



RESEARCH ARTICLE

## Studies on Canopy Parameters of Some Mangroves Along the Coast of Maharashtra

Narendra A. Kulkarni and Leela J. Bhosale

Department of Botany, P. D. V. P. College, Tasgaon (M.S.)

\*Corresponding Author: [nakul24in@yahoo.com](mailto:nakul24in@yahoo.com)

### Manuscript Details

Manuscript Submitted : 10/04/2021  
Manuscript Revised : 17/06/2021  
Manuscript Accepted : 18/08/2021  
Manuscript Published : 16/09/2021

### Available On

<https://plantaescientia.com/ojs>

### Cite This Article As

Kulkarni N. A. & Bhosale L. J., (2021). Studies on canopy parameters of some mangroves along the coast of Maharashtra. *Pla. Sci.* 2021; Vol. 04 Iss. 04 & 05:225-229.

### Copyright



© The Author(s). 2021. Open Access  
This article is distributed under the terms  
of the Creative Commons Attribution  
4.0 International License  
<http://creativecommons.org/licenses/by/4.0/>

### Indexed In

[CrossRef](#), [Scientific Indexing Services \(SIS\)](#), [Google Scholar](#), [Index Copernicus International \(ICI\)](#), [Directory of Research Journal Indexing \(DRJI\)](#), [CiteFactor](#), [Scientific Journal Impact Factor \(SJIF\)](#), [General Impact Factor](#), [Journal Factor](#), [Cosmos Impact Factor](#), [PKP Index](#), [AJIFACTOR Indexing](#), etc.

### ABSTRACT

Mangrove species, viz., *Avicennia officinalis*, *Avicennia marina* var. *acutissima*, *Avicennia marina* (dwarf), *Rhizophora mucronata*, *Sonneratia alba*, *Aegiceras corniculatum*, *Kandelia candel* were chosen for measurement of height of the tree and girth or circumference. The sampling was random and at least 50 records were made. The girth is measured by the tape. The measurement of the height is made with the help of Abney level. The Tables 1 to 8 records the values for girth, height and canopy cover as well as for correlation coefficient ( $r$ ). There correlation between girth and canopy in all the species studied however in case of *Avicennia officinalis* and *Aegiceras corniculatum* girth and height show more correlation than girth and C. cover. The positive co-relation observed between girth and canopy is more or less 0.7 except *Avicennia marina* (dwarf) *Excoecaria agallocha* and *Aegiceras corniculatum*. The co-relation is observed in girth and height is difficult to explain. This case is observed in *Avicennia officinalis* and *Aegiceras corniculatum*.

Keywords : Mangroves, Canopy, Height, Girth Correlation

INTRODUCTION

There is scanty literature available on the relationship of girth of the tree with its height. On several occasions the girth and/or height of mangroves are recorded, however, for any specific site such records are not available. This is true also for canopy cover. Nevertheless, there is one report (Bhosale, 2002) of canopy records for mangroves in Maharashtra. In the present study the records of girth, height and canopy area were made with the view to know co-relation between either height or girth with canopy cover. The results are presented in Tables from 1 to 8. The species selected are studied from Kolamb (16°02' N to 73°27' E) and Kalavali (16°05' N to 73°27' E) estuaries near the Malvan city from Sindhudurg district in Maharashtra.

MATERIAL AND METHODS

Matured individuals of some dominant Mangrove species of Ratnagiri and Sindhudurg districts of Maharashtra coast viz., *Avicennia officinalis*, *Avicennia marina* var. *acutissima*, *Avicennia marina* (dwarf), *Rhizophora mucronata*, *Sonneratia alba*, *Aegiceras corniculatum*, *Kandelia candel* were chosen for measurement of height of the tree and girth or circumference. The sampling was random and at least 50 records were made. The girth is measured by the tape. The measurement of the height is made with the help of abny level.

