

# Determinate pigeon pea [*Cajanus cajan* (L.) Millsp] genotypes on the north and south coasts of Puerto Rico<sup>1</sup>

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## ABSTRACT

Seven experiments were established at the Juana Díaz and Isabela agricultural experiment substations to evaluate the performance of determinate pigeon pea [*Cajanus cajan* (L.) Millsp] genotypes. Significant differences were found for yield, height, flowering date, seed weight and number of seeds per pod in almost all the experiments. Many genotypes performed better than the commercial cultivar 2B-Bushy used as check.

## RESUMEN

Genotipos determinados de gandules (*Cajanus cajan*) en las costas norte y sur de Puerto Rico

En las Subestaciones de Juana Díaz e Isabela se establecieron siete experimentos, en los cuales se evaluaron varios genotipos de gandules de porte determinado. Se encontraron diferencias significativas para rendimiento, altura, fecha de floración, peso de la semilla y número de semillas por vaina. Se encontraron varios genotipos superiores a la variedad comercial 2B-Bushy. Algunos de estos genotipos se podrían recomendar para siembras comerciales en Puerto Rico.

## INTRODUCTION

Pigeon pea is one of the most important legume crops in the world (5). It is a good source of protein and iron (3,6,7). It is noted for its great adaptability to a wide range of climatic and soil conditions in the tropics. It does well in shallow, poor marginal soils. However, better yields are obtained in deep rich sandy loams. It tolerates drought and high temperatures. In Puerto Rico, pigeon pea is second to beans in importance. Production during 1985-86 was approximately 2,640 tons with a farm value of \$3.1 million. Demand is higher than local production; therefore, it is also imported mainly from the Dominican Republic. The production of fresh pigeon pea must increase if we want to reduce imports.

This study was conducted to evaluate the performance of determinate genotypes of pigeon pea at two locations in Puerto Rico.

#### MATERIALS AND METHODS

Four field experiments were conducted at the Juana Díaz agricultural experiment substation and three at the Isabela agricultural experiment substation in 1979-80 and 1981-82. The soil at Juana Díaz is a Fraternidad clay (very fine, montmorillonitic, isohyperthermic Udic Chromustert), whereas the soil at Isabela is a Coto clay (clayey, kaolinitic, isohyperthermic Tropeptic Haplorthox). Yield plots consisted of two rows 6.1 m long with 0.91 m between rows. Plants were spaced 30 cm apart in the row. Sencor was applied as a preemergence herbicide at a rate of 1.7 kg/ha. Plants were sprayed with Lannate 90wsp at 0.60 kg/ha to control podborers. No fungicide nor fertilizer were used. The field was irrigated as needed.

Determinate genotypes tested were obtained from the pigeonpea breeding program of the Puerto Rico Agricultural Experiment Station. Cultivar 2B-Bushy was included in all the experiments as check. Separate analyses of variance were conducted for each year crop because the number of genotypes varied in the different experiments. (Different statistical designs were also used in some experiments.) Fisher L.S.D. at 0.05 was used to compare means (8). Data of the genotypes included in all the experiments by location are presented in the tables.

Thirty-two genotypes were planted at Juana Díaz 10 August and 3 October 1979. Thirty-nine genotypes were planted at Isabela 30 July 1979. A randomized complete block design with four replications was used in all three experiments.

Twenty-seven genotypes were planted at Juana Díaz 4 August 1980, and twenty-two genotypes at Isabela 23 July 1980. A partially balanced incomplete block design with five replications at Isabela and four at Juana Díaz was used.

Twenty-eight genotypes were planted at Juana Díaz 20 August 1981 and 22 at Isabela 13 August 1981 in randomized complete block designs with four replications. Data on yield, height, days to flower, seed weight and seeds per pod were recorded.

