OIL CROPS:
BRASSICA
SUBNETWORK

PROCEEDINGS OF THE
THIRD WORKSHOP, QUALITY
TRAINING, AND CHINESE
PROJECT REPORTS,
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21–24 APRIL 1990

ABBAS OMран

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Oil Crops: Brassica Subnetwork

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TABLE OF CONTENTS

Table of Contents ................................................................. iii
Participants ............................................................................... v
Introduction. ABBAS OMRAN ....................................................... 1

PART I
QUALITY TRAINING


- Analysis of Glucosinolate in Canola and Rapeseed:
  Determination of Glucosinolates by Gas Liquid Chromatography of the Trimethylsilylethers. J.K. DAUN,
  D.R. DECLERCQ AND D.I. MCGREGOR .................................. 8
- Determination of Glucosinolate Content by Gas Liquid Chromatography of Trimethylsilyl Derivatives of Desulfated Glucosinolates. J. P. RANEY AND D.I. MCGREGOR ....................... 14
- Determination of Glucosinolate Content by Gas Chromatography of Trimethylsilyl Derivatives of Glucose. D.I. MCGREGOR ................................................................. 20
- Determination of Total Glucosinolate and Total Indole Glucosinolate Content of Rapeseed/Canola Using Glucose Oxidase to Measure Glucose and Ferric nitrate to Measure Free Thiocyanate Ion. D. I. MCGREGOR ......................... 24
- Determination of Total Glucosinolate Content of Rapeseed/Canola Using Immobilized Myrosinase and Glucose Oxidase. S. WANG, Z.Y. YUAN AND D.I. MCGREGOR .................. 33

SECTION 2. Manual of Additional Training Lectures and Papers 41

- Total Glucosinolate Content In Rapeseed Using Reflectance.
  R.J.W. TRUSCOTT AND J.T. THOLEN .................................... 41
- A Simple Method for Identifying the Low-Erucic Acid and Low-Glucosinolate Rapeseed-Turbidity Titration-Colorimetry.
  WU MOUCHENG AND YUAN JUNHUA ................................... 45
- An Outline of Research On Rapeseed Quality Analysis.
  WU XINGYONG ................................................................. 48
- New Methods of Myrosinase Bioreactor and Glucose Sensor for Rapid and Accurate Assay of Glucosinolates in Rapeseeds.
  ZHONG YI YUAN, XIAO JUN WANG, TIAN MIN ZHU, PEI YING CHEN
  AND XIN SONG JI ............................................................. 50

PART II
A FINAL SUMMARY REPORT OF SINO-CANADIAN RAPESEED BREEDING PROJECT. QU NINGKANG

1. Shanghai Academy of Agricultural Sciences(SAAS), Shanghai, China. YAN ZHANG, GUANGHUA FANG .............................................. 57
2. Institute of Oilcrops Chinese Academy of Agricultural Sciences, Wuhan, China. CHENGQING LIU .................................................... 61
PART III
BRASSICA SUB-NETWORK COUNTRY PRESENTATIONS

- The Fast Developing Oilcrops Network - A Summary Report. ABBAS OMRAI. 78
- A Brief Report on the Brassica Sub-Network. BASUDEO SINGH. 83
- Research Progress on Rapeseed in Egypt. BADR A. EL-AHMAR. 85
- Quality Breeding in Brassica carinata A. Braun in Ethiopia. GETINET ALEMAW AND HIRUY BELAYNEH. 90
- Some of the contributions of Dr. Hiruy Belayneh to Oilseed Brassica Research in Ethiopia. GETINET ALEMAW. 92
- Strategies in Rapeseed and Mustard Development in Kenya. M.J. MAHASI. 95
- Status of Brassica Crops in Pakistan. MOHAMMED HANIF QAZI AND PARVEZ KHALIQ. 98
- National Uniform Rapeseed-Mustard Yield Trials and Their Role in Variety Selection. MOHAMMED HANIF QAZI AND MASOOD A. RANA. 108
- Present Status and Future Strategies of Oilseed Brassica Research in India. P.R. KUMAR AND P.S. BHATNAGAR. 112
- Rapeseed-Mustard in Nepal. B. MISHRA. 117
- Constraints and Opportunities of Brassica Oilseed Production in Bangladesh. M.A. ISLAM, M.A. KHALEQUE, K.P. BISWAS AND M.R.I. MONDAL. 120
- Progress in Rapeseed-Mustard Research in Bhutan. TAYAN RAJ GURUNG. 125
- Overview of Rapeseed Production and Research in China. YAN ZHANG. 130
- Analysis of Eight High-Quality Rapeseed (Brassica napus L.) Strains for - High and Stable Seed Yield. CHAOCAI SUN, GUANGHUA FANG AND HUA ZHAO. 134
- Canola Research in Australia. GREGORY BUZZA. 136
- Goals for 1989 - 1991 and Progress of the Barani Agricultural Research and Development Project (BARD) in Pakistan, Pertaining to Brassica. HANS HENNING MUENDEL. 137

