

AICRP on Sunflower
Main Agricultural Research Station, Raichur



Brief Background about the establishment of the Sunflower Centre:

Sunflower (*Helianthus annuus* L.) is major important oil seed crop of the country. Karnataka occupies first position with 29% of the total acreage and 27% of the total production of the country. Sunflower is becoming very important crop both in dryland and irrigated areas in Tungabhadra (TBP) and Upper Krishna (UKP) command areas of Raichur, Gulbarga and Bellary Districts.

During early 1990's although sunflower is a major oil seed crop of the region only national varieties/hybrids or private company hybrids were being grown extensively. Because of lack of suitable varieties/hybrids and unscientific spread sunflower faced several biotic and abiotic problems. A systematic multidisciplinary effort were required to develop and identify superior varieties/hybrids suitable for northern districts of Karnataka, hence the provision of AICRP centre at Raichur during 1992-93.

Since its inception the centre is involved in scientific research and developing technologies in sunflower crop in general and particularly to three agro-climatic zones of Karnataka viz., North Eastern Transition Zone (Zone-1), North Eastern Dry Zone (Zone-2) and Northern Dry Zone (Zone-3).

CENTRE'S MANDATE

1. Evaluation of germplasm
2. Development of early duration hybrids for rainfed situations and *rabi* summer
3. Evolving early maturing hybrids with medium height and inbuilt resistance to biotic stresses
4. Conduct of experiments relating to tillage, plant population and nutrient requirements
5. Incorporation of powdery mildew, necrosis and *Alternaria* leaf spot resistance
6. Integrated pest management
7. Technology transfer

Staff position

Sr. No.	Position Sanctioned	Nos.	Name and Designation	Contact No. and Email ID
1.	Junior Breeder	1	Dr. Vikas V. Kulkarni Scientist (Breeding) & Head AICRP on Sunflower,	9481702487 vik_gene@rediffmail.com
2.	Junior Entomologist	1	Dr. Vijaykumar N.G. Scientist (Entomology) AICRP on Sunflower	9449839662 vijayent1@rediffmail.com
3.	Junior Agronomist	1	Dr. M.R. Umesh Scientist (Agronomy) AICRP on Sunflower	9886776738 mrumeshagri@gmail.com
4.	Junior Pathologist	1	Dr. Poornima Scientist (Pathology)	7019228764 poornimaagri@gmail.com

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5.	Technical Assistants	2	Mr. Venkatesh S. Sr. Lab Assistant	8147536309
			Mr. Hanumanthu Sr. Field Assistant	--
6.	Field Man	1	Mr. Hanumesh Field Assistant	9986214730

Technologies developed

1. A high yielding sunflower hybrid RSFH-1887 has been developed and released in 2016 for cultivation for zone-1 & 2 of Karnataka.
2. A high yielding sunflower hybrid RSFH-130 has been developed and released in 2008 for cultivation for zone-1 & 2 of Karnataka.
3. A promising interspecific cross derivative population RSFV-901 resistance to *Alternaria* leaf blight and tolerant to moisture stress has been identified and released in 2010 for cultivation for zone-1 & 2 of Karnataka.
4. A promising high yielding sunflower hybrid RSFH-1 with high oleic acid content, and having alternaria and rust resistance has been developed and released in 2006 for cultivation for zone-2 of Karnataka.
5. Developed 3 powdery mildew resistant lines (PM81, PM66 and PM82) and are being registered at NBPGR, New Delhi
6. A total of 270 germplasm lines are being maintained for various traits viz., early flowering, high oil content, seed yield, high oleic acid content, plant height, high self fertility and Tolerant to *Alternaria* blight, Necrosis (Viral) and powdery mildew diseases.
7. Balanced fertilization with 100% NPK + Sulphur@20kg/ha through gypsum + Boron@1kg/ha as Borax in alternate years + Zn@10kg/ha to the *Kharif* Sunflower and 100% NPK to *Rabi* Chickpea realized higher yields of both crops and higher economic returns with positive soil fertility in sunflower-chickpea cropping system.
8. Soil test based fertilizer application with balanced fertilization with NPK has resulted in 6.62% higher seed yield over the farmers' practice in Northern Dry zone of Karnataka and achieved 2.29t/ha as against farmers yields of 2.14t/ha.
9. Application of Pendimethalin @1kg a.i/ha (pre-emergence) + Quizalofop Ethyl 10EC @37.5g a.i/ha at 15-20DAS (post-emergence) was effective in controlling broad leaf weeds and realizing 9-36% higher sunflower yields in Vertisols.
10. For higher in sunflower seed yield the optimum dose of fertilizers recommended was 90kg N + 90 kg P₂O₅ + 60 kg K₂O/ha in irrigated conditions.

