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Effect of bio-inputs on growth, yield attributes and yields of chickpea-wheat intercropping system under natural farming

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Abstract

A field experiment was conducted during the *rabi* season of 2025-26 in the Plot No. 11 at research farm, College of natural farming, Gujarat Natural Farming Science University, Halol (Gujarat). The experiment was laid out in a Randomized Block Design with three replications comprising nine treatments involving different combinations of *Ghanjeevamrit*, *Jeevamrit* and mulching under chickpea + wheat (2:1) intercropping system. The results revealed that the application of different bio-inputs significantly influenced several growth and yield parameters of chickpea and wheat. In chickpea, treatment T₉ [*Ghanjeevamrit* @ 2.5 t/ha + *Jeevamrit* @ 4% at 21 days interval + mulching @ 5 t/ha with paddy straw mulch] recorded superior performance for plant height, dry matter accumulation, secondary branches, root nodules, pods per plant and yield attributes. However, plant population, plant height at 30 days after sowing (DAS) and number of seeds per pod were not significantly influenced by the treatments. Treatment T₉ recorded the highest chickpea seed yield (1787 kg/ha), stover yield (2679 kg/ha), biological yield (4466 kg/ha) and chickpea equivalent yield (2402 kg/ha). In wheat, the application of bio-inputs significantly improved several growth, yield attributes and yield parameters, with T₉ recording the highest grain yield (1539 kg/ha) and straw yield (2131 kg/ha). However, plant population, plant height and number of spikelets per plant were not significantly affected by the treatments. The beneficial effect of integrated bio-input application may be attributed to improved nutrient availability, microbial activity and soil moisture conservation. Thus, integrated application of *Ghanjeevamrit*, *Jeevamrit* and mulching proved effective in enhancing the productivity of chickpea-wheat intercropping system under natural farming conditions.

Keywords: Natural farming, *Ghanjeevamrit*, *Jeevamrit*, mulching, chickpea, wheat

1. Introduction

Chickpea (*Cicer arietinum* L.) is one of the most important pulse crops owing to its high nutritional value and ability to improve soil fertility through biological nitrogen fixation. Rich in protein, carbohydrates and essential minerals, chickpea plays a vital role in ensuring food and nutritional security. India is the world's largest producer of chickpea, with Gujarat being one of the leading states in terms of productivity (Singh, 2009; Sachin and Gecit, 2006; Anonymous, 2023) ^[11, 9, 1]. Wheat (*Triticum aestivum* L.) is the second most important cereal crop after rice and is a major source of food for the global population. India ranks second in wheat production worldwide, with Gujarat contributing significantly to its cultivation (Kumar *et al.*, 2011; FAO, 2023; WAP, 2023; Anonymous, 2024) ^[7, 5, 13, 2]. The chickpea-wheat cropping system is widely adopted because it enhances resource-use efficiency, improves soil fertility and supports sustainable agricultural production.

Natural farming is a low-input, climate-resilient production system that promotes sustainable agriculture through the use of locally available biological inputs while minimizing dependence on synthetic fertilizers and pesticides. The system primarily relies on cow-based formulations and ecological management practices to improve soil fertility, enhance microbial activity, and sustain crop productivity. Among its major components, *Jeevamrit* and *Ghanjeevamrit* serve as microbial inoculants that stimulate beneficial soil microorganisms, improve nutrient cycling, and enhance nutrient availability, thereby promoting better crop growth and soil health (Palekar, 2016; ICAR,

2020)^[8,6]. Organic mulching further complements these practices by conserving soil moisture, suppressing weeds, regulating soil temperature and promoting favourable soil conditions for root growth. The integrated application of these bio-inputs has shown promising effects on crop growth and soil biological activity under different agro-ecological conditions (Palekar, 2016;)^[8]. Therefore, the present investigation was undertaken to evaluate the effect of different natural farming bio-inputs on the growth of the chickpea-wheat system under natural farming.

