with a field-grown selection of *X. violaceum* Schott. met with little success. *X. violaceum* produces a very robust plant, a moderate amount of very pale violet-fleshed cormels similar in size to those of Florida White and an abundance of inflorescences. Pollen production however is very limited under local conditions. Since hybridization attempts using *X. violaceum* as the pollen donor or as the female parent have failed to produce viable seeds it is possible that this species is more distantly related or that incompatability mechanisms are present.

A wide range of genetic diversity has been demonstrated in this investigation. Since there appears to be several genes involved in the traits evaluated it would be possible to identify and propagate new clones that have the best traits of both parents. In other studies, cocoyam seedlings produced from crosses of Nigerian-grown parents cultivars appeared to vary in susceptibility to Dasheen Mosaic Virus (DMV) (18). It is possible that genes for resistance to this and other threatening diseases are present in *Xanthosoma sp.* and through hybridization resistant genotypes can be selected.

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Proc. Fla. State Hort. Soc. 94:238-240. 1981.

EFFECT OF FERTILIZER LEVELS AND SEED SIZE ON GREEN POD YIELD OF WINGED BEAN, PSOPHOCARPUS TETRAGONOLOBUS (L.) DC.[1]

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Additional index words. seedling growth, full bed mulch, dry matter content, elemental concentration.

Abstract. **Winged bean accession 'TPt-1' was grown in the fall of 1980 on raised mulched beds at a density of 9080 plants/ha at 3 fertilizer levels from 3 sizes of seeds. Fertilizer levels were 1x, 1.5x and 2x. Seed diameters were: small, 6.85-7.8; medium, 7.8-8.5; and large, > 8.5 mm. The 1x fertilizer level was 40 N, 40 P_2O_5 and 40 K_2O kg/ha. Fertilizer levels had no significant effect on number of pods per plant or on total yield. Seed size significantly affected seedling growth, number of pods per plant and total yield. Seedlings from large seeds reached transplant stage earlier and had a greater fresh weight and a higher dry matter content than transplants from medium and small seeds. Plants grown from small, medium and large seeds had 73, 85 and 98 pods per plant and yielded 3.26, 3.90 and 4.54 MT/ha, respectively. The interaction of fertilizer levels with seed size resulted in a higher percent of early yield at the 1.5x and 2x fertilizer treatments with large size seeds. Elemental concentration in plant tissues was not affected by fertilizer levels or seed size.**

The importance of seed size and weight on emergence, growth, maturity and yield has been demonstrated on several vegetable crops. Tompkins (9) found that broccoli plants produced from large seeds were heavier and had higher early yields of center heads than plants from small seeds. Alam and Locascio (1) found earlier seed germination and faster emergence from large size broccoli and bean seeds. Large seeds produced taller and heavier seedlings than small seeds. Wester (10) found greater seedling size, higher plant fresh weight and larger number of pods per plant in lima beans grown from large seeds than from small seeds. Cameron et al. (2), found more vigorous sweet corn seedling growth and earlier ear maturity with large size seeds. With lettuce, Smith et al. (7) found greater seed vigor with heavier seeds. Plants grown from more vigorous seeds had a longer head size and a greater percent of marketable heads (8). Experimenting with onions, Hatridge-Esh and Bennett (5) found that seed size did not affect bulb dry weight or fresh weight of bulbs. Bulbs from large seed, however, had an earlier collapse of stems than bulbs grown from small seed.

[1]Florida Agricultural Experiment Stations Journal Series No. 3297.

No information was found on the effect of seed size and fertilizer levels on the green pod yield of winged bean under subtropical conditions. In a previous experiment at the AREC-Bradenton (4) the accessions 'Chimbu' and 'TPt-1' had yields of 6.81 and 10.76 MT/ha (6,070 and 9,600 lb/A), respectively at a fertilizer level of 154 kg N, 85 P_2O_5 and 213 K_2O.

In this paper the results of experiments on the effect of seed size on seedling growth and the effect of fertilizer level and seed size on green pod yield of winged bean are reported.

Materials and Methods

Seedling growth. In July 1980, one-year-old seeds of the accession 'TPt-1' were graded into 3 sizes by a series of sieves and after treatment (3) were planted in a greenhouse into 38 mm (1.5 in.) cell size Speedling® trays filled with Jiffy-Mix®. Seed diameters of the 3 size grades were: small, 6.85-7.8, medium 7.8-8.5, and large >8.5 mm. Treatments were arranged in randomized complete block design and were replicated 4 times. Each block had 20 plants from each seed size. Temperatures in the greenhouse were 34-36°C (94-96°F) daytime and 21-24°C (71-75°F) during the night. Relative humidity varied from 67-100%. The emerging seedlings were fertilized with 0.5 strength Hoagland's solution (6) once per week and watered with tap water as required. Seedlings which reached the transplant stage, i.e. the roots with the adhering growth medium could be removed intact from the cell by a gentle pull on the stem, were cut at soil level, and plant height, fresh and dry weight were measured.