11. For higher in sunflower seed yield the optimum dose of fertilizers recommended was 35kg N + 50 kg P₂O₅ + 35 kg K₂O/ha in rainfed conditions.
12. Modified Planting method of sunflower with ridges and furrows at a spacing of 60X30 cm recorded higher seed yield of 10 % as compared to flat bed sowing.
13. For management of annual grassy weeds in sunflower spraying of Propaquizofop ethyl 10% EC @ 0.63ml/l is effective at 15-20 days after sowing.
14. Application of 100% NPK + Sulphur @ 20 kg/ha through Gypsum + Boron @ 1 kg/ha as Borax + Zn @ 10 kg/ha in alternaria years to the sunflower and 100% NPK to bengalgram recorded higher yield of both sunflower and bengalgram and also higher net returns.
15. In groundnut + sunflower (3:1) intercropping system, addition of 100% RDF to main crop on area basis + 50% N (100% PK) of intercrop as basal + 50% N as top dress to intercrop gave higher yields of both groundnut and sunflower, higher net returns/ha and higher LER.
16. Under resource constraints situation in rainfed conditions, among production factors (Fertilizers, Thinning, Plant protection), fertilizer factor was found to be key factor for obtaining better yields and higher returns and was followed by thinning.
17. Growing of greengram (if rains received in the 1st week of June) and incorporation of residues followed by sunflower crop saved 25 % RDF of sunflower and recorded higher net returns.
18. Growing of sunhemp during *Kharif* followed by sunflower during *Rabi* season was found to increase yield and improved soil nutrients status.
19. Cultivating sunflower after legumes (incorporation of greengram/cowpea residues) was more profitable in terms of gross and net returns compared to fallow-sunflower.
20. Hybrids out yielded the varieties under different fertility levels (100 and 150% NPK). Hybrids recorded 40 % higher yield over varieties.
21. Site specific major nutrients management with target yield approach recorded significantly higher yields in sunflower to 100 % and 150 % RDF levels.
22. Organic sources alone cannot replace the role of inorganic fertilizers in Sunflower cultivation.
23. Seed treatment with *Trichoderma viride* @10 g/ kg followed by 0.1 % Propiconazole and 0.04 % Thiamethaxam spray as soon as *Alternaria* and Necrosis disease appears has recorded low disease severity of *Alternaria* leaf spot and Necrosis disease incidence at the final stage of harvest and also provides profitable yields.

24. For the management of *Alternaria* leaf spot in sunflower seed treatment with *Pseudomonas fluorescens* (Local isolate) 10g/kg seeds followed by spraying of Hexaconazole 0.1% at 45DAS and *P. fluorescens* 0.1% at 60 DAS is recommended.
25. For management of Powdery mildew, spraying of NSKE@ 5 ml/L followed by Difenconazole @ 1 ml/l during 30 & 45 DAS has been recommended along with high returns.
26. For sunflower powdery mildew, application of fungicide Myclobutanil 10 wp @ 0.5 g/l during onset of powdery mildew disease gives better control.
27. Seed treatment with Imidacloprid 600FS @5ml/ kg seed + foliar spray with flonicamide 50 WG (Ulala) @ 0.25 g/l. At 30, 45 and 60 DAS showed promising results with least incidences of necrosis and leaf curl in sunflower.
28. Seed priming with Carbendazim @ 2g /kg + Thiamethoxam @4 g /kg + foliar spray of Propiconazole @0.1% + Thiamethoxam @0.04 % as soon as disease appears & 15 days recorded lower incidence of powdery mildew, leaf curl and necrosis diseases.
29. Management of Lepidopteron insect pests in sunflower using Lamda cyhalothrin 5.0% EC @ 0.50 ml per litre was recommended during 2013-14.
30. Bio-intensive Integrated Pest Management (BIPM) module comprising, Use of KBSH-53 a powdery mildew tolerant sunflower hybrid, seed treatment with Imidachloprid 5 g/kg and Apron 2g/kg, Hand picking and destruction of early stage larvae of *Spodoptera* and Bihar hairy caterpillar, Sprays of Spinosad 0.1 ml/l against defoliators and head borer was recommended during 2015-16 against insect pests in Sunflower
31. Studies on the management of whiteflies in sunflower using different chemical insecticides revealed that Diafenthiuron 50% WP @ 1 gm/Ltr and Triazophos 40% EC @ 1.50ml/Ltr were most effective insecticides against whitefly.



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