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MEMORANDUM

TO: AID/PPC/CDIE/DI, room 209 SA-18

FROM: AID/SCI, Victoria Ose VO

SUBJECT: Transmittal of AID/SCI Progress Report(s)

Attached for permanent retention/proper disposition is the following:

AID/SCI Progress Report No. 2. A-04
PR #7 rec'd 9/28/87

Attachment
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PD-AAW-680

2. A. 04

PROGRESS REPORT No. 7

# ROLE OF VA MYCORRHIZAE IN THE PHOSPHORUS NUTRITION OF ECONOMIC LEGUMINOUS CROPS IN THAILAND

A RESEARCH PROJECT

USAID/PSTC PROGRAM

GRANT NO. 936-5542-G-SS-3038-00

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|---|---|
| Country | : Thailand |
| Grant No. | : 936-5542-G-ss-3038-00 |
| Program | : Program on Science and Technology Cooperation |
| Project Title | : Role of VA Mycorrhizae in the Phosphorus Nurtition of Economic Leguminous Crops in Thailand |
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## 1. Background/Introduction

While mycorrhizae have been studied for many years, very little work has been done in tropical soil. Thailand is unique in growing legume grain crops especially soybean and mungbean are the major protein component of the rural population. These legumes will be planted after flooded rice in the low phosphorus paddy field. A symbiosis VA mycorrhiza with plant growth can increase greatly the ability of these crops to take up phosphorus from low phosphorus soils, but their survival on their capacity for producing infection in these crops is not known and their effectivity for the legume growth is little known.

Studies are need to determine the extent to which these crops are mycorrhizae, the nature of the organisms involved, the constraints on mycorrhiza performance and the opportunity for enhancing the benefits of mycorrhizae in field-grown soybeans and mungbeans.

Research in mycorrhiza on soybean and mungbean from the last report had been done on pot culture multiplication and maintained the pure culture strains. Some of these strains were evaluated for the effectiveness on phosphorus absorbtion and soybean/mungbean growth. The experiments were done both in the glasshouse and field condition. Three locations : Chiangmai, Kalasin and

Prachinburi were selected for the cites to compare for species effectiveness on different kind of soil.

For soybean, some species such as Acaulospora scrobiculata gave the higher yield than uninoculated about 24 % at Chiangmai and 50 % at Kalasin. Mycorrhizal fungi showed more effective in low fertile soil at Kalasin than high fertile soil at Chiangmai. For mungbean , same specy Acaulospora scrobiculata gave the higher yield than uninoculated only 10 % at Kalasin and gave less yield than uninoculated at Prachinburi. These results could not interpreted at this moment dued to the complete data were not obtained yet. Number of spores in soil and percent root colonization from the experiment has been examined which are shown in this report.

2. Objectives.

The overall objectives of this project is to improve the phosphorus nutrition of soybean (Glycine max), mungbean (Vigna radiata) in Thailand through assured symbiosis with phosphate absorbing mycorrhiza fungi. The study will be included.

A. Selected effective species of VA mycorrhiza fungi which improve the phosphorus nutrition of soybean and mungbean.

B. Determine the survival of mycorrhizae following flooding of soils for rice by inoculation studies on soybeans and mungbeans.

C. Improve the method of producing the mycorrhizal inoculum for field trial.

The studies in this report are concerned the objectives in project B and C.

## 3. Materials and Methods

### 3.1 To determine the survival of mycorrhizal soybeans and mungbeans following flooding rice.

The experiment were done continuously to study the six selected effective species of VAM. Which selected from the glasshouse experiment. Rice variety 23 D were grown with 25 x 25 cm. spacing in the same plot of the first study without inoculation. Ditches were made around each split plot to maintain the water level of 15 - 20 cms. height.

Every 30 days after transplant soil and root samples in each treatment were collected to determine the percentage of survival mycorrhiza spores in the flooded soil and percentage of root colonization. Rice yield were analyzed for statistics.

