

ISSN 0970-2776

Volume 37 (Special Issue) February 2020

Journal of Oilseeds Research



Indian Society of Oilseeds Research

ICAR-Indian Institute of Oilseeds Research

Rajendranagar, Hyderabad-500 030, India

THE INDIAN SOCIETY OF OILSEEDS RESEARCH
(Founded in 1983, Registration Number ISSN 0970-2776)

EXECUTIVE COUNCIL FOR 2018-2020

President	:	Dr. Trilochan Mohapatra	
Vice-President	:	Dr. A. Vishnuvardhan Reddy	
General Secretary	:	Dr. M. Sujatha	
Joint Secretary	:	Dr. V.S. Bhatia	
Treasurer	:	Dr. G.D. Satish Kumar	
Councillors	:	Dr. Ravi Hunje	(South Zone)
		Dr. Anand Kumar Panday	(Central Zone)
		Dr. Tamina Begum	(Eastern Zone)
		Dr. K.L. Dobariya	(Western Zone)
		Dr. J.S. Yadav	(Northern Zone)

Editorial Board

Chief Editor : Dr. V. Dinesh Kumar, IIOR, Hyderabad

Associate Editors

Dr. D.M. Hegde, Ex-Director, IIOR, Hyderabad	Dr. M. Srinivas, ARS, Maruteru
Dr. Virender Sardana, PAU, Ludhiana	Dr. D.K. Yadava, ICAR, New Delhi
Dr. S.R. Bhat, NRCPB, New Delhi	Dr. P. Duraimurugan, IIOR, Hyderabad


Editorial Board Members

Dr. V.S. Bhatia, IISR, Indore	Dr. Anupama Singh, IARI, New Delhi
Dr. R.K. Mathur, IIOPR, Pedavegi	Dr. B. Sontakki, NAARM, Hyderabad
Dr. P.K. Singh, AICRP (Linseed), Kanpur	Dr. P. Lakshamma, IIOR, Hyderabad
Dr. C.A. Rama Rao, CRIDA, Hyderabad	Dr. Senthilvel Senapathy, IIOR, Hyderabad
Dr. K.K. Pal, DGR, Junagadh	Dr. Atagic Jovanka, IFVCNS, Serbia
Dr. V.V. Singh, DRMR, Bharatpur	Dr. Snazidur Rahman, University of Plymouth, UK

MEMBERSHIP TARIFF

(w.e.f. 01.06.2014)

Life Membership	Annual Subscription	India	Abroad
Individual : Rs.3000/- + Admn. Fee Rs.50/-	Individual : Institutions : Students :	Rs. 400/- + Admn. Fee Rs.50/- Rs. 3000/- Rs. 300/- + Admn. Fee Rs.50/-	US\$ 100 Ordinary US\$ 200 Institutions

For subscription, please contact  The General Secretary, Indian Society of Oilseeds Research, ICAR-Indian Institute of Oilseeds Research, Rajendranagar, Hyderabad-500 030, India

Payment can be made online by fund transfer to account No. **52032213529** with IFSC Code: **SBIN 0020074**. After payment, the UTR No. and payment details may be sent by e-mail (oilseedsociety@gmail.com) / post to the General Secretary, ISOR, ICAR-IIOR, Rajendranagar, Hyderabad-500 030. For further details please visit: <http://www.isor.in>.

ANNOUNCEMENT

The Journal of Oilseeds Research has been rated at **5.02** by National Academy of Agricultural Sciences (NAAS) from January 1, 2017

Journal of Oilseeds Research is published quarterly by the Indian Society of Oilseeds Research

Papers Presented in the National Seminar on

**“Technological Innovations in Oilseed Crops
for Enhancing Productivity, Profitability
and Nutritional Security”**

Jointly organized by

Indian Society of Oilseeds Research
Hyderabad

&

ICAR-Indian Institute of Oilseeds Research
Hyderabad

7-8 February, 2020 - Hyderabad

Editors

Chief Editor : Dr. V. Dinesh Kumar

Associate Editor : Dr. P. Duraimurugan

Editors : Dr. M. Sujatha
Dr. H.P. Meena
Dr. S. Senthilvel
Dr. P. Padmavathi
Dr. A.L. Ratnakumar
Dr. R.D. Prasad
Dr. C. Sarada
Ms. K. Sushma
Shri P. Srinivasa Rao

Contents

S. No.	Title & Author(s)	Page No.
1	Development of 2A-CHYSEL technology based multicistronic expression systems for imparting fungal tolerance <i>Konda Aravind Kumar, P B Kirti and V Dinesh Kumar</i>	1
2	Morphological characterization of sesame germplasm <i>K T Ramya, J Jawahar Lal, H H Kumaraswamy and P Ratnakumar</i>	2
3	Morphological and biochemical mechanisms of resistance against powdery mildew (<i>Golovinomyces cichoracearum</i>) of sunflower (<i>Helianthus annuus</i> L.) <i>V N Toprope and G D Matsagar</i>	3
4	Variability for agro-morphological traits in safflower (<i>Carthamus tinctorius</i> L.) germplasm <i>N Mukta, Praduman Yadav and P Kadirvel</i>	4
5	Development and evaluation of diverse wilt resistant monoecious lines in castor <i>T Manjunatha, C Lavanya, M Santhalakshmi Prasad, S Senthilvel, A J Prabhakaran, G Balakishan and A Vishnuvardhan Reddy</i>	6
6	Linkage between stem colour and pigmentation in young leaves of castor <i>Manmode Darpan Mohanrao and S Senthilvel</i>	7
7	Development of breeding lines with high oil content in safflower using exotic germplasm sources <i>P Kadirvel, Praduman Yadav and N Mukta</i>	8
8	Combining ability and heterosis of untested inbred lines in sunflower (<i>Helianthus annuus</i> L.) <i>M S Uma, S N Manohara and S D Nehru</i>	9
9	<i>Trichoderma</i> mediated induced systemic resistance in castor against seedling blight <i>V Dinesh Kumar, R D Prasad, K B Durga Bhavani, R Bhuvanewari and Velu Mani Selvaraj</i>	9
10	Robust and informative microsatellite markers for genetic improvement of Indian sesame (<i>Sesamum indicum</i> L.) <i>H H Kumaraswamy, K T Ramya, J Jawaharlal and P Ratnakumar</i>	10
11	Screening of new inbreds for their sterility and fertility reaction against new CMS lines in sunflower (<i>Helianthus annuus</i> L.) <i>S Neelima, K Ashok Kumar and K Venkataramanamma</i>	11
12	Combining ability for seed yield and its component traits in castor (<i>Ricinus communis</i> L.) <i>R B Madariya, M S Chaudhari and K L Dobariya</i>	12
13	Correlation and path analysis in relation to seed yield and its components in Indian mustard (<i>Brassica juncea</i> L. Czern and Coss) <i>J R Patel, A T Saiyad, P J Patel, K P Prajapati and B K Patel</i>	13
14	Efficiency of alpha lattice design in crop evaluation trials <i>K Alivelu, P Padmavathi and C Sarada</i>	14
15	Early events of root colonization in castor by the biocontrol agent <i>Trichoderma</i> <i>K B Durga Bhavani, R Bhuvanewari, Velu Mani Selvaraj, R D Prasad and V Dinesh Kumar</i>	15

