Crop Weeds

A WILD OAT SURVEY IN ASHBURTON COUNTY

D. J. SAVILLE, F. C. ALLEN AND P. R. HOCKEY.

*Research and Advisory Divisions,
MAF, Lincoln and Ashburton*

Summary

A survey was done in the summer of 1976/77 to determine the extent and severity of the wild oat (*Avena fatua*) problem in Ashburton County. The results showed that wild oats were present on most of the farms which were reasonably heavily cropped. Conversely, no wild oats were found in the surveyed paddock on most of the lightly cropped farms. For paddocks which were in their first year of crop following a period in pasture, the severity of wild oat infestation was inversely related to the length of time in pasture. Spraying for wild oat control was common only on continuous cropping farms.

INTRODUCTION

Wild oats have been present in the Ashburton County for many years and were first recorded by J. F. Armstrong in 1872. Latterly it has been felt that wild oats were spreading and infestations were getting denser, with farmers 'losing the battle' against the weed.

In 1976 a group consisting of farmers and farm advisers was set up under the auspices of the mid-Canterbury Provincial District of Federated Farmers to look at the problem of wild oats. It was thought that if the problem was severe enough, the group should urge that wild oats be declared a noxious weed and that control measures should qualify for financial assistance.

The group decided that a survey of the County should be made to determine the present prevalence and severity of incidence and to act as a baseline for gauging, by means of a survey in 5 years time, any change in prevalence. It was also hoped that the survey might link the severity of wild oat infestation to other factors such as past history of the paddock.

As a consequence farm visits were made over the period November 1976 to February 1977 by members of Federated Farmers, Farm Improvement Club staff, Private Consultants and Ministry of Agriculture and Fisheries staff.

This paper reports the survey methods and results.

METHODS

Population being sampled:

The area sampled was Ashburton County, defined as Ashburton Rural Deliveries 1-8 and Rakaia Rural Deliveries 1, 2 and 4.

The population was broken into three subpopulations on the basis of assumed intensity of cropping:

- Ashburton RD4 (Willowby-Eiffelton)
- Ashburton RD7 (Wakanui-Pendarves-Dorie)
- Remainder of Ashburton County.

Choice of sample:

The 1975 Ashburton Licensing Trust list of residences in the County was used to randomly select names from each sub-population as

Crop Weeds

detailed in Table 1. To boost the number of intensively cropped farms in the survey a higher percentage of names was taken from the most intensively cropped sub-population, Ashburton RD4.

Small holdings and cottages were removed from the sample selected, leaving a total of 255 farms to visit.

Table 1. Sample size by sub-population.

Sub-population	Number on Trust list	Number in sample	As %	Small holdings cottages, etc.	Farms visited
Ashburton RD4	158	32	20%	6	26
Ashburton RD7	204	30	15%	1	29
Rest of County	1606	208	13%	8	200
Total	1968	270		15	255

Field work:

The 255 farms were divided up among the 13 people who were to do the field work. This was done not at random but on a "who knows Mr Smith?" basis.

Two visits were made to most farms. During the first visit details such as name, address and seed certification scheme number were recorded. If there was no cropping this fact was recorded. For farms with cropping, a farm plan was drawn up with the fields in crop marked. If the cropping was continuous in that the farmer did not have pasture in the rotation other than first year grass seed and clover seed crops, two paddocks were chosen at random. If cropping was not continuous, paddocks first and third year out of pasture were marked and one of each chosen at random.

For each of the selected paddocks, the expected harvest date was recorded, along with the month sown, crop and variety, and whether it was sprayed for wild oat control. For paddocks first year out of pasture, the number of years previously in pasture was recorded. For paddocks continuously cropped or third year out of pasture, the crops in the two preceding years were recorded, along with whether or not they had been sprayed for wild oat control.

