SITE QUALITY OF KHAYA (*Khaya senegalenesis*) PLANTATIONS IN SRI LANKA AS INDICATED BY HEIGHT-DIAMETER RELATION AND TOP HEIGHT
TITLE

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ABSTRACT

Khaya (Khaya senegalensis) being a new introduction, recommended for forest plantation establishment in the Dry and Intermediate Zones of Sri Lanka, assessment of site quality at growing localities is vital. Variables, i.e. tree height and tree diameter were measured non-destructively, at identified age classes of Khaya in Anuradhapura and Kurunegala divisions as representatives of Dry and Intermediate Zones, respectively. Khaya in Kurunegala has achieved 39.98 cm of dbh and 18.31 m of height by the age of 18-20, whereas in Anuradhapura they were 22.21 cm and 12.41 m. The dbh and tree height showed a strong degree of correlation in both divisions. Among the height-diameter models regressed, parabolic model ($h = ß_0 + ß_1.d + ß_2.d^2$) and the model, $h - 1.3 = ß_1.d + ß_2.d^2$ showed the best fit with the available data in Anuradhapura and Kurunegala divisions, respectively. As per height-diameter relation, site quality of the beat Polpithigama in Kurunegala is superior to the beats Ullukkulama and Rathmale in Anuradhapura, while the beat Mihintale in Anuradhapura is superior to the beats Ranawarawa and Ambanpola in the Kurunegala division. Khaya has attained average top heights of 14.2 m and 20.8 m at the base age of 18-20 years in Anuradhapura and Kurunegala divisions, respectively. Elevated top heights demonstrated the richness of site quality in Kurunegala division. Top height being the site index, it can be concluded that the beats Rathmale, Elayapattuwa and Punewa in Anuradhapura and the beats Ranawarawa and Ambanpola in Kurunegala division are inferior, while the beat Mihintale in Anuradhapura and the beats Kuliyapitiya, Nikaweratiya, Nakkawatta and Polpitigama in Kurunegala division are superior in site quality. This confirms that Khaya performs well in the Intermediate Zone than in the Dry Zone of Sri Lanka. Further, it identified the inferior sites for the growth of Khaya. These findings can direct the decision making process on future forest plantation establishment in Sri Lanka with possible refining of present recommendations.

Key words: Top height, Height-diameter relation, *Khaya senegalensis*, Site quality

Introduction

Khaya (*Khaya senegalensis*), also known as 'African mahogany' is a newly introduced forest plantation tree species to Sri Lanka by the Forest Department of Sri Lanka in 1994. Today it has been identified as one of the promising (Tilakaratna and Weerawardane, 1992) and priority species for plantation establishment in the Dry and Intermediate zones of Sri Lanka (Tilakaratna, 2001) with the main aim of timber production. *Khaya* has become a priority species, while the main demanded species in the Dry Zone at present, *i.e. Tectona grandis* has failed in many instances for various reasons such as elephant damage, poor soil conditions in the second rotation sites, *etc*. Preliminary studies had shown that *Khaya* is able to overcome obstacles prevailed in the Dry Zone in its establishment, thus gained a wide appreciation in the Dry Zone reforestation programmes specially for its better establishment, faster growth and low risk from elephant damage (Alawathugoda, 2009). Besides these preliminary studies, availability of mature *Khaya* plantations invite the assessment of growth and site quality of *Khaya*, which will be useful in refining the future recommendations.

Site quality refers to a combination of physical and biological factors, characterizing a particular geographic location or site.Both edaphic and climatic factors influence the characters of a site in a plantation. The properties that determine the site quality are

generally inherent to that site, while being influenced by management. The height-diameter relationship, which is important to predict the respective height by measuring the *dbh*, also can be used to estimate the site quality. Stout and Shumway (1982) explained a method for estimating site quality, using height and diameter of dominant and co-dominant trees, independent of tree age. There are plenty of models available to explain the height-diameter relationship. According to Wenk *et al.*, (1990) a minimum of 30 different functions have been used for describing the relationship between diameter and height.

