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Satya Dev
 Research Scholar, Department of
 Agronomy, Brahmanand PG
 College Rath, Hamirpur,
 Uttar Pradesh, India

VK Singh
 Professor, Department of
 Agronomy, Brahmanand PG
 College Rath, Hamirpur,
 Uttar Pradesh, India

Himanshu
 Institute of Agronomy Sciences,
 Bundelkhand University, Jhansi,
 Uttar Pradesh, India

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

Satya Dev*, VK Singh and Himanshu

Abstract

The present research titled “Intercropping Effect of dual cut Wheat (*Triticum aestivum* L.) With single cut Berseem (*Trifolium alexandrinum* L.) on growth and yield attributes” was conducted at Agriculture Research farm of Braham an and Post graduate college Rath 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, Plant Height at harvest, Number of tillers m⁻¹ row length at 55 days after sowing and at harvest stage, Fresh weight (g) of per 2500 cm² at 55 DAS and harvest stage, Dry Weight (g) per 2500 cm² at 55 days after sowing and harvest, Leaf area index at 55 Days after sowing (only wheat), and Green Fodder yield. Plant height (cm) at 55 Days after sowing (only wheat), (57.30 and 58.00 cm) Maximum Plant Height at harvest (100.00 and 101.53 cm), Number of tillers m⁻¹ row length at 55 DAS (45.33 and 45.34) and at harvest stage (65.90 and 66.22), Fresh weight at harvest (513.13 and 507.65 g), Dry weight at harvest (456.130 and 453.69 g) Leaf area index at 55 Days after sowing (only wheat), (5.1 and 5.2) were reported in T₁ = Wheat sole (100% RSR of wheat: no cut for fodder only grain) whereas maximum Fresh weight (g) of per 2500 cm² at 55 DAS (490.00 and 487.00 g), Dry matter yield (22.50 and 22.8 q/ha) and fodder yield (226.00 and 220.80 q/ha). Were recorded in T₈ = Plant height (cm) at 55 Days after sowing (only wheat). This Wheat-Berseem intercropping schedule can be suggested to Bundelkhand’ farmers for better yield.

Keywords: Dual cut wheat, single cut berseem, intercropping

Introduction

Wheat (*Triticum aestivum* L.) is the most important cereal crop for the majority of world’s populations. It is the most important staple food of about two billion people (36% of the world population). Worldwide, wheat provides nearly 55% of the carbohydrates and 20% of the food calories consumed globally (Abdulahi *et al.* 2012) [2]. Wheat belongs to family *Poaceae* (Gramineae) which includes major crop plants such as Rice, Maize etc. In Wheat, Sakamura (1998) reported the chromosome number sets (genomes) for each commonly recognized type. He separated wheat into three groups viz. diploids (2n=14), tetraploids (2n=28) and hexaploids (2n=42) chromosomes. In India the wheat growing areas can be mainly divided into five soil divisions, viz. 1. The Gangetic alluvium of Uttar Pradesh and Bihar, 2. The Indus alluvium of the Punjab and Haryana, 3. The black soil regions of central and southern India comprising Madhya Pradesh and parts of Maharashtra and Karnataka, 4. The hilly regions of the Himalaya and elsewhere, and 5. The desert soils of Rajasthan. There is hardly any scope for expansion of area under wheat. The main emphasis would be on increasing the productivity of wheat by adopting the improved cultivation practices.

Corresponding Author:
Satya Dev
 Research Scholar, Department of
 Agronomy, Brahmanand PG
 College Rath, Hamirpur,
 Uttar Pradesh, India

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. Among the fodder crops, the area under berseem cultivation is next to that of sorghum (Hazra, 1995) [8]. In India, Berseem is one of the major rabi forage crops in northern region of India and occupies maximum area among forage crops during winter season (Hazra, 1995) [8].

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 (Willey, 1979) [15]. 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) [5, 11, 13], 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 laid out into Randomized Complete Block Design (RCBD) 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 10 cm and Berseem cv.JBSC-1throughBroadcasting. Observations were recorded *viz.* The observations were recorded on plant height at 55days after sowing and harvest stage, number of tiller⁻¹ row length (only wheat), number of tillers at harvest stage m⁻¹ row length (only wheat), Fresh and dry biomass weight at 55 days after sowing and harvest stage (gm) per 2500 cm²., leaf area index, length of ear (cm), green fodder yield (q/ ha), dry matter yield (q/ ha), grain yield (q/ ha), straw yield (q/ ha), biological yield (q/

ha) Standard culture practices recommended for Wheat and Berseem was followed uniformly in all experimental plots.

