

Studies on factors affecting *Rhizoctonia bataticola* (Taub.) Butler - IX : C/N ratio

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The growth and sclerotial morphology of seven *Rhizoctonia bataticola* isolates on 25 carbon-nitrogen combinations were studied. No difference in linear growth was observed after 72 hrs, but linear growth rate difference was noticed after 24 and 48 hrs in all the isolates. Higher carbon amount resulted more aerial growth, large and good sclerotia formation as compared to lower carbon amount. Smaller and poor sclerotia formation was observed at higher nitrogen (KNO_3) amount when amount of carbon was limited.

Key words: Factors, *Rhizoctonia bataticola*, C/N ratio

INTRODUCTION

The importance of carbon and nitrogen in the nutrition of fungi is well known. In green plants the ratio of carbohydrate and nitrogen plays an important part in reproduction as well as in vegetative growth. Similarly a proper balance of these two constituents in the culture medium and soil is essential for the best growth and sporulation of a fungus. The optimum C/N ratio varies for different fungi. The present paper deals with the influence of different C/N ratios on the growth and sclerotial morphology of seven isolates of *Rhizoctonia bataticola* (Jha, 2004).

MATERIALS AND METHODS

Asthana and Hawker's medium (KNO_3 3.5 g, KH_2PO_4 1.7 g, $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$ 0.75 g, glucose 5 g, distilled water 1 litre) was used as the basal medium. Different ratios of carbon-nitrogen were maintained by altering the amounts of KNO_3 and glucose in the basal medium. The amounts of KNO_3 and glucose in the medium were varied as follows : 0.5 C, 1 C, 2 C, 3 C, 4 C and 0.5 N, 1 N, 2 N, 3 N and 4 N where, C and N represents the normal amounts of carbon and nitrogen in the basal medium. Twenty-five different combinations of C and N were tried. Amounts of glucose and KNO_3 for each combination were taken for preparing the medium. Medium with different carbon-nitrogen ratios was autoclaved and poured in plates (20 ml/plate). After 24 hrs, the poured plates were inoculated with 8 mm diam. discs from the

margins of seven days old cultures of *R. bataticola* isolates. The inoculated plates were incubated at $29 \pm 1^\circ\text{C}$ and observations for the growth rate were taken at 24 hrs interval up to 72 hrs. Other observations were taken on 3rd and 5th day of incubation.

RESULTS AND DISCUSSION

From the results (Table 1 and Figs. 1 - 7) it is revealed that the different C/N ratios did not made any trend in increasing or decreasing linear growth of isolates and no C/N ratio was found which had pronounced effect on the linear growth. No doubt variation was observed in linear growth rate of the isolates. It might be due to differential response of isolates at different C/N ratios. Higher C amount (10, 15, 20 g/litre) resulted more aerial growth, large sclerotial size and good sclerotia formation in contrary to lower C amount (2.5, 5g/litre). Similar findings were also advocated by Abdou et al. (1979) that a decrease in C amount favoured mycelial growth over sclerotia formation. Chet and Henis (1975) observed that the number of *S. rolfsii* sclerotia produced on agar plates increased with glucose concentration up to 4%. It was observed that higher amount (7.0, 8.75 g/litre) of nitrogen (KNO_3) decreased sclerotial size and generally caused sparse pattern of sclerotia when the amount of carbon remained unaltered. At

constant carbon levels and varying nitrogen levels 0.5 N, 2 C : 1 N, 3 C : 1 N, 4 C : 0.5 N ; 0.5 C : 1 N, largest sclerotia were observed at 0.5 C : 4 N, 1 C : 0.5 N, 1 C : 1 N, 2 C : 1 N, 3 C : 2 N, 4 C : 0.5 N ; 0.5 C : N, 2 C : 0.5 N, 3 C : 2 N, 4 C : 0.5 N ; 0.5 C : 4 N, 1 C : N, 4 C : 1 N ; 0.5 C : 1 N, 1 C : 1 N, 2 C : 1 N, 3 C : 2 N,

Table 1 : Effect of C/N ratios on the morphological characters of different isolates of *R. bataticola*