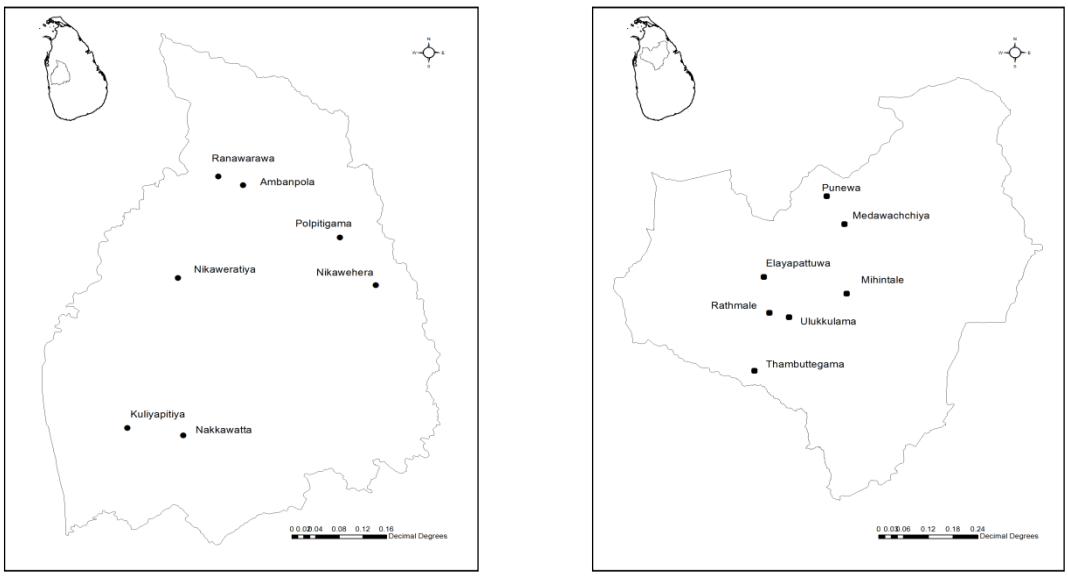
In addition, among the several indicators, stand height seems to be the most widely used, accepted and versatile site productivity indicator for even-aged forests (Hägglund, 1981; Kramer, 1988; Wenk *et al*., 1990; Vanclay, 1994; Pretzsch, 2001, 2002; Avery and Burkhart, 2002; Burger, 2004; Skovsgaard, 2004). Further, the site index, which is defined as the height of the dominant trees in the stand at a reference base age, gives an idea how a particular tree species performs over different sites. Vanclay (1994) mentioned that stand height is a good indicator of the site productivity of a stand as it reflects the maximum potential height in a particular site. Moreover, height growth is relatively independent of stand density, thus not affected much by thinning (Gadow and Hui, 1998). Gadow (1983a) stated that mean height can be used to describe the quality of growing site. However, the height variable generally used in evaluating is the dominant height, *i.e.* Mean Top Height (MTH), which is defined as the mean height of the 100 largest diameter stems of well-formed trees per hectare (Burkhart and Tennent, 1977). Further, Hummel and Christie (1953) introduced top height as the regression height of the mean diameter of the 100 thickest trees per hectare.
Khaya being a new introduction, growth evaluation as indicated by the site quality in its predominant and recommended growing localities, *i.e.* Dry and Intermediate Zones of Sri Lanka is a timely need. This will enable in identifying inferior sites for *Khaya*, which should be avoided in future recommendations. Thus, the present study aims to assess the site quality of *Khaya* in recommended growing localities based on height-diameter relation and top heights, which will be valuable in refining future recommendations on forest plantation establishment in Sri Lanka.

Methodology

Location
The study was concentrated on even aged stands of *Khaya* plantations distributed in the Anuradhapura and Kurunegala divisions representing Dry and Intermediate Zones of Sri Lanka. Potential *Khaya* plantations of different age classes (1-3, 4-5, 6-7, 8-10, 11-12, 13-15, 16-17 and 18-20) were identified through a primary land survey with the use of secondary data, obtained from the Forest Department of Sri Lanka.

Measurements
Primary data were gathered non-destructively from random sampling plots chosen for, each age class. In each division, the age classes were stratified, where sampling was done in different age classes within a division. Data at stand level were collected from 07 locations (beats) in 14 sites (blocks and sub blocks) per division (Figure 1) having a total of 28 sites with 57 sample plots from both divisions. Variables; *i.e*. total tree height and diameter at breast height (*dbh*) were measured using a Suunto Clinometer and diameter tape, respectively. Tree age was taken from the records maintained by the Divisional Forest Office of the Forest Department of Sri Lanka. GPS coordinates of each location was identified for mapping purposes.

Figure 01: Study locations in (a) Anuradhapura and (b) Kurunegala divisions



(a) **(b)**

Since, height-diameter relationship is used to estimate the site quality, different height-diameter models were regressed to get the best fit to the available height and diameter data. Accordingly, height-diameter curves were developed using single best fit model

for comparison of site quality at 'division' and 'beat' level. Further, the stand height being a versatile site productivity indicator for even-aged forests, present study used top height in assessing the site productivity.

Data Analysis

Analysis of Variance (ANOVA) were used to test the division differences between variables; *i.e. dbh* and tree height. Mean separation was done using Least Significant Difference (LSD). The best model to represent the height-diameter relation was selected by fitting several models using PORC NLIN procedure with Gauss-Newton algorithm (Hartley, 1961). The initial values for the iterative procedure were obtained by previously linearizing the model equations and fitting them with data by ordinary least squares. The estimated models were compared by graphical and numerical analysis of the residuals and by four statistics that describe model fit and quality *i.e.* R^2, RMSE (Root Mean square Error) and AIC (Akaike Information Criterion). For all statistical analysis, the level of significance was considered at $p < 0.05$ and all analyses were performed with SAS System (SAS version 9.3).

