

**EFFICACY EVALUATION OF HYFER PLUS
(GREEN) AS FOLIAR FERTILIZER
FOR BANANA**

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EFFICACY EVALUATION OF HYFER PLUS GREEN FOLIAR FERTILIZER FOR BANANA (*Musa sapientum*)

ABSTRACT

Field trials designed to assess the efficacy of HYFER PLUS green foliar fertilizer for banana was conducted at Barangay Inao-awan, Cavinti, Laguna from November 2010 to March 2011. HYFER PLUS applied in addition to chemical fertilizer was able to increase plant height, leaf length, leaf area index, stem circumference, weight of hands per bunch and yield of banana. Based on aggregated computations of all parameters irregardless of treatments, 12 % increase is attributed to application of Hyfer to lakatan banana.

INTRODUCTION

In the Philippines, banana is considered as the most economically and socially important fruit crop. Banana belongs to the family *Musaceae* under the order *Scitaginae* and it consists of two genera: *Ensete* and *Musa*. There are three species that are indigenous to the Philippine island: *Musa balbasiana* Colla, *Musa acuminata* Colla (saging maching), and *Musa textiles* Nee (abaca). Banana produces fruit without undergoing fertilization or sexual union. It is considered as a perennial herb but it bears fruit only once. Banana can be used for desert and for cooking. Bananas also have different morphological habits. Some have erect leaves (e.g. Inarbal, Lakatan), intermediate (Saba, Latundan) and drooping leaves (Matavia, Manang). Bananas can be seedless or can occasional seeds.

Among the ten Philippine exports, banana is considered second to coconut in terms of dollar earnings. In Southeast Asia, only the Philippines made it to the top five major suppliers of banana in 2002 together with India, Ecuador, Brazil and China (Molina et. al, 2002). In 2003, there are 409.8 hectares devoted to banana, which produced 5, 369.0 metric tons with a value of 30.7 billion pesos (BAS, 2003). Banana is grown throughout the country but the large farms are mostly located in Minadanao. Southern Minadanao tops the banana chips crckers and catsup. Lakatan, latundan and saba are the cultivars planted for the local market while Cavendish type cultivars like giant Cavendish, dwarf Cavendish, robusta, umalag, grande naine and Ecuadorian are being cultivated for export market (Molina et. al, 2002).

OBJECTIVES

1. To assess the efficacy of using HYFER PLUS green foliar fertilizer in the growth of lakatan banana compared to chemical fertilizer.
2. To compare the height, leaf length and diameter, pseudostem diameter, number of suckers and number of green and dead leaves of banana applied with HYFER PLUS foliar fertilizer and inorganic fertilizer.
3. To identify the efficient treatment in single or in combination of HYFER PLUS fertilizer with that of inorganic fertilizer

REVIEW OF RELATED LITERATURES

Banana Cultivars

Taxonomy. Banana, *Musa sapientum*, belongs to the family Musaceae of the order Scitamineae. This order also includes Cannaceae, Marantaceae, Zingiberaceae, Stultiziaceae and Lowiaceae. The family Musaceae is characterized to have spirally arranged leaves and bract, hermaphroditic flower arranged in a single inflorescence and has many seeds. *Musa* and *Ensete* are the only known genera of this family (Strover and Simmonds, 1987).

The genus *Musa* is subdivided into five major sections namely *Australimusa*, *Callimusa*, *Eumusa*, *Rhodoclamys* and *Ingentimusa*. *Abaca* (*M. textiles*) and *Fe'i* banana belong to the section *Australimusa*. Section *Callimusa* which is mainly used as ornaments has only one species, *M. coccinea*. The largest and widest distributed section of *Musa* is the *Eumusa*. It includes the edible banana and can be a source of minor fibers and vegetables. Similar to *Callimusa*, *Rhodoclamys* is also an ornamental type of banana. Lastly, the section *Ingentimusa* contain only one species of banana named *M. ingens*. It is characterized to have 14 chromosomes and originated from Papua New Guinea highlands (Strover and Simmonds, 1987).

Philippine Cultivars/Varieties of Banana. There are six major banana cultivars in the Philippines namely Bungulan, Giant Cavendish, Lakatan, Latundan, Saba and Señorita (Recel et al., 2004).

Cavendish plantation in the Philippines are mainly in the Southern Philippines particularly in the Central and Southern Mindanao. These areas have fertile soil, well-distributed rainfall and seldom visited by typhoon. Lakatan, Latundan and Bungulan are widely grown in the Southern Tagalog region as well as in the Northern and Central Mindanao. Saba on the other hand is propagated in the Western region of the Visayas and in some parts of the Southern Tagalog region (Angeles and Namuco, 1999).