Isolate No.	C/N Ratios	Colony Pattern /Margin	Hyphae Pattern /Colour	Sclerotia			
				LxW μ	Size/ Shape	Pattern/ Colour	
1	2	3	4	5	6	7	
Rb 1	1	0.5C:0.5N	Appr./Irre	Sp/H	81.25 x 69.80	Small/R to O	Sp/B
	2	0.5C:1N	Appr./Irre	Sp/H. to LB	69.87 x 61.75	Small/R to O	Sp/B
	3	0.5C : 2N	Appr./Even	Sp/H. to LB	61.25 x 72.71	Small/Irre	Sp/B
	4	0.5C : 3N	APPr./Even	Sp/H. to LB	96.88 x 85.31	Md/Irre	Dn/DB
	5	0.5C : 4N	Appr./Even	Sp/H. to LB	96.88 x 85.31	Md/Irre	Dn/DB
	6	1C:0.5N	Appr./Wavy	Dn/B	101.96 x 92.21	Md/Irre	Dn/DB
	7	1C:1N	Appr./Even	Dn/B	103.85 x 88.32	Md/R to O	Dn/DB
	8	1C:2N	Appr./Irre	Sp/H	86.53 x 78.81	Small/Irre	Sp/B
	9	1C:3N	Appr./Wavy	Sp/H. to LB	92.21 x 83.61	Md/Irre	Sp/DB
	10	1C:4N	Appr./Even	Sp/LB to B	93.63 x 84.92	Md/Irre	Sp/DB
	11	2C:0.5N	Appr./Even	Dn/LB to B	119.18 x 95.46	Md/Irre	Dn/DB
	12	2C:1N	Appr./Even	Dn/H. to LB	112.93 x 93.43	Md/Irre	Dn/DB
	13	2C:2N	Appr./Irre	Sp/H. to LB	110.52 x 91.39	Md/Irre	Dn/BI
	14	2C:3N	Flocc/Even	Dn/LB to B	112.12 x 90.34	Md/Irre	Dn/BI
	15	2C:4N	Flocc/Irre	Dn/LB to B	96.68 x 82.87	Md/Irre	Dn/BI
	16	3C:0.5N	Flocc/Irre	Dn/LB to B	104.21 x 86.68	Md/Irre	Dn/BI
	17	3C:1N	Flocc/Even	Dn/LB to B	102.31 x 86.65	Md/Irre	Dn/BI
	18	3C:2N	Flocc/Even	Dn/LB to B	108.06 x 92.21	Md/Irre	Dn/BI
	19	3C:3N	Flocc/Irre	Dn/LB to B	107.56 x 89.24	Md/Irre	Dn/BI
	20	3C : 4N	Flocc/Abrupt	Dn/H. to LB	92.62 x 82.87	Md/Irre	Sp/DB
	21	4C:0.5N	Flocc/Wavy	Dn/LB to B	115.37 x 87.34	Md/Irre	Dn/BI
	22	4C:1N	Flocc/Wavy	Dn/LB to B	93.43 x 81.25	Md/R to O	Dn/BI
	23	4C:2N	Flocc/Wavy	Dn/H. to LB	101.56 x 83.66	Md/Irre	Dn/DB
	24	4C:3N	Flocc/Irre	Dn/H. to LB	88.56 x 73.93	Md/R to O	Dn/BI
	25	4C:4N	Flocc/Wavy	Dn/H. to LB	91.83 x 86.68	Md/Irre	Dn/BI
Rb 2	1	0.5C : 0.5N	Flocc/Even	Dn/Hyaline	83.52 x 77.35	Small/R to O	Sp/BI
	2	0.5C:1N	Flocc/Even	Dn/H. to LB	85.80 x 77.55	Small/R to O	Sp/BI
	3	0.5C : 2N	Flocc/Wavy	Dn/H. to LB	91.00 x 77.35	Md/R to O	Sp/BI
	4	0.5C : 3N	Flocc/Wavy	Dn/H. to LB	75.40 x 70.20	Small/R to O	Sp/BI
	5	0.5C : 4N	Flocc/Wavy	Dn/H. to LB	96.85 x 87.50	Md/R to O	Dn/BI
	6	1C : 0.6N	Flocc/Even	Dn/LB to B	125.78 x 103.55	Large/Irre	Dn/BI
	7	1C:1N	Flocc/Wavy	Dn/H. to LB	100.10 x 89.38	Md/R to O	Dn/BI
	8	1C:2N	Flocc/Even	Dn/LB 99.LB	99.45 x 87.42	Md/R to O	Dn/BD
	9	1C:3N	Flocc/Wavy	Dn/LB 99.LB	94.22 x 85.66	Md/R to O	Dn/DB
	10	1C:4N	Flocc/Irre	Dn/LB 93.LB	83.22 x 76.03	Small/R to O	Sp/DB
	11	2C:0.5N	Flocc/Wavy	Dn/LB to B	111.15 x 100.10	Md/Irre	Dn/BI
	12	2C:1N	Flocc/Wavy	Dn/LBto B	138.45 x 117.65	Large/Irre	Dn/BI
	13	2C:2N	Flocc/Even	Dn/LB to B	125.18 x 110.18	Large/Irre	Dn/BI
	14	2C:3N	Flocc/Wavy	Dn/LB to B	121.23 x 105.63	Large/Irre	Dn/BI
	15	2C:4N	Flocc/Wavy	Sp/H. to LB	85.47 x 77.33	Small/R to O	Sp/DB
	16	3C:0.5N	Flocc/Even	Dn/LBto B	143.27 x 117.54	Large/Irre	Dn/DB to BI
	17	3C:1N	Flocc/Wavy	Dn/LB to B	147.87 x 119.60	Large/Irre	Dn/DB to BI
	18	3C:2N	Flocc/Wavy	Dn/LB to B	147.55 x 116.68	Large/Irre	Dn/DB to BI
	19	3C:3N	Flocc/Even	Dn/LB to B	97.50 x 84.50	Md/Irre	Dn/DB
	20	3C:4N	Flocc/Even	Dn/LB to B	94.25 x 78.00	Md/Irre	Dn/DB
	21	4C:0.5N	Flocc/Even	Dn/LB to B	157.95 x 133.25	Large/Irre	Dn/BI
	22	4C:1N	Flocc/Wavy	Dn/LB to B	149.50 x 87.42	Large/Irre	Dn/BI
	23	4C:2N	Flocc/Irre	Dn/LB to B	122.22 x 98.15	Large/Irre	Dn/DB
	24	4C:3N	Flocc/Irre	Dn/LB	127.07 x 109.53	Large/Irre	Dn/DB
	25	4C:4N	Flocc/Irre	Dn/LB	127.07 x 109.53	Large/Irre	Dn/DB
Rb 3	1	0.5C:0.5N	Flocc/Wavy	Dn/H. to LB	50.38 x 63	Small/Irre	Sp/B
	2	0.5C : 1N	Flocc/Irre	Dn/H. to LB	63.89 x 52.61	Small/Irre	Sp/B
	3	0.5C:2N	Flocc/Even	Dn/H. to LB	58.03 x 45.43	Small/R to O	Sp/B
	4	0.5C:3N	Flocc/Irre	Dn/H. to LB	56.50 x 45.25	Small/D	Sp/LB to B
	5	0.5C:4N	Flocc/Even	Dn/LB to LB	57.50 x 45.25	Small/R to O	Sp/B
	6	1C:0.5N	Cottony/Even	Dn/LB	75.19 x 65.73	Small/R to O	Sp/DB

