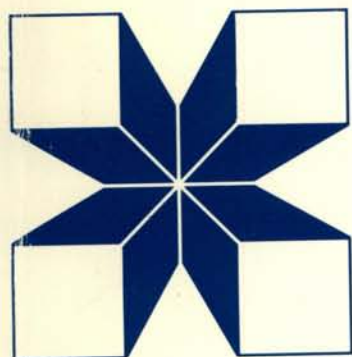


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C A N A D A

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

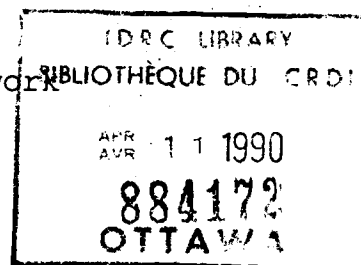
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**OIL CROPS:
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1. The Brassica Subnetwork-II
2. The Other Oil Crops Subnetwork-I
3. The Oil Crops Network Steering Committee-I

Edited by

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SAFFLOWER RESEARCH AND COORDINATION IN INDIA

V. Ranga Rao

Although safflower has been under cultivation in India since times immemorial either for its orange red dye carthamin extracted from its flowers and/or oil, the crop received practically little attention until early 70's. The extension of the All India Coordinated Project on Oilseeds which initially started in 1967 to hitherto neglected crop namely safflower gave a fillip to the research and developmental efforts in the crop. Since inception, the number of active research centres on safflower in the country have gone up from 4 to 7 and the network expanded to several non-traditional areas (Madhya Pradesh, Uttar Pradesh, Rajasthan) and situations. Besides, with effect from 1977 a fullfledged Project Coordinator has also been provided exclusively for safflower with headquarters at Solapur (Maharashtra) for the purpose of coordination and monitoring of research activities in the crop. Realizing the crucial importance of genetic resource conservation, documentation and evaluation, the ICAR has also set up a Germplasm Management Unit at the Headquarters of Project Coordinator (Safflower) since Vith Plan.

The last two decades of organized research activity in safflower has indeed been very rewarding; it opened several hitherto unknown and untapped opportunities for improving the yields and incomes of dryland areas and augment the country's edible oilseeds production. Extensive trials carried out in different parts of the country for the first time brought out the superior potentials of safflower as an entire crop under receding moisture conditions. In fact, in a number of areas both conventional (Maharashtra,

Karnataka, Andhra Pradesh) and non-conventional (Eastern Uttar Pradesh, Bundelkhand, South-Eastern Rajasthan, Plateau region of Bihar) cultivation of safflower proved far more paying and stable than a number of popularly grown winter season crops like chickpea, linseed, coriander, Herbaceum cottons, wheat etc., in drylands.

The impact of these findings on prevailing cropping patterns is clearly discernible in several parts of the country now identified as proven and efficient areas of safflower culture. What is more, a number of feasible and profitable two crop sequences identified for different rainfed areas in the country either on contingency basis or regular pattern (assured rainfall areas) also include safflower which is known for its ability to tap moisture from deeper layers as one of the important component after either a short duration rainy season cereal (sorghum, pearl millet, maize, rice) or grain legumes (green gram, black gram, groundnut, soybean) and non-legumes (sesame). This indeed brightened the prospects for making productive and profitable use of vast stretches of sorghum and soybean fallows currently under utilized in the peninsular region.

Wealth of data generated in recent years also point out safflower with its characteristic rosette habit and deep and efficient rooting system to be an ideal intercrop with a number of post rainy season crops. Thus, inclusion of safflower as an intercrop with coriander, wheat, linseed, gram at pre-determined row proportions of 3:1 or 2:1 or their multiples has not only registered higher land equivalent ratios in excess of unity but also produced extra

monitory returns to the tune of Rs.1000 to 2500/- over and above what is realized from the base crop. The popularization of such simple and synergistic crop combinations are expected to lead to sizeable expansion in the acreage under safflower and bring about greater stability to yields and returns from dryland areas in the country.

Equally rewarding are the researches on the breeding and agronomic front. Since 70's the country has developed 13 high yielding varieties of either location specific or multi regional importance with genetic potentials of 2-3 tons/ha. Breeding programs launched in non-traditional areas for the development of spineless varieties of safflower with high yielding potentials have yielded a number of valuable materials of considerable importance.

Simple low-cost practices such as planting at the recommended time and varietal choice have been demonstrated to have significant bearing on the incidence of insect pests and diseases and their management in both rainfed and irrigated areas and returns from costly inputs like fertilizers, chemical plant protection. Even in drylands, application of fertilizers turned out to be a very critical factor in safflower production. Yields and returns from rainfed safflower registered 40 - 50% increase if one supplementary irrigation is provided at sensitive stages of crop growth or when crop encountered moisture stress. Under constraints of water availability in irrigated canals/reservoirs shifts in crop choice from much preferred water intensive crops like wheat to safflower culminated in higher yields and incomes per unit area, water and input.

The prevailing per hectare yields of safflower in the country are

very low (≤ 500 kg). Added to this, there are wide regional disparities in the productivity levels. Results of on-farm trials available from different proven and potential areas of safflower culture in the country reveal existence of vast untapped yield reservoir. According to these, the per hectare yields of safflower even with the technologies currently available, could easily be stepped up to 1 to 1.5 tons/ha in rainfed areas and 1.5-2 tons/ha and above in areas with assured moisture or limited irrigation.

The area, production and productivity of safflower in the country has witnessed remarkable growth in recent years, thanks for the concerted research and developmental efforts. Since early 60's its acreage nearly doubled and production went up by 6.6 fold. While, no doubt, safflower holds tremendous potentials for stepping up yields and returns from dryland areas in the country and thereby impart stability to its production, a number of biotic constraints (Alternaria leafspot, aphids, wilts and root rots) limit realization of its true potentials. The unduly late maturing habit of the currently available varieties in areas with prolonged winter, their poor adaptability to salt affected areas and irrigated conditions, intense spiny nature are some of the other drawbacks limiting expansion of safflower to potentially new areas and situations. The future of safflower in the country and its expansion into newer areas would greatly depend on overcoming these and various other constraints and make its cultivation more attractive and production costs less. Rightly major thrust in the country's on-going research program is for incorporation of genetic resistance against Alternaria leaf blight, aphids in rainfed safflower and Alternaria, aphids, wilt and root

rots in irrigated safflower. Various other areas which are currently receiving attention on the research front are:

1. Upgradation of seed oil content in the available improved agronomic base (existing=30%).
2. Development of high yielding varieties of safflower both spiny (traditional belt) and spineless (non-traditional areas) with in built resistance to insect pests and diseases, suited to different situations (irrigated/rainfed, salt affected areas).
3. Exploitation of hybrid vigour.
4. Refine the agronomy of various

proven and profitable sequential, relay and intercropping systems for ensuring efficient use of inputs per unit area and time.

5. Integrated management of insect pests and diseases, and
6. Perfect the agronomy of safflower under limited irrigation in vertisols.

With these and the anticipated developments, the safflower scenario in the country is expected to undergo rapid changes in the coming few years and its contribution to the country's vegetable oil pool increased substantially.