#### RESULTS AND DISCUSSION

Tables 1 and 2 present yield of the seven experiments. Mean green pod yield ranged from 7,650 kg/ha in 1981-82 to 9,291 kg/ha in the first planting of 1979-80 at Juana Díaz; from 4,995 kg/ha in 1981-82 to 6,177 kg/ha in 1980-81 at Isabela. In general, yields were higher at Juana Díaz than at Isabela. This agrees with data obtained by Abrams et al. (1). This difference is expected since soils at Juana Díaz have a higher level of fertility than those at Isabela. Thirteen genotypes yielded better than

TABLE 1.—*Green pod yield (kg/ha) of pigeon pea grown at Juana Díaz, Puerto Rico*

| Genotype     | 1979 - 80      |                 | 1980 - 81 | 1981 - 82 |
|--------------|----------------|-----------------|-----------|-----------|
|              | First planting | Second planting |           |           |
| 21           | 10645.7        | 10641.2         | 9533.6    | 8322.9    |
| 24           | 5381.2         | 6706.3          | 8107.6    | 4080.7    |
| 30           | 10143.5        | 9275.8          | 8627.8    | 7596.4    |
| 43           | 8080.7         | 8713.0          | 9228.7    | 7802.7    |
| 48           | 6529.1         | 6861.0          | 6582.9    | 6905.8    |
| 49           | 9892.4         | 8704.0          | 7713.0    | 7605.4    |
| 51           | 8959.6         | 8968.6          | 8331.8    | 8439.4    |
| 53           | 9946.2         | 9161.4          | 10107.6   | 7139.0    |
| 69           | 8430.5         | 7204.0          | 9013.4    | 8878.9    |
| 76           | 9838.6         | 7174.9          | 10798.2   | 6591.9    |
| 77-1         | 13524.6        | 10448.4         | 9443.9    | 7381.2    |
| 86           | 9892.4         | 7787.0          | 9766.8    | 7722.0    |
| 92           | 18816.1        | 8724.2          | 9695.1    | 8278.0    |
| 93           | 11435.0        | 8583.0          | 9443.9    | 8269.0    |
| 97           | 9364.6         | 7269.0          | 8089.7    | 7408.1    |
| 98           | 12627.8        | 7540.4          | 10672.6   | 7201.8    |
| 100          | 8170.4         | 8695.1          | 10885.6   | 6878.9    |
| 100-1        | 11659.2        | 10946.2         | 9578.5    | 8152.5    |
| 102          | 9363.2         | 8477.6          | 9058.3    | 8376.7    |
| 109          | 11829.6        | 9917.0          | 9766.8    | 8878.9    |
| 110          | 7982.1         | 7542.6          | 8287.0    | 6852.0    |
| 118          | 7479.8         | 8623.3          | 9264.6    | 7148.0    |
| 133          | 8466.4         | 9722.0          | 8852.0    | 7345.3    |
| 135          | 7139.0         | 9009.0          | 9192.8    | 8520.2    |
| 147          | 8591.9         | 8600.9          | 9641.2    | 9345.8    |
| 148          | 8896.9         | 9529.1          | 10152.5   | 7775.8    |
| 2B-Bushy     | 7551.6         | 8522.4          | 9506.7    | 7677.1    |
| Mean         | 9291.47        | 8485.73         | 9219.72   | 7650.20   |
| L.S.D.(0.05) | 3047.95        | 2423.40         | NS        | 1861.23   |

the mean of the experiment in the first planting of 1979-80 at Juana Díaz. Genotypes 21,77-1,92,93,100-1, and 109 yielded significantly better than 2B-Bushy, the check. In the second planting during the same year 18 genotypes including 2B-Bushy yielded better than the mean of the experiment, but only 100-1 yielded significantly better than 2B-Bushy. In 1980-81 no significant difference was found among genotypes. In 1981-82 14 genotypes yielded more than the mean of the experiment, but none yielded significantly higher than 2B-Bushy. Genotype 147 yielded close to the significant level. In general, yields were lower that year at Juana Díaz probably because of environmental conditions. It should be noted that although pigeon pea is tolerant to enviromental stress, higher yields are obtained in favorable conditions.

