International Journal of Agriculture Innovations and Research
Volume 6, Issue 5, ISSN (Online) 2319-1473
Manuscript Processing Details (dd/mm/yyyy):
Received: 18/03/2018 | Accepted on: 27/03/2018 | Published: 02/04/2018

Standardization of Cassava Leaf Harvest in Relation to Ericulture cum Tuber Production

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***Abstract* – Quantum of cassava leaf harvest for rearing of eri silkworm (*Samia cynthia ricini* Boisduval) without adverse impact on tuber yield and starch content was standardized with seven popular varieties*viz.*, CO2, CO3, CO4, H165, H226, MVD1 and Kunguma Rose under irrigated conditions of Tamil Nadu, India. The rearing capacity was also estimated based on the availability of total foliage at the time of removal of weak shoots, 6 months after plantation (MAP), forced leaf harvest in 7-9 MAP without affecting tuber yield and starch content and finally at the time of tuber harvest (10 MAP). The forced leaf harvest in monthly intervals @ 3 harvests in 7, 8 & 9 MAP strongly affected tuber yield and starch content of the tubers in all varieties irrespective of percentage of leaves plucked. However, the forced leaf harvest up to 30% in bimonthly interval *i.e.* once at 8 MAP did not affect the tuber yield and starch content of the tubers in the varieties MVD1, H226, and CO4. The varieties Kunguma Rose, CO3 and H165 could tolerate leaf plucking up to 20% whereas CO2 was found highly sensitive in which leaf harvest @ 10% only found safe on yield and quality of main produce. Highest foliage yield and rearing capacity of eri silkworm were recorded with MVD1 without affecting yield and quality of the tuber. The variety H226 was found next best suited. The order of merit of cassava varieties in view of ericulture cum tuber production was MVD1>H226>CO4>Kunguma Rose > CO3> H165>CO2. The high leaf yielding varieties like MVD1, H226 and CO4 under irrigated conditions could successfully be exploited for production of eri silk in order to generate additional income to the cassava growers.**

***Keywords* – Cassava Varieties, Leaf Harvest, Tuber Yield, Starch Content, Eri Silkworm, *Samia cynthia ricini*, Rearing Capacity.**

I. Introduction

Ericulture is a traditional practice of tribal in North East India since the time immemorial. They rear eri silkworm in small scale primarily for the pupae as food and conventionally weave silk fabric for their family use. Eri silk though have an excellent thermal property did not gain importance in other part of the country due to its coarseness and the perception that its production elsewhere would be uneconomical because similar food habits and socio-cultural patterns do not prevail outside the North East regions. But in recent past, introduction of advanced machineries for spinning of eri cocoons facilitating production of finer yarns paved the way to commercially attractive designs and products which included blends with other natural silks, cotton, wool, synthetic materials *etc.*

As the eri silk gained the market value, there has been increasing demand in production of eri cocoons. This has attracted the non-traditional states, where the food plants of eri silkworm *viz.* castor and cassava are cultivated as agricultural crops to practice ericulture commercially as a source of additional income by using a part of foliage. Castor (*Ricinus communis*), the primary host plant of eri silkworm, *Samia cynthia ricini* Boisduval is greatly exploited for eri silk production in nontraditional states whereas cassava, the most preferred food plant after castor has also been proved to be suitable for commercial rearing [15].

Cassava is cultivated over 2.32 lakh hectare in India and the tubers are mainly used for starch production. The southern states *viz.,* Kerala, Tamil Nadu, Andhra Pradesh and Karnataka together are account for 88.65 % of total cassava cultivation of the country. In Tamil Nadu cassava is cultivated over 1, 27,000 hectares, leads in tuber production and has great potential for ericulture [14]. However, harvest of leaves from cassava plants could cause adverse effect on the main produce. In this context, a study was undertaken to standardize quantum of leaf harvest without affecting tuber yield and starch content with seven popular varieties and to estimate total foliage availability and rearing capacity of eri silkworm in view of generating additional income to the cassava growers.

