Agri. Res. J. *Kerala*, 1975, 13 (2) 113—116

EFFECT OF PHOSPHORUS AND MOLYBDENUM ON FLOWERING AND PODFORMATION IN GROUNDNUT CO POL-1*

A. MURALIDHARAN, C. M. GEORGE and N. SADANANDAN

College of Agriculture Vellayani, Kerala

Early reproductive developments in groundnut plants having higher concentration of phosphorus have been reported by Nicholoides and Cox (1970). They also observed the lowest number of days until flowering and the maximum number of pegs formed with an increase in the level of phosphorus application. Previous workers also reported beneficial effect of phosphorus on flowering, peg formation and pod development (Bledsoe and Harris, 1950; Gopalakrishnan and Nagarajan, 1958; Ried and York 1958; Sathyanarayana and Rao, 1962; Banerjee *et al* 1967; Puntamkumar and Bathkal, 1967). Haris (1949) observed a reduction in the number of gynophores and percentage of gynophores producing mature pods in a molybdenum deficient medium. Such informations are however scanty in Kerala especially with the newly released high yielding bunch variety of groundnut POL-1. Hence the present studies were undertaken at the Agricultural College Vellayani to find out the effect of phosphorus and molybdenum on flowering, peg formation and p,>d development in groundnut variety POL-1.

Materials and Methods

The experiment was laid out in R. B. D. with 4 replications on the red-loam soil of the Agricultural College Farm, analysing 0.002% available P_2O_5, traces of molybdenum and a pH of 5.3 The treatments consisted 12 factorial combinations of 4 levels of P_2O_5 (25, 50, 75 and 100 kg/ha) and 3 levels of molybdenum (0, 1 and 2 kg sodium molybdate/ha). A uniform application of cattle manure @ 10 tons/ha and lime @ 750 kg/ha was made 2 weeks before sowing. N and K_2O were kept constant @ 10 and 50 kg/ha respectively and applied prior to showing along with the concerned doses of phosphorus. Planting was done on 2-11-70 at a spacing of 30 cm between rows and 15 cm between plants in plots of 9m x 4.5m. Gaps were filled with in a week to ensure uniform stand of the crop. Sodium molybdate (Na_2MoO_4. 2 H_2O) was dissolved in water at required concentractions and drenched 12 days after sowing. Blank application of water was made on plots receiving no molybdenum. Cultural operations were given as per the package of practiees for the crop. Random plants were selected for recording the number of days required for flowering, peg formation and pod development.

* Part of M. Sc. (Ag.) thesis submitted to the University of Kerala, 1971.

Results and Discussion

The results were statistically analysed and the means are summarised in Table 1.

Application of P_2O_5 @ 50 kg/ha significantly reduced the vegetative phase by promoting early flower formation. The delay in flowering with higher levels of P_2O_5 might be due to an increased vegetative growth as reported by Black (1968). Molybdenum at 1 and 2 kg/ha also delayed flowering which may be due to the increased vegetative growth resulted from the increased nitrogen fixation reported by Muralidharan and George (1971).

Table 1

Reproductive developments

Levels of nutrients	Mean no. of days until flowering	Mean no. of pegs/plant	Mean no. of mature pods/ plant	% of pegs developed to mature pods
PA				
25 kg/ha	22.6	16.08	8.34	53.43
50 ,,	22.0	20.15	9.03	46.37
75 ,,	22.4	27.17	10.08	46.60
100 ,,	22.8	29.11	9.50	41.16
CD (0.05)	0.314	3.105	0.85	7.238
Molybdenum				
0 kg/ha	22.27	19.38	9 15	52.10
1 ,,	22.33	23.90	9.38	47.23
2 ,,	22.80	26.11	9.11	41.34
CD (0.05)	0.27	2.69	NS	6.23

There was significant increase in the number of pegs formed with increased levels of P_2O_5 and molybdenum. This increase in the number of pegs/plant was due to the increased vegetative growth (Goldin and Har-Tzook, 1966). The number of mature pods produced was also significantly increased with the increae in the level of P_2O_5 upto 75 kg/ha which might be due to an increase in the number of pegs formed. Molybdenum had no significant effect on the number

of mature pods probably due to a lower requirement of this element, except for the fixation of N, which is usually met from the soil as reported by Anderson (1956).

