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Assessment of Agronomic Performance and Productivity of Shri Ram Super 303 Wheat Variety

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Wheat (*Triticum aestivum* L.) occupies a central place in Indian agriculture. It is the second most important cereal crop after rice and forms the backbone of food security for a large proportion of the Indian population, particularly in northern and central India. According to the Indo-Gangetic Plains (IGP) production reports, this region alone contributes nearly 84% of India's total wheat production, making agronomic decisions particularly variety selection critically important for maintaining high output (Frontiers in Environmental Science, 2022).

Over the past two decades, the Indian wheat sector has witnessed a gradual shift from exclusively government-released varieties to a growing acceptance of private-sector high-yielding varieties. Companies like DCM Shriram Limited have invested significantly in wheat breeding research, and their product Shri Ram Super 303 has emerged as one of the widely adopted varieties across multiple states including Uttar Pradesh, Bihar, Madhya Pradesh, and parts of Haryana. The variety is specifically designed for the Rabi season and has been found suitable for both early and late sowing windows, which is a practical advantage for farmers managing their sowing calendar around pre-crop harvesting schedules (Shriram Farm Solutions, 2025).

Despite the widespread commercial popularity of Shri Ram Super 303 among farmers, peer-reviewed agronomic assessments specifically evaluating this variety's performance under controlled experimental conditions remain limited. Most available information is from product literature, company blogs, and farmer testimonials. This article therefore synthesizes available agronomic data, contextualizes it within published wheat science literature, and proposes a framework for systematic evaluation of this variety. The goal is to bridge the gap between commercial adoption and scientific documentation, thereby supporting informed variety selection by farmers and policymakers alike.

Origin and Breeding Background

Shri Ram Super 303 is a product of the advanced plant breeding and research programs conducted by Shriram Farm Solutions, a division of DCM Shriram Limited one of India's reputed agribusiness corporations. The variety was developed with a clear mandate: to create a wheat cultivar that delivers consistent high yield, adapts to diverse soil and climatic conditions, and meets the quality expectations of both producers and consumers (Shriram Farm Solutions, 2025).

Classified as a double dwarf variety, Shri Ram Super 303 stands at approximately 88 cm plant height a trait carefully selected through modern breeding to balance biomass allocation between vegetative and reproductive parts of the plant. The double dwarf character is a significant agronomic trait because it reduces the centre of gravity of the plant, thereby improving mechanical stability and resistance to lodging a major yield loss factor in high-input wheat production systems. Research on wheat lodging resistance has clearly established

that semi-dwarf and dwarf wheat genotypes perform significantly better in terms of yield stability under high nitrogen and irrigation inputs compared to taller varieties (Chen *et al*., 2024; Weng *et al*. as cited in Cheng & Liu, 2019).

The variety is registered for commercial cultivation and is currently marketed across multiple Indian states. It is available in pack sizes of 10 kg, 20 kg, and 40 kg, with a recommended seed rate of 40 kg per acre which is consistent with the general agronomic recommendations for irrigated wheat under timely sown conditions in the Indo-Gangetic Plains.

Morphological and Growth Characteristics

The morphological profile of Shri Ram Super 303 is one of its most distinguishing features. The grains are described as hard, lustrous, and bold three characteristics that collectively determine both the market acceptability and the processing quality of the wheat. Bold grains generally correspond to higher test weight (hectolitre weight), which is a key parameter for assessing grain filling efficiency and milling recovery. Research by Frontiers in Plant Science (2024) has confirmed that grain hardness, test weight, and protein content together form the composite quality matrix for evaluating Indian wheat cultivars for their chapati-making suitability.

The period of spike emergence for this variety is approximately 99 days from sowing. This places it in the medium-late maturity category for Rabi wheat in northern India, meaning the crop remains in the vegetative-to-reproductive transition phase during the cooler part of winter a condition highly favourable for grain filling. Temperature during the grain filling stage has a decisive influence on 1000-kernel weight; research has shown that grain number per ear and kernel weight both increase in seasons with cool, stable temperatures during spike development (Chen *et al.*, 2024).

