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Interactive effect of nitrogen and sulphur on the productivity and quality attributes of rapeseed-mustard [*Brassica juncea* (L.) Czern. and Coss.] and *Brassica campestris* L.

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Rapeseed mustard contributes 32% of the total oilseeds production in India and is the second largest indigenous oilseed crop after groundnut. The production and productivity of this crop were increased till 1996-97 due to the introduction of high yielding varieties, adoption of better cultural practices and increase in the area under cultivation, but these have remained stagnant since then. One of the main reasons of this stagnation could be the deficiency of sulphur (S) needed by this crop in large amounts for its optimum growth, development and yield. Due to the strong metabolic coupling between nitrogen (N) and sulphur (S), the deficiency of sulphur also limits the uptake and assimilation of nitrogen.

Keeping these facts in view field experiments were conducted in the rabi season of 1998-99 at Hamdard University and IARI, New Delhi and in the rabi season of 1999-2000 at farmer's fields in Haryana and U.P to assess the impact of various combinations of N and S and their mode of application on the yield and quality attributes of rapeseed-mustard (*Brassica juncea* Czern and Coss cv. Pusa Jai Kisan and *Brassica campestris* L. cv. Pusa Gold). Experiments were carried out using randomized block design with five treatments. $T_1(S_0N_{50+50})$, T_2 $(S_{40}\ N_{50+50})$, T_3 $(S_{20+20}\ N_{50+50})$, T_4 $(SGF_{30}\ N_{50+50})$ and T_5 $(SGF_{40}\ N_{50+50})$. Each treatment had three replications. Among these treatments, the optimum increase in seed and oil yield was achieved with the treatment, T_4 (64–133%, 77–145%) followed by T_3 (57-122%, 66-126%) when compared with the treatment, T_1. These treatments were also able to improve the quality of produce measured in terms of seed protein and concentration of unsaturated fatty acids in the oil and glucosinolate in the oil cake. The results obtained in these experiments clearly suggest that balanced and judicious application of N and S can improve not only the yield but also the quality of produce of rapeseed mustard. The physiological and biochemical basis of increased yield and improved quality with balanced application of S and N will be discussed in this paper.

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Host-plant resistance for reducing aflatoxin contamination in groundnut

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Groundnut (*Arachis hypogaea* L.), an important oilseed crop is cultivated in 96 countries of the world with an annual production of 30.2 million t on 23.7 million ha. About two thirds of production comes from the semi-arid tropics (SAT) regions which are characterized by uncertain rainfall and frequent droughts. Drought predisposes the crop to aflatoxin contamination by *Aspergillus flavus* and *A. parasiticus*. The aflatoxin contamination makes the produce unfit for consumption as these toxins are immuno-suppressant. The aflatoxin contamination can be reduced considerably through genetic enhancement and by adopting suitable management practices.

Several sources of resistance to seed infection and seed colonization by *A. flavus* (J 11, PI 337394F, PI 337409, UF 71513, Ah 32, Fiazpur, Var 27) and two sources of low aflatoxin production (U 4-7-5, VRR 245) have been identified at ICRISAT and elsewhere. These sources have been used in the

breeding program at ICRISAT and several breeding lines with higher levels of resistance to *A. flavus* seed infection/colonization in the improved agronomic background have been developed. Some of them (ICGVs 88145, 89104, 91278, 91283, 91284) have been released as improved germplasm ICGVs 87084, 87094, and 87110 have shown superior performance and *A. flavus* resistance in West and Central Africa. Efforts are currently focused on development of genotypes, which combine both resistance to *A. flavus* invasion and low aflatoxin production. Future strategies aim to explore additional sources of resistance to aflatoxin contamination and to examine the basis of genotypic variation for resistance in order to pyramid genes for resistance. This may reduce aflatoxin contamination but can not provide genotypes that are completely free from a flatoxin contamination for which we need to resort to biotechnological options like transformation.

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Stable soybean lines for quality traits for Rajasthan

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Soybean [*Glycine max* (L.) Merrill] along with groundnut and rapeseed mustard has established itself as third important oil seed crop of India. Soybean is the richest, cheapest and easiest source of best quality proteins and fats. It is widely used in industries for the production of food products, soybean oil and vanaspati ghee. Soybean has not become popular in the sub-continent due to poor yield and quality of varieties under various agroclimatic conditions. Therefore, development of varieties giving a stable performance over a range of environmental conditions would be useful. With this in view, stability parameters were estimated by growing thirty diverse varieties/strains of soybean [*Glycine max* (L.) Merrill] for seed protein and seed oil content at three locations in Rajasthan during *krarif*, 1997.

G × E interactions were significant for both the traits. Linear component was highly significant for both the characters. As per Eberhart & Russell (1966), JS 355, KHSb 2, Bragg for seed protein content and Pusa 16 for seed oil content exhibited high mean performance, average response and appeared widely adaptable. Further entries Pusa 24, PK 472, Pusa 40, JS 76-205 and MACS 124 were considered promising for seed protein content while JS 80-21, MACS 13, MACS 58 for seed oil content appeared to be better suited for high fertility condition. PK 564 turned-out as the stable variety for both quality characters under stress condition.

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Genetic architecture of fatty acids in linseed

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Linseed oil is unique as it contains a fatty acid with three double bonds i.e. linoleic acid which is used mainly as drying oil. Cultivars under the name "Linola" have been developed which contains only 2% linolenic acid (Murphy 1993). For the quantitative and qualitative improvement of linseed oil, it is imperative to know the genetics of fatty acid profiles. The nature of gene effects for fatty acids were studied using generation mean analysis in three crosses of linseed viz; Neela × Hira, Neela × J-23 & RLC (U)-2 × T-397. Experiments with six basic populations of each cross was conducted in RBD during 1998-99. Fatty acids were determined using GLC. Six parameter model was followed to detect the epistasis. The analysis indicated the importance of both additive and dominance gene effects for palmitic acid, stearic acid, oleic acid and linoleic acid. The dominance and dominance × dominance