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Intercropping effect of dual purpose wheat (*Triticum aestivum* L.) with single cut berseem (*Trifolium alexandrinum* L.) on yield and economics

Satya Dev, VK Singh and Bharat Lal Kushwaha

Abstract

The present research titled “Intercropping Effect of Dual purpose Wheat (*Triticum aestivum* L.) with single cut berseem (*Trifolium alexandrinum* L.) on yield and Economics” was conducted at Agriculture Research farm of Brahmanand Post graduate college Rath, Hamirpur (Uttar Pradesh) during Rabi season of 2017-18 and 2018-19 respectively. The experiment laid out in randomized block design and consisted 14 treatments viz. T₁ Wheat sole (100% RSR: no cut for fodder only grain), T₂ Berseem sole (100% RSR of berseem cut for fodder at 75 DAS), T₃ Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS + grain), T₄ Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS + grain), T₅ Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS+ grain), T₆ Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS + grain), T₇ Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS + grain), T₈ Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS + grain), T₉ Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS + grain), T₁₀ Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS + grain), T₁₁ Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS + grain), T₁₂ Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS + grain), T₁₃ Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS + grain) and T₁₄ Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS + grain). Study results revealed that, there was significant statistical variation in, Length of ear (cm), Number of grains ear⁻¹, Test weight (g), Green fodder yield (q/ha), Dry matter yield (q/ha), Grain yield (q/ha), Straw yield (q/ha), Biological yield (q/ha), Harvest Index (%) and Benefit cost ratio. Highest Length of ear (11.10 and 11.11 cm), Number of grains ear⁻¹ 55.66 and 55.33 Grain weight per ear (2.30 and 2.25g), Test weight (42.33 and 42.43 g) Grain yield (60.53 and 59.80q/ha), Straw yield (121.00 and 119.60q/ha), Biological yield (182.45 and 180.50q/ha), were reported in T₁ (Wheat sole 100% RSR of wheat: no cut for fodder only grain). Whereas maximum green fodder yield (226.00 and 220.80q/ha), dry matter yield (60.53 and 59.80 q/ha) and gross return (235289.00 and 245150.00 Rs./ha) were found in T₈= Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS+ grain). This Wheat-Berseem based intercropping schedule can be suggested to Bundelkhand’ farmers for better yield and Economics.

Keywords: Benefit-cost ratio, intercropping, harvest index and dry matter yield

Introduction

Wheat is one of the most extensively cultivated crop throughout the world for human consumption which supports approximately 35 per cent of the world population and regarded as an important food and feed crop based upon its production, utilization, nutritive value and adaptation (Hogg *et al.*, 2004)^[10]. Common wheat or bread wheat (*T. aestivum*) is a hexaploid species, the most widely cultivated in the world which covers 90 per cent area of the total area under wheat. Wheat is a C₃ plant and as such it thrives in cool environments but it has a wide adaptation due to the complex nature of the plant “genome, which provides great plasticity to the crop (Acevedo *et al.*, 2002)^[1]. Wheat is produced under a wide range of climatic conditions and geographical areas. It’s high adaptability with various climatic conditions of environment and distribution range is more than any other plants pieces makes wheat as the staple food.

Berseem (*Trifolium alexandrinum*) is an annual pasture legume originating in eastern Mediterranean regions. It is widely grown in its area of origin as a high-quality forage conservation crop and has been introduced to many other countries, such as India, Pakistan, South Africa, USA and Australia, where it is also primarily used for fodder conservation purposes. Berseem is also known as Egyptian and Alexandria clover.

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In Australia, it is most commonly grown in combination with other annual legumes, such as arrow leaf clover (*Trifolium vesiculosum*), Persian clover (*Trifolium resupinatum*) and balansa clover (*Trifolium michelianum*), to increase the bulk of forage conserved. It is also suitable to sow in a mixture with winter cereals, such as oats, to make high quality silage or hay. Berseem is the Arabic and Coptic word and it grows in Egypt since 6000 years BC. Egyptian clover, (*Trifolium alexandrinum* L.), is the traditional forage crop in Egypt. Berseem is one of the most important winter forage crop in north, north-west, and central parts of India. It has 20-24% crude protein and 70% digestible dry matter. Berseem, known as king of fodder crops, is popular among livestock farmers of the world. Berseem clover is an erect annual legume, which can grow 60-80 cm tall. It has a shallow taproot. Leaflets are commonly 4-5 cm long and 2-3 cm wide. Botanically it is known as *Trifolium alexandrinum* L. Berseem is one of the important winter forage crops in India. It spread very fast after its introduction in 1903, in the Northern regions of the country due to its various advantages particularly among small farm holders. India is one of the major berseem seed importing nations.