Another important morphological trait is the vigorous tillering ability reported for this variety. Effective tillering is one of the primary yield components in wheat, as a higher number of productive tillers per unit area directly translates into more spikes and therefore higher grain yield. The relationship between tillering capacity and grain yield has been well documented Sahoo *et al.* (2022) and other researchers working in IGP conditions have consistently shown that varieties with strong tillering response to nitrogen application produce significantly higher grain yields compared to low-tillering genotypes.

The recommended sowing spacing of 20 cm × 10 cm for Shri Ram Super 303 reflects the need to balance plant population density for optimum canopy coverage without inducing intra-row competition, which can suppress individual tiller productivity. This spacing allows for sufficient light interception and air circulation, which also helps in reducing the humidity-driven incidence of foliar diseases.

Adaptability and Agro-climatic Suitability

One of the most commercially significant features of Shri Ram Super 303 is its broad adaptability across agro-climatic zones. The variety has been found particularly well-suited for the East Plain Zone of India, which encompasses parts of Uttar Pradesh, Bihar, Jharkhand, and Chhattisgarh. This region is characterized by alluvial soils of varying texture, moderate winters, and a Rabi cropping window that typically runs from November to April (Shriram Farm Solutions, 2025; OneKisan, 2025).

The variety performs in both early and late sowing conditions, which provides operational flexibility to farmers. In many wheat-growing districts of eastern Uttar Pradesh and Bihar, late harvesting of the preceding kharif crop usually paddy delays wheat sowing beyond the optimal window of 1st–25th November. Varieties that can perform acceptably

even under late sowing (up to mid-December) are therefore extremely valuable in such farming systems. This adaptability to shifting sowing windows closely aligns with the characteristics identified in climate-resilient wheat varieties tested across Bihar by Borlaug Institute for South Asia (BISA) researchers (Frontiers in Agronomy, 2025).

The wheat variety's suitability for diverse soil types from sandy loam to clay loam further enhances its agronomic relevance across different districts within the East Plain Zone. Wheat grown on well-drained alluvial soils with a near-neutral pH and adequate potassium availability tends to respond well to fertilizer inputs, which is consistent with how most farmers in this region manage their soils.

Yield Potential and Productivity Assessment

Yield potential is perhaps the single most important parameter that drives farmer decision-making in variety selection. For Shri Ram Super 303, the reported yield range under farmer field conditions is 23–27 quintals per acre (approximately 57–67 quintals per hectare), which represents a notably high yield for Indian Rabi wheat conditions (OneKisan, 2025). For reference, the national average wheat yield in India has been hovering around 35–38 quintals per hectare in recent years, suggesting that Shri Ram Super 303, when managed well, can significantly exceed the national average.

This high yield potential is attributable to several yield-contributing factors: vigorous tillering leading to a higher number of productive tillers per unit area; bold grain size contributing to increased test weight; and the double dwarf plant type enabling better partitioning of photosynthates towards grain rather than straw. Research on wheat varieties in India's IGP has consistently shown that integrated management of nitrogen, irrigation, and sowing time can push high-potential varieties to 50–65 quintal/hectare yields a benchmark within reach for Shri Ram Super 303 (Sahoo *et al*., 2022; Scientific Reports, 2023).

A field trial conducted at Chandra Shekhar Azad University of Agriculture & Technology, Kanpur, during Rabi 2021–22 and 2022–23, evaluating integrated nutrient management on wheat (HD-2967) recorded grain yields up to 48.60–49.93 quintals per hectare under treatments combining 100% NPK with micronutrients, Azotobacter, PSB, and FYM. While those results pertain to a different variety, the underlying principle that high-yielding semi-dwarf wheat varieties respond proportionally to balanced nutrient management applies equally to Shri Ram Super 303 and provides a useful benchmark for potential yields under intensive management conditions (ResearchGate, 2020).

