

Vital Earth Resources

706 East Broadway, Gladewater, Texas 75647

(903) 845-2163 FAX: (903) 845-2262

2006 Crop Results

Vitazyme on Cowpeas (*Vigna unguiculata*)

Researchers: Maria Diaz, acela Gonzalez, M. Garcia, and Mariela Sarmientos

Research organization: Animal Science Institute, Havana, Cuba

Location: Havana, Cuba

Variety: cowpea (*Vigna unguiculata*)

Soil type: red ferralitic (estrustox)

Planting date: September 2005

Planting rate: unknown

Irrigation: none

Experimental design: A uniform field area of cowpeas was selected to evaluate the effect of Vitazyme on pea yield. Four randomly placed replicates were arranged with ten treatments.

Treatment	Rhizobium ¹	Fertilizer ²	Seed soak ³	Vitazyme	
				In-furrow ⁴	Early flowering ⁵
1 -----	O -----	O -----	O -----	O -----	O -----
2 -----	X -----	X -----	O -----	O -----	O -----
3 -----	O -----	O -----	H ₂ O		
4 -----	O -----	O -----	Vita		
5 -----	O -----	O -----		X	
6 -----	O -----	O -----	Vita		X
7 -----	O -----	O -----		X	X
8 -----	X -----	X -----	Vita		
9 -----	X -----	X -----		X	
10 -----	X -----	X -----	Vita		X

¹An inoculum of Rhizobium ssp. was added to the seed before planting.

²0.25 ton/ha was applied of a “complete” N-P-K fertilizer

³H₂O = distilled water; Vita = a 10 minute soak of a 5% Vitazyme solution at 1 liter/50 kg of seed.

⁴1.5 liters/ha in-furrow before covering.

⁵1.5 liters/ha on the leaves at flower initiation.

Fertilization: 0.25 ton/ha to Treatments 2,8,9, and 10 before planting

Vitazyme application: 1.5 liters/ha on either the seeds in the furrow, or on the leaves at early bloom (see the table); 1 liter of a 5% solution on 50 kg of seed for selected treatments

Harvest date: unknown

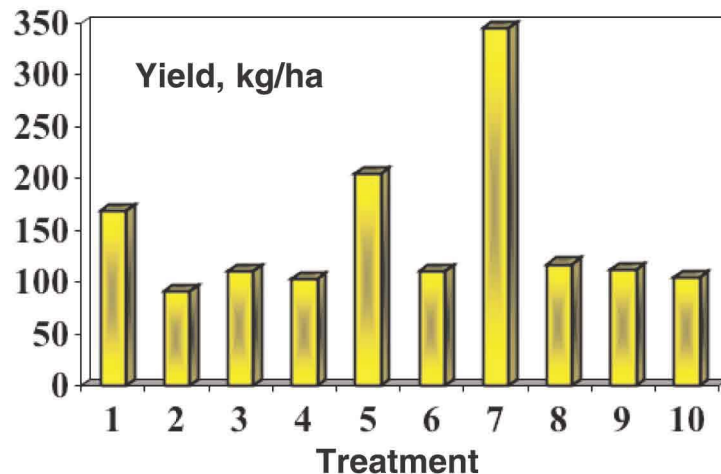
Yield results:

Treatment	Yield ^a	Crop residues ^a
	kg/ha	tons/ha
1	168.5 bc —	0.26 bc —
2	91.0 c —	0.22 bc —
3	110.7 bc (-34%)	0.16 c (-38%)
4	103.5 bc (-39%)	0.24 bc (-8%)
5	205.2 b (+22%)	0.53 a (+104%)
6	110.5 bc (-34%)	0.25 bc (-4%)
7	344.7 a (+105%)	0.49 ab (+88%)
8	117.7 bc (-29%)	0.19 c (-14%)
9	112.0 bc (-23%)	0.19 c (-14%)
10	105.2 bc (-16%)	0.34 abc (+31%)
	32.8***	0.08*

^aMeans followed by the same letter do not differ significantly at P=0.05 according to Duncan's Multiple Range Test. Percentage increases are calculated using the appropriate control.

***P<0.001.

*P<0.05



Increase in yield with in-furrow and foliar Vitazyme: +105%

Increase in residues with in-furrow and foliar Vitazyme: +88%

Conclusions: In this Cuban cowpea study, the two Vitazyme applications at 1.5 liters/ha to the seed furrow at planting and on the foliage at early bloom provided by far the best yield increase of all treatments (+105%). This yield increase was achieved without fertilizer and Rhizobium bacteria. The next best yield increase was with the soil furrow application only (+22%). The seed soak treatment negatively affected yield and plant growth, with or without Rhizobium and fertilizer, suggesting the oversaturation of enzyme systems had been achieved with excess active agents. Crop residue levels paralleled yields, the highest being with the in-furrow treatment (+104%) and the in-furrow plus early bloom treatment (+88%). These results show that the two treatments of Vitazyme, in-furrow and early bloom, are especially effective in Cuba for promoting pea yields and crop residues for human and animal use.

