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PROCEEDINGS

THIRD REGIONAL WHEAT WORKSHOP

- Durum Wheat Improvement
- Weed Control
- Crop Rotation with Annual Forage Legumes
- Seed

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WEED CONTROL ON THE HIGH PLATEAU OF TURKEY

H. M. Hepworth and C. Tezel

Turkey is situated in the northern Mediterranean area and has been a land bridge jointing Europe and Asia for many centuries. It is believed by many, and supported by considerable archeological evidence, that this region has been supporting same type of agriculture since the beginning of mankind. Due to its location it has been crossed and recrossed over the ages by every sort of traveller - armies, religious groups and wondering nomads. The result has been a mingling of plants of many species from many places.

As expected many of these plants are weeds today. Also as expected, the species which were most able to adapt to the prevailing ecological niches are now the dominant species.

Our concern here is wheat production and one of the major related problems; that of competition from these species of weeds which have made the area their habitat.

Turkey produces wheat on about 8.6 million hectares each year. This results in a crop of near 10 million tons for an average yield of 1100-1200 kilograms per hectare. About 70-80 percent of this wheat is produced on the Anatolian plateau where the fallow system is practiced. Lack of rainfall is the major limiting factor in production on the plateau.

No doubt farmers have always realized that weeds were reducing wheat yields. They have followed traditional methods of weed removal, some cultivation during the fallow season and some handweeding during the crop season. Obviously this has not been very successful.

One factor which complicates the weed control picture in Turkey is that of definition. When is a plant a weed? During the spring of the fallow year many farmers use the wild plant species (weeds) as a forage crop and thus they have a real value. This we believe is a very inefficient use of soil and water but the practice is widely followed. During the crop year however farmers seem to be agreed that weeds are detrimental.

The weed species which cause the greatest wheat losses are the broadleaved species yellowweed (Boreava orientalis) and cornflower (Centaurea

spp.), and Cephalaria syriaca, Syrian acabiosa. Several other species are present but are much less dominant than the three mentioned. Lithospermum, Lamium, Adonis, Sysimbrium, and Erodium spp. are also common broad-leaved species in wheat. The major grass species causing problems are (Bromus tectorum), downy brome grass, (Cynodon doctylon), bermuda grass, and (Aegilops cylindrica) jointed goat grass. Some areas are infested with (Alopecurus myosuroides) blackgrass and (Phalaris minor), canary grass.

How big is the problem?

According to the survey questionnaire at least 8 million hectares of the annual wheat crop are heavily infested with weeds of these major species.

If we assume a conservative figure of 20 percent yield increase which could be achieved from control of weeds; we see that an additional 2 million tons of wheat could be produced in Turkey each year. We also see that the problem is of such magnitude that it deserves a high priority from the Ministry of Agriculture.

What is being done about the problem?

As early as 1950 the Government of Turkey initiated a research and demonstration program in weed control. By 1953 phenoxy acid herbicides were applied to about 1350 hectares. By 1963 the use of herbicides had increased to an area covering 139,000 hectares. In 1973 herbicides were applied to 800,000 hectares. Since that time herbicide usage has leveled off and even declined. Now the situation is much worse due to the high prices and short supplies of herbicides. This year about 40 percent of the average annual herbicide tonnage will be available to farmers meaning that only 3 to 4 percent of the wheat crop will receive weed control.

During the past five years we have tried to raise the interest level of both farmers and government authorities in weed control. We hoped to see an increase in the tonnage of herbicides used.

To accomplish this goal we launched a research program to compare and evaluate available herbicides under Turkish conditions. We also carried on a series of adaptive research trials in wheat production in several provinces on the plateau. Timely weed control was an important part of the research procedure. For the past three seasons a series of wheat production demonstrations has been conducted in the central plateau and again weed control was an important element in the package.

What happened

Our early observations indicated that weeds were allowed to grow much too long before herbicides were applied. As part of our herbicide

evaluation effort we included a time of application variable. Data consistently show that early removal of weed competition results in significant yield increases.

For example in 1974 we recorded the data shown in Table 1.

Table 1. Yields[1/] from plots treated with herbicides at 3 dates Ankara, Turkey 1974.

Material	March 29	April 25	May 22
Bromoxynil	151	133	111
Bromoxynil - MCPA	162	188	121
2,4-D LVE	131	142	99
2,4-D - 2,4,5-T	144	128	116
2,4-D - Linuron	155	150	109
Control			91

1/ Kilogram/decare

This same trend has been recorded every year in our experimental plots. We feel it is very unfortunate that the farmers in Turkey spend their time and their money for equipment and herbicides but do not get optimum returns.

They must be educated to do a more timely job of applying herbicides.

Another example of the potential gain from timely weed control is illustrated below. In 1974 we applied herbicides to farmers' field which were farmed under the traditional system and also to adaptive research trials where improved farming methods were employed.

We later took samples from both treated and untreated areas of each field. We photographed the collected plant samples and counted the heads from each sample. We also took yield data from each area. The results are shown in Tables 2 and 3.