II. Materials and Methods

Cultivation of cassava

Seven popular cassava (*Manihot esculenta* Crantz) varieties of Tamil Nadu namely CO2, CO3, CO (TP) 4, H165, H226, Mulluvadi (MVD1) and Kunguma Rose were selected for the studies. Stems from disease and pest free plants of above varieties after attaining 8-10 months maturity and having a thickness of 2-3 cm were obtained from Tapioca and Castor Research Station, Tamil Nadu Agricultural University, Yethapur, Salem. Plantation was raised directly in the field at Karumapuram village, Namakkal district of Tamil Nadu, India after preparing sets of 10 cm length from the stems in the plots measuring 5.4 x 5.4m with spacing of 90 x 90 cm accommodating 49 plants in each plot, in a randomized block design, replicated five times for each variety. The crops were raised under irrigated condition as per recommended package of practices [6] and the studies were conducted in five successive crops during 2010- 2014.

Standardization of leaf harvest

In order to assess the quantum of cassava foliage that could be utilized for rearing of eri silkworms without affecting tuber yield and starch content, different types of harvesting schedules were studied *i.e.* recording the foliage yield of different cassava varieties by (a) removing weak shoots 6 months after plantation (MAP) allowing only two healthy shoots on opposite side, as per the traditional practice of the farmers (b) forced leaf harvest in different

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percentage of total leaves available per plant in fixed (monthly and bimonthly) intervals from 7-9 MAP and (c) harvest of total available foliage a week before tuber harvest (10 MAP). The details of treatment combinations studied are given below:

T_1 Harvest of 10% of leaves in monthly intervals at 7, 8 &9 MAP

T_2 Harvest of 20% of leaves in monthly intervals at 7, 8 &9 MAP

T_3 Harvest of 30% of leaves in monthly intervals at 7, 8 &9 MAP

T_4 Harvest of 40% of leaves in monthly intervals at 7, 8 &9 MAP

T_5 Harvest of 50% of leaves in monthly intervals at 7, 8 &9 MAP

T_6 Harvest of 10% of leaves in bimonthly interval *i.e.* once at 8 MAP

T_7 Harvest of 20% of leaves in bimonthly interval *i.e.* once at 8 MAP

T_8 Harvest of 30% of leaves in bimonthly interval *i.e.* once at 8 MAP

T_9 Harvest of 40% of leaves in bimonthly interval *i.e.* once at 8 MAP

T_{10} Harvest of 50% of leaves in bimonthly interval *i.e.* once at 8 MAP

T_{11} Control (Removal of weak shoot only at 6MAP and no forced leaf harvest)

T_{12} Standard check (No removal of weak shoots @ 6 MAP and no forced leaf harvest)

Leaf yield through removal of weak shoots

The weak shoots were pruned at 6 MAP following farmers traditional practice allowing only two tall shoots in opposite sides. The shoots were harvested manually and the leaves along with petiole from each of the shoot were collected. All the foliages harvested in each subplot were pooled and weighed with and without petiole to determine the fresh biomass yield. The leaf yield in metric ton (MT)/ha was calculated based on the mean leaf yield in gram (g)/ plant.

Leaf yield under different levels and intervals of forced harvest

In monthly intervals, harvesting of leaves was done at 7, 8 and 9 MAP whereas in bimonthly intervals leaf harvest was made only at 8 MAP *i.e.* two months after removal of weak shoots. The bottom leaves were harvested at the rate of 10, 20, 30, 40 & 50 % of total leaves available per plant. Leaf harvest was made by hand plucking along with petiole. At the time of leaf harvest, total numbers of leaves per stem were counted from 5 randomly selected plants per variety for respective level of defoliation in each treatment i.e. @ 10, 20, 30, 40 & 50% and number of leaves to be harvested was fixed following the formula given below.

$$\text{Number of leaves to be harvested} = \frac{\text{Percentage of leaves to be harvested}}{100}$$

X Total number of leaves

All the leaves harvested in each subplot were pooled and weighed with and without petiole to determine the fresh biomass yield. The leaf yield in metric ton (MT)/ha was calculated based on the mean leaf yield in gram (g)/ plant.

Leaf yield at the time of tuber harvest

Total available foliage was harvested a week before tuber harvest in all the treatments by breaking apical shoot portion bearing the foliage. The leaves were removed from the harvested shoots along with petiole and all the leaves harvested in each subplot were pooled and weighed with and without petiole to determine the fresh biomass yield. The leaf yield in metric ton (MT) / ha was calculated based on the mean leaf yield in gram (g) / plant.

