SHORT COMMUNICATION

THE RESPONSE OF ORGANIC FERTILIZER TVV 75 ON HIGH YIELDING RICE " IR 64" BY DIRECT SOWING METHOD IN TWO SOIL TYPES

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During the 1998's wet season; the Cuu Long Delta Rice Research Institute (CLRRI) has collaborated to Agrium Biologicals, Canada to test the organic fertilizer TVV 75 on high yielding rice for the purpose as following:

OBJECTIVES

- To determine the treating time of organic fertilizer TVV 75 on high yielding rice "IR 64" by direct sowing method.
- To evaluate the efficiency of organic fertilizer TVV 75 on growth, development, yield components and grain yield of high yielding rice "IR 64" in two types of soils by direct sowing method.

MATERIALS AND METHODS

1. Materials

- Rice variety : IR 64
- Chemical fertilizer : urea, super phosphate, KCl were used
- Organic fertilizer : TVV 75

2. Methods

Organic fertilizer TVV 75 on high yielding rice "IR 64" was tested on two types of soils at two experimental sites (CLRRI's rice experimental field and farmer field at Phuoc Thoi village, Omon district, Can Tho province).

The physical and chemical properties of two soil types as followed:

- **CLLRI's site**: the soil was classified as heavy clay, soil pH = 5.15; E.C = 0.67mmho/cm; Organic carbon = 2.20 %; N = 0.21 %; P_2O_5 = 0.04 %, = 1.79 %
- **Phuoc Thoi's site**: the soil was classified as loam clay, soil pH = 5.32; E.C = 0.20mmho/cm; organic carbon = 1.60 %; N = 0.20 %; P_2O_5 = 0.06 %, K_2O = 1.45 % .

The plot size: 20 m^2

Seeded rate: 200 kg rice seeds/ha

The seven treatments were designed in randomized complete block with six replications

T 1. Untreated control, no nitrogen fertilization: germinated seeds were not exposed to TVV 75 during the studies . All other cultural treatments were followed standard grower's practice except for nitrogen fertilizer which was not added.

T 2. Untreated control, half standard nitrogen fertilization: germinated seeds

were not exposed to TVV 75 during the studies. All other cultural treatments were followed standard grower's practices except nitrogen fertilizer which was at half the recommended rate.

T 3. Untreated control, standard nitrogen fertilization: germinated seeds were not exposed to TVV 75 during the studies. All other cultural treatments were followed standard grower's practices except nitrogen fertilizer which was at the recommended rate.

T 4. Treated with TVV 75 for 5 minutes: germinated seeds were soaked in TVV 75 for 5 minute prior to direct sowing. All other cultural treatments were followed standard grower's practices except nitrogen fertilizer which was not added.

T 5. Treated with TVV 75 for 5 minute combined with 50% nitrogen fertilization: germinated seeds were soaked in TVV 75 for 5 minute prior to direct sowing. All other cultural treatments were followed standard grower's practice except for nitrogen fertilizer which was at half the recommended rate.

T 6. Treated with TVV 75 for 1 hour: germinated seeds were soaked in TVV 75 for 1 hour prior to direct sowing. All other cultural treatments were followed standard grower's practice except for nitrogen fertilizer which was not added.

T 7. *Treated with TVV 75 for 1 hour combined with 50% nitrogen fertilization*: germinated seeds were soaked in TVV 75 for 1 hour prior to direct sowing. All other cultural treatments were followed standard grower's practice except nitrogen fertilizer which was at half the recommended rate.

The standard grower's practice at recommended rate was 100-40-30 (N - P_2O_5 - K_2O kg/ha) in which total P_2O_5 and K_2O were basal application. Nitrogen was applied in three splits: 1/3 N was applied at 7 days after sowing (DAS), then 1/3 N at 20 DAS and 1/3 N at 35 DAS.

