

Sub Project: 4

File No. DBT-412

Prof. Arun Jaggannath.

Co-PI: Sheelender Groel.

Title of Project "Exploiting..... Traits"
Sub Project 4: "Development..... Safflower"
Tenure of the Project:- 29/2/2020 to 28/02/2025
Funding: - DBT
Department. - Botany.

Record File

No. 450

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ORDER

Sanction of the President is hereby accorded, under Rule 18 of the Delegation of Financial Powers Rules, 1978, for the implementation of the project entitled "Exploiting Genetic Diversity for Improvement of Safflower through Genomics-Assisted Discovery of QTLs/Genes Associated with Agronomic Traits" under mission programme of "Minor Oilseeds of Indian Origin" for a period of 5 Years at a total cost of Rs. 195932740.00 (Rupees nineteen crore fifty nine lakh thirty two thousand seven hundred and forty only) as per details in Para's below:

2. The Project:
- 2.1 Title: Minor Oilseeds of Indian Origin: Exploiting Genetic Diversity for Improvement of Safflower through Genomics-Assisted Discovery of QTLs/Genes Associated with Agronomic Traits.
- 2.2 Project Coordinator: Dr. A. V. Reddy, Director, IIOR, Hyderabad
- 2.3 Project Co-coordinator: Dr. K. Palchamy, IIOR, Hyderabad
- 2.4 Principal Investigators and Coordinators of the Sub-projects:
- A. Sub Project - 1: Development of molecular core set of safflower (*C. tinctorius* L.) through GBS. There is one (01) component in this sub-project
- i. Component-1: NBPGR, New Delhi
- PI - Dr. S. Rajkumar
 - Co-PIs - Dr. J. Radhamani, Dr. R. Parimalan, Dr. Sunil Gomashe
- B. Sub Project-2: GWAS for Seed Yield, Oil Content, Oil Quality And Tolerance To Biotic And Abiotic Stresses Using Molecular Core Set of Safflower Germplasm. There are 05 components in this sub-project:
- i. Component-1: NBPGR, New Delhi
- PI - Dr. S. Rajkumar
 - Co-PIs - Dr. R. Parimalan, Dr. Sunil Gomashe, Dr. Sundeep Kumar, Dr. Rajesh Kumar
- ii. Component-2: Indian Institute of Oilseeds Research, Hyderabad
- PI - Kadirvel Palchamy
 - Co-PIs - Dr. N. Mukta, Dr. R.D. Prasad, Dr. P.S. Srinivas, Dr. Praduman Yadav, Dr. Lakshmi Prayaga, Dr. P. Ratna Kumar, Dr. P. Padmavathi, Dr. M.A. Qureshi, Dr. C. Sarada
- iii. Component-3: AICRP-Safflower Unit, VNMKV, Parbhani
- PI - Dr. S.B. Ghuge
 - Co-PIs - Dr. Pritam Bhatada
- iv. Component-4: AICRP-Safflower Unit, MPKV, Solapur
- PI - Dr. S.K. Shinde
 - Co-PIs - Dr. S.V. Khadtare
- v. Component-5: Punjab Agricultural University, Ludhiana
- PI - Dr. Pankaj Sharma
 - Co-PIs - Dr. V. Kalia and Dr. Sanjula Sharma
- C. Sub Project-3: Draft genome sequencing of safflower and its wild relatives. There are two (02) components in this sub-project:
- i. Component-1: University of Delhi, Delhi
- PI - Prof. Arun Jagannath
 - Co-PI - Prof. Shailendra Goel

ii. **Component-2: Indian Institute of Oilseeds Research, Hyderabad**

- PI -Dr. Kadirvel Palchamy
- Co-PI: Dr. C. Sarada

D. **Sub Project-4: Development of high throughput SNP markers for genotyping applications in safflower. There are two (02) components in this sub-project:**

i. **Component-1: Indian Institute of Oilseeds Research, Hyderabad**

- PI -Dr. Kadirvel Palchamy
- Co-PI: Dr. C. Sarada

ii. **Component-2: University of Delhi, Delhi**

- PI - Prof. Arun Jagannath
- Co-PI - Prof. Shailendra Goel

E. **Sub Project-5: Genetic mapping of traits of agronomic value in safflower. There are two (02) components in this sub-project**

i. **Component-1: University of Delhi, Delhi**

- PI - Prof. Arun Jagannath
- Co-PI - Prof. Shailendra Goel

ii. **Component-2: Indian Institute of Oilseeds Research, Hyderabad**

- PI -Dr. Kadirvel Palchamy
- Co-PI: Dr. C. Sarada & Dr. P.S. Srinivas

F. **Sub Project-6: Development of pre-bred materials using safflower wild relatives. There are two (02) components in this sub-project:**

i. **Component-1: Indian Institute of Oilseeds Research, Hyderabad**

- PI -Dr. Kadirvel Palchamy
- Co-PI: Dr. K. Anjani, Dr. P.S. Srinivas, Dr. R.D. Prasad, Dr. P. Ratnakumar

ii. **Component-2: PAU, Ludhiana**

- PI -Dr. Pankaj Sharma
- Co-PI: Dr. K. Anjani, Dr. P.S. Srinivas, Dr. R.D. Prasad, Dr. P. Ratnakumar

2.5 **Overall Objectives of the Network project:**

- To develop molecular core set of safflower germplasm.
- To discover genomic regions associated with seed yield, oil content, oil quality, resistance to Fusarium wilt, charcoal rot and aphid through genome wide association studies (GWAS).
- To generate draft genome sequences of safflower (*C. tinctorius* L.) and its wild relatives, *C. oxyacantha* and *C. palaestinus*.
- To develop high-density linkage maps of safflower using Genotyping by Sequencing.
- To develop high throughput SNP markers for genotyping applications in safflower.
- To map QTLs associated with traits of agronomic value
- To develop pre-bred materials using the wild species, *C. oxyacantha* and *C. palaestinus* for exploring novel QTLs for yield components and tolerance to aphid, resistance to charcoal rot and tolerance to moisture stress.

2.6 **Sub-Project/component and institutional objectives:**

Overall objectives:

- To genotype entire collection of safflower germplasm (~7000 accessions) by GBS.
- To develop molecular core collection of safflower germplasm using GBS data.

A. **Sub Project - 1:**

i. **Component-1: ICAR-National Bureau of Plant Genetic Resources, New Delhi**

- To assemble entire collection of safflower germplasm available at NBPGR, New Delhi
- To purify accessions through selfing (single seed descent method)

Swati