Estimation of rearing capacity

The rearing capacity of eri silkworm was worked out based on the availability of foliage from different treatments @ 800 kg /100 dfls [9].

Estimation of tuber yield

The tubers were harvested at 10 MAP irrespective of varieties. The tubers harvested from each treatment sub plots were weighed separately to determine fresh tuber yield. The tuber yield in MT/ha was calculated based on the mean tuber yield (kg) / plot.

Estimation of starch content

Starch content of the tubers was estimated following the procedure adopted by the sago industries using the Riemann scale balance using specific gravity method [2] to fix the rate to csssava tubers while purchase from the farmers. It is expressed as percentage.

The data recorded were analyzed statistically for test of significance using Fisher's method of "Analysis of variance" adopting two way factorial analyses [17]. The interpretation of the data was done using critical difference (CD) values calculated at P = 0.05.

III. Results and Discussion

Performance of different cassava varieties (Tables 1 & 2)

i) *CO_2*

Harvest of leaves at monthly intervals in all treatments (T1-T5) showed significant adverse effect on tuber yield and starch content. However, the tuber yield (32.600 MT/ha) and starch content (26.46 %) in T6 *i.e.* harvest of leaves done @ 10 % at bimonthly interval did not show significant variation compared to the (standard check) farmers practice of leaf harvest (32.562 MT/ha and 26.35 %). Thus the treatment T6 provided an optimum foliage yield of 2.348 MT/ha with rearing capacity of 294 dfls respectively without any adverse effect on yield and quality of tubers. As regards farmers practice (T_{11}) and the control (T_{12}) the foliage yield and rearing capacity of eri silkworm were recorded as 2.083 and 1.305 MT/ ha and 260 and 163 dfls.

ii) *CO_3*

Significant adverse effect on tuber yield and starch content of the tuber was recorded in all the treatments of harvest of leaves at monthly intervals (T1-T5) and 30-50% of leaf harvest at bimonthly intervals (T8-T10). Optimum foliage yield of 8.847 MT/ha with rearing capacity of 1106 dfls without significant adverse effect on tuber yield

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(34.400 MT/ha) and starch content (25.29 %) of the tuber compared to standard check (34.317 MT/ha and 25.45 %) was recorded in T7 *i.e.* leaf harvest @ 20 % at bimonthly intervals. As regards farmers practice (T_{11}) and the control (T_{12}) the foliage yield and rearing capacity of eri silkworm were recorded as 7.718 and 4.223 MT/ ha and 965 and 503 dfls.

iii) *CO(TP)₄*

Tuber yield and starch content (36.980 MT/ha & 28.83%) in T8 *i.e.* harvest of leaves @ 30% at bimonthly interval was found on par with farmers practice (37.189 MT/ha & 28.90%). Therefore, the foliage yield of 9.615 MT/ha with rearing capacity of 1202 dfls respectively was found optimum without affecting the crop produce. As regards farmers practice (T_{11}) and the control (T_{12}) the foliage yield and rearing capacity of eri silkworm were recorded as 7.878 and 6.146 MT/ ha and 985 and 768 dfls.

iv) *$H1_{65}$*

Optimum foliage yield of 8.325 MT/ha with rearing capacity of 1041 dfls without affecting the tuber yield (31.297 MT/ha) and starch content (27.10 %) were recorded in T7 *i.e.* harvest of leaves @ 20 % at bimonthly interval when compared to standard check (31.308 MT/ha and 27.12 %). All other treatments except T6 registered significant adverse effect on the tuber yield and starch content of the tubers. As regards farmers practice (T_{11}) and the control (T_{12}) the foliage yield and rearing capacity of eri silkworm were recorded as 6.883 and 5.864 MT/ ha and 860 and 733 dfls.

v) *H_{226}*

Tuber yield and starch content (33.816 MT/ha & 28.40%) in T8 *i.e.* harvest of leaves @ 30 % at bimonthly intervals was found on par with farmers practice (33.960 MT/ha & 28.73%). Therefore, the foliage yield of 12.039 MT/ha with rearing capacity of 1504 dfls was found optimum without affecting the yield and quality of tubers. As regards farmers practice (T_{11}) and the control (T_{12}) the foliage yield and rearing capacity of eri silkworm were recorded as 9.921 and 7.479 MT/ ha and 1240 and 934 dfls.