S. No.	Title & Author(s)	Page No.
16	Comparison of start codon targeted (SCoT) and EST-SSR markers in sesame <i>Maini Bhattacharjee and Tapash Dasgupta</i>	17
17	<i>In vitro</i> regeneration of castor (<i>Ricinus communis</i> L.) <i>B Usha Kiran, V Dinesh Kumar, H H Kumaraswamy and M Sujatha</i>	18
18	Screening for Alternaria leaf blight disease in breeding lines of sunflower (<i>Helianthus annuus</i> L.) <i>Vikas V Kulkarni, Poornima, Vijaykumar Ghante and M R Umesh</i>	19
19	Evaluation of new castor pistillate lines for agro-morphological characters and sex expression in different seasons <i>C Lavanya, T Manjunatha and S Senthilvel</i>	19
20	Genetic variation in sesame genotypes (<i>Sesamum indicum</i> L.) grown in Telangana <i>D Padmaja, T Kiran Babu, T Shobha Rani and R Uma Reddy</i>	21
21	Selection of castor germplasm for drought tolerance <i>P Lakshamma, A Vishnuvardhan Reddy and Lakshmi Prayaga</i>	22
22	Genetic divergence and character association studies in groundnut (<i>Arachis hypogaea</i> L.) <i>P M Mistry, P K Jagtap, R S Ganvit and A V Malviya</i>	23
23	Genetic variability and diversity studies in niger (<i>Guizotia abyssinica</i> L Cass.) <i>P K Jagtap, C S Patel and P M Mistry</i>	24
24	Character association and path analysis studies for yield and morpho-biochemical characters in groundnut (<i>Arachis hypogaea</i> L.) <i>A M Misal, V G Sonawane, P L Tavadare and D G Shinde</i>	25
25	Combining ability studies for yield and its component traits in safflower (<i>Carthamus tinctorius</i> L.) <i>P B Wadikar, S L Dhare and S L Waghmode</i>	26
26	Influence of different levels of waxy bloom intensity on gray mold disease severity in castor <i>P Ayesha Parveen, R D Prasad, S Senthilvel, J V Ramana, V Dinesh Kumar and M Lal Ahmed</i>	27
27	Assessment of genetic variability, heritability and genetic advance for yield and yield contributing traits in mesta (<i>Hibiscus</i> spp.) <i>D Raghu Varma, A M Misal and P L Tavadare</i>	28
28	Identification of important characters by principal component analysis in sesame germplasm <i>Manasi Dash, Sandeep Kumar Singh and Bansidhar Pradhan</i>	29
29	Character association and path coefficient studies on yield and its attributes in safflower (<i>Carthamus tinctorius</i> L.) <i>M V Dhuppe, D S Mutkule and A K Ghotmukale</i>	30
30	Variations for physical and nutritional quality traits in advanced breeding lines of groundnut <i>Praveen Kona, M K Mahatma, K Gangadhara, Narendra Kumar, B C Ajay, Kirti Rani, T Radhakrishnan, M C Dagla and Lokesh Kumar</i>	31
31	Early rosette mutant plants of Safflower (<i>Carthamus tinctorious</i> L.) <i>Rajeev Shrivastava and S Mondal</i>	32
32	Status of varietal improvement in sesame (<i>Sesamum indicum</i> L.) in ANGRAU, Andhra Pradesh <i>N Sabitha and S V S Gangadhara Rao</i>	33
33	Efficacy of omega-3-enriched medicated massage oil in rheumatoid arthritis <i>Chethana H Bhat, Pramod D Farde, Surendra M Vedpathak, Mahabaleshwar V Hegde and Anand A Zanwar</i>	33

S. No.	Title & Author(s)	Page No.
34	Marker assisted conversion of a high oleic maintainer line into a high oleic CMS line in sunflower (<i>Helianthus annuus</i> L.) <i>Ameena Premnath, N Manivannan, P L Viswanathan and S Geetha</i>	34
35	GG 41: A high yielding Virginia runner groundnut (<i>Arachis hypogaea</i> L.) variety for Gujarat state <i>V H Kachhadia, G K Sapara, C J Rajani and K L Dobariya</i>	35
36	Variation in quality traits of different seed sizes of groundnut <i>M K Mahatma, L K Thawait, Aman Verma, Narendra Kumar, Sushmita and A L Singh</i>	36
37	Optimizing maturity index calculation of groundnut in selected varieties at Coimbatore condition <i>R Sangeetha Vishnuprabha, P L Viswanathan, S Manonmani, L Rajendran and T Selvakumar</i>	37
38	Evaluation of soybean RIL population for charcoal rot resistance <i>Vennampally Nataraj, Sanjeev Kumar, Laxman Singh Rajput, M Shivakumar, Rajkumar Ramteke, Vangala Rajesh, Milind B Ratnaparkhe, Subhash Chandra, Gyanesh Kumar Satpute and Sanjay Gupta</i>	38
39	Evaluation of groundnut germplasm for pod yield and its attributes in summer <i>K Gangadhara, A L Rathnakumar, Praveen KonaI, B C Ajay, Narendra Kumar, Sushmita and H K Gor</i>	39
40	Evaluation, characterization and confirmation of hybrids derived from diverse CMS sources in sunflower (<i>Helianthus annuus</i> L.) <i>A C Shuba, R Gurumurthy and Ravi Hunje</i>	40
41	Identification of new molecular markers for low glucosinolates in Indian mustard (<i>Brassica juncea</i> L. Czern & Coss.) <i>H D Pushpa, D K Yadava, Sujata Vasudev, V Vinu, Chandanabehera and Naveen Singh</i>	41
42	Screening of sunflower genotypes for confectionery characters <i>Balpreet Kaur and Vineeta Kaila</i>	42
43	Combining ability and gene action analysis in sunflower (<i>Helianthus annuus</i> L.) <i>M K Ghodake, P Karande, A M Misal and P L Tavadare</i>	43
44	Studies on variability analysis in groundnut (<i>Arachis hypogaea</i> L.) <i>R G Gawali, A M Misal and V G Sonawane</i>	44
45	Use of CRISPR-CAS9 system in groundnut (<i>Arachis hypogaea</i>) transformation targeting <i>ahFAD2</i> gene <i>Riddhi H Rajyaguru and Rukam S Tomar</i>	45
46	Search for heterotic cross combinations in Indian mustard [<i>Brassica juncea</i> (L.) Czern & Coss] <i>Kartikeya Srivastava, Shirsat Mahesh Santosh, Girish Tantuway and Aditi Eliza Tirkey</i>	45
47	Heterosis studies for yield and its contributing characters in sesame (<i>Sesamum indicum</i> L.) <i>P B Wadikar, S J Sonawane and S H Patil</i>	47
48	Heterosis for yield and yield contributing traits in sunflower (<i>Helianthus annuus</i> L.) <i>B P Ailwar, M K Ghodke and R G Tathe</i>	47
49	Heterosis for yield and component traits in safflower (<i>Carthamus tinctorius</i> L.) <i>P B Wadikar, S L Dhare and S L Waghmode</i>	48
50	AMS-1001 (PDKV yellow gold): A new high yielding, charcoal rot and yellow mosaic virus disease resistant soybean variety <i>S S Nichal, P V Patil, G D Chandankar, M S Dandge, Y V Ingle, S S Munje and H H Dikey</i>	49
51	Development of random mating population for genetic enhancement of yield traits in sunflower (<i>Helianthus annuus</i> L.) <i>H P Meena, Praduman Yadav, Lakshmi Prayaga and A Vishnuvardhan Reddy</i>	51

S. No.	Title & Author(s)	Page No.
52	Evaluation of advanced breeding lines of sesame (<i>Sesamum indicum</i> L.) for seed yield and oil content <i>A B M Sirisha, S K Haseena Banu and S V S Gangadhara Rao</i>	52
53	Identification of promising sunflower (<i>Helianthus annuus</i> L.) inbred lines for oil and quality parameters <i>Praduman Yadav, H P Meena, K S V P Chandrika and A Vishnuvardhan Reddy</i>	53
54	YTP-1 (YRCS-1205): A promising castor variety for Tamil Nadu <i>S R Venkatachalam, P Arutchenthil, P Kathirvelan and M Deivamani</i>	53
55	Differentially expressed genes in transcriptomes of monoecious and pistillate lines of castor (<i>Ricinus communis</i> L.) <i>M Sujatha, M Tarakeswari, C Lavanya, Rukam Singh Tomar and Mir Asif Iquebal</i>	54
56	Identifying drought tolerant germplasm through multiplexing polygenic traits in soybean (<i>Glycine max</i> L. Merrill) <i>G K Satpute, M Arya, S Gupta, V S Bhatia, D Ramgopal, M B Ratnaparkhe, S Chandra, Maharaj Singh, S Nagar, V G Kambley, Sanjay Pandey, G Kumawat, M Shivakumar, V Nataraj and V Rajesh</i>	56
57	Comparative genomics studies of Rpp1 gene associated with soybean (<i>Glycine max</i> L.) rust resistance <i>Milind Ratnaparkhe, M Shivakumar, V Natraj, Viraj Kamble and Sanjay Gupta</i>	57
58	Evaluation and characterization of sunflower (<i>Helianthus annuus</i> L.) germplasm lines <i>E Umarani, A Saritha and A V Ramanjaneyulu</i>	58
59	Assessment of heritability and genetic advance in soybean [(<i>Glycine max</i> (L.) Merrill)] <i>P Manjunath, T H Renuka Devi and M Surya Prakash Reddy</i>	59
60	Assessment of genetic purity of two sunflower (<i>Helianthus annuus</i> L.) hybrids using sequence characterized amplified region (SCAR) markers <i>S Anusha, W Dhammaprakash, K N Yamini, C H Anil Kumar and V Dinesh Kumar</i>	60
61	Correlation studies for quantitative traits in sesame (<i>Sesamum indicum</i> L.) <i>S M Umate</i>	62
62	Morphological evaluation and comparative study of pollen viability of different promising genotypes of sesame (<i>Sesamum indicum</i> L.) <i>Adil Iqbal, Jhilik Chowdhury, Tamina Begum and Tapash Dasgupta</i>	63
63	Variations for oil content and fatty acid composition in wild <i>Arachis</i> species <i>A L Rathnakumar, K Gangadhara, S K Bera, B C Ajay and G Harish</i>	64
64	Genetic variability, heritability and genetic advance in F ₃ and F ₄ generations of the cross GKVK-4 × NRCG-12473 in groundnut <i>A Vijayabharathi and D L Savithramma</i>	64
65	Genetic parameter and character association studies in Indian mustard (<i>Brassica juncea</i> L. Czern & Coss) <i>Mahak Singh, Rupendra Singh, Jagdish Prasad Chaurasiya, and Kuldeep Yadav</i>	65
66	Genetic analysis for seed yield and its contributing traits in Indian mustard (<i>Brassica juncea</i> (L.) Czern & Coss) <i>Mahak Singh, Rupendra Singh, Kuldeep Yadav and Jagdish Prasad Chaurasiya</i>	66
67	Studies on capsule shattering character in sesame (<i>Sesamum indicum</i> L.) <i>M Mohammed Imran, Manasi Dash, P. Manjunath and M Surya Prakash Reddy</i>	67
68	Genetic parameters, correlation and path analysis for seed yield and morphological characters in niger [<i>Guizotia abyssinica</i> (L.f.) Cass.] <i>D S Sutar, S B Ghuge, S V Pawar and P O Bhutada</i>	68
69	India's first high oleic safflower variety for commercial cultivation <i>Anjani Kammili, Praduman Yadav and A Vishnuvardhan Reddy</i>	69