Results And Discussion

Agro Ecological Regions

Khaya plantations in Kurunegala were distributed in agro ecological regions (AER)* DL_{1b}, IL_3, IM_{3b} and IL_{1a}, with annual rainfalls of >900 mm, 1200 mm, >1200 mm and 1400 mm, respectively, whereas in Anuradhapura they were in agro ecological region DL_{1b} with an annual rainfall of >900 mm and experienced drought/rain free conditions during *Yala* season (Punyawardhana, 2008) (Table 01).

Table 01: Agro ecological regions (AER) of study locations

Age Class	Anuradhapura			Kurunegala		
	Range	**Beat**	**AER**	**Range**	**Beat**	**AER**
1-3	Anuradhapura	Ulukkulama	DL_{1b}	Galgamuwa	Ambanpola	DL_{1b}, IL_3
				Kuliyapitiya	Kuliyapitiya	IL_{1a}
4-5	Anuradhapura	Ulukkulama	DL_{1b}	Galgamuwa	Ambanpola	DL_{1b}, IL_3
4-5	Anuradhapura	Rathmale	DL_{1b}	Melsiripura	Polpithigama	DL_{1b}, IL_3, IM_{3b}
6-7	Anuradhapura	Mihintale	DL_{1b}	Galgamuwa	Ranawarawa	DL_{1b}
8-10	Anuradhapura	Mihintale	DL_{1b}	Galgamuwa	Ambanpola	DL_{1b}, IL_3
	Anuradhapura	Rathmale	DL_{1b}			
	Thambuttegama	Thambuttegama	DL_{1b}			
11-12				Melsiripura	Nikawehera	IL_3
13-15				Galgamuwa	Ambanpola	DL_{1b}, IL_3
				Kuliyapitiya	Kuliyapitiya	IL_{1a}
16-17	Anuradhapura	Elayapaththuwa	DL_{1b}	Melsiripura	Polpithigama	DL_{1b}, IL_3, IM_{3b}
	Medawachchiya	Punewa	DL_{1b}	Mahawa	Nikaweratiya	DL_{1b}, IL_3
18-20	Medawachchiya	Punewa	DL_{1b}	Kuliyapitiya	Nakkawatta	IL_{1a}

*** DL_{1b}:** Low country Dry Zone, receives >900 mm annual rainfall, experiences bi-modal rainfall pattern and drought/rain free conditions during *Yala* season, soil types are reddish brown earth and low humic glay; **IL_3:** Least potential area belongs to low country Intermediate Zone, receives 1200 mm annual rainfall, soil types are non calcic brown soil (which has low water holding capacity), reddish brown latesolic and low humic gley; **IM_{3b}:** Low country Intermediate Zone, receives >1200 mm annual rainfall mainly from north east monsoon, soil types are reddish brown latasolic and non calcic brown and reddish brown earth to a little extent; **IL_{1a}:** Low country Intermediate Zone, receives 1400 mm annual rainfall mainly through south west monsoon, experiences a weak bi-modal rainfall pattern, soil types are red yellow podsolic, reddish brown latesolic, non calcic brown and regosols (Punyawardhana, 2008)

Dbh And Tree Height

Greater *dbh* and tree height of *Khaya* in Kurunegala division could be attributed to its moisture rich growing conditions in many AERs and the other site quality parameters. *Khaya* being a deciduous tree, tends to shed its leaves in the dry spell and retard its growth specially in the Dry Zone, resulting poor *dbh* and height gain in Anuradhapura (Table 02). *Khaya* in Kurunegala has achieved 39.98 cm of *dbh* and 18.31 m of height by the age of 18-20, whereas in Anuradhapura it was 22.21 cm and 12.41 m (Table 02). Forouhbakhch *et al.*, (2006) stated that diameter and height are good indicators of site conditions; however they also depended on other factors such as inter-specific competition and stand density. Since the stand density of each age class is similar for both divisions, difference in *dbh* and height can be explained mainly due to site conditions, in which a vast variability exists inherent with the prevailing climate and soil conditions of *Khaya* plantations located at different AERs* in Anuradhapura and Kurunegala divisions.

Table 02: Average diameter *(dbh)* and average tree height of Khaya in Anuradhapura and Kurunegala divisions

	Mean Height (m)				Mean *dbh* (cm)			
Age Class	**A'pura**	**Std**	**K'gala**	**Std**	**A'pura**	**Std**	**K'gala**	**Std**
1-3	1.89^b	0.45	2.62^a	0.67	2.14^b	1.51	4.52^a	1.91

4-5	5.03[b]	1.35	7.68[a]	1.16	5.62[b]	1.42	11.21[a]	2.36
6-7	8.23[a]	2.24	*7.77[a]	-	12.35[a]	4.09	*11.02[a]	-
8-10	9.99[a]	4.81	9.23[a]	1.40	15.15[b]	4.53	17.34[a]	3.21
11-12	*11.58[a]	-	11.37[a]	1.72	*19.33[b]	-	17.59[a]	3.43
13-15	*12.05[a]	-	13.00[a]	2.67	*20.68[a]	-	22.57[a]	6.60
16-17	12.37[b]	1.95	14.82[a]	3.3	21.32[a]	4.53	23.21[a]	9.82
18-20	12.41[b]	2.48	18.31[a]	3.93	22.21[b]	5.63	39.98[a]	13.59

