
Farmer's Knowledge and Adoption of Dragon Fruit (*Hylocereus Undatus*) Cultivation: A Case Study in Sri Lanka

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Abstract

Though the dragon fruit cultivation is popular among both small scale and large scale fruit growers, in Sri Lanka little attention has been paid to the research and development of Dragon fruit cultivation. Therefore, this research attempted to find out the situation about cultivation with the specific objectives such as, to assess the knowledge and adoption to the practices of dragon fruit growers and to make appropriate recommendation for the future growers. Farmers who have cultivated more than 100 plants were selected to collect the primary data. Primary data were collected from the farmers through personal interview with the help of pre-tested interview schedule. Majority of farmers have shown poor knowledge (less than 50% of the index) on planting material selection, plant establishment, secondary fertilizer application, training and pruning of vine, propagation, pest and diseases control, and post harvesting. They showed high knowledge on land preparation, primary fertilizer application and harvesting. There was lack of adoption for planting material selection, post harvesting, and propagation. Farmers have highly adopted to land preparation, fertilizer application and plant establishment. Farmers exhibited high adoption level for plant establishment, secondary fertilizer application, training and pruning of vine even though, the poor knowledge on these practices. Plant per unit, no of main stems per plant, hale size, removing main tip, removal of lateral branches, inorganic fertilizer application, age, education level of the farmers, knowledge level variety selection were the significant variables which influenced the high management efficiency.

Key words: Dragon fruit, knowledge, Adoption, Practices

Introduction

Dragon fruit is a member of the Family Cactaceae which originated in North, Central and South America, (Southern Mexico, Pacific side of Guatemala, Costa Rica, El Salvador, Venezuela, Colombia, Ecuador, Curacao, Nicaragua, Panama, Brazil and Uruguay) where they were widely distributed from the coastal areas to the hilly mountains. Currently dragon fruit cultivation is popular among both small scale and large scale fruit growers. However, little attention has been paid so far, for the research and development of Dragon fruit cultivation in Sri Lanka. Further, there are no, any recommended management practices or package of practices for growers. Therefore, management practices change from farmer to farmer and it depends on the planting material suppliers. Therefore, this research was attempted to find real situation about Dragon fruit cultivation. On this sense, this research was healed to assess the knowledge and adoption to the practices of dragon fruit cultivation in Sri Lanka, and to

make appropriate recommendation for the future growers.

Methods and Materials

Dragon fruit cultivation is spread-out mainly around the area where planting materials are available. The planting materials are available in *Bulathsinhala, Horana, Ambilipitiya, Aralaganvila, Makadura and Kalpitiya*. Therefore, the highest number of Dragon fruit growers are scattered around the *Kaluthara, Colombo, Galle, Gampaha, Kurunegala, Rathnapura, Polonnaruwa, Hamabntota, Monaragala Kandy and Mathale* area. Therefore, these districts were selected as study area. Farmers who have purchased more than 100 plants were purposively selected from planting material suppliers list to form the sample frame for the study. There were 58 dragon fruit farmers in the sample frame. Simple random sample method was employed to select the sample for this study. Sample portion was 55 percent and sample size was 32.

Primary information was collected from the farmers through personal interview with the help of pre-tested interview schedule. Secondary information was collected from the various reports prepared by the planting material suppliers, department of agriculture, and other reviews. Past studies have proved that farmers' adoption decisions regarding new technology are influenced by the many factors (Somda et al. 2002)). Therefore, level of knowledge and adoption to the management practices of cultivation were measured based on different practices which are indicated in the Table 1. In addition, age, education level, land extent and agriculture experience were also collected.

Knowledge and adoption level on Dragon fruit cultivation was calculated by applying knowledge index and adoption index. Knowledge index and adoption index were measured using following formula (i) and (ii).

Knowledge index = (Known practices / Total practices in package) x 100 ... (I)

Adoption index = (Adopted practices / Total practices in package) x 100 (ii) (Rogers and Shoemake (1971).

Three categories such as high (100-75), moderate (75-35), low (34-0) were made based on the range of values of knowledge and adoption index. The descriptive statistics such as mean, percentage and Pearson's

correlation test and Kendall's correlation were employed to analyze the data (Majumdar 2002).

Result and Discussion

With regard to the age of the growers, about 41% of farmers belonged to 31-40 age group whereas 28% of farmers were in 41-50 age group. Rest of them was in other age categories 21-30 years (19%) and higher than 51 years (12%). The results proved that young farmers have shown high interest to cultivate the dragon fruit. Further, 40% of farmers have studied up to GCE advance level while 34% of farmers have studied up to degree level and rest of them were in primary or ordinary level of education. Therefore, Dragon fruit cultivation is more popular among the educated farmers. Majority of (59%) were experienced farmers regarding agriculture. Agricultural experience is very important to successful cultivation of dragon fruit. Majority (76%) of farmers belonged to small scale land ownership category. The land is very limited factor and opportunity cost of land is also very high in Sri Lanka. Therefore, the large scale cultivation may be limited. On this background, small scale cultivation needs to be promoted among the interested farm group. Majority (75%) of farmers have cultivated white variety. Rests of farmers have cultivated red variety. White variety provides high yield and it does not require artificial pollination though red variety needs artificial