S. No.	Title & Author(s)	Page No.
70	Genetic variability in castor (<i>Ricinus communis</i> L.) <i>Patel Ankit, C J Patel and D K Patel</i>	70
71	Biofortification of linseed as functional food for profitability and nutritional security <i>Suma Mogali, Lalita Jaggal and O Sridevi</i>	71
72	Assessment of genetic diversity in sunflower germplasm lines <i>S B Sakhare, Rupali Chakraborty, Sangita Fatak and N J Wankhade</i>	72
73	Effect of EMS on seed germination in white seeded sesame varieties (<i>Sesamum indicum</i> L.) <i>V Sandhiya, M Kumar, C Parameswari and Anand M Badigannavar</i>	73
74	Genetic variability for key physiological traits in groundnut under managed drought condition <i>B N Harish Babu, G Chandrashekara and S K Pattanashetti</i>	74
75	Sunflower germplasm catalogue: Necessity and benefit to sunflower researchers <i>M Y Dudhe, M Sujatha, H P Meena, M K Ghodke, Y G Shadakshari, J Radhamani, K Alivelu, R K Tyagi, A R G Ranganatha, K S Varaprasad and A Vishnuvardhan Reddy</i>	75
76	Genetic studies on yield and oil quality in sunflower (<i>Helianthus annuus</i> L.) <i>S Viswabharathy, P L Viswanathan, S Manonmani and R Chandirakala</i>	76
77	Identification of mutants for qualitative and quantitative traits through induced mutagenesis in sesame (<i>Sesamum indicum</i> L.) <i>G Ariharasutharsan, C Parameswari, C Vanniarajan, E Murugan and Chelvi Ramesh</i>	77
78	Heterosis for seed yield in sesame (<i>Sesamum indicum</i> L.) <i>A Disowja, C Parameswari, R P Gnanamalar and S Vellaikumar</i>	78
79	Generation mean analysis in maize (<i>Zea mays</i> L.) <i>Krantikumar H Patil, R C Mahajan and V T Nagargoje</i>	79
80	Association of characters for yield and yield components in soybean [<i>Glycine max</i> (L.) Merrill] <i>V T Nagargoje, M V Dhuppe and K H Patil</i>	80
81	Genetic studies on high lignan content in sesamum (<i>Sesamum indicum</i> L.) <i>S Md Usman, P L Viswanathan, S Manonmani and D Uma</i>	81
82	New high oil yield safflower variety SSF 12-40 for rainfed and irrigated conditions of India <i>S K Shinde, L N Tagad, S V Khadtare, D R Murumkar, V B Akashe and H N Aiwale</i>	81
83	SSF 1371 : A new spiny safflower variety for rainfed and irrigated conditions of India <i>L N Tagad, S K Shinde, S V Khadtare, D R Murumkar, V B Akashe and K C Ombase</i>	82
84	Identification of resistant genotypes against Fusarium wilt of safflower <i>H N Aiwale, D R Murumkar, S V Khadtare, S K Shinde, L N Tagad and K C Ombase</i>	83
85	Character association studies for morph-biochemical mechanisms of resistance against powdery mildew (<i>Golovinomyces cichoracearum</i>) of sunflower (<i>Helianthus annuus</i> L.) <i>V N Toprope, G D Matsagar and V L Rathod</i>	84
86	Combining ability analysis for yield and its components in sunflower (<i>Helianthus annuus</i> L.) <i>B P Ailwar, M K Ghodke, K W Kamble and M V Dhuppe</i>	85
87	Genotype × environment interaction studies in summer groundnut (<i>Arachis hypogaea</i> L.) <i>N D Sarode and V L Amolic</i>	86
88	Principal component analysis for yield attributing traits of sunflower (<i>Helianthus annuus</i> L.) genotypes <i>R Sasikala, P L Viswanathan and S Manonmani</i>	87
89	Assessment of combining ability with elite genotypes in sesame (<i>Sesamum indicum</i> L.) by half diallel mating design <i>S J Sonawane, P B Wadikar and Anjali Talape</i>	88

S. No.	Title & Author(s)	Page No.
90	Breeding for large seed size in sesame (<i>Sesamum indicum</i> L.) <i>S T Ponsiva, A P T Rajkapur Hartiabinesaraja, S Praveenkumar, S Selvamani, N Senthilkumar and S Thirugnanakumar</i>	89
91	Studies on genetic variability, correlation coefficient and path analysis in niger (<i>Guizotia abyssinica</i> L. Cass) <i>S S Atlawar, V N Toprope and R J Shinde</i>	89
92	Studies on genetic diversity in sesame (<i>Sesamum indicum</i> L.) over seasons <i>S Praveenkumar, S T Ponsiva, A P T Rajkapur Hartiabinesaraja, S Selvamani, S Ranjith Rajaram and S Thirugnanakumar</i>	90
93	Studies on genetic parameters in sesame (<i>Sesamum indicum</i> L.) over seasons <i>S Selvamani, S T Ponsiva, A P T Rajkapur Hartiabinesaraja, S Praveenkumar, R Elangaimannan and S Thirugnanakumar</i>	91
94	Correlation and path coefficient analysis for seed yield and its component traits in castor (<i>Ricinus communis</i> L.) <i>S K Mohanty, P N Jagadev, C Lavanya and C M Khanda</i>	92
95	Utilization of dwarf dura mother palms for production of high yielding and dwarf oil palm (<i>Elaeis guineensis</i>) hybrids <i>Anitha Pedapati, Ravi Kumar Mathur, G Ravichandran, B Kalyana Babu and H P Bhagya</i>	93
96	Best management practices for yield maximization in rainfed castor <i>N Nalini, A V Ramanjaneyulu, K Mamatha, T L Neelima, G Anuradha, M Venkata Ramana, G Suresh and Ch V Durga Rani</i>	94
97	Character association and genetic divergence study in elite breeding lines of groundnut (<i>Arachis hypogaea</i> L.) <i>Jayashree Kar and Ankita Jena</i>	95
98	Studies on heterosis, correlation and genetic advance parameters for seed yield and its related traits in Indian mustard [<i>Brassica juncea</i> (L.) Czern & Coss.] <i>Mohd Salman, Mahak Singh, Harshit Tripathi, Pawan Kumar, Swapnil Dwivedi, Surendra Kumar and R P Vyas</i>	96
99	Identification of fruit forms using CAPS marker among the oil palm indigenous germplasm <i>M V B Venu and B Kalyana Babu</i>	97
100	GJG 32 High oil and high yielding Spanish bunch groundnut variety for Gujarat <i>K L Dobariya and N D Dholariya</i>	98
101	Mean performance of newly developed restorer lines of sunflower (<i>Helianthus annuus</i> L.) for different agronomical traits <i>G Sandhyasree, A Vishnuvardhan Reddy, V Roja and H P Meena</i>	99
102	Performance of newly developed sunflower inbred lines for yield and yield contributing traits under rainfed condition <i>D Mohan Vamsi, G Sandhyasree, H P Meena, S K Payasi and A Vishnuvardhan Reddy</i>	100
103	Genotype x environment interaction through AMMI analysis in sesame genotypes <i>Bhagwat Singh and Rajani Bisen</i>	101
104	Effect of intermittent water stress on oil quality in groundnut (<i>Arachis hypogaea</i> L.) <i>P Srivalli and H L Nadaf</i>	102
105	Studies on combining ability and heterosis for seed yield and its attributing traits in sunflower <i>S D Nehru, B Niharika, M S Uma and K M Srinivas Reddy</i>	103
106	High zinc density groundnut cultivars: A solution to Zn malnutrition <i>A L Singh, V Sushmita Chaudhari and C B Patel</i>	105