2. Materials and Methods

The present field experiment was conducted during the *rabi* season of 2025-26 at Plot No. 11, Research Farm, College of Natural Farming, Gujarat Natural Farming Science University, Halol, Gujarat, India. The experiment was laid out in a Randomized Block Design (RBD) with three replications comprising nine treatments under a chickpea-wheat (2:1) cropping system. Chickpea cultivar GG-5 and wheat cultivar GW-496 were used as component crops. The experiment comprised 27 plots with a gross plot size of 5.0 x 3.6 m and a net plot size of 4.0 x 3.0 m. The treatments consisted of T₁-Control, T₂-*Ghanjeevamrit* @ 2.5 t/ha before sowing, T₃-Soil application of *Jeevamrit* @ 1000 l/ha after sowing, T₄- Mulching @ 5 t/ha (Paddy straw mulch), T₅-*Jeevamrit* foliar application (@ 4% at 21 days interval after sowing), T₆-*Ghanjeevamrit* (2.5 t/ha) + *Jeevamrit* (@ 4% at 21 days interval), T₇-*Ghanjeevamrit* (2.5 t/ha) + Mulching (@ 5 t/ha with paddy straw mulch), T₈-*Jeevamrit* (Soil application @ 1000 l/ha) + Mulching (@ 5 t/ha with paddy straw mulch), T₉-*Ghanjeevamrit* (2.5 t/ha) + *Jeevamrit* (@ 4% at 21 days interval) + Mulching (@ 5 t/ha with paddy straw mulch).

Ghanjeevamrit was incorporated into the soil before sowing according to the treatment schedule, whereas *Jeevamrit* was applied as soil drenching or foliar spray at the prescribed intervals. Paddy straw mulch was applied after crop establishment as per the treatment. All bio-inputs were prepared using indigenous cow-based ingredients following the standard natural farming protocol. Chickpea GG-5 and wheat GW-496 were sown on 18 November 2025 in a 2:1 row proportion following a replacement-series approach. Chickpea was maintained at 30 x 10 cm spacing, while wheat was sown at 30 cm row spacing. The seed rate was 40 kg/ha for both chickpea and wheat. Seeds were placed at approximately 4-5 cm depth. Under the ridge-furrow arrangement, two rows of chickpea were planted on the ridge and one row of wheat was planted in the furrow. Growth and yield attributes of chickpea and wheat were recorded at different growth stages and at harvest. Seed/grain, stover/straw and biological yields were recorded from the net plot and expressed on a hectare basis. The recorded data were subjected to statistical analysis appropriate for a Randomized Block Design, and treatment means were compared at the 5% level of significance.

3. Results and Discussion

The results pertaining to the effect different natural farming treatments on growth, yield attributes and yields parameters of chickpea and wheat are presented in Table 1-6

3.1 Growth and yield attributes of chickpea

The growth of chickpea was significantly influenced by the natural-farming treatments, particularly during the later stages of crop growth (Table 1). Plant population at 20 DAS and harvest was not significantly affected by the treatments, indicating that crop establishment was relatively stable among treatments. However, plant height at 30 DAS was non-significant, while

significant improvement was observed at 60, 90 DAS and harvest. Treatment T₉, *Ghanjeevamrit* (2.5 t/ha) + *Jeevamrit* (@ 4% at 21 days interval) + Mulching (@ 5 t/ha with paddy straw mulch), recorded the maximum plant height at the later growth stages. The enhanced growth under T₉ may be attributed to the complementary effects of biological inputs and mulching. *Jeevamrit* and *Ghanjeevamrit* may have enhanced microbial-mediated nutrient transformation and nutrient availability, whereas paddy straw mulch helped conserve soil moisture and moderate the soil microclimate. Similar improvement in growth and productivity of chickpea through integrated natural-farming components and organic mulching has been reported recently by Tiwari *et al.* (2026)^[12]. Dry matter accumulation increased progressively with crop age and was highest under T₉ at the later growth stages. Greater dry matter production under integrated treatment indicates improved crop growth and resource utilization. The continuous availability of moisture and nutrients may have supported photosynthetic activity, leaf area development and assimilate production, resulting in greater biomass accumulation.