TABLE 2.—*Green pod yield (kg/ha) of pigeon pea grown at Isabela, Puerto Rico*

| Genotype     | 1979-80 | 1980-81 | 1981-82 |
|--------------|---------|---------|---------|
| 4            | 5830.4  | 6745.4  | 5718.3  |
| 29           | 6413.5  | 4861.7  | 4328.0  |
| 59           | 5965.0  | 6709.5  | 5404.4  |
| 60           | 7086.2  | 6171.3  | 4238.3  |
| 65           | 6530.1  | 6278.9  | 5337.1  |
| 79           | 7292.5  | 5579.3  | 3946.8  |
| 82           | 6171.3  | 7965.3  | 6256.5  |
| 83           | 7113.1  | 7229.8  | 5449.2  |
| 84           | 7243.2  | 7373.3  | 6413.5  |
| 98           | 7220.8  | 5704.9  | 4058.9  |
| 100-1        | 5471.6  | 5507.5  | 3677.7  |
| 109          | 6234.1  | 5256.4  | 3901.9  |
| 115          | 5965.0  | 3928.8  | 3341.3  |
| 120          | 6395.6  | 6081.6  | 4215.9  |
| 134          | 6211.7  | 7660.3  | 6458.3  |
| 135          | 5516.5  | 7229.8  | 5815.3  |
| 137          | 5543.4  | 6314.8  | 5942.6  |
| 147          | 6485.2  | 6243.1  | 5987.4  |
| 148          | 6664.6  | 6960.7  | 6278.9  |
| 151          | 5830.4  | 6655.7  | 4350.4  |
| 153          | 7669.3  | 4987.3  | 4103.7  |
| 2B-Bushy     | 4798.9  | 4449.1  | 4619.5  |
| Mean         | 5904.63 | 6177.04 | 4995.60 |
| L.S.D.(0.05) | 1758.99 | 1143.54 | 1156.43 |

At Isabela 7 genotypes yielded significantly better than 2B-Bushy in 1979-80 (table 2). In 1980-81, 14 genotypes yielded significantly better than 2B-Bushy, and in 1981-82 7 genotypes did better than 2B-Bushy. Genotypes 84 and 148 yielded better than 2B-Bushy in the three experiments. Genotypes 98, 100-1, 109, 135, 147, 148 and 2B-Bushy were included in the 7 experiments; 135, 147 and 148 showed more stability, yielding consistently well in all the experiments (table 3). Genotypes 100-1 and 109 did not perform as well at Isabela as at Juana Díaz.

Significant differences were found among genotypes for plant height in the seven experiments (tables 4,5). The lowest mean value was obtained in the experiment planted in October at Juana Díaz. Date of planting has a significant effect on plant height in "day-length sensitive pigeon pea" as determined by Abrams and Juliá (2). Delayed plantings tend to reduce plant stature. Short genotypes are better suited for mechanical harvesting. Plants one meter high or shorter could be easily harvested mechanically. Genotypes 48 and 21 planted in October at Juana Díaz can be mechanically harvested with a higher efficiency than the other genotypes.

TABLE 3.—*Green pod yield (kg/ha) of pigeon pea grown at Juan Díaz and Isabela, Puerto Rico*