PART IV
BRASSICA SUB-NETWORK: DISCUSSIONS / RECOMMENDATION

- Collaborative Programmes - Minutes of Meeting for Scientific Exchange and Institutional Collaborative Programmes among Member Countries of Brassica Sub-Network. 140
- India/China Collaboration - Minutes of Meeting of Counterpart Scientists for International Collaborative Research Between China and India. 143
- General Discussions and Recommendations. 147
CONSTRANTS AND OPPORTUNITIES OF BRASSICA OILSEED PRODUCTION IN BANGLADESH

M.A. Islam, M.A. Khaleque, K.P. Biswas and M.R.I. Mondal

Oilseeds in Bangladesh constitute the commercial crops of Bangladesh. Oils and fats, apart from forming an essential part of human diet, serve as important raw material for the manufacture of soaps, paints, varnishes, hair oils, lubricants, textile auxiliaries, pharmaceutical, etc. Oil cakes and meals are used as animal feeds and as manures.

The bulk of vegetable oil production in Bangladesh is derived from six oilseeds (mustard, groundnut, sesame, safflower, niger and sunflower) forming the edible group, and (linseed and castor) forming the non-edible group. In addition, cotton seeds, seeds from some oil bearing tree species, etc. are also being exploited as vegetable oils. About 70% of the total oilseed area is covered by rapeseed and mustard.

Development of oilseeds and vegetable oils holds an important place in Bangladesh's economy. There has been big gap between supply and demand of vegetable oils which has been met through annual imports, Table 1. The per capita consumption of vegetable oils in the country is very low as compared to the world average. In this context, the increase in production of oilseeds has been given priority. Every possible effort is being made to accelerate the production of oilseeds in the country.

Table 1. Oilseed production and requirement of oil in Bangladesh.

<table>
<thead>
<tr>
<th>Year</th>
<th>Population (million)</th>
<th>Requirement of Oil (000 mt)</th>
<th>Oilseed Production (000 mt)</th>
<th>Deficiency of Oil (000 mt)</th>
<th>Requirement of Oil/Cap/annum (g)</th>
<th>Requirement of Oil/ha day (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1974-75</td>
<td>78.0</td>
<td>142</td>
<td>168</td>
<td>56</td>
<td>86</td>
<td>1821</td>
</tr>
<tr>
<td>1979-80</td>
<td>87.7</td>
<td>160</td>
<td>266</td>
<td>82</td>
<td>78</td>
<td>1824</td>
</tr>
<tr>
<td>1984-85</td>
<td>98.0</td>
<td>178</td>
<td>270</td>
<td>90</td>
<td>88</td>
<td>1816</td>
</tr>
<tr>
<td>1989-90</td>
<td>111.0</td>
<td>202</td>
<td>300</td>
<td>112</td>
<td>90</td>
<td>1820</td>
</tr>
</tbody>
</table>

Source: Third Five Year Plan, Planning Commission, People's Republic of Bangladesh.

CONSTRANTS IN INCREASING PRODUCTION OF OILSEEDS

Fluctuations in production of oilseeds from year to year could be attributed to the following constraints and bottlenecks:

1. Socio-economic constraints: Most of our farmers are small and marginal, they can not afford to invest on various inputs. Oilseeds mostly grown under rainfed conditions, become high-risk crops. As a result, oilseed crops are grown mostly under poor crop management resulting in low yield. The non-realization of the benefit of improved crop production technology is, therefore, more due to poor economic condition of the farmers.