1998 Crop Results

Vitazyme on Cowpeas Caribbean Agricultural Research and Development Institute (CARDI)

Researcher: Leslie Simpson, Ph.D.Location: Ebini region, GuyanaSeeding date: unknownVariety: Minica 4 (indeterminate)Seeding rate: unknownRow spacing: unknownExperimental design: A randomized complete block design with four replications was established on a uniform soil area. Each plot was 3.6X10.0 meters (0.0036 ha). Treatments were as follows:

1. Control (no Vitazyme)
2. Vitazyme applied twice
3. Vitazyme applied once

Fertility treatments: unknownVitazyme applications: For Treatment 2, Vitazyme was applied at 1 liter/ha (13 oz/acre) to the soil after planting but before emergence, and at the same rate at early bloom. For Treatment 3, only the early bloom treatment was applied.Harvest date: unknownYield results: Several parameters were determined at harvest, as indicated below.

PLANT DRY WEIGHT

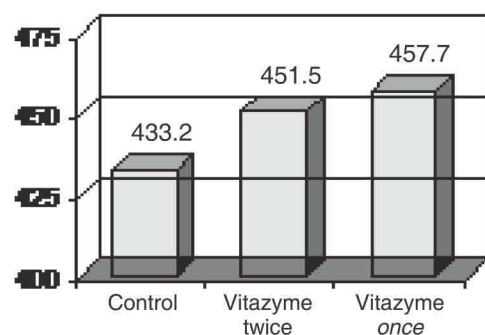
Treatment	Weight of 10 plants, g	Increase, g
1. Control	433.2	--
2. Vitazyme twice	451.5	18.1 (+4 %)
3. Vitazyme once	457.7 *	24.5 (+6 %)

*Significantly greater than the control at P=0.05. $LSD_{0.05} = 18.65$.

Dry weight increase:

6%

Dry weight per 10 plants, g

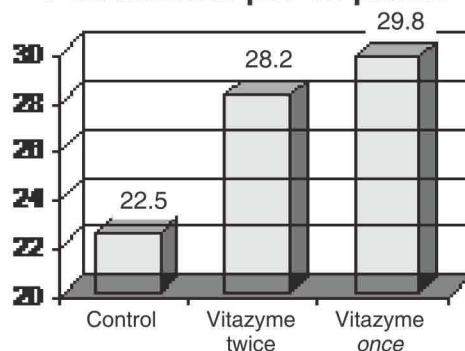


POD NUMBER

Treatment	Pods/10 plants	Increase
1. Control	22.5	--
2. Vitazyme twice	28.2 *	5.7 (+25 %)
3. Vitazyme once	29.8 *	7.3 (+32 %)

*Significantly greater than the control at P=0.05. $LSD_{0.05} = 5.05$.

Pod number per 10 plants

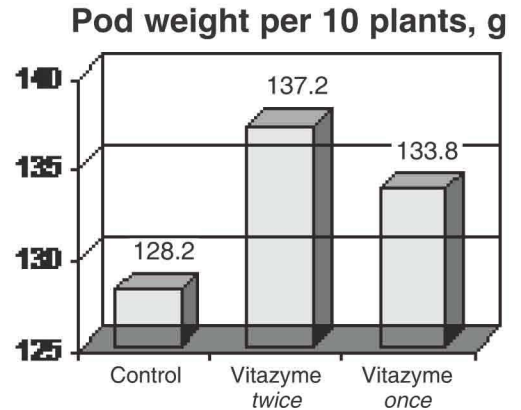


Pod number increase: 32%

POD WEIGHT

Treatment	Pods weight/10 plants	Increase
1. Control	128.2	--
2. Vitazyme twice	137.2	9.0 (+7 %)
3. Vitazyme once	133.8	5.6 (+4 %)