vi) *MVD_1*

Significant adverse effect on tuber yield and starch content of the tuber was recorded in all the treatments of harvest of leaves at monthly intervals (T1-T5) and 40& 50% of leaf harvest at bimonthly intervals (T9-T10). Optimum foliage yield of 13.552 MT/ha with rearing capacity of 1694 dfls without significant adverse effect on tuber yield (35.648 MT/ha) and starch content (29.78 %) compared to standard check (35.686 MT/ha and 29.95 %) was recorded in T8 *i.e.* leaf harvest @ 30% at bimonthly intervals. As regards farmers practice (T_{11}) and the control (T_{12}) the foliage yield and rearing capacity of eri silkworm were recorded as 11.269 & 9.000 MT/ ha and 1408 & 1125 dfls.

vii) *Kunguma Rose*

Tuber yield and starch content (28.398 MT/ha & 23.96 %) in T7 *i.e.* harvest of leaves @ 20 % at bimonthly intervals was found on par with farmers practice (28.548 MT/ha & 24.00 %). Therefore, the foliage yield of 8.850 MT/ha with a rearing capacity of 1106 dfls was found optimum without affecting the yield and quality of tubers. As regards farmers practice (T_{11}) and the control (T_{12}) the foliage yield and rearing capacity of eri silkworm were recorded as 7.582 & 5.812 MT/ ha and 948 & 726 dfls.

Comparative foliage yield of cassava varieties without affecting tuber yield and starch content and estimated rearing capacity of eri silkworm

Highest leaf yield and eri silkworm rearing capacity (13.552 MT / ha / crop & 1694 dfls) without adverse effect on crop produce was recorded with the cassava variety MVD1 followed by H226 (12.039 MT / ha / crop & 1504 dfls) and CO4 (9.615 MT / ha / crop & 1202 dfls). Kunguma Rose and CO3 were found next best and exhibited on par results (8.850 & 8.847 MT / ha / crop and 1106 & 1106 dfls respectively) which were closely followed by H165 (8.325 MT / ha / crop & 1041 dfls). The variety CO2 was found least performer, registering poorest leaf yield (2.348 MT / ha / crop) and rearing capacity of eri silkworm (294 dfls) among the varieties screened (Table 3).

The potential yield of cassava leaves varies considerably depending upon cultivar, age of plants, plant density, soil fertility and climate [1]. The rearing capacity of eri silkworm is directly proportionate to foliage yield of cassava plant and approximately 800 kg of leaves are required to rear 100 dfls of eri silkworm [8]. Removal of weak shoots @ 6 MAP irrespective of varieties has been practiced by the farmers traditionally. This practice helps for production of large number of uniformly sized roots all around the base of the plant [12]. Earlier studies recommended that initial harvest of cassava leaves at 105 days after plantation and should not be shorter than 3 months [19] while it was suggested that delaying the first foliage collection until the fourth months allows the plant to pass the most critical stage for its tuberous root yield [8]. However it was found [5] that cassava leaves defoliated from 6 MAP onwards has little or no influence on tuber yield and they recommended that the cassava foliage could be harvested from 6 MAP onwards to ensure higher leaf harvest, high nutrient content and avoid reduction in tuber yield.

Contrary results were, however also reported [16] that defoliation at any stage of the crop was observed to be harmful to the plants. It is reasonable to attribute the variation in the above reports to environmental conditions and the defoliation pattern employed which might probably have led to reduction in effective photosynthetic activities of the plants. In the present investigation forced leaf harvest in different percentages (10, 20, 30, 40 & 50 %) in monthly and bimonthly intervals was done one month after removal of weak shoots *i.e.* from 7 MAP till tuber harvest. The foliage yield varied significantly among the varieties. The foliage availability was also greatly influenced by percentage and interval of leaf harvest.