Field experiments. Five-week-old seedlings raised from size-graded seeds as described above were transplanted in Myakka fine sandy soil (Aeric haplaquod) on August 26 in raised mulched beds (4). Experimental design was split-plot in randomized blocks with 3 replications. Main plots were 3 fertilizer levels, 1x, 1.5x, and 2x, and sub-plots were the 3 seed sizes. The 1x fertilizer level was equivalent to 40 kg N, 40 P_2O_5, and 40 K_2O/ha for 5540 m-row net (36 lb for 7340 ft row acre). Nutrients were derived from 18-0-25-2, NH_4NO_3, KNO_3 and superphosphate (20% P_2O_5). The superphosphate contained fritted micronutrients (FN 503) at 40 kg/MT (80 lb/ton). Superphosphate and the 18-0-25-2 were incorporated in the soil to 10 cm (4 in.) in the full width of the bed and the NH_4NO_3 and the KNO_3 were banded in the shoulder region of the bed. A soil fumigant, 67% methylbromide and 33% chloropicrin (MC-33) was applied with 3 chisels per bed at 167 kg per net ha (149 lb/acre), then the entire bed was covered with a 0.32 μ (1.25 mil) white polyethylene mulch. Sub-plots were 7.6 m long and seedlings were set at 61 cm (24 in.) apart within the row, 12 plants per sub-plot. Due to the climbing growth habit, plants were supported by 3 rows of strings, tied 30 cm (1 ft) apart on 1.2 m (4 ft) high stakes. At harvest, green pods 10-18 cm (4-7 in.) long from 8 plants from each sub-plot were harvested once or twice per week as required. Fully developed trifoliate leaves and stems were taken for dry matter content and analysis of major nutrient concentration at the last harvest date from the upper 1/3 of the plants. Nitrogen was determined by the Kjeldahl method, P colorimetrically and K, Ca and Mg by atomic absorption spectrophotometry.

Results and Discussion

Seedling growth. Seedlings grown from large seeds reached transplant stage earlier than seedlings from medium and small seeds (Table 1). Four weeks after sowing, 100% of the seedlings from large seeds were ready to set in the field and only 78 and 73% of the seedlings grown from medium and small seeds, respectively, were transplantable. Five weeks after sowing, all seedlings from medium and small size seeds were also ready to set in the field. Plant height, fresh weight and dry matter content of seedlings at transplant stage were also affected by seed size (Table 1). Plants grown from large seeds were significantly taller than seedlings from small seeds. There was no difference in height, however, between seedlings from large and medium and between seedlings from medium and small seeds. Fresh and dry weight of seedlings from large seeds were higher than from medium and small seeds.

In the field, first bloom was observed on Oct. 17th and plants were in full bloom on Oct. 20th. First harvest of green pods was on Oct. 31st, 101 days after sowing and 14 days after 1st bloom. Date of 1st bloom was not influenced by seed size. Fertilizer levels had no significant effect on the green pod yield of winged beans. Yields at the 1x, 1.5x and 2x fertilizer levels were 3.62, 3.76 and 3.80 MT/ha, respectively (1.62, 1.68 and 1.70 T/acre).

Plants grown from large seeds had a larger number of pods per plant than plants grown from medium and small seeds (Table 2). Plants raised from large seeds had an average of 98 pods per plant vs. 85 and 73 pods from plants grown from medium and small seeds, respectively. Yield per ha also increased with increasing seed diameter (Table 2). Plants from large seeds yielded 4.26 MT/ha (1.9 T/

Table 2. Effect of seed size on green pod yield of 'TPt-1' winged bean.

Seed size[z]	Number of pods per plant	Yield per plant (kg)	Yield per ha[y] (MT)
Small	73	0.36	3.26
Medium	85	0.43	3.90
Large	98	0.50	4.54
LSD 0.05	12	0.10	0.61

[z]Small: 6.85-7.80; medium: 7.80-8.50; and large >8.5 mm diam.
[y]9100 plants per ha (14,680 plants/acre).

Table 1. Effect of seed size on seedling development of 'TPt-1' winged bean.