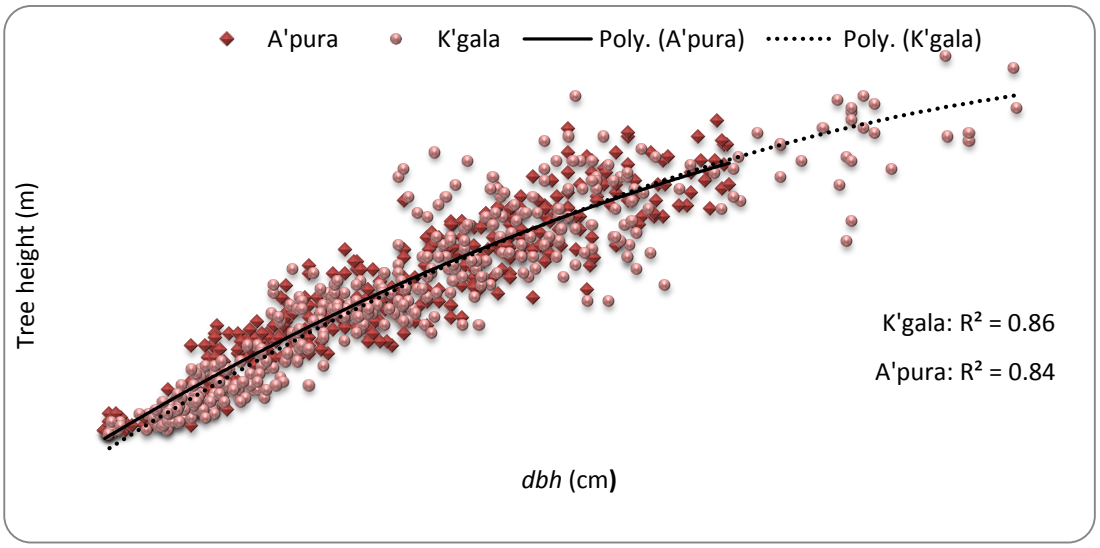
Means with same letters in Anuradhapura and Kurunegala divisions are not significantly different at P≤0.05 as determined by Least Significant Difference (LSD)

* Values predicted by non linear regression

Height-Diameter Relationship

The statistical relationship between *dbh* and tree height was compared by fitting the standard two parameter polynomial curves, where eleven (11) different models were regressed to get the best fit to the available height, diameter data of Anuradhapura and Kurunegala divisions by considering highest R^2, lowest RMSE (Root Mean square Error) and AIC (Akaike Information Criterion) values (Table 03). The selection of the regression model was based on the coefficient of determination of the model (R^2) and the standard error of estimates. Except for the models, Petterson ($1 / (\sqrt{(h - 1.3)} = ß_0 + ß_1.(1/d))$, $\ln(h) = ß_0 + ß_1.\ln(d)$ and Schumarcher ($\ln(h) = ß_0 + ß_1 . (1/d)$), other models were found to be the best fits with the available height, diameter data in both Anuradhapura and Kurunegala divisions. Confirming the above, Haung *et al.*, (1992) stated that several functions may give similar results and perform nearly well in describing the height-diameter relationships. Parabolic model ($h = ß_0 + ß_1.d + ß_2 . d^2$) showed the best fit with the available height and diameter data in Anuradhapura division, while model, $h - 1.3 = ß_1.d + ß_2.d^2$ showed the best fit with the available height, diameter data in Kurunegala division (Table 03). Since there were no significant difference between the two models, height-diameter curves for both divisions were developed using Parabolic model for comparison, where the *dbh* and tree height showed a strong degree of correlation in both divisions (Figure 02). As the height-diameter relationship is used to estimate the site quality, the existence of site quality variation within the two divisions was evident from figure 02, though not prominent.

Figure 02: Height-diameter curves of Khaya in Anuradhapura and Kurunegala divisions



Hence, height-diameter relationship was carried out for same age plantations at different sites in two divisions (Figure 03). The age is similar in each site for the comparison of height-diameter relationship for different sites. Curtis (1967) stated that in even-aged stands, the basic relationship between tree height and diameter (for a given age) is sigmoid in shape, which is clearly evident from the present study (Figure 03). Figure 03 (a) compares the height-diameter relation of 04 years old *Khaya* plantations located in the beat Polpithigama in Kurunegala division and the beats Ullukkulama and Rathmale in Anuradhapura division. Existence of site variation within two divisions is evident, where the beat Polpithigama is superior to the beats Ullukkulama and Rathmale. This can be attributed to the variation among the AERs of above beats. Figure 03 (b) and figure 03 (c) compare the height-diameter relation of 06 and 10 year old *Khaya* plantations, located in the beat Ambanpola in Kurunegala division and in the beat Mihinthale in Anuradhapura division. Existence of site variation within two divisions is clear, where the beat Mihinthale is superior to the beat Ambanpola.

