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# Ear-sore affected buffaloes (*Bubalus bubalis*)

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ABSTRACT

Buffaloes (65) of both sexes and 1–12 years of age were used to study the effect of ear-sore on blood plasma biochemical and enzymological alterations in buffaloes. Clinical examination revealed the presence of large number of flies of muscid family on the body and varying degrees of lesions at the base of the ears and in some animals extended up to hump region and involvement of eyes. The blood plasma level of glucose, total plasma protein, albumin, globulin and calcium were lower in ear-sore affected animals, which significantly increased after the treatment. Blood plasma AST level was significantly high in affected buffaloes in comparison to treated buffaloes.

**Key words**: Biochemical parameters, Buffalo, Ear-sore, Filarid, Stephanofilaria

Ear-sore is a form of dermatitis in buffaloes which is mainly caused by filarid belonging to the genus *Stephanofilaria*. To date, 9 species of *Stephanofilaria* have been reported from different parts of the world, of which *Stephanofilaria assamensis* (Pandey 1936), *Stephanofilaria zaheeri* (Singh 1958), *Stephanofilaria andamani*, Singh and Das (1958) and *Stephanofilaria srivastavai*, Bhattachrjee (1967) occur in India. Ear-sore caused by *Stephanofilaria zaheeri* (Singh 1958) is a prominent form of dermatitis of buffaloes in India (Agrawal and Dutt 1977). About 70–80% population of buffaloes suffer from the infection in the endemic areas.

The transmission of *Stephanofilaria* occurs mainly by a vector (Agrawal and Shah 1984). On the basis of reports, the outbreak of ear-sore is very rare in India since 1990. Lot of work on ear-sore etiology and histopathology of the lesion had been done up to 1990 in India. But research data on biochemical changes in ear-sore affected buffaloes and effect of treatment are not available. Due to these facts keeping in the mind, study was conducted with objective of biochemical changes in the ear-sore affected buffaloes and changes after treatment.

*Experimental design:* The present study was conducted in the 4 villages of R.S. Pura block, Jammu, North India. During February and March, large number of buffaloes were affected with severe skin lesions particularly around the base of the ears and in some cases on the hump region. The diagnosis of ear-sore was based on the ear lesions and presence of large number of muscid family flies on the body of animals and therapeutic response.

Buffaloes (65; both sexes), 1 to 12 years of age were used. All the buffaloes were clinically examined for the skin lesions, involvement of ears and other adjoining area and flies on the body. The lesions were categorized as +, ++ and +++ on the basis of severity of lesion. Temperature was recorded by digital thermometer. A full case history and owner complaint of individual animal was recorded. After blood collection, all animals were treated with single shot of Ivermectin injection @ 200µg/kg body weight (subcutaneous route) and topical application of ointment (anti-inflammatory and fly repellent and for flies control) along with supportive treatment with ofloxacin and dexamethasone eye drop. All the buffaloes were again clinically examined for the skin lesions and flies on the body on the eighth day after treatment and collected blood samples for biochemical changes after recovery.

*Blood collection:* Blood samples (15–20 ml approximately) were collected in dry, double distilled water rinsed, heparinized screw capped vials, through jugular venipuncture from all animals of both groups. For glucose analysis blood samples were collected in sodium fluoride vials. The samples were carried to laboratory in ice box and stored at 0–4°C. All the blood samples were centrifuged at 3000 rpm for 15 min, plasma harvested to study the effect of ear-sore lesions on biochemical parameters and stored at –20°C until assayed. The enzymology was completed within

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Table 1. Clinical appraisal of animals

| No. of animals examined and affected | Severity of lesions | | | Involvement of ears | | Lesions extended to hump | Tilting of head |
|---|---|---|---|---|---|---|---|
| | + | ++ | +++ | Unilateral | Bilateral | | |
| 65 | 11(16.92) | 30(46.15) | 24(36.92) | 41(63.08) | 24(36.92) | 10(15.38) | 45(69.23) |

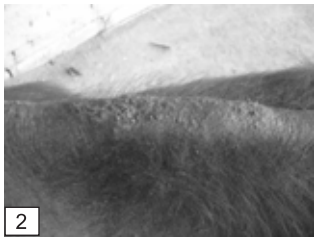
Values in the parenthesis indicate percentage.

2 hours of sampling.

*Quantification of blood metabolites and minerals:* Blood plasma glucose, total protein, albumin, globulin, A/G ratio, urea, aspartate amino transferase (AST), alanine amino transferase (ALT), calcium and phosphorous were estimated using kits. Plasma sodium and potassium were analyzed with a flame photometer.

*Statistical analysis:* The results were subjected to student's 't' test and expressed as mean±SE. Analysis of variance was applied to analyze the differences between groups as per the methods described (Snedecor and Cochran 1994). A level of $P < 0.05$ was considered to be statistically significant.

