

THE APPLICATION OF FOLIAR FERTILIZER FOR TEA CROPS AS ALTERNATIVE FERTILIZATION METHOD DURING DRY PERIOD CONDITION IN PAGILARAN TEA ESTATE

PEMAKAIAN PUPUK DAUN PADA TANAMAN TEH SEBAGAI ALTERNATIF CARA PEMUPUKAN SELAMA MUSIM KERING DI KEBUN PAGILARAN

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INTISARI

Suatu penelitian dengan percobaan lapangan telah dilakukan di kebun teh PT Pagilaran, Batang, untuk mengkaji pemakaian pupuk daun pada tanaman teh sebagai alternatif cara pemupukan dalam rangka mengatasi problem pelaksanaan pemupukan di musim kering.

Percobaan dengan menggunakan rancangan petak-terbagi terdiri atas anak petak (sub plot) pemupukan daun dengan dan tanpa perlakuan pemupukan daun, petak utama (main plot) adalah klon teh yang terdiri atas 8 klon unggul (PS I, Cin 56, Cin 143, SKM 118, Kiara 8, TRI 2024, PGL biji dan TRI 2025). Ulangan dilakukan empat kali.

Pengamatan dilakukan terhadap panen pucuk dengan rumus petik medium berupa : bobot total pucuk, persentase bobot pucuk peko dan persentase bobot pucuk burung. Panen dilakukan tujuh (7) kali, dimulai pada tanggal 25 Agustus 1997 sampai dengan 6 Oktober 1997.

Hasil penelitian menunjukkan bahwa pupuk daun berpengaruh nyata pada kenaikan pucuk, utamanya bobot (47% pada panen II, 46 % pada panen III, 8% pada panen IV), dan untuk selanjutnya pada saat tanaman telah mengalami kekurangan air, pupuk daun tidak memberikan pengaruh pada kenaikan hasil panen. Dari analisis pucuk diperoleh hasil bahwa pupuk daun tidak mampu untuk menaikkan bobot total pucuk pecco.

Kata kunci : pupuk daun, the, musim kering

ABSTRACT

A field experiment was done to study the effect of the application of foliar fertilizer on growth and yield of the in Pagilaran tea estate as an alternative method of applying fertilizer during the dry season that the ordinary fertilizer application cannot be done.

The field experimental design used was Split-Plot with four replications. The sub-plot was the application of foliar fertilizer : applied and not applied. The main-plot was tea clone. There are eight clone: PS I, Cin 56, Cin 143, SKM 118, Kiara 8, TRI 2024, PGL biji and TRI 2025. The plots were 100 Sq.m.

Observations were done on shoots yield, plucked following the criterion of pure medium. The data were the total weight of shoots plucked, the percentage of pecco and burung shoots (by weight). Plucking were done for seven (7) times starting at August 25, 1997 up to October 6, 1997.

The results of the experiment showed that foliar fertilizer (in this experiment the foliar fertilizer used was Bayfolan) increased the shoots yield significantly, particularly on the second, third and the fourth plucking by 47%, 16% and 8% respectively, when the plants under mild stress. The fifth, sixth and seventh plucking shown has no increase on yield due to the condition that plant had already under the severely drought stress. The shoots analysis indicated that the application of foliar fertilizer under the condition of drought stress was not able to improve the percentage of pecco shoots.

Key words : foliar fertilizer, tea, dry period

INTRODUCTION

Tea crops were usually grown under the site with the average temperature of 18°C-25°C, with the rainfall at the range of 2500 mm – 3000 mm

per year. An seven rainfall distribution without marked seasonally is ideal (Watson, 1986). An acid soil, could be podsollic. is the important requirement with pH 4.5-5.5. Soil should be deep permeable and well drained.

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Untuk meningkatkan produktivitas pucuk daun pada tanaman teh seragam, diperlukan pemupukan dalam rangka meningkatkan produktivitas pucuk daun di musim kering. Penelitian dengan menggunakan rancangan petak-tersaji terdistribusi dua arah petak (split-plot) pemupukan dan dengan dua tahap pemupukan daun, petak utama (main plot) adalah klon teh yang terdiri atas 8 klon unggul (PS I, Cio 26, Cio 44, SKM 118, Kian 8, TRI 2024, PGI, pit dan TRI 2025). Rancangan dilakikan empat kali.

Pengamatan dilakukan terhadap pucuk petak dengan analisis petak medium petang : bobot total pucuk, persentase bobot pucuk dan persentase bobot pucuk kering. Hasil dilakikan tujuh (7) kali, dimulai pada tanggal 25 Agustus 1997 sampai dengan 6 Oktober 1997.