Accordingly, Khaya plantations of 06 years (age class 6-7) and 10 years (age class 8-10) located in the beat Mihinthale shows very impressive *dbh* and tree height (Table 02), thus found to be superior for the better growth of *K. senegalensis*, even though it is located in the AER, DL_{1b}. Other than the rainfall distribution, other site quality parameters such as edaphic factors might have influenced on above. Figure 04, which compares the height-diameter relationship of *Khaya* plantations of different age classes, located in the beat Ambanpola in Kurunegala division and the beat Mihinthale in Anuradhapura division revealed that the beat

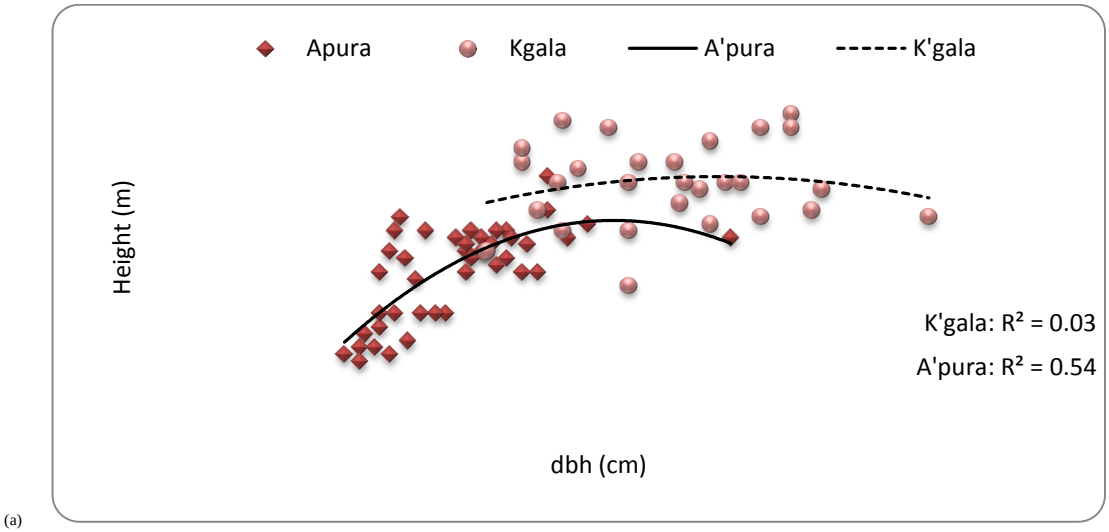
Mihinthale is superior to the beat Ambanpola. This further confirms the richness of the site quality in the beat Mihinthale, though it is located in AER, DL_{1b} in the Dry Zone of Sri Lanka.

Table 03: Fitted models for height and diameter relationship of *K. senegalensis* in Anuradhapura and Kurunegala divisions

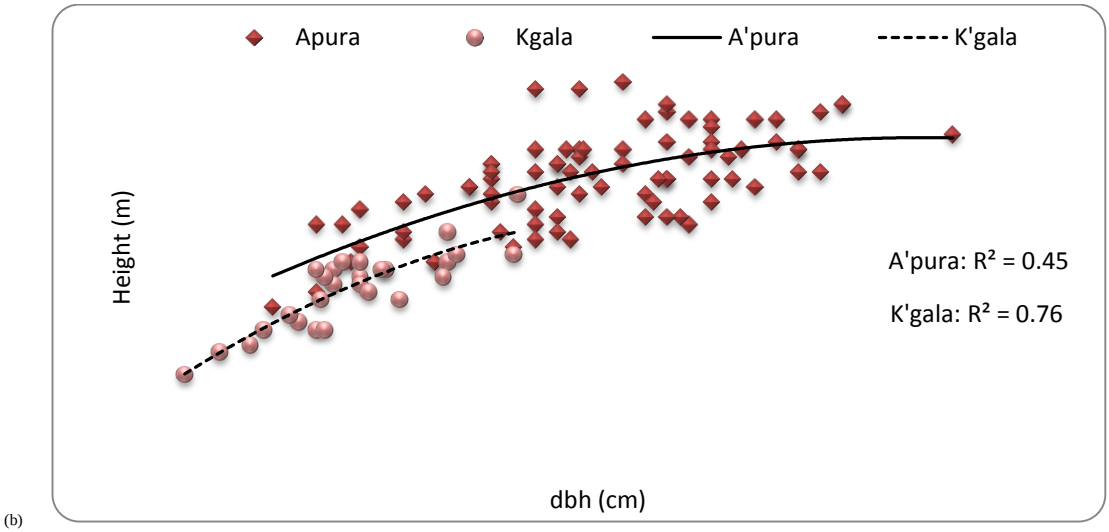
			Kurunegala			Anuadhapura		
	Model	**Model Name**	**R^2**	**RMSE**	**AIC**	**R^2**	**RMSE**	**AIC**
1	$h = ß_0 + ß_1 . d + ß_2 . d^2$	PARABOLIC	*0.8192	*1.8178	*242.053	0.8753	1.7389	218.454
2	$h - 1.3 = ß_1 . d + ß_2 . d^2$		0.8100	1.8638	249.928	*0.8797	*1.7081	*209.597
3	$h = ß_0 + ß_1 . \ln(d)$		**0.6925	**2.3709	**344.984	**0.7975	**2.2162	**309.582
4	$1 / (\sqrt{(h - 1.3)} = ß_0 + ß_1 . (1/d)$	PETTERSON	**0.3335	**3.4903	**497.744	**0.5261	**3.3904	**472.844
5	$\ln(h) = ß_0 + ß_1 . \ln(d)$		0.7913	1.9529	268.384	0.8628	1.8246	234.914
6	$\ln(h) = ß_0 + ß_1 . (1/d)$	SCHUMACHER	**0.2877	**3.6081	**510.862	**0.3659	**3.9220	**528.770
7	$h - 1.37 = ß_1 . (1 - e^{- ß 2.d})$		0.8047	1.8894	255.322	0.8675	1.7926	228.125
8	$h = ß_1 . (1 - e^{- ß 2.d})$		0.8147	1.8403	244.912	0.8776	1.7228	212.867
9	$h = ß_1 . ((d^{ß 2}) / ß_3 + d^{b2})) ß_2$		0.8138	1.8447	247.871	0.8789	1.7138	212.873
10	$h = \exp^{(ß 0 + ß 1 . \ln(d) + ß 2 . d)}$	FREESE	0.8184	1.8218	242.928	0.8772	1.7261	215.619
11	$h = \exp^{(ß 0 + ß 1 . \ln(d) + ß 2 . (\ln(d))2}$	KORSUN	0.8149	1.8394	246.720	0.8788	1.7148	213.101