**Pod weight increase:
7%**

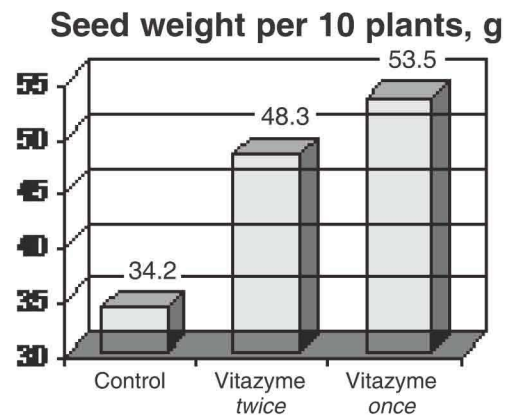


SEED WEIGHT

Treatment	Seed weight/10 plants, g	Increase, g
1. Control	34.2	--
2. Vitazyme twice	48.3 *	14.1 (+41 %)
3. Vitazyme once	53.5 **	19.3 (+56 %)

*Significantly greater than the control at $P=0.06$; **significantly greater than the control at $P=0.03$. $LSD_{0.05}=15.1$.

**Seed weight increase:
56%**

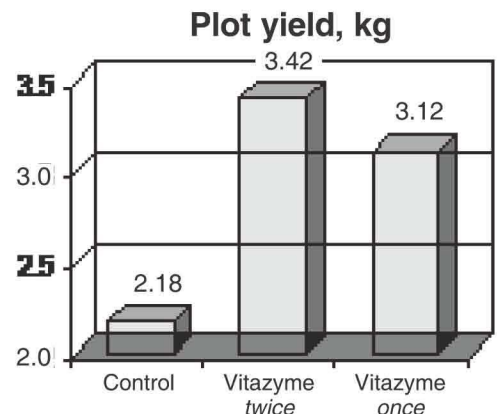


PLOT YIELD

Treatment	Plot yield, kg	Increase, kg
1. Control	2.18	--
2. Vitazyme twice	3.42 **	1.24 (+57 %)
3. Vitazyme once	3.12 *	0.94 (+43 %)

*Significantly greater than the control at $P=0.07$; **significantly greater than the control at $P=0.05$. $LSD_{0.05}=1.23$.

Yield increase: 57%



Comments: Several significant differences in plant growth parameters appeared in this cowpea test. Vitazyme increased plant dry weights, pod numbers, and seed weights per 10 plants for either one or two applications. Plot yield was increased with either one or two applications, but the greatest increase (56%) was with one application. Results of this study suggest that, under the conditions of this tropical climate and soils, one application of Vitazyme at 1 liter/ha (13 oz/acre) at early bloom may be sufficient to attain optimum yields for cowpeas.

1998 Crop Results

Vitazyme on Cowpeas Caribbean Agricultural Research and Development Institute (CARDI)

Researcher: Leslie Simpson, Ph.D.Location: Ebini region, GuyanaSeeding date: unknownVariety: California No. 5Seeding rate: unknownRow spacing: unknownExperimental design: A randomized complete block design with four replications was established on a uniform soil area. Each plot was 2.7X10.0 meters (0.0027 ha). Treatments were as follows:

1. Control (no Vitazyme)
2. Vitazyme applied twice
3. Vitazyme applied once

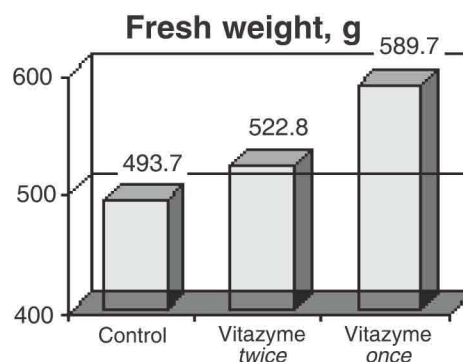
Fertility treatments: unknownVitazyme applications: For Treatment 2, Vitazyme was applied at 1 liter/ha (13 oz/acre) to the soil after planting but before emergence, and at the same rate at early bloom. For Treatment 3, only the early bloom treatment was applied.Harvest date: unknownYield results: Several parameters were determined at harvest, as indicated below.

PLANT FRESH WEIGHT

Treatment	Weight of 10 plants, g	Increase, g
1. Control	493.7	--
2. Vitazyme twice	522.8	29.1 (+6 %)
3. Vitazyme once	589.7 *	96.0 (+19 %)

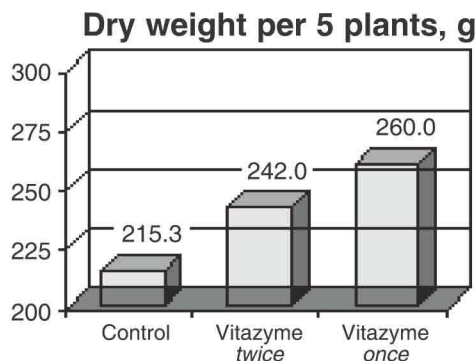
*Significantly greater than the control at P=0.10. $LSD_{0.10} = 98.11$.

