Original Research Article

Dry matter accumulation and biomass partitioning of groundnut (*Arachis hypogaea* L.) as influenced by genotypes and sulphur levels ~~and genotypes~~

Comment [A1]: Because genotypes are the first factor and sulphur levels are the second factor.

ABSTRACT

Groundnut is an important oilseed crop and belongs to the family Leguminosae. However, the productivity of groundnut in India is less as compared to average productivity of the world. The main cause of low groundnut production is an unbalanced and insufficient usage of nutrients. Because groundnut is a legume-oilseed crop, it has a high phosphorus, calcium, and Sulphur demand. Therefore, this field experiment was conducted during the *Kharif* season of 2023 at crop physiology field lab, Department of Agronomy, CCS Haryana Agricultural University, Hisar. The experiment was laid out in split plot design with four genotypes (G_1-MH 4, G_2-HNG 10, G_3-HNG 69 and~~,~~ G_4- GNH 804) in main plots and four sulphur levels (S_1-Control, S_2-20 kg/ha, S_3-40 kg/ha and~~,~~ S_4-60 kg S/ha) in sub-plots with three replications. Result revealed that among genotypes GNH 804 resulted in significantly higher total plant biomass and its partitioning into different plant parts *viz*, leaves, stem, root and pod at different growth stages in groundnut followed by HNG 69. Among sulphur levels, 60 kg S/ha recorded higher dry matter accumulation closely followed by sulphur level 40 kg S/ha So, to obtain higher total dry matter accumulation and its partitioning, the genotype GNH 804 may be fertilized with 40 kg S/ha.

Comment [A2]: Fabaceae (It is the modern name for the legume family)

Comment [A3]: in a completely randomized block arrangement

Key words: Biomass, genotypes, groundnut, partitioning, sulphur

Comment [A4]: Groundnut, genotypes, sulphur, biomass partitioning

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is one of the best-known oilseed crops and belongs to the family Leguminosae and sub-family Papilionaceae. It is believed that it originated in South America (Kamal *et al.*, 2023a; Hussainy *et al.*, 2023). Groundnut covers an area of 44.3 lakh ha with production of 86.5 lakh tonnes and productivity of 1953 kg ha^{-1} in India during 2023-24. The major groundnut producing states in India are Gujrat, Rajasthan and Tamil Nadu. Groundnut accounts for 31.7% of India total oilseed production and about 28.3 % of the

Comment [A5]: Fabaceae

cultivated area of total oilseeds (Kamal *et al.*, 2024b; Ali *et al.*, 2021). In India groundnut is grown in both the seasons i.e., *Kharif* and *Rabi*. But in Haryana groundnut is grown only in *Kharif* season over an area of 0.07 lakh ha with production and productivity of 0.08 lakh tonnes and 1080 kg ha^{-1}, respectively during 2023-24 (Anonymous, 2024).

There is less productivity of groundnut in India as compared to average productivity of world due to uncertainty in monsoon rainfall as well as different bio-stresses such as diseases, insect pests and weeds. The main cause of low groundnut production is an unbalanced and insufficient usage of nutrients. Because groundnut is a legume-oilseed crop, it has a high phosphorus, calcium, and sulphur demand (Sruthi *et al.*, 2021; Kamal *et al.*, 2023b). Variety and sulphur are crucial for the physiological growth and yield of crops like groundnut. Selecting the appropriate variety is crucial for groundnut production. The adoption of high-yielding varieties has surged in recent years, bringing the country close to self-sufficiency in groundnut. Varieties suited to early *Kharif* differ significantly in growth habits compared to those suited for other seasons. Maintaining the optimum plant population per hectare for a given variety in a specific situation not only reduces cultivation costs but also maximizes the yield potential of the cultivar (Dileep *et al.*, 2021). Certain groundnut varieties have demonstrated that a poor source-to-sink relationship leads to the formation of more unfilled pods and a lower seed yield (Chandrasekaran *et al.*, 2007). Variety is a key factor that affects the development, productivity, and quality of peanuts.

Comment [A6]: I suggest deleting it because this study is not about plant population.