Total biomass of shoot and root was recorded at 14 and 20 DAS

RESULTS AND DICUSSION

The effect of organic fertilizer TVV 75 on plant height, shoot and root biomass at 14 and 20 DAS were presented in table 1 at CLRRI site and table 2 at Phuoc Thoi site.

CLRRI's site

Plant height: At 14 DAS, treatment T3 was recorded to enhance the highest plant height as compared to others. Treatment T7 significantly differed in plant height, taller than T4 at 5% level. At 20 DAS, T1 significantly exhibited in plant height shorter at 5 % level as compared to others. The highest plant height was recorded in T7, then followed by T3, T5.

Shoot weight: Treatment T3 was recorded to enhance higher shoot weight as compared to others. Treatments T2, T5, T7 significantly differed from T1, T4, T6 in higher shoot weight at 14 DAS. Treatments T5, T7 significantly

differed from T1, T4, T6 in higher shoot weight at 20 DAS.

Root weight:. At 14 DAS, T3 significantly differed from others in higher root weight at 5% level..At 20 DAS, T1, T4, T6 significantly differed from T3, T5, T7 in higher root weight

Phuoc Thoi's site

Plant height. At 14 DAS, the treatment T3 was recorded to enhance in higher plant weight as compared to others at 5% level. T7 significantly differed from T1, T2, T4, T6 in higher plant height. At 20 DAS, significant differences were not found in plant height among the treatments .

Shoot weight:. At 14 DAS, significant differences were not found in shoot weight among treatments T3, T5, T7 and among T1, T2, T4, T6. While, T5, T7 significantly differed from T1, T4 in higher shoot weight at 5% level. At 20 DAS, T3 significantly differed from others in higher shoot weight.

Root weight: At 14 DAS and 20 DAS, no difference in root weight was found among the treatments.

Table 1. Root and shoot biomass at 14 and 20 DAS (CLRRI' s site)

Treatment		Plant height (cm)		Shoot weight (g)		Root weight (g)	
		14DAS	20DAS	14DAS	20DAS	14DAS	20DAS
0VS+O%N	T1	27.33	32.67	3.44	4.67	2.90	3.86
OVS+50%N	T2	28.50	35.50	4.55	5.36	3.25	4.97
OVS+100%N	T3	30.67	37.83	5.45	7.08	4.42	5.83
5'H+0%N	T4	26.83	34.83	3.78	4.92	3.14	4.33
5'H+50%N	T5	28.50	37.17	4.96	5.95	3.72	5.52
1hH+0%N	T6	27.83	34.50	3.62	4.81	3.03	4.20
1hH+50%N	T7	29.17	38.00	4.90	5.93	3.53	5.40
CV%		6.20	2.80	8.40	11.20	15.90	9.40
LSD5%		2.07	1.17	0.43	0.73	0.64	0.54

Table 2. Root and shoot biomass at 14 and 20 DAS (Phuoc Thoi's site)

Treatment		Plant height (cm)		Shoot weight (g)		Root weight (g)	
		14DAS	20DAS	14DAS	20DAS	14DAS	20DAS
0VS+O%N	T1	28.50	31.50	2.20	4.58	2.05	3.56
OVS+50%N	T2	29.50	32.33	2.62	5.21	2.20	4.50
OVS+100%N	T3	31.83	34.17	3.20	6.63	2.73	5.58
5'H+0%N	T4	28.67	31.00	2.44	4.92	2.10	3.66
5'H+50%N	T5	30.50	31.83	2.91	5.51	2.28	4.16
1hH+0%N	T6	28.33	31.00	2.63	4.69	2.03	3.88
1hH+50%N	T7	30.83	32.83	2.89	5.36	2.27	4.48
F		**	ns	**	**	**	**
CV%		2.80	6.20	15.20	10.20	12.00	17.80
LSD5%		1.00		0.49	0.64	0.32	0.90
LSD1%		1.30		0.65	0.86	0.43	1.21

Note: shoot weight and root weight values were obtained from 10-seedling means.