3.2 To improve the method of producing the mycorrhizal inoculum for field trial.

The expriment was conducted in the glasshouse by using Menge's pot culture technique. The multiplied number of mycorrhiza spores Glomus mosseae were obtained by inoculate mycorrhizal fungi in susceptible host plant grown in the pot. Sterilized peat, sand, clay, loamy sand, vermiculite, rice husk, coconut coir, sand + peat, sand + clay were used as the medium growth. Cowpeas, Nepia grass, sudan grass, corn, sorghum and onion were used as the host-plant to compare their effectiveness grown in the selected medium. Each experiment was employed in Randomized Complete Block Design with 6 replications, the treatments were kinds of medium growth and the host species. Five to six seeds were used for each pot. After germinated only 3 plants will keep for study. Once a week,every treatment will be applied with 1/2 the standard Hoagland's solution minus phosphorus. After germinated one month, soils and root samples of the plants from each treatment were collected to examine for the number of spores and percent root colonization every month. The data was analyzed for statistical comparison of spore production by using ANOV and Duncan's multiple range test.

## 4. Results and Discussion

### 4.1 To determine the survival of mycorrhizal soybeans and mungbeans following flooding rice.

Inoculated soybeans field :

Eventhough the result in table 1-5 showed no statistical differences among inoculated and uninoculated plots on rice height, dry weight and yield but rice grown in the plot inoculated with Glomus intraradcies, and Glomus deserticola shown to obtained the highest yield either applied or non-applied of phosphorus fertilizer. The pot inoculated with Acaulospora scrobiculata seem to be a non - effective species compare to the control. In generally, inoculated VAM plot gave a higher yield of rice than control plot either applied or not applied with phosphorus fertilizer.

No colonization of VAM in the rice root was found eventhough number of spores were found in every plot including uninoculated. The number of spores decreased with time. Indiginous species found in control plot seem to be tolerance to flooding than inoculated species because the indiginous species did not decreased as much as other inoculate species during flooding period.

Inoculated mungbeans field:

Table 6-10 showed the result of flooded rice grown after inoculated mungbean field. There were slighly statistical difference on height of rice inocculated with VAM. No differences were found on dry weight and yield. Rice grown in the control plot seem to give the better yield. Only two species of VAM which enhanced the crop yield of rice. The others VAM species gave the lower yield compare to control. The incidence of spores survival and root colonization were the same as in soybean field. Number of spores were found in every plot including control but they were decreased with time which was affected by flooding during rice growing period.

4.2 To improve the method of producing the mycorrhizal inoculum for field trial.

Selection medium for host plant

Results in table 11-12 indicated that when peanuts were grown as the host cultivar, peat and sand + clay were the best growth media to give the highest height, fresh and dry weight, the number of spores and percent root colonization.

Selection of VA mycorrhiza plant host.

Results in table 13 - 15 showed that at 120 days corn and sorghum gave the higher root dry weight than the other plants. Soybean, corn and sorghum produce more spores and have higher percentage of root colonization than the other plant respectively. So soybean, corn and sorghum should be selected as the host plant for producing inoculum of VAM spores and infected root.

Table 1. Average height (cm) of rice grown after mycorrhizae inoculated soybean at Chiangmai province.

| Species | 60 days | | | 90 days | | | 120 days | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pl | PO | Mean | Pl | PO | Mean | Pl | PO | Mean |
| MOS 156 # 6 | 70.9 | 68.3 | 69.60 | 79.0 | 80.4 | 79.7 | 111.2 | 108.5 | 109.85 |
| Glomus # 17 | 69.8 | 68.3 | 69.05 | 79.7 | 79.8 | 79.75 | 110.2 | 110.2 | 110.20 |
| INT 183 # 26 | 71.7 | 70.2 | 70.95 | 79.8 | 80.2 | 80.00 | 112.0 | 108.7 | 110.35 |
| ASCR # 22 | 68.3 | 72.8 | 70.55 | 79.3 | 79.2 | 79.25 | 105.3 | 108.0 | 106.65 |
| ETU 157 # 31 | 68.7 | 66.0 | 67.35 | 79.5 | 79.7 | 79.60 | 108.8 | 107.0 | 107.90 |
| DES 160 # 39 | 68.4 | 70.2 | 69.30 | 79.7 | 78.8 | 79.25 | 110.2 | 108.9 | 109.55 |
| Control | 69.1 | 66.4 | 67.75 | 82.0 | 79.6 | 80.9 | 110.1 | 107.8 | 108.85 |
| Mean | 69.55 | 68.88 | 69.22 | 79.85 | 79.67 | 79.77 | 109.68 | 108.41 | 109.05 |
| C.V.P.(%) | | 4.1 | | | 5.8 | | | 2.7 | |
| C.V.Species(%) | | 6.9 | | | 2.8 | | | 3.0 | |