Bungulan. A commercial cultivar distributed by the Personal access network of Association of Southeast Asian Nation (Pan ASEAN). The fruit is characterized to be medium to large in size, light green to greenish yellow in color and with soft, aromatic and sweet flesh (Hassan and Pantastico, 1990). The fruit of bungulan is circular and have no seed while the peel is thick and appears to be green when immature and ripe. The fruiting period is up to 12 months (Valmayor et al., 2002).

Giant Cavendish. Mainly for export purposes. Its fruit is big having a thick skin/peel and turns yellow when ripe. The flesh is creamy, white, aromatic and sweet. Every hand of a giant Cavendish has 16 to 20 fingers and each bunch consist of 14 to 20 hands (Angeles and Namuco, 1999 and Hassan and Pantastico, 1990). The fruit of cavendish is greenish – yellow under normal temperature. Each bunch weighs about 60 kilogram. From the day of shooting, it takes 105 – 120 days for the fruit to mature. Cavendish can grow up to a height of 3 – 5 meters. Cavendish will bear fruits after 9 months from planting if the sucker used is 3 – 5 months old with a height of 1 to 1.5 meters (Espino et al., 2001). Emergence of leaves differs between upland and lowland conditions. In upland, it takes about 11 – 15 days while in lowland, it only takes 7 – 9 days before the

first leaf emerge. From the emergence of the first leaf to maturity, it can produce up to 36 leaves. Each leaf can grow as much as 4 meter long and more than a meter wide (Espino et al., 2001).

Lakatan. The most highly priced cultivar in the Philippines and is traded locally. It is mainly use as food supplement. The size of its fruit is medium to large and the color is orange – yellow when ripe. The peel of its fruit is thick and leaves some rags on the pulp when peeled off. The flesh is firm, light orange and aromatic with very good flavor (Angeles and Namuco, 1999 and Hassan and Pantastico, 1990). Each bunch of lakatan consist of 10 – 12 hands and each hand has around 12 – 20 fingers. The finger size ranges from 10 – 20 centimeter in length and 2 – 2.5 centimeter in diameter. From the day of shooting, the fruit will mature in 75 to 80 days (Espino et al., 2001).

Latundan. Most widely distributed in the Philippines. Like Lakatan, it is also considered as a dessert cultivar. Latundan fruit can grow from small to medium in size, and it become yellow when ripe. It can be easily detached from the hand when matured. The peel is very thin and develops numerous dark brown to black spots when fully ripe. The flesh is soft, white and with slightly subacidic taste. Every hand of latundan has around 12 to 18 fingers and every bunch consists of 5 to 9 hands (Angeles and Namuco, 1999 and Hassan and Pantastico, 1990).

Saba. The most important local commercial cultivar. Its fruit is 10 to 15 centimeter long and angular. The skin is thick and becomes yellow upon maturity. Saba fruit is being cooked first before consumption, unlike the other cultivars which are readily eaten when ripe (Hassan and Pantastico, 1990). Every hand of saba has about 12 to 20 fingers and every bunch consists of 10 to 16 hands (Angeles and Namuco, 1999).

The fruit matures in 150 – 180 days from the day of shooting. Generally, the male bud is used as vegetable. Saba can grow up to about 5 – 6 meters (Espino et al., 2001).

Señorita. Consist of five to six (5-6) hands with about 14 - 20 fingers per hand. It takes 15 months before it is harvested after transplanting. It has a small fruit and turns yellow to orange when ripe. It can grow up to a height of 2.1 to 2.9 m. It can also be used as a dessert (Recel et al., 2004).

Other varieties of banana being grown in the country are Dali-an, Binaktong, Bata-bata, Patag, Morado, Pitogo Los Baños, Tindok, Gloria, Granda and Tumok. Bata-bata has the lightest bunch while Patag have the heaviest bunch. On the other hand, Dali-an has the longest gestation period, which is about 21 months and 25 days while Binaktong has the shortest, with 7 months gestation period (Valmayor et al., 2002 and Morton, 1987).

Fertilization

Banana responds well to fertilizer treatment using chemical rather than organic sources. But for economic reasons organic fertilizers are used as supplements. The amount to be applied depends on nutrient availability and absorption by plants, crop logging, fertilizer usage in the plantation, rainfall pattern of the area, soil texture and leaf analysis (Lantican, 1991 and Simmonds, 1959). The best available guide to good fertilizer practice is attained by critical combination of soil analysis and factorial experiment (Simmonds, 1959).

Nitrogen deficiency is indicated by yellowing of the young leaves, but if the condition is not too severe, it turns back to green within a week or so after emergence (PCARRD, 1988, Shanmugavelu et. al, 1992 and Simmonds, 1959). If root growth is

satisfactory, the condition can easily be corrected by ammonium sulfate application or a much faster way is foliar spraying of urea.

