



## Evaluation of potential runner type groundnut variety for its suitability during summer cultivation

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### ABSTRACT

Production of summer groundnut is one of promising area for Bihar where only rainy season groundnut cultivation is predominant. Promising groundnut genotype (EC 7773735) is introduced from USA, a runner type variety. It was evaluated during 2014 for its summer cultivation suitability. It was recorded that days to germination was taken 07 days, similarly days to 50% flowering range in between 45-62 with mean value of 53 days. Number of seed per pod was recorded 2.7. The average pod productivity was ranged in between 2984-3472 kg /ha. Crop was planted on 20 March, 2014 and was harvested on 12 July, 2014. It matures mature in 112 days. The crop was found free from major disease and insect pests. It require 2310-2420 heat unit (0C days) to complete their life cycle in Indian condition.

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India is the world leader in production, consumption and import as well in case of vegetable oils. India imports 9.2 Mt of vegetable oils during 2010-11. Currently India is in the mid-way of self-sustaining in oilseeds production. By the 2050, India as a whole will be able to sustain their production. Indian will produced plenty with respect the non-food commodity i.e. oilseeds. India may emerged as net exporter from being net importer for century the with respect to oilseed (Singh *et al.*, 2013). Vegetable oil seeds are s second most important commodity after cereal in terms of area production and in economic term (Dhedhi *et al.*, 2007). Considering the socio-political situation and poor land to man ratio in eastern region the likelihood for oilseeds is not at all in bad shape (Singh *et al.*, 2014). Inclusion of soybean and summer groundnut sesamum as oilseeds crop, cropping system approach especially intercropping are one of few options for horizontal expansion coupled with several technologies niche (Singh *et al.*, 2012) for vertical acceleration of production and productivity. Ground nut is an important oilseed food legume. Keeping in view above fact groundnut (*Arachis hypogaea* L) production is keys to vegetable oil sustainability and agricultural import dependability, being native of South America, it was first cultivated in Mysore state around 1800 AD. Presently groundnut is being cultivating mainly dry and intermediate states of India. It contains 44-50% vegetable oil and 26-28%

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protein, and is a rich source of dietary fiber, minerals and vitamins. There calorific value is 394 /100g (Anonymous, 2006). Ground nut is mainly cultivated in the developing world (Asia and Africa) as its area (97%) and production (94%) developing countries. As of now it is being cultivated in 120 countries. India is largest producer of groundnut with 5.52 Mha area and 6.11 Mt production with an average of 1105kg/ha (DGR, 2013). It is a self-pollinated, allotetraploid (2n=4x=40) with a genome size of 2891 Megabase pare. A megabase pair (Mbp) is a unit of length of nucleic acids, equal to one million base pairs or to one thousand kilobase pairs. Groundnut is crop, which accounted for 43% of total area under oilseed crops and 60 percent of total oilseeds production. In general this part of country groundnut is major crop *Kharif* seasons, but huge potential is lies in the spring/ summer season too with improve productivity. Since there is dearth of suitable varieties for spring/ summer cultivation, an introduction EC 7773735 from USA has been evaluated at main campus of this institute during spring season to test it suitability under Indo Gangetic Plain condition.

To evaluate the suitability of groundnut genotype (EC 7773735), field evaluation was conducted at ICAR Research Complex for Eastern Region Patna during 2014 in complete randomized block design (CRD) and replicated thrice (Fig. 1). The experimental plot size was 5.0 m X 4.0 m. The surface soil up to 30 cm depth were sampled and collected from the experimental field,



Fig. 1: Performance of ground nut during summer 2014 under Patna condition

air dried, mixed and passed through 2mm sieves and analyzed for various physical and chemical prosperities. Physical and chemical parameter of soils were recorded with reference to pH, EC (dS/m), OC (%), available P(ppm) and exchangeable K(ppp) before sowing and after harvest crop. The soil samples were analyzed as per the procedure described by AOAC (1999). The texture of soil of experimental field was silty clay loam with mean pH value of 6.8. Other parameters viz., electrical conductivity (1:2 soils: water solution) 0.16 dS/m organic carbon 0.68 %, available phosphorus 14.6ppp, exchangeable potassium 92.8ppm, sulphur 4.2ppp and zinc 0.38ppp were recorded. Seedbed with medium tilth for was prepared for sowing. Sowing of groundnut was performed on 20<sup>th</sup> March, 2014. Seeds were sown at 3 cm depth at 30 cm row distance. Nutrients particularly, nitrogen, phosphorus, potassium and sulphur were applied as basal dose as well as other agronomic management practice was as per recommended practices and was kept similar for

all the plots. One hand weeding after three weeks of sowing was performed to maintain optimum plant population. Three watering was done at grand growth phase, flowering and pegging stage. No plant protection measures were exercise due to on incidence of insect's pest and disease were seen during whole crop period. At harvest five representative samples of each plot were collected and biometrical data were recorded and computed for plant height (cm), productive branch/plant, pod/plant, seed yield (g/plant). Similarly 100 seed weight (g) were also computed. Biomass (kg/ ha) and seed yield (kg/ ha) were computed based on seed weight per plot and computed for ha.