Sulphur plays a crucial role in several metabolic enzyme processes in plants, it affects productivity both quantitatively and qualitatively (Sheoran *et al.*, 2013). Sulphur is essential in the process of synthesis of amino acids that contain sulphur, such as methionine and cysteine and it plays an important role in the synthesis of proteins, chlorophyll and oil (Kamal *et al.*, 2024a). The Sulphur containing enzyme is also responsible for the synthesis of vitamins (biotin and thiamine), as well as co-enzyme A and metabolism of carbohydrates, proteins and fats. Biomass partitioning is the most influential physiological factor in yield determination of groundnut. The high yield is associated with rapid increase in pod number and near cessation of vegetative growth during pod filling. Based on the above reasons, a study was conducted to investigate dry matter accumulation and biomass partitioning of groundnut as influenced by genotypes and sulphur levels. ~~and genotypes~~.

MATERIALS AND METHODS

The field experiment was conducted during the *Kharif* season of 2023 at crop physiology field lab, Department of Agronomy, CCS Haryana Agricultural University, Hisar. Geographically, Hisar is situated at 29°10' N latitude and 75°46' E longitude at an elevation of 215 m above mean sea level. The total rainfall received during the crop growing period was 176.1 mm. Weekly maximum and minimum temperatures remained under a suitable range for different crop growth stages. Average temperature on sowing date for crop season was 35.2°C, while average temperature at harvesting was 24.9°C. On the other hand, mean weekly maximum and minimum temperatures ranged between 30.5-39.1°C and 15.6-28.3°C, respectively during crop season. The experiment was laid out in split plot design with four genotypes (G_1-MH 4, G_2-HNG 10, G_3-HNG 69~~,~~ and G_4- GNH 804) in main plots and four sulphur levels (S_1-Control, S_2-20 kg/ha, 10, S_3-40 kg/ha~~,~~ and S_4-60 kg S/ha) in sub-plots with three replications. The soil of the field was sandy in texture, slightly alkaline in pH (8.1), EC (0.15 ds/m), low in organic carbon (0.12%), low in available N (130.8 kg/ha), medium in available P (17.9 kg/ha), medium in available K (138.8 kg/ha) and low in available S (21.4 kg/ha). Standard cultural practices were followed for all treatments which was recommended in groundnut crop.

Comment [A7]: in a completely randomized block arrangement

Dry Matter Accumulation (g) and Partitioning

Three plants were randomly taken from one replication for recording the biomass of leaves, stem, root and pods at different growth stages (30, 60, 90 DAS and at maturity) of all the treatments. Plants were taken out with roots after thorough washing of the sand by water jet gently. The plants sampled from each replication were separated into leaves, stem, root and pod and were first dried in the sun and then in oven at 80°C for about 72 hours or more until a constant weight was obtained and then weighed. Dry matter accumulation per plant was calculated by adding the dry weights of individual plant parts and expressed in g~~/~~plant^{-1}.

Comment [A8]: from **one** replication or from **each** replication ?

Comment [A9]: This is correct

Percent Contribution of Plant Parts

Per cent contribution of individual plant parts at 30, 60, 90 days after sowing (DAS) and at maturity was computed by using the following formula:

$$\text{Contribution of leaves to total dry weight of plant (\%)} = \frac{\text{Weight of leaves at a particular time}}{\text{Total dry weight of plant at the same time}} \times 100$$

$$\text{Contribution of stem to total} = \frac{\text{Weight of stem at a particular time}}{} \times 100$$

dry weight of plant (%) Total dry weight of plant at the same time

$$\text{Contribution of root to total dry weight of plant (\%)} = \frac{\text{Weight of root at a particular time}}{\text{Total dry weight of plant at the same time}} \times 100$$

$$\text{Contribution of pod to total dry weight of plant (\%)} = \frac{\text{Weight of pod at a particular time}}{\text{Total dry weight of plant at the same time}} \times 100$$

All the data recorded were analyzed with the help of analysis of variance (ANOVA) technique (Gomez and Gomez, 1984) for split plot design. The least significance test was used to decipher the effect of treatments at 5% level of significance.