Table 2. Average shoot dry weight (gm/Pl) of rice grown after mycorrhizae inoculated soybean at Chiangmai province.

| Species | 60 days | | | 90 days | | | 120 days | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pl | PO | Mean | Pl | PO | Mean | Pl | PO | Mean |
| MOS 156 # 6 | 14.4 | 8.6 | 11.50 | 35.7 | 25.3 | 30.50 | 30.1 | 24.1 | 27.10 |
| Glomus # 7 | 18.3 | 10.8 | 14.55 | 29.1 | 29.6 | 29.35 | 29.2 | 29.7 | 29.45 |
| INT 183 #26 | 14.6 | 12.5 | 13.55 | 26.1 | 33.9 | 30.00 | 25.2 | 28.6 | 26.90 |
| ASCR # 22 | 14.5 | 11.3 | 12.90 | 26.1 | 28.3 | 27.20 | 30.7 | 24.8 | 27.75 |
| ETU 157 # 31 | 16.9 | 13.7 | 15.20 | 28.8 | 28.7 | 28.75 | 31.3 | 21.9 | 26.60 |
| DES 160 # 39 | 15.0 | 15.7 | 15.35 | 27.9 | 35.2 | 31.55 | 30.4 | 22.3 | 26.35 |
| control | 19.2 | 15.0 | 17.10 | 27.6 | 24.1 | 25.85 | 27.2 | 30.2 | 28.70 |
| Mean | 16.12 | 12.51 | | 28.75 | 29.30 | | 29.15 | 25.90 | |
| C.V.P.(%) | | 17.7 | | | 25.0 | | | 14.2 | |
| C.V.Species(%) | | 51.1 | | | 30.1 | | | 23.7 | |

Table 3. Average yield of rice grown after mycorrhizae inoculated soybean at Chiangmai province.

| Species | Yield (kg/ha) | | |
|---|---|---|---|
| | P1 | P0 | Mean |
| MOS 156 # 6 | 4908.6 | 4471.4 | 4690.00 |
| Glomus # 17 | 4883.5 | 4508.2 | 4695.85 |
| INT 183 # 26 | 4815.5 | 4602.1 | 4808.8 |
| ASCR # 22 | 4385.8 | 4496.5 | 4441.15 |
| ETU 157 # 31 | 4816.7 | 4575.0 | 4695.85 |
| DES 160 # 39 | 4939.0 | 4671.4 | 4805.20 |
| Control | 4725.7 | 4506.5 | 4616.10 |
| Mean | 4782.11 | 4575.87 | |
| C.V.P.(%) | 11.6 | | |
| C.V.Species(%) | 10.2 | | |

Table 4. Percent root colonization of rice grown after inoculated soybean at Chiangmai province. (1986)

| Species | 60 days | | | 90 days | | | 120 days | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pl | PO | Mean | Pl | PO | Mean | Pl | PO | Mean |
| MOS 156 # 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glomus # 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| INT 183 # 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ASCR # 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ETU 157 # 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DES 160 # 39 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Control | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

Table 5. Number of spore in 100 gram soil grown rice after mycorrhizae inoculated soybean at Chiangmai province. (1986)

| Species | 60 days | | | 90 days | | | 120 days | | |
|---|---|---|---|---|---|---|---|---|---|
| | P1 | P0 | Mean | P1 | P0 | Mean | P1 | P0 | Mean |
| MOS 156 # 6 | 103 | 90 | 96.5 cd | 61 | 53 | 57.0 c | 58 | 36 | 47.0 |
| Glomus # 17 | 158 | 109 | 133.5 bc | 50 | 59 | 54.5 c | 42 | 71 | 56.5 |
| INT 183 # 26 | 273 | 118 | 195.5 a | 79 | 67 | 73.0 ab | 88 | 80 | 84.0 |
| ASCR # 22 | 152 | 121 | 136.5 bc | 59 | 73 | 66.0 abc | 72 | 53 | 62.5 |
| ETU 157 # 31 | 90 | 69 | 79.5 d | 66 | 54 | 60.0 bc | 81 | 64 | 42.5 |
| DES 160 # 39 | 185 | 169 | 177.0 a | 73 | 83 | 78.0 a | 116 | 73 | 94.5 |
| Control | 106 | 125 | 115.5 bc | 65 | 74 | 69.5 abc | 94 | 59 | 76.5 |
| Mean | 152.4 | 114.4 | | 64.7 | 66.1 | | 80.4 | 62.3 | |
| C.V.P. (%) | | 10.2 | | | 11.0 | | 24.6 | | |
| C.V.Speies(%) | | 6.3 | | | 5.8 | | 23.2 | | |

