EFFICACY TESTING OF HYFER PLUS FOLIAR FERTILIZER (8-16-24) ON CHRYSANTHEMUM

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ABSTRACT

A field trial was conducted at Lamut, Beckel La Trinidad, Benguet to determine the efficacy of HYFER PLUS as a foliar fertilizer for Chrysanthemum. The treatments were designed to determine the effect of HYFER PLUS on selected growth parameters of chrysanthemum and to compare the performance of HYFER PLUS with soil-applied inorganic and organic fertilizers. The application of recommended rate of HYFER PLUS markedly increased plant height when compared with the control (no fertilizer) and the application of recommended rate of inorganic fertilizer. Applying half the recommended rate of HYFER PLUS together with the recommended rate of soil-applied organic fertilizer resulted in improved plant height, increased lateral stem and wider leaves. The addition of the recommended rates of inorganic combined with organic fertilizer gave the best results for all the parameters measured. These results suggest that the efficacy of HYFER PLUS as foliar fertilizer can be enhanced by combining it with the recommended rate of organic fertilizer.

I. INTRODUCTION

The use of foliar fertilizers is becoming popular particularly in areas where nutrient uptake is limited by certain soil physical and chemical properties. Aside from providing nutrients more quickly, foliar fertilizers also enhance the uptake of nutrients from the soil by encouraging plants to take up more water. A wide range of this type of fertilizer is now

commercially available and so it is important to choose the right foliar fertilizer that matches the nutritional needs of a particular crop.

Chrysanthemum (*Dendranthema grandiflora* formerly *Chrysanthemum morifolium* (Ramat) Hemsel, is considered an ideal cutflower because it has a wide range of flower form, size and color; long storage life (3-6 weeks); relatively long vase life (1-2 weeks); easily propagated; short life cycle; flowering can be controlled and can be harvested in the immature stage and opened artificially under controlled conditions. The demand for Chrysanthemum cutflowers continues to be strong and the demand is all year round.

HYFER PLUS (8-16-24) manufactured by Multi Lines Incorporated, is guaranteed to (a) promote growth and healthy green leaves and reduce intensity of chlorosis; (b) increase plants resistance to diseases; (c) increase flower formation, fruit and seed set, and rate of maturity; (d) facilitate plant health and strength against stress conditions; and (e) improve soil health and microflora activities. However, these claims have not yet been validated for ornamentals particularly Chrysanthemum grown under Philippine conditions, hence the need to conduct field trials.

II. OBJECTIVES

1. To evaluate the efficacy of HYFER PLUS as foliar fertilizer for ornamentals particularly chrysanthemum.
2. To generate field data needed by Fertilizer and Pesticide Authority (FPA) for purposes of product registration.

III. MATERIALS AND METHODS

1. Product Description

HYFER PLUS fertilizer is a reddish-pink liquid with a pH of 5.8 -6.8 in 0.5% aqueous solution. It contains 8% N, 16% P_2O_5 and 24% K_2O. In addition, it also contains trace amounts of amino acids, humic acid, vitamins, hormones and chelated forms of B, Cu, Ca, Fe, Mg, Mn, Mo, Na, S and Zn

HYFER PLUS can be applied in combination with most commercially preferred agricultural insecticides and fungicides. Recommended rate of application is 60mL/tankload at 7-10 days interval.

2. Experimental Requirement

- Site: Lamut, Beckel, La Trinidad, Benguet
- Soil Analysis: Before Experiment
- Crop: Chrysanthemum
- Variety: Green Balls (Malaysian mumps)
- Treatments: Nine (9)
- Replications: Three (3)
- Design: RCBD

3. Treatments as prescribed by FPA (Fertilizer and Pesticide Authority, Regulatory Division).

T1 - Control

T2 - Recommended Rate of Inorganic Fertilizer (RRIF)

T3 - ½ Recommended Rate of Inorganic Fertilizer (½ RRIF)

T4 - Recommended Rate of HYFER PLUS (RRHP)

T5 - ½ Recommended Rate of Inorganic Fertilizer + ½ Recommended Rate of HYFER PLUS

T6 - Recommended Rate of Inorganic Fertilizer (RRIF) +

Recommended Rate of HYFER PLUS (RRHP)

T7 - Recommended rate of organic fertilizer (RROF) +

Recommended Rate of HYFER PLUS (RRHP)

T8 - Recommended Rate of organic fertilizer (RROF) +

½ Recommended Rate of HYFER PLUS (RRHP)

T9 - Recommended Rate of organic fertilizer (RROF) +

Recommended Rate of inorganic Fertilizer (RRIF)

4. Fertilizer Application

A. HYFER PLUS application

The recommended rate used was 80mL/TL sprayed weekly.