RESULTS AND DISCUSSION

Effect of genotypes on dry matter, partitioning and percent contribution of plant parts:

The data pertaining to dry matter accumulation in various plant parts at 30 DAS are presented in Table 1. Significant variation among genotypes regarding dry matter accumulation in various plant parts and total dry weight was recorded at 30 DAS. ~~However, non significant variation was recorded among sulphur levels regarding dry matter accumulation in various plant parts~~. Numerically, higher values for total dry matter accumulation at 30 DAS were recorded in GNH 804 genotype (2.73 g/plant) followed by HNG 69 (2.63 g/plant). Among genotypes significantly higher dry matter accumulation at 30 DAS in various plant parts leaves (1.23 g/plant), stem (0.66 g/plant) and root (0.84 g/plant) were recorded in GNH 804 genotype, which were 54.00, 69.23 and 147.05 percent higher over MH 4, respectively. A disquisition to data given in Figure 1 exhibited that the per cent contribution to total dry matter at 30 DAS was more towards leaves followed by stem and root. Among genotypes the maximum per cent contribution to total dry matter in leaves (44.07 %) and root (26.27) was found in MH 4, while in stem (31.10) was found in HNG 10. A perusal of data in Table 2 depicted that dry matter accumulation in various plant parts at 60 DAS of groundnut was significantly affected by genotypes. Among genotypes significantly higher dry matter accumulation in leaves (7.23 g/plant), stem (10.32 g/plant), root (3.01 g/plant) and pod (2.86 g/plant) were recorded with GNH 804 which were 34.88, 69.73, 67.22and 146.55 percent higher over control, respectively. The higher values for total dry matter accumulation at 60 DAS were recorded in GNH 804 (23.90 g/plant), which was 59.86 per cent higher over MH 4. A probe to data presented in Figure 2 unveiled that the per cent contribution to total dry matter at 60 DAS towards stem was more followed by leaves and root. Among genotypes the maximum dry matter in leaves (37.13 %) was found in MH 4, while in stem (44.27 %) and root (13.09) was found in HNG 69 and in pod (12.19) was found in GNH 804. A disquisition to data given in Table 3 exhibited that dry matter accumulation in various plant parts at 90

Comment [A10]: in a completely randomized block arrangement

Comment [A11]: Write it down when viewing the results of the sulphur effect.

Comment [A12]: Except for the root, where significant variation was recorded. See Table 1.

Comment [A13]: Please check all total values in all tables.

Comment [A14]: Please list the plant parts from bottom to top (Root - Stem - Leaves)

DAS of groundnut was significantly affected by genotypes. Amongst genotypes, significantly higher dry matter accumulation in leaves (16.60 g/plant), stem (16.72 g/plant), root (3.95 g/plant) and pod (8.59 g/plant) were recorded with GNH 804 which were 41.15, 45.89, 36.20 and 60.60 percent higher over MH 4, respectively but dry matter accumulation in leaves and pods were statistically at par with HNG 69. The higher values for total dry matter accumulation at 90 DAS were recorded in GNH 804 (46.06 g/plant) which was 31.81 per cent higher over MH 4. An inquisition to data showed in Figure 3 strutted that the maximum per cent contribution to total dry matter at 90 DAS was towards leaves and followed by stem. Among genotypes maximum dry matter in leaves (37.63 %) and stem (36.77), root (8.55) was found in MH 4. while in pod (19.83 %) was found in HNG 10. A delve to data exhibited in Table 4 revealed that the total dry matter per plant was increased significantly with genotype variation. At the time of maturity, GNH 804 resulted in significantly higher dry matter accumulation in leaves (15.38 g/plant), stem (17.44 g/plant), root (1.75 g/plant) and pod (19.05 g/plant). The lowest dry matter in leaves (10.33 g/plant), stem (13.08g/plant), root (0.60g/plant) and pods (10.92 g/plant) were recorded with MH 4. It was also clear from data that at the time of maturity groundnut genotype GNH 804 accumulated significantly higher total dry matter per plant (57.52 g/plant) as compared to other genotypes. A perusal of data in Figure 4 depicted that the per cent contribution to total dry matter at maturity was more in pod followed by stem, leaves and root. Per cent contribution in various plant parts of groundnut at maturity was significantly influenced by genotypes. The per cent contribution to total dry matter towards leaves was significantly higher in HNG 10 (26.91%) followed by HNG 69 (26.90 %). The per cent contribution to total dry matter towards stem was significantly higher in MH 4 (33.43 %) followed by HNG 10 (31.50 %). Significantly higher per cent contribution to total dry matter was accumulated in root (3.03 %) when GNH 804 genotype crop was grown followed by HNG 69. While, the per cent contribution to total dry matter towards pods was higher in GNH 804 (39.90%) followed by HNG 69 (39.45%) during the experiment. The yield of groundnut genotypes differs mainly because of differences in their ability to develop the reproductive sink rather than differences in their leaf area or crop growth rate (Source). The peg production and pod formation are influenced differently by assimilate supply, the pegs may be initiated even when the plant does not have the assimilate status necessary to initiate pods on these pegs, however, once more pegs are initiated the assimilate supply is inadequate for the full achievement of reproductive growth potential which results in fewer and smaller kernels in each pod. The growth of groundnut fruit was influenced by the time of initiation relative to the changes in assimilates supply of the crop. The pod initiated at a time when there is apparently no limitation to assimilate supply in plant had a larger growth rate than those initiated later when the reproduction sink was most active. The preponderant effect of genotypic variation on various growth of groundnut due to increased utilization of carbohydrates for protein synthesis and physiological capacity to translocate them to organ of vegetative growth, resulting in increased growth characteristics. Dry matter accumulation per plant showed an increasing trend up to maturity in different genotypes. It might be due to high leaf area index of varieties to produce more dry matter. ~~Reason of high LAI is the genetic makeup of groundnut plants~~. Similar results have been reported by (Kalaiyarasan *et al*. 2019; Nurezannat *et al*. 2019; Manaf *et al*. 2017).

