

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

ISSN 0970-2776

Volume 37

(Special Issue)

Feb., 2020

Journal of OILSEEDS RESEARCH

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

populations and evaluated for its yield performance. The genotype was tested under multi location trials in Gujarat during *kharif* 2014 to 2018. It was screened for reaction to major pests (thrips, jassids and *Spodoptera*) as well as major diseases (rust, ELS, LLS, stem rot and collar rot) under field conditions. The yield data were analyzed for a randomized block design as suggested by Panse and Sukhatme (1985).

Of 17 evaluation trials, this entry has given 2722 kg/ha of pod yield as compared to 2352 and 2344 kg/ha of pod yield of check varieties GG 11 and GJG 17, respectively. Pod yield increase was to the tune of 15.74% and 16.10%, respectively. This genotype also exhibited higher kernel and oil yields than the check varieties. The entry GG 41 was comparable to the checks against tikka and rust diseases, while stem rot and collar rot incidence was low in GG 41 as compared to the check varieties. The pest infestation was lower in GG 41 as compared to the check varieties. Based on its consistent superior

performance over locations and years, GG 41 has been released for general cultivation in the *kharif* groundnut growing areas of Gujarat. By virtue of superior performance for high pod and kernel yields and oil with better quality characteristics, the newly developed variety GG 41 has been identified for release by 15th Combined Joint AGRESCO meeting of SAUs held on 29 April - 1 May 2019 at AAU, Anand (Anonymous, 2019) for general cultivation in the *kharif* rainfed spreading groundnut growing areas of the entire Gujarat State

REFERENCES

- Anonymous 2018. *Proceedings of 15th Combined Joint AGRESCO Meeting of SAUs of Gujarat* held at Junagadh Agricultural University, Junagadh, 29 April-1 May, 2019.
- Anonymous 2019. *Annual Report (Kharif) 2018 of All India Coordinated Research Project on Groundnut*, Directorate of Groundnut Research, Junagadh, pp. i-iv.

Variation in quality traits of different seed sizes of groundnut

M K MAHATMA, L K THAWAIT, AMAN VERMA, NARENDRA KUMAR, SUSHMITA AND A L SINGH

ICAR-Directorate of Groundnut Research, Junagadh-362 001

*Corresponding author: maheshmahatma@gmail.com

ABSTRACT

Groundnut is an energy rich oilseed and food crop. There is no information on quality traits of different seed sizes of a same groundnut variety. Therefore, in present investigation seven groundnut varieties i.e. Girnar 2, Girnar 3, GJG 9, GJG22, GG 20, KDG 128 and TG 37A were used to find out variations in quality traits of different seed sizes of groundnut. Small seed of groundnut possessed higher content of soluble sugars and protein while bold seeds had higher oil content. Oleic acid content was higher in bold seeds while linoleic acid was higher in small seeds.

Keywords: Groundnut, Linoleic acid, Oleic, Quality, Seed size, Soluble sugars

Groundnut is an energy rich oilseed and food crop. About 50% of its produce is used for direct consumption especially as value-added products like roasted and salted groundnuts, groundnut-candy, peanut-butter etc. After grading of groundnut kernels bold seeds are generally used for direct consumption in various forms of value added products. Medium and small sized kernels are either used for oil extraction or as a bird feed. There is no information of quality traits of different seed sizes of same groundnut varieties.

Seven groundnut varieties, Girnar 2, Girnar 3, GJG 9, GJG 22, GG 20, KDG 128 and TG 37A were used. Bold, medium and small kernels were graded by hand picking. Hundred seed weight of graded kernels were recorded. Oil, protein and total soluble sugars contents were analysed by NIR. Sugar and fatty acid profiles were estimated using Ion chromatograph (Bishi *et al.*, 2015) and Gas chromatograph (Misra and Mathur, 1998) respectively. Data were statistically analysed for significance.

Variation of oil content in small seed of these seven cultivars ranged from 4% (GJG 9) to 12% (Girnar 2). Bold seeded cultivars (Girnar 2, GJG 22 and GG 20) had higher variation for oil, protein and sugar contents between bold and small kernels than that of normal (Java) seeded cultivars (KDG 128, GJG 9 and TG 37A). Results of sugar profiling showed that inositol, sucrose and raffinose contents reduced with increase in seed size. Small seeds of all the genotypes possessed higher inositol, sucrose and raffinose content while lower trehalose content compared to medium and bold seeds of respective cultivars. Fatty acid profile also differed with seed size. Oleic acid content was significantly lower in small seeds of GG 20 and GJG 22 (52 and 54%) as compared to their medium (60% and 64%) and bold seeds (63% and 68%). These results showed that sugar and protein biosynthesis takes place early during seed maturation than oil biosynthesis. Similarly higher content of oleic acid in bold seeds showed that oleic acid accumulated later during seed maturation. Thus, to have higher proportion of oleic acid in oil, medium and bold seeds should be used for oil

extraction. Whereas, medium and small seeds of groundnut can be used for table purpose that requires low oil, high sugar and protein contents.