Table 1. Height, Girth and Canopy cover in *A. marina* var *acutissima*. (Sample size : random 50)

Value	Girth (m)	Height (m)	Canopy cover (m <sup>2</sup> )
Lowest	0.56	5.71	2.86
Highest	2.42	18.2	49.74
Average	1.05	17.42	17.41

Correlation coefficient (r) between :

- 1) Girth and height = 0.5495
- 2) Height and canopy cover = 0.3969
- 3) Girth and canopy cover = 0.6731

Fig. 1. : Scatter diagram for canopy cover and girth of *A. marina* var. *acutissima*

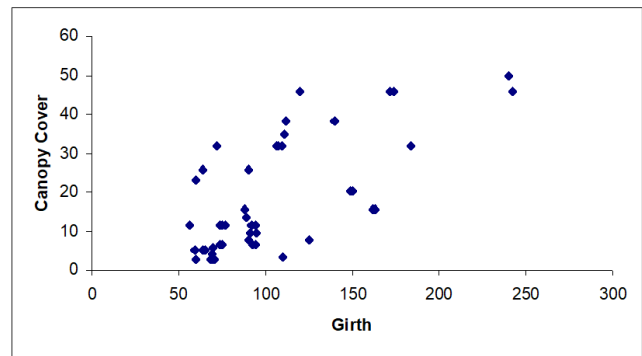


Table 2. Height, Girth and Canopy cover in *A. officinalis*. (Sample size : random 50)

Value	Girth (m)	Height (m)	Canopy cover (m <sup>2</sup> )
Lowest	0.72	6	2.96
Highest	2.5	15.8	28.83
Average	1.24	9.02	9.85

Correlation coefficient (r) between :

- 1) Girth and height = 0.8279
- 2) Height and canopy cover = 0.4666
- 3) Girth and canopy cover = 0.7335

Fig. 2: Scatter diagram for canopy cover and girth of *A. officinalis*

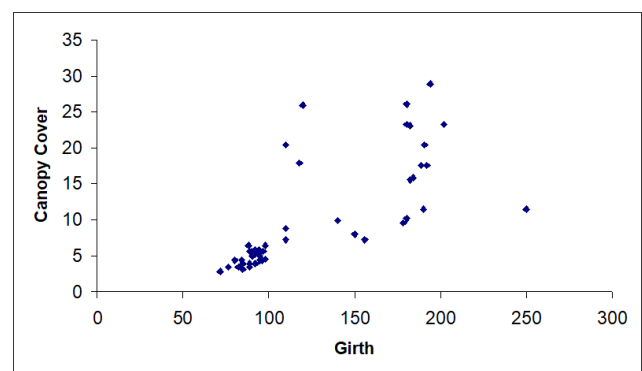


Table 3. Height, Girth and Canopy cover in *A. marina* (dwarf). (Sample size : random 50)

Value	Girth (m)	Height (m)	Canopy cover (m <sup>2</sup> )
Lowest	0.08	0.35	0.02
Highest	0.62	1.8	0.98
Average	0.22	0.72	0.31

Correlation coefficient (r) between :

- 1) Girth and height = 0.162
- 2) Height and canopy cover = 0.06
- 3) Girth and canopy cover = 0.57

Fig. No. 3. Scatter diagram for canopy cover and girth of *A. marina* (dwarf)

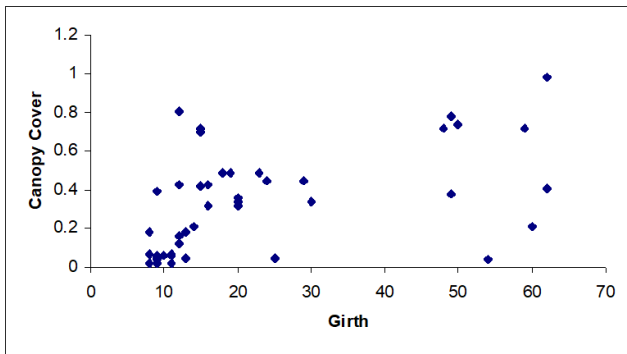


Table 4. Height, Girth and Canopy cover in *Rhizophora mucronata* (Sample size : random 50)

Value	Girth (m)	Height (m)	Canopy cover (m <sup>2</sup> )
Lowest	0.12	3	0.32
Highest	1.4	14.71	49.44
Average	0.38	7.63	7.53

Correlation coefficient (r) between :

- 1) Girth and height = 0.583
- 2) Height and canopy cover = 0.432
- 3) Girth and canopy cover = 0.723

Fig. 4. Scatter diagram for canopy cover and girth of *Rhizophora mucronata*

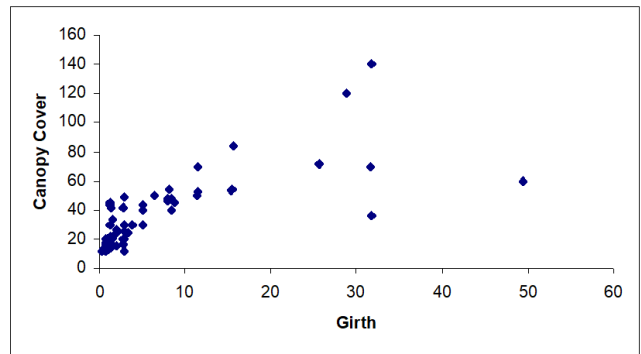


Table 5. Height, Girth and Canopy cover in *Sonneratia alba*. (Sample size : random 50)