Cumulative heat units (HU) were determined by summing the daily mean temperature above base temperature and are expressed in °C day. This was calculated using the following formula:

$$\text{Heat Unit (}^{\circ}\text{C day)} = \sum_a^b \left( \frac{T_{\max.} + T_{\min.}}{2} - T_b \right)$$

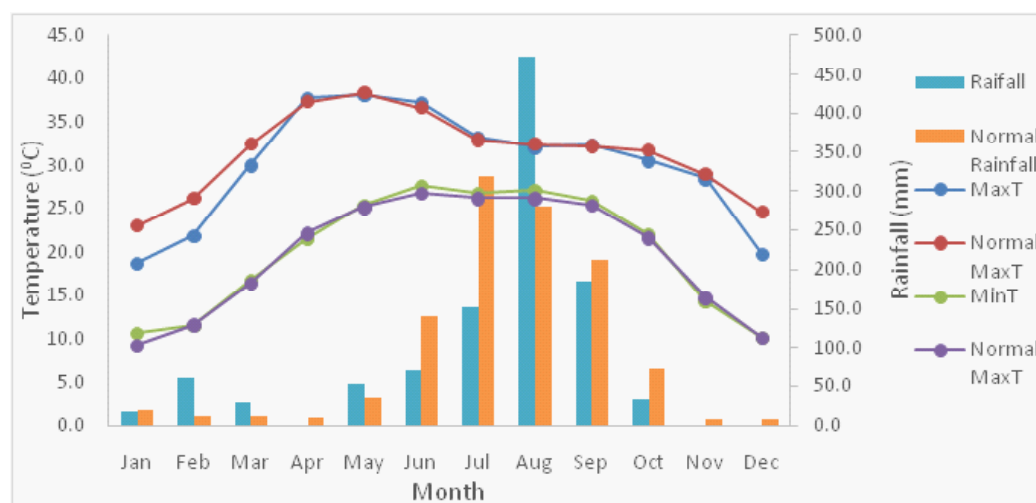
Where,

- a = Date of start of a phenophase
- b = Date of end of the phenophase
- T<sub>max.</sub> =Daily maximum temperature (°C)
- T<sub>min.</sub> =Daily minimum temperature (°C)
- T<sub>b</sub> = Minimum threshold/base temperature (10°C, WMO, 1996)

Regular analysis of variance was performed for each trait after testing error variance homogeneity was carried out according to the procedure outlined by Gomez and Gomez (1984), using the MSTATC version 2.1 (Michigan State University, USA) statistical package design. Significant differences between the treatments were compared with the critical difference at (± 5%) probability by LSD.

Weather during the period of experimentation was depicted in Fig. 2. It was noticed that the total annual precipitation received in 2014 was 1071.4 was little below normal and the year's rainfall was not deficient. The distribution of rainfall over time and intensity in the rainy season was erratic. The monsoon rainfall (June-September) was low (878.50 mm) as compared to normal (951.9 mm). The mean maximum temperature varied from 36.3°C in May to 19.7°C in January while the mean minimum temperature varied between 27.1°C in July to 7.7°C in January. The average relative humidity and sunshine hours for the year was 69.4% and 5.0 hours.

The genotype EC No 7773735 is introduction from USA is a runner type groundnut. The traits observed and recorded is summarized in the table 1, on an average



**Fig. 2: Monthly variation of temperature and rainfall during 2014 at Patna**

days to germination was taken 07 days, similarly days to 50% flowering range in between 45-62 with mean value of 53 days. Number of seed per pod was recorded 2.7. The average pod productivity was ranged in between 2984-3472 kg /ha.

Perusal of data presented in Table 2 it was notice that groundnut crop needed 85-123 heat unit ( $^{\circ}\text{C days}$ ), likewise for anthesis 525-698, similarly to complete their life cycle it require 2310-2420 heat unit ( $^{\circ}\text{C days}$ ).

**Table 1: Ground nut during performance during summer 2014 under Patna condition**

Particulars	Range
Days to germinate	5-10
Days to Anthesis	27-35
Days to 50 % Flowering	45-62
Runner (cm) at maturity	65- 91
Number of branching	31-46
Number of pods	74-125
Pod weight (g)	49-86
Above ground biomass (g/plant)	110-229
Root bio mass (g/plant)	8-14
Ground nut (g/plant)	88-159
Pod yield (kg/ha)	2984-3472
Seeds /pod	2-4
Shelling (%)	69-77

**Table 2: Heat unit and number of days needed to attain different phenophases in Groundnut crop**

Phenophases	DAS	Heat unit ( $^{\circ}\text{C days}$ )
Germination	5-7	85-123
Anthesis	27-35	525-698
50% Flowering	45-62	949-1308
Sowing to maturity	108-115	2310-2420

Lack of suitable agro-technique is the major bottle neck for summer ground nut production. Present study revealed that if farmers should guided for selection of suitable cultivar, production of summer groundnut may prove one of the promising area for Bihar where only rainy season groundnut cultivation is practiced. Promising groundnut genotype (EC 7773735, Ex. USA), a runner type variety, matures in 112 days with an average pod productivity of 2984-3472 kg /ha, is one of the cultivar which is in demand.

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### Citation

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