*Clinical examination:* On clinical examination of animals, large number of flies of muscid family was present on the whole body particularly concentrated around ears, on the ventral aspect and xephoid region of the affected animals and feeding on lesions. Unsuccessful attempts were done by Rahman (1957) and Huq *et al.* (1957) to transmit hump-sore by collection flies feeding on hump-sore lesions and transferring them immediately to abraded skin of healthy cattle. However, Srivastava and Dutt (1963) were able to demonstrate *Musca conducens* to be the biological vector for this parasite. Clinical parameters (temperature and respiration) were under normal range in the present investigation. Lesions were mostly found on ventral aspect of the base of ears (Fig. 1) in unilateral or bilateral (Table 1) and in some animals these lesions were extended upto hump (Fig. 2) and xephoid region. The severity of lesions on the ventral aspect of base of the ear might be due to more folds on the ventral aspect of the ear. The worms of the flies live in the skin of affected animal, causing further irritation, resulting in large lesions. The lesions were characterized by pruritis, nodules, ulceration, exudation, granulation, thickened, fissures, incrustation, alopecia and de-pigmentation depending on the severity of infection.


Figs 1–2. **1.** Showing ear-sore lesion on the ventral aspect of the ear of buffalo. **2.** Showing lesions on the hump (hump-sore).

Gopalkrishnan (1951) and Patnaik (1964) also reported similar lesions in ear-sore cases. About 46% animals had '++' grade of severity of ear lesions followed by '+++' and '+' grade. It was reported that *S. zaheeri* is confined to the ears of buffaloes probably because the skin on the inner side of the ear is thin and is easily abraded by the muscids (Agrawal and Shah 1984). Proliferation of mast cells and resultant increase in chymase and tryptase activity is supposed to play an important role in development of skin lesions (Noviana *et al.* 2004). Forty five (69.23%) animals had unilateral and 10 (15.38%) buffaloes had bilateral eye infection with clinical signs of injected conjunctiva, severe lacrimation, protrusion of eyeball, however vision and palpebral reflexes was normal in all cases. In most of cases, eye of the same side of affected ear was mainly involved. The exact relationship of ear-sore and eye infection is not known to yet. The findings of involvement of eyes and its treatment could not be compared with other reports because as such no report is available on involvement of eye in ear-sore and hump-sore buffaloes. Hence, there is a need of future research on this relationship. In maximum number of cases outer surface of the pinna was affected, while Agrawal *et al.*

Table 2. Blood plasma biochemical changes in ear sore affected buffaloes

| Parameters | Unit | Ear sore affected or before treatment | After treatment |
|---|---|---|---|
| Glucose | mg/dl | 44.82±2.04 | 54.67±3.23* |
| Total serum protein | g/dl | 4.12±0.25 | 6.58±0.14** |
| Albumin | g/dl | 2.07±0.11 | 3.34±0.21** |
| Globulin | g/dl | 2.04±0.81 | 3.12±0.39* |
| Albumin : Globulin ratio | – | 1.29±0.99 | 1.11±0.37 |
| Urea | mg/dl | 19.68±2.58 | 20.79±2.01 |
| AST | U/L | 110.05±6.31 | 98.99±6.97* |
| ALT | U/L | 43.39±5.25 | 44.27±3.06 |
| Sodium | mEq/l | 143.03±2.66 | 142.95±2.84 |
| Potassium | mEq/l | 3.59±0.77 | 3.49±0.95 |
| Calcium | mg/dl | 8.03±0.50 | 9.80±0.22* |
| Inorganic phosphorous | mg/dl | 5.09±1.70 | 5.04±1.68 |

*, values between groups differ significantly ($P < 0.05$); **, Values between groups differ significantly ($P < 0.01$) and significant higher level of AST

(1978) reported that the lesions due to *S. zaheeri* were on the inner surface of the pinna. In the present study, male and female were equally affected. The findings are in agreement with the results of Gopalkrishnan (1951). On the basis of clinical findings, presence of muscid flies on the animal body and therapeutic response gave tentative diagnosis for *Stephanofilaria* infestation.

*Biochemical profile:* The mean levels of blood biochemical and mineral profiles in ear-sore affected buffaloes and treated buffaloes are presented in Table 2. The biochemical and mineral profile before treatment indicated alterations in the biochemical and mineral profile due to ear-sore infection. The level of blood plasma glucose, total plasma protein, albumin, globulin and calcium were lower in ear-sore affected animals, which significantly increased after the treatment. The lower level of glucose and proteins in ear-sore affected animals might be due to the impact of negative energy balance caused by the parasites. The lower level of proteins in affected animals also aggravated by plasma leakage through the injured skin (Radotitis 2000) and increased albumin catabolism. Adult buffalo flies also suck the blood from the animal. Flies bite their host up to 40 times/day causing intense irritation. The plasma AST level was significantly higher in infected animals as compared to post treated animals. This increased activity of the enzyme may be due to the soft tissue damage caused by the parasite which results into release of AST enzymes in blood. The present findings are in agreement with the findings of Randhawa *et al.* (1997) in the mange affected buffaloes. They found that total protein and albumin were low in the affected buffaloes than the healthy, while AST level was high. Our results revealed a significant lower level of plasma calcium in ear-sore affected animals. This fall may be attributed to hypoalbuminemia caused due to leakage of serum proteins through the skin and change in the protein metabolism.

The nonsignificant difference was observed in plasma concentration of urea, ALT, sodium, potassium and inorganic phosphorous in present study. The normal level of blood urea indicating there was no impairment of glomerular filtration in ear-sore affected animals. We could not compare our findings much, due to paucity of research on the effect of ear-sore infection on biochemical changes in buffaloes.

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