Hasil penelitian menunjukkan bahwa pupuk daun berpengaruh nyata pada kuantitas pucuk tanaman bobot (1478 gram klon H, 467 pada pucuk III, 872 pada pucuk IV) dan untuk selanjutnya pada saat tanaman telah mencapai ketinggian an pucuk daun tidak memberikan pengaruh pada kuantitas hasil pucuk. Dari analisis pucuk diperoleh hasil bahwa pucuk daun tidak mampu untuk meningkatkan bobot total pucuk petak.

Kata kunci : pucuk daun, teh, musim kering

ABSTRACT

A field experiment was done to study the effect of the application of foliar fertilizer on growth and yield of the in Palangra tea estate as an alternative method of applying fertilizer during the dry season that the ordinary fertilizer application cannot be done.

The field experimental design used was split-plot with four replications. The subplot was the application of foliar fertilizer : applied and not applied. The main plot was tea clones. There are eight clones (PS I, Cio 26, Cio 44, SKM 118, Kian 8, TRI 2024, PGI, pit and TRI 2025). The plots were 100 sqm.

Observations were done on shoot yield, plucked following the criterion of pure medium. The data were the total weight of shoot plucked, the percentage of pucuk and during shoot dry weight. Plucking were done for seven (7) times starting at August 25, 1997 up to October 6, 1997.

The results of the experiment showed that foliar fertilizer in this experiment the foliar fertilizer used was Bayfolan increased the shoot yield significantly, particularly on the second, third and the fourth plucking by 40%, 16% and 8% respectively, when the plants under mid stress. The fifth sixth and seventh plucking shown no increase on yield due to the condition that plant had already under the severely drought stress. The shoot analysis indicated that the application of foliar fertilizer under the condition of drought stress was not able to improve the percentage of pucuk shoot.

Key words : foliar fertilizer, tea, dry period

INTRODUCTION

Tea crops were usually grown under the site with the average temperature of 18°C-25°C with the rainfall in the range of 2500 mm - 3000 mm per year. An even rainfall distribution without marked seasonality is ideal (Watson, 1985). An acid soil could be grown in the important requirement with pH 4.5-5.5 and should be deep permeable and well drained.

Gadd *cit.* Eden (1976) estimated that tea transpired on the average of 60 cm per annum (=50 mm/mo.) depending on the temperature, wind speed and environmental relative humidity.

The higher total rainfall is not the insurance for the favorable growth of tea, for example in Fort Portal, Africa the average rainfall was 1520 mm per year has as long as six months under the deficit conditions, while in Tukuyu, the rainfall was 2460 mm per year, has seven (7) months under deficit conditions. The study showed that when the monthly rainfall average fall below 50 mm, over a period of several months, crops productions suffers severally (Carr, 1971).

Uppassi *cit.* Info teh (1999) found that the requirements of tea plantation for evapotranspiration at 2,000 kgs. Tea made per year is about 75 mm/mo. Or about 87 mm for 3,000 kgs tea made per year. If the seepage and percolation of well-drained soil is about 75 mm/mo., the available water should be at least 150 mm/mo. For 2,000 kgs. And about 162 mm/mo. For 3,000 kgs tea made per year.

Under the normal conditions, when the normal rainfall (monthly) is at the above of 50 mm, the application of the recommendation of exact month for the purpose of applying fertilizers is not possible due to be variation of the climates. But, for the principles, the fertilizers should preferably be applied at the moderately wet weather (Wickremasinghe and Khriisnapillan, 1986).

The problem is now, how to apply the fertilizers when the crops are under the dry period conditions. This experiment was conducted to know the effect of the application of foliar fertilizer under the mild drought stress in PT Pagilaran tea estate, hopefully that it could maintain the crop production.

MATERIALS AND METHODS

There are eight (8) improved tes clones used in this experiment. These clones are : PS I, Cin 56, Cin 143, SKM 118, Kiara 8, TRI 2024, PGL biji and TRI 2025.

The Design used was Split-Plot with four replications. The sub plots were foliar fertilizer consisted of applied and was not applied with foliar fertilizer. The main-plots were the clones. The foliar fertilizer used was Bayfolan containing of Nitrogen 11%, P₂O₅ 8%, K₂O 6% and micro elements Fe, Zn, Mn, bo, Cu, and Mo.

The concentration was 2.0 cc/l solution and the dose applied was 700 l. solution/ha. (1.400 l Bayfolan/ha), for once spraying. The spraying was done at the intervals of two weeks.

The first application of the foliar fertilizer was conducted on August 21, 1997 when the crops were still under the normal conditions (as noted that the rainfall in July 1997 was 296 mm, while in August was 20 mm). The second application was on September 9, 1997 at the time the crops were under mild water stress condition (as noted that there was no rainfall in September, 1997) and the third (last) application was on September 21, 1997 when crops were already under the seriously water deficit condition.

