

2nd International Conference on

Livestock Nutrition

July 21-22, 2016 Brisbane, Australia

Neutrophilic toll-like receptor 4, Fas gene expression and level of some plasma parameters: Causative factor for repeat breeding

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Insulin like growth factor-1 (IGF-1) plays an important role in reproduction because it has anabolic and positive effect on cell proliferation, transformation and differentiation. IGF-1 also plays a prominent role in the regulation of immunity and inflammation. Plasma lactoferrin (LF) and haptoglobin (Hp) reflect the immune status of the animal. Higher level of plasma Hp indicates sub-clinical or clinical infections. The present study was conducted in order to investigate whether the TLR-4 and Fas gene expression in neutrophils and plasma level of IGF 1, LF and Hp varied between repeat breeding (RB) and regular breeding (RgB) cross bred cattle. For the study, recently calved Karan Fries cattle of 2nd-3rd parity with body weight ranging from 400-460 kg reared under farm and field conditions and free from clinical reproductive tract infections and mastitic conditions were selected. Cows were monitored up to three consecutive services. Animals which conceived by maximum three number of services (23 weeks post partum) were considered as regular breeders and those that did not conceive, as repeat breeders. Relative expression of TLR-4 and Fas genes in neutrophils were significantly ($P<0.05$) higher in RgB group when compared with RB group. On *in vitro* supplementation of IGF-1, the relative expression of TLR-4 and Fas gene in neutrophils of RgB group increased but was not significant. Concentration of plasma IGF-1 and LF were significantly ($P<0.001$) greater in RgB group while plasma Hp was significantly ($P<0.001$) less in RgB group when compared with RB group. Within RgB group the concentration of IGF-1 significantly increased post 9th week but such an increase was not observed in RB group. The concentration of plasma Hp at the beginning, at the end of 23 weeks of experiment and also at weekly interval was significantly greater in RB group when compared with RgB group. The concentration of LF increased significantly in RgB group from 12th week postpartum and was significantly higher in RB group. IGF-1 and LF parameters were positively correlated with each other and both of them were negatively correlated with Hp. From the present study, it can be concluded that the immune status of RgB group animals was better when compared with RB group animals. Poor immune status and some type of inflammation may be the causative factor for repeat breeding problem to persist in one of the group of cows.

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Evaluation of a short-horn grasshopper *Spathosternum praciniferum* as an alternative protein source for livestock feed

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Despite being a capable alternative protein source in livestock diets, grasshoppers received fewer attentions regarding mass scale cultivation. Probable annual biomass of two short-horn grasshoppers of the genus *Oxya* has been estimated so far but both the works used an environmental chamber, the cost of which is a definite encumbrance for local livestock farmers. Hence it is essential to estimate the annual biomass in natural condition. In this context the present work explores whether the short-horn grasshopper *Spathosternum praciniferum* could be a suitable alternative protein supplement. Firstly, the proximate composition along with fatty acids, amino acids, vitamins, minerals and anti-nutritional factors were estimated. Then they were reared in the laboratory with the host plant *Sorghum halepense* and nymphal mortality was calculated followed by estimation of sex ratio. Number of egg pods laid by each female and number of eggs hatched were also determined. Results revealed that the insects are highly nutritious with more than 65% protein and are affluent in essential amino acids. Total six fatty acids and five vitamins were detected. Anti-nutrients were also present in extremely low titer. The results have instated these insects as a rich nutrient resource; moreover, the projected annual biomass was found to be about 3.5 kg of dry weight obtained from a single pair. This is certainly lower than the earlier biomass estimations, but one should note that environmental chamber was not used in the present work. Hence the present findings strongly established the candidature of short-horned grasshoppers as an alternative protein source for livestock.

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