Madras Agric. J., 83(10): 640-642 October 1996
https://doi.org/10.29321/MAJ.10.A01072

SEASONAL INFLUENCE ON THE RESPONSE OF SUNFLOWER TO SULPHUR AND MAGNESIUM APPLICATIONS

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ABSTRACT

Field experiments conducted during *kharif* 1992, summer and *rabi* 1993 at Agricultural Research Station, Bhavanisagar with 4 levels of sulphur (0, 15, 30 and 45 kg ha^{-1}) and 4 levels of magnesium (0, 15, 30 and 45 kg ha^{-1}) showed that sulphur fertilization at 45 kg ha^{-1} increased the seed yield of sunflower significantly over control by 6.2 per cent in summer, 9.1 per cent in *rabi* and 14.5 per cent in *kharif*. The effect was more pronounced in *kharif* grown crop followed by *rabi* and summer. Added Mg failed to exert any influence. Similar influence was observed in stalk yield also. But in terms of percentage, the responses were 46.0, 32.4 and 5.1 per cent over control during *kharif*, *rabi*, and summer, respectively. Due to sulphur application at 45 kg ha^{-1} the oil yield was increased by 17.1 per cent in *rabi* followed by *kharif* (11.5 per cent) and summer (9.5 per cent).

KEY WORDS: Sunflower, Seasons, Response, Sulphur, Magnesium

Sunflower (*Helianthus annuus* L.) crop can be grown successfully in all three major seasons (*kharif*, *rabi* and summer) in India under wide range of agro-climatic conditions (Singh, 1972). However, significant variations in seed filling, seed and oil yields on sunflower were observed in different seasons by Kushwaha and Sharma (1973). Premsekar (1973) obtained higher seed yield only in summer. But Varisai Mohamed and Sivasubramaniam (1973) reported higher yields during *kharif*. The oil content ranged from 30 per cent in wet to 40 per cent in dry seasons (Ghosh and Chatterjee, 1975). It is, thus, observed that yield responses of sunflower grown in different seasons seems to depend on the regional climatic pattern. Present study, was, therefore, aimed at the yield potential of sunflower crop grown in all the three seasons in an Alfisol of the Bhavanisagar ayacut area of Tamil Nadu for enabling the transfer of research results to other similar areas of Lower Bhavani Project area.

MATERIALS AND METHODS

Field trials were laid out at Agricultural Research Station, Bhavanisagar, Tamil Nadu. The mean annual rainfall was 685 mm. The mean maximum and minimum temperatures were 32.5°C and 21.5°C, respectively. The relative humidity ranged from 40 to 89 per cent. The average monthly evaporation ranged from 124 to 409 mm with a mean of 235 mm while sunshine ranged from 5.2 to 9.3 hours per day. The soil of the experimental area was developed from sedimentary rocks of varying compositions. It is an Alfisol and belongs to Irugur soil series. It is sandy loam in texture, neutral in reaction (pH 7.2) and low in electrical conductivity (0.2 dSm^{-1}). The soil was poor in organic carbon (0.2%), low in available N (193 kg ha^{-1}), medium in available P (14.2 kg ha^{-1}), high in K (295 kg ha^{-1}), medium in available P (14.2 kg ha^{-1}), high in K (295 kg ha^{-1}), medium in Mg (16 kg ha^{-1}) and low in available S (18 kg ha^{-1}). A total of 915.1 mm rainfall was received during 55 rainy dyas, of which the months of November and December were completely dry. A rainfall of 606.8 mm was received during the first crop (*kharif* 92), 80.1 mm during the second crop (summer '93) and 115.2 mm during the third crop (*rabi* '93)

The experiment was laid out in fields in all the seasons in a factiorial randomised block design in plots of 5 x 3 m. The treatments replicated thrice comprised of 4 levels of sulpur and 4 levels of magnesium as detailed aready (Krishnamurthi and Mathan, 1996)

At maturity, the yields of seed and stalks were recorded. The seed samples were dried to 10% moisture levels and oil was extracted by using Hexane (B.P.75-80°C) and oil content was determined (AOAC, 1970). Form these values, the oil yield was computed.

Table 1. **Seasonal influence on the response of sunflower to sulphur and magnesium application**

	Sulphur (kg ha^{-1})				CD (P=0.05)	Magnesium (kg ha^{-1})				CD (P=0.05)
	0	15	30	45		0	15	30	45	
Seed yield (kg ha^{-1})										
Rabi	1378	1411	1456	1506	59	1417	1428	1450	1456	NS
Summer	1433	1456	1495	1522	43	1467	1472	1478	1489	NS
Kharif	1233	1283	1350	1417	60	1295	1311	1311	1367	60
Stalk yield (kg ha^{-1})										
Rabi	1778	1972	2139	2361	282	1806	2083	2167	2195	282
Summer	2149	2168	2201	2257	60	2919	2187	2219	2161	60
Kharif	1583	1806	2111	2319	211	1861	1945	1972	2042	NS
Oil Content (%)										
Rabi	36.6	36.9	37.0	37.3	3.30	36.8	36.9	36.9	37.0	NS
Summer	36.7	36.8	37.0	37.4	0.23	36.9	36.9	37.0	37.0	NS
Kharif	36.8	37.3	37.5	37.6	0.30	37.3	37.3	37.4	37.4	NS
Oil yield (kg ha^{-1})										
Rabi	452	472	499	529	22	478	484	484	506	NS
Summer	528	541	560	572	17	545	549	566	554	NS
Kharif	503	520	537	561	23	521	527	536	538	NS