B. Inorganic fertilizer

The recommended rate of inorganic fertilizer was 100 kg N/ha – 30 kg P_2O_5/ha – 60 kg K_2O/ha applied using urea (46-0-0), complete (14-14-14) and muriate of potash (0-0-60).

C. Organic fertilizer

The organic fertilizer used was chicken manure and it was applied at the rate of 2 tons/ha.

5. Cultural Management

Standard cultural management for chrysanthemum was followed. Furthermore, extreme weather conditions which may influence the performance of the field trials were recorded to help explain the final results.

6. Data gathering

The following growth parameters were determined in at various growth stages of chrysanthemum:

a. Plant height (cm)

b. Lateral stem

c. Diameter of leaf (cm)

IV. RESULTS AND DISCUSSION

The influence of the various fertilizer treatments on plant height is presented in Figure 1 and summarized in Table 1. The addition of soil-based (inorganic and organic) and foliar-applied (HYFER PLUS) fertilizers markedly increased plant height over the control. Plants applied with HYFER PLUS alone (T4) or in combination with inorganic (T5, T6) and organic fertilizer (T7, T8) were significantly taller than the plants that received the recommended rate of inorganic fertilizer (T2). Among the treatments which included HYFER PLUS, using half its recommended rate and combining it with the recommended rate of organic fertilizer resulted in better plant height (T8). However, the combined application of the recommended rates of organic and inorganic fertilizers (T9) resulted in the highest plant height throughout the duration of the field experiment (Fig 1).

Table 1. Plant height of chrysanthemum as influenced by fertilizer treatments at various growth stages

Treatment	Days after Planting (DAP)			
	48	59	72	84
T1, control	17 e	20 h	20 e	22 f
T2, Recommended rate of inorganic fertilizer (RRIF)	36 c	40 e	44 d	44 e
T3, ½ RRIF	37 c	39 f	46 c	46 d
T4, Recommended rate of Hyfer Plus foliar (RRHP)	40 b	41 d	46 c	46 d
T5, ½ RRIF + ½ RRHP	39 b	42 c	46 c	47 c
T6, RRIF + RRHF	33 d	36 g	46 c	47 c
T7, Recommended rate of org fertilizer (RROF) + RRHP	39 b	42 c	47 b	47 c
T8, RROF + ½ RRHP	40 b	45 b	48 b	49 b
T9, RROF + RRIF	42 a	47 a	50 a	52 a

In a column, means followed by the same letter(s) are not significantly different from each other

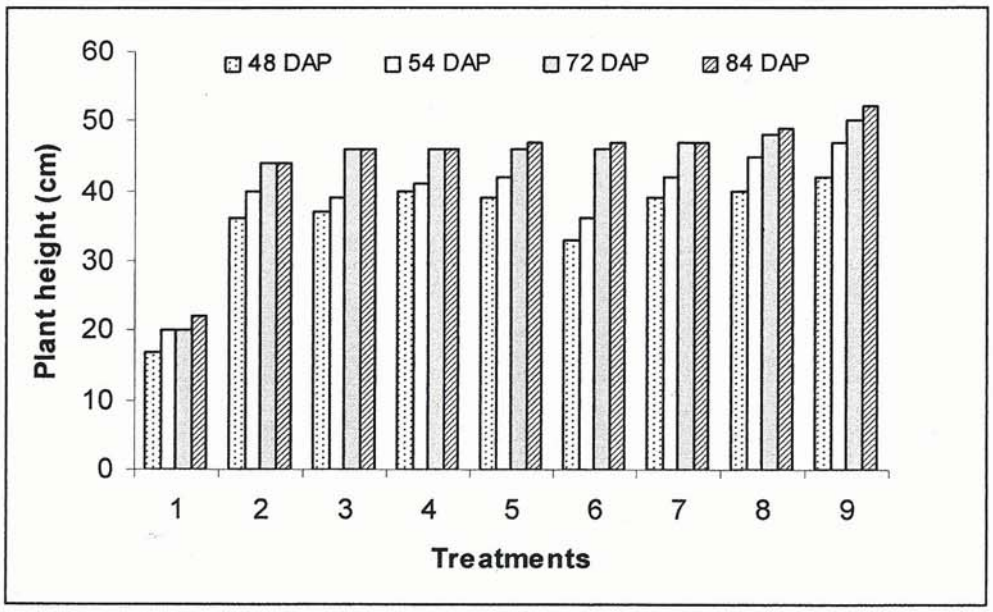

Fig.1. Plant height of chrysanthemum at various growth stages as influenced by fertilizer treatments. (T1, control; T2, Recommended rate of inorganic fertilizer (RRIF); T3, ½ RRIF; T4, Recommended rate of Hyfer Plus foliar (RRHP); T5, ½ RRIF + ½ RRHP; T6, RRIF + RRHF; T7, Recommended rate of org fertilizer (RROF) + RRHP; T8, RROF + ½ RRHP; T9, RROF + RRIF)