Anochili and Tindall (1986) and Shanmugavelu (1992) believed that phosphorus produces healthy rhizomes, strong root system, good flowering setting and favorable to vegetative growth. Bananas planted on phosphate deficient soil stopped growing and subsequently die. The cessation of growth was accompanied by bad leaf color coupled with severe marginal scorching and shrinking of the older leaves, poor root development and rotting of the base of the corm. These plants were said to respond excellently to fertilizers application (Simmonds, 1959 and Soils and Fertilizer in Taiwan, 1988).

In potassium deficiency, early growth of the plant is affected but as it gets older leaves turns yellow at the tips and distal margins. Then yellowing spreads very rapidly in a proximal direction until the whole leaf has withered. In severely affected fields, there is also some brownish water soaking of the tissues in the center of the corm and in some cases, the brownish water-soaked patches that can be seen at the base of the petiole. The condition is associated with low soil potash levels or near the critical levels which is sometimes related to high pH and presence of much free lime (Simmonds, 1959)

Iron deficiency was observed on banana plantation areas especially under alkaline soils. It is seen as interveinal chlorosis of the young leaves, turning into a general chlorosis as severity progresses.

Magnesium deficiency has a symptom of blue-tinged blotching and striation of the petioles.

METHODOLOGY

Time and Place of Study

The experiment was conducted in branagay Inao-awan, Cavinti, Laguna from November 2010 to March 2011. The variety that will be used is lakatan variety.

Framework and Treatments

Preselected sites grown to lakatan banana in Cavinti, Laguna were divided into six (6) treatments and three (3) replications arranged in a randomized block design. Each plot contained a total of 25 banana plants (5 bananas planted in a row and 5 bananas planted in a column). The distance of planting was 2 m between rows and 3 m between hills. Hyfer foliar fertilizer was applied at the rate of 3.5 ml per liter of water per plant or 60ml/16 liters. It was applied in addition to the monthly application of chemical fertilizer based on the designated treatments. The age of the plant at application time of Hyfer was towards harvest (10-12th months after transplanting). The growth of the banana (in terms of leaf length and width, height, pseudostem diameter and number of suckers) were measured and monitored from ten (10) randomly selected and tagged banana plants. The results plant growth and yield parameters and yield were analyzed statistically and correlation analysis was performed using IRRISTAT (Irristat, 2002). A total of 18 plots was designated as experimental sites for the study.

Growth Parameters Data Collection

Growth parameter data were taken from nine representative plants within the harvestable area or three plants from the three inner rows of each plot. The representative plants will be the source of the data for plant height, leaf width and length, number of leaves and pseudostem diameter.

Table 1. Treatment number, code and description of the efficacy experiment on banana planted in Cavinti, Laguna.

| Treatment # | Treatment Code | Description |
|-------------|-------------------------|--|
| 1 | Control | No fertilizer application |
| 2 | HRR | Application of chemical fertilizer at half recommended rate |
| 3 | FRR | Application of chemical fertilizer at full recommended rate |
| 4 | HRR + HHFF ¹ | Application of chemical fertilizer at half recommended rate and half the recommended rate of Hyfer Foliar Fertilizer |
| 5 | FRR + HHFF ¹ | Application of chemical fertilizer at full recommended rate and half the recommended rate of Hyfer Foliar Fertilizer |
| 6 | HFF | Hyfer Foliar Fertilizer at full recommended rate |

¹Recommended application rates are 60ml/16 liters of water (based on manufacturer's product).

Plant Height

This was taken by measuring the length of the plant from the soil surface to the intersection of the flag leaf and the second leaf.

Leaf Length and Width

The leaf width and length was measured by selecting the second fully expanded leaf. The principle behind this sampling technique is that this leaf is the site where there is maximum photosynthetic activity. The width of the leaf is taken at the middle of the whole leaf, measuring across the tip of both sides of the leaf margin. Furthermore, leaf length is measured at the bottom of the leaf margin running to the tip of the upper leaf margin. The data on leaf length and width was used for calculating the LAI (leaf area index).

Pseudostem Diameter

The pseudostem diameter was measured approximately at 10 cm above the ground using a Vernier caliper. For the mature bananas, the pseudostem diameter was taken at breast height or approximately 1.5 meter above the soil using a tape measure.

Number of Leaves

The mature and dead leaves of the representative plants was counted.

Number of Suckers

The number of suckers of the representative plants was counted. It is a measure of the viability of the mother plant such that it is an indication of the interaction of the fertility of the soil and health of the plant.

Data Analysis and Interpretation

Data gathered was analyzed and subjected to Analysis of Variance (ANOVA). Treatment means were compared using Duncan's Multiple Range Test (DMRT) at 5% level of significance.