In wheat-based intercropping system, selection of an appropriate intercrop having desirable plant type and growth pattern which does not coincide with the peak period of growth of main crop is important, as research on intercropping has indicated how niche differences in crop species can lead to resource capture and conversion leading to increase biological efficiency and yield advantage. Intercropping has been popular farming practice from time immemorial. Most of the studies of winter intercropping were focused on forage production. They are intercrops of wheat, barley or oat-Egyptian or berseem clover (El-Karamany *et al.*, 2012; Ross *et al.*, 2004; Vasilakoglou and Dhima, 2008) [7, 16, 18] and wheat or barley-vetch.

Materials and Methods

The present trail was executed during the rabi season of 2017-18 and 2018-19 at the Research Farm of Brahmanand P.G. College, Rath, Hamirpur (Uttar Pradesh). The experiment was layout into Randomized Block Design (RBD) with 3 replication and consisted 14 treatments *viz.* Wheat sole (100% RSR: no cut for fodder only grain), Berseem sole (100% RSR of berseem cut for fodder at 75 DAS), Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS + grain), Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS + grain), Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS + grain), Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS + grain), Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS + grain), Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS + grain), Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS + grain), Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS + grain), Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS + grain), Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS + grain), Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS + grain) and Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS + grain). Wheat var. VL-Gehun 829 was

sown at the spacing 25 X 10cm and Berseem cv. JBSC-1 through Broadcasting. Standard culture practices recommended for Wheat and Berseem was followed uniformly in all experimental plots.

Result and Discussion

Length of ear (cm)

Significantly higher ear length (11.10 and 11.11cm) were reported in T₁ (Wheat sole 100% RSR of wheat: no cut for fodder only grain) and minimum length of ear (9.22 and 9.16 cm) was reported in Treatment T₅= Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS) during both growing years 2017-18 and 2018-19 respectively. These results are closely conformity with the findings of Kubota *et al.*, (2016) [12], Table 1.

Number of grains ear⁻¹

Numbers of grain per ear were influenced by different treatment combinations during both the years of study. Highest number of grains (55.66 and 55.33) recorded under T₁= Wheat sole (100% RSR of wheat: no cut for fodder only grain) and lowest (48.33 and 48.33) with T₅ = Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS in both growing years 2017-18 and 2018-19 respectively. The present findings were close conformity with the findings of Aparicio *et al.*, (2010) [4], Table 1.

Grain Weight per ear (g)

Grain Weight per ear were significantly influenced maximum grain weight/ear (2.30 and 2.25) was observed in T₁ = Wheat sole (100% RSR of wheat: no cut for fodder only grain) and minimum grain weight was registered in T₅ (1.65 and 1.63) during both growing season 2017-18 and 2018-19 respectively. Similar result was recorded by Nargis *et al.*, 2004 [15], Table 1.

Test weight (g)

Among the various treatments highest grain weight (42.33 and 42.43g) was noted in T₁ = wheat sole (100% RSR of wheat: no cut for fodder only grain). However Minimum, grain weight was registered in Treatment T₈ (34.83g and 34.33g) during both growing years respectively. Ross *et al.*, (2004) [16] reported similar result, Table 2.

Yield

Green fodder yield (q/ha)

Among the various treatments highest green fodder yield (226.00 and 220.80q/ha) was reported in T₈ =Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS + grain) followed by T₇ (210.40 and 210.32 q/ha) during both the years of study 2017-18 and 2018-19 respectively. However minimum fodder yield was registered in T₃ (72.30 and 71.15q/ha). These variations in green fodder yield may be due optimum seed rate and maximum days of cutting. The present findings was in close conformity with the findings of Sandler (2015) [17], Table 2.

Dry matter yield (q/ha)

Dry matter yield was significantly influenced by different treatments. Highest dry matter yield (22.50 and 22.08q/ha) was reported in T₈ = Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS+ grain) followed by T₁₁(20.00 and 20.33q/ha) and T₁₄ (19.62

and 19.50 q/ha) during both year of experiment 2017-2018 and 2018-2019 respectively. However, Minimum dry weight was noted in T₃ (5.95 and 6.15q/ha). This result in dry yield may be due to optimum seed rate and maximum days of cutting. Similar result have also have been postulated by Naeem *et al.*, (2013) [14], Table 2.