| Genotype      | Juana Díaz       |              |                | Isabela        |                |                |                |
|---------------|------------------|--------------|----------------|----------------|----------------|----------------|----------------|
|               | <u>1979 - 80</u> |              | <u>1980-81</u> | <u>1981-82</u> | <u>1979-80</u> | <u>1980-81</u> | <u>1981-82</u> |
|               | 1st planting     | 2nd planting |                |                |                |                |                |
| 98            | 12627.8          | 7540.4       | 10672.6        | 7201.8         | 7220.8         | 5704.9         | 4058.9         |
| 100-1         | 11659.2          | 10946.2      | 9578.5         | 8152.5         | 5471.6         | 5507.5         | 3677.7         |
| 109           | 11829.6          | 9917.0       | 9766.8         | 8878.9         | 6234.1         | 5256.4         | 3901.9         |
| 135           | 7139.0           | 9009.0       | 9192.8         | 8520.2         | 5516.5         | 7229.8         | 5815.3         |
| 147           | 8591.9           | 8600.9       | 9641.2         | 9345.3         | 6485.2         | 6243.1         | 5987.4         |
| 148           | 8896.9           | 9529.1       | 10152.5        | 7775.8         | 6664.6         | 6960.7         | 6278.9         |
| 2B-Bushy      | 7551.6           | 8522.4       | 9506.7         | 7677.1         | 4798.9         | 4449.1         | 4619.5         |
| Mean          | 9291.47          | 8485.73      | 9219.72        | 7650.20        | 5904.63        | 6177.04        | 4995.60        |
| L.S.D. (0.05) | 3047.95          | 2423.40      | NS             | 1861.23        | 1758.99        | 1143.54        | 1156.43        |

TABLE 4.—*Plant height (m) of pigeon pea grown at Juana Díaz, Puerto Rico*

| Genotype     | 1979 - 80      |                 | 1980 - 81 | 1981 - 82 |
|--------------|----------------|-----------------|-----------|-----------|
|              | First planting | Second planting |           |           |
| 21           | 1.150          | 1.003           | 1.253     | 1.302     |
| 24           | 1.173          | 1.080           | 1.308     | 1.291     |
| 30           | 1.203          | 0.998           | 1.335     | 1.341     |
| 43           | 1.160          | 1.008           | 1.265     | 1.359     |
| 48           | 1.005          | 1.000           | 1.095     | 1.122     |
| 49           | 1.090          | 1.055           | 1.163     | 1.284     |
| 51           | 1.198          | 1.198           | 1.230     | 1.277     |
| 53           | 1.185          | 1.150           | 1.305     | 1.305     |
| 69           | 1.190          | 0.938           | 1.373     | 1.396     |
| 76           | 1.128          | 0.920           | 1.323     | 1.165     |
| 77-1         | 1.240          | 0.993           | 1.428     | 1.533     |
| 86           | 1.275          | 1.210           | 1.348     | 1.274     |
| 92           | 1.230          | 1.048           | 1.348     | 1.386     |
| 93           | 1.238          | 1.050           | 1.378     | 1.365     |
| 97           | 1.160          | 1.100           | 1.360     | 1.309     |
| 98           | 1.250          | 1.033           | 1.460     | 1.373     |
| 100          | 1.200          | 1.098           | 1.458     | 1.388     |
| 100-1        | 1.263          | 0.978           | 1.388     | 1.450     |
| 102          | 1.098          | 1.043           | 1.288     | 1.317     |
| 109          | 1.153          | 1.093           | 1.343     | 1.397     |
| 110          | 1.065          | 1.025           | 1.250     | 1.394     |
| 118          | 1.250          | 1.068           | 1.428     | 1.423     |
| 133          | 1.257          | 1.133           | 1.320     | 1.354     |
| 135          | 1.190          | 1.055           | 1.390     | 1.410     |
| 147          | 1.253          | 1.060           | 1.445     | 1.516     |
| 148          | 1.235          | 1.090           | 1.458     | 1.414     |
| 2B-Bushy     | 1.108          | 0.978           | 1.195     | 1.185     |
| Mean         | 1.1817         | 1.0535          | 1.3306    | 1.3477    |
| L.S.D.(0.05) | 0.0854         | 0.0973          | 0.1126    | 0.1275    |

Plants grew taller at Isabela than at Juana Díaz. This may be attributed to the higher amount of rain at Isabela, which is located in the humid region of the island whereas Juana Díaz is in the dry region.