Continued

1	2	3	4	5	6	7	
	7	1C:1N	Cottony/Wavy	Dn/LB to B	89.37 × 63.40	Small/R to O	Sp/DB
	8	1C:2N	Cottony/Wavy	Dn/LB to B	67.03 × 60.93	Small/R to O	Sp/DB
	9	1C:3N	Flocc/Irre	Dn/H LB to B	56.73 × 42.54	Small/Irre	Sp/DB
	10	1C:4N	Flocc/Irre	Dn/LB	53.04 × 48.33	Small/D	Sp/B
	11	2C:0.5N	Cottony/Abrupt	Dn/LB	58.45 × 74.68	Small/R to O	Sp/B
	12	2C:1N	Cottony/Irre	Dn/LB	89.57 × 78.28	Small/R to O	Sp/DB
Rb 3	13	2C:2N	Cottony/Even	Dn/LB to LB	81.66 × 73.10	Small/R to O	Sp/B
	14	2C:3N	Cottony/Irre	Dn/LB to B	78.64 × 67.84	Small/R to O	Sp/B
	15	2C:4N	Flocc/Wavy	Dn/LB to B	79.26 × 69.62	Small/D	Sp/B
	16	3C:0.5N	Flocc/Irre	Dn/LB to B	94.35 × 80.11	Md/R to O	Dn/DB
	17	3C:1N	Flocc/Irre	Dn/LB to B	102.75 × 93.68	Md/R to O	Sp/B
	18	3C:2N	Flocc/Even	Dn/LB to B	105.23 × 94.68	Md/R to O	Sp/B
	19	3C:3N	Flocc/Wavy	Dn/LB to B	90.75 × 81.50	Md/Irre	Sp/B
	20	3C:4N	Flocc/Irre	Dn/H to LB	87.95 × 78.15	Small/D	Sp/B
	21	4C:0.5N	Flocc/Irre	Dn/LB to B	110.87 × 98.30	Md/R to O	Sp/DB
	22	4C:1N	Flocc/Irre	Dn/LB to B	103.81 × 88.03	Md/R to O	Sp/DB
	23	4C:2N	Flocc/Abrupt	Dn/LB to B	108.75 × 87.95	Md/R to O	Sp/DB
	24	4C:3N	Flocc/Irre	Dn/LB to B	98.21 × 87.95	Md/R to O	Sp/DB
	25	4C:4N	Flocc/Irre	Dn/LB to B	96.87 × 87.95	Md/R to O	Sp/DB
	1	0.5C:0.5N	Appr/Wavy	Sp/H. to LB	114.56 × 91.00	Md/R to O	Sp/BI
	2	0.5C : 1N	Appr/Wavy	Sp/H. to LB	112.93 × 95.87	Md/R to O	Sp/BI
	3	0.5C:2N	Flocc/Wavy	Sp/H. to LB	77.59 × 70.28	Small/R to O	Sp/BI
	4	0.5C:3N	Appr/Irre	Sp/H. to LB	77.59 × 68.65	Small/R to O	Dn/LB
	5	0.5C:4N	Appr/Irre	Sp/H to LB	86.12 × 75.53	Small/R to O	Dn/BI
	6	1C:0.5N	Flocc/Wavy	Dn/LB to B	132.43 × 109.28	Large/Irre	Dn/BI
	7	1C:1N	Flocc/Even	Dn/H to LB	130.93 × 92.21	Large/R to O	Dn/BI
	8	1C:2N	Flocc/Irre	Dn/LB	105.56 × 89.62	Md/Irre	Sp/BI
	9	1C:3N	Flocc/Wavy	Dn/LB	102.37 × 85.81	Md/R to O	Dn/BI
	10	1C:4N	Flocc/Irre	Dn/LB	108.12 × 85.56	Md/R to O	Sp/BI
	11	2C:0.5N	Flocc/Even	Dn/B. To LB	141.37 × 107.25	Large/E	Sp/BI
	12	2C:1N	Flocc/Wavy	Dn/H. to LB	142.18 × 111.31	Large/E	Dn/BI