The results showed that the biomass of shoot and root at 14 DAS and 20 DAS was well fluctuated. There was non significant differences in plant height, shoot-root biomass as comparing between two treating times with TVV 75 5 minute and 1 hour prior direct sowing) combined with 0 % nitrogen fertilization or combined with 50 % nitrogen fertilization. However, treatments treated with TVV 75 (for 5 minute or 1 hour prior direct sowing) combined with 50% nitrogen fertilization trend to increase in plant height, shoot - root biomass as compared to applying alone 50 % nitrogen fertilization without TVV 75.

The effect of organic fertilizer TVV 75 on yield and yield components were presented in table (3) at CLRRI site and in table (4) at Phuoc Thoi site.

CLRRI's site

Panicles/sqm and 1000-grain weight were not found to be significantly different among the treatments. T3 significantly differed from others in higher filled grains/panicle.

The treatment T3, however, obtained the highest unfilled grain percentage. Non significant differences in unfilled grain % among T2, T5, T7 and T1, T4, T6 were observed.

The treatment T3 obtained the highest yield as compared to others. Non significant differences in term of yield among treatments T2, T5, T7 and T1,

T4, T6 were observed. Treatment T1 exhibited statistically lower in term of yield than T2, T5, T7. The minimum yield was obtained in T1. While the maximun yield was obtained in T3, then T5, T7.

Phuoc Thoi's site

No difference in terms of unfilled grain percentage and 1000-grain weight among the treatments was noticed.

T3 significantly differed from T1, T2, T4, T6, T7 in higher panicle/sqm at 5% level.

No difference in terms of filled grains / panicle among treatments T2, T3, T7; and T4, T5, T6 ; and T1, T4, T6 at 5% level. The treatment T3, however, significantly differed from others in higher filled grains / panicle, then T2, T7 higher than T1, T4, T6.

The treatment T3 obtained the highest yield as compared to others at 5% level. Non - significant differences in yield among treatments T1, T4, T6; between T5, T7 were observed. T5 significantly differed from others in higher yield. The maximum yield was obtained in T3, then T5 and T7.

The results showed that non-significant differences in terms of yield as comparing between two treating times with TVV 75 (5 minute and 1 hour prior direct sowing) combined with 0 % nitrogen fertilization or combined with 50 % nitrogen fertilization. However, treatments treated with TVV 75 (for 5 minute or 1 hour prior direct sowing) combined with 50 % nitrogen fertilization trend to increase grain yield as compared to treatment in which 50 % nitrogen fertilize was applied alone without TVV 75. It was clearly recorded in treatment T5 (treatment with TVV 75 for 5 minute combined with 50% nitrogen fertilizer) at Phuoc Thoi 's site. Attentions should be paid to soil type in which TVV 75 product could be performed better in case of loam clay soil texture at Phuoc Thoi than in heavy clay soil texture at CLRRI site.

During experiment time, we also recorded that rice thrips occurred at 3 weeks after sowing (WAS) and leaf folders at 7 WAS. Fastac 5EC was sprayed to control these pests. While diseases were not found.

CONCLUSIONS AND SUGGESTION

Conclusions:

- There were non-significant differences in plant height, shoot-root biomass as comparing between two treating times with TVV 75 (5 minute and 1 hour prior direct sowing) at the same rate of nitrogen application.
- Treatments with TVV 75 (for 5 minute or 1 hour prior direct sowing) combined with 50 % nitrogen fertilization trend to increase in plant height, shoot - root biomass, grain yield as compared to the treatment in which 50 % nitrogen fertilize was applied alone without TVV 75
- The maximum in yield was obtained in treatment T3 (untreated control, standard nitrogen fertilization) ,then followed by T5 (treated with TVV 75 for 5 minute combined with 50% nitrogen fertilization) and T7 (treated

with TVV 75 for 1 hour combined with 50% nitrogen fertilization).