The variety's ability to sustain its yield under both timely and late sowing conditions is an important productivity attribute. In regions like Prayagraj, Varanasi, and Gorakhpur districts of Uttar Pradesh, where paddy-wheat rotation is practised, sowing is often delayed, and yield-stable varieties that do not suffer dramatically from the shortened growing season are preferred.

Disease Resistance Profile

Disease losses in wheat particularly from rust diseases remain a perennial concern in India. Wheat rust (brown rust / leaf rust caused by Puccinia triticina; yellow rust / stripe rust caused by P. striiformis; and stem rust caused by P. graminis) collectively account for significant yield losses in susceptible varieties, particularly during years with favourable humidity and temperature conditions for sporulation.

Shri Ram Super 303 has been documented to offer good resistance to brown rust and leaf spot diseases, thereby reducing the dependency on chemical fungicide applications and contributing to lower input costs (Agrovatsya FPO, 2025). This is an important economic advantage for smallholder farmers. Brown rust in particular thrives under the warm and humid conditions of the IGP and can cause yield losses of 10–30% in susceptible varieties if not managed promptly.

The incorporation of rust resistance in private-sector wheat varieties follows a broader national strategy of deploying rust-resistant genotypes as a front-line defence against disease epidemics. Research published in AGRIS-FAO (Sharma *et al*., 2015) demonstrated that rust-

resistant varieties such as HD 3090 (Pusa Amulya) achieved average yields of 4.21 t/ha under late sown conditions and offered disease management advantages over checks a finding that parallels the agronomic philosophy behind Shri Ram Super 303's design.

It should be noted that rust resistance in wheat cultivars is not always durable new pathogenic races can overcome specific resistance genes over time. This has been documented globally in the context of both stem rust (Ug99 race) and yellow rust. It is therefore advisable that farmers and researchers monitor the rust response of Shri Ram Super 303 regularly through coordinated disease nurseries and update their management strategies accordingly.

Grain Quality and End-Use Characteristics

Wheat grain quality in India is evaluated through a composite set of parameters: test weight (hectolitre weight), grain hardness, protein content, gluten content, SDS sedimentation value, and chapati-making quality. For Indian consumers, chapati quality evaluated through puffability, softness, colour, and taste is the ultimate quality benchmark, as over 70% of India's wheat production is consumed as unleavened flatbread.

The grains of Shri Ram Super 303 are described as hard, lustrous, and bold attributes that directly correlate with good milling quality and high extraction rate. Hard grain endosperm indicates a higher protein matrix, which supports better water absorption, gluten network formation, and ultimately good chapati texture. Research by Srivastava *et al*. (2003), published in the Journal of the Science of Food and Agriculture, established that Indian wheat cultivars with protein content around 130 g/kg and strong SDS sedimentation values yield excellent chapatis, while grain hardness is positively correlated with gluten content ($r = 0.79$, $p < 0.01$).

More recent work by Frontiers in Plant Science (2024) on genetic dissection of wheat quality traits confirmed that grain protein content is the primary determinant of wheat end-use quality, and that a specific combination of grain hardness, test weight, and protein percentage defines suitability for chapati making. Shri Ram Super 303's bold, lustrous grain morphology suggests it falls within the preferred quality category for the domestic chapati-based consumption market, making it attractive not only to farmers but also to grain traders and flour mill operators who pay a premium for quality wheat.

Recommended Agronomic Management Practices

Optimum agronomic management is essential for realising the full yield potential of any wheat variety. For Shri Ram Super 303, the following practices are recommended based on general wheat agronomy guidelines applicable to the East Plain Zone:

Sowing Time and Seed Rate: The variety can be sown during both the timely sowing window (1–25 November) and the late sowing window (up to mid-December). A seed rate of 40 kg per acre with a row spacing of 20 cm is recommended. Timely sowing generally ensures better tillering, higher spike density, and superior grain filling.