Rb 4	13	2C:2N	Flocc/Wavy	Dn/H. to LB	108.06 × 95.46	Md/O to E	Dn/BI
	14	2C:3N	Flocc/Irre	Dn/LB to B	104.40 × 90.59	Md/R to O	Sp/BI
	15	2C:4N	Flocc/Irre	Dn/LB to B	103.90 × 91.54	Md/R to O	Sp/BI
	16	3C:0.5N	Flocc/Irre	Dn/LB to B	155.18 × 123.50	Large/E	Dn/BI
	17	3C:1N	Flocc/Irre	Dn/LB to B	143.00 × 110.50	Large/E	Dn/BI
	18	3C:2N	Flocc/Irre	Dn/LB to B	109.68 × 91.80	Md/E	Sp/BI
	19	3C:3N	Flocc/Irre	Dn/LB to B	107.28 × 90.34	Md/O to E	Sp/BI
	20	3C:4N	Flocc/Irre	Dn/LB to B	104.00 × 93.43	Md/R to O	Sp/BI
	21	4C:0.5N	Flocc/Irre	Dn/LB to B	149.50 × 124.31	Large / O to E	Sp/BI
	22	4C:1N	Flocc/Irre	Dn/LB to B	145.30 × 122.28	Large/Irre	Dn/BI
	23	4C:2N	Flocc/Irre	Dn/LB to B	135.57 × 109.86	Large/Irre	Dn/BI
	24	4C:3N	Flocc/Irre	Dn/LB to B	122.21 × 90.45	Large/Irre	Dn/BI
	25	4C:4N	Flocc/Irre	Dn/LB to B	109.53 × 88.87	Md/R to O	Dn/BI
	1	0.5C:0.5N	Flocc/Even	Dn/Hyaline	81.25 × 73.12	Small/R to O	Sp/B
	2	0.5C : 1N	Flocc/Even	Dn/H. to LB	85.62 × 75.43	Small/R to O	Sp/B
	3	0.5C:2N	Flocc/Irre	Dn/H. to LB	89.80 × 78.68	Small/R to O	Sp/B
	4	0.5C:3N	Flocc/Even	Dn/H. to LB	86.59 × 68.65	Small/R to O	Dn/LB
	5	0.5C:4N	Appr/Irre	Sp/H to LB	86.12 × 75.53	Small/R to O	Dn/BI
	6	1C:0.5N	Flocc/Even	Dn/LB	90.65 × 80.39	Md/R to O	Dn/DB
	7	1C:1N	Flocc/Wavy	Dn/LB	102.69 × 89.02	Md/R to O	Dn/DB to, BI
	8	1C:2N	Flocc/Irre	Dn/LB	105.56 × 89.62	Md/Irre	Sp/BI
	9	1C:3N	Cottony/Wavy	Dn/LB	81.82 × 74.40	Small/R to O	Sp/DB
	10	1C:4N	Cottony/Wavy	Dn/LB	74.40 × 61.50	Small/R to O	Sp/B
	11	2C:0.5N	Cottony/Wavy	Dn/LB To B	128.37 × 111.37	Large/Irre	Dn/DB to BI
	12	2C:1N	Cottony/Even	Dn/LB to LB	115.37 × 101.56	Md/R to O	Dn/DB to BI
Rb 5	13	2C:2N	Cottony/Wavy	Dn/B	159.25 × 138.93	Large/Irre	Dn/DB to BI
	14	2C:3N	Cottony/Even	Dn/LB	140.26 × 125.59	Large/Irre	Sp/DB
	15	2C:4N	Cottony/Wavy	Dn/LB	122.68 × 110.50	Large/Irre	Sp/DB
	16	3C:0.5N	Cottony/Even	Dn/B	144.64 × 125.59	Large/R to O	Sp/DB to BI
	17	3C:1N	Cottony/Wavy	Dn/B	117.00 × 105.62	Md/R to O	Sp/DB to BI
	18	3C:2N	Cottony/Wavy	Dn/B	117.81 × 104.00	Md/R to O	Dn/DB to BI