Yield attributes showed a pronounced response to integrated bio-inputs application (Table 2). T₉ recorded the highest number of secondary branches (7.6/plant), root nodules (39.53/plant), and pods per plant (58.6). The enhanced nodulation under T₉ suggests a favourable rhizosphere environment, possibly resulting from improved biological activity and nutrient availability. *Ghanjeevamrit* and *Jeevamrit* may have provided organic substrates and microbial populations conducive to nutrient mineralization, while mulching helped maintain favourable soil moisture and temperature around the root zone. Better nodulation could have enhanced biological nitrogen fixation and supported vegetative as well as reproductive development. The higher pod formation under T₉ may consequently be associated with improved nutrition, branching, moisture availability and reduced reproductive stress. In contrast, seeds per pod and 100-seed weight were not significantly affected by the treatments. Although T₉ recorded the highest numerical 100-seed weight (24.30 g), compared with (21.33 g) under control, the difference remained statistically non-significant. This indicates that the yield advantage under integrated treatment was primarily associated with greater biomass production and improvement in traits such as branching, nodulation and pods per plant rather than a significant alteration in individual seed size.

3.2 Yield and productivity of chickpea

The improvement in growth and yield attributes was reflected in chickpea productivity (Table 3). Seed yield was significantly influenced by the treatments, with T₉ recording the highest seed yield of 1787 kg/ha, remaining at par with T₈ (1655 kg/ha). The higher seed yield under T₉ may be attributed to the cumulative improvement in plant growth, nodulation, branching and pod formation. The integrated application of *Ghanjeevamrit* and *Jeevamrit* probably enhanced nutrient cycling and microbial activity, while paddy straw mulch reduced evaporative losses and maintained a favourable soil moisture regime. Thus, the crop was able to maintain better growth and reproductive activity for a longer period. A particularly strong response was observed in stover production. T₉ recorded the maximum stover yield (2679 kg/ha), remaining at par with T₈ (2548 kg/ha), T₇ (2489 kg/ha) and T₆ (2463 kg/ha), compared with only 1341 kg/ha under control. The approximately 50% higher stover yield under T₉ over control indicates greater vegetative biomass production. This may be associated with improved nutrient availability, greater photosynthetic activity, better branching and prolonged

availability of soil moisture. The combined action of the bio-inputs and mulch likely promoted sustained vegetative growth and dry matter accumulation.

Consequently, biological yield was also significantly enhanced, with T₉ recording the maximum value (4466 kg/ha), followed by T₈ (4202 kg/ha) and T₇ (4021 kg/ha), whereas the control recorded 2260 kg/ha. The increase in total biomass demonstrates that the integrated treatment improved overall crop productivity rather than influencing only economic yield. Similar positive effects of integrated natural-farming components and organic residue mulching on chickpea yield have recently been reported by Tiwari *et al.* (2026) [12]. Chickpea equivalent yield was also significantly increased by the treatments, with T₉ recording the highest value (2402 kg/ha), followed by T₈ (2224 kg/ha) and T₇ (2074 kg/ha), compared with 1269 kg/ha under control. The greater equivalent yield reflects the combined productivity advantage of the chickpea-wheat intercropping system. Similar benefits of suitable row arrangements and bio-stimulant management in wheat-chickpea intercropping have been reported by Devi *et al.* (2024) [4].

Harvest index of chickpea was not significantly influenced by the treatments (Table 3). Numerically, the highest harvest index (43%) was recorded under T₃, followed by T₂ (42%), whereas T₉ recorded 40%. The non-significant response may be attributed to a proportionate increase in seed and biological yield, resulting in relatively stable partitioning of assimilates between economic and vegetative components. Therefore, the higher seed yield under T₉ was mainly a consequence of greater overall biomass production and improved yield attributes rather than a significant increase in harvest index.