Significant differences between flowering dwarfs were also found among genotypes in the four experiments in which data for this character was recorded (tables 6, 7). As in plant height, the lowest mean was found in the October planting at Juana Díaz. This trait is also affected by day length. Flowering date and plant height are highly positively correlated, whereas flowering date is inversely correlated with yield (4). Genotypes flowering significantly earlier than 2B-Bushy were found only in the October planting at Juana Díaz (48, 49, 51, 53, 86). Apparently these genotypes are affected more by day length.

TABLE 5.—Plant height (m) of pigeon pea grown at Isabela, Puerto Rico

| Genotype      | Plant height (cm) |         |         |
|---------------|-------------------|---------|---------|
|               | 1979-80           | 1980-81 | 1981-82 |
| 4             | 1.469             | 1.738   | 1.503   |
| 29            | 1.441             | 1.779   | 1.538   |
| 59            | 1.149             | 1.655   | 1.346   |
| 60            | 1.383             | 1.731   | 1.552   |
| 65            | 1.325             | 1.644   | 1.358   |
| 79            | 1.211             | 1.598   | 1.368   |
| 82            | 1.421             | 1.806   | 1.485   |
| 83            | 1.455             | 1.776   | 1.488   |
| 84            | 1.496             | 1.817   | 1.643   |
| 98            | 1.398             | 1.696   | 1.518   |
| 100-1         | 1.338             | 1.703   | 1.530   |
| 109           | 1.293             | 1.665   | 1.454   |
| 115           | 1.360             | 1.592   | 1.402   |
| 120           | 1.473             | 1.812   | 1.622   |
| 134           | 1.430             | 1.789   | 1.588   |
| 135           | 1.483             | 1.815   | 1.586   |
| 137           | 1.400             | 1.763   | 1.550   |
| 147           | 1.532             | 1.810   | 1.562   |
| 148           | 1.539             | 1.795   | 1.577   |
| 151           | 1.408             | 1.729   | 1.527   |
| 153           | 1.337             | 1.713   | 1.428   |
| 2B-Bushy      | 1.249             | 1.631   | 1.312   |
| Mean          | 1.3775            | 1.7299  | 1.4969  |
| L.S.D. (0.05) | .1286             | .0749   | .0889   |

Significant differences were found for seed weight in 6 experiments in which this trait was evaluated (tables 7,8). Seeds at genotype 48 were significantly heavier than those of 2B-Bushy in the four experiments at Juana Díaz; 33 had the lowest seed weight. None of these genotypes were included in the experiments planted at Isabela.

Tables 9 and 10 present data on number of seeds per pod. Significant differences were found for this trait in 6 out of the 7 experiments. However, differences among all genotypes are small. No significant difference was found in 1981-82 at Isabela.

The data show that genotypes better than 2B-Bushy can be selected and recommended for commercial plantings.

#### LITERATURE CITED

1. Abrams, R., J. Vélez Fortuño and J. López García, 1969. The interaction of variety and environment in pigeon pea (*Cajanus cajan*) trials. *J. Agric. Univ. P. R.* 53 (1):61-6.
2. \_\_\_\_ and F. J. Juliá, 1973. Effect of planting time, plant population and row spacing on yield and other characteristics of pigeon pea (*Cajanus cajan* (L.) Millsp.). *J. Agric. Univ. P. R.* 57 (4):275-85.