In a column, means followed by different letter are significantly different at the 5 % level by DMRT.

Table 6. Average height (cm) of rice grown after mycorrhizae inoculated mungbean at Kalasin province.

| Species | 60 days | | | 90 days | | | 120 days | | |
|---|---|---|---|---|---|---|---|---|---|
| | P1 | P0 | Mean | P1 | P0 | Mean | P1 | P0 | Mean |
| MOS 156 # 6 | 65.7 | 62.7 | 64.20 | 99.1 | 86.9 | 93.00 | 107.0 | 102.1 | 104.6 ab |
| Glomus # 17 | 69.0 | 61.6 | 65.30 | 96.8 | 94.5 | 95.65 | 103.7 | 101.8 | 102.75 b |
| INT 183 # 26 | 66.3 | 68.7 | 67.50 | 97.7 | 97.5 | 97.60 | 104.7 | 103.0 | 103.85 ab |
| ASCR # 22 | 68.6 | 62.5 | 65.60 | 98.1 | 93.1 | 95.60 | 105.4 | 102.8 | 104.15 ab |
| ETU 157 # 31 | 68.7 | 62.4 | 65.55 | 97.4 | 90.1 | 93.75 | 104.7 | 101.8 | 103.25 ab |
| DES 160 # 39 | 67.7 | 65.0 | 66.35 | 95.2 | 92.6 | 93.90 | 105.2 | 104.7 | 104.95 ab |
| Control | 67.6 | 65.4 | 66.50 | 96.4 | 97.2 | 96.80 | 105.7 | 105.7 | 105.7 a |
| Mean | 67.65 | 64.05 | | 97.24 | 93.12 | | 105.55 | 103.14 | |
| C.V.P.(%) | | 4.6 | | | 9.8 | | | 2.5 | |
| C.V.Species (%) | | 6.9 | | | 5.4 | | | 2.4 | |

In a column, means followed by different letter are significantly different at 5 % level by DMRT.

Table 7. Average shoot dry weight (gm/pl) of rice grown after mycorrhizae inoculated mungbean at Kalasin province.

| Species | 60 days | | | 90 days | | | 120 days | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pl | PO | Mean | Pl | PO | Mean | Pl | PO | Mean |
| MOS 156 # 6 | 30.3 a | 22.1 abc | 26.2 | 23.9 | 14.8 | 19.35 | 24.6 | 17.6 | 21.10 |
| Glomus #17 | 21.0 b | 17.1 c | 19.05 | 20.4 | 20.2 | 20.30 | 17.5 | 16.0 | 16.75 |
| INT 183 # 26 | 21.1 b | 25.8 a | 23.45 | 19.0 | 19.4 | 19.20 | 19.4 | 19.9 | 19.65 |
| ASCR #22 | 27.4 a | 19.3 bc | 23.35 | 22.9 | 18.9 | 20.90 | 21.9 | 18.3 | 20.10 |
| ETU 157 # 31 | 21.2 b | 24.5 ab | 22.86 | 16.7 | 16.1 | 16.40 | 17.2 | 17.9 | 17.55 |
| DES 160 #39 | 26.1 ab | 20.4 abc | 23.25 | 17.2 | 17.5 | 17.35 | 21.0 | 18.9 | 19.95 |
| Control | 21.0 b | 23.4 ab | 22.2 | 17.3 | 19.2 | 18.25 | 17.9 | 22.6 | 20.25 |
| Mean | 24.0 | 21.8 | | 19.6 | 18.0 | | 19.9 | 18.7 | |
| C.V.A.(%) | | 10.4 | | | 25.0 | | | 10.5 | |
| C.V.Species(%) | | 16.8 | | | 26.7 | | | 34.3 | |

In a column, means followed by different letter are significantly different at 5 % level by DMRT.