Comment [A15]: This study does not include LAI attribute.

Effect of sulphur levels on dry matter, partitioning and percent contribution of plant parts:

A perusal of data presented in Table 1 showed non significant variation was recorded among sulphur levels regarding dry matter accumulation in various plant parts depicted that among sulphur levels higher dry matter accumulation at 30 DAS in various plant parts leaves (1.12 g/plant), stem (0.60 g/plant) and root (0.71 g/plant) were recorded with 60 kg/ha sulphur level, which were, 21.73, 17.64 and 31.48 percent higher over control, respectively. Numerically, higher values for total dry matter accumulation at 30 DAS were recorded in sulphur level 60 kg/ha followed by 40 kg/ha. An inquisition to data showed in Figure 1 strutted that among sulphur level, the maximum per cent contribution to dry matter in leaves was accumulated by control (47.48%) followed by 20 kg S/ha (46.61 %), while in stem was accumulated by 40 kg S/ha (30.29 %) followed by 60 kg S/ha (29.56 %) and in roots was accumulated by control (26.51 %) followed by 20 kg S/ha (24.81 %). A delve to data given in Table 2 presented that sulphur levels also affected dry matter accumulation significantly in different plant parts at 60 DAS. Significantly higher dry matter accumulation in leaves (7.16 g/plant), stem (9.36 g/plant), root (2.73 g/plant) and pod (2.57 g/plant) were recorded in 60 kg S/ha sulphur level, which were 26.31, 16.66 and 55.75 percent higher over control, respectively. Significantly higher total dry matter accumulation was recorded in 60 kg S/ha (22.41 g/plant) compared to all other levels. A delve to data exhibited in Figure 2 revealed that among the sulphur levels, the maximum per cent contribution to total dry matter in leaves was accumulated by 40 kg S/ha (33.91 %), in stem and root was accumulated by control (44.31 %) and (14.08 %), respectively, in pods was accumulated by 60 kg S/ha (11.27%). However, the minimum per cent contribution to dry matter in leaves (32.17 %) and pod (9.43 %) was accumulated by control while the minimum contribution of stem (42.63%) and root (12.17%) was recorded with 40 kg S/ha. A probe to data presented in Table 3 unveiled that sulphur levels also affected dry matter accumulation significantly in different plant parts. Significantly higher dry matter accumulation in leaves (16.12 g/plant), stem (15.57 g/plant), root (3.71 g/plant) and pod (8.25 g/plant) were recorded in 60 kg S/ha level which were 21.611, 14.90, 13.80 and 22.58 per cent higher over control, respectively. Significantly higher total dry matter accumulation was recorded in 60 kg S/ha (43.42 g/plant), which was 18.60 per cent higher over control. A perusal of data presented in Figure 3 depicted that among sulphur level, maximum per cent contribution to total dry matter in leaves was accumulated by 60 kg S/ha (37.17%) followed by 40 kg S/ha (37.15 %), in stem was accumulated by control (37.08 %) followed by 20 kg S/ha (36.28 %), in pod was accumulated by 60 S/ha (18.93 %) followed by 40 kg S/ha (18.80 %) and in root was accumulated by control (8.35 %) followed by 20 kg S/ha (8.07 %). A probe to data presented in Table 4 revealed that sulphur levels

Comment [A16]: Except for the root, where significant variation was recorded. See Table 1.

