

Research Note

LACK OF RESPONSE OF SWEET PEPPERS TO P LEVELS, P PLACEMENT, AND TIMING OF N APPLICATION IN SOUTHERN PUERTO RICO^{1, 2}

Sweet peppers are a popular food item in Puerto Rico and are both locally produced and imported from the United States and foreign countries. Local production in 1972-73 was 4,219 tons, while 1,825 tons were imported. In 1975 almost 50% of the peppers consumed were imported³. Thus, there has been a decline in local production and an increase in imports.

High-yielding sweet pepper cultivars are locally available⁴. Cultivation practices must be improved in order to increase local production. The use of fertilizers, properly placed, in adequate amount, and at the right time, is of paramount importance.

A field experiment was established at Fortuna Substation in southern Puerto Rico, to study the effect of levels and placement of P and timing of N applications on pepper production. The soil at the experimental site was classified as San Antón, Cumulic Haplustolls, fine-loamy, mixed, isohyperthermic⁵.

During the crop cycle rainfall was 737 mm. Mean maximum and minimum daily temperatures were 31 and 21° C, respectively. Evaporation from a Class A pan was 174 mm from March to November 1975.

The experiment was laid out following a split-plot design with six replications. The main plots were the P treatments, while the subplots were the timing of N application treatments. The treatment differentials are listed below.

P Placement (448 kg/ha P₂O₅):

1. Broadcast on top of bed at time of planting, and disked.
2. Banded 5 cm directly below seed rows.
3. Banded 5 cm below and 5 cm to one side of seed rows.
4. No P (check).

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³ Rodríguez de Zapata, L., Hortalizas y Legumbres: Situación Actual de la Industria, Departamento de Economía Agrícola y Sociología Rural, Est. Exp. Agr., Informe mimeografiado, 1975.

⁴ Serrano, A. C., Performance of Sweet Pepper (*Capsicum annuum*) Cultivars at Northwestern Puerto Rico, J. Agric. Univ. P.R. 61(1): 90-9, 1977.

⁵ Lugo-López, M. A., and Rivera, L. N., Taxonomic Classification of the Soils of Puerto Rico, Ext. Exp. Sta., Univ. P.R., Bull. 245, 1975.

Timing of N applications (224 kg/ha N):

1. All applied on top of beds at time of planting, and disked.
2. Half applied at time of planting and half at time of flowering.
3. One third at time of planting, one third at time of flowering, one third at time of fruiting.

Ninety-three kg/ha of K_2O , as potassium chloride, were applied to all plots; P was supplied as triple superphosphate and N, as ammonium sulfate.

Subplots were 6 m × 3.5 m (22 m²). Each subplot consisted of four beds separated by empty furrows. There were four rows 0.9 m apart in each bed. Plants were spaced 0.3 m within the row (20 plants per row).

TABLE 1.—Effect of P fertilizer placement and timing of N application on pepper yields

P levels and placement	Mean yields	Subplot yields under indicated N timings—224.07 kg/ha		
		Treatment 1	Treatment 2	Treatment 3
		All preplanting	¹ / ₂ at planting ¹ / ₂ at flowering	¹ / ₃ at planting ¹ / ₃ at flowering ¹ / ₃ at fruiting
		Kg/plot		
448 kg/ha, broadcast and disked	91.8	93.8	99.1	82.7
448 kg/ha, banded 5 cm below seed row	79.7	79.3	83.0	76.2
448 kg/ha, banded 5 cm below and 5 cm to one side of seed row	82.5	78.5	87.1	82.0
No P	86.2	88.3	84.4	85.8
Mean	85.0	84.9	88.9	81.7

The experiment was machine-planted on March 6, 1975. Cultivar Blanco del País was used. A pre-emergent application of Enide⁶ was made at time of planting, but shallow cultivation and hand weeding were also used for weed control. During seed germination, overhead irrigation was applied every other day. Subsequently, until flowering, water was applied weekly at the rate of 2.5 cm. At flowering, surface irrigation was substituted for overhead irrigation.

One application of Lannate-L at the rate of 2.5 liters/ha was used to control aphids by the middle of May. Dithane M-45 was applied weekly

⁶ Trade names are used in this publication solely for the purpose of providing specific information. Mention of trade names does not constitute a guarantee or warranty of equipment or materials by the Agricultural Experiment Station of the University of Puerto Rico or an endorsement over other equipment or materials not mentioned.

at the rate of 1.6 kg/ha as a preventive measure against downy mildew. By the beginning of April, Diazinon, at the rate of 5 cm³ per 4 liters of water was applied to control leaf miners.

The pepper crop was harvested in 6 packings, from June 8 to November 8, 1975.

Information on some soil chemical characteristics at the experimental site is given in the following tabulation:

<i>Property</i>	<i>Value</i>
pH	7.4
C.E.C.	22 meq/100 g
Exchangeable Ca	19 meq/100 g
Exchangeable Mg	5 meq/100 g
Exchangeable K	0.77 meq/100 g
Available P (Olsen)	60 p/m

Table 1 gives data on pepper production. A field-wide average of 33.4 metric tons/ha was obtained with only 3% culls. This is a very high yield and indicates production potential of pepper on the southern coast. Serrano⁷ reported yields of more than 30 metric tons/ha with Blanco del País in variety trials at Isabela in the northwestern region.

Mean differences attributable to level or placement of P were not significant. With no measured response to P, no valid measurement could be obtained as to the effectiveness of either the broadcast or the banded P application method. The lack of measured response to 448 kg/ha of applied P can be attributed to the high level of available native P or residual fertilizer P in the soil. Prior to the fertilizer application, the range and mean of NaHCO₃ available P in the broadcast fertilizer plots were 50-72 and 59 p/m, respectively; four weeks after the fertilizer application, the respective values for range and means were 183-346 and 233 p/m. In the check plots the mean available P value was 60 p/m. Samples were taken prior to and 4 weeks after planting; this was of no consequence on yields because the available P levels were already high enough to meet the needs of the growing crop and also to provide for high yields under the conditions prevailing at the experimental site.

Also, mean differences attributable to timing of N application were not significant. Since there was no response to timing of N application, it appears that all N as a preplant application should be recommended because one application is cheaper than several.

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⁷ Loc. cit.