Grain yield (q/ha)

Among all treatments highest grain yield (60.53 and 59.80 q/ha) was registered in T₁ followed by T₉ (51.02 and 51.70 q/ha) during both the years 2017-2018 and 2018-19 respectively. However Minimum yield was noted in T₅ (41.78 and 40.02q /ha) during both growing seasons 2017-2018 and 2018-19 respectively. It was may be due to optimum seed rate and no competition of intercropping. Li *et al.*, (2011) [13], Das *et al.*, (2012) [6] and Mehdi Dahmardeh also reported similar result, Table 3.

Straw yield (q/ha)

Among all treatments highest straw yield (121.00 and 119.60q/ha) was recorded in treatment T₁=Wheat sole (100% RSR of wheat: no cut for fodder only grain) and minimum straw yield (87.74q/ha and 84.63 q/ha) was recorded in T₅ (Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS) in both the years respectively. Nargis *et al.*, 2004 [15] reported similar result, Table 3.

Biological yield (q/h)

Biological yield was directly was influenced by application of different treatment. Highest biological yield (182.45 and 180.50q/ha) was reported in T₁ =Wheat sole (100% RSR of

wheat: no cut for fodder only grain) followed by T₉ (154.30 and 157.10q/ha) during both the year 2017-18 and 2018-19 respectively. However lowest biological yield was reported in T₅ (130.32 and 126.20 q/ha). Ross (2013) [16] reported similar result, Table 3.

Harvest Index (%)

Among the various treatments maximum harvest index (34.83 and 34.72%) was reported in T₆ = Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS + grain) followed by T₇ (34.62 and 34.58%) during both the years 2017-2018 respectively. However minimum harvest index was reported in T₃ (31.07 and 31.13%). This result was variation in biological yield and economic yield. Aparicio *et al.*, (2010) [4], Kubota *et al.*, (2016) [12] reported similar result. Table 4.

Economics

Among the all treatments highest gross return was recorded in T₈ (235289.00 and 245150.00 Rs./ha) followed by T₁₁ (232809.50 and 242414.50ha Rs./ha) compared to sole fodder treatments (T₁ and T₂) during both year 2017-18 and 2018-19 respectively. Net income was significantly influenced by different treatments. Significantly higher net return was also recorded in T₈ (175491.06 and 180380.20 Rs./ha⁻¹) compared to sole fodder treatments (T₁ and T₂) and were on par with rest of the treatments. Similar trend was observed with regard to B:C ratio among different treatments maximum B:C ratio (2.97 and 3.15) in T₁₁ and minimum in T₂ (0.24 and 0.26) during both years of experiment. Table 5.

Table 1: Intercropping effect on length of ear (cm), Number of grain/ear and Grain weight (g)

Treatments	Length of Ear (cm)			Number of grain/ear			Grain weight/ear (g)		
	2017-18	2018-19	Mean	2017-18	2018-19	Mean	2017-18	2018-19	Mean
T ₁ -Wheat sole (100% RSR of wheat: no cut for fodder only grain)	11.000	11.110	11.05	55.660	55.330	55.49	2.300	2.250	2.27
T ₃ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS + grain)	9.720	9.770	9.74	50.330	50.660	50.49	1.820	1.800	1.81
T ₄ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS + grain)	9.380	9.380	9.38	48.890	48.660	48.77	1.800	1.720	1.76
T ₅ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS + grain)	9.220	9.160	9.19	48.330	48.330	48.33	1.650	1.630	1.64
T ₆ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS + grain)	9.990	9.940	9.96	51.330	51.660	51.49	1.750	1.770	1.76
T ₇ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS+ grain)	9.880	9.440	9.66	51.110	51.000	51.05	1.700	1.690	1.69
T ₈ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS + grain)	9.330	9.330	9.33	50.780	50.660	50.72	1.680	1.650	1.66
T ₉ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS + grain)	10.110	10.220	10.16	52.330	52.660	52.49	1.990	2.000	1.99
T ₁₀ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS + grain)	10.380	10.050	10.21	52.660	52.000	52.33	2.040	1.990	2.01
T ₁₁ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS + grain)	9.900	9.990	9.94	51.670	50.990	51.33	1.930	1.880	1.90
T ₁₂ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS + grain)	10.110	9.830	9.97	52.220	52.330	52.27	1.950	1.960	1.95
T ₁₃ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS + grain)	9.770	9.770	9.77	51.330	51.110	51.22	1.900	1.860	1.88
T ₁₄ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS + grain)	9.270	9.160	9.21	50.670	50.550	50.61	1.760	1.750	1.75
C.D.	0.417	0.350		2.326	2.259		0.093	0.082	
S.E(m)	0.142	0.119		0.792	0.769		0.032	0.028	
S.E(d)	0.201	0.169		1.121	1.088		0.045	0.039	
C.V.	2.49	2.11		2.674	2.601		2.952	2.617	

