

Do Urban Households Prefer Medicinal Plants for Landscaping? A Case Study in Kurunegala Municipal Area

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ABSTRACT

Sri Lankans use medicinal plants for curative and therapeutic values and in other social, cultural and religious activities. However, there is a potential of using medicinal plants in landscaping to provide aesthetic and other benefits. Therefore, the present study was conducted with the objective of assessing the preference of selected home garden owners on selected medicinal plants in view of introducing these plants for landscaping. For this, a survey was conducted in Kurunegala Municipal limits using a pretested questionnaire. Friedman and Mann-Whitney tests were carried out to analyze preferences. Results revealed a high preference towards medicinal plants by households and among the species studied, Komarika, Vishnukranthi and Thebu received a significant preference. Komarika and Vishnukranthi can be used as a ground cover while Thebu can be used as a specimen plant or can be introduced into borders. Therefore, this study stresses the importance of popularizing medicinal plants in home garden landscaping as it will give an aesthetic value in addition to medicinal and other benefits.

KEYWORDS: Landscaping, Medicinal plant, Urban households

Introduction

A home garden is a piece of land around the dwelling with clear boundaries and it has a functional relationship with its occupants related to economic, biophysical and social aspects (Weerakoon, 2011). Home gardens in Sri Lanka offer a highly diversified and economically viable form of land use. A home garden often consists of a mixture of annual and perennial crops and they produce a variety of products such as food, fruits, medicine, spices, fuel wood and timber (Ariyadasa, 2002). Home gardens are widespread and vary in species composition. Traditionally the development and maintenance of a home garden is a collective effort of family members and according to Weerakoon, (2011), the cultivation of varied species of plants around the house is usually unplanned. In the back garden people tend to grow vegetables and culinary plants such as Karapinchcha and Rampe. However, due to the popularity of the concept of landscaping, nowadays people tend to grow ornamental plants in the front garden of a home. Still in Sri Lanka, the main objective of landscaping is to provide aesthetic benefits. However, according to Hull and Revell, (1989), landscaping is the art and science of arranging outdoor space for human use and enjoyment, which can be

directly perceived by a person visiting and using that environment. Therefore, it is clear that a well-planned landscape can provide not only aesthetic benefits but also some functional benefits. In this context multipurpose plants which include medicinal plants can play a significant role in home gardens.

In Sri Lanka ayurveda and the traditional system of healthcare have been systematically used for over 2000 years to treat illnesses (Mahindapala, 2004) and out of 4150 flowering plants recorded in Sri Lanka (Senarathne, 2001), about 208 medicinal plant species are widely used in Ayurveda system. Out of that, 50 species are heavily used in Ayurveda medicine (Pallegedara, 2003). In addition to their curative and therapeutic values, Sri Lankans use medicinal plants in rituals, cultural activities, religious functions (Mahindapala, 2004), in cosmetic industry and as a source of health foods from time immemorial in Sri Lanka (Jayaweera, 1981b). In the Sri Lankan context, in most of the front gardens, people widely use popular exotic plants which mainly provide aesthetic benefits in addition to some functional benefits such as shade, dividing space, providing privacy, directing people etc. Thus, incorporation of medicinal plants into the home garden landscapes, can provide diverse benefits to the land owner. Some of the medicinal plants are attractive. In addition, certain plants can be used as food (Thebu, Anguna), as a gruel (Hatawariya, Wel-penela) tonic (Iramusu), as a home remedy (Komarika, Ginger) and for beautification (Komarika). Additionally, nearly 80 medicinal plants are now considered as threatened (Mahindapala, 2004) and therefore, it can also contribute to the conservation of rare medicinal plants. Certain medicinal plants are capable of attracting wildlife such as *Woodfodia fruticosa* attract sun birds (Napagoda and Yakandawala, 2008), *Osbeckia octandra* attract bees and serve as a butterfly host plant (Weerasinghe and Yakandawala, 2009). Further, in some instances it can also provide an additional income to the owner as certain plant products have a demand in the local market. Therefore, the concept of introducing medicinal plants as a soft landscape element is important. Further, depending on their height, growth habit, canopy density, form, texture and colour, certain medicinal plants can be incorporated into designs instead of traditionally used ornamental plants (as a hedge) or some can be mixed with ornamentals (in a mix border). Therefore, the present study was conducted with the objective of assessing the preference home garden owners to medicinal plants which also have an ornamental value that can be incorporated into landscaping.