3.3 Growth and yield attributes of wheat

The response of wheat growth to natural-farming treatments is presented in Table 4. Plant population at 20 DAS and harvest was not significantly influenced by the treatments, indicating that the treatments had comparatively little effect on initial plant establishment. Plant height showed a significantly stronger response at 90 DAS and at harvest, suggesting that the benefits of integrated bio-input management became more evident as crop nutrient and moisture requirements increased. Dry matter accumulation was also significantly influenced by different treatments, increased with crop advancement and was generally higher under integrated treatments. The better biomass production under T₉ may be attributed to improved nutrient availability and moisture conservation throughout crop growth. In an intercropping system, improved resource availability may be particularly important because the component crops compete for nutrients, moisture and other resources. Recent research has shown that row arrangement and bio-stimulant management can significantly influence growth and yield attributes in wheat-chickpea intercropping systems (Devi *et al.*, 2024) [4].

The major yield attributes of wheat are presented in Table 5. Effective tillers and spikes per plant were significantly improved by the treatments, with T₉ recording the highest values. T₉ produced (7.07) spikes per plant compared with (4.73) under control, while its higher tillering (79.33) response contributed to greater reproductive sink development. The increase in productive tillers may be associated with better nutrient availability during the tillering phase and improved soil moisture conditions under mulch. The number of spikelets per spike was non-significant, although T₉ recorded the highest numerical value (18.17) compared with 14.00 under control. The limited treatment response may be related to the relatively strong genetic control of spikelet formation. However, the numerical improvement under

integrated treatments suggests that improved crop nutrition and soil conditions still provided a favourable environment for spike development. Grains per spike showed a significant response, with T₉ recording the highest value (47.67 grains/spike), remaining at par with T₈ (44.67) and T₇ (43.33). The increase in grain number may be attributed to improved assimilate supply during reproductive development, better nutrient availability and reduced moisture stress. The combination of *Ghanjeevamrit*, *Jeevamrit* and mulch may therefore have improved both source capacity and sink development.

3.4 Yield and harvest index of wheat

The effect of treatments on wheat yield and harvest index is presented in Table 6. Grain yield was significantly influenced by the treatments. T₉ recorded the highest grain yield (1539 kg/ha), remaining at par with T₈ (1422 kg/ha) and T₇ (1355 kg/ha), while the control recorded only 872 kg/ha. The grain yield advantage under T₉ was the cumulative result of improved vegetative growth, productive tiller formation, spike development and grain number. The integrated application likely maintained a more favourable nutrient and moisture supply during the critical reproductive and grain-filling stages, resulting in better conversion of assimilates into grain. Straw yield was also highest under T₉ (2131 kg/ha), followed by T₈ (1949 kg/ha), compared with 1392 kg/ha under control. The greater straw production indicates enhanced vegetative biomass accumulation under integrated bio-inputs management. *Ghanjeevamrit* and *Jeevamrit* may have promoted nutrient mineralization and microbial activity, while paddy straw mulch conserved moisture and moderated the soil environment, together supporting sustained vegetative growth.

Biological yield followed the same trend, with T₉ producing the highest value (3670 kg/ha), remaining at par with T₈ (3371 kg/ha), whereas the control recorded 2264 kg/ha. The increase in biological yield confirms that T₉ enhanced total dry matter production through simultaneous improvement in grain and straw formation. The strong performance of the integrated treatment is also consistent with recent evidence that combining cow-based organic preparations with mulching can improve productivity of wheat-chickpea intercropping systems (Choudhary *et al.*, 2026) [3]. Harvest index of wheat was not significantly affected by the treatments. Numerically, the highest harvest index (43.11%) was recorded under T₇, followed by T₈ (41.98%) and T₉ (41.96%), while the lowest value (38.58%) was recorded under T₁. The non-significant effect indicates that grain and straw yields increased relatively proportionately under the treatments, resulting in limited variation in assimilate partitioning. Thus, the higher grain yield under T₉ was mainly associated with increased total biomass and improved yield attributes rather than a substantial alteration in harvest index.