Table 2: Intercropping effect on Test weight (g), Green fodder yield (q/ha) and Dry matter yield (q/ha)

Treatments	Test weight (g)			Green Fodder yield (q/ha)			Dry matter yield (q/ha)		
	2017-18	2018-19	Mean	2017-18	2018-19	Mean	2017-18	2018-19	Mean
T ₁ -Wheat sole (100% RSR of wheat: no cut for fodder only grain)	42.330	42.430	42.38	132.000	137.000	134.50	9.560	9.590	9.57
T ₃ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS + grain)	36.830	37.000	36.91	70.000	72.300	71.15	5.950	6.150	6.05
T ₄ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS + grain)	36.000	36.080	36.04	84.600	86.300	85.45	7.600	7.770	7.68
T ₅ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS + grain)	35.500	35.670	35.58	101.010	102.800	101.90	10.100	10.200	10.15
T ₆ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS + grain)	35.660	35.330	35.49	192.130	195.040	193.58	16.320	16.570	16.44
T ₇ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS + grain)	35.170	35.000	35.08	210.240	210.400	210.32	18.920	18.940	18.93
T ₈ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS + grain)	34.830	34.330	34.58	226.000	220.800	223.40	22.500	22.080	22.29
T ₉ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS + grain)	39.500	39.870	39.68	171.000	172.200	171.60	14.540	14.640	14.59
T ₁₀ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS + grain)	40.000	39.670	39.83	185.320	187.000	186.16	16.680	16.830	16.75
T ₁₁ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS + grain)	39.170	38.870	39.02	200.200	202.300	201.25	20.000	20.230	20.11
T ₁₂ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS + grain)	39.220	39.170	39.19	164.400	165.000	164.70	13.970	14.030	14.00
T ₁₃ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS + grain)	38.670	38.500	38.58	181.100	182.500	181.80	16.300	16.430	16.36
T ₁₄ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS + grain)	38.500	38.170	38.33	196.200	195.000	195.60	19.620	19.500	19.56
C.D.	1.573	1.781		8.636	7.824		0.535	0.835	
S.E(m)	0.536	0.607		2.941	2.665		0.182	0.284	
S.E(d)	0.758	0.858		4.159	3.769		0.258	0.402	
C.V.	2.455	2.787		3.132	2.819		2.136	3.320	

Table 3: Intercropping effect on Grain yield (q/ha), Straw yield (q/ha) and Biological yield (q/ha)