Increase in percentage of forced leaf harvest in monthly interval yielded increased foliage yield initially @ 7 MAP but there was corresponding reductions in consequent harvests @ 8 & 9 MAP compared to the initial harvest. The foliage availability at the time of tuber harvest (@ 10 MAP) was reduced drastically with increase in percentage of leaf harvest @ 7, 8 & 9 MAP. However forced leaf harvest at bimonthly interval *i.e.* only @ 8 MAP did not affect the

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quantum of foliage yield at the time of tuber harvest @ 10 MAP. This is because of significant growth of plants at bimonthly interval resulting into addition of considerable quantity of new leaves. The results are in agreement with the earlier observations [13] who reported significant reduction in cassava foliage yields by subsequent harvest and with the age of the plants. In contrary, [3] increase in foliage yield by increase in frequency of harvesting interval. Foliage yield also depends on the plant age at first harvest and interval between subsequent harvests [11], [19], [7]. Among the cassava varieties, MVD1 exhibited highest foliage yield in all treatments of forced leaf harvest followed by H226. The varieties CO (TP) 4 and Kunguma Rose were on par with each other and found next best after H226. Highest foliage yield was also recorded with MVD1 at the time of tuber harvest in all treatments compared to the other varieties followed by H226 and Kunguma Rose. The variety CO2 was found least among all parameters. Considering over all foliage yield, MVD1 registered highest foliage yield in all the treatments compared to the other varieties followed by H226 and CO(TP)4.

Decrease in total fresh tuberous root yields of 56-76%, 34-62% and 15-32% on cassava varieties Isunikankiyan and TMS30211 when leaves were harvested at 1, 2 and 3 month intervals respectively compared to the plants whose leaves were not harvested [4]. The two cassava varieties reacted differently to leaf harvest in terms of tuber yields. They recommended harvesting leaves of cassava at 2 or 3 month intervals to ensure reasonable yields of both leaves and tubers. Similarly, influence of cutting interval and harvesting height of cassava shoot on tuber yield is also reported [7]. The most extreme effect *i.e.* 72% reduction in tuber yield was recorded on foliage harvest at 10 cm above ground portion in 45 days interval while the 90 day cutting intervals and 50cm harvesting height only reduced the yield by 7%. An initial foliage harvest at 105 MAP and later harvests with 90 days intervals at 50cm harvesting height increased the foliage yield but showed only marginal negative effect on tuber yield [10]. The percent starch in cassava root was significantly lower when cutting the stems was taken up from 15-75 days before root harvesting compared to immediate harvesting [18]. The variation thereafter appears to exist among cultivars in their tolerance to quantity and harvesting frequency of cassava leaves for eri silkworm rearing.

IV. Conclusion

In the present study, removal of weak shoots allowing only two tall shoots and harvest of total foliage at the time of tuber harvest was practiced irrespective of varieties. The forced leaf harvest in monthly interval @ 3 harvests in 7, 8 & 9 MAP strongly affected tuber yield and starch content of the tubers in all varieties irrespective of percentage of leaves plucked. However, the forced leaf harvest up to 30% in bimonthly interval *i.e.* once @ 8 MAP did not affect the tuber yield and starch content of the tubes in the varieties MVD1, H226, and CO4. The varieties Kunguma Rose and H165 could tolerate leaf plucking up to 20% whereas CO2 was found highly sensitive in which leaf harvest @ 10% only found safe on yield and quality of main produce. Considering the overall foliage yield without affecting the tuber yield and its quality and rearing capacity of eri silkworm, the order of merit of cassava varieties in view of ericulture cum tuber production was MVD1 > H226 > CO4 > Kunguma Rose > CO3 > H165 > CO2 (Figure 1). The high leaf yielding varieties like MVD1, H226 and CO4 under irrigated conditions could successfully be exploited for production of eri silk in order to generate additional income to the cassava growers.

References

[1] Ahmad, M.I. 1973. Potential fodder and tuber yields of two varieties of tapioca. *Malaysian Agric. Journal*, 49: 166- 174.

[2] Bainbridge, Z., Tomlins, K., Wellings, K. and Westby, A. 1996. *Methods for Assessing Quality Characteristics of Non-Grain Starch Staples (*Part 2. Field Methods), Natural Resources Institute, Chatman, UK.

[3] Chantaprasaran, B. and Wanapat, M. 2003. Effects of different harvest intervals on cassava foliage (cassava hay) and root yield. Tropical Feed Resources Research and Development Center (TROFREC), Department of Animal Science, Faculty of Agriculture, Khon Kaen University, Khon Kaen- 40002, Thailand. Available: http://www.mekarn.org/msc2003-05/ theses05/ chan_pl.pdf.