4. Conclusion

The present investigation demonstrated that integrated application of natural-farming bio-inputs significantly improved the growth, yield attributes and productivity of the chickpea-wheat intercropping system. Among the treatments, T₉ (*Ghanjeevamrit* @ 2.5 t/ha + *Jeevamrit* @ 4% at 21-day intervals + paddy straw mulching @ 5 t/ha) recorded the most consistent and superior performance in terms of growth, nodulation, yield attributes, seed/grain yield, stover/straw yield and biological yield of both chickpea and wheat. The treatment also resulted in the highest chickpea equivalent yield, indicating better overall productivity of the intercropping system. The improved performance under T₉ may be attributed to the complementary

effects of biological nutrient mobilization, enhanced microbial activity and improved soil moisture conservation through organic mulching. Thus, integrated use of *Ghanjeevamrit*, *Jeevamrit* and paddy straw mulch can be considered a promising natural-farming approach for improving productivity of the chickpea-

wheat intercropping system under the agro-climatic conditions of Gujarat. Further multi-season and multi-location studies are required to validate the long-term effects of such integrated bio-inputs management on crop productivity and soil health.

Table 1: Effect of natural-farming treatments on plant population, plant height and dry matter accumulation of chickpea

Treatments	Plant population (per metre row length)		Plant height (cm)				Dry matter accumulation (g/plant)			
	DAS		DAS				DAS			
	At 20	At harvest	At 30	At 60	At 90	At harvest	At 30	At 60	At 90	At harvest
T ₁	9.07	8.87	19.3	28.3 ^b	34.3 ^c	37.0 ^c	2.4 ^c	7.6 ^c	13.9 ^d	19.3 ^c
T ₂	9.53	9.47	22.8	30.6 ^b	39.6 ^b	42.8 ^b	3.1 ^b	8.9 ^b	17.2 ^c	21.9 ^c
T ₃	9.67	9.53	23.0	31.6 ^b	41.0 ^b	43.6 ^b	3.4 ^a	9.0 ^b	18.2 ^b	23.5 ^b
T ₄	9.47	9.40	21.7	29.7 ^b	37.7 ^b	41.3 ^b	2.5 ^c	8.4 ^c	16.4 ^c	20.7 ^c
T ₅	9.40	9.27	21.6	29.0 ^b	36.6 ^b	39.0 ^c	3.1 ^b	8.3 ^c	17.1 ^c	20.0 ^c
T ₆	9.87	9.80	24.3	32.0 ^b	42.0 ^b	44.0 ^b	3.5 ^a	9.5 ^b	18.8 ^b	24.3 ^b
T ₇	9.93	9.87	25.6	33.3 ^a	43.3 ^a	45.7 ^b	3.6 ^a	9.8 ^b	19.3 ^b	25.6 ^b
T ₈	9.93	9.80	26.0	35.3 ^a	45.0 ^a	48.9 ^a	3.6 ^a	10.7 ^a	20.3 ^b	27.8 ^a
T ₉	10.00	9.93	27.0	38.0 ^a	49.3 ^a	52.3 ^a	3.9 ^a	11.5 ^a	23.8 ^a	30.5 ^a
S.Em. ±	0.43	0.39	1.57	1.63	2.05	1.99	0.20	0.46	0.99	1.20
C. D. (P=0.05)	NS	NS	NS	4.92	6.20	5.83	0.62	1.38	3.01	3.63

Table 2: Effect of natural-farming treatments on number of secondary branches, number of root nodules and yield attributes of chickpea