* R2, RMSE and AIC values of the best fit model
** R2, RMSE and AIC values of the least fit model

Figure 03: Height-Diameter relationship of (a) 04 year, (b) 06 year and (c) 10 year old *Khaya* Plantations in Anuradhapura and Kurunegala Divisions



(a)



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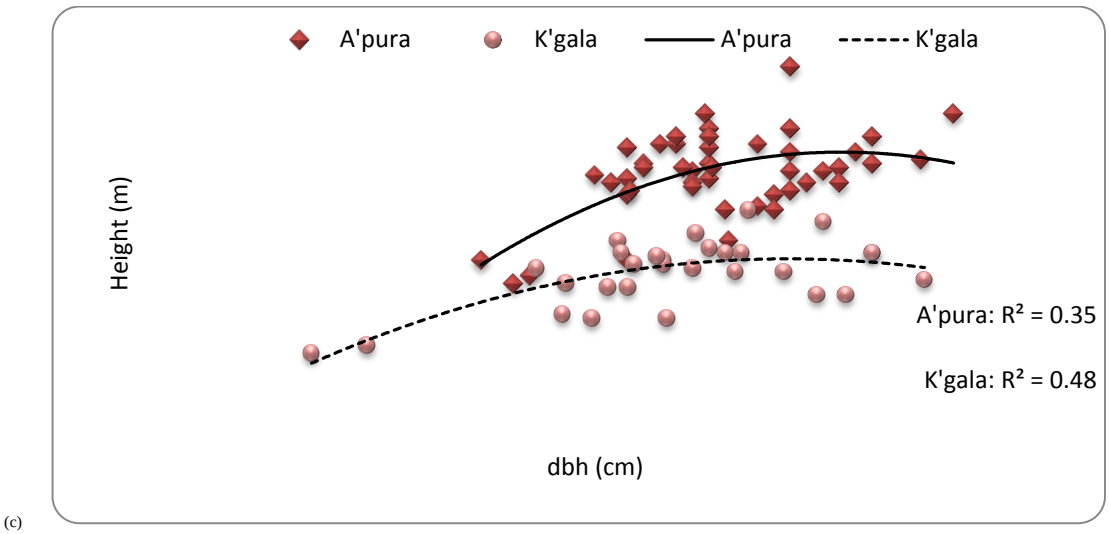
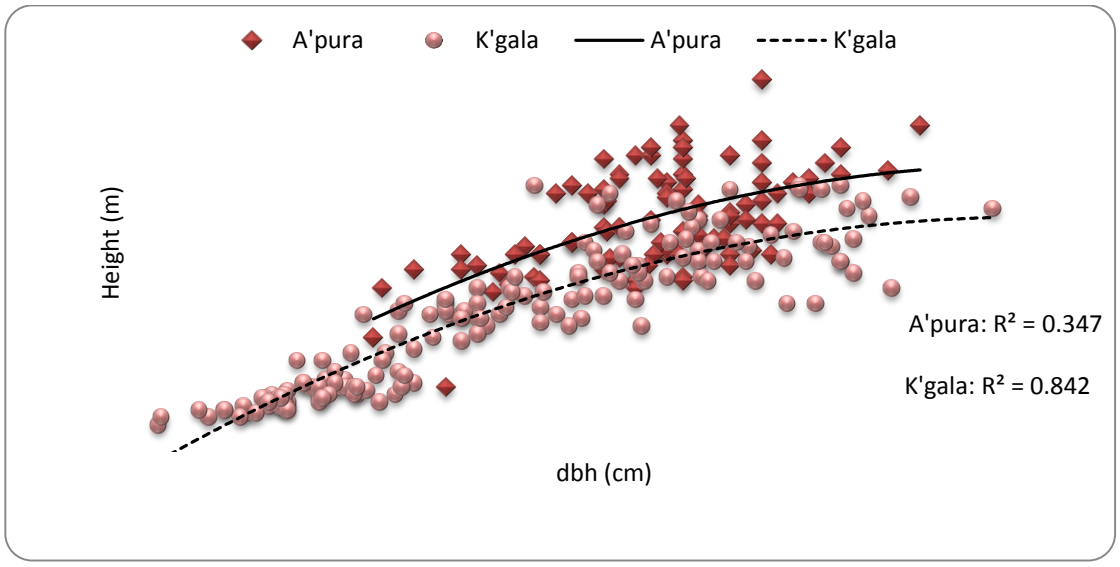