[4] Dahniya, M.T., Oputa, C.O. and Hahn, S.K. 1981. Effect of harvesting frequency on leaf and root yields of cassava. *Journal of Experimental Agriculture*, 17: 91-95.

[5] Fasae, O.A., Adu, I.F., Aina, A.B.J. and Elemo, K.A. 2009. Production, defoliation and storage of cassava leaves as dry season forage for small ruminants in small holder crop livestock production system. *Agricultura Tropica et Subtropica (Tropical Agriculture and Subtropics)*, 42(1): 15-19.

[6] George, J., Mohankumar, C.R., Nair, G.M. and Ravindran, C.S. 2000. Cassava agronomy research and adoption of improved practices in India- Major achievements during the past 30 years. *In: Proceeding of the 6th Regional Cassava Workshop*. 21-25 February 2000. International Center for Tropical Agriculture, Ho Chi Minh city, Vietnam, pp. 279-299.

[7] Hong, N.T.T., Wanapat, M., Wachirapakorn, C., Pakdee, P. and Rowlinson, P. 2003. Effects of timing of initial cutting and subsequent cutting on yield and chemical composition of cassava hay and its supplementation on lactating dairy cows. *Asian-Australasian Journal of Animal Science*, 16: 1763-1769.

[8] Jalloh, A. 1998. Cassava plant population and leaf harvesting effects on the productivity of cassava – rice intercrop on the upland in Sierra Leone. *Tropical Agriculture*, 75: 67-71.

[9] Jayaraj, S., Amuthamurugan, D., Subramanian, K., Mahesh Kumar, M., Madesu, C., Qadri, S.M.H., Sakthivel. N.,Anbalagan, R. and Mathew, P.J. 2004. Ericulture in Tamil Nadu, Pondicherry and Kerala states in India: A study on feasibility, technology development, refinement and transfer. *Half Yearly Progress Report for the Period Ending 31 December 2004*, Central Silk Board, Bangalore, India, pp.40-45.

[10] Khang, D.N.., Wiktorsson, H. and Preston, T.R. 2005. Yield and chemical composition of cassava foliage and tuber yields as influenced by harvesting height and cutting interval. *Asian Australasian Journal of Animal Sciences*, 18(7): 1029-1035.

[11] Lockard, R.G., Saqui, M.A. and Wounuah, D.D. 1985. Effects of time and frequency of leaf harvest on growth and yield of cassava (*Manihot esculenta* Crantz) in Liberia. *Field Crops Research*, 12: 175-180.

[12] Mandal, R.C., Singh, K.D. and Maini, S.B. 1973. Effect of plant density, fertility level and shoot number on tuber yield and quality of tapioca. *Indian Journal of Agronomy*, 18: 498-503.

[13] Phengvilaysouk, A. and Wanapat, M. 2008. Study on the effect of harvesting frequency on cassava foliage for cassava hay production and its nutritive value. *Livestock Research for Rural Development*, 20 (Supplement): 1-7.

[14] Sakthivel, N., Qadri, S.M.H., Anbazhagan, R., Krishnamoorthy, T.S. and Jayaraj, S. 2010. Cropping system of eri food plants for

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economically viable ericulture in Tamil Nadu. *Asian Textile Journal*, 19(4): 70-76.

[15] Sakthivel, N. 2012. Studies on utilization of tapioca (*Manihot esculenta* Crantz) for ericulture in Tamil Nadu, Ph.D., thesis, submitted to the Periyar University, Salem, Tamil Nadu. pp. 175-178.

[16] Singh, J. and Chaudhury, D.R. 1985. Effect of topping and defoliation in tapioca. *Journal of Root Crops*, 7: 86.

[17] Sundararaj, N., Nagaraju, S., Venkataramu, M.N. and Jagannath, M.K. 1972.*Design and Analysis of Field Experiments.* Directorate of Research, UAS, Bangalore. P.419.

[18] Tiraporn, C. and Narintaraporn, K. 1983. Harvesting of cassava root. Cassava monograph number 7. Department of Agriculture, Ministry of Agriculture and Cooperatives, Bangkok, Thailand. pp. 113-119.

[19] Tung, C.M., Liang, J.B., Tan, S.L., Ong, H.K. and Jelan. Z.A. 2001. Foliage productivity and growth persistency of three local cassava varieties. *Asian Australasian Journal of Animal Science*, 14: 1253-1259.

