

Effect of Photo periodicity and Carbon dioxide assimilation on growth of coconut seedlings



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Introduction

Plant experiences a number of developmental phases during its life cycle. The transition starts from germination to juvenile vegetative phase and then to reproductive stage. The growth and development of the plant is affected by many factors such as genotype, soil moisture, temperature, relative humidity, photo periodicity, carbon dioxide assimilation etc. Therefore, this present investigation was undertaken to study the impact of growth of coconut seedlings on extended photoperiodism and carbon dioxide assimilation.

Materials and Methods

The experiment was started during August 2015 at the D. S. P. Farm, Mandya. The nuts of different genotypes

such as WCT, COD, MYD and CDG X TT were sown in polybags. The extended photoperiodicity is given by electric light at night and carbon dioxide assimilation is given externally. The observations were recorded for plant height (cm), collar girth (cm), number of leaves and leaf width (cm).

Results and Discussion

The data pertaining to plant height, collar girth, number of leaves, leaf width were collected at 180 DAS, 210 DAS, 240 DAS, 270 DAS and 300 DAS and are presented in Table 1, 2, 3 and 4 respectively.

The growth characters of coconut seedlings such as plant height, collar girth, number of leaves and leaf width have shown better growth under the treatment

Table 1: Extended photoperiodicity and carbon dioxide assimilation on plant height of coconut seedlings at 180, 210, 240, 270 and 300 DAS

S.No.	Genotypes	Under Treatment					Under Control				
		Plant height (cm)									
		180 DAS	210 DAS	240 DAS	270 DAS	300 DAS	180 DAS	210 DAS	240 DAS	270 DAS	300 DAS
1	WCT	84.40	97.50	112.50	121.75	130.00	61.25	78.00	98.25	106.00	115.25
2	COD	67.75	80.00	90.00	93.75	98.25	61.50	70.00	87.00	89.50	92.50
3	MYD	58.50	76.25	86.25	92.00	99.50	43.75	44.00	55.50	66.50	82.25
4	CDG x TT	75.50	79.25	80.25	86.75	94.00	68.75	73.75	77.50	85.75	97.75

Table 2: Extended photoperiodicity and carbon dioxide assimilation on collar girth of coconut seedlings at 180, 210,240, 270 and 300 DAS

S.No.	Genotypes	Under Treatment					Under Control				
		Collar Girth (cm)									
		180 DAS	210 DAS	240 DAS	270 DAS	300 DAS	180 DAS	210 DAS	240 DAS	270 DAS	300 DAS
1	WCT	10.75	12.75	13.50	13.75	14.25	9.00	11.50	12.25	13.00	13.50
2	COD	9.75	11.25	11.50	11.75	13.25	9.50	9.75	10.50	11.00	11.75
3	MYD	9.00	10.75	10.75	11.50	12.00	9.00	9.25	10.00	10.75	10.75
4	CDG x TT	9.75	10.75	11.00	12.00	13.50	9.75	10.25	11.50	12.00	12.50



of extended photoperiodicity and carbon dioxide assimilation treatment compared to normal condition.

Under the treatment of extended photoperiodicity and carbon dioxide assimilation WCT shows taller plant height at 180 DAS, 210 DAS, 240 DAS, 270 DAS and 300 DAS, whereas MYD shows shorter plant height at 180 DAS and 210 DAS. In case of CGD X TT the plant shows shorter plant height at 240, 270 and 300 DAS. The

thickest collar girth was observed in WCT and thinner collar girth found in MYD at 180 DAS, 210 DAS, 240 DAS, 270 DAS and 300 DAS. CGD X TT recorded maximum number of leaves whereas WCT recorded minimum number of leaves at 180 DAS, 210 DAS, 240 DAS, 270 DAS and 300 DAS. The broadest leaf width was noticed in COD, CGD X TT shows narrow leaf width at 180 DAS, 210 DAS, 240 DAS, 270 DAS and 300 DAS.

Conclusion

From the study it was found that the coconut seedlings shows better growth under the treatment of extended photoperiodicity and carbon dioxide assimilation compared to normal condition. Among the four varieties WCT shows better growth compared to other varieties. ■

Table 3: Extended photoperiodicity and carbon dioxide assimilation on number of leaves of coconut seedlings at 180, 210,240, 270 and 300 DAS

S.No.	Genotypes	Under Treatment					Under Control				
		Number of leaves									
		180 DAS	210 DAS	240 DAS	270 DAS	300 DAS	180 DAS	210 DAS	240 DAS	270 DAS	300 DAS
1	WCT	4.25	5.00	5.75	6.25	6.75	3.75	5.00	5.75	5.75	6.25
2	COD	4.25	5.50	6.00	6.00	6.25	4.00	5.25	6.00	6.25	6.75
3	MYD	4.25	5.50	6.25	6.50	6.75	4.00	4.50	5.25	5.50	5.25
4	CDG x TT	4.50	5.50	6.25	6.50	7.25	4.50	4.50	5.00	6.00	6.00

Table 4: Extended photoperiodicity and carbon dioxide assimilation on leaf width of coconut seedlings at 180, 210,240, 270 and 300 DAS

S.No.	Genotypes	Under Treatment					Under Control				
		Leaf width (cm)									
		180 DAS	210 DAS	240 DAS	270 DAS	300 DAS	180 DAS	210 DAS	240 DAS	270 DAS	300 DAS
1	WCT	17.00	15.50	17.75	19.50	21.25	12.50	13.25	17.50	19.75	21.25
2	COD	12.25	17.25	19.00	20.50	22.50	10.50	11.75	13.50	14.75	15.00
3	MYD	13.00	14.75	15.25	17.00	16.25	9.50	9.50	9.75	10.00	12.00
4	CDG x TT	11.75	12.50	12.75	14.25	14.25	10.75	10.75	12.00	14.75	17.00