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PROCEEDINGS

THIRD REGIONAL WHEAT WORKSHOP

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

Tunis, Tunisia
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THE WEED SITUATION IN THE REGIONS OF NORTH
AFRICA AND THE MIDDLE EAST

W.L. Nelson, CIMMYT, Algeria

This report attempts to summarize the overall weed situation in the production of wheat for the countries represented here at this conference. This report will point up, in a generalized way, the importance of weeds as a limiting factor in production, the species representation of the major weeds and the general situation on weed control for the region.

This report is a summation of the questionnaires received from representatives here. Two thirds of the countries responded, and all of the regions were well represented in the response. This report would be more accurate if all the countries had responded, however, the summary is probably representative of the region as a whole. No individual country data will be reported in this summary. Country representatives are more qualified to discuss their particular weed problems and questions for specific information should be addressed to them.

The questionnaire sent out requested information on the four weed species causing the greatest economic loss, wheat area infested by each and an estimate of yield losses by each. Information was requested on the intensity of tillage to evaluate in a general way if this could be a factor in weed population and control. Data on the herbicides, rates of application and area treated were requested. The questionnaire also attempted to get a general picture of research, extension and government participation in weed control.

In order to get some overall picture of the magnitude of loss due to weeds, calculations were made using F.A.O. statistics reported in 1972. All calculations were based on the mean yield and the average hectares of wheat harvested for the five year period 1968-1972. The data obtained are conservative because wheat abandoned due to weed infestation is not included. The yield losses were calculated for each individual country according to the average loss reported by the questionnaire.

Not all countries responded to all the questions in the questionnaire. It was not possible to report all categories from the same countries. Those countries not reporting in all categories involved less than 400,000

hectares total wheat production, and probably did not change significantly the general situation for the more than 30,000,000 hectares reported by the other countries.

Table 1. Wheat production and estimated yield loss from weeds reported by 13 countries in North Africa and Middle East.

	No. of Countries	Calculated Data
Hectares of wheat harvested ^{1/}	13	30,900,000
Wheat Production (tons) ^{1/}	13	26,600,000
Estimated Production Loss from ^{2/} Weeds (tons)	11	5,130,000
% loss reported (Ave.)	11	19.4

^{1/} F.A.O. Statistics 1968-1972.

^{2/} Calculated from estimated loss reported by each country.

What does this estimated yield loss mean in terms of the total needs of these countries?

To arrive at some estimate of the value of this wheat, this loss was compared to the estimated import needs of 13 North African and Middle Eastern countries, all of which were invited to this conference. F.A.O. statistics on average production for 1968-1972 was used as a production base. The consumption figures were those reported by ALAD in the publication by Arsvik. Ten of the 13 countries responded to the questionnaire.

Table 2. Wheat production, consumption estimates, and estimated wheat production losses from weeds for 13 North African and Middle Eastern countries. (Metric tons).

Wheat production	25,992,000
1975 Estimated	
1975 Estimated Wheat Consumption	32,700,000
Import Needs	6,708,000
Est. Loss from Weeds ^{1/}	4,938,000
Loss in % of Import Needs	74

^{1/} Calculated on an average 19% reported loss by weeds.

On the basis of these data, about three fourths of the projected short fall for 1975 could have been avoided by weed control over all of the wheat production. By 1980 an estimated 6,000,000 more tons of wheat will be needed. The importance of controlling the weeds will be even more significant then. The yield losses alone do not accurately reflect the total loss due to weeds. Additional losses from poor fertilizer efficiency, increased harvest costs, reduced quality and additional costs of handling and storing weed infested wheat all add to the total loss caused by weeds.

What species of weeds are prevalent in the region?

As might be expected, weeds of the same species, genera or family were reported by several countries. (Table 3)

Of special interest from the control stand point, over 15,000,000 hectares (about half of the wheat area) were reported to be infested with weeds readily controlled with 2,4-D. This is a relatively safe, low cost, easily applied herbicide, that is adapted even to back pack sprayers. A major effort to utilize this herbicide is indicated as an initial step to improve weed control in the region.

The percent loss reported for each species was highly variable indicating the relative competitive ability of that species under the environment of the wheat production in the particular country. Losses were reported as low as 1% and as high as 45% for an individual species. In general the losses from the grass-type weeds were greater than from dicotyledons, however, some high losses were reported from this class of weeds also. The total loss of wheat production from weeds in percent was calculated for those countries reporting percent loss by species. The total losses varied from 4 to 38% for the four major weeds reported.