Table 8. Average yield of rice grown after mycorrhizae inoculated mungbean at Kalasin province.

| Species | Yield (kg/ha) | | |
|---|---|---|---|
| | P1 | P0 | Mean |
| MOS 156# 6 | 4053.9 | 3523.7 | 3788.80 |
| Glomus # 17 | 3676.0 | 3336.0 | 3506.00 |
| INT 183 # 26 | 3899.5 | 4241.8 | 4070.65 |
| ASCR # 22 | 4333.7 | 3482.0 | 3907.85 |
| ETU 157 # 31 | 3565.5 | 3189.7 | 3377.60 |
| DES 160 # 39 | 3765.9 | 4083.2 | 3924.55 |
| Control | 3991.3 | 3882.8 | 3937.05 |
| Mean | 3897.97 | 3677.03 | |
| C.V.P.(%) | | 15.9 | |
| C.V.Species(%) | | 19.0 | |

Table 9. Percent root colonization of rice grown after inoculated mungbean at Kalasin province. (1986)

| Species | 60 days | | | 90 days | | | 120 days | | |
|---|---|---|---|---|---|---|---|---|---|
| | P1 | P0 | Mean | P1 | P0 | Mean | P1 | P0 | Mean |
| MOS 156 # 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Glomus # 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| INT 183 # 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ASCR # 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| ETU 157 # 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| DES 160 # 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Control | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Mean | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

(+) only 2 samples from 500 samples were found infection of VAM.

Table 10. Number of spore in 100 gram soil grown rice after mycorrhizae inoculated mungbean at Kalasin province.

| Species | 60 days | | | 90 days | | | 120 days | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pl | PO | Mean | Pl | PO | Mean | Pl | PO | Mean |
| Mos 156 # 6 | 74 | 34 | 54.0 | 48 | 70 | 59.0 a | 18 | 20 | 19.0 |
| Glomus # 17 | 57 | 41 | 49.0 | 29 | 41 | 35.0 ab | 37 | 28 | 32.5 |
| INT 183# 26 | 113 | 72 | 92.5 | 24 | 58 | 41.0 ab | 48 | 22 | 35.0 |
| ASCR # 22 | 42 | 50 | 46.0 | 42 | 36 | 39.0 b | 21 | 56 | 38.5 |
| ETU 157 # 31 | 50 | 50 | 50.0 | 42 | 158 | 100.0 a | 12 | 50 | 31.0 |
| DES 160 # 39 | 54 | 58 | 56.0 | 50 | 39 | 44.5 ab | 20 | 35 | 27.5 |
| Control | 56 | 64 | 60.0 | 34 | 44 | 39 ab | 25 | 23 | 24.0 |
| Mean | 63.7 | 52.7 | | 38.4 | 53 7 | | 25.9 | 33.4 | |
| C.V.P. (%) | | 35.3 | | | 51.5 | | | 12.3 | |
| C.V. Species (%) | | 26.5 | | | 22.9 | | | 30.3 | |

Table 11. Average height root of mycorrhizal inoculated peanuts grown in different media.

| Treatments | Height (cm) | | Dry weight/pl(gm) | |
|---|---|---|---|---|
| | 60 days | 90 days | 60 days | 90 days |
| 1. Sand | 29.7 de | 34.5 e | 1.82 cd | 1.38 c |
| 2. Clay | 48.3 abc | 58.0 abc | 4.72 ab | 3.49 abc |
| 3. Peat | 54.9 a | 66.5 a | 2.98 bcd | 4.73 a |
| 4. Loamy sand | 28.5 e | 34.0 e | 1.08 d | 1.50 c |
| 5. Rice husks | 38.8 cde | 39.8 de | 2.24 bcd | 1.67 bc |
| 6. coconut coir dust | 42.7 bc | 49 0 bcde | 3.06 abc | 2.34 bc |
| 7. Sand + Peat | 40.7 bc | 43.5 cde | 3.57 abc | 2 59 bc |
| 8. Sand + clay | 51.9 ab | 63.3 ab | 5.20 a | 5.03 a |
| 9. Vermiculite | 49.5 abc | 52 7 abcd | 3.86 abc | 3.72 ab |

-Means followed by different letter are significantly different at the 5 % level by DMRT.