During the second farm visit, timed for about 3 weeks prior to the expected harvest date, each selected paddock was inspected. The surveyor first recorded the number of wild oats in an area of half a square metre positioned by a random choice of coordinates on an approximate 10 x 10 grid. Secondly, the surveyor counted the number of wild oats in the area subjectively estimated to be the most densely infested (a zero count if none in paddock). Thirdly, a subjectively estimated "paddock average" was written down. The search intensity (and hence the probability of finding wild oats) is likely to have varied between surveyors, especially for paddocks with low levels of infestation.

The farmer was asked a series of supplementary questions concerning the incidence of wild oats on the rest of the property, and his opinions on how the problem should be handled.

RESULTS AND DISCUSSION

Number of complete returns:

The final compilation of results used 156 returns. Questionnaires were not returned for 27 farms, 44 had no crop and 28 were too incomplete to use in the compilation of results. In 15 of the 28, the

Crop Weeds

returns were marked "no wild oats on property" or "no wild oats in selected paddocks", but no details of the type of cropping were given.

Classification of farms by intensity of cropping:

The farms were divided into the following cropping categories:

1. Farms with a 1st yr crop but no 3rd yr crop (66 farms)
2. Farms with a 3rd yr crop but no 1st yr crop (9 farms)
3. Farms with both 1st and 3rd year crops (59 farms)
4. Continuous cropping farms (22 farms)

The categories represent a progression from the least intensively cropped farms (category 1) to the most intensively cropped farms (category 4). The survey method resulted in only one paddock being sampled on category 1 and 2 farms, as against two paddocks on category 3 and 4 farms. This meant there was more likelihood of finding wild oats on the more intensively cropped farms.

Tabulating the results into the twelve (cropping category) x (sub-population) classes showed that the important differences were between cropping categories rather than between sub-populations within cropping categories. For example, there were more wild oats in the Ashburton RD4 sub-population than in the other two sub-populations, but this was solely because there was a higher proportion of intensive cropping farms. For simplicity of presentation, results in this paper distinguish only between cropping categories.

Table 2. Severity of wild oat infestation by intensity of cropping.

No. of farms with:	1st yr crop only	3rd yr crop only	1st + 3rd yr crops	Continuous cropping	Total
	One paddock sampled		Two paddocks sampled		
no wild oats in (either) selected paddock	57 (86%)	7 (78%)	21 (36%)	1 (5%)	86 (55%)
at least one wild oat, $<1/m^2$	8 (14%)	1 (22%)	23 (64%)	8 (95%)	40 (45%)
$>1/m^2$ over selected paddock(s)	1	1	15	13	30
Total	66	9	59	22	

Severity of wild oat infestation by cropping intensity:

Table 2 classifies the surveyed farms into farms with none, some and "more" wild oats in the surveyed paddock(s), on the basis of the "paddock average" estimated by the surveyor (for farms with two selected paddocks, the mean of the estimated paddock averages was used).

It can be seen that the severity of the wild oat problem increased with intensity of cropping. Infestation was low on the "1st year crop only" farms, with wild oats being found in only 14% of sampled paddocks. The infestation was comparatively high (64%) on farms with both a 1st

Crop Weeds

and 3rd year crop, even when it was taken into account that two paddocks were sampled instead of one. In turn, infestation was still higher ($P < 0.01$) on farms classified as continuous cropping (95% infested).

Effect of number of years previously in pasture on wild oat numbers:

The numbers of years previously in pasture are given in Table 3 for the paddocks first year in crop on category 3 farms.

Table 3. Severity of wild oat infestation by number of years previously in pasture, for "1st yr" paddocks on "1st and 3rd yr crop" farms

Number of category 3 farms with:	Years in pasture			
	1 or 2	3 or 4	5 or 6	7 or more
no wild oats in "1st yr" paddock	2	8	10	8
$<1/m^2$	5	7	4	2
$>1/m^2$	5	6	2	0
% free of wild oats	17%	38%	63%	80%

The percentage of clean paddocks increased steadily with the number of years previously in pasture (Table 3). For paddocks in pasture for more than 4 years the proportion of "clean" paddocks (69%) was significantly higher ($P < 0.01$) than for paddocks in pasture for four or less years (30%). Possible reasons are:-

- (i) the longer a paddock has been in pasture, the greater the mortality of buried seed, and
- (ii) the longer a paddock has been in pasture, the fewer the number of times the paddock will have been exposed to cropping, in general. This means there will have been less opportunity for invasion by wild oats in the seed or on machinery, and less opportunity for multiplication of seed already in the soil.