continued

1	2	3	4	5	6	7	
	19	3C:3N	Cottony/Wavy	Dn/B	105.62 × 96.68	Md/R to O	Sp/DB to BI
	20	3C:4N	Cottony/Wavy	Dn/B	89.37 × 78.80	Small/R to O	Sp/DB
	21	4C:0.5N	Cottony/Wavy	Dn/B	149.50 × 128.37	Large/E	Dn/DB to BI
	22	4C:1N	Cottony/Wavy	Dn/B	160.06 × 135.68	Large/Irre	Dn/DB to BI
	23	4C:2N	Cottony/Wavy	Dn/B	104.00 × 93.84	Md/R to O	Sp/DB to BI
	24	4C:3N	Cottony/Wavy	Dn/B	102.36 × 89.69	Md/to O	Sp/DB to BI
	25	4C:4N	Cottony/Wavy	Dn/B	102.90 × 89.37	Md/R to O	Sp/DB to BI
	1	0.5C:0.5N	Appr./Even	Sp/LB	75.40 × 66.62	Small/R to O	Sp/DB
	2	0.5C : 1N	Appr./Even	Sp/LB	89.05 × 75.72	Small/R to O	Sp/DB
	3	0.5C:2N	Appr./Even	Sp/LB to B	77.35 × 67.27	Small/R to O	Sp/BI
	4	0.5C:3N	Appr./Even	Sp/H. to LB	60.45 × 53.95	Small/R to O	Sp/BI
	5	0.5C:4N	Appr./Even	Sp/LB	72.80 × 62.40	Small/R to O	Sp/DB
	6	1C:0.5N	Appr./Even	Sp./LB to B	105.99 × 90.11	Md/R to O	Dn/DB
	7	1C:1N	Flocc/Wavy	Dn/B	119.28 × 100.82	Md/Irre	Dn/DB to BI
	8	1C:2N	Flocc/Even	Dn/LB	105.56 × 89.62	Md/Irre	Dn/DB
	9	1C:3N	Flocc/Even	Dn/B	91.96 × 77.92	Md/R to O	Dn/DB to BI
	10	1C:4N	Flocc/Even	Dn/B	90.11 × 83.09	Md/R to O	Sp/DB
	11	2C:0.5N	Flocc/Even	Dn/B	124.09 × 104.14	Large/Irre	Dn/DB to BI
	12	2C:1N	Flocc/Even	Dn/B	132.66 × 119.94	Large/Irre	Dn/DB to BI
Rb 6	13	2C:2N	Flocc/Even	Dn/B to DB	100.45 × 86.68	Md/Irre(c)	Dn/DB to BI
	14	2C:3N	Flocc/Even	Dn/LB to DB	113.75 × 98.23	Md/Irre(c)	Dn/DB to BI
	15	2C:4N	Flocc/Even	Dn/B to DB	91.96 × 80.88	Md/To to O	Dn/DB to BI
	16	3C:0.5N	Flocc/Even	Dn/B to DB	125.68 × 108.25	Large/Irre	Dn/DB to BI
	17	3C:1N	Flocc/Even	Dn/B to DB	137.38 × 111.53	Large/Irre	Dn/BI
	18	3C:2N	Flocc/Even	Dn/B to DB	142.55 × 115.39	Md/Irre	Dn/DB
	19	3C:3N	Flocc/Even	Dn/B to DB	118.92 × 106.36	Md/Irre	Dn/BI
	20	3C:4N	Flocc/Even	Dn/B to DB	97.50 × 82.35	Md/Irre	Dn/BI
	21	4C:0.5N	Flocc/Even	Dn/B to DB	149.50 × 128.37	Large/E	Dn/DB to BI
	22	4C:1N	Flocc/Wavy	Dn/B to DB	134.06 × 115.22	Large/Irre	Dn/BI
	23	4C:2N	Flocc/Wavy	Dn/B to DB	104.44 × 118.39	Large/Irre	Dn/BI
	24	4C:3N	Flocc/Even	Dn/B	85.68 × 73.86	Small/Irre	Dn/BI
	25	4C:4N	Flocc/Even	Dn/B	98.97 × 82.72	Md/Irre	Dn/BI
	1	0.5C:0.5N	Flocc/Wavy	Dn/H to LB	69.40 × 65.00	Small/R to O	Sp/DB
	2	0.5C : 1N	Cottony/Even	Dn/H. to LB	59.86 × 54.43	Small/R to O	Sp/DB
	3	0.5C:2N	Flocc/Even	Dn/H to LB	58.72 × 53.53	Small/Irre	Sp/B
	4	0.5C:3N	Flocc/Even	Dn/LB	59.62 × 52.11	Small/R to O	Sp/DB
	5	0.5C:4N	Flocc/Even	Dn/LB	51.56 × 48.62	Small/R to O	Sp/DB
	6	1C:0.5N	Flocc/Even	Dn/LB	74.40 × 65.24	Small/R to O	Sp/LB to B
	7	1C:1N	Flocc/Even	Dn/H. to LB	83.41 × 72.66	Small/R to O	Sp/LB to B
	8	1C:2N	Flocc/Wavy	Dn/H to LB	72.64 × 58.68	Small/R to O	Dn/DB
	9	1C:3N	Flocc/Wavy	Dn/H. to LB	73.21 × 58.31	Small/R to O	Dn/DB
	10	1C:4N	Flocc/Wavy	Dn/LB	75.75 × 59.66	Small/Irre	Dn/DB
	11	2C:0.5N	Cottony/Even	Dn/H. to LB	85.49 × 71.19	Small/Irre	Dn/DB
	12	2C:1N	Flocc/Even	Dn/H. to LB	88.11 × 73.52	Small/Irre	Sp/DB
Rb 7	13	2C:2N	Flocc/wavy	Dn/H. to LB	78.62 × 69.24	Small/R to O	Dn/DB
	14	2C:3N	Flocc/Even	Dn/H. to LB	75.82 × 62.22	Small/R to O	Dn/DB
	15	2C:4N	Flocc/Even	Dn/H. to LB	81.18 × 75.43	Small/R to O	Dn/DB
	16	3C:0.5N	Cottony/Even	Dn/LB	91.28 × 82.63	Md/R to O	Dn/DB
	17	3C:1N	Cottony/Wavy	Dn/LB	86.81 × 76.77	Small/R to O	Dn/DB
	18	3C:2N	Cottony/Irre	Dn/H to LB	85.28 × 78.44	Small/R to O	Sp/DB
	19	3C:3N	Cottony/Irre	Dn/H to LB	78.54 × 67.70	Small/R to O	Sp/DB
	20	3C:4N	Cottony/Wave	Dn/LB	67.86 × 62.11	Small/Irre	Dn/DB
	21	4C:0.5N	Cottony/Wavy	Dn/LB to B	95.60 × 86.31	Md/Irre	Dn/DB
	22	4C:1N	Cottony/Irre	Dn/LB to B	101.63 × 89.51	Md/Irre	Dn/DB
	23	4C:2N	Cottony/Irre	Dn/LB to B	73.53 × 63.37	Small/E	Dn/DB
	24	4C:3N	Flocc/Irre	Dn/B	70.16 × 59.48	Small/E	Dn/DB
	25	4C:4N	Flocc/Even	Dn/LB	75.15 × 67.43	Small/R to O	Sp/DB