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Table: 1 Effect of different harvest intervals and quantum of harvest of cassava leaves on foliage yield (FY: MT/ha) and rearing capacity (RC: No. of dfls) of eri silkworm

Treatment	CO2		CO3		CO(TP)4		H165		H226		MVD1		K. Rose	
	FY	RC	FY	RC	FY	RC	FY	RC	FY	RC	FY	RC	FY	RC
T_1	2.740	343	9.192	1149	9.627	1203	8.936	1117	11.986	1498	13.736	1717	9.358	1170
T_2	3.334	417	10.940	1368	11.197	1400	10.378	1297	13.765	1720	15.689	1961	10.971	1371
T_3	3.529	441	11.082	1385	11.739	1467	10.707	1338	13.885	1735	15.949	1993	11.281	1410
T_4	3.597	450	11.352	1419	11.874	1484	10.775	1347	13.976	1747	16.070	2009	11.636	1454
T_5	3.626	453	11.484	1436	11.976	1497	10.856	1357	14.059	1757	16.161	2020	11.368	1421
T_6	2.348	294	8.397	1050	8.514	1064	7.777	972	10.743	1343	12.222	1528	8.247	1031
T_7	2.513	314	8.847	1106	9.014	1127	8.325	1041	11.361	1420	12.961	1620	8.850	1106
T_8	2.705	338	9.281	1160	9.615	1202	8.873	1109	12.039	1504	13.552	1694	9.355	1169
T_9	2.932	367	9.791	1224	10.180	1273	9.458	1182	12.824	1603	14.482	1810	9.881	1235
T_{10}	3.033	379	10.380	1298	10.442	1305	9.715	1214	13.135	1642	14.637	1829	10.165	1270
T_{11}	2.083	260	7.718	965	7.878	985	6.883	860	9.921	1240	11.269	1408	7.582	948
T_{12}	1.305	163	4.223	503	6.146	768	5.864	733	7.479	934	9.000	1125	5.812	726
CD (5%)	0.155	16.82	0.10	13.91	0.12	16.85	0.13	16.10	0.13	14.83	0.12	15.74	0.13	14.92

Table: 2 Effect of different harvest intervals and quantum of harvest of cassava leaves on tuber yield (TY: MT/ha) and starch content (SC: %)

Treatment	Tuber Yield (MT/ha) & Starch content (%)													
	CO2		CO3		CO(TP)4		H165		H226		MVD1		K. Rose	
	TY	SC	TY	SC	TY	SC	TY	SC	TY	SC	TY	SC	TY	SC
T_1	31.453	24.33	33.722	24.60	36.250	26.83	30.316	25.27	33.311	27.15	35.450	28.80	26.383	23.12
T_2	30.557	23.09	30.765	23.66	34.913	25.69	29.359	24.18	32.616	25.63	34.613	27.57	25.130	22.56
T_3	27.164	21.16	28.966	22.35	31.780	23.48	26.900	21.25	30.375	22.17	32.960	26.72	23.120	20.67
T_4	22.783	18.38	25.727	20.63	26.895	20.18	22.546	18.59	27.933	19.05	28.641	23.00	20.569	18.35
T_5	17.420	15.47	20.631	17.46	19.243	15.30	18.278	14.21	23.677	15.77	23.267	19.90	16.412	15.66
T_6	32.600	26.46	34.430	25.48	37.200	29.01	31.320	27.27	34.000	29.00	35.717	30.13	28.620	24.16
T_7	32.017	25.75	34.400	25.29	37.205	28.76	31.297	27.10	33.980	28.78	35.680	30.06	28.398	23.96
T_8	31.200	24.17	33.984	24.98	36.980	28.83	31.100	26.83	33.816	28.40	35.648	29.78	27.155	22.83
T_9	28.923	23.32	32.798	23.03	33.156	26.99	29.412	24.19	32.500	26.70	33.900	24.25	25.648	21.75
T_{10}	24.003	21.06	28.957	21.19	28.243	23.44	26.823	20.36	29.678	24.39	30.234	21.69	22.378	18.33
T_{11}	32.562	26.35	34.317	25.45	37.189	28.90	31.308	27.12	33.960	28.73	35.686	29.95	28.548	24.00
T_{12}	32.608	27.33	33.800	26.18	36.018	29.13	30.800	26.90	33.079	28.46	34.219	28.10	28.050	24.10
CD (5%)	0.617	0.516	0.800	0.501	0.652	0.498	0.701	0.522	0.812	0.617	0.733	0.558	0.685	0.498

