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Changes in metabolic and hormonal profiles with heat shock protein-70 and their association with follicular dynamics in dairy cattle in the subtropical region of Peshawar

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Thermal stress affects the fertility of high producing dairy cattle, badly. This study was conducted to compare Holstein Frisian (HF), cross-bred and indigenous dairy cattle (Sahiwal and Achai) in terms of effects of ambient temperature on HSP-70 expression, serum P₄, glucose and cortisol concentrations and follicular number during the dioestrus period of the estrous cycle. Thirty six multiparous lactating dairy cows with normal cyclicity comprising nine cows from each breed of Sahiwal, Achai, cross-bred and HF were selected in two state farms in Peshawar located at 34.0°N, 71.6°E. Blood sampling was conducted at an average ambient temperature of 18°C (thermoneutral) in February, 32°C (thermal transitional) in April and 42°C (thermal stress) in late June. Rectal ovarian ultrasonography was performed to determine follicular dynamics. Thermal stress increased concentrations of glucose (P<0.05), cortisol (P<0.001), HSP-70 (P<0.001) and number of follicles (P<0.01), while decreased progesterone (P<0.01) in all four breeds beyond 32°C; however, Achai cows resisted elevation of HSP-70 levels with the increasing ambient temperature up to 32°C. As the ambient temperature increased to 32°C and 42 °C, a notable elevation was observed in the first four parameters while progesterone concentrations were decreased. Positive correlation was found between level of glucose, cortisol and HSP-70 with the rise in ambient temperature while progesterone concentrations related negatively with the changing temperature. The number of follicles related positively with ambient temperature, cortisol, HSP-70 and blood glucose and negatively with progesterone concentrations. It is concluded that thermal stress elevated concentration of HSP-70 associated with enhanced concentration of glucose, cortisol and number of follicles. Progesterone concentration provided a good indication of fertility and related negatively with the thermal stress; however, the number of follicles may be considered as a negative indicator of fertility due to lack of a dominant follicle. The indigenous dairy breeds resisted heat stress better than the exotic and crossbred cows indicating that the later are more susceptible to heat stress than the former breeds.

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A study to estimate longevity of thermostable Newcastle disease vaccine (strain I-2) in village chicken of Nepal

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Newcastle disease (ND) is one of the most important poultry diseases because of its widespread distribution and economic impact on poultry. The present study was conducted to estimate the longevity of thermostable ND vaccine (NDV strain I-2) in village chickens of Nepal. A total of 56 (27 days old chicks) were allocated randomly into 2 groups (treatment and control) with 28 birds in each group. On day 28, ND vaccine was administered to the treatment group only. Blood sample was collected from experimental birds at 1 day prior to vaccination and 14, 21, 30, 60, 90 and 105 days post vaccination. The serum obtained was titrated for NDV antibody using hemagglutination inhibition test. The data obtained were log transformed and subjected to the SPSS 16.0. The antibody response of treatment group revealed that the log₂HI titers were 5.7, 7.0, 7.2, 6.0, 3.7 and 3.1 for 14, 21, 30, 60, 90 and 105 days after vaccination. The treatment group had higher (P<0.05) antibody titer level at 14, 21, 30, 60 and 90 days after vaccination compared to control group however, there was no significant difference in the mean titer level between treatment and control group on 105 days after vaccination suggesting that booster dose is required after 90 days of primary vaccination. Thus, thermostable ND vaccine (strain I-2) produced specific immunity against ND for at least 90 days after vaccination and may be considered suitable in Nepalese condition where cold chain maintenance is a huge challenge especially in rural area.

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