Appr.- Appressed, flocc.-Floccose, Irre-Irregular, Dn - Dense, Sp-Sparse, B-Brown, DB - DarkBrown, BI - Black, LB - Light Brown, LBI - Light Black, Md - Medium, R - Round, O - Oval, E - Elongated, Ely - Early Dly - Delayed, H-Hyaline.
 0.5 N, 1 C : 0.5 N, 2 C : 1 N, 3 C : 0.5 N, 4 C : 0.5 N ; 0.5 C ; 0.5 C : 2 N, 1 C : 1 N, 2 C : 2 N, 3 C : 0.5 C : 0.5

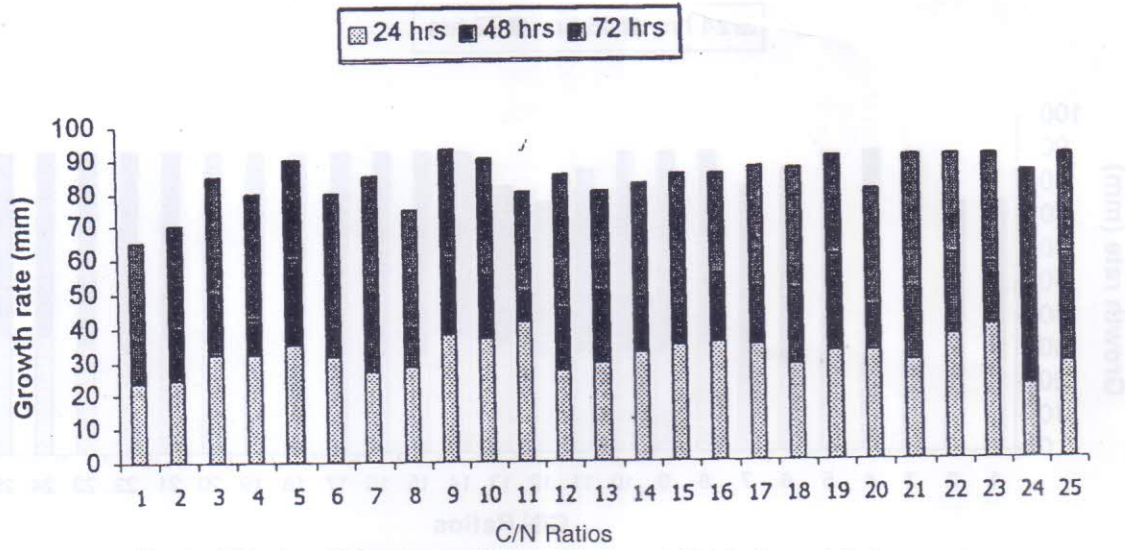


Fig. 1 : Effect of C/N ratios, on the growth rate of Rb1 isolate of *R. bataticola*

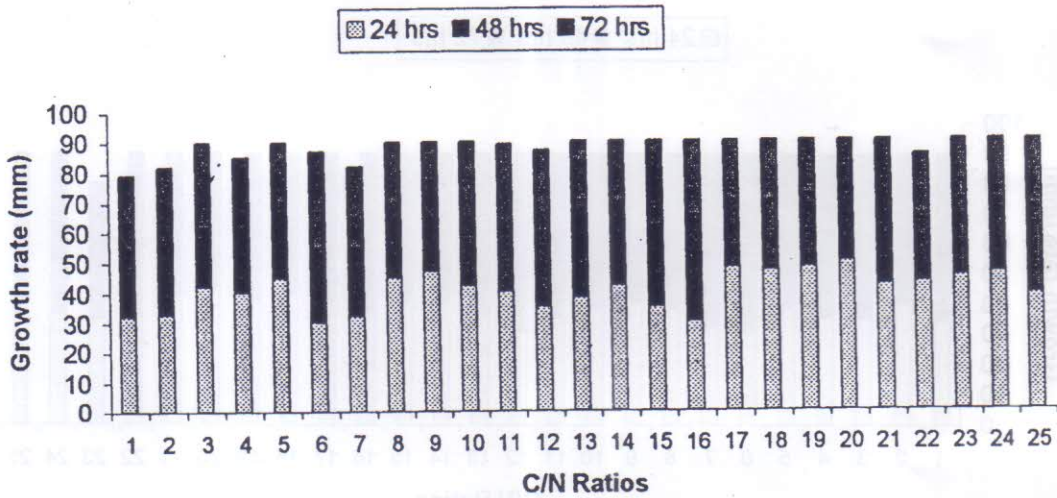


Fig. 2 : Effect of C/N ratios on the growth rate of Rb 2 isolate of *R. bataticola*

