OIL CROPS: SESAME AND SUNFLOWER SUBNETWORKS

PROCEEDINGS OF THE JOINT SECOND WORKSHOP HELD IN CAIRO, EGYPT,
9-12 SEPTEMBER 1989
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This series includes meeting documents, internal reports, and preliminary technical documents that may later form the basis of a formal publication. A Manuscript Report is given a small distribution to a highly specialized audience.

La présente série est réservée aux documents issus de colloques, aux rapports internes et aux documents techniques susceptibles d'être publiés plus tard dans une série de publications plus soignées. D'un tirage restreint, le rapport manuscrit est destiné à un public très spécialisé.

Esta serie incluye ponencias de reuniones, informes internos y documentos técnicos que pueden posteriormente conformar la base de una publicación formal. El informe recibe distribución limitada entre una audiencia altamente especializada.
OIL CROPS:
SESAME AND SUNFLOWER SUBNETWORKS

Proceedings of the Joint Second Workshop
held in Cairo, Egypt, 9–12 September 1989

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In September 1989, the Sunflower and Sesame subnetworks held their bi-annual meetings in Cairo, Egypt. The meetings were well attended and papers, presented in these proceedings, provide a very informative overview of some of the cropping systems, management practices, production constraints and research highlights for both crops in several countries.

Chronic edible oil deficit is a major problem facing many developing countries in Africa and Asia where most countries are forced to import large quantities to satisfy the requirements of their growing populations. With the present rates of population increase and the improvement of nutrition standards it is likely that the consumption of edible oil will rise over the years, increasingly drawing on scarce foreign exchange for the importation of this vital food staple. For this reason, several countries have opted to increase self-sufficiency in edible oil.

Production deficits are due to a number of factors, among which neglect in oilcrops research, in both developed and developing countries has been a major one. This is particularly true for minor crops such as sesame. In the context of the IDRC oilcrops network, initiated in 1981, the interchange of information and the sharing of results between scientists have proved to be very useful and beneficial for the generation of scientific knowledge and the stimulation of research in this important area. It is hoped that conclusions and recommendations of this meeting will stimulate further research and development in the future.

A second important reason for limited national production has been the exceptionally low levels of world prices for oils and fats in the 1980's and the comparative advantage of importation over production for developing countries. The description of a case study using a system's approach to analysis the Vegetable Oil/Protein System of Kenya has stirred much interest during the Cairo meetings and it is hoped that similar work can be carried out in other countries in the future.

The Cairo meetings will also unfortunately be remembered as the one which has witnessed the diagnosis of the fatal disease of late Dr. Hiruy Belayneh, Chairman of the Brassica Subnetwork. We will all regret his absence.

On behalf of IDRC and of all participants, I would like to thank the Government of Egypt for its hospitality, the organizers for the excellent arrangements and all those who contributed to the success of these meetings by their presentations and discussions.

Eglal Nached,
Senior Program Officer,
IDRC, Cairo
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Sesame is considered one of the important food crops because it is the main ingredient in preparing local food, Halawa Tehenia, which is a good source of valuable protein for a large sector of Egyptians. The total consumption is estimated to be about 45,000 tons annually, while, the national production fluctuated from year to year. However, it is about 10,000 tons in the last five years depending on the area devoted to this crop, which is about 25,000 faddans, Table 1.

Table 1. Sesame area, yield and production in Egypt, 1978-88.

<table>
<thead>
<tr>
<th>Year</th>
<th>Area (faddan)</th>
<th>Seed yield (kg/faddan)</th>
<th>Total production (ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1978</td>
<td>33.122</td>
<td>214</td>
<td>12663</td>
</tr>
<tr>
<td>1980</td>
<td>30.820</td>
<td>442</td>
<td>8022</td>
</tr>
<tr>
<td>1981</td>
<td>44.063</td>
<td>49</td>
<td>5121</td>
</tr>
<tr>
<td>1982</td>
<td>49.551</td>
<td>420</td>
<td>10312</td>
</tr>
<tr>
<td>1983</td>
<td>35.002</td>
<td>430</td>
<td>7624*</td>
</tr>
<tr>
<td>1984</td>
<td>26.002</td>
<td>415</td>
<td>10815</td>
</tr>
<tr>
<td>1985</td>
<td>21.871</td>
<td>425</td>
<td>2117</td>
</tr>
<tr>
<td>1986</td>
<td>27.000</td>
<td>444</td>
<td>2268</td>
</tr>
</tbody>
</table>

*; faddan = 4000 m²

Sesame is planted as a summer crop during April/May in rotation with the winter crop, sugarcane, in small holdings of 1-5 faddans under surface irrigation so that it can give high yield.