Suggestion:

To determine the residual efficiency of organic fertilizer TVV 75 in case of direct sowing method of high yielding cultivars for long-term study.

To test this product in different soil types of rice cultivation in Mekong Delta.

Table 3. Yield components and yield of IR64 variety- CLRRI ' s site

Treatment		Plant height (cm)	Panicle/ sqm	Filled grains / pan.	Unfilled grain (%)	1000-grain weight (g)	Yield (T/ ha)
0VS+O%N	T1	84	436	22	22.6	27.4	2.1
OVS+50%N	T2	87	484	26	27.2	27.4	2.6
OVS+100%N	T3	91	536	32	30.7	27.3	3.5
5'H+0%N	T4	85	480	24	23.1	27.5	2.2
5'H+50%N	T5	88	492	27	26.4	27.6	2.8
1hH+0%N	T6	84	480	25	23.1	27.6	2.2
1hH+50%N	T7	89	500	29	26.3	27.6	2.6
CV%		2.5	8.2	9.8	11.3	1.3	8.6
LSD5%		2.5		3.0	3.4		0.3

Table 4. Yield components and yield of IR64 variety - PHUOC THOI ' s site

Treatment		Plant height (cm)	Panicle/ sqm	Filled grains / pan.	Unfilled grain (%)	1000-grain weight (g)	Yield (T/ ha)
0VS+O%N	T1	71	509	16	27.7	25.5	1.9
OVS+50%N	T2	74	547	22	24.3	25.8	2.4
OVS+100%N	T3	80	580	25	28.3	26.1	3.2
5'H+0%N	T4	72	515	18	30.0	25.6	2.0
5'H+50%N	T5	73	567	21	26.6	25.6	2.6
1hH+0%N	T6	72	509	18	26.4	25.5	2.0
1hH+50%N	T7	75	547	22	26.3	25.8	2.5
CV%		7.0	7.2	14.9	17.0	1.7	7.2
LSD5%		6.1	45.9	3.5			0.2

TÓM TẮT

Sự đáp ứng của phân hữu cơ TVV 75 đối với phương pháp sạ lan lúa cao sản " IR 64 " trên hai nền đất khác nhau

Phân hữu cơ TVV 75 là sản phẩm sinh học có chứa vi khuẩn *Burkholderia Vietnamiensis* Nov., được ly trích từ đất Việt Nam do công ty Agrium - Canada điều chế và cung cấp nhằm ứng dụng để đánh gía sự đáp ứng cuả sản phẩm đối với phương pháp sạ lan lúa cao sản " IR 64 " trên hai nền đất khác nhau. Những kết qủa nghiên cứu cho thấy rằng, khi so sánh hai thời gian chủng TVV 75 (5 phút hoặc 1 giờ trước khi sạ) có kết hợp với phân đạm (50 % N) hoặc không kết hợp (0 % N) thì không có sự khác biệt về chiều cao cây, trọng lượng thân - rễ (14 và 20 ngày sau khi sạ), các thành phần năng suất và năng suất. Tuy nhiên, ở các nghiệm thức có chủng TVV 75 (5 phút hoặc 1 giờ trước khi sạ) kết hợp với 50 % N có chiều hướng gia tăng chiều cao cây, trọng lượng thân - rễ, các thành phần năng suất và năng suất thực tế so với nghiệm thức chỉ bón đơn thuần 50 % N. Năng suất tối đa được ghi nhận từ nghiệm thức T3 (hạt lúa không xử lý TVV 75 nhưng 100 % N được bón sau khi sạ), kế tiếp nghiệm thức T5 (hạt lúa xử lý TVV 75 trong thời gian 5 phút trước khi sạ, kết hợp bón 50 % N) và nghiệm thức T7 (hạt lúa xử lý TVV 75 trong thời gian 1 giờ trước khi sạ, kết hợp bón 50 % N) .