S. No.	Title & Author(s)	Page No.
107	Evaluation of different mustard varieties under northern Telangana zone <i>P Madhukar Rao, D Padmaja, P Madhukar and R Uma Reddy</i>	105
108	Transgressive segregation for high shelling percentage in summer groundnut (<i>Arachis hypogaea</i> L.) <i>N D Sarode, V L Amolic and S V Pawar</i>	106
109	Response of castor (<i>Ricinus communis</i> L.) to polymeric bio-formulation based seed coating for drought stress <i>K S V Poorna Chandrika, M Bhaskar Reddy, P Lakshamma, R D Prasad and Varsha Godbole</i>	108
110	Influence of conservation agricultural practices on performance of castor (<i>Ricinus communis</i> L.) based intercropping systems in shallow Alfisols under rainfed conditions <i>G Suresh and Aziz Qureshi</i>	109
111	Low temperature stress dictates the success of rice fallow sesame in Odisha - An analysis <i>K Ramesh, Anita Mohapatra, B C Dhir and A Vishnuvadhan Reddy</i>	110
112	Yield compensation in castor (<i>Ricinus communis</i> L.) with nipping of different order spikes <i>P Lakshamma and Lakshmi Prayaga</i>	110
113	Plant geometry and nitrogen effect on fatty acid composition of sesame (<i>Sesamum indicum</i> L.) seed <i>K Ramesh, G Suresh, M A A Qureshi, P Ratnakumar, Praduman Yadav and Ch.V. Haripriya</i>	112
114	Effect of lime and FYM on growth, yield and quality of soybean (<i>Glycine max</i>) grown in acid soils of Nagaland <i>A K Singh, A O Engrala and Avinie Nakhro</i>	112
115	Seed setting and filling under pollination with stored pollen in sunflower (<i>Helianthus annuus</i> L.) <i>S N Sudhakara Babu, M Leelavathi, G Balakishan, N Prabhakar Rao and A Vishnuvardhan Reddy</i>	113
116	Evaluation of safflower (<i>Carthamus tinctorius</i> L) genotypes against salinity stress <i>A Aziz Qureshi, P Kadirvel, N Mukta and Ch V Haripriya</i>	114
117	Foliar application of water soluble fertilizers in summer groundnut in a Vertisols <i>B S Yeangi, Roopa, U Iramma Goudar and P Nagaraju</i>	115
118	Yield performance and quality of Indian mustard (<i>Brassica juncea</i>) as influenced by various nutrient management options <i>A L Jat, A J Desai, K P Prajapati, J R Patel, S K Shah and G P Gangwar</i>	116
119	Conversion of castor shell into a value added compost <i>S K Shah, A L Jat, A M Patel, D K Patel, D N Tejani and A G Desai</i>	117
120	Role of biopolymer based <i>Trichoderma</i> in plant growth promotion and mitigation of drought stress in groundnut <i>B Shrey, R D Prasad, K S V Poorna Chandrika, Aziz Qureshi and P Lakshamma</i>	118
121	Yield and economics of soybean based cropping systems as influenced by different cropping systems, crop establishment method and residue management practices <i>R K Verma, M Raghavendra, S D Billore, A Ramesh, Shivani Nagar and N Khandekar</i>	119
122	Influence of terminal drought stress on root and biochemical parameters in groundnut (<i>Arachis hypogaea</i> L.) <i>G Chandrashekhara, Hasanali Nadaf and B N Harish Babu</i>	120
123	Effect of imposed terminal drought on yield, yield attributing traits and aflatoxin contamination in groundnut (<i>Arachis hypogaea</i> L.) <i>Hasanali Nadaf, G Chandrashekhara and B N Harish Babu</i>	121

S. No.	Title & Author(s)	Page No.
124	Effect of dates of sowing and cutting for fodder on fodder yield, seed yield and oil yield of oilseed rape genotypes <i>Aaradhana Chilwal, Virender Sardana and Kulvir Singh</i>	122
125	Effect of long term application of fertilizers on soil nutrient status in groundnut (<i>Arachis hypogaea</i> L.) <i>K V Naga Madhuri, P Ratna Prasad, P V R M Reddy, Khalid Ahmady and M Madhan Mohan</i>	123
126	Assessment of bio-mulches on weed control in sunflower (<i>Helianthus annuus</i> L.) <i>B S Vidyashree and P Murali Arthanari</i>	124
127	Evaluation of groundnut (<i>Arachis hypogaea</i> L.) advanced breeding lines under mid-season drought stress conditions for root traits <i>P Latha, T Anitha, A R Nirmal Kumar, P Sudhakar, R P Vasanthi and K John</i>	125
128	Effect of phosphorus biofertilizers and foliar spray of potassium fertilizers on growth and yield of sunflower (<i>Helianthus annuus</i> L.) <i>B B Praveen Kumar and G Somanagouda</i>	126
129	Optimization of safflower sowing time in northern Karnataka <i>G Somanagouda, R H Patil and M P Basavarajappa</i>	127
130	Influence of soil moisture conservation practices and planting geometry on growth, yield and economics of safflower (<i>Carthamus tinctorius</i> L.) <i>Kumar Lamani, G Somanagouda and S R Salakinkop</i>	128
131	Optimization of tillage and fertilizers for productive and profitable sunflower in paddy fallows of deep Vertisols of Karnataka <i>M R Umesh, U K Shanwad, Vikas V Kulkarni, N Ananda, N Vijaykumar, Ghante Poornima and Y M Ramesh</i>	129
132	Effect of herbicides on weed dynamics, efficiency and yield of linseed (<i>Linum usitatissimum</i> L.) <i>S K Dwivedi and C S Puhup</i>	130
133	Bio-efficacy of growth regulator stance 110 SC on soybean (<i>Glycine max</i> L.) <i>S Rajakumara</i>	131
134	Productivity potential of sesame in <i>rabi</i> -summer season under rice-fallow and turmeric-fallow <i>G D Satish Kumar and A Aziz Qureshi</i>	132
135	Effect of sowing dates on confectionery traits of groundnut cultivars <i>Harpuneet Kaur, Virender Sardana, D N Yadav, M S Alam and Pushp Sharma</i>	133
136	Effect of hydro-priming on imbibition rates in oilseed crops <i>Y N Priya Reddy and V K Deshpande</i>	134
137	Evaluation of sunflower (<i>Helianthus annuus</i> L.) based cropping systems for enhanced productivity and efficiency <i>T Selvakumar, L Rajendran, R Sasikala and P L Viswanathan</i>	135
138	Nitrogen and sulphur requirements of shattering tolerant canola oilseed rape (<i>Brassica napus</i> L.) under varied plant population <i>Virender Sardana, S S Banga, Gurpreet Kaur and Pushp Sharma</i>	136
139	Integration of pre and post-emergence herbicides for weed management in irrigated groundnut (<i>Arachis hypogaea</i> L.) <i>T Parthipan</i>	137
140	Genetic association studies for oil yield in F ₃ generation of sunflower (<i>Helianthus annuus</i> L.) for the cross COSF7B x 302 B <i>S Divya, T Kalaimagal, S Manonmani, L Rajendran and R Chandirakala</i>	138

S. No.	Title & Author(s)	Page No.
141	Influence of weed management practices on growth parameters and seed yield of sunflower (<i>Helianthus annuus</i> L.) <i>Madhumati S Pujeri and J A Hosmath</i>	139
142	Effect of different levels of fertilizer doses on growth, nutrient uptake and yield of sunflower cultivars <i>V G Takankhar, P N Karanjikar and M U Jogdand</i>	140
143	Response of safflower (<i>Carthamus tinctorius</i> L.) to integrated nutrient management practices <i>Ripan Chandra Das and G Somanagouda</i>	140
144	Management strategies to mitigate drought stress in Indian mustard (<i>Brassica juncea</i> L.) through microbes <i>O P Premi, Ibandalin Mawlong, Sangeeta Paul and P K Rai</i>	141
145	Response of soybean (<i>Glycine max</i> L.) genotypes to different spacings <i>A B Chavan, V P Suryavanshi and R C Mahajan</i>	142
146	The agro-morphological characterization of castor (<i>Ricinus communis</i> L.) inbred lines <i>Yamanura and R Mohan Kumar</i>	143
147	Performance of castor (<i>Ricinus communis</i> L) hybrids and varieties under rainfed conditions in Alfisols <i>R Mohan Kumar and Yamanura</i>	144
148	Cropping systems approach in oil palm for higher productivity and profitability <i>K Ramachandrudu, V Suneetha and G Sekhar</i>	145
149	Effect of source of nitrogen, organic manure and PSB application on groundnut (<i>Arachis hypogaea</i> L.) yield, P uptake in calcareous soil of southern Saurashtra <i>Kiran K Reddy, Ram A Jat and Raja Ram Choudhary</i>	146
150	Effect of potassium on growth, yield and economics of safflower (<i>Carthamus tinctorius</i> L.) <i>K C Ombase, S V Khadtare, S K Shinde, L N Tagad, D R Murumkar, V B Akashe and H N Aiwale</i>	147
151	Enhancing the productivity of wheat + mustard intercropping system with different row proportions and nutrient management practices <i>T Sudha and K Shivappa</i>	148
152	Seed yield of sunflower (<i>Helianthus annuus</i> L.) in rice fallow system <i>D Lakshmi Kalyani, K Prabahkar, K Venkata Ramanamma and S Neelima</i>	148
153	Yield maximization through INM in sunflower (<i>Helianthus annuus</i> L.) <i>C Ravikumar and M Ganapathy</i>	149
154	Effect of sulphur application on seed yield of sesame (<i>Sesamum indicum</i> L.) in north coastal Andhra Pradesh <i>V Sujatha and S V S Gangadhara Rao</i>	150
155	Optimization of seed rate and spacing in soybean (<i>Glycine max</i> L.) <i>D K Kathmale, R N Palvi and S B Mahajan</i>	151
156	Effect of time of sowing and spacing on seed yield and quality of hybrid seed production in castor (<i>Ricinus communis</i> L.) <i>P Arutchenthil, S R Venkatachalam, P Kathirvelan and M Deivamani</i>	152
157	Energy use efficiency in mechanized cultivation of castor (<i>Ricinus communis</i> L.) <i>P Kathirvelan, S R Venkatachalam, P Arutchenthil and M Deivamani</i>	153
158	Effect of micronutrient on growth attributes, yield and economics of linseed under limited irrigation <i>J R Katore, Beena Nair, Rupali Damdar, Shilpa Rananaware, S R Kamdi and G R Kavalkar</i>	154