Results and Discussion

Plant Height (cm) at 55 days after Sowing

Among the various treatments maximum plant height (57.30 and 58.00 cm) was recorded in T₁=Wheat sole (100% RSR of wheat: no cut for fodder only grain) during both years 2017-2018 and 2018-2019 respectively. However minimum plant height at cutting stage were reported in T₆ (53.00 and 53.30 cm). This might be due to that number of days with directly associated plant height in same growing condition. These results were in accordance with findings of Anderson (2017) [1] and Kubota *et al.* (2016) [9]. (Table 1).

Plant Height at harvest (cm)

Among various treatments maximum plant height at harvest (100.00 and 101.53 cm) was recorded in T₁= Wheat sole (100% RSR: no cut for fodder only grain) during both years 2017-2018 and 2018-2019 respectively However minimum plant height at harvest stage was reported in T₅ (65.83 cm) in 2017-18 and T₁₄ (65.00 cm) in 2018-19. This result might be due to that number of days of growing period directly associated with plant height in same growing condition. Similar result was reported by Gunes *et al* (2007) [7], Gill *et al.* (2009) [6] and Khatun *et al.* (2012) [18], Table (1).

Number of tillers m⁻¹ row length at 55 days after sowing (only wheat)

Highest number of tillers (45.33 and 45.34 m⁻¹ row length at 55 DAS were reported in T₁= Whole sole (100% RSR: no cut for fodder only grain) followed by T₁₄ (43.66m⁻¹ row length) in 2017-18 and T₅ (43.66m⁻¹ row length) during 2018 – 19. However minimum tillers at 55 DAS were observed in T₆ (41.11 and 40.33m⁻¹ row length). This result may be due to plant population per m⁻¹ row length between both crops (Wheat + Berseem). These results are in agreement to the Khatun *et al.* 2012 [18]. (Table 1).

Number of tillers at harvest m⁻¹ row length

The Highest number of tillers (65.99 and 66.22m⁻¹ row length) were produced under T₁= Wheat sole (100% RSR: no cut for fodder only grain) whereas minimum tillers after cutting for fodders were observed in T₈ (60.38 and 60.44m⁻¹ row length). These findings fall in line earlier workers of Gill *et al.* (2009) [6], Akthar *et al.* (2010) [19] and Das *et al.* (2012) [4], (Table 2).

Fresh biomass (g) at 55 Days after sowing per 2500 cm²

Fresh weight per 2500 cm² before and after cutting was directly influenced with different treatments before cutting of fodder highest fresh weight per 2500 cm² (490.00 and 487.00 g) was reported in T₈ = Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS+ grain) during both year of study 2017- 18 and 2018 -19 respectively and lowest fresh weight before cutting was reported in T₄ (174.00 g) in 2017-18 and T₅ (177.35) during 2018-19,(Table 2).

Fresh biomass (g) at harvest stage per 2500 cm²

Highest fresh biomass at harvest stage per 2500 cm² (513.13 and 507.65 g) was observed in T₁ = Wheat sole (100% RSR: no cut for fodder only grain) While lowest fresh weight (g) at

harvest stage per 2500 cm² was observed in T₅ (369.78 and 358.10 g) during both the years 2017-18 and 2018-19 respectively. This effect may be due to cutting effect of fodder. These result may be supported by Choudhary and Suri (2014) [3] and Sandler (2015) [12], (Table 2).

Dry biomass (g) at 55 Days after sowing per 2500 cm²

Among all treatments highest dry weight at 55 Days after sowing per 2500 cm² (26.15 and 26.45 g) was recorded in T₈ = Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS+ grain) While minimum dry weight per plant before cutting were recorded in T₄ (10.44 and 10.68 g), (Table 3).

Dry weight (g) at harvest stage per 2500 cm²

Highest dry weight at harvest per 2500 cm² (456.13 and 451.25 g) was recorded in T₁ = Wheat sole (100% RSR of wheat: no cut for fodder only grain) and minimum dry weight at harvest stage per 2500 cm².were recorded in T₅ (325.80 and 315.50 g).These result are closely conformity with the findings of Mohammdi *et al.* (2012) [16], Mehdi (2013) [17] and Ross (2004) [11], (Table 3).

Leaf Area Index (only wheat)

Highest Leaf area index (5.10 and 5.20) was reported in Treatment T₁ = Wheat sole (100% RSR of wheat: no cut for fodder only grain) followed by T₄ (5.00 and 4.98) during both the years 2017- 18 and 2018- 19 respectively and minimum leaf area index was (2.50 and 2.41) calculated in T₈ = Wheat + Berseem (100% RSR of Wheat + 100% RSR of Berseem: cut

for fodder at 75 DAS + grain). This reason might be due to intercropping cropping. These results are partially related to findings of Wasayaet *al.* (2013) [20] and Ross *et al.* (2004) [11], (Table 3).