Value	Girth (m)	Height (m)	Canopy cover (m <sup>2</sup> )
Lowest	0.2	3.5	1.27
Highest	1.28	12.9	20.5
Average	0.58	7.13	7.77

Correlation coefficient (r) between :

- 1) Girth and height = 0.61
- 2) Height and canopy cover = 0.55
- 3) Girth and canopy cover = 0.79

Fig. No. 5. Scatter diagram for canopy cover and girth of *Sonneratia. Alba*

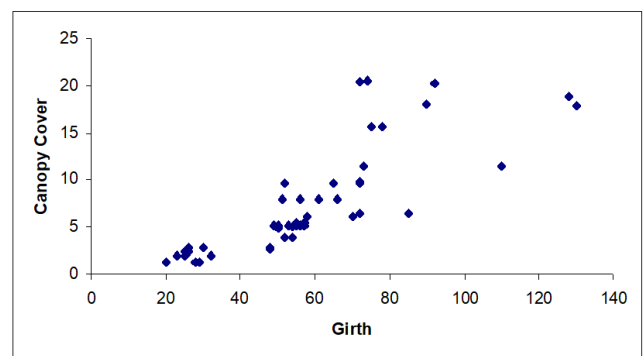


Table 6. Height, Girth and Canopy cover in *Excoecaria agallocha*. (Sample size : random 50)

Value	Girth (m)	Height (m)	Canopy cover (m <sup>2</sup> )
Lowest	0.12	2.7	1.27
Highest	1.60	6.4	11.58
Average	62.96	4.63	4.11

Correlation coefficient (r) between :

- 1) Girth and height = 0.2617
- 2) Height and canopy cover = 0.4253
- 3) Girth and canopy cover = 0.6113

Fig. No. 6. Scatter diagram for canopy cover and girth of *E. agallocha*

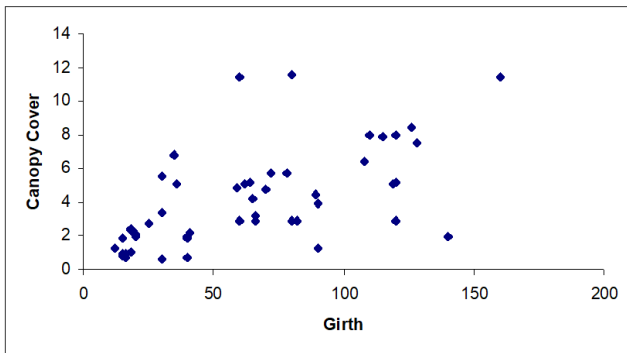


Table 7. Height, Girth and Canopy cover in *A. corniculatum*. (Sample size : random 50)

Value	Girth (m)	Height (m)	Canopy cover (m <sup>2</sup> )
Lowest	0.11	1.10	0.18
Highest	0.36	2.62	0.78
Average	0.21	1.71	0.41

Correlation coefficient (r) between :

- 1) Girth and height = 0.6113
- 2) Height and canopy cover = 0.5053
- 3) Girth and canopy cover = 0.5069

Fig. 7. Scatter diagram for canopy cover and girth of *A. corniculatum*

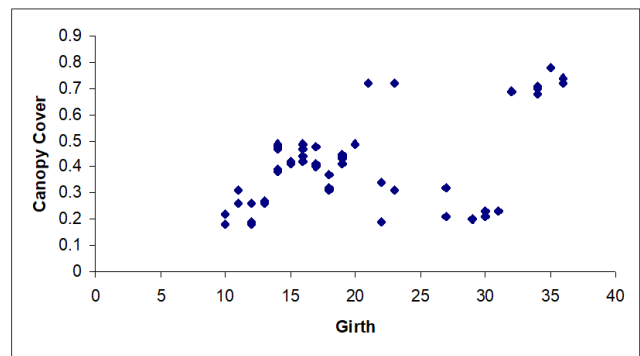


Table 8. Height, Girth and Canopy cover in *Kandelia candel*. (Sample size : random 50)

