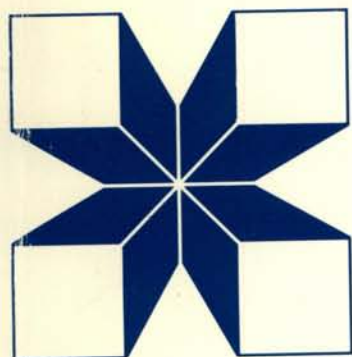


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**OIL CROPS:  
PROCEEDINGS OF THE  
THREE MEETINGS HELD  
AT PANTNAGAR AND  
HYDERABAD, INDIA,  
4 – 17 JANUARY 1989**

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**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.**

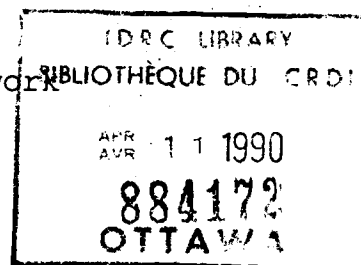
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**OIL CROPS:  
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PANTNAGAR AND HYDERABAD, INDIA, 4-17 JANUARY 1989**

1. The Brassica Subnetwork-II
2. The Other Oil Crops Subnetwork-I
3. The Oil Crops Network Steering Committee-I

Edited by

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Organized by

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# CONTENTS

Foreword .....	v
List of Participants .....	vi
Introduction .....	xi

## Part 1. Brassica Subnetwork-II

Opening Remarks. MAHATIM SINGH .....	2
Recent Development in Oilseed Brassicas. R.K.DOWNEY .....	4
The Interinstitutional Collaborative Research Program on White Rust ( <i>Albugo candida</i> ) Between India (ICAR) and Canada (IDRC) for Rapeseed-Mustard Improvement. P.R.VERMA .....	9
Stability Parameters for Seed Characters In Different Species of Oleiferous Brassica. H.SINGH, D.SINGH, and V.S. LATHER .....	14
Oilseed Brassica Research in India. P.R.KUMAR .....	17
Transfer of Technology and On-farm Trials of Rapeseed and Mustard. BASUDEO SINGH .....	24
Status of Breeding Research on brassica Oil Crops at Pantnagar, India. G.N.SACHAN .....	30
Agronomic Investigations on Rapeseed and Mustard at Pantnagar. ARVIND KUMAR and R.P. SINGH .....	35
Disease Problems in Brassicas and Research Activities at Pantnagar. S.J.KOLTE, R.P.AWASTHI and VISHWANATH .....	43
Effect of Some Epidemiological Factors on Occurrence and Severity of Alternaria Blight of Rapeseed and Mustard. R.P. AWASTHI and S.J.KOLTE .....	49
Problems of Insect Pests in Brassicas and Research Work at Pantnagar. G.C.SACHAN .....	56
Economic Performance, Potential and Constraints in Toria Production. L.R.SINGH .....	66
Rapeseed In Egypt. BADR A.EL-AHMAR .....	70
The Role of High-Yielding Varieties and Production Techniques on Oilseed Brassica Performance in the Central, South-Eastern and North-Western Zones of Ethiopia. HIRUY BELAYNEH, GETINET ALEMAW and NIGUSSIE ALEMAYEHU .....	72
The Achievements and Future of Brassica in Kenya. M.J.MAHASI .....	79
Rapeseed Adaptation Trials in Cyprus. A.HADJICHRISTODOULOU .....	83
The Rapeseed ( <i>Brassica napus</i> L.) Quality Breeding Progress in Shanghai Academy of Agricultural Sciences (SAAS) for Recent Years. SUN CHAOCAI .....	92
Statement on the Execution of the Sino-Canadian Rapeseed Breeding Project in 1988. WANG ZAO MU .....	94
A Preliminary Study on the Combining Ability and Heritability of Main Agronomic Characters in <i>B. juncea</i> . WANG ZAO MU and WANG YAN FEI .....	98
Report on the Execution of Sino-Canada Research Breeding Project. LIU CHENG QUING and HONG HAI PING .....	103