Fresh weight increase:
19%



PLANT DRY

Treatment	Weight of 10 plants, g	Increase, g
1. Control	215.3	--
2. Vitazyme twice	242.0	26.7 (+12 %)
3. Vitazyme once	260.0 *	44.7 (+21 %)

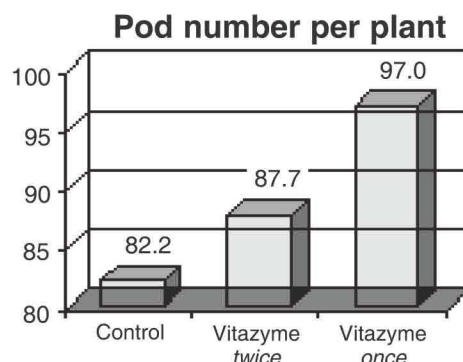
*Significantly greater than the control at P=0.15. $LSD_{0.10} = 58.45$.

Dry weight increase: 21%

Treatment	Pods/10 plants	Increase
1. Control	82.2	--
2. Vitazyme twice	87.7	5.5 (+7 %)
3. Vitazyme once	97.0 *	14.8 (+18 %)

*Significantly greater than the control at P=0.10. $LSD_{0.10}=13.02$.

**Pod number increase:
18%**

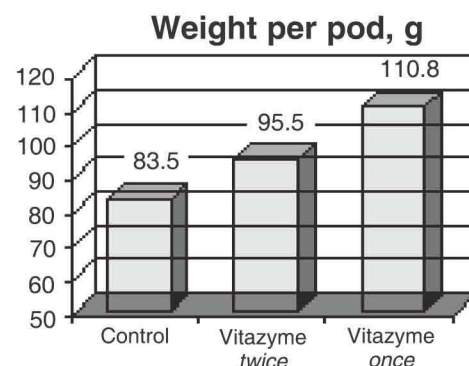


POD WEIGHT

Treatment	Pods weight/10 plants	Increase
1. Control	83.5	--
2. Vitazyme twice	95.5	5.5 (+14 %)
3. Vitazyme once	110.8 *	14.8 (+33 %)

*Significantly greater than the control at P=0.03. $LSD_{0.05}=25.51$.

**Pod weight increase:
33%**

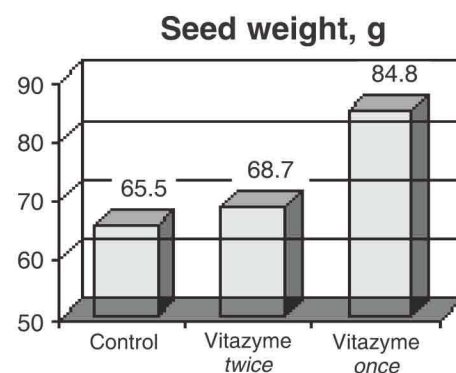


SEED WEIGHT

Treatment	Seed weight/10 plants, g	Increase, g
1. Control	65.5	--
2. Vitazyme twice	68.7	3.2 (+5 %)
3. Vitazyme once	84.8 *	19.3 (+29 %)

*Significantly greater than the control at P=0.03. $LSD_{0.05}=25.51$.

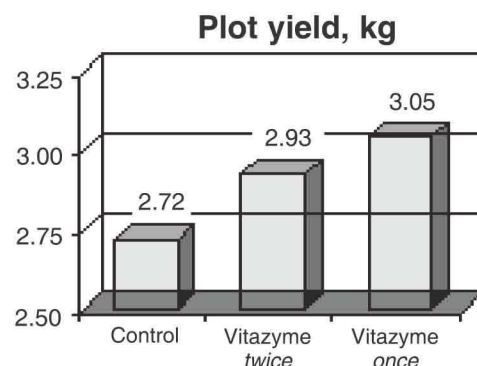
**Seed weight increase:
29%**



PLOT YIELD

Treatment	Plot yield, kg	Increase, kg
1. Control	2.72	--
2. Vitazyme twice	2.93	0.21 (+8 %)
3. Vitazyme once	3.05	0.33 (+12 %)

Yield increase: 12%



Comments: In this Caribbean study with cowpeas, Vitazyme significantly improved all plant parameters examined, including plant fresh and dry weights, pod weight and number, and seed weight. Plot yield was not significantly increased, but the yield for one application at bloom was 12% higher than the control. It is apparent that , under the conditions of this study, only one application of Vitazyme, at 1 liter/ha (13 oz/acre) at bloom, was sufficient to elicit the significant effects noted.