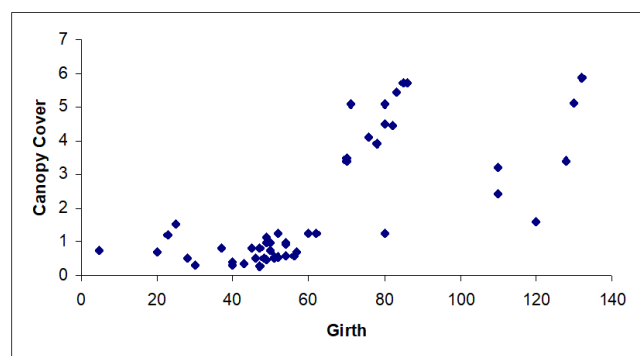
Value	Girth (m)	Height (m)	Canopy cover (m <sup>2</sup> )
Lowest	0.2	1.05	0.28
Highest	1.32	4.8	5.85
Average	0.62	3.26	1.96

\* From Kalavali estuary

Correlation coefficient (r) between :

- 1) Girth and height = 0.4629
- 2) Height and canopy cover = 0.3764
- 3) Girth and canopy cover = 0.7101

Fig. 8. Scatter diagram for canopy cover and girth of *K. candel*



## RESULTS AND DISCUSSION

The Tables 1 to 8 records the values for girth, height and canopy cover as well as for correlation coefficient (r). There correlation between girth and canopy in all the species studied however in case of *Avicennia officinalis* and *Aegiceras corniculatum* girth and height show more co-relation than girth and C. cover. The positive co-relation observed between girth and canopy is more or less 0.7 except *Avicennia marina* (dwarf) *Excoecaria agallocha* and *Aegiceras corniculatum*. The co-relation is observed in girth and height is difficult to explain. This case is observed in *Avicennia officinalis* and *Aegiceras corniculatum*.

During the present study the vegetation is also analyzed to understand the possible Correlation between height and girth with that of canopy cover. It is found that the species like *Avicennia officinalis* and *Aegiceras corniculatum* show more positive correlation in case of girth and height. The positive correlation is observed between girth and canopy cover is more or less 0.7 except *Avicennia marina* (dwarf), *Excoecaria agallocha* and *Aegiceras corniculatum*.

The data presented in the Tables indicate that in eight species studied there is co-relation between girth and canopy cover except *Avicennia officinalis* and *Aegiceras corniculatum*. In case of *Sonneratia alba* the value of 'r' for girth and height is higher (0.61). Some of the species show distinct co-relation (*Kandelia candel*) between girth and canopy cover. In others there is narrow difference in value of 'r'.

Kurlapkar and Bhosale (1985) have given the average canopy diameter for *Rhizophora apiculata*. Ramchandran, *et al.* (1985) has given the height of some mangrove species and he has recorded 4-6 m height for *Rhizophora mucronata*, 2-3 m height for *Kandelia candel*, 3-5 m for *Aegiceras corniculatum*, 2-4 m for *Avicennia marina*, 6-8 m for *Avicennia officinalis*, respectively. In the present study similar range of height has been recorded for these species. Kulkarni (2006) and Kulkarni and Bhosale (2014) have given the similar observations.

The only inference drawn can be, the growth is proceeding in two directions, vertical and horizontal. It is felt that mature (old) individuals may not add much to the height but can increase in the girth and produce more branches in the canopy.

## REFERENCES

- Bhosale L. J.; Banik, S., Gokhale, M. V. and Jayappa, M. A. (2002). Occurrence of *Xylocarpus granatum* Koen and *Cynometra iripa* kostel along the coast of Maharashtra J. Econ. Taxon. Bot. 26(1): 82-87.
- Kurlapkar, D. D., and L. J. Bhosale (1985). Preliminary Report on Ecology of *Rhizophora apiculata*. In : Bhosale, L. J. (ed.) *The mangroves : Proc. Nat. Symp. Biol. Util. Cons. Mangroves*. Nov. 1985. Shivaji University, Kolhapur, India. 205-209.
- Ramchandran, K. K., G. Balasubramanian, J. Kurian and J. Thomas (1985). The mangrove ecosystem of Kerala. Its mapping, Inventory and some environmental aspects. 47 p.
- Kulkarni N.A. and L.G.Bhosale (2014). Ecological Studies on the Mangroves Along the Coast of Maharashtra State With Respect to Their Conservation. Pp 1-109. In: *Microbial Applications and Environment*. Discovery Publishing House.Ltd. New Delhi.pp 188.
- Kulkarni N. A. (2006). Ph. D. Thesis Submitted to Shivaji University, Kolhapur.

---

Plantae Scientia, 2021