Table 2. Numbers of Wheat Heads from 6 samples.

Sample area	Weeds Controlled	No Weed Control	Percent Change
Farmer Field # 1	866	444	- 49
Farmer Demonstration Field	833	415	- 50
Farmer Field # 2	358	252	- 30

Table 3. Wheat yields from weedy and weed free samples, Ankara, Turkey 1974.

Sample area	Weeds Controlled	No Weed Control	Kilograms Increase	% Increase Over Non Weeded
Farmer Field # 1	130	85	45	53
Demonstration Field	274	142	132	93
Farmer Field # 2	138	70	68	97

We also conducted a competition study in which we handweeded trial plots by two methods. In one series we kept the plots weed free by hand-weeding for periods of 4 and 8 weeks and then allowed the weeds to grow. In the other series we allowed the weeds to grow for 4 and 8 weeks and then handweeded the plots for the remainder of the season. Yields were compared with plots that were weedy throughout the season and with plots kept weed free all season. The results are compared in Table 4.

Table 4. Wheat yields from plots handweeded for various intervals. Ankara, Turkey 1974.

Treatment	Kgs/decare
Handweeded for 4 weeks	203
Handweeded for 8 weeks	207
Handweeded throughout season	205
Weedy for 4 weeks then clean for season	195
Weedy for 8 weeks then clean for season	160
Weedy for the season	121

This again illustrates the value of early removal of weed competition. It appears that early germinating weeds cause the greatest yield decrease.

For several years we have been comparing various herbicides for weed control in wheat. The phenoxy acid materials are doing a good job and certainly should continue to be used in Turkey. It is sad that only 8-10 percent of the wheat receives any weed control treatments. However, because these materials are usually applied rather late in the season and because they do not successfully control some of the weed species we believe there is and will be a need for other materials in Turkey.

Table 5 summarizes our findings in comparing several of the commonly used materials.

Table 5. Wheat yields and percent weed control from several herbicides. Ankara, Turkey 1974.

Material	Rate Kg/ha.	% Control Boreava	% Control Centaurea	Yield in Kgs/decare
Bromoxynil	.4	90	80	131
Bromoxynil plus MCPA	.4	95	95	133
Bromoxynil plus Lorox	.2-.3	94	80	114
Tribunil plus 2,4-D	1.3-.5	98	98	124
2,4-D	.85	85	80	123
2,4-D plus 2,4,5-T	.6	85	85	127
Control				91

We are aware that downy brome grass and bermuda grass are becoming more serious problems in certain areas. There now appear to be some exciting candidate herbicides for controlling these species as well as some of the perennial broad leaf species. Until these materials are fully tested a well managed summer tillage system is the best method for controlling the grassy weeds.

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We are confident from the research work we have done that controlling weeds can produce a major increase in wheat for Turkey and the hungry world. During the past 2 years at numerous meetings and training seminars we have presented the case for weed control. Farmer interest is increasing rapidly. Several commercial chemical companies are building sales organizations and research development programs in Turkey.

We believe that a stronger effort is required in education and training. It is hoped that a much more ambitious weed control effort can be supported. The country sorely needs the wheat that is now being lost to weeds.

LUTTE CONTRE LES MAUVAISES HERBES SUR LES PLATEAUX D'ANATOLIE EN TURQUIE

H.M. Hepworth et Gengiz Tezel

RESUME:

Chaque année en Turquie, environ 8.6 millions d'hectares sont semés en blé. La majorité de ces terres à blé est située sur le plateau central d'Anatolie et la production de blé dépend entièrement d'une pluviométrie adéquate.

Le rendement moyen annuel dans la région du plateau est de 10 à 11 Qx par hectare en utilisant des méthodes de cultures traditionelles. Cependant, des expériences effectuées au cours des cinq dernières années ont démontré que, si on luttait efficacement contre les mauvaises herbes la production pourrait etre considérablement augmentée.

Les mauvaises herbes annuelles, en particulier la Boreava orientalis et la Centaurea cyanus provoquent une diminution du rendement de l'ordre de 25 à 50% selon l'importance de l'infestation.

Les herbicides communément employés sont le 2,4-D et un mélange de 2,4-D et de 2,4,5-T. Malheureusement, ces herbicides bien qu'extrêmement efficaces sont en général appliqués tard dans la saison quand les dégâts sont déjà faits et la production déjà diminuée.

Des herbicides tels que le bromoxynil et des mélanges de bromynil et d'autres herbicides sont prometteurs car ils peuvent être appliqués plus tôt que les herbicides phenoxides.

Des études ont démontré que si les herbicides phenoxides sont appliqués au moment voulu on pouvait obtenir des rendements supérieurs à ceux obtenus dans les champs traités en temps "normal".

Normalement, il n'y a que 8 à 10% des terres a blé qui sont traitées avec des herbicides. It serait opportun de mettre au point un programme pour augmenter de façon considérable le nombre d'hectares traités.

Original: Anglais

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