Comment [A17]: Differences between sulphur levels are not significant for stem and leaves. See Table 1.

60 kg/ha produced higher dry matter accumulation in leaves (14.40 g/plant), stem (16.50 g/plant), root (1.49 g/plant) and in pod (17.20 g/plant) which were statistically similar with 40 kg S/ha. Sulphur level 60 kg/ha was found significantly superior in terms of total dry matter accumulation per plant (53.68g/plant) at maturity, which was at par with 40 kg S/ha (52.61g/plant). A delve to data given in Figure 4 presented that among the sulphur levels the maximum per cent contribution to total dry matter in leaves (26.92 %), pod (39.57%) and root (2.71 %) was recorded in 60 kg S /ha, in stem (32.29 %) was recorded by 60 kg S/ha. However, the minimum per cent contribution to total dry matter in leaves (26.13 %) and root (2.17 %) was accumulated by control, in stem (30.91 %) was accumulated by 60 kg S /ha and in pod (39.06%) accumulated by 40 kg S/ha. The growth at higher level of sulphur might be because sulphur plays a crucial role in many physiological and biochemical processes that are essential for plant development, and its application to deficient soil can promote overall growth. Sulphur is associated with the improvement of sulphur containing amino acids and vitamins, which play a direct role in the vegetative and reproductive parts of plants. Improved growth due to sulphur fertilizer, in combination with higher photosynthesis on one hand and greater mobilization of photosynthates towards reproductive structures on the other, may have contributed to a large rise in groundnut yield parameters. Sink strength is reflected in its higher demand for photosynthates and sufficient supply of sulphur also aids in the development of floral primordial or reproductive parts, which might have resulted in the development of pods and kernels in plants. The distribution of available photosynthate to reproductive components could be improved by selecting for more determinate types that cease stem growth as soon as the kernels start growing, and which have the capacity for growth in the kernel to use all the assimilate produced during the reproductive phase. For high yield peak kernel growth had to occur while leaf area was adequate to achieve the full potential of the kernel sink. It has been observed that the yield continues to increase because of continued pod setting, even though assimilate (source) shortage are likely. Thus, in groundnut, it can be concluded that both source and sink are limiting factors depending upon the varieties, but in most cases the source is adequate and only sink is the limiting factor. Stimulation of photosynthesis of a large sink and the utilization of materials accumulated in vegetative structures could contribute to increasing the yield of groundnut. Similar results have been reported by (Kamal *et al*. 2024a; Kamal *et al*. 2024b).

CONCLUSION

The results of the present study revealed that genotypes and sulphur application significantly improved the dry matter accumulation and biomass partitioning in groundnut. Among genotypes GNH 804 resulted in significantly higher total plant biomass and its partitioning into different plant parts *viz*, leaves, stem, root and pod at different growth stages in groundnut followed by HNG 69. So, to obtain higher total dry matter accumulation and its partitioning, the genotype GNH 804 may be fertilized with 40 kg S/ha. Among sulphur levels, 60 kg S/ha recorded higher dry matter accumulation closely followed by sulphur level 40 kg S/ha. So, to obtain higher total dry matter accumulation and its partitioning, the genotype GNH 804 may be fertilized with 40 kg S/ha.