Seed size[z]	Cumulative percent of seedlings reaching transplant stage Days after seeding 21 (%)	28 (%)	Average seedling height at transplant stage (cm)	Average fresh wt per plant at transplant stage (g)	Dry matter content of seedlings at transplant stage (%)
Small	21	73	13.1	3.24	10.6
Medium	33	78	15.1	3.50	11.3
Large	72	100	17.3	3.80	13.7
LSD[y]	11**	6**	2.4*	0.25**	1.5**

[z]Small: 6.85-7.80; medium: 7.80-8.50; and large: >8.50 mm diam.
[y]LSD is significant at the 10% (*) or the 5% (**) level.

acre) of green pods vs. 3.72 MT/ha for medium and 3.19 MT/ha for small size seeds.

The interaction of fertilizer levels and seed size influenced the cumulative percent of pods harvested during the first 30 days (Table 3). At the 1x fertilizer level, plants from medium size seeds had a higher cumulative yield than plants from small and large seeds. With increasing fertilizer levels, the cumulative percent of pods harvested from large seeds also increased compared to small and medium size seeds. At the 2x fertilizer level, plants from large seeds had 79% cumulative green pod yield vs 60% for medium and 56% for small seeds.

Table 3. Influence of fertilizer level and seed size on cumulative percent of green pods harvested from 'TPt-1' winged bean plants. Fall 1980.

Fertilizer level[z]	Seed size[y]	Total harvested at period ending[x] Nov. 14	Nov. 30 (%)	Dec. 12
1x	Small	19	67	100
	Medium	28	78	100
	Large	15	61	100
1.5x	Small	21	64	100
	Medium	17	65	100
	Large	19	72	100
2x	Small	9	56	100
	Medium	10	60	100
	Large	22	79	100
LSD 0.10		NS	8.0	

[z]1x = 40 N, 40 P_2O_5, and 40 K_2O kg/ha.
[y]Small: 6.85-7.80; medium: 7.80-8.50; and large >8.50 mm diam.
[x]First harvest date was on October 31.

Elemental concentration in leaves and stems was not affected by fertilizer levels or seed size. The mean concentration of N, P, K, Ca and Mg on dry weight basis was 3.45, 0.25, 1.53, 1.40 and 0.46%, respectively.

Seedling growth and green pod yields increased with increasing seed size. Similar increase in seedling growth with large size seeds was reported for broccoli, beans (1, 9), lima beans (10), sweet corn (2), and lettuce (7, 8). Seedlings of the accession 'TPt-1' from large seeds had a more vigorous growth in the seedling stage and a higher yield than plants from medium and small size seeds. Plants from larger seeds did not have an earlier blooming date since the 'TPt-1' requires short daylength for blooming. Thus, growers using larger seeds could delay direct seeding or setting plants in the field by approximately 1 week, since plants from large seeds would develop more rapidly and would have a higher early yield than plants grown from medium and small size seeds, especially with increasing fertilizer levels. Green pod yields in these experiments were below those reported earlier (4). The reason for the lower yield was the shorter growing season in the fall of 1980. During the last week of November, minimum temperatures were below 10°C (50°F) which reduced blooming and pod development. After December 12, minimum temperatures for 3 consecutive days were around 5-6°C (41-43°F) which killed the flowers on all of the plants and no more blooming was observed for the remainder of the season. Growers in west central Florida therefore cannot expect a long growing season for winged beans where temperatures often fall 6°C or below in early December, especially in the interior areas.

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Proc. Fla. State Hort. Soc. 94:240-245. 1981.

THE CHAYOTE, A PERENNIAL, CLIMBING, SUBTROPICAL VEGETABLE

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Additional key words. Sechium edule.

Abstract. **The chayote (Sechium edule Sw.), native to the highlands of southern Mexico and Central America, was an important food source in pre-Columbian times as far south as Peru and Brazil. It was early introduced into the West Indies and later to southern Europe, North Africa and the Old World tropics. In 1886, chayotes grown in the Azores were being exported to England. In the early 1920's, the vine was being planted in the southern United States and in California. There have been several attempts on the part of the U. S. Department of Agriculture to popularize the chayote in North America. Varieties from Costa Rica, the West Indies and Algiers were grown at the Plant Introduction Garden at Brooksville, Fla. Nevertheless, only a few planters took up the crop. Except for the enthusiasm of one individual in Lake City, the chayote might have vanished from Florida. For some years, chayotes were imported into the U. S. from Cuba—42 tons in 1941. In recent times, the newly aroused "gourmet" appreciation of unusual foods, and the active demand on the part of Latin American residents of this country, have given the chayote another chance to appeal to American farmers. The fruit raised in Florida and California is selling readily. In 1978, 5 acres of chayotes near Homestead were more profitable to the grower than were cucumbers or tomatoes. Yields may amount to 50,000 fruits**