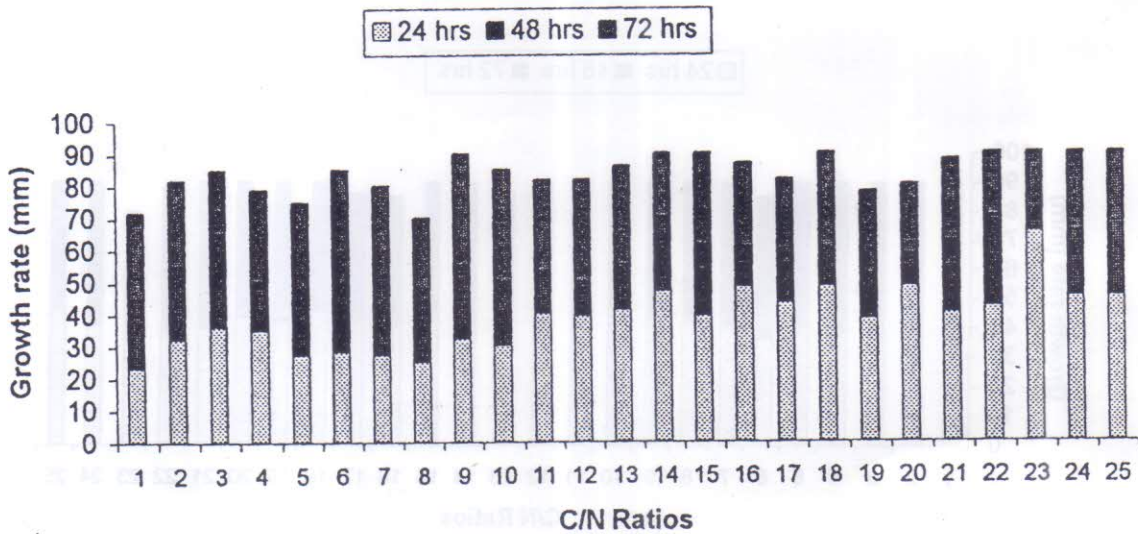


Fig. 3 : Effect of C/N ratios on the growth rate of Rb 3 isolate of *R. bataticola*

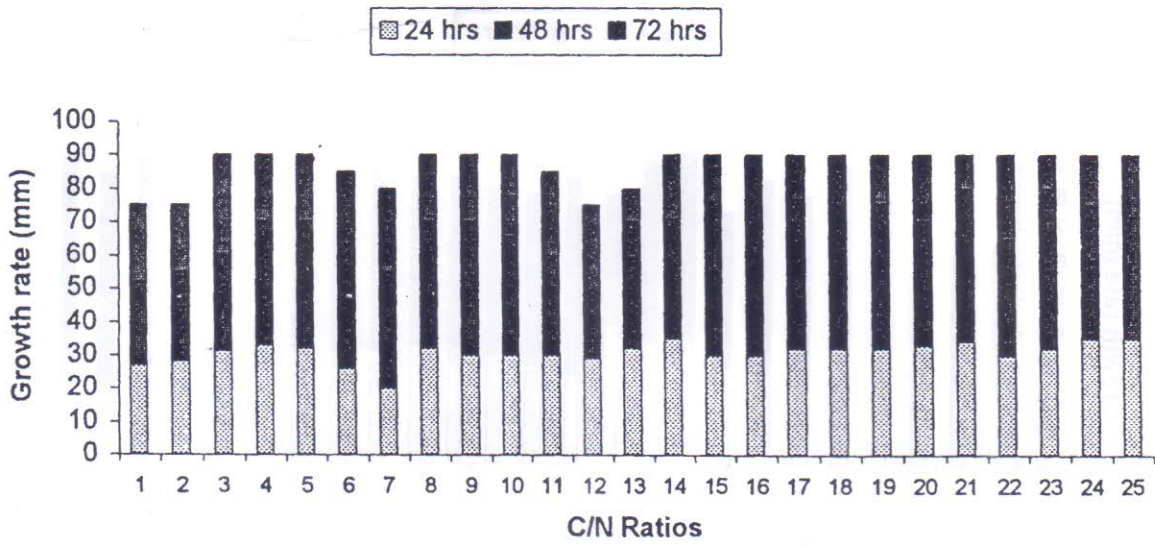


Fig. 4 : Effect of C/N ratios on the growth rate of Rb 4 isolate of *R. bataticola*