Table: 1. Effect of groundnut genotypes and sulphur levels on dry matter accumulation (g/ plant) in various plant parts at 30 DAS ~~of groundnut genotypes~~

Treatment	Dry matter accumulation (g) in various plant parts at 30 DAS			
	Leaves	Stem	Root	T
Genotypes				
MH 4	0.69	0.39	0.34	1.42~~1~~
HNG 10	1.09	0.56	0.65	2.30~~1~~
HNG 69	1.21	0.63	0.79	2.63
GNH 804	1.23	0.66	0.84	2.73
SEm ±	0.09	0.05	0.01	0.09
CD at 5%	**0.33**	**0.17**	**0.03**	**0.03**
Sulphur levels (kg S /ha)				
Control	0.92	0.51	0.54	~~2.01~~1.97
20	1.05	0.55	0.65	2.25~~6~~
40	1.10	0.58	0.71	2.39~~6~~
60	1.12	0.60	0.71	2.43~~4~~
SEm ±	0.07	0.04	0.01	0.08
CD at 5%	**NS**	**NS**	**0.035**	**0.25**

Comment [A18]: Please follow the following sequence: Root Stem Leaves

Table 2. Effect of groundnut genotypes and sulphur levels on dry matter accumulation (g/plant) in various plant parts at 60 DAS ~~of groundnut genotypes~~

Treatment	Dry matter accumulation (g) in various plant parts at 60 DAS				
	Leaves	Stem	Root	Pod	T
Genotypes					
MH 4	5.36	6.08	1.80	1.16	14.40~~95~~
HNG 10	6.54	8.38	2.52	2.14	~~20.24~~19.58
HNG 69	6.66	9.67	2.85	2.66	~~22.50~~21.84
GNH 804	7.23	10.32	3.01	2.86	23.42~~90~~
SEm ±	0.04	0.04	0.03	0.01	0.08
CD at 5%	**0.13**	**0.13**	**0.11**	**0.03**	**0.27**
Sulphur levels (kg S /ha)					
Control	5.26	7.41	2.34	1.65	~~17.27~~16.66
20	6.36	8.56	2.51	2.15	~~20.19~~19.58
40	7.01	9.11	2.60	2.45	21.17~~79~~
60	7.16	9.36	2.73	2.57	~~22.41~~21.82
SEm ±	0.03	0.06	0.03	0.02	0.05
CD at 5%	**0.09**	**0.17**	**0.09**	**0.05**	**0.15**

Comment [A19]: Please follow the following sequence: Root Stem Leaves

Table: 3. Effect of groundnut genotypes and sulphur levels on dry matter accumulation (g/plant) in various plant parts at 90 DAS ~~of groundnut genotypes~~

Treatment	Dry matter accumulation (g) in various plant parts at 90 DAS				
	Leaves	Stem	Root	Pod	T
Genotypes					
MH 4	11.76	11.46	2.90	5.33	31.45~~22~~
HNG 10	15.21	14.78	3.51	8.23	41.73~~48~~
HNG 69	16.71	16.33	3.82	8.52	45.38~~13~~
GNH 804	16.60	16.72	3.95	8.59	45.86~~60~~
SEm ±	0.09	0.06	0.02	0.05	0.12
CD at 5%	**0.31**	**0.22**	**0.07**	**0.19**	**0.38**
Sulphur levels (kg S /ha)					
Control	13.28	13.55	3.26	6.73	36.82~~61~~
20	15.09	14.80	3.54	7.63	~~40.81~~41.06
40	15.79	15.36	3.67	8.04	42.86~~58~~
60	16.12	15.57	3.71	8.25	43.65~~42~~
SEm ±	0.09	0.14	0.03	0.06	0.21
CD at 5%	**0.28**	**0.41**	**0.09**	**0.18**	**0.63**

Comment [A20]: Please follow the following sequence: Root Stem Leaves

Table: 4. Effect of groundnut genotypes sulphur levels on dry matter accumulation (g/plant) in various plant parts at maturity ~~of groundnut genotypes~~

Treatment	Dry matter accumulation (g) in various plant parts at maturity				
	Leaves	Stem	Root	Pod	T
Genotypes					
MH 4	10.33	13.08	0.60	10.92	~~39.21~~34.93
HNG 10	13.65	15.96	1.31	15.05	~~50.69~~45.97
HNG 69	14.75	16.83	1.62	17.74	~~54.85~~50.94
GNH 804	15.38	17.44	1.75	19.05	~~57.52~~53.62
SEm ±	0.22	0.21	0.02	0.19	0.29
CD at 5%	**0.78**	**0.76**	**0.06**	**0.66**	**1.03**
Sulphur levels (kg S /ha)					
Control	11.95	14.56	1.63	13.44	~~45.44~~41.58
20	13.60	15.82	1.32	15.66	~~50.55~~46.40
40	14.16	16.42	1.44	16.45	~~52.61~~48.47
60	14.40	16.50	1.49	17.20	~~53.68~~49.59
SEm ±	0.23	0.18	0.03	0.17	0.30
CD at 5%	**0.67**	**0.53**	**0.09**	**0.50**	**0.89**