RESULTS AND DISCUSSION

The growth of banana as represented by plant height (from 10-12th month after transplanting) planted in Cavinti, Laguna applied with different treatments of chemical fertilizer and in combination with Hyfer Plus foliar fertilizer is presented in Table 2 and Figure 1. During the 10th month the tallest plants were those applied with the full rate of chemical fertilizer in combination with Hyfer Plus (198.93cm). This height was not significantly different from those plants applied with the full rate of chemical fertilizer (195.70cm) but there was a tendency for an increased in height when Hyfer plus was added to the chemical fertilizer. The same trend was observed when comparison was between those applied with half the recommended rate of chemical fertilizer plus Hyfer (HRIF + HYFER) as against those bananas applied with half the recommended rate of chemical fertilizer (HRIF), 175.23 vs 168.70 cm, respectively. When no application of fertilizer was done (control), the height of the plants was 150.63cm. Irregardless of treatment when compared with the control, there was an increased of 15%. But when Hyfer was applied in addition to chemical fertilizer, there was a nine percent (9%) increased in plant height compared with chemical fertilizer alone.

On the 11th month after transplanting, the same trend was observed where addition of Hyfer to chemical fertilizer improved the height of plants against those with just fertilizer or with the control (Table 2 and Figure 1). The percentage increase compared with the control without regard to treatments was 26%. The addition of Hyfer to the fertilizer application produced the same incremental percentage from month 10 that is 9% in terms of plant height.

For the 12th month after transplanting, the incremental percentage increase in plant height over the control and the application of fertilizer alone remains stable for both comparisons at 26% and 9%, respectively. The same trends in plant height measurements are the same where addition of Hyfer performed better than just the application of chemical whether in full or half rate (FRIF and HRIF).

One possible explanation for this is that, at this time the plant is already on the reproductive stage that nutrients applied are purposively drawn towards the fruit of the banana rather than the growth. But one thing good about these results is that addition of Hyfer produced stable increase percentage increases in height that make the plant stable

under high velocity wind conditions and at the same time nutrients are distributed evenly within the plant system.

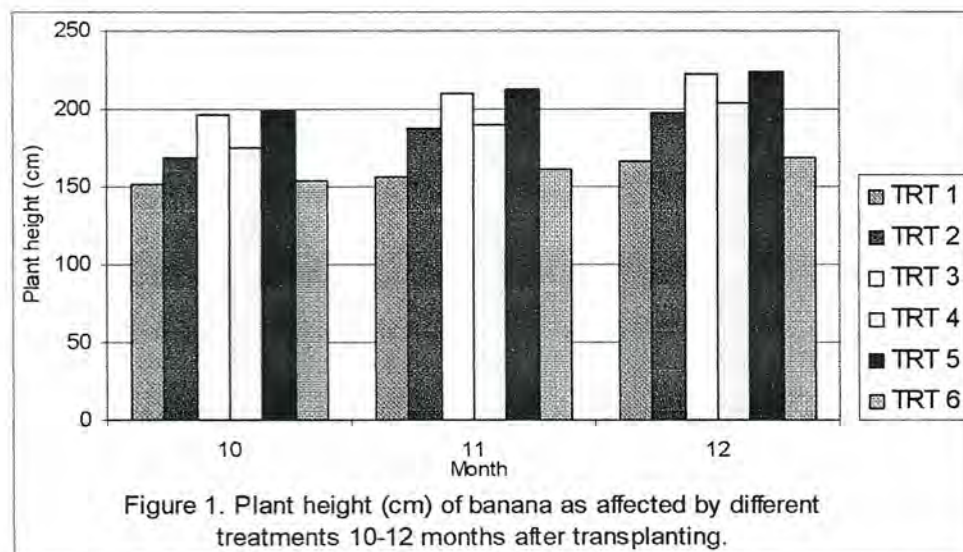
Table 2. Plant height (cm) of banana at 10-12 months after transplanting as affected by different treatments.

| Treatment | Months after Transplanting | | |
|--------------|----------------------------|---------|---------|
| | 10 | 11 | 12 |
| Control | 150.63a | 156.87a | 166.40a |
| HRIF | 168.70b | 186.90b | 197.67b |
| FRIF | 195.70c | 209.77c | 222.07c |
| HRIF + HYFER | 175.23b | 190.20b | 203.30b |
| FRIF + HYFER | 198.93c | 212.73c | 223.83c |
| HYFER | 153.67c | 161.07a | 168.73a |
| LSD (5%) | 6.83505 | 4.80235 | 6.49339 |

Note:

