

Variation in reproductive efficiency and flowering behaviour of cultivated groundnut

R.K. Mathur^{1*}, P.K. Ghosh² and P. Manivel³

National Research Centre for Groundnut, ICAR, PO. Box-5, Ivnagar Road, JUNAGADH (GUJARAT) INDIA

ABSTRACT

The study was undertaken to understand the reproductive efficiency and flowering behaviour of different forms of cultivated groundnut, and to know the extent and scope of conversion of flowers into pegs, pods and kernels. The genotypes included in the experiment were taken two from each habit group. VL genotypes possessed high reproductive efficiency followed by SP in converting maximum flowers into pods. The correlation study indicated that flowers produced up to 50 DAS had good association with mature pod number and should be given due attention to select high yielding genotype with more proportion of mature pods. Relative humidity recorded at 2 PM had impact on flower production. Maximum temperature was negatively correlated with flowers for all the genotypes of VL and SP but it was positive with Virginia types except Somnath. Association of rainfall with flowers was mostly negative. The stepwise regression analysis revealed importance of the low temperature on the flower production in both rainy and summer seasons. The Virginia runner genotypes were sensitive to rainfall. In summer season no significant effect of relative humidity on flower production was observed. Gangapuri was found sensitive to duration of sunshine hours. Impact of weather parameters on flower production was not found in the both Valencia genotypes and Somnath, but minimum temperature had significant effect in other genotypes.

Key words: Groundnut, Reproductive efficiency, Flowering pattern, Multiple regression, Weather parameters.

INTRODUCTION

Groundnut (*Arachis hypogaea* L.) is an autogamous and indeterminate legume crop. There is generally a big gap between the number of flowers produced and the number of mature pods formed from them (reproductive efficiency). The reproductive efficiency, defined as the percentage of viable reproductive tissues (Pattee and Young, 1992), in groundnut is assessed by flowers, pegs, mature pods, immature pods, sound kernels and unsound kernels (Coffelt *et al.*, 1989). Less than 10 per cent of the flowers produced develop into mature pods (Othman 1979; Lim *et al.*, 1980). There are four varietal forms of groundnut cultivated in India *viz.*, Valencia (ssp. *fastigiata* var. *fastigiata*), Spanish bunch (ssp. *fastigiata* var. *vulgaris*), and Virginia bunch and Virginia runner (ssp. *hypogaea* var. *hypogaea*). Maturity differences between groundnut genotypes belonging to different varietal forms have been observed (Chunilal *et al.*, 1997; Ghosh *et al.*, 1997). The systematic study on flowering behaviour and reproductive efficiency of genotypes belonging to different varietal forms in groundnut is meagre. With this view, the present investigation was undertaken (i) to understand the reproductive efficiency and flowering behaviour of different forms of cultivated groundnut, and (ii) to know the extent and scope of conversion of flowers into pegs, pods and kernels.

MATERIALS AND METHODS

The experimental material included eight genotypes belonging to four-habit groups of groundnut *viz.*, Gangapuri and MH 2 (Valencia type), JL 24 and GG 2 (Spanish bunch

type), Kadiri 3 and BG 1 (Virginia bunch type) and Somnath and GAUG 10 (Virginia runner type). The experiment was conducted in completely randomized design with three replications during two rainy and two post-rainy seasons at the National Research Centre for Groundnut, Junagadh, Gujarat. In each replication three pots were maintained. Five plants were maintained in each pot keeping Optimum plant-to-plant distances. Hoagland's nutrient solution (Hewitt, 1966) was applied to each pot at 15 days' interval starting from the 10th day and was continued up to 40 DAS. The number of flowers opened between 0900 to 0930 hours each morning was recorded on the main axis, primary and secondary branches separately from date of initiation of flowers till 80 days after emergence (DAE). The data on total number of flowers produced by each genotype were used to calculate the days taken to complete 25%, 50% and 75% flowering. Contributions of main axis, primary and secondary branches to the total flowers and pods were calculated and expressed in percentage. Mature pods were separated from immature pods, which were identified by their shriveled seeds. The plants and pods were oven dried at 65±5°C for 48 hours and their weights were recorded in grams. The pegs that had penetrated the soil surface, turned horizontally and elongated to at least 1cm were classified as immature pods. Hanging pegs were those that could not be classified as immature pods. The total numbers of mature pods, total pods per plant, total pegs per plant and pod yield per plant were counted, weighed and used to compute the reproductive efficiency (RE) indices using the following formulae outlined by Coffelt *et al.*, (1989).

$$RE = \frac{\text{Pod yield}}{\text{Total biomass}} \times 100$$

* Author for correspondence. Present Address :

¹ NRC for Oil Palm, Pedavegi (A.P.)

² Indian Institute for Soil Science, Bhopal (M.P.)

³ Central Potato Research Institute, Shimla (H.P.)