A summation of the tillage data reported indicated that most of the countries had 3 to 4 tillage operations in land preparation for wheat production. One or two operations were before seeding for seed bed preparation. Only one country reported more than five tillage operations in wheat production. Since preplant weed control and good seed bed preparation are major factors in weed control for wheat production, this appears to be another area where improvement will benefit weed control. A uniform stand of wheat emerging before the weeds offers the best competition to weeds. Highest losses from weeds occur when weeds emerge before or with the emergence of wheat.

Applied research in the field of tillage was reported by nine of the countries. This indicates an awareness of tillage as a problem in wheat production in those countries. Basic research in tillage was reported by three countries. An increased store of knowledge on tillage practices is necessary for each country. The variable soil and climatic conditions within and between countries requires investigation to supply the necessary information for the

Table 3. The most common and important weed species affecting wheat production in North Africa and Middle East.

Species or Genera	Area infested Hectares ^{1/}	Rank				No. times reported
		1	2	3	4	
<u>Brassica, Synapsis, Rapistrum</u>	5,831,800	3	2	0	3	8
<u>Avena spp.</u>	1,573,600	3	0	0	3	6
<u>Lolium spp.</u>	718,100	1	2	1	0	4
<u>Convolvulus arvensis</u>	2,062,600	0	2	2	0	4
<u>Phalaris spp.</u>	1,302,200	0	0	3	0	3
<u>Chephalaria syrica</u>	2,526,000	1	0	1	0	2
<u>Cynadon dactylon</u>	863,000	2	0	0	0	2
<u>Chenapodium spp.</u>	330,900	0	1	0	1	2
<u>Malva spp.</u>	44,000	0	1	1	0	2
<u>Boreava orientalis</u>	5,190,000	1	0	0	0	1
<u>Carthamus oxyancanthus</u>	2,110,000	1	0	0	0	1
<u>Centaurea spp.</u>	4,325,000	0	1	0	0	1
<u>Ipomea kurdofan</u>	-----	1	0	0	0	1
<u>Medicago spp.</u>	-----	1	0	0	0	1

^{1/} Area infested calculated from reported percent area infested.

extension effort. However, data from other countries within a climatic region can often be directly usable to develop wheat production and research programs.

The use of herbicides for wheat production was reported by 8 of the 14 countries. However, the area treated was very limited. Only 1,547,000 hectares were treated, which is only 5% of the total area reported. The maximum percentage of the wheat production treated by one country was 23%. Almost all the wheat was treated with 2,4-D, combinations with 2,4-D

or a 2,4-D type compound. Only 4,000 hectares were reported treated using herbicides for control of grass type weeds. There may have been more wheat treated as two countries reported herbicides being used, but gave no figures of the area treated.

It is apparent that herbicides could play a very important part in weed control for wheat production in the reporting countries. However, the application of herbicides requires specialized equipment, means to import or procure the herbicide, and the extension of the information on application. Each of these factors requires help from some government agency. Spray equipment, whether it is a back pack sprayer for the small farmer, a tractor mounted or trailer mounted sprayer or an airplane for large surfaces, are expensive and will probably have to be imported. They require exacting maintenance and operation. Calibration of the sprayer, the necessity for uniform speed and pressure, tank agitation, herbicide dosage and time of application are technics that have to be taught to the farm operator. Herbicide spraying is probably the most exacting operation in wheat production. A successful program of herbicide application in a developing country requires careful planning and direction of all agencies involved from the procurement of the herbicide and equipment to the extension of application information to the farmer.

What are the governments doing towards improving weed control? The survey reported that in thirteen of the fourteen countries the government was involved in at least one function of a herbicide program. Eleven of these countries were involved in regulatory functions. Five countries were involved in operating field and ground equipment for herbicide application. Four were involved in aerial application and five reported financial assistance in herbicides. This survey indicated there is an awareness of the need for government assistance in weed control by herbicides. To date most of the involvement by government agencies in most of the countries was regulatory.

Another indication of interest in herbicides by countries was the number reporting conducting applied research in herbicides. All but one reported activity in this field of research. It is important that some applied research be conducted within a country to verify recommendations for herbicide use. Herbicides are responsive to variations in climate, soil and growth patterns of both the weeds and wheat. Different climatic conditions between and within a country or region will alter recommendations for herbicide use. An active applied research program will identify these problems, improve recommendations and provide a base for evaluating new herbicides. The results and experience obtained in applied research programs are also the source of information necessary for a progressive extension program needed to develop a herbicide program in a developing agriculture.

Basic research activity in herbicides was reported by four countries. The need for this type of research is far less than applied research in a developing field production program. Only after the extensive use of

herbicides is adopted does the need for extensive basic research exist. In the developmental stages of a program, the applied research expenditures will be more beneficial than money spent on basic research. As the general knowledge and use of herbicide within a country increases, then the problems of a more basic nature become more important. This type of research will enable refinement in applied research and application as it seeks to solve specific problems that arise.