HRIF = Half the Recommended Rate of Inorganic Fertilizer

FRIF = Full Rate of Recommended Inorganic Fertilizer



The second growth parameter measured for the same period was leaf length. This was gathered by measuring the length of the third lead from the tip to the end of the sheath. The leaf is the site of food production where chlorophyll is produced. The data for this parameter is shown in Table 3 and Figure 2. The same results as that of plant height were observed starting from the 10th to the 12 month after transplanting. For all three months, the addition of Hyfer to the full rate of chemical fertilizer produced the longest leaf (188.23, 196.37 and 221.67cm). The application of Hyfer to plants without fertilizer has

the tendency to improved leaf length by as much as five percent (5%). Without any regard to treatment the percentages was observed to be decreasing (26, 32 and 21%) for the three months where leaf length was measured. As for the treatments with Hyfer, the percentages were more stable at 9, 7 and 9 %, respectively. Again this could help the plant cope with sudden changes in weather condition such as high winds and heavy rainfall events.

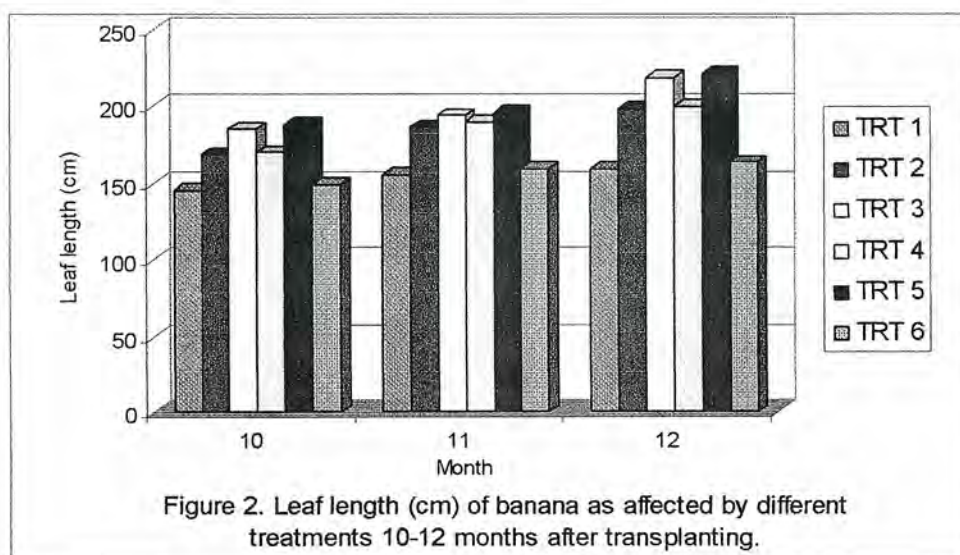
Table 3. Plant leaf length (cm) of banana at 10-12 months after transplanting as affected by different treatments.

| Treatment | Months after Transplanting | | |
|--------------|----------------------------|---------|---------|
| | 10 | 11 | 12 |
| Control | 145.07a | 155.80a | 159.50a |
| HRIF | 168.73b | 186.43b | 198.47b |
| FRIF | 185.33c | 194.33c | 218.60c |
| HRIF + HYFER | 170.17b | 189.37b | 200.03b |
| FRIF + HYFER | 188.23c | 196.37c | 221.67c |
| HYFER | 149.43a | 159.27a | 163.47a |
| LSD (5%) | 9.46569 | 6.743 | 11.5997 |

Note:

HRIF = Half the Recommended Rate of Inorganic Fertilizer

FRIF = Full Rate of Recommended Inorganic Fertilizer



Complimentary to leaf length as a growth parameter is leaf width. Again for three consecutive months starting on the 10th month after transplanting, measurement of leaf width was gathered. Results of the measurements are presented on Table 4 and Figure 3. On the 10th month after transplanting, only the plants applied with Hyfer in combination with full rate of chemical fertilizer and both chemical fertilizers (half rate and full rate)

alone showed significantly wider diameter of the leaf compared with the other treatments. Although, Hyfer applied plants have wider leaf diameter than the control, such difference was not significant (64.50 vs 63.80cm). For the 11th and 12th months the measurements, differences between treatments were not significantly different anymore. Again this can be explained by the stage by which the measurements were taken which was during the reproductive stage of the banana plant where resources of the plant are being diverted from the growth to the fruits.