A Review of Orobanche Problem in Nepal. M.L.JAYASWAL .....	106
Oil Crops in Bhutan. TAYAN RAJ GURUNG .....	119
Brassica Production and Research in Pakistan. REHMAT ULLAH KHAN and MASOOD A.RANA .....	127
Summary and Wrap-up for Brassica Sub-Network Meeting. HUGH DOGGETT ..	130
Report on a Tour to Oilseed Brassica Growing Areas of India. GETINET ALEMAW .....	136
Discussions and Recommendations .....	138

## Part 2. Other Oilcrops Subnetwork-I

Safflower Research and Coordination in India. V.RANGA RAO .....	144
Highlights of the Second International Safflower Conference Hyderabad, India from January 9-13, 1989. V.RANGA RAO .....	147
Coordinated Research Efforts and Linseed ( <i>Linum Usitatissimum</i> L.) Improvement in India. MANGALA RAI .....	149
Safflower Research in Eighties in Madhya Pradesh (India). A.R.SAWANT	154
Nigerseed in India: Present Status of Cultivation, Research Achievements and Strategies. S.M.SHARMA .....	159
Constraints and Opportunities for Increasing the Production and Productivity of Niger in India. S.M.SHARMA .....	166
New Potential Areas of Niger in India. S.M.SHARMA .....	169
Present Production, Research and Future Strategy for Niger in Maharashtra. A.V.JOSHI .....	171
Niger in Tribal Bihar. H.B.P.TRIVEDI .....	176
Cultivation and Varietal Improvement of Linseed in India. R.N.DUBEY .	180
Agronomic Management/Agro-Techniques for Improving Production of Niger and Linseed. G.L.MISHRA .....	186
The Present Status of Niger and Linseed Pathology Work in India. G.S.SAHARAN .....	192
Safflower, Niger and Linseed in Nepal. B.MISHRA .....	203
Country Paper on Other Oilcrops in Bangladesh. M.A.KHALEQUE and DILRUBA BEGUM .....	208
Country Report on Linseed and Safflower in Pakistan. MASOOD A.RANA, MOHAMMAD SHARI, and ALTAF H.CHAUDHRY .....	213
Present Status of Safflower in Egypt. BADR A. EL-AHMAR .....	218
Progress in Linseed On-station and On-farm Research in Ethiopia. HIRUY BELAYNEH, NIGUSSIE ALEMAYEHU and GETINET ALEMAW .....	220
Investigations on Some Biochemical Characteristics of Nigerseeds ( <i>Guizotia abyssinica</i> Cass). GETINET ALEMAW and HIRUY BELAYNEH	229
Processing of Oil Seeds in Ethiopia. DEJENE TEZERA .....	233
The Status of Linseed, Safflower and Niger Research and Production in Kenya. T.C.RIUNGU .....	238
Summary and Wrap-up for Other Oilcrops Sub-Network Meeting. HUGH DOGGETT .....	241
Discussions and Recommendations .....	248

### Part 3. Oilcrops Network Steering Committee-I

The Oilcrops Network for East Africa and South Asia, Achievements and Future. ABBAS OMRAN .....	256
Recent Developments in The Oil Crops Network and the ORU. HUGH DOGGETT	265
IBPGR's New Concept for the Conservation and Utilization of Germplasm; Global Crop Networks. J.M.M.ENGELS .....	272
Technology Mission on Oilcrops for Self-Reliance in Vegetable Oils in India. MANGALA RAI .....	274
Oilseeds Research in India: Network, Its Set Up, Organization, Past Achievements and Current Research Thrusts. V.RANGA RAO .....	283
Groundnut and the Oilcrops Network. S.N.NIGAM .....	286
Oilcrops Production in Ethiopia Current Status and Future Prospects. SEME DEBELA .....	288
The Vegetable Oil/Protein System in Kenya Summary Report-Phase I. C.ZULBERTI and J.LUGOGO .....	293
Brassica Sub-Network Achievements and Activities, 1987-88. HIRUY BELAYNEH .....	320
The Present Situation and Main Achievements of Sesame Production in East Africa. MOHAMMED EL-HASSAN AHMED .....	324
Constituion of the Oil Crops Network (Second Draft). MASOOD A.RANA and ABBAS OMRAN .....	330