2. Environmental constraints: About 97% of the area under oilseed crops is rainfed comprising mostly marginal and sub-marginal lands with soils of poor fertility (9). Substantial production losses were found to occur due to pests and diseases.

3. Technological constraints:
   - Lack of high yielding varieties, particularly those which could give high stable yield under rainfed and short winter conditions and resist pest and diseases especially against Alternaria and Orobanche.
   - Shortage of improved farm implements,
program was realized during the 1970's and Oil necessity remained unattained. The importance of attention were production technologies varieties million people leaving jute, in every 71%. only 29% of Bangladesh. prevailed since 2. oilseeds Area, Status prior to 1975

4. Organizational and infrastructural constraints:
- Inadequate arrangements for production and distribution of quality seed,
- Supply of other inputs in time like credit and irrigation.
- Lack of transfer of technology from researcher to farmers,
- Insufficient storage and grading, and
- Poor marketing of oilseeds coupled with wide fluctuation in price.

BRASSICA OILSEEDS DEVELOPMENT PROGRAM

Status prior to 1975

Area, production and yield of different oilseeds in 1972-73 are shown in Table 2. Acute shortage of edible oilseeds prevailed since long time in Bangladesh. In 1972-73, the production of oil was only 51,359 mt which met only 29% of the requirement for 75 million people leaving a deficiency of 71%. This shortage was met by import every year at the cost of foreign exchange. At that time, high yielding varieties of oilcrops of improved production technologies of oilseeds were lacking. Scientists were engaged in research for main crops like rice, jute, sugarcane, etc. and least attention was given to oilseeds. So, the oilseeds improvement program remained unattained. The importance and necessity of oilseed improvement program was realized during the late 1970's and Oil Seeds Research and Development Project was initiated in 1971. But the project could not function due to liberation war. So, a new project for the development of oilseeds especially Brassica oilseeds was taken up in 1975 with few scientists only.

Status after 1975

Intensive research on oilseeds was initiated in 1975 when the Accelerated Winter Oilseed Improvement and Development Program (AWOIDP) started functioning with the assistance of Swedish International Development Agency (SIDA) during the First Five Year Plan (FFYP) of Bangladesh. Scientists were trained in Sweden, India, UK and Philippines under the program. Equipments were procured and an oilseed laboratory was established at Bangladesh Agricultural Research Institute (BARI). At the same time, other Institutes of Bangladesh like Bangladesh Agricultural University (BAU), Bangladesh Institute of Nuclear Agriculture (BINA), Rajshahi University (RU), Mennonite Central Committee (MCC), etc. also started research on oilseeds.

Status after 1980

During the Second Five Year Plan (SFYP) period, BARI developed two high yielding varieties of mustard namely: SS-75 (Sonali Sarisa) and TS-72 (Tliania) and BAU developed one variety, M-12 (Sampad) Table 3. As a result, the oil production started increasing and rose to 57.7 thousand tons in 1981-82. Brassica oilseeds, being the major oilseeds in the country contributed a total production of 41,700 tons (13).

Extension Officers, like subject matter officers and subject matter specialists of the Department of Agricultural Extension (DAE), were trained during

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area</th>
<th>Production</th>
<th>Yield</th>
<th>Oilseeds available for oil purpose</th>
<th>Oil equivalent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rape and mustard</td>
<td>473,155</td>
<td>106,160</td>
<td>591.88</td>
<td>104,858</td>
<td>34,953</td>
</tr>
<tr>
<td>Winter and Summer Til (Sesame)</td>
<td>117,925</td>
<td>27,460</td>
<td>590.63</td>
<td>27,135</td>
<td>9,045</td>
</tr>
<tr>
<td>Winter and Summer Groundnut</td>
<td>56,570</td>
<td>31,000</td>
<td>1,256.25</td>
<td>29,443</td>
<td>7,361</td>
</tr>
<tr>
<td>Total</td>
<td>647,650</td>
<td>164,620</td>
<td>161,636</td>
<td>161,636</td>
<td>51,359</td>
</tr>
</tbody>
</table>