S. No.	Title & Author(s)	Page No.
159	Standardization of fertigation schedule for <i>rabi</i> castor (<i>Ricinus communis</i> L.) under drip irrigation <i>A V Ramanjaneyulu, A Madhavi, M V Nagesh Kumar, T L Neelima, M Venkata Ramana and A Srinivas</i>	155
160	Effect of conservation tillage practices on rice fallow sunflower (<i>Helianthus annuus</i> L.) at Odisha <i>Anita Mahapatra, Diksha Patel, K Ramesh and Bishnupriya Gouda</i>	156
161	Mechanized cultivation in safflower (<i>Carthamus tinctorius</i> L.) <i>Pritam O Bhutada, S B Ghuge, S A Shinde and S V Pawar</i>	156
162	Response of sunflower (<i>Helianthus annuus</i> L.) based cropping systems to fertilizer levels <i>D Swetha, A V Ramanjaneyulu, D Sravanthi and N Sainath</i>	157
163	Influence of component technology on growth, yield and economics of safflower (<i>Carthamus tinctorius</i> L.) <i>S V Khadtare, K C Ombase, D R Murumkar, S K Shinde, L N Tagad, V B Akashe and H N Aiwale</i>	158
164	Efficacy of pre and post-emergence herbicide on growth, yield and economics of sunflower (<i>Helianthus annuus</i> L.) under modified spacing <i>K S Somashekar, G M Sujith, M S Uma, K Ramesh, D Nehru, K M Srinivas Reddy and C P Manjula</i>	159
165	Yield response of soybean [<i>Glycine max</i> (L.) Merrill] to liming and manuring in acidic soil of Manipur <i>T Sunanda Devi, Nililma Karam, H Nanita Devi and L Sophia Devi</i>	160
166	Role of seed age in screening for salt tolerance of sunflower at germination <i>Lakshmi Prayaga, P Lakshamma and C Sarada</i>	161
167	Establishment of suitable date of sowing and nutrient management for niger (<i>Guizotia abyssinica</i>) <i>Ravi More, Nisha Sapre, Rajani Bisen and Surbhi Jain</i>	162
168	Response of linseed (<i>Linum usitatissimum</i>) to sulphur, zinc and iron under irrigated conditions <i>B M Wakchaure, P N Karanjikar and V G Takankhar</i>	163
169	Performance of soybean (<i>Glycine max</i> L.) genotypes under delayed monsoon conditions in transitional tract of Dharwad <i>Bomngam Karlo and J A Hosmath</i>	164
170	Raising micropot nursery and crop establishment in main field for improving oilseed productivity <i>Sampad R Patra, Malay K Bhowmick and Shantanu Kar</i>	165
171	Seed and petal yield of non-spiny cultivars of safflower (<i>Carthamus tinctorius</i> L) under rainfed conditions <i>P Padmavathi and Praduman Yadav</i>	166
172	Traits conferring intermittent drought tolerance across seasons in sesame (<i>Sesamum indicum</i> L.) <i>P Ratnakumar, Brij B Pandey, A Sravanthi, E Sonia, M Dudhe, Y Praduman, K T Ramya, H Kumaraswamy, K Ramesh and A Vishnuvardhan Reddy</i>	167
173	Climate change mitigation strategies by altering crop canopy for enhancing heat unit efficiency and sustainable productivity of sesame (<i>Sesamum indicum</i> L.) <i>C Harisudan</i>	168
174	Sustainability of castor based intercropping systems under varied planting geometry <i>Keshavamurthy and J S Yadav</i>	169
175	Standardization of seed viability testing through tetrazolium in oil palm (<i>Elaeis guineensis</i> L.) <i>G Ravichandran, B Kalyana Babu, P Anitha, G Somasundaram and H P Bhagya</i>	170
176	Evaluation of mutants for bold seed and high yield in niger (<i>Guizotia abyssinica</i> L.) <i>Suvarna, B V Tembhurne, V Rachappa Haveri and J R Diwan</i>	171

S. No.	Title & Author(s)	Page No.
177	Screening of sesame (<i>Sesamum indicum</i> L.) genotypes for leaf potassium accumulation under drought stress environments <i>Brij B Pandey, P Ratnakumar, K Ramesh, G S Lakshmi and A Guhey</i>	172
178	Influence of different levels of pressmud compost and fertilizer grades on growth, yield and quality of soybean (<i>Glycine max</i>) <i>Gore Varsharani Shivaji and N K Kalegore</i>	173
179	Selective mechanization-A way forward in augmenting the productivity and profitability of safflower (<i>Carthamus tinctorius</i> L.) <i>C Sudhakar and C Sudha Rani</i>	174
180	Response of mustard (<i>Brassica juncea</i> L.) varieties to different levels of plant spacings and fertilizer <i>Beena Nair, J R Katore, S R Kamdi and D D Mankar</i>	176
181	Effect of different sources of phosphorus and sulphur on <i>kharif</i> groundnut (<i>Arachis hypogaea</i> L.) <i>A K Ghotmukale, K U Lande, D S Mutkule and S S Waghmare</i>	177
182	Impact of foliar spray of nutrients seed yield and economics of soybean (<i>Glycine max</i> L. Merrill) <i>Sreedhar Chauhan, K Sukumar and M Rajendar Reddy</i>	178
183	Effect of seed priming on germination and seed yield of safflower (<i>Carthamus tinctorius</i> L.) <i>S B Ghuge, P O Bhutada, D S Sutar and S V Pawar</i>	179
184	Impact of change in weather on seed and oil yield of niger [<i>Guizotia abyssinica</i> (L.f.) Cass.] <i>V N Tiwari and Aruna Devi Ahirwar</i>	179
185	Seed priming for long-term storage of sesame (<i>Sesamum indicum</i> L.) <i>Tamina Begum and Tapash Dasgupta</i>	180
186	Comparison of screening methods for evaluating leafhopper (<i>Empoasca flavescens</i>) resistance in castor <i>P Duraimurugan, K Anjani and A Vishnuvardhan Reddy</i>	183
187	Efficacy of insecticides against groundnut defoliators, <i>Helicoverpa armigera</i> (Hubner) and <i>Spodoptera litura</i> (F.) <i>D M Jethva and J B Bhut</i>	184
188	Population dynamics of major insect pests and natural enemies of sunflower <i>Vijaykumar N Ghante, Arunkumar Hosamani, Poornima, Vikas Kulkarni and M R Umesh</i>	185
189	Management of safflower aphid through seed treatment and foliar sprays <i>P S Srinivas</i>	186
190	Host plant resistance in safflower (<i>Carthamus tinctorius</i> L.) to aphid, <i>Uroleucon compositae</i> (Theobald) <i>V B Akashe, P B Wakale, D V Indi, S K Shinde, L N Tagad and K C Ombase</i>	187
191	Effect of novel formulation of <i>Bacillus thuringiensis</i> var. <i>Kurstaki</i> (DOR Bt-127) against semilooper (<i>Achaea janata</i>) in castor <i>V Vineela, P S Vimala Devi and P Duraimurugan</i>	188
192	Assessment of biopriming potential of <i>Trichoderma</i> and <i>Pseudomonas</i> against seed and soil borne diseases of safflower <i>D R Murumkar, H N Aiwale, L N Tagad, S V Khadtare, S K Shinde and K C Ombase</i>	189
193	Seasonal incidence and population dynamics of castor pests and their natural enemies in Tamil Nadu <i>B Geetha, M Senthil Kumar, M Deivamani and S R Venkatachalam</i>	191
194	Evaluation of storage containers and botanical oils for bruchid management in groundnut <i>Nataraja Maheshala, Poonam Jasrotia, G Harish, S D Savalia and Ram Dutta</i>	192