Spraying for wild oat control:

The number of farmers who said they had sprayed one or both of the selected paddocks for wild oat control is presented in Table 4, for each level of intensity of cropping.

In total there were 18 farmers out of 144 who said they had sprayed for wild oat control. In the "continuous cropping" category 52% of farmers had sprayed at least one of the surveyed paddocks. This was a significantly higher percentage ($P < 0.01$) than the percentage of farmers who sprayed in the "1st and 3rd year crop" category (13%). None of the category 1 or 2 farmers had sprayed the selected paddock.

There were in total 22 paddocks which had been sprayed on the 18 farms. At time of sampling, 4 of these paddocks were free of wild oats, 7 had estimated wild oat densities $<1/m^2$ and 11 had infestations $>1/m^2$. This suggests that the spraying carried out had not been effective for converting an infested paddock to a "clean" paddock. This result is in line with the results of a 1977 survey of wild oats carried out in England, Wales, Scotland and N. Ireland (MAFF 1977). In that survey, 32% of the area treated for wild oat control contained appreciable infestations (more than 1000 seed-heads/ha) and 79% of the treated area contained at least

Crop Weeds

some wild oats.

Other management effects:

There appeared to be little difference between autumn and spring sown crops or between cereal and noncereal crops in severity of wild oat infestation.

Supplementary questions in survey:

The management methods commonly mentioned by farmers were buying clean seed (71 farmers), spraying (33 farmers), hand roguing (32) and making sure the header is clean (23).

When farmers were asked for their opinions on how the wild oat problem in the County should be handled, the two commonest views were

- (i) that seed certification standards should be made more stringent (46 farmers), and
- (ii) that wild oats should be declared a noxious weed (38 farmers).

Table 4. Spraying for wild oat control by intensity of cropping.

No. of farms with:	1st yr crop only	3rd yr crop only	Both 1st and 3rd yr crops	Continuous cropping	Total
no spraying	59	9	48	10	126
spray on (at least one of) the selected paddocks	0	0	7	11	18
(no response to question)	(7)	(0)	(4)	(1)	(12)
% of farms with spraying (on selected paddock)	0	0	13	52	

CONCLUSIONS

The single most important factor in determining the severity of the wild oat problem was found to be intensity of cropping.

The survey confirmed that wild oats are present on many of the intensively cropped farms in Ashburton County. It also showed wild oats to be relatively uncommon on the less intensively cropped farms.

For paddocks just out of pasture, the severity of the wild oat problem declines with the length of time the paddock was in pasture. This may be related to the frequency at which the paddock is cropped, rather than proof of a decline in the number of buried seeds.

Spraying for wild oat control is common only on the continuous cropping farms. The survey suggests that spraying cannot be relied upon to "clean up" an infested paddock.

It is suggested that the way the farmer handles the situation is important. Using clean seed, hand roguing and making sure the header is clean are the most commonly used management methods.

ACKNOWLEDGEMENTS

The people who did the field work (as listed in the Introduction) and the farmers who were selected for the survey are gratefully acknowledged. Special thanks also to Mr John Proffitt (Biometrics, Lincoln) and Miss Sue Corbishley for assistance in collating the survey results, and to Mrs Pat Challenger for typing the drafts of this paper.

REFERENCES

- MAFF, 1977. 1977 National Survey of Wild-oats and other Grass Weeds - Preliminary Report. Min. Agriculture, Fisheries & Food, London.