Methodology

Experimental Design

A commonly used ground cover plant *Rhoeo spathacea* and shrub *Durandtha repens* were selected as popularly used ornamental plants. While based on experience *Vishnukranthi*, *Komarika* and *Iramusu* were selected as alternate to *Rhoeo* while *Bowitiya*, *Katukarandu* and *Thebu* were selected as an alternate to *Durandtha* to evaluate the preference. The morphology, striking features and medicinal values of all the eight plants were recorded (Table 1 and Table 2). Photographs of plants depicting habit of the plant, leaves and flowers were taken and eight descriptive illustrations were made separately for each medicinal and ornamental plant, which also include their landscape

potential and medicinal values where relevant in order to describe the plants to the interviewees who indicated their preferences in a Likert scale. A questionnaire was also developed to gather background information and it was pretested using a sample of 10 people before going into the full scale survey.

Table 1. Landscape Potential, Striking Features and Medicinal Values of Selected Gourd Cover Plants

Species	Morphology	Striking feature	Medicinal value
<i>Rhoecy spathacea</i> (Ornamental plant)	Herb	Leaf-Green upper surface Lower purple surface Flower-White colour	No
Iramusu (<i>Hemidesmus indicus</i>)	Semi shrubby twine; prostrate or accent	Leaf-Green surface with white midrib Flower-White colour	Tonic drink, home remedy (Skin and urinary diseases), root for fever and skin diseases. **
Komarika (<i>Aloe vera</i>)	Herb	Leaf-Green colour fleshy Flower-Red colour	Home remedy (burning wound) For beauty culture, cure eye diseases. ***
Vishnukranthi (<i>Evolvulus alsinoides</i>)	Herb; Prostrate wiry stem	Leaf-Green colour Flower-Purple colour	To make oil for hair growth, make decoction, cure nerve debility. *

Note: *Source: Jayaweera (1980); **Source: Jayaweera (1981a); ***Source: Jayaweera (1981b).

Table 2. Landscape Potential, Striking Features and Medicinal Values of Selected Shrubs

Species	Morphology	Striking feature	Medicinal value
<i>Duranta repens</i> (Ornamental plant)	Height-6 m Spreading branching	Leaf-Small green colour Flower- Violet colour	No
Katukarandu (<i>Barleria prionitis</i>)	Height-0.6 m- 1.4 m	Leaf -Green colour Flower-Orange yellow colour	To make oil, cure for diabetic, catarrhal fever Rat bites poisoning. **
Thebu (<i>Costus speciosus</i>)	Height-2-3 m Spreading horizontally	Leaf-Green colour Flower-White colour with yellow center Specimen plant	Leave for salad, to cure joints, catarrhal fever, Cough, worm and skin diseases. ****
Bowitiya (<i>Osbeckia octandra</i>)	Height-2-3 m	Leaf-Green colour Flower-Purple colour	Tender leaves curry, Mature leaves salad cure for diabetics, Treat fractures. ****

Note: **Source: Jayaweera (1981a); ****Source: Jayaweera (1982).

Data Collection

Three Grama Niladhari (G.N.) Divisions viz. Udawalpola, Theliagonna and Gangoda representing Kurunegala Municipality area were selected for the survey. Face to face interviews were conducted using the questionnaire from a randomly selected 100 households from June to August in 2011. Each questionnaire included questions with regard to demographic characteristics, details of landscaping practices and attitude towards medicinal plants. To evaluate the preference of medicinal plants compared to popularly use ornamental plants, households were asked to rank the ornamental and medicinal plants according to their preference. Descriptive illustrations which include the pictures of the plants and characters were shown to the households to facilitate better ranking.

Data Analysis

Descriptive statistics were used to describe demographic characteristics. The Friedman test was used to evaluate preference of the selected medicinal and ornamental plants. The Friedman test statistic can be depicted as,

$$X_r^2 = \frac{12}{bC(C+1)} \sum_{j=1}^c R_j^2 - 3b(C+1) \quad (1)$$

Where;

C = number of treatment level

b = number of block

R_j = Total of ranks for a particular treatment level (column)

j = particular treatment level (column)

$X_r^2 \approx X^2$, with $df = C - 1$ (Black, 2001)

The level of significance was set at 5%. Lowest sum of rank value denoted that there was high preference rate. Highest ran sum value was denoted lowest preference level. Mann-Whitney test, the Non parametric counterpart of the t test, was done for each plant pairs to see whether there is a difference between ranks (Black, 2001).