Yield attributes

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 been postulated by Khatun *et al.* (2012) [18] and Naeemet *al.* (2013), (Table 4).

Green fodder yield (q/ ha)

Among the various treatments highest green fodder yield (226.00 and 220.80 q/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 71.15 q/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) [12], (Table 4).

Table 1: intercropping effect of Plant Height (cm) at 55 days after Sowing, Plant Height at harvest (cm) and Number of tillers m⁻¹ row length at 55 days after sowing (only wheat).

Treatments	Plant Height (cm) at 55 days after Sowing			Plant Height at harvest (cm)			Number of tillers m ⁻¹ row length at 55 days after sowing (only wheat).		
	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)	57.300	58.000	57.65	100.000	101.530	100.76	45.330	45.340	45.33
T ₃ – Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS)	55.100	56.800	55.95	76.530	75.880	76.25	43.220	43.120	43.17
T ₄ - Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS+Grain)	55.000	56.000	55.50	71.630	70.130	70.88	43.000	43.110	43.05
T ₅ - Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS+Grain)	56.300	56.900	56.60	65.830	66.770	66.30	43.220	43.660	43.44
T ₆ - Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS+ grain)	54.100	56.900	54.15	78.600	79.800	79.20	41.110	40.330	40.72
T ₇ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS+ grain)	53.000	54.200	53.15	73.330	73.920	73.62	41.660	41.440	41.55
T ₈ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS+ grain)	54.000	53.300	54.05	68.500	68.700	68.60	42.780	41.550	42.16
T ₉ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS+ grain)	55.000	54.100	55.15	77.630	77.800	77.71	43.330	42.660	42.99
T ₁₀ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS+ grain)	55.400	55.300	55.20	74.330	74.900	74.81	42.110	42.880	42.49
T ₁₁ - Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS+ grain)	54.500	55.000	55.25	69.930	70.000	70.96	43.120	42.120	42.62
T ₁₂ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS+	55.000	56.000	55.05	76.770	75.800	76.28	43.330	43.110	43.22

grain)									
T ₁₃ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS+ grain)	56.000	55.500	55.75	71.600	70.300	70.95	43.550	43.330	43.44
T ₁₄ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS+ grain)	55.300	56.000	55.65	66.150	65.000	65.57	43.660	43.220	43.44
C.D.	N/A	N/A		2.762	4.161		1.770	1.755	
SE(m)	0.954	0.930		0.941	1.417		0.603	0.598	
SE(d)	1.349	1.315		1.330	2.004		0.852	0.845	
C.V.	3.000	2.891		2.181	3.288		2.426	2.422	

Table 2: Intercropping effect on Number of tillers (m⁻¹ row length) at harvest stage (only wheat) Fresh weight (g) of per 2500cm² at 55 DAS, Fresh weight (g) per 2500 cm² at harvest stage (only wheat)

Treatments	Number of tillers (m ⁻¹ row length) at harvest stage (only wheat)			Fresh weight (g) of per 2500 cm ² at 55 Days after sowing			Fresh weight (g) per 2500 cm ² at harvest stage (only wheat)		
	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)	65.990	66.220	66.10	180.000	182.000	181.00	513.130	507.650	510.39
T ₂ – Berseem sole 100% RSR of Berseem: cut for fodder at 75DAS)	-	-	-	300.000	305.000	302.50	-	-	-
T ₃ – Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS+Grain)	61.990	62.110	62.05	175.000	178.250	176.62	430.350	425.830	428.09
T ₄ - Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS+Grain)	62.220	62.440	62.33	174.000	178.000	176.00	396.950	397.200	397.07
T ₅ - Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS+Grain)	62.550	61.780	62.16	177.000	177.350	177.17	369.780	358.100	363.94
T ₆ - Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS+ grain)	60.990	61.120	61.05	480.320	485.100	482.71	399.380	406.650	403.01
T ₇ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS+ grain)	60.550	60.990	60.77	483.010	483.500	483.25	392.250	400.300	396.27
T ₈ .Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS+ grain)	60.380	60.440	60.41	490.000	487.000	488.50	388.450	390.250	389.35
T ₉ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS+ grain)	62.330	62.990	62.41	425.000	430.500	427.75	435.130	443.070	439.08
T ₁₀ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS+ grain)	63.890	63.470	63.68	418.250	422.500	420.37	417.830	425.730	421.78
T ₁₁ - Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS+ grain)	61.890	62.220	62.05	423.010	424.000	423.50	413.580	400.650	407.11
T ₁₂ .Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS+ grain)	63.990	63.770	63.88	408.500	409.550	409.02	430.330	429.830	430.08
T ₁₃ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS+ grain)	62.990	62.440	62.71	415.250	417.300	416.27	407.380	393.250	400.31
T ₁₄ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS+ grain)	62.780	61.990	62.38	410.500	408.500	409.50	490.130	380.000	385.06
C.D.	2.096	N/A		15.610	19.513		20.344	13.362	
SE(m)	0.714	1.015		5.340	6.675		6.929	4.551	
SE(d)	1.010	1.436		7.552	9.441		9.799	6.436	
C.V.	1.978	2.815		2.611	3.245		2.845	1.912	