Source: Accelerated Winter Oilseed Improvement and Development Program (AWOIDP), Govt. of Bangladesh.
1981-84. The newly developed technologies of oilseeds and demonstration of high yielding varieties were demonstrated at the farmers' fields by the newly trained officers. The coverage of High Yielding Variety (HYV) of mustard increased from 12 to 17% during 1982-85, Table 4. The productivity also increased from 591 kg/ha in 1972-73, Table 2, to 733 kg/ha in 1984-85, Table 4. Bangladesh Agricultural Development Corporation (BADC) initiated mustard seed production and the Department of Agriculture Extension (DAE) conducted intensive demonstration of HYV in farmers' field. Special publications like "Krishikatha" (Oilseed Issue, November 1983) and leaflets on the developed varieties and other technologies were brought out. As a result, oil production continued to increase up to 91,712 mt in 1985, Table 4.

Table 4. Production statistics of rape and mustard in 1982-1985 cropping season.

<table>
<thead>
<tr>
<th>Year</th>
<th>Variety</th>
<th>Area (ha)</th>
<th>% of Total</th>
<th>Production (mt)</th>
<th>Yield (kg/ha)</th>
<th>Total oil (mt)</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>1982-83</td>
<td>HYV</td>
<td>34,491</td>
<td>11.3</td>
<td>30,515</td>
<td>885</td>
<td>-</td>
<td>BARC</td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td>269,982</td>
<td>88.7</td>
<td>182,433</td>
<td>676</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>304,473</td>
<td>100.0</td>
<td>212,948</td>
<td>699</td>
<td>70,649</td>
<td></td>
</tr>
<tr>
<td>1983-84</td>
<td>HYV</td>
<td>43,927</td>
<td>14.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>DAE</td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td>269,838</td>
<td>86.0</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>313,765</td>
<td>100.0</td>
<td>225,000</td>
<td>717</td>
<td>75,000</td>
<td></td>
</tr>
<tr>
<td>1984-85</td>
<td>HYV</td>
<td>62,371</td>
<td>17.0</td>
<td>62,075</td>
<td>995</td>
<td>-</td>
<td>DAE</td>
</tr>
<tr>
<td></td>
<td>Local</td>
<td>313,031</td>
<td>83.0</td>
<td>213,083</td>
<td>681</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>375,402</td>
<td>100.0</td>
<td>275,158</td>
<td>733</td>
<td>91,712</td>
<td></td>
</tr>
</tbody>
</table>

Source: Third Five Year Plan, Planning Commission, People's Republic of Bangladesh. * NA= Not available

**Status after 1985**

A program was taken up in the Third Five Year Plan (TFYP) to produce 112 thousand tons of oil for 111 million people in 1990 against the target of 202,000 mt at the rate of 5 g/h/d, Table 1.

In 1988, the number of HYV of rape and mustard has been increased to seven, Table 5. Other technologies have also been developed to grow oilseed crop without affecting rice and wheat. Practice of inter-cropping, relay-cropping and mixed cropping with pulses, sugarcane, maize, etc. were followed with improved technologies. As a result, production continued to rise steadily. Accordingly, the edible oil production went up to around 106,000 mt in 1987-88, Table 6, against the set target of 202,000 mt, leaving a deficiency of over 90,000 mt of oil. Brassica only contributed 73,000 mt of oil.

Recently, attempts have been made to introduce B. napus in Bangladesh by resynthesis and introgression. As a result, three advance lines of B. napus are now under regional yield trial. Two
problems, shattering and sterility, have been detected in *B. napus*. Attempts are being made to overcome these problems.

**OPPORTUNITIES FOR FUTURE BRASSICA OILSEED DEVELOPMENT**

During the coming years, more quantity of edible oil will be required for consumption. Therefore, a larger program has been set up for oilseeds under the Crop Diversification Program to accelerate the pace of oilseed production.

The major strategy comprises increasing the production and productivity of oilseeds. The experience so far gained from the results of demonstration in farmers' fields in several districts namely: Jessore, Jhenaidah, Magura, Kushtia, Pabna, Brahmanbaria, etc. indicated that concentrated-area-crop approach with irrigation and fertilizer can pay rich dividends. This approach should be incorporated in the National Oilseed Development Program, (10).

