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Parasitic Control in Dairy Buffaloes

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Abstract - **Buffalo is main dairy animal of Pakistan. The high prevalence of parasitic infections in buffaloes cause reduced milk production and along with that causes allergic reactions, retarded growth, low weight gain, dullness, irritation hair loss and anemic conditions in dairy buffaloes. The dairy buffalo is encountered with both the internal and external parasites. The young calves cannot withstand the parasitic load and may die after attack of parasites and in untreated cases the parasites may cause huge economic losses in young and adult dairy buffaloes. The losses due to parasitic infections are high in developing countries including Pakistan and an effective parasitic control program is necessary for preventing economic losses in buffaloes due to parasitism. The lack of knowledge of parasitic control at farmers' level is the basic issue of parasitic control program. The open grazing pattern and intensive management of buffaloes within the urban population are also the risk factors for high incidence and prevalence of parasitic infections. The parasitism can be controlled in buffaloes through providing balanced ration, hygienic environment, minimizing load of parasites, timely de-worming, good management practices, minimizing stress on buffaloes and making the environment of dairy buffaloes dry and clean.**

Keywords – **Parasites, Buffalo, Prevention, Control.**

I. Introduction

Buffaloes are major part of livestock population of Pakistan and play a significant role of providing food to the population in the form of meat and milk. Dairy buffaloes are source of animal proteins in terms of milk production in Pakistan. The dairy buffaloes efficiently convert the feed into highly valuable product in the shape of milk. There are many factors which affect the production performance of dairy buffaloes. The main factors responsible for low productivity in Pakistan are limited exploration of genetic potential, high incidence of certain diseases, high calf mortality, late age of maturity in heifers and farming on traditional lines [6]. High rates of infectious diseases are also the contributors for decreased production. The buffalo may be affected with bacterial, viral, fungal and parasitic pathogens [12]. Parasites are one of the major causes of economic losses to the dairy industry [11]. Morbidity due to parasites ranges from 20 – 22 % in calves [5]. The parasites cause clinical and sub-clinical parasitism. The gastro-intestinal tract of buffaloes harbors most of internal parasites. Both internal and external worms are one of the major causes of enormous economic losses to the livestock industry in Pakistan due to damage to skin and offal of buffaloes. The parasites vary in size, single cell protozoa (coccidia) to larger worms (round and tape worms) and complex organisms (ticks, flies). Parasites range from fractions of a millimeter in length (flukes) to several meters (tapeworms). The breeding sites of internal parasites are within the body of animal and eggs are shed with feces and larva hatches from eggs under suitable environmental conditions. The breeding sites of flies are damp conditions, decaying or wet vegetation, stagnant water of pools and ponds, streams, muddy and marshy places, feces and dung, soil, wounds, etc. The common sites of wounds for development of larva of parasites are navel cords of new born calves, damaged tissue of castration, branding, ear tagging and dehorning, accidental wounds. The lice are found moving through out the body of animal and are grossly visible. A small number of parasites may cause sub-clinical infestation but in severe cases clinical signs appear in buffaloes. The external parasites are noticeable while internal parasites cause sub-clinical infections and are only noticed when serious damage has occurred.

II. Predisposing Factors for Parasitic Infections

The pre-disposing factors for parasitic infestations in buffaloes are; young age of dairy calves, provision of low quality feed, deficiency of Calcium and Phosphorus in feed of lactating dairy buffaloes, bad habits in buffaloes like liking of manger, woods, soil, dung and urine, un-hygienic environment, over crowding, consumption of contaminated feed and water, immune status of buffaloes, open grazing in pasture, the wet and stagnant water in the environment of buffalo dairy farm, accumulation of dung, urine and unsanitary conditions. Overcrowding and over stocking at intensively managed farm results rapid transmission of external parasites from one animal to the other and is also cause of parasitic infestation. The sub-optimal management, low quality feed, poor nutrition, feeding of refused feed to male calves, un-hygienic environment and traditional livestock systems are

contributing factors for high prevalence of parasitic infestations in dairy buffaloes in Pakistan. The physiological status of buffaloes, age, climatic conditions and existing managemental conditions influence the prevalence of parasites [1]. Temperature and moisture also influence the development and survival of helminth parasites [15]. The dairy farm management practices under field condition of Toba Tek Singh (Pakistan) were assessed and it was found that only 33.33% of farmers carried deworming in calves while 66.67% farmers did not perform deworming in calves [3]. Parasites are responsible for huge economic losses under field conditions mainly due to poor husbandry practices and lack of knowledge on the part of livestock farmers [9]. Open grazing of buffalo in pasture with different species of livestock increases the risk of parasitic infestations due to possibility of contamination of pasture from wide range of livestock species. Over crowding and intensive buffalo farming in Pakistan is due to rapid urbanization and raising of different age groups of buffalo together also increases the risk of parasitism in buffaloes. Increased number breeding sites of flies, tick and lice due to marshy areas, ponds, stagnant water also poses a threat of parasitism in buffaloes.

III. Parasites of Buffalo

The external parasites of buffaloes are flies (*Stamoxys spp, Hypoderma spp.*), lice (*Glossina spp.*), ticks (*Boophilus spp., Ixodes spp.*) and mites (*Sarcoptes, Psoroptes spp., Chorioptes spp., Demodex spp.*). The internal parasites of buffaloes are nematodes (*Dictyocalus spp. Hemonchus, Ostertagia, Trichostrongylus spp.*), trematodes (*Faciola hepatica, Paramphistomum spp.*), cestoeds (*Taenia spp.*) and protozonal parasites (*Eimeria spp., Babesia spp., Theileria spp.*).