Extension activities were reported by 10 of the surveyed countries in tillage practices and/or herbicide application. The quality and intensity of the extension effort in these countries will be a major factor in the adoption of improved weed control either through tillage, herbicides or both. The total extension effort will affect the speed with which new practices are adopted. Extension of new farm practices takes place in many ways. Not the least of these is the farmer to farmer extension of new practices.

In summary, there is no question but what weeds are a major if not the major factor preventing the realization of increasing wheat production in the regions surveyed. There is no magical cure for the problem. However, with extension of knowledge and practices now in use, a major reduction in weed losses could be obtained. To do this, all government and private resources must be organized to make this knowledge available to the producer and to mobilize resources to supply the materials and equipment for weed control in wheat and other crops in the rotation.

LA SITUATION DES MAUVAISES HERBES EN AFRIQUE DU NORD ET AU MOYEN-ORIENT

W.L. Nelson

RESUME:

Il ressort des questionnaires envoyés par 14 des pays participant à la présente conférence qu'une perte moyenne de l'ordre de 19% dans la production de blé est imputable aux mauvaises herbes. Exprimées en tonnes de blé, les pertes annuelles se chiffrent donc à environ 5,130,000 tonnes pour ces 14 pays si l'on prend comme base de comparaison les chiffres de production énumérés pour les années 1968-72 dans l'Annuaire Statistique 1972 FAO.

On estime que la consommation de blé pour le 13 pays de l'Afrique du Nord et du Moyen-Orient pour l'année 1975 dépassera la production moyenne pour les années 1968 à 1972 de 6,700,000 tonnes. Sur ce total, 4,900,000 tonnes auraient pu être récupérées si une lutte efficace contre les mauvaises herbes avaient permis d'éviter les 19% de pertes signalés. Ceci représente approximativement 75% des importations qui seront nécessaires en 1975. D'ici 1980, ces mêmes pays auront besoin de 6,000,000 tonnes supplémentaires, et une lutte efficace contre les mauvaises herbes sera enconre plus nécessaire pour satisfaire ces besoins à l'avenir.

Dans les pays ayant répondu au questionnaire, des herbicides ont été utilisés sur 1,547,000 ha sur une superficie totale de 30,900,000, c'est-à-dire sur 5% seulement des emblavures.

Les estimations des pertes variaient entre 4% et 38%. Les pertes indiquées par les pays ayant signalé les graminées comme étant les plus nuisibles ont été très élevées, conséquence de la concurrence intense exercée par ces espèces.

Parmi les mauvaises herbes signalées, les différentes espèces de moutarde (Brassica, Synapsis et Rapistrum) ont été mentionnées huit fois, les espèces d'Avena six fois, Convolvulus arvensis quatre fois, les espèces de Lolium quatre fois et de Phalaris trois fois. Cynadon dactylon, différentes espèces de Chenapodium et Malva et Chephalaria syrica ont été mentionnés chacun deux fois. Une seule mention a été faite de toutes les

autres espèces. Les espèces ayant été signalées une seule fois comme étant les plus nuisibles ont été: Boreava orientalis, Ipomoea kurdofan, Carthamus oxyancantha et les espèces de Medicago et de Melilotus.

Les mauvaises herbes signalées comme étant les plus importantes par la moitié des pays répondant au questionnaire sont des espèces qui sont de façon générale éliminées par le 2,4-D.

Sur les 14 pays, huit se servaient de produits chimiques pour lutter contre les mauvaises herbes dans les céréales. Le chiffre maximum avancé a été 23% de la superficie traitée. Dans 13 des 14 pays l'Etat joue un rôle actif dans la lutte chimique contre les mauvaises herbes. Dans 11 pays il s'agit d'un contrôle officiel, dans 5 de l'opération de matériel pour le traitement par voie de surface, dans 4 du traitement aérien, et dans 5 de la subvention des produits.

Un seul pays a signalé plus de cinq opérations pour le travail du sol et la préparation du lit de semences; la moyenne était de trois.

Les pays ayant répondu au questionnaire étaient actifs dans la vulgarisation et la recherche dans le domaine de la lutte contre les mauvaises herbes. Dix ont indiqué des activités de vulgarisation ayant trait à la lutte contre les mauvaises herbes par le moyen de techniques culturales et de produits chimiques. Des recherches de base ont été signalées dans 3 pays dans le domaine des techniques culturales et dans 4 pays dans le domaine des produits chimiques. Quant à la recherche appliquée, 9 pays ont signalé des travaux ayant trait aux façons culturales et 13 des travaux dans le domaine de produits chimiques.

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