## REPORT ON THE EXECUTION OF SINO-CANADA RESEARCH BREEDING PROJECT

Liu Cheng Quing and Hong Hai Ping

The Institute of Oil Crops Research of China Academy of Agriculture and Quinghai Academy of Agriculture Sciences are two of the four co-operated Institutes in Sino-Canada Rapeseed Breeding Project. Meanwhile, we have been carrying on the key projects in China on the sixth and seventh five-year plans, since good-quality rapeseed breeding became our country's key project. We have also been supported by IDRC for two periods with finance, equipment and technology. Owing to the bilateral effort by China and Canada, the good-quality rapeseed breeding project has made great progress. Both China and Canada are satisfied with the result.

### A. Screening and evaluating good parental lines

The collection and evaluation of parent materials is an important aspect of the study in Sino-Canada rapeseed breeding project. Since 1983, we have screened and evaluated more than 280 materials of *B. napus* and 210 materials of *B. campestris*, and from these we have selected some good parent materials for the breeding study.

1. After several years of selfing, we have selected a lot of parental lines with different maturity times, good quality characters, single-low, double-low, oil content - above 45% and linoleic acid content - about 35%.
2. After several years of natural field evaluation and partly of greenhouse artificial inoculation, we selected several varieties (lines) that are tolerant to *Sclerotinia*, such as 81007, 81006, 84004 and

Start, which are double-low or single-low varieties. Some of these can also resist virus. Nowadays, we have got preliminary results to use them in crossing programs. Among these, 84004 and 821 have the strongest disease tolerance and heritability. We used them as parents and crossing progenies have higher disease tolerance. The reciprocal cross was different as tolerance to *Sclerotinia* is influenced by the female.

### B. Double-and single-low varieties

We have begun breeding rapeseed for quality since the end of 1970. Under the financial aid from IDRC, we have bred six single-and double-low rapeseed varieties and used them in rapeseed production. They filled the gap of our country's good quality rapeseed demand.

1. Within a few years, Quinghai Academy of Agricultural Sciences introduced, selected and developed good-quality varieties such as Oro, Tower, Westar from Canada, and Topas from Sweden. These varieties have been planted on large-scale in northwest and northeast parts of China. Among these, Oro covered 800,000 ha, Tower 133,333 ha, Westar 66,667 ha, Regent 33,333 ha and Topas 13,333 ha. Next year, these areas will be increased. In addition, the QAAS has bred double-and single-low *B. campestris* varieties (lines) such as 82 C 11-4, 82 C1, 83-81 which are used in cold and high altitude areas. Varieties 83-109 and 86027 appeared to be very good in the northern rapeseed

testing region. Next year, they will become registered varieties.

2. The Institute of Oil Crops Research in China Academy of Agricultural Sciences has bred six single- and double-low rapeseed varieties (lines) of *B. napus* which have been put into rapeseed production in the region of the Yangze river:

- i) In 1986, three single-low and winter-form rapeseed varieties of *B. napus* have finished their test and became normal varieties. Zhong you 1 and 2 were widely developed in the middle region of Yangze (Hubei, Hunan, Jiangxi, Anhui). The total rapeseed area was 46,667 ha. The average rapeseed yield was 1350 - 2023 kg/ha. It increased by 5-12% than those of the local varieties Zhong You 2 single-low appeared more tolerant to *Sclerotinia* than those of the local double-high improved varieties up to now.