The maximum percentage of pegs developed to mature pods was noticed under 25 kg P_2O_5/ha and no molybdenum. This higher percentage was possible since the number of pegs formed under the treatment was the lowest. The formation and development of pods appeared to be inhibited by a relatively higher number of flowers and strong vegetative growth (Goldin and Har-Tzook, 1966). In present experiment also the vegetative growth and peg formation continuing until harvest in treatments receiving 100 kg P_2O_5 and 2 kg molybdenum/ha (Muralidharan and George, 1971). The pegs formed very late did not get enough time to develop into mature pods.

Summary

Field experiment conducted at the Agricultural College, Vellayani with 4 levels of P_2O_5 and 3 levels of molybdenum revealed that

(1) Application of P_2O_5 @ 50 kg/ha significantly reduced the preblossom period which was delayed by higher levels of phosphorus and molybdenum.

(2) P_2O_5 @ 85 and 100 kg/ha increased the number of pegs and mature pods/plant. Molybdenum though increased the number of pegs/plant did not influence the number of mature pods/plant.

(3) P_2O_5 and molybdenum at higher levels reduced the percentage of pegs developed to mature pods.

Acknowledgement

The authors are grateful to the Principal, College of Agriculture, Vellayani for providing the facilities and to the I C. A. R. for awarding a Junior Fellowship to the first author which enabled him to persue the studies.

സംഗ്രഹം

പോ—1 എന്നയിനം നിലക്കടലയിൽ നാല്തോതിൽ ഫോസ്ഫറസും മൂന്ന അളവിൽ മോളിബ്ഡിനവും ചേർത്തു നടത്തിയ ഒരു പരീക്ഷണത്തിൽ, ഫോസ്ഫോറിക്ക് ആസിഡ്, ഹെക്ടറിന് 85 കിലോഗ്രാം, 100 കിലോഗ്രാം എന്നീ തോതുകളിൽ ചേർത്തപ്പോഴാണ് ഓരോ ചെടിയിലുമുള്ള കായ്കളുടെ എണ്ണം കൂടുന്നതായി കണ്ടത്. എന്നാൽ ഈ സ്വഭാവത്തിൽ മോളിബ്ഡിനത്തിന് പ്രത്യക്ഷ പങ്ക് ഉള്ളതായി കണ്ടില്ല. ഈ രണ്ടു മൂലകങ്ങളും വളരെ കൂടിയ തോതിൽ ചേർത്തപ്പോൾ കായ്പിടുത്തം കുറയുന്നതായും കണ്ടു.

REFERENCES

Anderson. A. J. 1956. Molybdenum as a fertilizer. *Adv. agron.* **8**, 164-199.

Banerjee, H. D., Das, M. S. and Bhattacharjee, T. K. 1967. Nutrition of laterite zone groundnut in W. Bengal. *Fert. News* **12** (9), 41-42

Black, C. A. 1968. Soil plant relationships. Phosphorus Functions in plants 626. 2nd Edn. John Willey & Sons,

Goldin, E. and Har-Tzook, A. 1966. The effect of fertilization on the vegetative and reproductive developments of Virginia bunch improved groundnuts. *Oleaginex* **21** (1), 17-20

Gopalakrishnan, S. and Nagarajan, S. 1958, Macro-nutrient deficiency studies on groundnut, *Indian Oil Seeds J.* 2 (1), 5-9.

Harris, H. C. 1949. The effect on the growth of peanuts of nutrient deficiencies in the root and the pegging zone. *Plant Physiology.* 24 (1), 150-161.

Muralidharan, A, and George, C. M. 1971. Effect of Phosphorus and Molybdenum on the growth and nodulation of groundnut. *Agri. Res. J. Kerala 9* (2), 48-53.

Nicholoides, J. J. and Cox, F. R. 1970. Effect of mineral nutrition on chemical composition and early reproductive development of Virginia type peanuts (Arachis hypogaea L.) *Agron J. 61,* 262-265.

Puntamkumar, S, S. and Bathkal, B. G. 1967. Influence of N, P and K fertilizer on composition growth and yield of groundnut. *Indian J. Agron.* **12**, 344-350.

Reid, P. H. and Jr. Yok, E. T. 1958. Effect of nutrient deficiencies on growth and fruiting characteristics of peanut in sand cultures. *Agron J.* **50**, 63-67

Sathyanarayana, P. and Krishna Rao, D. V. 1962. Investigation on the mineral nutrition *of* groundnut by the method of foliar diagnosis. *Andhra Agric. J.* 9, 329-343

(M. S. *received* 18-12-1973)