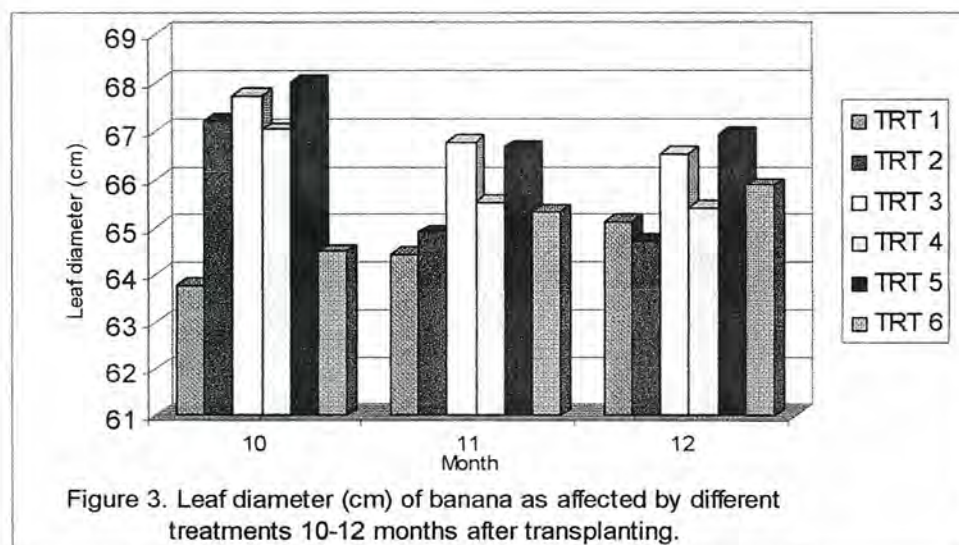
Table 4. Plant leaf width (cm) of banana at 10-12 months after transplanting as affected by different treatments.

| Treatment | Months after Transplanting | | |
|--------------|----------------------------|---------|---------|
| | 10 | 11 | 12 |
| Control | 63.80a | 64.43a | 65.13a |
| HRIF | 67.20bc | 64.90a | 64.73a |
| FRIF | 67.73bc | 66.77a | 66.53a |
| HRIF + HYFER | 67.03ab | 65.53a | 65.40a |
| FRIF + HYFER | 68.03bc | 66.67a | 66.93a |
| HYFER | 64.50a | 65.33a | 65.87a |
| LSD (5%) | 2.10043 | 3.92999 | 3.07825 |

Note:

HRIF = Half the Recommended Rate of Inorganic Fertilizer

FRIF = Full Rate of Recommended Inorganic Fertilizer



Leaf area index is a parameter which is the product of leaf length and diameter. For banana, a bigger area index would mean more food production site that could help in the increased yield of the plant. The computed leaf area index for the different treatments of

banana for three consecutive months planted in Cavinti, Laguna is presented in Table 5 and Figure 4. The plants that have the largest leaf area were those applied with Hyfer in addition with the full rate of chemical fertilizer for all three measurement period (10241, 10743 and 11664 cm², respectively). Although all treatments with Hyfer has the tendency to increase leaf area compared those applied with chemical fertilizer alone (HRIF and FRIF), the differences were not significant (Table 5). To ascertain the contribution of Hyfer as an additive to fertilizer, computed percentage increase accounted to Hyfer showed that compared with the control, there was a 4% increase. Compared with HRIF, there was a computed increase of 5% and compared with the full rate the increase was computed to be 5%. This may seem low in terms of differences but if the foliar was applied much earlier within the vegetative stage of the banana, a much higher differences can be observed.

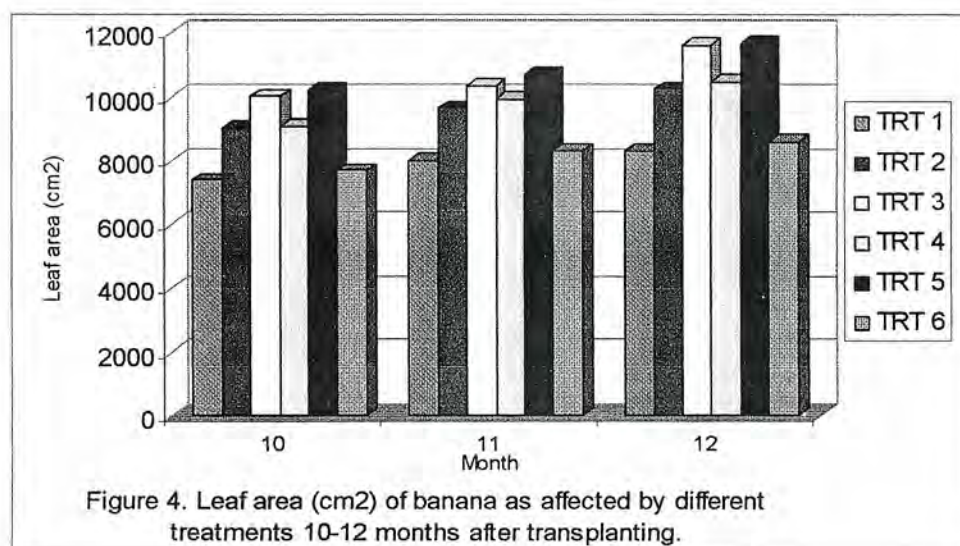
Table 5. Plant leaf area (cm²) of banana at 10-12 months after transplanting as affected by different treatments.