S. No.	Title & Author(s)	Page No.
195	Evaluation of sunflower germplasm for resistance against leafhopper, <i>Amrasca biguttula biguttula</i> (Ishida) <i>Tabassum Fatima, G Sridevi, P S Srinivas, K V Radhakrishna and Bharati Bhat</i>	193
196	Estimation of yield loss in soybean triggered by <i>Spodoptera litura</i> <i>B Sundar, Nanda Khandwe and M Surya Prakash</i>	194
197	A review on management of major insect pests in castor <i>N Vinay, S V S Raju, S Ramesh Babu and Kamal Ravi Sharma</i>	194
198	Effect of different plant extracts on growth indices of tobacco caterpillar (<i>Spodoptera litura</i>) on soybean under laboratory conditions <i>Navya Matcha and A K Bhowmick</i>	195
199	Management of groundnut diseases through organic amendments, bio products and biocontrol agents <i>D S Kelaiya and K L Dobariya</i>	196
200	Evaluation of fluorescent <i>Pseudomonads</i> and <i>Trichoderma</i> for growth promotion and control of soil borne diseases of groundnut <i>P Revathi, M Venkataiah and P Gonya Naik</i>	198
201	Association of late leaf spot (LLS) and rust resistance with yield in selected peanut genotypes <i>N Ramya Selvi, P L Viswanathan, S Manonmani, L Rajendran and S Sundravadana</i>	199
202	PGPR for the management of sunflower major diseases of north eastern dry zone of Karnataka <i>T Poornima, Vikas V Kulkarni, Vijayakumar Ghante and M R Umesh</i>	199
203	Influence of powdery mildew disease on sunflower and its possible management using <i>Ampelomyces</i> spp. <i>L Rajendran, T Selvakumar, R Sasikala and P L Viswanathan</i>	200
204	Integrated management of castor wilt disease <i>M Santha Lakshmi Prasad, E Bharathi, B Gayatri and R D Prasad</i>	201
205	Management of pod rot of groundnut using new fungicide molecules under field condition <i>T Hanamant and P Nagaraju</i>	202
206	Bio-efficacy of fungicides and bio control agents against root rot of soybean incited by <i>Rhizoctonia solani</i> <i>Punam Kashyap, S N Singh, M Surya Prakash Reddy and Jhumishree Meher</i>	203
207	Impact of seed mycoflora of soybean on seed quality <i>M C Rajeshwari and Ravi Hunje</i>	204
208	New source of Fusarium wilt resistance in castor <i>J Jawahar Lal, K Anjani, M A Raoof and M Santha Lakshmi Prasad</i>	204
209	Bio-efficacy of bio-agents against <i>Aspergillus niger</i> inciting collar rot in groundnut (<i>Arachis hypogaea</i> L.) <i>Mahadevi and Sreedevi S Chavan</i>	205
210	Biochemical changes induced by compost tea and seaweed formulation spray inhibiting Alternaria leaf blight of sunflower <i>M Shadab, K Khatib, K Karuna, C P Manjula and Dattatreya</i>	206
211	Identification of resistant sources against phyllody and foliar diseases of sesamum (<i>Sesame indicum</i> L.) <i>K Divya, T Kiran Babu, T Shobha Rani and D Padmaja</i>	207
212	Efficacy of different fungicides and <i>Trichoderma</i> spp. against stem rot of groundnut incited by <i>Sclerotium rolfsii</i> Sacc. <i>K Vinod Kumar, R D Prasad and S K Tripathi</i>	208
213	Efficacy of biocontrol agents against seed mycoflora of groundnut at different storage periods <i>A Srinivas, B Pushpavathi, B K M Lakshmi and V Shashibushan</i>	209

S. No.	Title & Author(s)	Page No.
214	Field evaluation of Bt 127 SC formulation against <i>Spodoptera litura</i> (F.) in soybean <i>R Channakeshava, Sangshetty, G Somanagouda, Shalini N Huilgol, G T Basavaraja and C J Kumar</i>	210
215	Effect of different media, temperature, pH on the growth of <i>Macrophomina phaseolina</i> (Tassi) Goid causing root rot of sesame <i>M Surya Prakash Reddy, M Santha Lakshmi Prasad, R D Prasad and Jayant Bhatt</i>	210
216	Studies on transmission of sesame phyllody through different methods <i>K Prasindhu, M Santha Lakshmi Prasad, R Sarada Jayalakshmi Devi and P Duraimurugan</i>	211
217	Foraging pattern of major pollinator fauna of sunflower <i>K M Srinivas Reddy, Y G Shadakshari, S D Nehru, K Karuna and M S Uma</i>	212
218	Management of rust red flour beetle (<i>Tribolium castaneum</i>) in stored sesame <i>A K Panday, Rajani Bisen, Surabhi Jain, M M Sundaria and M Chandrasekaran</i>	214
219	Bioefficacy and evaluation of newer insecticides against whitefly in castor <i>B Geetha, M Senthilkumar, M Deivamani and S R Venkatachalam</i>	215
220	Traps: a low cost IPM tool for pest monitoring and management in groundnut ecosystem <i>G M Shreevani, Sreedevi S Chavan and B Rajanna</i>	216
221	Bio-intensive IPM module for management of mustard aphid <i>D K Singh, Rajvir Singh, Mahak Singh and H G Prakash</i>	217
222	Seasonal incidence of major insect pests in the multi-storey farming of Mahaneem, pulses and castor in south west Haryana <i>S P Yadav, R P S Deswal, J S Yadav, Balbir Singh, Satyajeet and Narender Singh</i>	218
223	Integrated management of root rot of sesamum caused by <i>Macrophomina phaseolina</i> (Tassi) Goid. <i>T Kiran Babu, T Shobha Rani and D Padmaja</i>	219
224	Genetic variability for Alternaria leaf blight resistance in groundnut genotypes <i>Narendra Kumar, B C Ajay, K S Jadon, K Gangadhara, Praveen Kona, A L Rathanakumar, T Radhakrishnan and B M Chikani</i>	220
225	Evaluating bio-safety of newer and conventional insecticides against parasitoids and predators of castor whitefly <i>M Senthil Kumar, M Deivamani and S R Venkatachalam</i>	221
226	Response of newly developed sunflower hybrids and varieties against downy mildew disease <i>D S Mutkule, M V Dhuppe and M K Ghodkhe</i>	223
227	Effect of potassium on yield and the rust incidence of soybean <i>S B Mahajan and D K Kathmale</i>	224
228	Identification of temperature tolerant sunflower (<i>Helianthus annuus</i> L.) inbreds <i>V Aparna, Lakshmi Prayaga, Arti Guhe and P Lakshamma</i>	224
229	Yield and oil quality of groundnut (<i>Arachis hypogaea</i> L.) genotypes under elevated temperature and carbon dioxide <i>M. Vanaja, N Jyothi Lakshmi, S K Yadav, P Sathish, C H Mohan, B Sarkar, M Srinivasa Rao, M Prabhakar, M Maheswari and G Ravindra Chary</i>	225
230	Present status of resistance to collar rot disease caused by <i>Sclerotium rolfsii</i> Sacc in soybean <i>Rajkumar Ramteke, Vennampally Nataraj, M Shivakumar, Sanjeev Kumar, Laxman Singh Rajput, Subhash Chandra and Vangala Rajesh</i>	226
231	Evaluation of advanced breeding genotypes of castor for resistance to sucking pests <i>P Duraimurugan and G Balakishan</i>	227