Table 3: Intercropping effect on Dry Weight (g) per 2500 cm² at 55 days after sowing, Dry weight (g) per 2500 cm² at harvest, Leaf area index at 55 Days after sowing (only wheat)

Treatment	Dry Weight (g) per 2500 cm ² at 55 days after sowing			Dry weight (g) per 2500 cm ² at harvest			Leaf area index at 55 Days after sowing (only wheat)		
	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)	10.800	10.920	10.86	456.130	451.250	453.69	5.100	5.200	5.15
T ₂ – Berseem sole 100% RSR of Berseem: cut for fodder at 75DAS)	16.500	16.770	16.63	-	-	-	-	-	-
T ₃ – Wheat sole dual cut (100% RSR of wheat: cut for fodder at 55 DAS+Grain)	10.500	10.690	10.59	381.600	377.500	379.55	4.800	4.720	4.76
T ₄ - Wheat sole dual cut (100% RSR of wheat: cut for fodder at 65 DAS+Grain)	10.440	10.680	10.56	351.300	351.500	351.40	5.000	4.980	4.99
T ₅ - Wheat sole dual cut (100% RSR of wheat: cut for fodder at 75 DAS+Grain)	10.790	10.640	10.71	325.800	315.500	320.65	4.900	4.850	4.87
T ₆ - Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 55 DAS+ grain)	26.000	26.200	26.10	355.000	360.500	357.75	2.800	2.860	2.83
T ₇ -Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 65 DAS+ grain)	26.150	26.150	26.15	348.050	354.250	351.15	2.600	2.770	2.68
T ₈ .Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS+ grain)	26.600	26.450	26.52	343.750	345.800	344.50	2.500	2.410	2.45
T ₉ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 55 DAS+ grain)	23.150	23.430	23.29	385.750	392.750	389.25	3.800	3.750	3.77
T ₁₀ -Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 65 DAS+ grain)	23.720	23.130	23.42	369.750	376.750	373.25	3.600	3.700	3.65
T ₁₁ - Wheat + Berseem (100% RSR of wheat + 75% RSR of Berseem: cut for fodder at 75 DAS+ grain)	23.250	23.300	23.27	364.380	364.000	364.19	3.520	3.550	3.53
T ₁₂ .Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 55 DAS+ grain)	22.300	22.350	22.32	381.500	381.050	381.27	4.500	4.620	4.56
T ₁₃ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 65 DAS+ grain)	22.750	22.850	22.80	360.500	348.000	354.25	4.300	4.490	4.39
T ₁₄ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS+ grain)	22.600	22.500	22.55	343.500	335.000	339.25	4.330	4.440	4.38
C.D.	0.891	1.075		17.317	13.931		0.174	0.159	
SE(m)	0.305	0.368		5.898	4.745		0.059	0.054	
SE(d)	0.431	0.520		8.341	6.710		0.084	0.076	
C.V.	2.684	3.230		2.786	2.247		2.578	2.327	

Table 4: Intercropping effect on Green Fodder Yield (q/ha) & Dry matter (q/ha).

Treatment	Green Fodder Yield (q/ ha)			Dry matter (q/ ha)		
	2017-18	2018-19	Mean	2017-18	2018-19	Mean
T ₁ -Wheat sole (100% RSR of wheat: no cut for fodder only grain)	-	-	-	-	-	-
T ₂ - Berseem sole (100% RSR of Berseem: cut for fodder at 75 DAS)	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)	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)	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)	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)	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)	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)	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)	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)	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)	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)	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)	181.100	182.500	181.80	16.300	16.430	16.36

Berseem: cut for fodder at 65 DAS+ grain)						
T ₁₄ -Wheat + Berseem (100% RSR of wheat + 50% RSR of Berseem: cut for fodder at 75 DAS+ grain)	196.200	195.000	195.60	19.620	19.500	19.56
C.D.	8.636	7.824		0.535	0.835	
SE(m)	2.941	2.665		0.182	0.284	
SE(d)	4.159	3.769		0.258	0.402	
C.V.	3.132	2.819		2.136	3.320	

Conclusion

Based on this result it may be concluded that Wheat + Berseem (100% RSR of wheat + 100% RSR of Berseem: cut for fodder at 75 DAS+ grain) useful to obtain the maximum fodder yield as well as dry matter yield. Grain produced from dual cut wheat is surplus value under this intercropping system. Therefore, growers should be encouraged to use this intercropping system in Bundelkhand region.

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