| Treatment | Months after Transplanting | | |
|--------------|----------------------------|------------|----------|
| | 10 | 11 | 12 |
| Control | 7404.90a | 8032.40a | 8311.4a |
| HRIF | 9060.83b | 9685.60b | 10279.5b |
| FRIF | 10040.10c | 10380.30cd | 11635.2c |
| HRIF + HYFER | 9117.93b | 9931.73bc | 10465.2b |
| FRIF + HYFER | 10241.00c | 10743.60d | 11664.4c |
| HYFER | 7710.67a | 8325.27a | 8613.9a |
| LSD (5%) | 398.987 | 582.785 | 980.108 |

Note:

HRIF = Half the Recommended Rate of Inorganic Fertilizer

FRIF = Full Rate of Recommended Inorganic Fertilizer



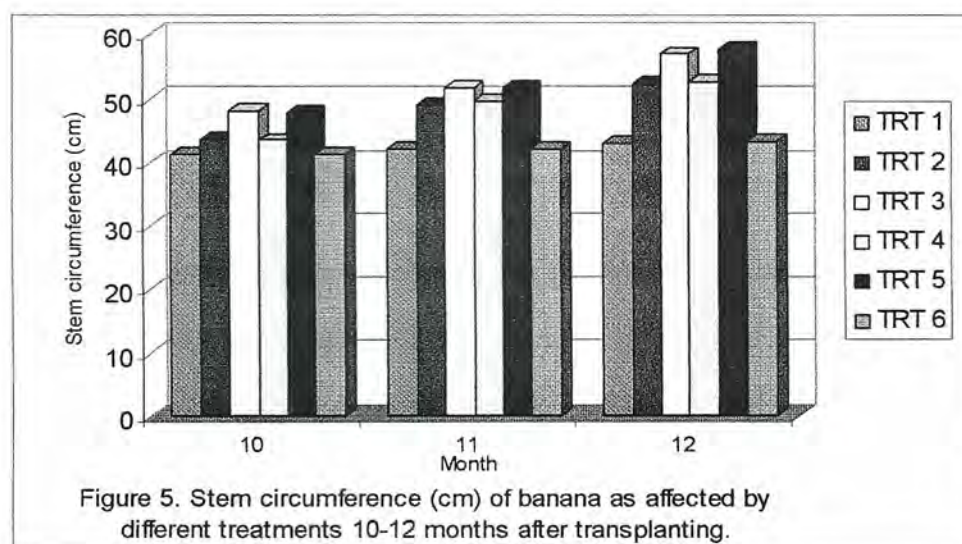
Stability of the banana to counteract, weather changes such as strong winds and heavy rains can be seen on the leaf and the stem. Because of this a good parameter to measure for this would be stem circumference. The effect of the various treatments on stem circumference for three consecutive months is presented in Table 6 and Figure 5. Based on the measurements, there seems to be no effect of Hyfer on the stem circumference because the addition of Hyfer to chemical fertilizer did not produce wider stem circumference compared with chemical fertilizer alone (Table 6) for two sampling periods. On the 12th month there was an increase but still this cannot be attributed to the application of Hyfer. Since the plant is already on the reproductive stage, there are no more significant growth factors that maybe seen because fruit development is the major physiological activity of the plant. It would have been nice to apply the foliar fertilizer earlier so that it can still affect the target growth parameters of the banana.

Table 6. Plant stem circumference (cm) of banana at 10-12 months after transplanting as affected by different treatments.

| Treatment | Months after Transplanting | | |
|--------------|----------------------------|---------|---------|
| | 10 | 11 | 12 |
| Control | 41.33a | 42.17a | 43.10a |
| HRIF | 43.83b | 49.17b | 52.50b |
| FRIF | 48.30c | 51.73c | 57.03c |
| HRIF + HYFER | 43.63ab | 49.77bc | 52.77b |
| FRIF + HYFER | 48.03c | 51.87c | 57.87c |
| HYFER | 41.27a | 42.20a | 43.56a |
| LSD (5%) | 2.36363 | 2.49642 | 3.90153 |

Note:

HRIF = Half the Recommended Rate of Inorganic Fertilizer
FRIF = Full Rate of Recommended Inorganic Fertilizer