Comment [A21]: Please follow the following sequence: Root Stem Leaves

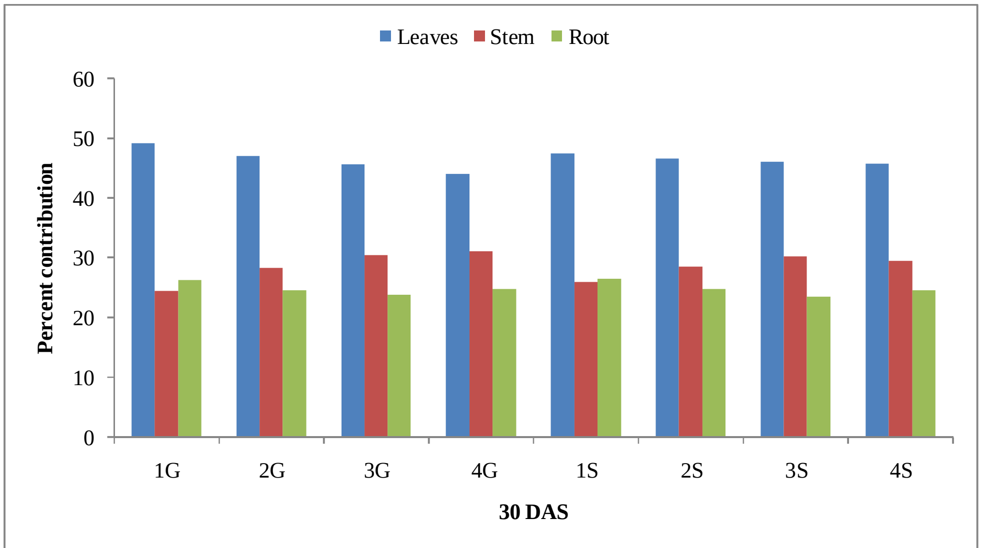

Figure 1: Effect of groundnut genotypes and sulphur levels on per cent contribution in various plant parts at 30 DAS ~~of groundnut genotypes~~

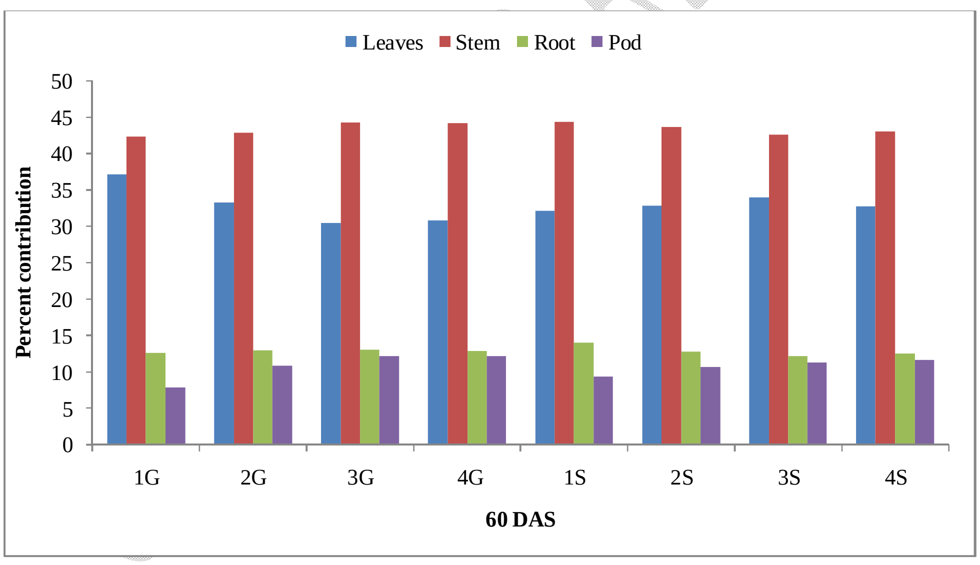

Figure 2: Effect of groundnut genotypes and sulphur levels on per cent contribution in various plant parts at 60 DAS ~~of groundnut genotypes~~