The data observed were total shoots yield and the percentage weight of either pecco or burung shoots. The criteria of shoots plucked were pure medium, consisted of : P + 3m; P=2; P+1; B+2m and B+1. Pluckings were done for seven (7) times, with the intervals of seven (t) days, started from August 25, 1997 up to October 6, 1997. Total shoots yield was presented in grams and proportion of pecco or burung were presented in per cent (%).

The data obtained were analyzed for valance analysis based on Split-Plot Design with four replications. For knowing the significant differences among treatments, Duncan's New Multiple Range Test ($\alpha=5\%$) were used.

RESULT AND DISCUSSIONS

The data of the average of shoots yield were presented on table 1. It showed that the application of foliar fertilizer could significantly increase the shoots yield particularly for the clones (Cin 56, PS I, SKM 118, Kiara 8, PGL biji and TRI 2025, bay 24%, 32%, 35%, 30%, 22% and 4%, respectively).

Based on the plucking time, the application of foliar fertilizer only improved shoots yield when the crops were still under normal or mild stress conditions. Furthermore under the seriously water stress condition the fertilizer had no effect on yield (Figure 1).

The percentage weight of pecco and burung shoots were presented on table 2. It was showed that the application of foliar fertilizer under the conditions of water (drought) stress did not improved the quality of shoots yield as indicated by percentage of pecco shoots did not increased.

Tabel 1. The average weight of shoots yield (in grams) of tea applied and not applied with foliar during the dry periods conditions in Pagilaran tea estate

No.	Clones	Not Applied	Applied
1.	PS I	3440.50 bcd	4546.25 bcd
2.	Cin 56	1802.50 d	2341.25 cd
3.	Cin 143	9185.00 a	9388.78 a
4.	SKM 118	4436.25 bcd	5996.25 abc
5.	Kiara 8	3837.50 bcd	5017.50 bcd
6.	TRI 2024	7473.75 ab	7082.50 ab
7.	PGL biji	4847.50 bcd	5930.75 abc
8.	TRI 2025	9135.00 a	9530.00a
Average		4947.50 B	6229.06A

Add : Values in columns or rows followed by the same letters are not significantly difference (DMMRT 5%)

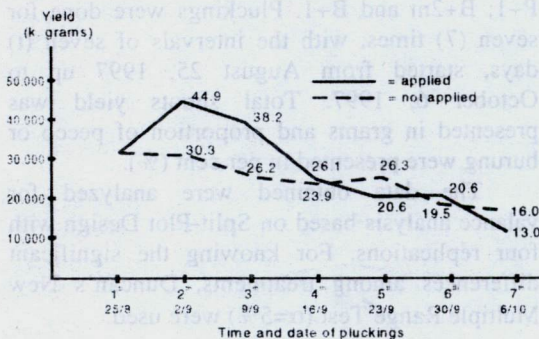


Figure 1. The total of shoots yield of tea plucked weekly starting from August 25, 1997 up to Oct. 6, 1997 from 8 clones applied and not applied with foliar fertilizer

Table 2. The average percentage of pecco and burung shoot weight of tea from 8 improved clones applied and not applied with foliar fertilizer

No	Clones	Pecco shoots		Burung shoots	
		Not applied	applied	Not applied	applied
1	PS I	62.67 a	67.88 a	37.33 a	32.12 a
2	Cin 36	34.60 b	31.60 b	63.40 b	60.40 b
3	Cin 143	38.74 b	31.51 b	61.26 b	68.49 b
4	SKM 118	32.10 b	29.53 b	67.90 b	70.47 b
5	Kiara 8	28.42 b	29.10 b	71.58 b	70.90 b
6	TRI 2024	29.35 b	30.24 b	70.65 b	69.76 b
7	PGL biji	39.26 b	38.10 b	60.74 b	61.90 b
8	TRI 2025	30.31 b	29.10 b	63.04 b	71.90 b
Average		36.96 A	35.88 A	63.04 B	64.12 B

It was shown that under the condition of drought stress the physiological activities in plant were inhibited due to the lack turgor, transportation activities, metabolic activities, and finally affecting the growth rate of shoots yielding only burung(terminated shoots). As stated by Krammer (1969) that plants require water for nutrients and assimilates transportation, hydrolysis, transportation, enzymatic activities of water required varied depending on kind of plants, stages of growth and the environmental conditions of the plants.

CONCLUSION

Based on the experiment, it could be concluded that the application of foliar fertilizer could increase significantly the shoots yield of tea under the condition of normal and mild drought stress, but it did not affect the yield when applied under the condition of seriously drought stress.

The application of foliar fertilizer did not improve the quality of shoots in term of the percentage pecco and burung shoots.

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