TABLE 6.—Days to 50% flowering of pigeon pea grown at Fortuna, Puerto Rico

| Genotype      | 1979 - 80      |                 | 1980-81 |
|---------------|----------------|-----------------|---------|
|               | First planting | Second planting |         |
| 21            | 97.5           | 74.5            | 95.5    |
| 24            | 97.0           | 72.0            | 92.0    |
| 30            | 97.5           | 77.0            | 98.3    |
| 43            | 96.5           | 77.0            | 90.8    |
| 48            | 96.5           | 67.0            | 89.5    |
| 49            | 97.5           | 68.0            | 96.3    |
| 51            | 96.0           | 64.0            | 91.0    |
| 53            | 96.5           | 67.0            | 92.0    |
| 69            | 98.0           | 78.5            | 100.3   |
| 76            | 110.5          | 72.3            | 112.3   |
| 77-1          | 118.8          | 78.5            | 120.5   |
| 86            | 96.0           | 66.0            | 95.0    |
| 92            | 111.3          | 73.0            | 116.5   |
| 93            | 112.0          | 77.8            | 116.5   |
| 97            | 119.3          | 73.0            | 115.3   |
| 98            | 116.5          | 73.0            | 115.3   |
| 100           | 119.0          | 73.0            | 117.8   |
| 100-1         | 118.8          | 75.8            | 116.5   |
| 102           | 116.0          | 73.0            | 114.0   |
| 109           | 114.5          | 73.0            | 115.3   |
| 110           | 123.3          | 73.0            | 118.3   |
| 118           | 99.5           | 79.3            | 95.0    |
| 133           | 96.0           | 87.5            | 97.0    |
| 135           | 98.0           | 74.5            | 103.00  |
| 147           | 100.5          | 78.5            | 102.8   |
| 148           | 104.3          | 77.8            | 99.8    |
| 2B-Bushy      | 98.5           | 77.8            | 96.5    |
| Mean          | 104.75         | 74.84           | 104.13  |
| L.S.D. (0.05) | 4.47           | 6.06            | 7.27    |

- Jambunathan, R. and V. Singh, 1981. Grain quality of pigeon pea. Proceedings of the International Workshop on pigeon peas. ICRISAT, 15-19 Dec. 1980. Patancheru, India. Vol. 1:351-56.
- Morales-Muñoz, A. and R. Abrams, 1971. Inheritance of some quantitative characters in pigeon peas (*Cajanus cajan*). *J. Agric. Univ. P. R.* 55 (1):23-43.
- Morton, J. F., R. E. Smith, M. A. Lugo-López and R. Abrams, 1982. Pigeon peas (*Cajanus cajan* Millsp.): A Valuable crop of the tropics. Special publication of the College of Agricultural Sciences, Department of Agronomy and Soils, Mayagüez, P. R.
- Parsi-Ros, O., E. J. Rodríguez, J. R. Cruz-Cay and M. E. Cintrón, 1987. Processing and the nutritional contents of canned and not canned pigeon peas (*Cajanus cajan* (L.) Millsp.). *J. Agric. Univ. P. R.* 71 (1):33-41.
- \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_, 1987. Processing and storage and the nutritional contents of pigeon peas (*Cajanus cajan* (L.) Millsp.). *J. Agric. Univ. P. R.* 71 (1):43-51.
- Snedecor, G. W. and W. G. Cochran, 1980. Statistical Methods 7th ed., The Iowa State University Press, Ames, Iowa.

TABLE 7.—Days to 50% flowering and weight (g.) of 100 seeds of pigeon pea grown at Isabela, Puerto Rico

