower Oat Samples from Bordertown, Cannawigara, Frances & Wolseley, South Australia

Collection Centre	No. of Samples	No. with DDT & metabolites	Concentration in parts per million
Bordertown	6	1	0.18
Cannawigara	10	1	0.32
Frances	4	1	1.86
Wolseley	3	1	0.23
Total	23	4	

Table 2: Results of Insecticide Residue Analysis on Silo "running" Samples from Cannawigara, Frances & Wolseley, South Australia

Collection Centre	DDT & metabolites (p.p.m.)	Dieldrin (p.p.m.)	Lindane (p.p.m.)
Cannawigara	0.03	-	-
Frances	0.22	0.01	-
Wolseley	0.04	0.02	0.01

Detailed results of replies given to the questionnaire are tabulated at Appendix 3.

DISCUSSION:

Appendix 3 shows that four of the twenty-three growers from whom samples were taken said that they had used DDT this season. The grower from whom sample No. 11 was taken could not remember the insecticide used. His sample had 0.32 p.p.m. DDT. No information was available from the grower from whom sample No. 24 was taken. This sample contained

0.23 p.p.m. DDT. It may be assumed that all six growers had used DDT.

Comparison of Appendices 2 and 3 shows that of the four samples which contained DDT residues, three had been sprayed with DDT three to six weeks previously. No information was available regarding the fourth sample. As shown in Table 1 this has resulted in residue levels ranging from 0.18 p.p.m. to 1.86 p.p.m. DDT. No DDT was detected in the samples from the two growers who had used DDT on other cereal crops on their property.

All three silo "running" samples contained residues of DDT and metabolites. In addition two contained traces of dieldrin and one a trace of lindane - see Table 2.

CONCLUSIONS:

The use of DDT for barley grub control in the 1970 season in the Upper South East can be considered widespread as indicated by a total of six of twenty-three farmers sampled having used it.

Used in this way, it resulted in contaminated grain being delivered to silos. The levels in these contaminated deliveries were high enough to result in easily detectable levels of DDT being present in bulk silo samples. The level of 0.22 p.p.m. at Frances was particularly high. Compared with the level of 1.86 p.p.m. in the contaminated grower sample it suggests that about one-tenth of the grain received may have been sprayed with DDT just prior to harvest.

ACTION TAKEN:

All growers from whom samples were taken have been informed (Appendix 4) of the results of the survey and of the DDT levels in their own sample. They have been advised that though these levels were not particularly high, there is no tolerance for DDT in grains, and some importing countries are very strict in this regard. Also these levels are significant in animal feedstuffs and can result in higher concentrations in animals consuming them. These results indicated the need for them to avoid using DDT for barley grub control in oats.

The relevant personnel of South Australian Co-operative Bulk Handling Ltd. have also been informed of these results.

ACKNOWLEDGMENTS:

Thanks are due to the General Manager and staff of the South Australian Co-operative Bulk Handling Ltd., for their assistance in obtaining the samples; to the Director and staff of the Department of Chemistry for analysis of the samples; and to growers who co-operated in this exercise.

Appendix 1

Sample No.	Name of Grower:
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Postal Address:

Has this crop been sprayed with insecticide since heading?
Yes. No.

If	What insecticide?	When?
yes,	By whom?	

Was any other grain crop on your property sprayed since heading?
Yes. No.

If	What insecticide?	When?
yes,	By whom?	

Other than above, was any DDT used on your property since last autumn?
Yes. No.

If yes, list occasions and purpose	

Appendix 2

Results of insecticide residue analysis on oat samples from Bordertown, Cannawigara, Frances and Wolseley, South Australia

Sample		Insecticide or metabolites in p.p.m.					
No.	From	Lindane	Dieldrin	DDE	DDD	op DDT	pp DDT
1	Bordertown	N.D.*	N.D.	N.D.	N.D.	N.D.	N.D.
2	"	"	"	"	"	"	"
3	"	"	"	"	"	"	"
4	"	"	"	"	"	"	"
5	"	"	"	"	"	"	"
6	"	"	"	"	"	"	0.18
7	Cannawigara	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
8	"	"	"	"	"	"	"
9	"	"	"	"	"	"	"
10	"	"	"	"	"	"	"
11	"	"	"	"	"	"	0.32
12	"	"	"	"	"	"	N.D.
13	"	"	"	"	"	"	"
14	"	"	"	"	"	"	"
15	"	"	"	"	"	"	"
16	"	"	"	"	"	"	"
17	" (silo)**	"	"	"	"	"	0.03
18	Frances	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
19	"	"	"	"	"	"	"
20	"	"	"	"	"	"	"
21	"	"	"	0.02	0.04	0.05	1.75
22	" (silo)**	"	0.01	N.D.	N.D.	N.D.	0.22
23	Wolseley	N.D.	N.D.	N.D.	N.D.	N.D.	N.D.
24	"	"	"	"	"	"	0.23
25	"	"	"	"	"	"	N.D.
26	" (silo)**	0.01	0.02	"	"	"	0.04

* Not detected

** Silo "running" samples

No other organochlorine or organophosphorus pesticides were detected.

Appendix 3

Tabulated Details of Replies to Questionnaire at Appendix 1

No.	Sample	This crop sprayed?		Other crops sprayed?		Any other DDT usage on property?	
		No.	Yes/ what when?	No.	Yes/ what when?	No.	Yes/ when? why?
1	Bordertown	x		x		x	
2	"	x		x		x	
3	"	x		x		x	
4	"	x		x		x	
5	"	x		x		x	
6	"	x		x		x	
7	Cannawigara		DDT 3 weeks ago	x		x	
8	"	x		x		x	
9	"	x		x		x	
10	"	x		x		x	
11	"	x	Cannot remember	x		x	Not sure
12	"	x		x	DDT July, 70	x	
13	"	x		x		x	
14	"	x		x		x	
15	"	x		x		x	
16	"	x		x		x	
17	"	x		x		x	
18	Frances	 Silo "running" samples	
19	"	x		x	Unknown, 6 wks. ago	x	
20	"	x		x		x	
21	"	x	DDT, Nov. 70	x	DDT, Nov. 70	x	
22	"	Silo "running"	 sample	
23	Wolseley	x		x		x	
24	"	No information given	
25	"	x		x		x	
26	"	Silo "running"	 sample	

Appendix 4

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Dear Sir,

Thank you for your co-operation in the recent oat survey which was conducted in your district. The table below gives the collection points and the results obtained.

Collection Point	No. Samples Taken	No. with DDT	Highest Concentration of DDT (parts per million)	Concentration of DDT in silo running sample (parts per million)
Bordertown	6	1	0.18	-
Cannawigara	11	2	0.32	0.03
Frances	5	2	1.86	0.22
Wolseley	4	2	0.23	0.04
Totals	26	7		

Your sample had p.p.m. DDT.

While these levels are not particularly high, there is no tolerance for DDT in grains, and some importing countries are very strict in this regard. Also these levels are significant in animal feedstuffs, and can result in higher concentrations in animals consuming them. Consequently these results indicate the need to avoid using DDT for barley grub control in oats.

Yours faithfully,

(R.B. Jenkins)

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RBJ/MC.