Fertilizer Management: Balanced fertilization is critical for high-yielding wheat varieties. Research from the IGP has consistently demonstrated that nitrogen application in split doses basal plus two top dressings before the first and second irrigation maximises nitrogen use efficiency (NUE) and grain yield (Scientific Reports, 2023). For varieties like Shri Ram Super 303 with strong tillering potential, a nitrogen dose of 120–150 kg N/ha in three equal splits has been shown to significantly improve yield over a single basal application. Phosphorus and potassium should be applied as per soil test recommendations, with the full dose applied basally.

Irrigation Scheduling: Wheat in the IGP typically requires 4–6 irrigations at critical growth stages: crown root initiation (CRI) at 20–25 DAS, late tillering (40–45 DAS), jointing (60 DAS), flowering (75–80 DAS), milk stage (90 DAS), and dough stage (105–110 DAS). Among these, the CRI irrigation is the most critical and should never be missed. Proper irrigation scheduling has been shown to significantly improve intercepted photosynthetically active radiation (PAR) and, consequently, grain yield (ResearchGate, 2020).

Weed Management: Due to the variety's semi-dwarf growth habit, early weed competition can be particularly damaging. Pre-emergence or early post-emergence herbicide application is recommended to manage broad-leaved weeds and grassy weeds like Phalaris minor, which is the most problematic weed in Rabi wheat of the IGP.

Economic Significance for Farmers

The adoption of Shri Ram Super 303 by approximately one million farmers across India is a testimony to its economic viability (Shriram Farm Solutions, 2025). The variety delivers several economic benefits simultaneously: higher grain yield, better market price due to bold and lustrous grain quality, reduced pesticide expenditure due to disease tolerance, and stable performance across early and late sowing conditions that reduces income risk for farmers.

The benefit-cost (B:C) ratio of wheat cultivation is significantly influenced by variety selection. Varieties that combine higher yield with lower disease management costs and acceptable input requirements tend to generate the highest net returns per hectare. Given the reported yield range of 57-67 quintals per hectare for Shri Ram Super 303 under good management compared to the national average of about 35–38 quintals/hectare the economic advantage for well-managed fields can be substantial.

For smallholder farmers in eastern Uttar Pradesh and Bihar who cultivate 1–3 hectares of wheat, the difference between a 40 quintal/hectare and a 60 quintal/hectare yield, at prevailing Minimum Support Price (MSP) rates, can translate into tens of thousands of rupees in additional household income per season. This economic dimension underlines the importance of not just variety selection, but also the accompanying management practices that unlock a variety's full genetic potential.

Research Gaps and Future Directions

Despite the commercial success of Shri Ram Super 303, several important research gaps remain. First, there is a near-total absence of peer-reviewed, replicated field trial data specifically evaluating this variety under different agronomic treatments (nutrient management levels, sowing dates, irrigation schedules) in a Randomized Block Design (RBD) framework. Such experiments are essential to generate statistically validated yield and quality data that can be cited in scientific literature and used for variety recommendation by state agricultural universities and ICAR institutes.

Second, the response of Shri Ram Super 303 to integrated nutrient management (INM) approaches combining inorganic fertilizers with organic inputs such as vermicompost, FYM, and biofertilizers like Azotobacter and PSB has not been documented. Given the national push towards sustainable and regenerative agriculture, understanding how this variety responds to reduced-chemical or organic supplemented nutrient regimes is both scientifically and policy-relevant.

Third, a systematic disease nursery evaluation of this variety against the prevailing races of brown rust, yellow rust, and stem rust in the IGP would help confirm or update its resistance profile, which is currently based on company literature rather than independent scientific evaluation.