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Table 3: Comparative foliage yield of different cassava varieties over control without affecting tuber yield and starch content and rearing capacity of eri silkworm

Variety	Treatment	6 MAP		8 MAP		10 MAP		Total		Tuber Yield (MT/ha)	Starch content (%)	Control	
		FY	RC	FY	RC	FY	RC	FY	RC			Tuber Yield (MT/ha)	Starch content (%)
CO2	T6 (10% BMI)	0.985	123	0.195	24	1.168	146	2.348	294	32.600	26.46	32.562	26.35
CO3	T7 (20% BMI)	5.225	653	1.112	139	2.510	314	8.847	1106	34.400	25.29	34.317	25.45
CO(TP)4	T8(30% BMI)	4.173	522	1.842	230	3.600	450	9.615	1202	36.980	28.83	37.189	28.90
H165	T7(20% BMI)	3.280	410	1.160	145	3.885	486	8.325	1041	31.297	27.10	31.308	27.12
H226	T8(30% BMI)	4.900	612	2.365	296	4.774	597	12.039	1504	33.816	28.40	33.960	28.73
MVD1	T8(30% BMI)	6.016	752	2.363	295	5.173	647	13.552	1694	35.648	29.78	35.686	29.95
K. Rose	T7(20% BMI)	3.551	439	1.209	151	4.090	511	8.850	1106	28.398	23.96	28.548	24.00
Average	--	**4.018**	**502**	**1.463**	**183**	**3.600**	**450**	**9.082**	**1135**	**33.305**	**27.11**	**33.367**	**27.21**

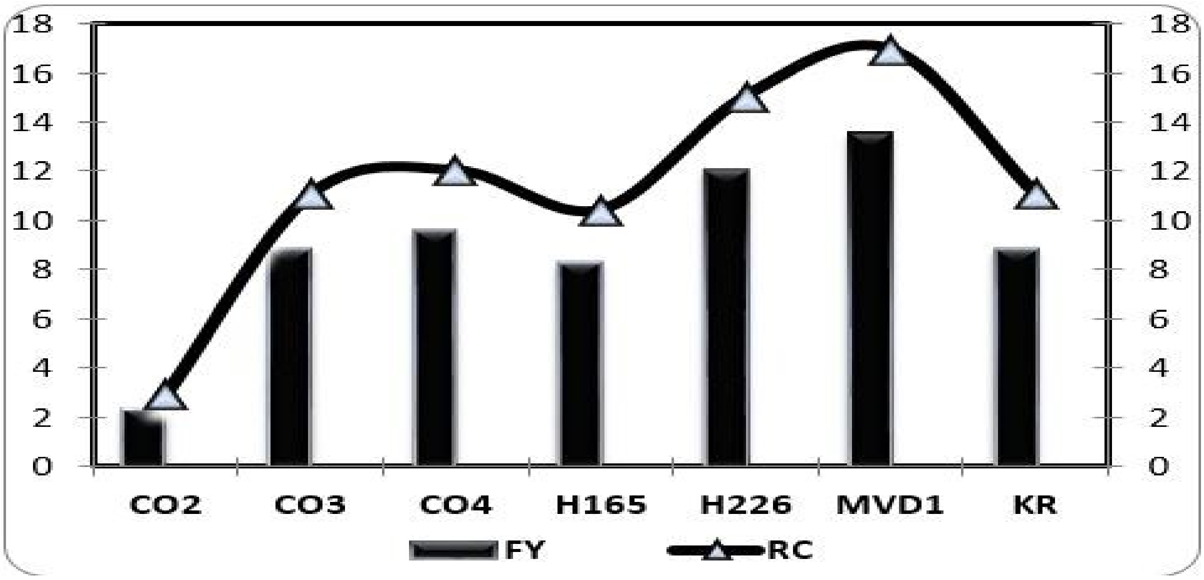

Fig. 1. Comparative foliage yield (MT/ha) of different cassava varieties and rearing capacity (00 dfls) of eri silkworm without affecting main crop productivity (tuber yield & starch content)

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