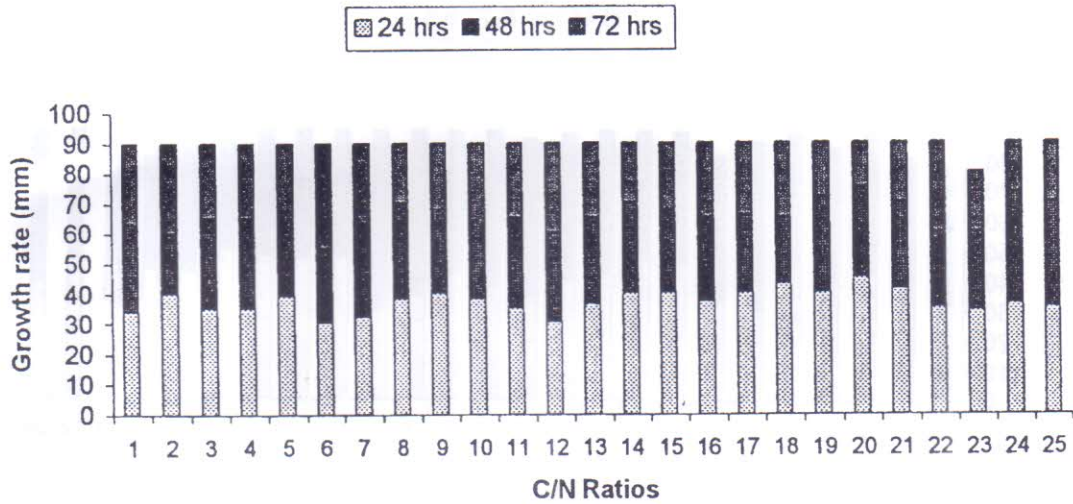


Fig. 5 : Effect of C/N ratios on the growth rate of Rb 5 isolate of *R. bataticola*

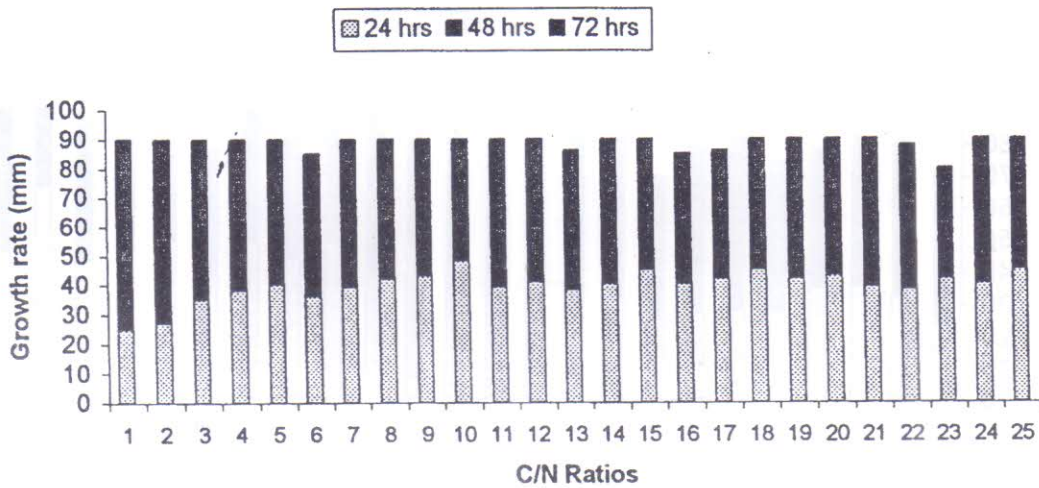


Fig. 6 : Effect of C/N ratios on the growth rate of Rb 6 isolate of *R. bataticola*

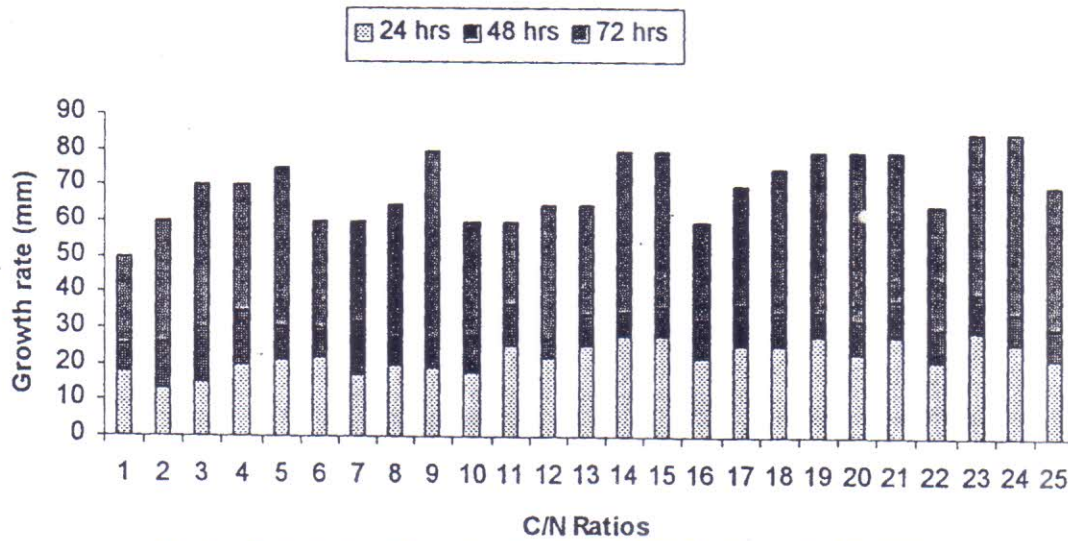


Fig. 7 : Effect of C/N ratios on the growth rate of Rb 7 isolate of *R. bataticola*

4 C : 2 N & 0.5 C : 0.5 N, 1 C : 1 N, 2 C : 1 N, 3 C : 0.5 N, 4 C : 1 N in isolates Rb 1, Rb 2, Rb 3, Rb 4, Rb 5, Rb 6 and Rb 7, respectively.

At a given level of nitrogen the growth of *R. bataticola* increased with an increase in carbon concentration. Similar observation was recorded by Shanmugam and Govindaswamy (1973) who reported that increase in carbon concentration increase growth of *M. phaseolina* till nitrogen become the limiting factor.

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(Accepted for publication November 12, 2008)