Zhong You 3 single-low which became a good quality variety with yield higher than that of the double-high varieties. It is an early maturing winter variety. Its seed yield is 1800-2700 kg/ha and is 14-23% higher than that of the local double-high varieties. It suits a type of rice-rapeseed rotation in a year. It appears very well in He Zi Zou Lang of Gansu province. Nowadays, it occupies 4000 ha. Yunnan, Sichuan and Gueizhou planted larger area.

- ii) Three double - low winter rapeseed varieties (lines) were bred in 1988. The erucic acid content of the double-low line 84001 is

0.32% and its glucosinolate content is 14.36 - 21.02  $\mu\text{mol/g}$ . The seed yield equaled that of the local double-high varieties. The average seed yield of 36 places in Yunnan province was 2407 - 2979 kg/ha from 1986 to 1987. The seed yield was 18.3 - 22% higher than that of Zhong You 3 single-low, 23-25.1% higher than that of double-high variety "Yun You 31". In 1987-88, it was planted on 733 ha and the average seed yield was 2414.55 kg/ha in spring of 1989, it will be developed to suit tri-rotation in a year.

Erucic acid content of the double - low 84039 is 0.5%, glucosinolate content is 16.52 - 22.3  $\mu\text{mol/g}$ , and oil content is 42.4 - 43%. Through a three-year regional testing in the middle region of the Yangze river, the seed yield equaled that of the local double-high varieties (average 1447.5 kg/ha). It is the best good-quality rapeseed variety in the middle region of the Yangze river. We planted 333 ha in Jian county of Jiangxi province in 1987. The average seed yield was 3.2 - 14.1% higher than that of the local double-high varieties "Xinan 302". It can be widely grown in spring of 1989, and it suits tri-rotation with rice, but it is not tolerant to *Sclerotinia*.

The erucic acid content of the double - low 84004 is 0.31%, its glucosinolate content is 13.27 - 21.45  $\mu\text{mol/g}$  and its oil content is 43.2%. The seed yield in the regional test in Hubei and Anhui provinces was the same as that of local double-low varieties. But the seed yield of the large-scale rapeseed



production increased and reached significant level. Average seed yield of 252.3 ha test planted in Guchang country of Hubei province from 1986 to 1987 was 2298 kg/ha. The area under this variety increased to 600 ha in 1987-88 and although during flowering it met an abnormal climate, it yielded 15.7% higher than that of double - high varieties. The average seed yield was 1350 kg/ha. In this area, the average seed yield of 62.3 ha was 2310 kg/ha and was the highest one. In 1988, 84004 was planted on 2333 ha in this county. The seed yield in Zhecheñg county of Hubei province was 3750 kg/ha which was the highest in this year than before. It also appeared hardly resistant/tolerant to *Sclerotinia* and virus. Varieties 84004 and 821 were artificially inoculated with *Sclerotinia* for six times in greenhouse and were evaluated. The result showed that 821 was more tolerant to *Sclerotinia* than the double-high variety (Gan You 5), at 5% significance level. It was also hardly resistant/tolerant to virus. We are sure that 821 is one of the best double low-varieties (lines) for disease tolerance

in Hubei.

Besides these, our two institutes selected a number of double - low lines for disease tolerance and also put them in the third regional test.

#### C. Establishing systematic analysis techniques to fit rapeseed breeding

With the financial aid from IDRC, the rapid and precise analyses of erucic acid, glucosinolate and oil content have been established and we gained a lot of equipments in recent year. According to Chinese status, few rapid analyses of erucic acid and glucosinolate were improved and some simple instruments were made.

#### D. Training

With the financial aid from IDRC, we have cooperated with other institutions to train several persons for Degrees abroad and 120 technicians for rapeseed breeding, introducing varieties, regional test and quality analysis at home. These trained technicians are playing an important role in enhancing the research on quality rapeseed breeding and popularizing modern techniques in China.