Treatments	Number of secondary branches/plant	Number of root nodules/plant	Number of pods/plants	Number of seed/pods	Seed index (g)
T ₁	5.2 ^c	19.67 ^d	36.6 ^c	1.73	21.33
T ₂	6.3 ^b	24.85 ^c	42.0 ^c	1.93	22.70
T ₃	6.4 ^b	26.28 ^c	43.0 ^c	1.93	22.97
T ₄	5.6 ^b	23.60 ^c	40.7 ^c	1.87	22.10
T ₅	5.8 ^b	22.67 ^c	39.6 ^c	1.80	22.00
T ₆	7.3 ^a	30.72 ^b	46.3 ^b	1.87	23.27
T ₇	6.4 ^b	31.60 ^b	48.2 ^b	2.00	23.90
T ₈	7.0 ^a	33.15 ^b	50.7 ^b	2.00	23.97
T ₉	7.6 ^a	39.53 ^a	58.6 ^a	2.07	24.30
S.Em. ±	0.35	1.49	2.33	0.09	0.903
C. D. (P=0.05)	1.03	4.52	7.05	NS	NS

Table 3: Effect of natural-farming treatments on seed yield, stover yield, biological yield, chickpea equivalent yield and harvest index of chickpea

Treatments	Seed yield (kg/ha)	Stover yield (kg/ha)	Biological yield (kg/ha)	Chickpea equivalent yield (kg/ha)	Harvest index (%)
T ₁	920 ^d	1341 ^c	2260 ^d	1269 ^d	40
T ₂	1260 ^c	1743 ^c	3003 ^c	1744 ^c	42
T ₃	1284 ^c	1700 ^c	2984 ^c	1783 ^c	43
T ₄	1243 ^c	2199 ^b	3442 ^b	1684 ^c	36
T ₅	1200 ^c	2159 ^b	3359 ^c	1591 ^c	36
T ₆	1439 ^b	2463 ^a	3901 ^b	1940 ^b	37
T ₇	1532 ^b	2489 ^a	4021 ^a	2074 ^b	38
T ₈	1655 ^a	2548 ^a	4202 ^a	2224 ^a	39
T ₉	1787 ^a	2679 ^a	4466 ^a	2402 ^a	40
S.Em. ±	71.47	146.47	156.83	75.3	2.27
C. D. (P=0.05)	213.12	437.60	467.63	340.98	NS

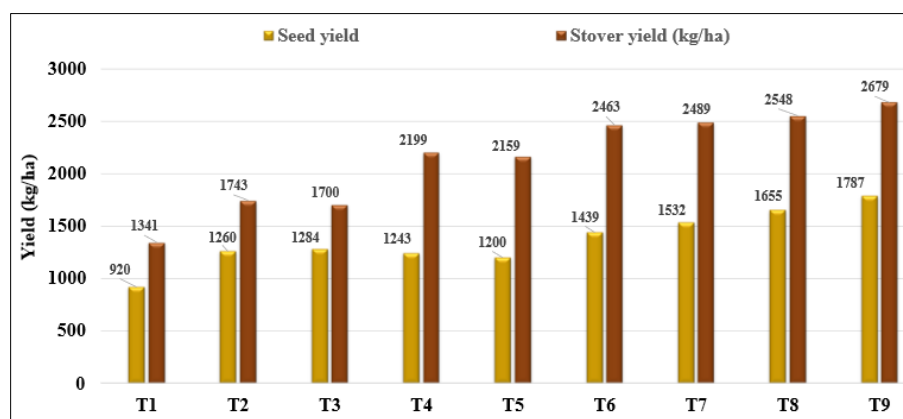


Fig 1: Seed yield and stover yield of chickpea as influenced by different treatments

Table 4: Effect of natural-farming treatments on plant population, plant height and dry matter accumulation of wheat