Results and Discussion

Descriptive Statistics of the Sample

The sample comprised of 76% females and majority of them (47%) were housewives. In terms of level of education, 85% have studied up to (A/L) or above (Table 3).

Table 3. Demographic Features of the Sample

Attributes	Levels	Percentage
Age (Years)	≤40	25%
	41-50	30%
	51-60	30%
	≥61	15%
Gender	Male	24%
	Female	76%
Occupation	Government	26%
	Private	11%
	Self employed	16%
	House wife	47%
Education level	Primary	15%
	Secondary	63%
	Diploma	9%
	Degree	13%

Attitude towards Medicinal Plants

Because many medicinal plants are used in treatments in Ayurveda, respondents’ belief of this treatment system was assessed. Majority of the respondents (52%) strongly agreed to the idea of using Ayurveda medicine as a successful treatment followed by 41% of them agreed. Only 4% disagreed with the idea. While none of the respondents strongly disagreed (Figure 1).

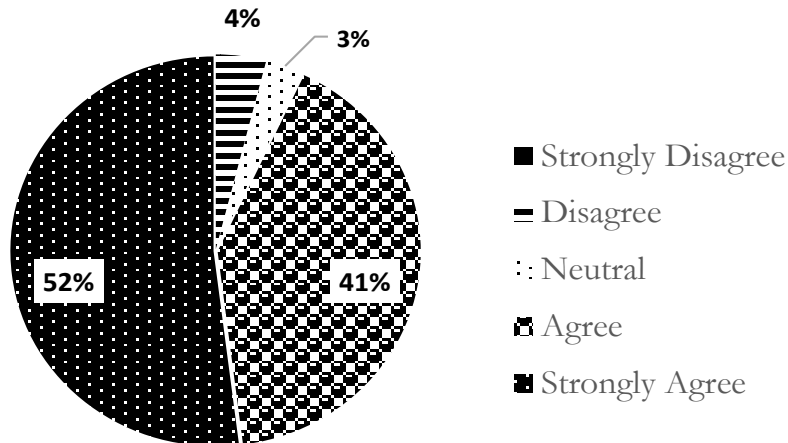


Figure 1. Belief of Ayurveda Medicine as a Successful Treatment Method

Perception of the sample with regard to the possibility of using medicinal plants for minor ailments is given in Figure 2. The majority of the sample (62%) agreed to the idea of the possibility of using medicinal plants for minor ailments while 28% strongly agreed.

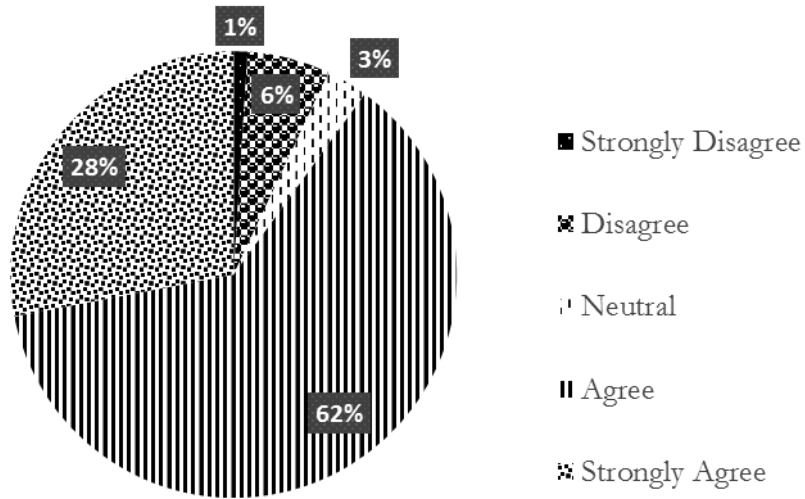


Figure 2. Medicinal Plant Usage for Minor Ailments

The preference for medicinal plants in home gardens were found to be high, evidenced by agreement to the idea of using medicinal plants as ornamental plants in landscaping by the majority (88%) (Figure 3)

