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WEED RESEARCH ORGANIZATION



TECHNICAL REPORT NO. 23

PRELIMINARY REPORT

ON

A SURVEY OF THE PRESENCE OF WILD OATS AND BLACKGRASS
IN PARTS OF THE UNITED KINGDOM DURING SUMMER 1972

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NOTE

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ARC Weed Research Organization
Agricultural Development and Advisory Service
Ministry of Agriculture, Fisheries and Food
Department of Agriculture and Fisheries for Scotland
East of Scotland College of Agriculture
Ministry of Agriculture for Northern Ireland
Rothamsted Experimental Station

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PRELIMINARY REPORT ON A SURVEY OF THE PRESENCE OF WILD OATS AND
BLACKGRASS IN PARTS OF THE UNITED KINGDOM DURING SUMMER 1972*

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INTRODUCTION

The object of this preliminary report is to present the main items of information obtained from the survey as quickly as possible. Additional data will be published when a detailed analysis of results is completed.

1.1 Origin of survey

After informal discussion between the Weed Research Organization (WRO) and the Agricultural Development and Advisory Service (ADAS) and after consultation with the Statistics Department of Rothamsted Experimental Station (Rothamsted), a proposal was made that a survey of the presence of wild oats and blackgrass should take place in one or two ADAS regions of England in July 1972, to be followed by a national survey in a following year. It was subsequently agreed that the subject was of sufficient importance to justify the widening of the scope of the survey immediately and it was decided to invite any region able to do so to take part in 1972. The invitation was extended to Scotland through the Department of Agriculture and Fisheries for Scotland (DAFS) and to Northern Ireland through the Ministry of Agriculture for Northern Ireland (MANI).

Thus it came about that Northern Ireland (MANI), the East of Scotland College of Agriculture (ESCA) and the Wales, Northern, West Midlands, South West and South East regions of ADAS were able to be associated with the work described below.

*Wild oat: Avena fatua; A. ludoviciana.

Blackgrass: Alopecurus myosuroides.

** Surveys Section, WRO.

1.2 Objective

The main objective was to record, by observation during walks through fields growing wheat and barley crops, the presence or absence of wild oats and blackgrass. A subsidiary aim was to obtain additional facts about the presence or absence of these weeds on whole farms, about roguing for wild oats, and about other items (including the use of herbicides) on the fields observed. A target was set of 700 farms and 1400 fields to be visited.

1.3 Method

A random selection of approximately 100 farms in each area was made, the probability of selection in England, Wales and Scotland being proportional to farm cereal acreage; farms with less than 20 acres of cereals were excluded. Each farmer was approached to ask for his co-operation and was subsequently interviewed. With his agreement, two fields (where possible, one of winter-sown and one of spring-sown wheat or barley) were chosen at random on each farm for examination. These fields were visited by the observers who were ADAS advisory officers in England and Wales, agricultural advisers in Scotland (ESCA), and staff of the Field Botany Research Division in Northern Ireland (MANI). The part of the field to be walked over was selected in a prescribed but random way, and a simple arbitrary system of defining and recording the degree of infestation was followed during the walk. Additionally, before they began their walk, the observers were asked to record their impression of the weed situation over the whole field as observed from the field boundary. The observations were made mostly in July so that identification of the weeds was as simple as possible. Illustrations of grass weeds were provided for each observer.

During the interview with the farmer, a questionnaire was completed to provide background data about the fields and crops observed and also to provide information about the presence or absence of wild oats or blackgrass on the farm as a whole.

The records and questionnaires were then returned to WRO and, after checking and coding, were passed to Rothamsted to be processed using a program prepared by the Statistics Department within the Rothamsted general survey program.

RESULTS

2.1 Winter-sown and spring-sown cereals

Table 1 Estimated proportion of winter-sown and spring-sown cereals*

Area	Percentage of cereal* acreage:		Number of farms visited
	Winter-sown	Spring-sown	
South East	42	58	96
South West	31	69	99
W. Midlands	41	59	98
Northern	20	80	96
Wales	17	83	99
E. Scotland	10	90	101
N. Ireland	estimate not available **		85
Total	-	-	674

* The term "cereal" here and subsequently in the report refers to wheat and barley only.

** The fields observed in Northern Ireland were almost entirely spring-sown.

Table 1 shows that the target of 100 farms in each area was almost reached. The proportion of winter-sown to spring-sown cereals varied widely as would be expected according to the different areas, and this factor has been allowed for wherever infested acreages of "all cereals" have been calculated.