In terms of the number of lateral stem, all fertilized plants have significantly more stem than the control (Table 2). The application of HYFER PLUS alone (T4) produced the same number of lateral stem as those applied with recommended rate of inorganic fertilizer (T2) and those applied with HYFER PLUS in combination with inorganic fertilizer (T5,T6) or organic fertilizer (T7,T8) particularly during the later stages of plant growth. Similar to plant height, combining the recommended rates of inorganic and organic fertilizer likewise resulted in more lateral stems throughout the field experiment (Fig 2).

Table 2. Number of lateral stem of Chrysanthemum as influenced by fertilizer treatments at various growth stages

Treatment	**Days after Planting (DAP)**			
	48	**59**	**72**	**84**
T1, control	4 d	5 c	5 c	5 c
T2, Recommended rate of inorganic fertilizer (RRIF)	4 d	6 b	6 b	6 b
T3, ½ RRIF	4 d	5 c	5 c	5 c
T4, Recommended rate of Hyfer Plus foliar (RRHP)	5 c	6 b	6 b	6 b
T5, ½ RRIF + ½ RRHP	6 b	6 b	6 b	6 b
T6, RRIF + RRHF	5 c	6 b	6 b	6 b
T7, Recommended rate of org fertilizer (RROF) + RRHP	5 c	6 b	6 b	6 b
T8, RROF + ½ RRHP	5 c	6 b	6 b	6 b
T9, RROF + RRIF	7 a	7 a	7 a	7 a

In a column, means followed by the same letter(s) are not significantly different from each other

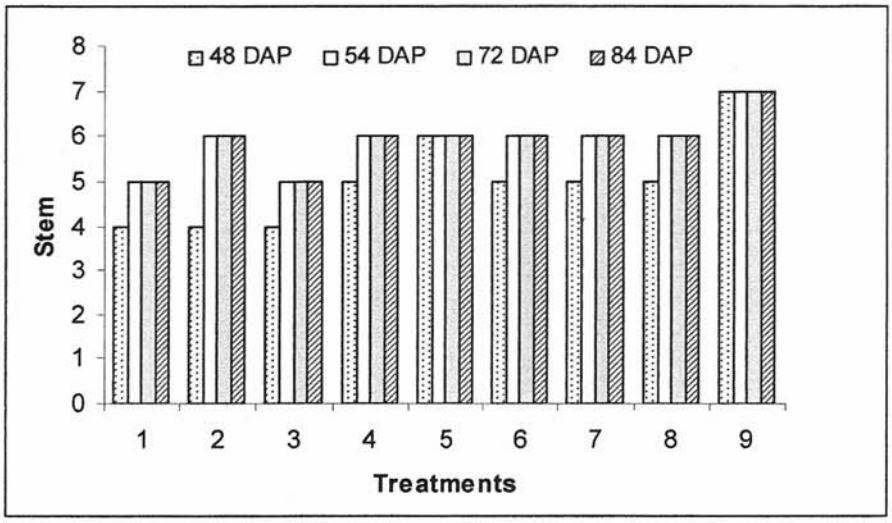

Fig.2. Length of chrysanthemum leaves at various growth stages as influenced by fertilizer treatments. (T1, control; T2, Recommended rate of inorganic fertilizer (RRIF); T3, ½ RRIF; T4, Recommended rate of Hyfer Plus foliar (RRHP); T5, ½ RRIF + ½ RRHP; T6, RRIF + RRHF; T7, Recommended rate of org fertilizer (RROF) + RRHP; T8, RROF + ½ RRHP; T9, RROF + RRIF)

Table 3 summarizes the influence of the applied fertilizers on leaf diameter. The application of HYFER PLUS alone (T4) resulted in wider leaves than the control (T1). Combining half the recommended rate of HYFER PLUS with organic fertilizer (T8) improved the results however it was the application of the recommended rates of inorganic and organic fertilizer (T9) that gave the bet results in terms of leaf diameter (Table 3).

