Full Length Article

COMPARATIVE STUDY ON THE PERFORMANCE OF LARGE WHITE YORKSHIRE AND TANUVAS KPM GOLD (75% LWY CROSSBRED) PIGS IN AN ORGANIZED FARM IN TAMIL NADU

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ABSTRACT

The study aimed to compare the productive traits of purebred Large White Yorkshire (LWY) pigs and TANUVAS KPM Gold pigs, a 75% LWY crossbred line, under organized farm conditions in Tamil Nadu during the period from 2018 to 2020. Data were collected from 206 farrowings in LWY and 164 farrowings in KPM Gold pigs to evaluate parameters including litter size and weight at birth and weaning, as well as individual piglet birth and weaning weights. The results indicated no significant differences ($P > 0.05$) between the two genetic groups in terms of mean litter size at birth (7.58 ± 1.97 for LWY vs. 7.52 ± 1.99 for KPM Gold), litter weight at birth, or birth weights of male and female piglets. Similarly, individual weaning weights and litter weight at weaning did not differ significantly. However, the litter size at weaning was significantly higher ($P \leq 0.01$) in TANUVAS KPM Gold pigs (7.34 ± 2.03) compared to LWY pigs (6.39 ± 2.35), suggesting improved piglet survivability and better mothering ability in the crossbred group. The findings demonstrate that TANUVAS KPM Gold pigs perform on par with purebred LWY in most production traits, with the added advantage of significantly higher litter size at weaning. This supports the use of crossbreeding strategies to enhance productivity and adaptability in tropical pig farming systems.

Keywords: *Large White Yorkshire, TANUVAS KPM Gold, Crossbred pig, Production traits*

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INTRODUCTION

Pig farming plays a crucial role in the livelihood and nutritional security of rural and peri-urban populations, especially in developing countries like India. It offers high feed conversion efficiency, early maturity, short generation interval, and prolificacy, making it an economically viable livestock enterprise. The Large White Yorkshire (LWY) is a prominent exotic breed widely adopted in India for its excellent productive and reproductive traits under intensive systems (Ramesh *et al.*, 2009; Chiduwa *et al*., 2008). However, purebred LWY pigs may show reduced adaptability and higher susceptibility to environmental stressors and local diseases, particularly under tropical conditions (Ajayi and Adebambo, 2011). To address these challenges, crossbreeding has been recognized as an effective strategy to enhance climate resilience, disease tolerance, and survivability without compromising productivity (Naskar *et al*., 2016). Crossbreeding exploits heterosis or hybrid vigor, offering advantages over purebreds in terms of adaptability and production efficiency. In India, crossbreeding between indigenous and exotic pigs such as Large White Yorkshire (LWY) has resulted in improved reproductive traits, such as larger litter sizes and better survivability (Prasanna *et al.*, 2009)

The TANUVAS KPM Gold, a three-way synthetic pig (75% LWY x 25% desi) developed by Tamil Nadu Veterinary and Animal Sciences University, has been designed specifically to perform well under the hot and humid conditions of Tamil Nadu (TANUVAS, 2019). Preliminary field evaluations have indicated that KPM Gold pigs exhibit desirable traits such as better litter survivability, mothering ability, and overall adaptability (Selvaraj *et al*., 2020). A comparative assessment of these crossbreds with purebred LWY pigs under standardized farm conditions is essential to quantify their production potential. Hence, the present study was conducted to evaluate and compare the performance of Large White Yorkshire and TANUVAS KPM Gold pigs maintained at an organized farm.

MATERIALS AND METHODS

The study was conducted at the Organized Piggery Unit of the Post Graduate Research Institute for Animal Sciences (PGRIAS), Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Kattupakkam, Tamil Nadu, from January 2018 to December 2020. The farm follows an intensive housing system with concrete-floored pens and nipple drinkers and is situated in a tropical climate with ambient temperatures ranging from 20°C to 38°C and relative humidity between 60–85%. A total of 370 farrowings were recorded during the study period, comprising 206 farrowings from purebred Large White Yorkshire (LWY) sows and 164 farrowings from TANUVAS KPM Gold sows, which are crossbreds with 75% LWY inheritance. All animals were maintained under uniform management conditions and were between first and fifth parity. The sows were housed individually two weeks prior to farrowing. Feeding was standardized across genetic groups and the diet was formulated as per the National Research Council (NRC) 2012 recommendations. Data were collected on

key productive traits including litter size and litter weight at birth and weaning, and individual birth and weaning weights of male and female piglets. Birth weights were recorded within 24 hours of farrowing, and weaning weights were taken at 56th day of birth using a digital weighing balance with ±10 g accuracy. Statistical analysis was carried out using the independent t-test to compare the means between the two genetic groups. The assumptions of normality and homogeneity of variance were checked before analysis. Differences were considered statistically significant at $P \leq 0.05$ and highly significant at $P \leq 0.01$. All statistical procedures were performed using IBM SPSS Statistics version 25.0.