Treatments	Plant population (per metre row length)		Plant height (cm)				Dry matter accumulation (g/plant)			
	DAS		DAS				DAS			
	At 20	At harvest	At 30	At 60	At 90	At harvest	At 30	At 60	At 90	At harvest
T ₁	32.6	32.0	29.9	53.3	65.0 ^b	72.3 ^b	1.6 ^b	5.7 ^d	16.3 ^d	21.4 ^d
T ₂	36.3	35.6	35.2	60.3	73.7 ^b	78.6 ^b	1.7 ^b	9.5 ^b	22.3 ^b	28.3 ^c
T ₃	37.0	36.3	37.2	62.3	74.6 ^b	80.5 ^b	1.8 ^b	9.8 ^b	24.0 ^b	28.4 ^c
T ₄	35.3	34.3	31.5	57.5	72.2 ^b	77.4 ^b	1.7 ^b	8.7 ^c	20.4 ^c	25.8 ^c
T ₅	34.0	33.0	31.2	59.3	71.6 ^b	77.6 ^b	1.7 ^b	8.7 ^c	19.3 ^c	25.5 ^c
T ₆	37.3	36.7	37.3	64.3	75.0 ^a	81.3 ^b	1.9 ^b	10.8 ^b	23.2 ^b	32.6 ^b
T ₇	38.3	37.6	38.3	65.4	78.0 ^a	82.3 ^b	1.9 ^a	11.0 ^b	25.0 ^b	33.2 ^b
T ₈	38.7	38.0	38.4	66.7	78.3 ^a	83.7 ^a	2.0 ^a	11.4 ^b	25.0 ^b	35.2 ^b
T ₉	40.3	39.6	40.3	67.4	84.6 ^a	94.6 ^a	2.3 ^a	15.0 ^a	29.0 ^a	39.6 ^a
S.Em. ±	2.07	2.19	2.35	3.14	3.23	3.23	0.13	0.13	0.71	1.20
C. D. (P=0.05)	NS	NS	NS	NS	9.77	9.72	0.38	0.38	2.14	3.63

Table 5: Effect of natural-farming treatments on yield attributes of wheat

Treatments	Number of effective tillers (per metre row length)	Number of spikes/plants	Number of spikelets/spikes	Number of grains/spike	Test weight (g)
T ₁	59.33 ^b	4.73 ^c	14.00	34.67 ^b	34.67
T ₂	63.33 ^b	6.07 ^b	16.67	39.67 ^b	38.33
T ₃	64.67 ^b	6.13 ^b	17.33	40.00 ^b	38.67
T ₄	61.67 ^b	5.93 ^b	15.67	37.00 ^b	37.67
T ₅	60.33 ^b	5.80 ^b	15.33	36.67 ^b	37.43
T ₆	66.00 ^b	6.53 ^a	16.67	40.67 ^b	40.67
T ₇	70.00 ^a	6.80 ^a	17.33	43.33 ^a	41.00
T ₈	72.00 ^a	6.87 ^a	17.67	44.67 ^a	41.67
T ₉	79.33 ^a	7.07 ^a	18.17	47.67 ^a	41.83
S.Em. ±	3.69	0.314	0.87	2.15	1.66
C. D. (P=0.05)	11.17	0.935	NS	6.49	NS

Table 6: Effect of natural-farming treatments on grain yield, straw yield, biological yield and harvest index of wheat

Treatments	Grain yield (kg/ha)	Straw yield (kg/ha)	Biological yield (kg/ha)	Harvest index (%)
T ₁	872 ^c	1392 ^c	2264 ^c	38.58
T ₂	1209 ^b	1673 ^b	2883 ^b	41.43
T ₃	1248 ^b	1786 ^b	3034 ^b	40.84
T ₄	1101 ^b	1526 ^b	2627 ^c	41.62
T ₅	977 ^c	1474 ^c	2450 ^c	40.01
T ₆	1254 ^b	1769 ^b	3023 ^b	41.26
T ₇	1355 ^a	1790 ^b	3146 ^b	43.11
T ₈	1422 ^a	1949 ^a	3371 ^a	41.98
T ₉	1539 ^a	2131 ^a	3670 ^a	41.96
S.Em. ±	66.56	92.44	127.36	1.80
C. D. (P=0.05)	203.22	278.09	383.11	NS

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