S. No.	Title & Author(s)	Page No.
232	Screening of soybean genotypes for antixenosis against <i>Spodoptera litura</i> <i>Vangala Rajesh, Lokesh Kumar Meena, Sanjay Gupta, M Shivakumar, V Nataraj, Viraj G Kamble, R Ramteke, Subhash Chandra, R N Singh and A N Sharma</i>	228
233	Yield reduction and efficacy of antiviral product against yellow mosaic virus disease in soybean <i>Pawan K Amrate, M K Shrivastava and Dinesh K Pancheshwar</i>	229
234	Evaluation of antifungal molecules against <i>Alternaria helianthi</i> causing leaf blight in sunflower <i>K Karuna, C P Manjula and Abhilash</i>	230
235	Incidence of sucking insect pests in groundnut <i>G Harish, Ram Dutta, P P Thirumalaisamy, M V Natraja, Rupak Jena and S D Savaliya</i>	231
236	Efficacy of different methods of inoculation for inducing root rot disease in castor caused by <i>Macrophomina phaseolina</i> <i>Pinal Vekariya and A G Desai</i>	231
237	Influence of abiotic factors on seasonal abundance of natural enemies on safflower during <i>rabi</i> season <i>S C Kumbhar, D S Mutkule and M V Dhuppe</i>	232
238	Effect of seed bacterial endophytes on stem rot and growth promotion in groundnut <i>T Archana, L Rajendran, S L Manoranjitham, V P Santhana Krishnan and G Karthikeyan</i>	234
239	Impact of elevated carbon dioxide on biomass and seed yield of groundnut genotypes (<i>Arachis hypogaea</i> L.) under irrigated and moisture stress conditions <i>G Sandhya, M Vanaja, P Sathish, A Sushma, J M Upendra and Ch Mohan</i>	235
240	Field evaluation of <i>Trichoderma</i> and fungicides for the management of castor Fusarium wilt disease <i>M Deivamani, S R Venkatachalam, P Arutchenthil, P Kathirvelan, M Senthilkumar and B Geetha</i>	237
241	Screening of castor (<i>Ricinus communis</i> L.) germplasm and inbred lines against Fusarium wilt (<i>Fusarium oxysporum</i> f.sp. <i>ricini</i>) <i>Yamanura, R Mohan Kumar, C P Manjula and V Apurva</i>	238
242	Evaluation and identification of wild species promising for diseases of sesame <i>M G Palakshappa, Harshiya Banu, S G Parmeshwarappa, Laxmi C Patil and Vanishree</i>	239
243	Comparative performance of spraying operations by Drone/Unmanned Aerial Vehicle (UAV) <i>vis-à-vis</i> traditional method on management of safflower aphid (<i>Uroleucon compositae</i>) <i>T Rajeshwar Reddy, C Sudhakar, C Sudha Rani and C Manikya Minnie</i>	239
244	Integrated management of foliar diseases of sesame (<i>Sesamum indicum</i> L.) <i>Nayan Kishor Adhikary, Tamina Begum and Rambilash Mallick</i>	241
245	Advancement in <i>Sclerotinia</i> rot management in Indian mustard (<i>Brassica juncea</i> L.) <i>Pankaj Sharma, P D Meena, V V Singh, N C Gupta, H K Sharma and P K Rai</i>	241
246	Physical compatibility of insecticides and fungicides and their phytotoxicity on castor <i>G Madhuri, P Duraimurugan, V Divya Rani, K Sadaiah, G Neelima, M Rajashekar, Ch V Durga Rani, G Anuradha and M Venkata Ramana</i>	242
247	Development of white rust resistant Indian mustard (<i>Brassica juncea</i> L. Czern & Coss) strain, "DRMRIJ 12-40" <i>K H Singh, A K Thakur, Guman Singh and Bhagirathram</i>	243
248	Agri-innovations in oilseed crops for enhanced productivity and nutritional security <i>K Akhila, G Bhavani and S Akhila</i>	245
249	Mobile application for safflower technology transfer <i>P Madhuri, N Mukta, K Anjani, P Padmavathi, P S Srinivas, R D Prasad and S V Ramana Rao</i>	245

S. No.	Title & Author(s)	Page No.
250	Development of decision support system (DSS) for forecasting of gray mold disease of castor (<i>Ricinus communis</i> L.) using internet of things (IOTs) <i>R D Prasad, C Sarada, B Balaji Naik, Santosh Sam Koshy, R Arutselan, P Ravikumar and A Vishnuvardhan Reddy</i>	247
251	Correlation studies of sunflower Alternaria leaf blight with weather parameters <i>K Venkata Ramanamma, S Neelima and K Prabhakar</i>	248
252	On-farm demonstrations on management of gray mold disease of castor <i>R Arutselvan, R D Prasad, G Uma Devi and C Sarada</i>	249
253	Software aiding in selection of promising germplasm for oil palm improvement trials <i>K L Mary Rani, H P Bhagya, A Sivani, S Govandhan Rao, P Anitha and G Ravichandran</i>	250
254	Frontline demonstrations on whole package in oilseeds: impact in enhancing productivity and profitability <i>M Nagaveni, G D S Kumar and S V Ramana Rao</i>	251
255	Temporal performance of castor <i>vis-à-vis</i> competing crops in Gujarat - A Markov chain analysis <i>C Sarada and S V Ramana Rao</i>	252
256	Performance of Oilseeds in India: A temporal study <i>S V Ramana Rao, D Vaishnavi Sankari and A Vishnuvardhan Reddy</i>	253
257	Trends in consumption of vegetable edible oils in India: A temporal analysis <i>D Vaishnavi Sankari, S V Ramana Rao and A Vishnuvardhan Reddy</i>	254
258	Storage stability of kernels and oil of normal and oleic acid rich groundnut varieties <i>K C Dileepa and S Hemalatha</i>	255
259	Decomposition analysis of safflower production in India <i>S B Ramya Lakshmi, K C Gummagolmath and Priyanka Patra</i>	256
260	ICT outreach for farmers and other stakeholders to enhance productivity of oilseeds <i>Samala Akhila, N Mamatha and K Akhila</i>	258
261	Analysis on export competitiveness of oilseeds with BRICS countries <i>S R Devegowda, P S Badal and Avdhesh Sharma</i>	259
262	Growth and decomposition of major oilseeds in Madhya Pradesh (2000-01 to 2017-18) <i>Paladugu Praveen Kumar, S V Ramana Rao, Vijay Kumar Choudhary and Ajay Kumar Koshta I</i>	260
263	Transforming production technologies for more productivity and profitability towards doubling the farmers income : Success stories of large scale linseed cultivation at farmers field <i>Devendra K Payasi</i>	261
264	On-farm validation of management technology for seed and soil borne safflower diseases <i>S V Pawar, S B Ghuge and P O Bhutada</i>	263
265	Effect of technology transfer through frontline demonstrations on yield and economics of safflower in scarcity area of Western Maharashtra <i>V D Shende, S V Khadtare and S K Shinde</i>	264
266	Formulation and development of soy okara cookies by blending with different levels of black scented rice flour <i>L Sophia Devi, Nilima Karam, T Sunanda Devi and H Nanita Devi</i>	266
267	Cost and returns of groundnut crop in Andhra Pradesh <i>Perka Shiva Kumar</i>	267
268	Technology interventions for enhancing the productivity and profitability of small holder agriculture in Vikarabad district of Telanagana <i>V Jhansi Rani, S V Ramana Rao and A Aziz Qureshi</i>	269

S. No.	Title & Author(s)	Page No.
269	Performance of DRMRIJ-31 (Giriraj) variety of mustard in cluster front line demonstration under arid climate condition <i>R R Meghwal and B S Rathor</i>	270
270	Castor (<i>Ricinus communis</i> L.) based cropping system for higher income in South-Western Haryana <i>J S Yadav, Satyjeet and R S Dadarwal</i>	271
271	Impact of front line demonstration on yield and economics of sunflower (<i>Helianthus annuus</i> L.) in Bihar <i>Vikram Bharati, U K Singh, Kaushal Kishor and C S Choudhary</i>	272
272	Studies on phenotypic stability in sesame (<i>Sesamum indicum</i> L.) <i>A P T Rajkapur Hartiabinesaraja, S T Ponsiva, S Praveenkumar and S Thirugnanakumar</i>	273
273	Indian castor oil exports concentration- a perspective <i>N Sandra, C Sarada and N K Chaure</i>	273
274	Trend analysis of weather parameters in relation to castor yield <i>Abha Goyal, K Alivelu and S Shukla</i>	274
275	Evaluation, multiplication and deposition of sunflower germplasm accessions in medium term storage <i>P B Swetha, M Leelavathi and M Y Dudhe</i>	276
276	Molecular and biotechnical approaches for oil quality improvement in <i>Brassica</i> species <i>V Blessy, R P Gnanamalar and K Manivelan</i>	276
277	Evaluation of soybean [<i>Glycine max</i> (L.) Merrill] germplasm for seed yield and earliness <i>T Onkarappa and H H Sowmya</i>	277
278	Polymorphism in FAE1gene paralogs of <i>Brassica juncea</i> associated with erucic acid content <i>Yashpal, Navinder Saini, Naveen Singh, Rajendra Singh, Sujata Vasudev and D K Yadava</i>	277
279	Enhancing water use efficiency in rainfed Indian-mustard (<i>Brassica juncea</i> L.) <i>Rajvir Singh, D K Singh, Mahak Singh and H G Prakash</i>	278
280	Estimates of variability, heritability and genetic advance for yield components in linseed (<i>Linum usitassimum</i> L.) genotypes <i>A K Toor and A Singh</i>	278

The pooled mean of three *kharif* seasons revealed that, the minimum root rot incidence (13.0 %) and maximum percent reduction of disease over control (68.8%) and yield (304 kg/ha) was realized in integrated treatment T5 i.e. seed treatment *T. viride* (Tv) + *P. fluorescens* (Pf) @ 5 g/kg each + soil application of *P. fluorescens* @ 2.5 kg/ha + *T. viride* @ 2.5 kg/ha enriched in FYM + neem cake @ 250 kg/ha at the time of sowing, whereas the maximum incidence (41.7 %) and minimum yield (127 kg/ha) was recorded in untreated check (Nayan *et al.*, 2019). Similar kind of results were obtained during summer season also (Table 1). Overall, the incidence of root rot was less during summer as compared to *kharif*. However, maximum yield was realized in summer over *kharif*. The yield reduction during *kharif* was due to severe incidence of

phyllody in experimental plots. It was found that, combined application of bio-control agents (*T. viride* and *P. fluorescens*) as seed treatment and soil application showed the minimum root rot incidence and higher yields as compared to application of bio-control agent alone and over untreated check.