Future research should therefore prioritize: (a) multi-location Randomized Block Design experiments across districts of eastern UP and Bihar; (b) integrated nutrient management trials comparing chemical-only, organic-supplemented, and biofertilizer-enhanced treatments; (c) quality evaluation studies involving grain protein, gluten, SDS sedimentation, and chapati score; and (d) disease nursery evaluations under natural and artificial inoculation conditions.

Conclusion

Shri Ram Super 303 wheat variety, developed by DCM Shriram Limited, represents a well-designed high-yielding variety that combines practical agronomic advantages vigorous tillering, double dwarf plant type, lodging resistance, disease tolerance, broad adaptability, and bold grain quality in a single commercial package. With a reported yield potential of 23-27 quintals per acre and suitability for both timely and late sowing in the East Plain Zone and

surrounding agro-climatic regions of India, this variety has rightly earned its place in the planting basket of progressive farmers.

However, translating commercial popularity into scientific credibility requires systematic, independent agronomic evaluation. Randomized Block Design experiments under different nutrient management levels, irrigation schedules, and sowing dates conducted at agricultural universities and ICAR regional stations will generate the peer-reviewed evidence base needed to formally recommend this variety in state and national wheat production advisory systems. Until such data become available, the assessment presented in this article based on a synthesis of available product literature and contextualizing wheat science provides a useful starting point for both researchers and farmers seeking to make informed decisions about variety selection for the Rabi season.

In the bigger picture, the agronomic success of varieties like Shri Ram Super 303 demonstrates the value of private-sector investment in plant breeding and highlights the importance of collaboration between private companies, academic institutions, and government extension systems in validating and disseminating high-performing wheat varieties to India's farming community.

References

1. Chen, X., Liu, Q., Zheng, B., & Li, J. (2024). Optimized phosphorus application enhances wheat stem lodging resistance under spring low-temperature stress. Plants, **13**(21), 2980.
2. Cheng, X., & Liu, X. (2019). Improving lodging resistance: Using wheat and rice as classical examples. Frontiers in Plant Science.
3. Frontiers in Agronomy. (2025). Enhancing wheat resilience in subtropical agroecosystems through climate-resilient agriculture strategies. Frontiers in Agronomy.
4. Frontiers in Environmental Science. (2022). Yield, nitrogen-use efficiency, and distribution of nitrate-nitrogen in the soil profile as influenced by irrigation and fertilizer nitrogen levels under zero-till wheat in the eastern Indo-Gangetic plains of India. Frontiers in Environmental Science.
5. Frontiers in Plant Science. (2024). Genetic dissection of value-added quality traits and agronomic parameters through genome-wide association mapping in bread wheat (*T. aestivum* L.). Frontiers in Plant Science.
6. OneKisan. (2025). Shriram Super 303 Wheat – High Performance Variety. Retrieved from
7. Sahoo, S., Mukhopadhyay, P., Sinha, A.K., Bhattacharya, P.M., Rakesh, S., Kumar, R., ... & Kumar, U. (2022). Yield, nitrogen-use efficiency, and distribution of nitrate-nitrogen in the soil profile in eastern Indo-Gangetic plains. Frontiers in Environmental Science, 10, 970017.
8. Scientific Reports. (2023). Boosting wheat yield, profitability and NUE with prilled and nano urea in conservation tillage. *Scientific Reports*, 13, Article 18132.
9. Sharma, J.B., Singh, S.S., Vinod, Singh, P.K., Prabhu, K.V., & Singh, G.P. (2015). HD 3090 (Pusa Amulya) – A new rust resistant, high yielding wheat variety for late sown irrigated conditions of Peninsular Zone in India. *Indian Council of Agricultural Research*
10. Shriram Farm Solutions. (2025). Shriram Super 303: Revolutionizing wheat farming for Indian farmers.
11. Srivastava, A.K., Prasada Rao, U.J., & Haridas Rao, P. (2003). Studies on protein and its high-molecular-weight subunit composition in relation to chapati-making quality of Indian wheat cultivars. *Journal of the Science of Food and Agriculture*, **83**(3), 225–231.