| Genotype      | Days to 50% flowering |           | 100-seed weight |           |
|---------------|-----------------------|-----------|-----------------|-----------|
|               | 1981 - 82             | 1980 - 81 | 1981 - 82       | 1980 - 81 |
| 4             | 88.0                  | 36.1      | 39.8            |           |
| 29            | 88.0                  | 31.4      | 32.0            |           |
| 59            | 110.0                 | 22.5      | 31.6            |           |
| 60            | 116.8                 | 24.0      | 35.0            |           |
| 65            | 110.0                 | 23.2      | 31.2            |           |
| 79            | 110.0                 | 22.8      | 29.6            |           |
| 82            | 88.0                  | 30.5      | 30.9            |           |
| 83            | 88.0                  | 31.5      | 30.6            |           |
| 84            | 89.8                  | 31.7      | 31.1            |           |
| 98            | 112.3                 | 24.9      | 35.5            |           |
| 100-1         | 119.0                 | 26.8      | 34.3            |           |
| 109           | 116.8                 | 25.0      | 34.5            |           |
| 115           | 88.0                  | 36.3      | 34.8            |           |
| 120           | 93.3                  | 27.6      | 28.4            |           |
| 134           | 88.0                  | 32.5      | 33.0            |           |
| 135           | 88.0                  | 33.9      | 33.2            |           |
| 137           | 88.0                  | 29.8      | 33.7            |           |
| 147           | 88.0                  | 32.1      | 34.7            |           |
| 148           | 89.8                  | 32.2      | 32.6            |           |
| 151           | 88.0                  | 31.3      | 31.8            |           |
| 153           | 110.0                 | 26.6      | 32.2            |           |
| 2B-Bushy      | 88.0                  | 32.5      | 32.0            |           |
| Mean          | 97.52                 | 29.33     | 32.84           |           |
| L.S.D. (0.05) | 3.02                  | 3.73      | 3.94            |           |

TABLE 8.—*Weight (g) of 100 seeds of pigeon pea grown at Fortuna, Puerto Rico*

|              | 100-seed weight (g) |                 |           |           |
|--------------|---------------------|-----------------|-----------|-----------|
|              | 1979 - 80           |                 | 1980 - 81 | 1981 - 82 |
|              | First planting      | Second planting |           |           |
| 21           | 29.6                | 33.5            | 31.8      | 36.0      |
| 24           | 32.1                | 35.6            | 28.1      | 33.7      |
| 30           | 30.1                | 32.3            | 29.7      | 33.0      |
| 43           | 29.3                | 32.5            | 29.0      | 32.6      |
| 48           | 36.3                | 42.3            | 35.0      | 40.4      |
| 49           | 30.1                | 37.5            | 32.4      | 35.9      |
| 51           | 29.8                | 39.1            | 30.5      | 36.5      |
| 53           | 30.5                | 34.5            | 32.0      | 35.5      |
| 69           | 29.8                | 37.8            | 30.8      | 33.1      |
| 76           | 26.5                | 27.8            | 26.0      | 30.1      |
| 77-1         | 29.3                | 34.4            | 31.9      | 33.0      |
| 86           | 32.4                | 35.4            | 31.0      | 34.5      |
| 92           | 29.1                | 30.9            | 30.3      | 33.1      |
| 93           | 30.6                | 31.5            | 28.6      | 34.0      |
| 97           | 32.3                | 29.5            | 30.8      | 37.8      |
| 98           | 30.0                | 29.9            | 29.9      | 35.3      |
| 100          | 29.3                | 32.4            | 30.3      | 32.7      |
| 100-1        | 33.0                | 34.3            | 28.7      | 34.9      |
| 102          | 30.5                | 34.3            | 31.1      | 35.6      |
| 109          | 30.8                | 33.5            | 30.7      | 35.9      |
| 110          | 34.3                | 31.3            | 33.4      | 37.3      |
| 118          | 29.1                | 31.0            | 28.7      | 31.3      |
| 133          | 25.0                | 27.5            | 23.0      | 23.9      |
| 135          | 32.8                | 34.5            | 29.1      | 33.5      |
| 147          | 32.0                | 33.9            | 30.9      | 34.2      |
| 148          | 29.6                | 35.6            | 31.2      | 30.2      |
| 2B-Bushy     | 31.3                | 31.5            | 29.3      | 31.2      |
| Mean         | 30.77               | 33.50           | 30.14     | 33.88     |
| L.S.D.(0.05) | 3.79                | 3.47            | 2.64      | 3.99      |