Table 1: Knowledge and adoption on the practices

Item	High		Medium		Low	
	Knowledge level	Adoption level	Knowledge level	Adoption level	Knowledge level	Adoption level
Land preparation	14(43%)	24(75%)	12(38%)	2(06%)	6(19%)	6(19%)
Planting material selection	3(09%)	4(12%)	7(22%)	6(19%)	22(69%)	22(69%)
Plant establishment in the field	8(25%)	12(37.5%)	9(28%)	15(47%)	15(47%)	5(15.5%)
Primary fertilizer application	10(31%)	11(34.5%)	14(44%)	4(12.5%)	8(25%)	17(53%)
Secondary fertilizer application	7(21%)	13(40.5%)	4(12.5%)	5(15.5%)	21(65.5%)	14(45%)
Pruning and training of plant	09(28%)	11(34%)	9(28%)	7(22%)	14(45%)	14(45%)
Harvesting	16(50%)	15(47%)	2(06%)	3(09%)	14(45%)	14(45%)
Post harvesting	3(09%)	2(06%)	3(09%)	4(12.5%)	26(81%)	26(81%)
Propagation of plant	6(18%)	4(12.5%)	15(47%)	15(47%)	11(34%)	13(41%)
Pest and diseases control	12(37.5%)	11(34%)	05(16%)	8(25%)	15(47%)	13(41%)

pollination. Therefore, white varieties are more popular among the farmers. But, empirical reviews have showed that red varieties are tastier (Nerd et al. 1999). Majority of farmers (66%) were in intermediate zone while 31% and 35% were reported in low country dry zone and low country wet zone, respectively.

According to the Table 1, around 43% and 75% of farmers were in high knowledge and adoption level in respect to land preparation. Further, the Table 1 clearly illustrates that majority (69%) of farmers were in low level of knowledge and adoption regarding correct planting material selection. Therefore, it is necessary to increase their knowledge on correct planting material selection, because, it is significant to get high yield. These results are not in line with previous findings (Meti et al. 2004).

Table 1 further shows that about 47% of farmers in low knowledge level about plant establishment. Around 28% of farmers were in medium level. However, 37.5% of farmers were identified in high level of adoption. Forty seven percent belonged to medium level. Correct plant establishment directly effects on the performance on the crop. Therefore, it is necessary to improve farmers' knowledge and adoption regarding correct plant establishment in the field. Here, selecting correct sides of seedling and depth of plant are more important.

Table 1 illustrates that around 31% and 44% of farmers were in high and medium level knowledge regarding to the primary fertilizer application. However, majority (53 %) were in low adoption level. Further, majority of farmers were in the low level of knowledge (65.5%) and adoption (45%) regarding the correct secondary fertilizer application. Fertilizer is directly influenced the yield of the crop. Therefore, farmers' awareness and adoption regarding correct fertilizer application must increase. It may further help to effective utilization of resources of the farmers.

Correct pruning and training of plant is pre requisite for high yield of Dragon fruit. It effects directly on the yield of the crop. Table 1 clearly illustrates that about 28% of farmers were in high knowledge level. Around 28% and 44% of farmers were identified as medium and low level respectively. Further, 34% of farmers have practiced

correct method while 44 % of them in low level of adoption on this regard. Final aim of the any farmer is to get high yield from field. Therefore, correct harvesting is very important. Table 1 shows that half of farmers were in high knowledge category regarding harvesting. Further, 47% of farmers have shown high level of adoption. Other important point was that the considerable numbers of farmers (44 %) were still in low level of knowledge and adoption on this regard. Post harvesting knowledge is very important to get high price for Dragon fruit. Majority (81%) of farmers have still not paid their attention on proper post harvest handling due to low level of knowledge. Around 47% of farmers were identified in medium knowledge level regarding correct propagation of plant. With regard to the adoption level, around 41% of them were in low level of adoption category.

Around 47% and 415 of farmers were in low knowledge and adoption level regarding pest and diseases control, respectively.

However, Figure 1a clearly illustrates that majority of farmers have shown poor knowledge (less than 50% of the index) planting material selection, plant establishment, secondary fertilizer application, training and pruning of vine, propagation, pest and diseases control, and post harvesting. Hence, they have shown high knowledge on land preparation, primary fertilizer application and harvesting. Therefore, appropriate training and awareness program needs to be introduced to increase the knowledge related aspects.

There was lack of adoption for planting material selection, post harvesting, and propagation. Farmers have highly adopted to land preparation, fertilizer application and plant establishment. (Figure 1b) Other interesting point was that farmers have exhibited high adoption level for plant establishment, secondary fertilizer application, training and pruning of vine with the other practices even though, the poor knowledge on these practices.

The interesting point was that adoption level was found that highly significant and positive correlation with knowledge level ($r = 0.873$, $p = 0.01$). It means that

farmers' adoption level can be increased by increasing their knowledge on Dragon fruit cultivation practices. Further, farmers' age was negatively significant with knowledge ($r = -.507, p = 0.01$) and adoption ($r = -.351, p = 0.05$) level whereas education level of the respondents was positively correlated with knowledge ($r = .628, p = 0.01$) and adoption level ($r = .483, p = 0.01$).

Conclusion

It can be concluded that farmers knowledge about management practices varied from medium to low. Therefore, appropriate training and awareness program needs to be introduced to increase the knowledge related aspects. Farmers adaptation was little higher than knowledge because of farmers have adapted to practices given by planting material supplier.

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