Table 12. Average number of spores and percent peanuts root colonization of mycorrhizal inoculated peanuts grown in different media

| Treatment | No. of spores/100 g. growth media | | % root colonization | |
|---|---|---|---|---|
| | 60 days | 90 days | 60 days | 90 days |
| Sand | 105 b | 160 a | 6 b | 27 b |
| Clay | 284 a | 315 a | 8 b | 35 b |
| Peat | 345 a | 351 a | 17 a | 58 a |
| Loamy sand | 21 b | 164 a | 6 b | 25 b |
| Rice husks | 2 c | 12 b | 11 ab | 40 ab |
| Coconut coir dust | 139 a | 140 a | 14 a | 48 a |
| Sand + Peat | 245 a | 294 a | 9 b | 39 b |
| Sand + Clay | 313 a | 370 a | 12 a | 60 a |
| Vermiculite | 144 a | 156 a | 4 b | 16 b |

- Means followed by a different letter are significantly different at the 5 % level by DMRT

Table 13. Root dry weight of different kinds of plant host inoculated by *Glomus fasiculatum*.

| Plant host | Root dry weight/Pl(gm) | | | |
|---|---|---|---|---|
| | 30 days | 60 days | 90 days | 120 days |
| 1. Onion | 6.85 a | 6.94 a | 4.92 b | 3.80 c |
| 2. Sorghum | 6.60 a | 8.38 a | 8.29 a | 8.11 b |
| 3. Corn | 4.87 a | 1.30 c | 3.91 b | 9.01 a |
| 4. Soybean | 1.67 c | 3.59 b | 3.60 b | 3.68 c |
| 5. Mungbean | 1.54 c | 0.51 c | 0.34 c | 1.28 d |
| 6. Peanut | 2.56 b | 3.80 b | 1.72 c | 1.20 d |
| 7. Sabi | 0.42 d | 0.72 c | 0.71 c | 1.20 d |
| 8. Bahia | 1.17 c | 0.46 c | 0.25 c | 1.18 d |
| 9. Kudsu | 1.37 c | 2.42 b | 2.89 b | 4.59 c |
| 10. Chinese Cabbage | 0.61 d | 0.78 c | 1.23 c | 1.36 d |

In a column, means followed by a different letter are not significantly different at the 5 % level by DMRT.

Table 14. VAM spores in the soil grown different kinds of plant host inoculated by *Glomus fasiculatum*

| Plant host | Spores/100 gm. soil | | |
|---|---|---|---|
| | 60 days | 90 days | 120 days |
| 1. Onion | 253 c | 342 c | 312 c |
| 2. Sorghum | 293 b | 413 b | 410 a |
| 3. Corn | 269 bc | 365 bc | 415 a |
| 4. Soybean | 333 a | 421 a | 431 a |
| 5. Mungbean | 205 d | 313 d | 329 c |
| 6. Peanut | 253 c | 372 c | 379 b |
| 7. Sabi | 137 f | 284 c | 310 c |
| 8. Bahia | 170 e | 319 c | 325 c |
| 9. Kudsu | 250 c | 368 c | 390 ab |
| 10. Cabbage | 130 f | 139 e | 120 d |

In a column, means followed by a different letter are not significantly different at the 5 % level by DMRT.

Table 15. Percent root colonization of different kinds of plant inoculated by *Glomus fasiculatum*.

| Plants | Root colonization (%) | | |
|---|---|---|---|
| | 60 days | 90 days | 120 days |
| 1. Onion | 46 a | 80 a | 80 a |
| 2. Sorghum | 12 bc | 60 a | 80 a |
| 3. Corn | 20 b | 76 a | 80 a |
| 4. Soybean | 32 a | 64 a | 84 a |
| 5. Mungbean | 6 c | 10 c | 14 cd |
| 6. Peanut | 10 bc | 46 b | 20 c |
| 7. Sabi | 6 c | 6 cd | 8 d |
| 8. Bahia | 8 c | 10 c | 10 c |
| 0. Kudzu | 10 bc | 27 b | 56 b |
| 10. Cabbage | 0 d | 0 d | 0 d |

In a column, means followed by a different letter are not significantly different at the 5 % level by DMRT.