Treatments	Grain Yield (q/ha)			Straw yield (q/ha)			Biological Yield (q/ha)		
	2017-18	2018-19	Mean	2017-18	2018-19	Mean	2017-18	2018-19	Mean
T ₁ -Wheat sole (100% RSR of wheat: no cut for fodder only grain)	60.530	59.800	60.16	121.000	119.600	120.30	182.450	180.500	181.47
T ₃ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS + grain)	47.430	47.000	47.21	104.460	103.540	104.00	152.640	151.000	151.82
T ₄ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS + grain)	45.420	45.020	45.22	94.860	94.040	94.45	140.520	140.600	140.56
T ₅ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS + grain)	41.780	40.020	40.90	87.740	84.630	86.18	130.320	126.200	128.26
T ₆ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS + grain)	49.460	50.060	49.76	91.580	93.100	92.34	142.000	144.200	143.40
T ₇ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS + grain)	48.200	49.000	48.60	90.420	91.660	91.03	139.220	141.700	144.46
T ₈ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS + grain)	47.590	48.500	48.04	89.030	90.120	89.57	137.500	140.320	138.91
T ₉ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS + grain)	51.020	51.700	51.36	102.040	104.000	103.02	154.300	157.100	155.70
T ₁₀ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS + grain)	50.130	51.580	50.85	96.920	98.020	97.47	147.900	150.700	149.430
T ₁₁ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS + grain)	49.700	49.800	49.75	95.000	95.550	95.27	145.750	146.700	146.22
T ₁₂ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS + grain)	50.870	50.870	50.87	99.320	100.520	99.92	152.600	152.450	152.11
T ₁₃ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS + grain)	47.720	46.020	46.87	95.440	92.040	93.74	144.200	139.200	141.70
T ₁₄ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS + grain)	44.070	42.850	43.86	92.500	89.980	91.24	137.400	134.000	135.70
C.D.	2.026	1.817		4.501	3.692		6.401	5.827	
S.E(m)	0.690	0.619		1.533	1.257		2.180	1.985	
S.E(d)	0.976	0.875		2.168	1.778		3.083	2.807	
C.V.	2.451	2.20		2.739	2.253			2.346	

Table 4: Intercropping effect on Harvest Index (%)

Treatments	Harvest Index (%)		
	2017-18	2018-19	Mean
T ₁ -Wheat sole (100% RSR of wheat: no cut for fodder only grain)	33.170	33.130	33.15
T ₃ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS + grain)	31.070	31.130	31.10
T ₄ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS + grain)	32.320	32.020	32.17
T ₅ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS + grain)	32.060	31.930	31.99
T ₆ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS + grain)	34.830	34.720	34.77
T ₇ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS + grain)	34.620	34.580	34.60
T ₈ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS + grain)	34.610	34.56	34.58
T ₉ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS + grain)	33.070	32.90	32.98
T ₁₀ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS + grain)	33.890	34.220	34.05
T ₁₁ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS + grain)	34.090	34.05	34.07
T ₁₂ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS + grain)	33.340	33.36	33.35
T ₁₃ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS + grain)	33.090	33.060	33.07
T ₁₄ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS + grain)	32.070	31.97	32.02
C.D.	1.491	1.571	
S.E(m)	0.508	0.535	
S.E(d)	0.718	0.757	
C.V.	2.646	2.797	

Table 5: Gross Income, Cost of Cultivation, Net Income & B: C ratio

Treatments	Gross Income		Cost of cultivation		Net Income		B: C ratio	
	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19	2017-18	2018-19
T ₁ -Wheat sole (100% RSR of wheat: no cut for fodder only grain)	189719.55	199732.00	52218.44	52072.28	137501.11	142653.49	2.63	2.73
T ₂ -Berseem sole (100% RSR of Berseem: cut for fodder at 75 DAS)	52800.00	54800.00	42316.53	42454.48	10483.47	11345.52	0.24	0.26
T ₃ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS + grain)	183413.05	193055.00	49531.93	51509.47	13381.12	136724.55	2.70	2.65
T ₄ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS + grain)	179045.70	183184.80	51533.13	51500.10	127512.62	129615.15	2.47	2.51
T ₅ -Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS + grain)	174310.30	178744.50	51274.55	50956.29	123035.45	125571.11	2.39	2.46
T ₆ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS + grain)	226667.10	239951.40	59239.84	59440.28	167525.26	173918.97	2.82	2.92
T ₇ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS + grain)	231017.00	243065.00	59488.01	59652.27	171518.99	177388.73	2.88	2.97
T ₈ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS + grain)	235289.00	245150.00	59797.94	59839.30	175491.06	180380.20	2.93	3.01
T ₉ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS + grain)	228347.70	242008.00	58037.34	58206.31	170310.36	176971.54	2.94	3.04
T ₁₀ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS + grain)	228947.55	243222.20	58254.59	58590.67	170692.96	177494.20	2.93	3.02
T ₁₁ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS + grain)	232809.50	242414.50	58579.21	57357.13	174230.29	181154.90	2.97	3.15
T ₁₂ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS + grain)	223543.45	234990.80	56893.77	56910.33	166649.68	172356.79	2.92	3.02
T ₁₃ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS + grain)	222042.20	226706.80	56725.12	56424.00	165317.08	167950.50	2.91	2.97
T ₁₄ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS + grain)	2196.91.45	224329.00	56412.42	56152.10	163279.03	165858.12	2.89	2.95

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