Table 3. Diameter (cm) of chrysanthemum leaves as influenced by fertilizer treatments

Treatment	**Days after Planting (DAP)**			
	48	**59**	**72**	**84**
T1, control	2.0 d	4.0 c	5.0 c	5.0 c
T2, Recommended rate of inorganic fertilizer (RRIF)	3.7 bc	4.0 c	5.0 c	5.0 c
T3, ½ RRIF	3.0 c	5.0 b	5.0 c	5.7 bc
T4, Recommended rate of Hyfer Plus foliar (RRHP)	3.0 c	5.0 b	5.0 c	5.7 bc
T5, ½ RRIF + ½ RRHP	3.3 bc	5.7 a	5.7 ab	5.7 bc
T6, RRIF + RRHF	4.0 ab	5.0 b	5.7 ab	5.7 bc
T7, Recommended rate of org fertilizer (RROF) + RRHP	3.7 bc	4.0 c	5.7 ab	6.0 ab
T8, RROF + ½ RRHP	4.7 a	5.0 b	5.7 ab	6.0 ab
T9, RROF + RRIF	4.7 a	5.7 a	6.0 a	6.7 a

In a column, means followed by the same letter(s) are not significantly different from each other

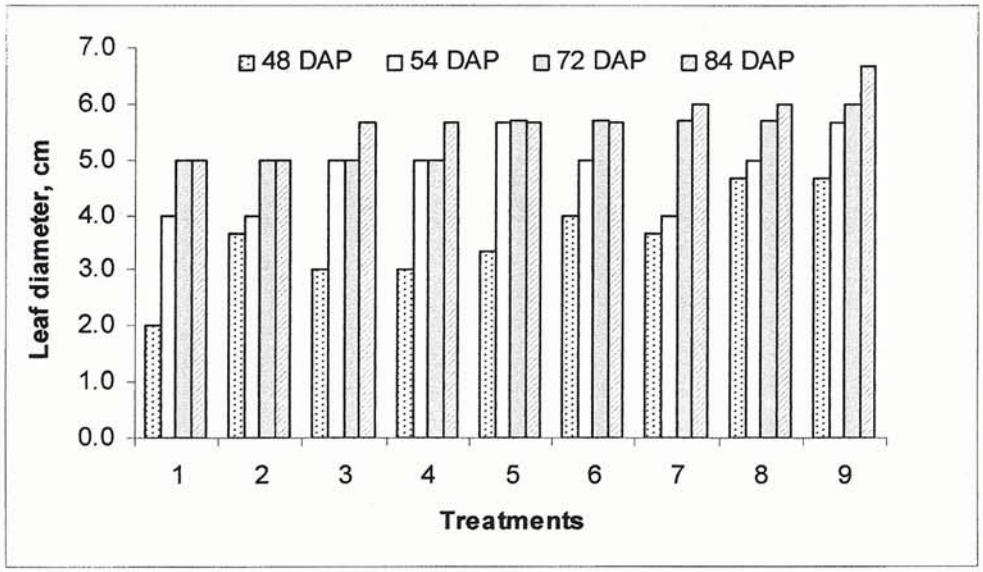

Fig.3. Diameter of chrysanthemum leaves at various growth stages as influenced by fertilizer treatments. (T1, control; T2, Recommended rate of inorganic fertilizer (RRIF); T3, ½ RRIF; T4, Recommended rate of Hyfer Plus foliar (RRHP); T5, ½ RRIF + ½ RRHP; T6, RRIF + RRHF; T7, Recommended rate of org fertilizer (RROF) + RRHP; T8, RROF + ½ RRHP; T9, RROF + RRIF)

V. SUMMARY AND CONCLUSION

A field trial was conducted at Lamut, Beckel, La Trinidad, Benguet to evaluate the effect of HYFER PLUS on certain growth parameters of chrysanthemum at various growth stages. The data generated from the efficacy trial shows that the new product, HYFER PLUS was effective in significantly improving plant height, number of lateral stem and leaf diameter over the control and in some instances even more effective than the soil-applied inorganic fertilizers. The results further indicate that the effect of HYFER PLUS can be enhanced by combining half the recommended rate with the recommended rate of organic fertilizer.

Hence, the new product, HYFER PLUS may qualify for provisional registration by the Fertilizer and Pesticide Authority.

VI. RECOMMENDATION

On the basis of the results obtained from the efficacy testing on chrysanthemum, provisional Fertilizer and Pesticide Authority registration is recommended for HYFER PLUS.

For purposes of full registration, there is a need to conduct another field trial.