The main constraints confronting sesame production can be summarized as follows:

1) Low income compared with other competitive summer crops such as corn and sugarcane.

2) Susceptibility to root and stem rot and wilt diseases. The most prevalent causal organisms are: Rhizoctonia solani, Sclerotia bataticola, Macrophomina phaseoli, Fusarium oxysporum and Phytophthora parasitica.

3) The crop management (sowing, cultivating, harvesting, threshing, and cleaning) is labor intensive.

The principal goal of the sesame breeding program is to maximize production through: release of high yielding and disease resistant varieties, improvement of agronomic practices and transferring recommended practices to the growers through on-farm trials.

Breeding nursery

Breeding nurseries have been cultivated in two sites, Giza and Shandaweel Research Stations; representing the main sesame growing areas of the Middle and upper Egypt, respectively.

These nurseries include more than 700 lines from different genetic sources: landraces, introductions and hybrid derivatives. The main economic characters which include plant height, height of first capsule, number of branches and seed yield per plant are recorded.

Crossing program

About 30 crosses are made each year to obtain a wider genetic variability in F₂ generations to serve the selection procedures. The parents are chosen to represent the two extremes of each economic characters.

Diseases nursery

About 100 sesame strains were tested in the disease nursery under artificial infection by R. solani, S. bataticola (M. phaseoli), F.
Oxysporium and parasitica together with the commercial variety Giza-32, to find a source of tolerance/resistance. Some of the strains exhibited a high tolerance to these fungi.

Comparative yield trials

The first evaluation for yield potential of promising breeding materials is usually conducted on state farms. Thirty two branched and 15 non-branched varieties were tested in two locations last season.

The final stage of evaluation took place in farmers' fields under normal production condition and following recommended agronomic practices. The data of the advanced yield trials of branched and non-branched varieties during 1985, 1986 and 1987 seasons are presented in Tables 2 and 3.

Data presented in Table 2 indicates that all branched hybrids gave 4-9% higher yield over the control Giza 25 with an average increase of 26-56 kg/faddan.

Table 3 shows that the non-branched varieties N.A 261-1, B-10 and H87-12 outyielded the commercial variety Giza-32 by an average yield of 31-60 kg/faddan by (5-10%).

On-farm trials

Sesame is planted on small holdings of 1-5 faddans. Most of the farmers follow their own methods of production. To achieve higher yield, which is a major target, new techniques have been transferred to the farmers. In this regard, 12 on-farm trials are conducted every year in upper Egypt, (Assuit, Sohag, and in Quena governorates) which were the most important sesame producing areas during 1986-1988, Table 4. Each trial was carried out in an area of 1/2 faddan in two replications, with 1/4 faddan. for recommended and 1/4 faddan. for farmers techniques. The package included:

<table>
<thead>
<tr>
<th>Governorate</th>
<th>Year</th>
<th>No. of trials</th>
<th>Yield (kg/faddan)</th>
<th>Increase</th>
</tr>
</thead>
<tbody>
<tr>
<td>Assuit</td>
<td>1986</td>
<td>4</td>
<td>581</td>
<td>784</td>
</tr>
<tr>
<td></td>
<td>1987</td>
<td>4</td>
<td>530</td>
<td>620</td>
</tr>
<tr>
<td></td>
<td>1988</td>
<td>4</td>
<td>315</td>
<td>497</td>
</tr>
<tr>
<td>Soheg</td>
<td>1986</td>
<td>3</td>
<td>503</td>
<td>553</td>
</tr>
<tr>
<td></td>
<td>1987</td>
<td>3</td>
<td>444</td>
<td>536</td>
</tr>
<tr>
<td></td>
<td>1988</td>
<td>4</td>
<td>492</td>
<td>556</td>
</tr>
<tr>
<td>Quena</td>
<td>1986</td>
<td>5</td>
<td>552</td>
<td>660</td>
</tr>
<tr>
<td></td>
<td>1987</td>
<td>5</td>
<td>636</td>
<td>715</td>
</tr>
<tr>
<td></td>
<td>1988</td>
<td>4</td>
<td>612</td>
<td>774</td>
</tr>
<tr>
<td>Overall mean</td>
<td></td>
<td></td>
<td>518</td>
<td>637</td>
</tr>
</tbody>
</table>
1) Variety Giza-32,
2) Plant density (50 x 10 cm, two plants/hill = 168,000 plants/faddan),
3) Fertilization (30 kg P$_2$O$_5$ + 30 kg N + 24 kg K$_2$O/faddan), and
4) Irrigation intervals (12-15 days).

The trial show that the recommended practices gave remarkable increases in yield (129 kg/faddan) compared with farmers technique. Consequently, it is possible to increase the average seed yield by 25% through transferring recommended practice to the farmers.