TABLE 9.—*Seeds per pod of pigeon pea grown at Fortuna, Puerto Rico*

| Genotype     | 1979 - 80      |                 | 1980 - 81 | 1981 - 82 |
|--------------|----------------|-----------------|-----------|-----------|
|              | First planting | Second planting |           |           |
| 21           | 3.9            | 3.5             | 4.0       | 4.2       |
| 24           | 3.5            | 3.6             | 3.5       | 3.3       |
| 30           | 3.8            | 4.1             | 3.9       | 4.0       |
| 43           | 4.1            | 3.7             | 3.7       | 4.2       |
| 48           | 3.6            | 3.6             | 3.5       | 3.8       |
| 49           | 3.6            | 3.3             | 3.7       | 4.1       |
| 51           | 3.8            | 4.1             | 3.7       | 4.2       |
| 53           | 3.7            | 3.6             | 3.8       | 4.0       |
| 69           | 4.0            | 4.0             | 4.0       | 4.0       |
| 76           | 4.2            | 4.1             | 4.4       | 4.3       |
| 77-1         | 3.7            | 3.8             | 4.1       | 4.2       |
| 86           | 3.8            | 3.6             | 3.9       | 4.2       |
| 92           | 3.9            | 4.2             | 4.0       | 4.2       |
| 93           | 4.0            | 4.4             | 3.8       | 4.3       |
| 97           | 4.2            | 4.5             | 4.4       | 4.2       |
| 98           | 3.8            | 4.1             | 4.2       | 4.2       |
| 100          | 4.1            | 4.6             | 4.2       | 4.4       |
| 100-1        | 4.2            | 3.9             | 3.9       | 4.0       |
| 102          | 3.8            | 4.4             | 3.9       | 4.1       |
| 109          | 3.8            | 4.1             | 4.1       | 4.3       |
| 110          | 4.0            | 4.7             | 4.1       | 4.4       |
| 118          | 4.1            | 3.8             | 4.2       | 4.0       |
| 133          | 4.1            | 3.9             | 3.9       | 4.3       |
| 135          | 3.9            | 3.8             | 3.6       | 4.3       |
| 147          | 3.9            | 3.6             | 3.6       | 4.0       |
| 148          | 4.0            | 3.7             | 3.8       | 4.3       |
| 2B-Bushy     | 3.8            | 3.7             | 3.6       | 4.1       |
| Mean         | 3.88           | 3.89            | 3.91      | 4.13      |
| L.S.D.(0.05) | 0.35           | 0.35            | 0.27      | 0.45      |

TABLE 10.—*Seeds per pod of pigeon pea grown at Isabela, Puerto Rico*

| Genotype     | 1979 - 80 | 1980 - 81 | 1981 - 82 |
|--------------|-----------|-----------|-----------|
| 4            | 3.9       | 4.4       | 4.1       |
| 29           | 4.1       | 4.5       | 4.4       |
| 50           | 4.7       | 4.8       | 4.1       |
| 60           | 4.0       | 4.8       | 4.3       |
| 65           | 4.3       | 5.0       | 4.6       |
| 79           | 4.4       | 4.9       | 4.3       |
| 82           | 4.2       | 4.4       | 4.3       |
| 83           | 4.0       | 4.5       | 4.0       |
| 84           | 4.2       | 4.4       | 4.4       |
| 98           | 4.2       | 4.8       | 4.2       |
| 100-1        | 4.2       | 4.8       | 4.3       |
| 109          | 4.1       | 4.7       | 4.3       |
| 115          | 3.9       | 4.3       | 3.9       |
| 120          | 4.0       | 4.7       | 4.3       |
| 134          | 3.9       | 4.5       | 4.5       |
| 185          | 4.0       | 4.4       | 4.2       |
| 187          | 4.3       | 4.5       | 4.3       |
| 147          | 4.1       | 4.4       | 4.2       |
| 148          | 4.4       | 4.2       | 4.3       |
| 151          | 4.4       | 4.6       | 4.4       |
| 153          | 4.1       | 4.5       | 4.3       |
| 2B-Bushy     | 3.6       | 4.1       | 3.9       |
| Mean         | 4.10      | 4.55      | 4.26      |
| L.S.D.(0.05) | 0.54      | 0.32      | NS        |