(c)

Figure 04: Height-Diameter relationship for different age classes in the beat Mihinthale in Anuradhapura and in the beat Ambanpola in Kurunegala division



Top height

Top height in the present study was defined as the average height of the 100 largest diameter trees in a hectare of a stand. Top height is greater than the mean height of the stand (Tables 04 and 05) in both divisions and it ranged from 1.6 to 17. 2 m in Anuradhapura and 2 to 23.6 m in Kurunegala divisions over the age classes considered. Vanclay (1994) reported that stand height is an estimator of site productivity and it is good enough to reflect the maximum potential height in a particular site. According to the figure 05, Kurunegala division recorded an elevated top hieght values demonstrating the richness in site quality in both edaphic and climatic parameters as indicated by the agro ecological reagions, execept in the age classes 6-7 and 8-10.

Table 04: Mean height and top height of Khaya under different age classes in the different beats in Kurunegala Division

Age lass	Range	Beat	Mean height (m)	Top height (m)
1-3	Kuliyapitiya	Kuliyapitiya	2.35	2.67
	Galgamuwa	Ambanpola	2.93	3.80
	Melsiripura	Polpithigama	**7.58	**7.90
4-5	Galgamuwa	Ambanpola	*7.27	*8.10
	Melsiripura	Polpithigama	**8.19	**9.40
6-7	Galgamuwa	Ranawarawa	*3.91	*5.60
8-10	Galgamuwa	Ambanpola	8.90	9.30
11-12	Melsiripura	Nikawehera	11.13	12.30
13-15	Galgamuwa	Ambanpola	10.94	12.47
	Kuliyapitiya	Kuliyapitiya	**14.39	**16.00
16-17	Melsiripura	Polpithigama	13.67	14.00
	Mahawa	Nikaweratiya	**16.95	**19.80
18-20	Kuliyapitiya	Nakkawatta	**18.45	**20.80

* Poor mean height and top height values
** Best mean height and top height values

Table 05: Mean height and top height of Khaya under different age classes in the different beats in Anuradhapura Division

Age class	Range	Beat	Mean height (m)	Top height (m)
1-3	Anuradhapura	Ulukkulama	1.75	2.20
	Anuradhapura	Ulukkulama	1.95	2.30
4-5	Anuradhapura	Ulukkulama	5.86	6.20
	Anuradhapura	Rathmmale	*3.35	*4.60
6-7	Anuradhapura	Mihintale	**10.61	**11.36
	Anuradhapura	Mihintale	6.77	8.07
	Anuradhapura	Rathmmale	7.69	8.10
	Thambuttegama	Thambuttegama	6.93	7.67
8-10	Anuradhapura	Mihintale	**13.85	**15.73
11-12	-	-	-	-
13-15	-	-	-	-
16-17	Anuradhapura	Elayapattuwa	*11.08	*12.70