### Table 5. Different rape and mustard cultivars (including HYV) in Bangladesh December, 1988.

<table>
<thead>
<tr>
<th>Crop/Variety</th>
<th>Days to maturity</th>
<th>Yield (kg/ha)</th>
<th>Oil content(%)</th>
<th>Organization</th>
<th>Year of recommendation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tori</td>
<td>70-80</td>
<td>950-1100</td>
<td>39-40</td>
<td>ARI</td>
<td>Traditional</td>
</tr>
<tr>
<td>TS-72 (Kalyenia)</td>
<td>75-85</td>
<td>1500-1600</td>
<td>41-42</td>
<td>BARI</td>
<td>1979</td>
</tr>
<tr>
<td>SS-75 (Sonali Sarisha)</td>
<td>90-100</td>
<td>1800-2000</td>
<td>43-44</td>
<td>BARI</td>
<td>1979</td>
</tr>
<tr>
<td>M-12 (Sampad)</td>
<td>90-100</td>
<td>1600-1800</td>
<td>42-44</td>
<td>BAU</td>
<td>1982</td>
</tr>
<tr>
<td>Rai-5</td>
<td>90-100</td>
<td>950-1100</td>
<td>39-40</td>
<td>ARI</td>
<td>Traditional</td>
</tr>
<tr>
<td>M-248 (Sambal)</td>
<td>100-110</td>
<td>1050-1150</td>
<td>38-39</td>
<td>BAU</td>
<td>1984</td>
</tr>
<tr>
<td>RS-81 (Baulat)</td>
<td>95-105</td>
<td>1100-1250</td>
<td>38-39</td>
<td>BARI</td>
<td>1988</td>
</tr>
</tbody>
</table>

Source: Oilseed Research Centre, BARI.

### Table 6. Area and production of oilseed crops for the year 1987-88.

<table>
<thead>
<tr>
<th>Crop</th>
<th>Area (ha)</th>
<th>Production (mt)</th>
<th>Yield (kg/ha)</th>
<th>Oil equivalent (2233 Ton)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rape and mustard</td>
<td>317,863</td>
<td>222,008</td>
<td>699</td>
<td>73,263</td>
</tr>
<tr>
<td>Sesame</td>
<td>81,985</td>
<td>49,027</td>
<td>598</td>
<td>16,179</td>
</tr>
<tr>
<td>Groundnut</td>
<td>38,472</td>
<td>47,753</td>
<td>1,241</td>
<td>15,758</td>
</tr>
<tr>
<td>Other Oilseeds</td>
<td>310</td>
<td>190</td>
<td>612</td>
<td>63</td>
</tr>
<tr>
<td>Total/Average</td>
<td>438,630</td>
<td>318,978</td>
<td>788</td>
<td>105,263 (52%)</td>
</tr>
</tbody>
</table>

Source: Bangladesh Bureau of Statistics.

The broad strategy will be:

a) To increase the productivity through varietal replacement by available HYV, use of quality seed, large scale use of fertilizer and organic manures, effective plant protection measures and other improved agronomic practices.

b) To expand irrigated area under oilseed crops especially for rape and mustard.

c) To increase area under rape and mustard by double/multiple cropping program.

d) To distribute large number of minikits.

e) To strengthen seed production and distribution program.

f) To increase awareness and popularization of fertilizers in potential areas.


g) To use more power expeller for efficient extraction of oil instead of "Local Ghani", and

h) To organize village demonstration, on-farm training, provision of incentive price through government procurement policy etc.
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5. 1981b. Sonali Sarisha (SS-75), Published by Oilseed Research Project, BARI.
8. 1987. Cultivation of Mustard (Sarisher Chash). Published by oilseed Research Project, BARI.

DISCUSSION

Kumar: Did the variety of mustard shown which had a compact pod structure had Been looked at for aphid reaction?

Islam: No.

Mundel: What species are used for intercropping with sugarcane and how this was done?

Islam: Both B. campestris and B. juncea are intercropped with 2 rows of sugarcane adjacent to 2 rows of Brassica. The Brassica rows are harvested when the Sugarcane is only 20 cm tall.

Singh: The mustard protects sugar cane from frost injury.

--- XXX ---