2.2 Farms with wild oats and blackgrass

It is evident from Table 2 that farms claiming to be free from wild oats in England were few, from 5% to 22% according to region, despite the fact that the regions surveyed in England, other than the South East, were those expected to be least infested. The incidence of wild oats in Wales, East of Scotland and Northern Ireland was also higher than might have been anticipated.

Table 2 Proportion of farms upon which wild oats and blackgrass were stated by the farmer to have occurred in 1972 or were seen by the observer.

Area	% of total sampled farms	
	with wild oats	with blackgrass
South East	95	52
South West	87	39
W. Midlands	85	33
Northern	78	1*
Wales	51	12
E. Scotland	52	2*
N. Ireland	26	0

* Possibly cases of errors in identification since no Alopecurus myosuroides species was detected by the observers in the fields they examined in these areas.

Blackgrass occurred more frequently than expected in those areas where it was known to exist. In an area where it was not expected at all (East of Scotland) a report of its presence was investigated and the plant was identified as Alopecurus geniculatus. However, whilst an occasional error might have been made in a statement about the existence of blackgrass on the farm, errors were far less likely where trained men examined the plants in the individual field.

2.3 Fields with wild oats and blackgrass

Although the proportion of farms with the weeds in one or more fields should be of interest since the risk of spread is greater once they are on the farm unit, an estimate on a field basis of the infested acreage as a proportion of the total acreage of cereals is probably the most appropriate figure to consider for an estimate of the problem nationally.

The figures given in Table 3 almost certainly under-estimate rather than over-estimate the occurrence of the weeds. Occasions when wild oats or blackgrass had been or were present but were unseen would be more frequent than those when plants were seen and wrongly identified as wild oats and

blackgrass. Also a small proportion of fields was rogued or had been sprayed with specific herbicides before being examined (See Tables 5 and 6); some of these fields would be apparently free from infestation when in fact the weeds had been present. This aspect will be examined in a subsequent report.

Table 3 The occurrence of wild oats and blackgrass: the acreage of infested fields* as a percentage of the total cereal acreage

Area	% of cereal acreage: / with wild oats			with blackgrass			No. of fields examined	
	Winter	Spring	All	Winter	Spring	All	Winter	Spring
South East	71	71	71	32	16	23	91	100
South West	78	72	74	32	9	16	74	122
W. Midlands	70	52	59	20	10	14	79	108
Northern	67	62	63	0	0	0	66	125
Wales	43	28	31	14	0	2	38	150
E. Scotland	21	26	25	0	0	0	34	162
N. Ireland	-	16	15	-	0	0	1	141

*Seen from the field boundary and during the course of a prescribed walk by the observer.

The problem of wild oats was not negligible anywhere, but was acute in all regions surveyed in England. The weed appeared almost indiscriminately in both winter- and spring-sown crops.

Blackgrass appeared not only in the winter-sown crops in the Midlands and the South but also, less expectedly, in the spring-sown crops.

^ The standard errors of the percentages in the table are approximately binomial and may be calculated from the formula:

$$SE = \pm \sqrt{\frac{p(100 - p)}{n}} \quad \text{where } p = \% \text{ of acreage infested and} \\ n = \text{number of sampled fields}$$

For example:	No. of sampled fields	% of acreage infested		
	100	10%	50%	70%
	Standard error:	± 3	± 5	± 4.6

2.4 Degree of infestation

Table 4 classifies the infested cereal acreage in all areas according to the extent of infestation. For a survey of this magnitude, elaborate weed counting techniques were not practical, but some standardisation of assessment was necessary because of the many surveyors taking part. An arbitrary system was therefore adopted during the walk in each field. On the edge of a 'square' with sides 120 paces each, the observers counted, in a path 2 yards wide, the number of plants (wild oats and blackgrass) up to 10 plants per side. Weed population up to this level on one or more sides (a maximum of about 200 plants/acre) was classified as a "light" infestation. When plants could be seen continuously in the path on any 3 sides with every step taken, the infestation was termed "heavy". Any degree of infestation between these extremes was termed "intermediate". Because of patchy infestations, any classification of this kind is open to criticism. However, there is reason to believe that the "light" category gives a fair approximation of the true state in relation to the infested fields; the "intermediate" and "heavy" categories are less reliable.

Table 4 Degree of infestation of wild oats and blackgrass: Classified infested acreage as percentage of total observed infested acreage (all areas).