REFERENCE

Nayan K A, Riton Chowdhury Md., Tamina Begum and Rambilash Mallick 2019. Integrated management of stem and root rot of sesame (*Sesamum indicum* L.) caused by *Macrophomina phaseolina* (Tassi) Goid. *International Journal of Current Microbiology and Applied Sciences*, **8**(4): 804-808.

Table 1 Integrated management of root rot disease of sesame

Treatment	Pooled data (<i>Kharif</i> , 2014, 2015 and 2015)			Pooled (Summer, 2015 and 2018)	
	Root Rot (%)	Phyllody (%)	Yield (kg/ha)	Root Rot (%)	Yield (Kg/ha)
T1-Seed treatment <i>T. viride</i> @ 4 g/kg + soil application of Tv @ 2.5 kg/ha enriched in 100 kg of FYM at sowing.	18.5 (25.1)	21.3 (26.8)	231	11.9 (19.6)	664
T2-Seed treatment <i>P. flourescens</i> @ 10 g/kg + Soil application of Pf @ 2.5 kg/ha enriched in 100 kg of FYM at sowing.	24.0 (28.8)	22.4 (27.7)	204	12.9 (19.9)	654
T3-Seed treatment <i>T. viride</i> @ 4 g/kg + soil application of Tv @ 2.5 kg/ha enriched in 100 kg of FYM + neem cake @ 250 kg/ha at sowing.	23.1 (28.4)	25.0 (29.3)	226	6.8 (14.1)	611
T4-Seed treatment <i>P. fluorescens</i> @ 10 g/kg + soil application of Pf @ 2.5 kg/ha enriched in 100 kg of FYM + neem cake 250 kg/ha at sowing.	22.6 (27.6)	23.4 (28.3)	261	16.1 (23.4)	672
T5-Seed treatment Tv + Pf @ 10 g /kg + Soil application of Pf @ 2.5 kg/ha + Tv @ 2.5 kg/ha enriched in 100 kg of FYM + neem cake @ 250 kg/ha at sowing.	13.0 (20.9)	17.8 (24.7)	304	9.3 (15.8)	769
T6-Seed treatment Carbendazim @ 2 g/kg + soil drenching with Carbendazim @ 1 g/l.	33.4 (35.1)	19.8 (25.9)	183	13.5 (21.2)	561
T7-Untreated check	41.7 (40.1)	27.8 (31.6)	127	27.7 (31.7)	473
S.Em ±	2.7	2.2	17.1	3.1	70.1
CV%	18.7	17.0	13.6	23.5	19.3
LSD (5%)	7.7	6.3	49.0	9.0	204

*mean of 3 replications; figures in parenthesis are angular transformed values

Genetic variability for Alternaria leaf blight resistance in groundnut genotypes

NARENDRA KUMAR*, B C AJAY, K S JADON, K GANGADHARA, PRAVEEN KONA,
A L RATHANAKUMAR, T RADHAKRISHNAN AND B M CHIKANI

ICAR-Directorate of Groundnut Research, Junagadh-362 001, Gujarat

*Corresponding author: narendrapb09@gmail.com

ABSTRACT

Fifty genotypes were screened for resistance to *Alternaria* leaf blight during three successive summer seasons during 2013 to 2015. Pooled analysis of variance indicated significant genotypic differences observed for resistance of *Alternaria* leaf blight indicating the existence of genetic variability among the 50 genotypes. *Alternaria* leaf blight had high heritability coupled with high genetic advance as per cent of mean revealed selection would be effective for improving this trait in studied genotypes. Based on three year data two advanced breeding lines *viz.*, PBS-12169,

PBS-12190 found resistance to *Alternaria* leaf blight. These genotypes can be used in breeding programme for developing high yielding groundnut cultivars resistance to *Alternaria* leaf blight.

Keywords: *Alternaria* leaf blight, Genetic variability, Genotypes, Groundnut

Groundnut (*Arachis hypogaea* L.) is an important self-pollinated oilseed crop grown in 117 countries with different agro-climatic conditions between 40°N to 40°S latitudes. In India, last 4-5 years it has been observed that incidence of *Alternaria* leaf blight has continued to increase in farmers field of summer groundnut in Gujarat. *Alternaria* leaf blight is becoming a major disease in *rabi*-summer groundnut particularly in major groundnut growing states like Andhra Pradesh, Karnataka, Tamil Nadu, Gujarat and Maharashtra. These five states account for about 80% area of total *rabi*-summer groundnut area of country. It has been reported that *Alternaria* leaf blight reduced 13-22% pod yield, 24-63% haulm yield and it also affects kernel quality in groundnut (Kumar *et al.*, 2012). The objective of this investigation was to evaluate groundnut genotypes for resistance to *Alternaria* leaf blight and to identify resistance sources.

A total of 50 genotypes including advanced breeding lines, interspecific derivatives and cultivars recommended for summer season were screened for resistance to *Alternaria* leaf spot during three successive summer seasons during 2013 to 2015 following RBD with three replications and disease was scored using modified 1-9 scale. Data on pod yield (kg/ha), shelling out-turn (%), days to maturity and 100 kernel weight (g), SPAD chlorophyll meter reading (SCMR) and Specific leaf area (cm²/g) at 50 and 80 DAS were recorded. Analysis was performed using DSAASTAT (Onofri, 2007).

Pooled analysis of variance indicated significant genotypic differences observed for all the traits. Disease incidence ranged between 3 and 9 on 1-9 scale.

Maximum average disease score was observed in an advanced breeding line PBS 12092 (8.7 on 1-9 scale). Two advanced breeding lines *viz.*, PBS-12169, PBS-12190 had disease score ≤ 4.3 which was at par with resistant check NRCGCS 349 (with 4.3 score). High heritability along with high genetic advance as per cent of mean observed for *Alternaria* leaf blight indicated that this disease is least influenced by environmental effect. Hence selection would be rewarding for improving this trait due to additive effect. Based on pod yield (kg/ha), top five high yielding and low yielding genotypes were selected and observed difference between these two groups for all characters. High yielding genotypes had tolerance to *Alternaria* leaf blight (≤ 6.0 on 1-9 scale), high shelling out-turn (68%), short duration (114 days), high HKW (39g), high SCMR (33), low SLA (176 and 160 cm²/g at 50 and 80 DAS respectively) while low yielders were susceptible to *Alternaria* leaf blight and were also having lower value of all the studied traits except SLA.

REFERENCES

- Kumar V, Lukose C, Bagwan N B, Koradia V G and Padavi R D 2012. Occurrence of *alternaria* leaf blight of groundnut in Gujarat and reaction of some genotypes against the disease. *Indian Phytopathology*, **65**(1): 25-30.
- Onofri A 2007. Routine statistical analyses of field experiments by using an Excel extension. Proceedings 6th National Conference Italian Biometric Society: "La statisticanellescienzedella vitae dell'ambiente", 20-22 June 2007, Pisa, pp. 93-96.

Evaluating bio-safety of newer and conventional insecticides against parasitoids and predators of castor whitefly

M SENTHIL KUMAR¹, M DEIVAMANI² AND S R VENKATACHALAM²

¹Forest College and Research Institute, Tamil Nadu Agricultural University, Mettupalayam-641 301, Tamil Nadu

²Tapioca and Castor Research Station, Tamil Nadu Agricultural University, Yethapur, Tamil Nadu

*Corresponding author: senthilkumariari@gmail.com

ABSTRACT

This investigation was carried out to evaluate the bio-safety of newer and conventional insecticides tested against *Eretmocerus mundus*, *Nephus regularis*, *Chilocorus nigirita* under laboratory conditions at Tapioca and Castor Research Station, Yethapur. The results showed that diafenthiuron 50 WP @ 0.8g/l and buprofezin 25 SC @ 0.8 ml/l recorded lowest adult mortality of *Eretmocerus mundus* (60 and 65 percent), *Nephus regularis* (40.60 and 39.40 per cent) and *Chilocorus nigirita* (39.20 and 34.60 per cent) respectively and highest adult emergence (74.41 and 73.49 percent) in *Eretmocerus mundus*. However, thiomethaxam 25 WG0.4 g/l and dimethoate 30 EC1.7 ml/l were very harmful to parasitoid and predators.

Keywords: Bio-safety, Castor, Insecticides, Parasitoids, Predators, Whitefly