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Changes in hematological and biochemical parameters in different genetic grades of pigs

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Abstract
Significantly higher total serum protein was found in T &D x Tamworth and T &D x Russian Charmukha followed by T &D x Hampshire and T &D x T &D where former two genetic groups did not differ significantly but later two groups differ significantly from each other. Significantly higher hemoglobin (13.98%) was estimated in T &D x Tamworth as compared to T&D x T&D (12.92%), T&D x Hampshire (12.76%) and T&D x Russian Charmukha (12.71%); the differences among latter three genetic groups were non-significant statistically. The genetic groups had non- significant effect on serum cholesterol level and total erythrocyte count. Understanding the above fact about blood parameters will further help in formulating breeding strategies for pig improvement.

Keywords: T&D, Pig, hemato-biochemical

Introduction
Swine husbandry has become very important in India due to increased demand of pork and pork products of our society. Biochemical constituents have clinical importance in assessment of growth, health, nutritional status, diagnosis and prognosis of metabolic disorders of animals. Therefore, biochemical characterization/exploration of different genetic groups of pig would help in better understanding of pig in relation to growth and meat quality as well as in production of disease resistant line. Besides, indirect selection of important economic traits using blood parameters may also be very helpful in formulating breeding strategies for pigs. Hence, the present study was conducted with a view to develop genetically improved pig through hematological and biochemical parameters.

Materials Methods
The present investigation was carried out 'on four genetic groups of pigs maintained at instructional Pig farm of Ranchi Veterinary College, Birsa Agricultural University, Ranchi, Jharkhand. The blood samples of pigs were collected from all the four genetic groups viz., "T&D" and their crosses with Tamworth, Russian Charmukha, and Hampshire. Total of 32 pigs comprising of 8 from each genetic group were taken into account for hematological and biochemical investigations

Blood samples were collected aseptically from the saphenous vein of the experimental animals into two sets of sterile glass tubes, one set with anticoagulant using Ethylene Diamine Tetracetic acid (EDT A) and another without anticoagulant. The blood samples, without anticoagulant were allowed to clot at room temperature by placing the tubes in slanting position. The clear supernatant serum was poured off into vials from the side of the tube. Serum was kept in refrigerator until analysed. The total serum protein was estimated using the method given by Lowery *et al.* (1951) [7].The cholesterol in blood serum was estimated by the method of Zlatkis *et al.* (1953) [9]. The hematological parameters like Hb%, PCV% and Total erythrocyte count (TEC) were estimated. Data were analysed according to Snedecor and Cochran (1989) [8].

Result and Discussion
Hematological parameters
Hemoglobin (Hb %): Analysis of variance showed significant ($p<0.05$) effect on genetic group on Hb%, DMRT presented in Table 1 indicated. Significantly higher and lower hemoglobin was observed in T&D x Tamworth (13.98± 0.27 g/100ml) and T&D x Russian

Charmukha (12.71 ± 0.34 g/100ml) respectively. Kumar (2006) [4] also reported significantly highest Hb value in T&D (12.89 ± 1.15 G/100ml) and Tamworth (12.05 ±0.41g/100ml) than *Desi* pigs (10.96 ± 0.18 g/100ml).

Packed cell volume (PCV %): The average PCV % range from 43.86 ± 0.46 in T&D x Hampshire to 44.60 ± 0.41 in T&D x Tamworth. The differences among the four groups were non-significant. Jan, (1986) [3], Banerjee (2004) [1] and Barar *et al.* (2004) [2] reported almost similar value ranges between 32 to 50%, 32 to 50% and 30 to 48%, respectively.

Total Erythrocyte count (TEC): The average total erythrocyte count range from 6.99 ± 0.29xl0^6/µ1in T&D xT&D to 7.43 ± 0.24x10^6/µ 1in T&D x Tamworth. The differences among four groups were statistically non-significant. The values of present observation are almost similar to earlier reports of Jain (1986) [3], Banerjee (2004) [1] and Barar *et al.*(2004) [2] who observed total erythrocyte count in pigs to be 5-8 x l0^6/µl

Biochemical parameters

Total serum protein (gm %): Genetic group had significant effect on Total serum protein level. Significantly highest Total serum protein was found in T &D x Tamworth (5.97 ± 0.14 gm %) and lowest value was found in T&D x T&D (5.55 ± 0.10 gm %). The findings of present observation had been similar to earlier reports of Lingaas *et al.* (1992) [6] and Kumari (2001) [5], who also reported significant effect of breed on Total serum protein in pig.

Table 1: Average hematological and biochemical parameter in different genetic groups of pigs

Parameters	Significance	T&D×T&D	T&D× Tamworth	T&D× Russian Channukha	T&D× Hampshire
Hb%	*	12.92^a ±0.33	13.98^b±0.28	12.71^a±0.34	12.76^a±0.38
PCV%	NS	44.16±0.53	44.60±0.41	43.94±0.47	43.86±0.46
Total Erythrocyte count(X 10^6/µl)	NS	6.99±0.30	7.43±0.24	7.11±0.26	7.11±0.25
Total serum protein (gm %)	**	5.55^a±0.11	5.97^c±0.14	5.87^c±0.11	5.70^b±0.09
Total serum cholesterol (mg %)	NS	140.48±0.86	139±0.72	141±0.80	139.25±0.85

Mean under the same superscript did not differ significantly.

Total serum cholesterol (mg %): The mean total serum cholesterol (mg %) ranged from 139.25 ± 0.85 in T&D x Hampshire to 141.91 ± 0.81 in T&D x Tamworth. The differences were statistically non-significant. Kumar (2006) [4] reported Total serum cholesterol level in T&D to be 127.05 ± 6.75 to 141.61 ± 6.90 mg% which is almost similar to present findings. In the present investigation body weight of T &D x Russian Charmukha were higher than T &D x T &D, T &D x Tamworth and T &D x Hampshire up to 0-8 weeks of age. This reflects higher growth rate of T &D x Russian Charmukha then T &D x T &D, T &D x Tamworth and T &D x Hampshire. This might be possibly, one of the reasons for higher total serum cholesterol content in T &D x Russian Charmukha during present investigation.

Summary

Significantly higher total serum protein was found in T &D x Tamworth and T &D x Russian Charmukha followed by T &D x Hampshire and T &D x T &D where former two genetic groups did not differ significantly but later two groups differ significantly from each other. Significantly higher hemoglobin (13.98%) was estimated in T &D x Tamworth as compared to T&D x T&D (12.92%), T&D x Hampshire (12.76%) and T&D x Russian Charmukha (12.71%); the differences among latter three genetic groups were non-significant statistically. The genetic groups had non-significant effect on serum cholesterol level and total erythrocyte count. Understanding the above fact about blood parameters will further help in formulating breeding strategies for pig improvement

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