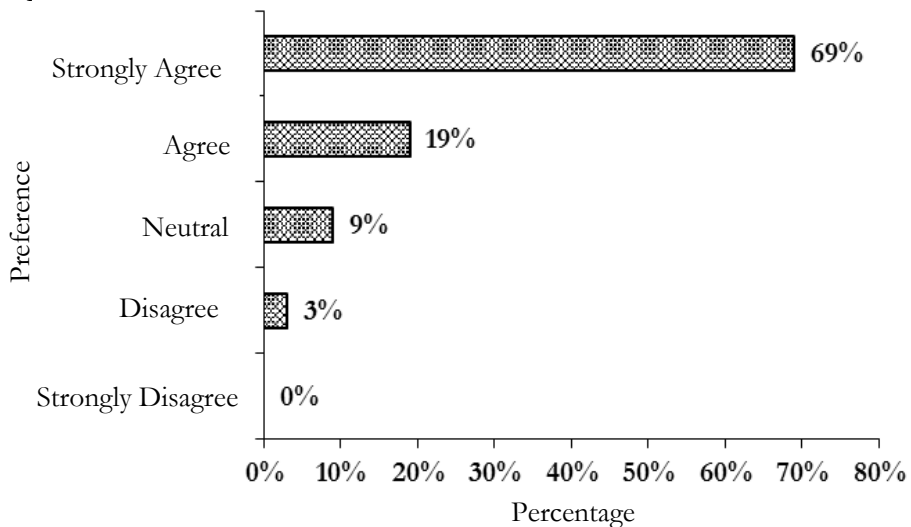


Figure 3. Preference for Medicinal Plants to be Used as Ornamental Plants

Preference for Use as Medicinal and Ornamental Plants

In the Friedman test carried out to assess the comparative preference of the selected plants for this study, Thebu received a low rank sum value (201), where Durentha obtained the highest rank sum value (304). The comparable rank sum value obtained for Katukarandu and Bowitiya demonstrates that respondents have given similar preference for both (Table 4)

Table 4. Preference of Shrubs

Preference	Est. median	Sum of rank
Thebu	1.6 ^a	201
Katukarandu	2.7 ^b	247
Bowitiya	2.2 ^b	248
Durentha	3.3 ^c	304

Note: Based on Man-Whitney test pairs with different letters are statistically significant at $p < 0.001$

Of the ground cover plants assessed, Komarika and Vishnukranthi received the lowest rank sum values (195, 200 respectively), where Rhoeo received highest rank sum value (Table 5).

Table 5. Preference of Ground Cover Plant

Preference	Est. median	Sum of rank
Komarika	1.5 ^a	195
Vishnukranthi	2.2 ^a	200
Iramusu	2.7 ^b	253
Rhoeo	3.5 ^c	352

Note: Based on Man-Whitney test pairs with different letters are statistically significant at $p < 0.001$

Thus, out of the four ground cover plants used in the study, the most preferable plants were Komarika and Vishnukranthi. Of which Komarika is popular in beauticulture while Vishnukranthi produce attractive purple coloured flowers. Whereas the popularly used ornamental plant *Rhoeo* received a significantly lower preference. Some respondents stated that water can accumulate within *Rhoeo* leaves hence which can contribute to Dengue. With regard to shrubs, Thebu received a significantly high preference (Table 5) followed by Katukarandu and Bowitiya. Thebu can be used as a specimen plant in landscaping and its leaves used to prepare a popular salad. In this group the ornamental plant *Durantha* received the lowest preference too.

Conclusions

In urban areas there is a high demand for landscaping and people widely use popular ornamental plants. However, medicinal plants with ornamental value can be incorporated into front gardens. The present study revealed the high preference towards medicinal plants by households in the Kununegala Municipal area. Among the species studied Komarika, Vishnukranthi and Thebu received a significantly high preference. Komarika, Vishnukranthi can be used as a ground cover while Thebu can be used as a specimen plant or can be introduced to borders.

Most respondents were not aware about the possibility of using medicinal plants for landscaping. Therefore, in future an awareness programs can be conducted to educate people about the ornamental value of medicinal plants. Further research should also be conducted to identify specific landscape use of medicinal plants. So that this information could be passed during the awareness programs. In addition to the

identification of highly preferred medicinal plants these should be propagated and distributed at a reasonable price in view of promoting them in landscaping.

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