Infestation class	Wild oats %	Blackgrass %
Light	57	50
Intermediate	35	37
Heavy	8	13
Total	100	100

The extent to which the high percentage of infested fields with a light infestation is due to control measures previously applied to greater populations, or to a build-up of even lower populations, cannot be deduced from the data in Table 4. It is probable that the latter is the greater factor in view of the limited use of herbicides and hand-roguing recorded in the survey (Tables 5 and 6) and the known ability of the wild oat to increase its population. If so, the large acreage of lightly infested land may be an ominous sign of more serious infestation in the future.

So far, the degree of infestation has been estimated by what was seen in a group of 4 strips (120 x 2 yds) around the sample "square" in the field. However, data from the sample strips also enable an estimate to be made of the total cereal acreage, ignoring field boundaries, which was affected. Thus, if this acreage were to be notionally sub-divided into 120 x 2 yd strips and each strip assigned to the class of infestation ascribed to it, the percentage of the total acreage in the different categories would be:-

	<u>% of total cereal acreage</u>	
	Wild oats	Blackgrass
None seen	65	94
Light	21	2
Intermediate	9	2
Heavy	5	2

Wild oat was detected on only about 35% of these small sample areas, whereas, because of the patchiness of weed infestation, a much greater proportion of the acreage was on fields where the weed occurred. (Compare Table 3).

2.5 Roguing for wild oats

Table 5 Roguing for wild oats: acreage of fields rogued, before being examined, as % of the total cereal acreage.

<u>Area</u>	<u>%</u>
South East	12
South West	6
W. Midlands	5
Northern	8
Wales	5
E. Scotland	10
N. Ireland	0

The figures for roguing refer to statements made by the farmer at the time of the visit to the farm. It is possible that in some cases roguing was done at a later date, but it is thought that this would only have occurred to a very minor extent since most visits took place fairly late in the growing season.

2.6 Herbicides used

Table 6 Herbicides: Acreage of fields on which herbicides were used as percentage of total cereal acreage.

Area	Herbicides used:	
	for all purposes	against wild oats and/or blackgrass
	%	%
South East	90	16 (23)*
South West	87	11 (15)
W. Midlands	90	10 (17)
Northern	87	4 (6)
Wales	85	1 (3)
E. Scotland	82	1 (4)
N. Ireland	76	0 (0)

* Figures in brackets show the % of wild oat infested acreage on which the specific herbicides were used.

The acreage (as a percentage of the total cereal acreage) on which herbicides were used for all purposes is based on the answer (Yes or No) to the question: "Has herbicide of any kind been used on the field since harvest of the last crop or on the present crop?" Thus it includes between-crop and pre- and post-emergence treatments.

The acreage on which herbicides were used against wild oats of blackgrass is shown as a proportion of the total cereal acreage, and also (in brackets) of the wild oat infested acreage of cereals. The non-bracketed figures can be considered in relation to those showing the general use of herbicides for all purposes; the other figures (in brackets) to those showing the size and degree of the infestation of wild oats and blackgrass in the areas. (Tables 3 and 4).

SUMMARY

The survey was carried out in the summer of 1972 in four ADAS regions of England, and in Wales, in the East of Scotland and in Northern Ireland. The main object was to make a reliable estimate of the presence or absence of wild oats and blackgrass in wheat and barley crops in the areas; other relevant background information was also obtained. Six hundred and seventy four farms were visited by official agricultural officers and in most cases 2 fields on each farm were examined. The report is a preliminary one.

Wild oats. Wild oats were stated to be present on from 26% to 95% of the farms visited, according to the region. In relation to the total wheat and barley acreage of each region, wild oats were estimated to be present on from 15% to 74% of it, according to the region. The weed was present in high proportions in both winter-sown and spring-sown crops. Taking all areas together, 57% of the infested acreage could be classed as having a light infestation. Except in Northern Ireland, roguing was done (prior to the survey visit) on from 5% to 12% of the wheat and barley acreage according to the region.

Blackgrass. Blackgrass was stated to be present on from 12% to 52% of the farms visited, according to region, excluding E. Scotland, N. Ireland and the Northern region of England where none was detected with certainty. In relation to the total wheat and barley acreage of each region, blackgrass was estimated to be present on from 14% to 23% of it in the West Midlands, South West and South East regions of England and 2% in Wales. The weed appeared more in the winter-sown but also to a substantial extent in the spring-sown crops. Fifty per cent of the total infested acreage could be classed as having a light infestation.

Herbicides. Herbicides for all purposes were used on from 76% to 90% of the various regional acreages, in contrast to specific herbicides against wild oats and blackgrass on from 0 to 16% of them.