REFERENCES

Misra J B and Mathur R S 1998. A simple and economic procedure for transmethylation of fatty acids of groundnut

oil for analysis byGLC. *International Arachis Newsletter*, **18**:40–42.

Bishi S K, Kumar L, Mahatma M K, Khatediya N, Chauhan S M and Misra J B 2015. Quality traits of Indian peanut cultivars and their utility as nutritional and functional food. *Food Chemistry*, **167**:107–114.

Optimizing maturity index calculation of groundnut in selected varieties at Coimbatore condition

R SANGEETHA VISHNUPRABHA*, P L VISWANATHAN, S MANONMANI, L RAJENDRAN AND T SELVAKUMAR

Centre for Plant Breeding and Genetics, Tamil Nadu Agricultural University, Coimbatore

*Corresponding author: sangeetha30nov@gmail.com

ABSTRACT

The present study was taken up to evaluate the efficiency of the maturity index calculating methods viz., shell out method, seed hull ratio maturity index, hull scrape method and maturity profile board (MPB) method in determining the maturity duration of ten groundnut varieties CO 7, ICGV 07222, VRI 6, VRI 8, GPBD 4, VRI 3, Chico, Gangapuri, ICGV 91114 and ICGV 93468 at Coimbatore. In Shell out and hull scrape method maturity indices ranged from 70-80% and in seed hull ratio maturity index it ranged from 2.9-3.6 which revealed the highest number of matured pods with maximum weight. In hull scrape method and MPB the colour of mesocarp exactly revealed maturity status of groundnut pods with a strong correlation with yield. Thus, maturity index in groundnut is more reliable when calculated by hull scrape method in combination with maturity profile board (MPB) to determine the days until digging.

Keywords: Groundnut, Hull scrape, Maturity profile board, Shell out method, Seed hull ratio

Groundnut pod development takes place in the soil making it difficult to correctly judge the maturity of the crop. Over the past few decades, several methods have been used to assess groundnut maturity. The present study considered shell out, seed hull ratio maturity index, hull scrape and maturity profile board (MPB) methods and their efficiency for predicting the correct date of harvest in groundnut.

Ten groundnut varieties with wide difference in days to maturity viz., CO 7, ICGV 07222, VRI 6, VRI 8, GPBD 4, VRI 3, Chico, Gangapuri, ICGV 91114 and ICGV 93468 were taken up for the study in two seasons *rabi* 2018-19 and *kharif* 2019 at Department of Oilseeds, CPBG, TNAU. A range of five different days to maturity check was planned with five days interval for all the varieties under study. In each harvest of all the varieties, the maturity index by shell out method (Miller and Burns, 1971), seed hull ratio method (Pattee *et al.*, 1977), hull scrape method and Maturity Profile Board (Williams and Drexler, 1981) was calculated along with average yield. Coefficient of correlation was calculated among days after sowing, maturity indices and average pod yield and tested for its significance.

In all the varieties, the highest average yield in both the seasons clustered around the third and fourth harvests which were scheduled to be the mean maturity duration of the varieties. On the whole, the maturity duration of the

varieties was higher during *rabi* season in comparison to those in *kharif* season. Thus, from the study, the optimum maturity indices for predicting the date of harvest for groundnut are summarized in the Table.1. The hull scrape method of maturity index showed highest positive correlation of 55% with average pod yield while shell out method stood second with 48% correlation. Thus, the maturity indices calculations by hull scrape method and Maturity Profile Board method which are based on mesocarp colour were most reliable. A groundnut cultivator is suggested to examine the mesocarp colour and calculate the maturity index according to the Hull Scrape method. If the maturity index is under 70%, the samples may be placed on the MPB to determine a prediction for harvest date.

REFERENCES

Miller O and Burns E 1971. Internal color of Spanish peanut hulls as an index of kernel maturity. *Journal of Food Science*, **36**: 669–670.

Pattee H E, Wynne J C, Young J H and Cox F R 1977. The seed-hull weight ratio as an index of peanut maturity. *Peanut Science*, **4**:47-50.

Williams E J and Drexler J S 1981. A non-destructive method for determining peanut pod maturity. *Peanut Science*, **8**: 134–141.