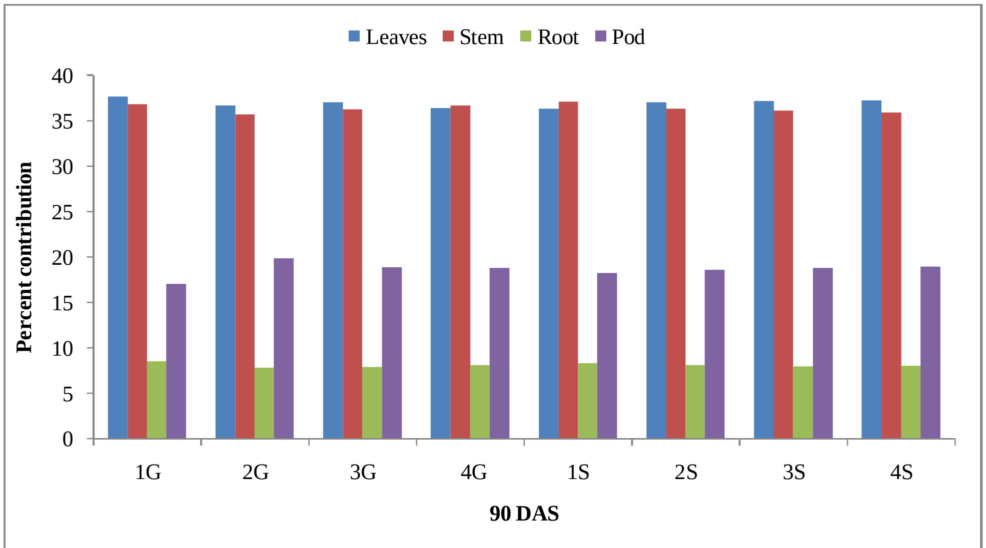

Figure 3: Effect of groundnut genotypes and sulphur levels on per cent contribution in various plant parts at 90 DAS of ~~groundnut genotypes~~

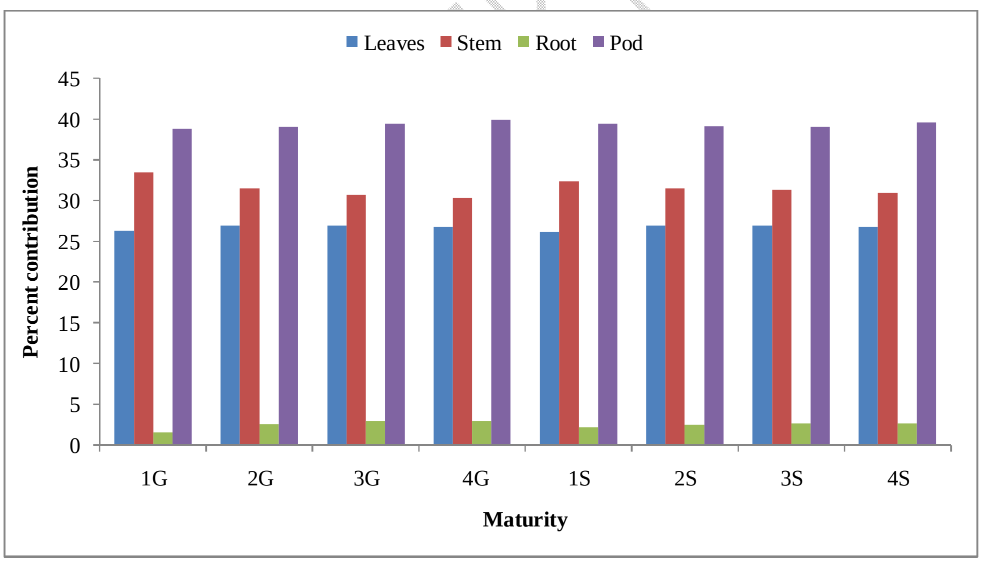

Figure 4: Effect of groundnut genotypes and sulphur levels on per cent contribution in various plant parts at- maturity ~~of groundnut genotypes~~

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