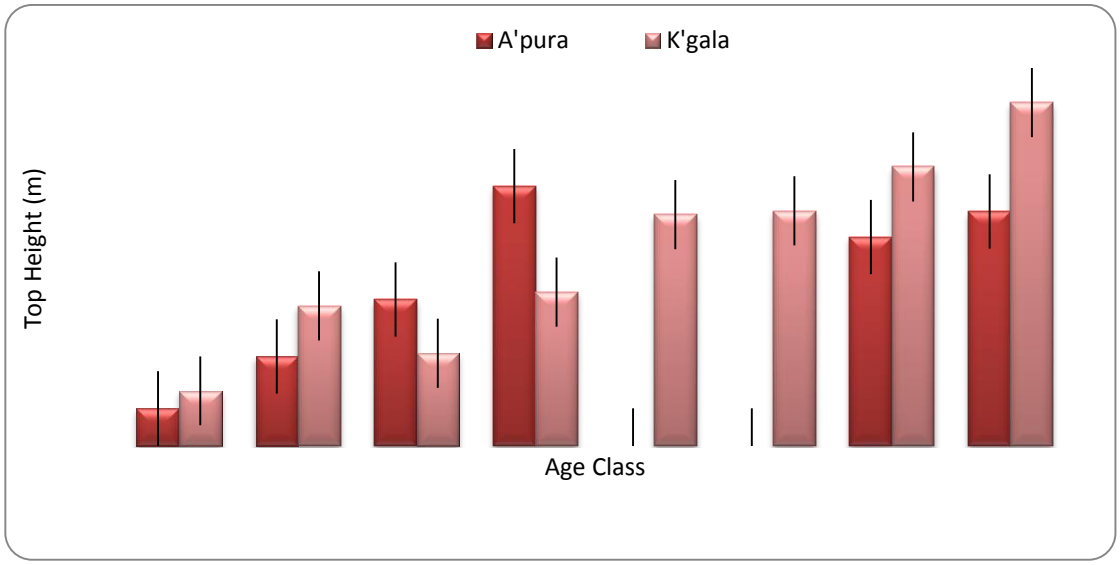
	Medawachchiya	Punewa	*12.28	*12.60
18-20	Medawachchiya	Punewa	*12.71	*14.20

* Poor mean height and top height values
** Best mean height and top height values

The beat Ranawarawa in age class 6-7 and the beat Ambanpola in age class 8-10 recorded poor top height values where-as the beat Mihithale in age class 6-7 and 8-10 recorded greater top height values (Table 04 and 05). Despite being in same AER (DL_{1b}), the differences in edaphic factors associated with each beat might have influence on the above, where site quality in the beat Mihintale is much is privileged than in the beats Ranawarawa and Ambanpola. There is a general recognition that climate and soil greatly influence the height growth of a species, which is clearly evident in the present study. Thus, it can be concluded that *K. senegalensis* is highly adapted to the soil characteristics of the beat Mihinthale in Anuradhapura division, although located in the Dry Zone of Sri Lanka.

The beats Rathmale, Elayapattuwa and Punewa in Anuradhapura division and the beat Ranawarawa in Kurunegala division had poor top height values in age classes 4-5, 16-17, 18-20 and 6-7 (Tables 04 and 05). Top height being a good site index, which gives an idea of how a particular tree species performs across different sites, it can be concluded that site productivity of Khaya is inferior in the beats Rathmale, Elayapattuwa, Punewa in Anuradhapura division and the beats Ranawarawa and Ambanpola in Kurunegala division, whereas it is superior in the beat Mihintale in Anuradhapura division and in the beats Kuliyapitiya, Nikaweratiya, Nakkawatta and Polpitigama in Kurunegala division.

Figure 05: Top height variation across diffetent age classes of Khaya in Kurunegala and Anuradhapura divisions



Conclusions

Khaya recorded a significantly higher *dbh* and tree height in Kurunegala division than in Anuradhapura, owing to its moisture rich growing conditions. The *dbh* and tree height of *Khaya* show a strong degree of correlation in both divisions. Among the height-diameter models regressed, parabolic model ($h = ß_0 + ß_1.d + ß_2.d^2$) and the model, $h - 1.3 = ß_1.d + ß_2.d^2$ showed the best fit with the available data in Anuradhapura and Kurunegala divisions, respectively. Height-diameter relation revealed that site quality of the beat Polpithigama in Kurunegala division is superior to the beats Ullukkulama and Rathmale in Anuradhapura division, while the beat Mihintale in Anuradhapura division is superior to the beat Ambanpola in Kurunegala division.

Kurunegala division recorded an elevated top hieght values, demonstrating the richness in site quality in both edaphic and climatic parameters. Top height ranged from 1.6 - 17.2 m in Anuradhapura division and 2 - 23.6 m in Kurunegala division. Khaya has attained average top height of 14.2 m and 20.8 m at the base age of 18-20 in Anuradhapura and Kurunegala divisions, respectively. Top height being an excellent site index, it can be concluded that site productivity of *Khaya* is inferior in the beats Rathmale, Elayapattuwa and Punewa in Anuradhapura division and the beats Ranawarawa and Ambanpola in Kurunegala division, whereas it is superior in the beat Mihintale in Anuradhapura and the beats Kuliyapitiya, Nikaweratiya, Nakkawatta and Polpitigama in Kurunegala division. Yet, the absence of different aged *Khaya* plantations at a particular site, prevented making a sound assessment of site quality, based on top height.

Khaya, which is known to thrive well under Dry Zone environmental conditions, has been currently recommended to the Dry and Intermediate Zones of Sri Lanka. However, present study revealed that *Khaya* performs better in the Intermediate Zone than in the Dry Zone. Further, it identified the inferior sites for the growth of *Khaya* in recommended growing localities, based on height-diameter relation and top height. Thus, findings of the present study can be effectively utilized for decision making in future *Khaya* plantation establishment in Sri Lanka by refining the present recommendations.

Acknowledgment
NARP research grant – 2011, under CARP is appreciated for the financial support, while Dr. W.C.P. Egodawatta is acknowledged for his contribution in data analysis.

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