The yield parameters of banana are the number of hands and the weight of each hand per bunch and are presented in Table 7. Also shown in Table 7 is the yield of banana as affected by the different treatments. Based on the results, the treatments applied with Hyfer in addition to chemical fertilizer showed no significant effect compared with the chemical fertilizer alone whether applied at full rate or half rate for both number of hand and weight of hands per bunch of banana. For number of hands, the average increase in percentage attributed to Hyfer was computed to be five (5) percent. For the weight of hands per bunch, the increased was computed to be seven (7) percent. The ultimate measure of effect would be the yield of the banana. Based on the result, the addition of Hyfer to chemical fertilizer at full rate showed no effect and this maybe because the amount of fertilizer supplied was already sufficient for the banana that addition of foliar fertilizer did not contribute to the yield of the crop. Also, since there were only three applications and the stage of the crop where the applications were done was already on the reproductive stage that it was late to reflect the effect of the operation. But for the treatment with Hyfer in addition to chemical fertilizer at half the rate, there was a 14% increase in yield attributed to Hyfer. Although it was not a significant increased compared with the half rate of chemical fertilizer alone, still the increase in yield contributed about 700 kilos of banana. The same observation was seen when Hyfer was applied and compared with the treatment without any application (18713 vs 17973 kg/ha, respectively).

Table 7. Yield (kg/ha) and yield parameters (number of hands/bunch and weight of hands/bunch) of banana as affected by different treatments.

| Treatment | Yield | Number of hands per bunch | Weight of hands per bunch |
|--------------|----------|------------------------------|------------------------------|
| | kg/ha | Number | kg |
| Control | 17973.3a | 6.13a | 8.99a |
| HRIF | 22873.3b | 7.16b | 11.44b |
| FRIF | 30600.0c | 8.01c | 15.3c |
| HRIF + HYFER | 23506.7b | 7.31b | 11.75b |
| FRIF + HYFER | 30186.7c | 8.02c | 15.09c |
| HYFER | 18713.3a | 6.35a | 9.36a |
| LSD (5%) | 3044.89 | 0.586794 | 1.52244 |

Note:

HRIF = Half the Recommended Rate of Inorganic Fertilizer

FRIF = Full Rate of Recommended Inorganic Fertilizer

SUMMARY AND CONCLUSION

A field experiment was conducted to assess the efficacy of Hyfer Plus as a foliar fertilizer for banana. The experiment was conducted in Cavinti, Laguna from November 2010 to February 2011. The sites grown to lakatan banana were divided into six (6) treatments and three (3) replications arranged in a randomized block design. Each plot will contain a total of 25 banana plants. The distance of planting will be 2 m between rows and 3 m between hills. Hyfer foliar fertilizer was applied at the rate of 3.5 ml per liter of water per

plant or 60ml/16 liters. It was applied in addition to the monthly application of chemical fertilizer based on the designated treatments. The age of the plant at application time of Hyfer was towards harvest (10-12th months after transplanting). The growth of the banana (in terms of leaf length and width, height, pseudostem diameter and number of suckers) will be measured and monitored from ten (10) randomly selected and tagged banana plants. The results of the plant growth and yield parameters and yield were analyzed statistically and correlation analysis will be performed using IRRISTAT (Irristat, 2002). A total of 18 plots were designated as experimental sites for the study.

Growth parameters such as plant height, leaf length and diameter and stem circumference were measured periodically within the three months of the project. Leaf area index was computed using leaf length and diameter data. Yield parameters such as number of hands and weight of hands per bunch were weighed at harvest. Yield was measured and computed on a per hectare basis.

Results revealed that plant height showed the ability of Hyfer application in addition to chemical fertilizer to increase banana stature although the differences were not significant. The same trends were observed for leaf length, stem circumference and leaf area index whereby the addition of Hyfer to chemical fertilizer whether in full rate or half the rate could improve the values of the parameters. No significant contribution of Hyfer was observed for leaf diameter. The percentage increase attributed to Hyfer for the growth parameters ranges from five (5) to nine (9) percent. As for the yield parameters (number of hands and weight of hands per bunch), contributions of Hyfer were observed on the treatments in combination with half the rate of chemical fertilizer and those plants with Hyfer applied alone compared with the control. For the yield, the highest increase in percentage was observed for those treatments applied with half the rate of chemical fertilizer in addition with Hyfer computed at 14% compared with chemical fertilizer alone. The same results showed that when Hyfer was applied alone compared with plants with no application (control).

It was recommended that Hyfer be applied in addition to chemical fertilizer during the early stages of the plant so that its effect on the growth and development of banana be carried until its reproductive stage. Based on these results Hyfer was able to increase plant height, leaf length, leaf area index, stem circumference, weight of hands per bunch and yield of banana. Based on aggregated computations of all parameters irregardless of treatments, 12% increase is attributed to application of Hyfer to lakatan banana.

Adrian T. Jay

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