RESULTS AND DISCUSSION

The results of the comparative analysis between Large White Yorkshire (LWY) and TANUVAS KPM Gold pigs are summarized in Table 1. The mean litter size at birth was 7.58 ± 1.97 in LWY and 7.52 ± 1.99 in TANUVAS KPM Gold, with no statistically significant difference ($t = 0.29$, $P>0.05$), indicating that both genetic groups have similar reproductive potential at parturition. This finding aligns with earlier reports suggesting minimal influence of breed type on litter size at birth when exotic and crossbred sows are managed under similar environmental and nutritional conditions (Naskar *et al*. 2016; Kumaresan *et al*., 2007). The mean litter weight at birth also showed no significant difference between LWY (9.76 ± 2.56 kg) and TANUVAS KPM Gold (9.66 ± 2.84 kg), further confirming comparable prenatal development across the two genetic groups. These results align with the findings of Kumaresan *et al*. (2007), who found that crossbred pigs adapted well to Indian conditions and performed on par with exotic breeds in early litter traits.

Individual birth weights of male and female piglets in both groups were statistically non-significant. The overall birth weight averaged 1.29 ± 0.16 kg in LWY and 1.28 ± 0.20 kg in KPM Gold piglets. These values are consistent with the findings of Selvaraj *et al*. (2020), who reported that crossbreds with 75% exotic inheritance maintain optimal birth weights suitable for survivability and early growth. However, significant differences were observed in litter size at weaning, where TANUVAS KPM Gold sows weaned a significantly higher number of piglets (7.34 ± 2.03) compared to LWY sows (6.39 ± 2.35), with $t = 4.12$ ($P \leq 0.01$). This suggests that KPM Gold piglets had better survivability and maternal support, potentially due to improved mothering ability and environmental adaptability of the crossbreds (Selvaraj *et al.,* 2020; Prasanna *et al.*, 2009; Chiduwa *et al.*, 2008). Increased weaning survival has been attributed to hybrid vigor in crossbred sows, which improves piglet vitality and lactation performance (Ajayi and Adebambo, 2011).

Despite the higher number of piglets weaned in KPM Gold, the total litter weight at weaning showed no significant difference between LWY (53.78 ± 13.82 kg) and KPM Gold (52.72 ± 14.53 kg), indicating that the average weaning weights were marginally lower in the crossbreds. The mean weaning weights of individual piglets (male and female) did not differ significantly between

the groups. The overall weaning weight was 7.30 ± 1.74 kg in LWY and 7.20 ± 1.66 kg in KPM Gold, which is in accordance with previous observations by Naskar *et al.* (2016) and Das *et al*. (2017), who stated that while crossbreds may wean more piglets, their individual weights may be slightly lower due to increased litter competition.

Overall, the study demonstrates that TANUVAS KPM Gold pigs can match the purebred LWY in terms of reproductive traits at birth, while outperforming them in terms of litter size at weaning, highlighting their suitability for tropical production systems with better survivability and maternal performance (Singh *et al*., 2015).

Table.1. Comparative Litter Performance of Large White Yorkshire and TANUVAS KPM Gold (75% LWY Crossbred) Pigs

S.No.	Litter Traits (Mean ± S.D)	Pure breed (LWY)	Cross breed (KPM Gold)	t value
1	Litter size at birth (in Numbers)	7.58±1.97 (206)	7.52±1.99 (164)	0.29^{NS}
2	Litter weight at birth (kg)	9.76±2.56 (206)	9.66±2.84 (164)	0.36^{NS}
3	Birth weight (kg)			
	Male	1.30±0.17 (760)	1.29±0.20 (652)	1.30^{NS}
	Female	1.27±0.16 (800)	1.28±0.21 (581)	1.05^{NS}
	Overall	1.29±0.16 (1560)	1.28±0.20 (1233)	0.09^{NS}
4	Litter size at weaning (No.)	6.39±2.35 (799)	7.34±2.03 (161)	4.12**
5	Litter weight at weaning (kg)	53.78±13.82 (223)	52.72±14.53 (161)	0.73^{NS}
6	Weaning weight (kg)			
	Male	7.35±1.74 (799)	7.21±1.69 (626)	1.59^{NS}
	Female	7.23±1.71 (847)	7.14±1.66 (557)	1.01^{NS}
	Overall	7.30±1.74 (1560)	7.20±1.66 (1233)	1.56^{NS}

NS- Non significant (P>0.05), **- Significant (P≤0.01)

CONCLUSION

The present study demonstrated that there were no significant differences between Large White Yorkshire and TANUVAS KPM Gold pigs in terms of litter size and weight at birth, birth weight, and weaning weight. However, TANUVAS KPM Gold pigs showed a significantly higher litter size at weaning, indicating better survivability and maternal ability. These results suggest that TANUVAS KPM Gold, with 75% LWY inheritance, is a suitable alternative to purebred LWY for pig production in tropical

climates, offering improved weaning performance without compromising birth traits. This crossbred line can be effectively utilized in organized farming systems to enhance productivity and sustainability under Indian conditions.

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