NS : Not Significant

RESULTS AND DISCUSSION

Sunflower responded to S application. The highest yield was obtained by application of 45 kg S ha^{-1} (S_3); the yield increase being 9.3 per cent over control during *rabi*, 6.2 per cent during summer and 14.9 per cent during *kharif* (Table 1) In *rabi*, yield at S_3 was significantly higher than S_2 and S_1 which were on par with each other. The lowest seed yield was recorded in S_0 (1378 kg ha^{-1}) which was on par with S_1 and was significantly lower than other. In summer, the yield at S_3 and S_2 were on par but were significantly higher than S_0. In *kharif*, the seed yield at S_3 was the highest while the yield at S_2 was significantly higher than S_1 and S_0 which were on par with each other.

Among the three seasons, summer crop recorded comparatively higher sunflower seed yield. The increased yield in summer crop might probabaly by due to higher intensity of bee activity when the temperature would be optimum (Deshmukh, 1977)

Mg fertilization did not significantly influence [illegible] (1962), working on red soils of Tamil Nadu, did not obtain much yield response to applied Mg in *ragi* as the soils were rich in native Mg content.

The highest stalk yield was recorded in S_3 in all the three seasons, which was significantly higher than those of S_1. Increased dry matter yield due to level of S application was mainly because of the stimulatory effect of applied S on the synthesis of chloroplast and protein, which in turn promoted greater photosynthesis ultimately resulting in higher stover yield. In *rabi*, the effect of Mg at Mg_3 (2195 kg na^{-1}) was significantly higher than at Mg_0 (1806 kg ha^{-1}), which was on par with Mg_2 and Mg_1. In summer and *kharif*, the effects of Mg fertilization on stalks yield were not significant. The interaction effect was also found not significant. Profused vegetative growth of sunflower in *rabi*, mainly because of continuous rains, resulted in higher stalk yield.

The highest oil contents of 37.3, 37.4 and 37.6 per cent during *rabi*, summer and *kharif*, respectively, were recorded at S_3 level which was on par with S_2 during *rabi* and *kharif* seasons but was significantly higher than the content recorded

during summer. The percentage increase in oil contents over control were 6.15, 4.05 and 5.66 in *rabi*, summer and *kharif* respectively.

The oil content and oil yield of sunflower did not vary much due to application of different levels of Mg in all the three seasons. The cost benefit ratio was worked out and was found to be 13.42, 7.21 and 9.83 rupees per rupee invested for *rabi*, summer and *kharif* seasons, respectively. Thus, it is clear that S is an important key input in augmenting the yield of sunflower grown on Arfisol.

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(Received : July 1995 Revised : September 1995

Madras Agric J., 83(10): 642-643 October 1996

INHERITANCE OF FLOWER COLOUR AND PETAL SHAPE IN BLUE PEA

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ABSTRACT

Clitoria ternatea Linn is a hardy pasture legume. It bears typical clitorious flowers which are either blue or white. However, during a plant survey, a plant type with all the five petals which are broad was identified. The inheritance of the broad shaped petals and their colour was studied and it was found to segregate in a typical dihybrid ratio of 9:3:3:1. Test cross of the F_1 with the double recessive also confirmed the above results.

KEY WORDS : Blue pea, *Clitoria ternatea*, Flower Colour, Petal shape

The *sangupu* or blue pea *Clitoria ternatea* Linn. is a commonly occurring twiner in South India. Apart from its use in medicine and religious rituals, it is also a good leguminous fodder crop for the pastures. The plant bears a typical clitorious flower with a broad standard petal and small wings and keel petals situated at the neck of the standard petal. Two flower colours are normally seen *ie.* blue and white The literature on *clitoria* is very meagre Srinivasan (1962) reported on some floral abnormality in this species. The present study is a first report on the genetics of floral characters in *Clitoria*.

MATERIALS AND METHODS

A few years back, a new flower type was observed in a plant during out plant collection survey. The flower was blue in colour but, unlike the typical flower, the wing and keel patals were broad, comparable in size to the standard. It was found to breed true. To study the inheritance pattern of this flower shape, crosses were effected during *kharif* '92 between the normal petaled white flower as female and the broad petaled blue flower as male.

All the F_1 plants were broad and blue petaled. The F_1s were selfed and seed collected. The F_2