IV. Prevalence of Parasites in Buffaloes

The prevalence of gastro-intestinal parasites in dairy buffaloes in Peshawar is 46.6%. It is also observed that the incidence of infestation of nematode parasites in female buffalo as is low as compared to male buffalo bulls [1]. The frequency of endo-parasitc and ecto-parasite infestation in buffalo calves was also recorded as 83.3%, and 81.3% [2]. [4] found that prevalence of 75% of gastrointestinal parasites in buffalo calves and recorded high prevalence of nematodes followed by mixed infections of cestodes, and also found that calves up to 6 months of age were more affected (86.67%) by GIT parasites compared to 7-12 months of age (60%). *Toxocara vitulorum* is a highly prevalent parasite of water buffalo calves between 15 and 120 days of age and is responsible for high morbidity and mortality rates resulting in serious economic losses [13]. [4] microscopically found eggs of *Strongyloides pappillosus*, *T. vitulorum*, *H. contortus*, *O. ostertagi*, *Bunostmum phleboyomum*, *Oesophagostomum radiatum*, *Trichstrongylus spp*. Nematode spp., *Cooperia spp.*, *Monezia benedeni* and *Monezia expensa* in male buffalo calves. The dairy buffalo is the main source of income for dairy farmers as compared to male buffalo bulls and lower incidence may be due to the fact that livestock farmers pay more attention for proper health and husbandry of female buffaloes [14] – [8].

V. Effects of Parasites in Dairy Buffaloes

Parasites cause many harmful effects in dairy production; Parasites cause continuous annoyance and uneasiness, suck blood from the host buffaloes, produce toxic substances which cause allergic reactions, cause reduction in milk production, decrease the growth rate of growing dairy buffalo calves, cause anemia, general weakness and debility, reduce the resistance to other secondary diseases and cause complications. Parasites also transmit diseases from one buffalo to other buffaloes and act as carrier of the diseases. External parasites i.e. mites, ticks and lice, cause irritation, un-thriftiness, hair loss from skin and interfere with rest of buffaloes. These common factors contribute towards the decreased milk production. In case of heavy parasitic infestations the buffaloes may die, or may exhibit marked weakness and anemia. The endo-parasites cause sub-clinical infections and dairy buffaloes may not attain maximum peak milk production. The major external parasites are lice, mites and ticks. Although there are rare deaths from infestations of external parasites, but huge amount of production losses often occur because of the irritation, disturbance, annoyance and change in behavior of animals. External parasites suck blood which causes anemia, ticks also act as vector and transmit diseases to other healthy buffaloes, like theileriosis, babesiosis, Congo Crimean Hemorrhagic Fever (CCHF) (Congo fever) in animals. The internal parasites live inside the digestive tract and are transmitted to other buffaloes via feces or via an intermediate host. Some of the parasites have direct life cycle and the eggs of some roundworms are picked up directly by the buffaloes and are directly transmitted, but the eggs of other roundworms and tapeworms require an inter-mediate host for completion of the life cycle. The young growing calves after being affected by internal and external parasites exhibit the symptoms of poor growth, decreased weight gain, anemia, loss of appetite, emaciation, weakness, hyper salivation, enlargement of lymph nodes, unable to stand, ruffled appearance, diarrhea, sometimes blood stained diarrhea, delayed maturity, reduced growth rate, and in extreme cases death [7]. The external parasites i.e. ticks suck blood and are found on the body of animal, skin around neck region, on udder and inside the ears. Ticks are firmly attached to the body of animal and manual removal results in bleeding from the skin. The mite infestation cause roughness of skin, dermatitis, and skin appears dry, rough and dull. The mites are microscopically observed after skin scrapping. Some mites also have zoonotic importance and may be transmitted to humans and cause skin infections. The parasite *Echinococcus granulosus* causes hydatid cyst in buffaloes and also has zoonotic importance. Most of the internal parasites live within the

different parts of stomach (rumen, reticulum, omasum, abomasum) and lumen of small and large intestine and remain attached with the intestine and cause digestive disorders. Parasitism is one of the causes of decreased milk production and buffaloes may not reach to peak milk production during their lactation period. The protozoanal parasites of *Eimeria spp.* cause coccidiosis in dairy buffaloes, different species of Eimeria infect intestine and multiply in the mucosal region of intestine, severity of disease is based on the type, pathogenicity and virulence of infecting organisms. *Eimeria spp.* infection in buffalo calves results in production of loose feces, feces mixed with mucus, or bloody diarrhea and results in dehydration and anemia. In severe cases calves stand straining with posture of arched back. Parasites cause buffaloes to become appear lazy, uneasy, restless and depressed. External parasites like ticks and fleas transmit diseases, damage skin and cause anemia. The ticks excrete toxins in the body of buffaloes through their bite and may cause paralysis. The theileriosis and babesiosis are also very common and prevalent diseases of dairy buffalo and are responsible for high morbidity and mortality in young dairy calves under Pakistani conditions. Sura (Trypanosomiasis) causes weight loss, infertility and abortion in water buffalo [10]. The lice and fleas found on the body of infested buffaloes under poor management. The mites cause infestation of skin and can cause roughness of skin, heavy mite infestation cause dermatitis in buffaloes and may lead to swelling of legs and skins. Ecto-parasites of dairy buffaloes live on the skin or penetrate within the skin or even penetrate inside the skin through wound and result in 'myiasis'. The ecto-parasites consume dead cells of skin and tissue fluids and suck blood [15]. The roundworms cause general weakness, abdominal pain, and decrease growth rate of buffaloes. Single or mixed type of worm infestation can be found in the dairy buffaloes. The external parasites may coincide with internal worm infestation and complicate the disease and can increase production losses in dairy industry. Although parasites have direct effect on the growth and production of all aged buffaloes, the fully mature and adult buffaloes are resistant to some extent to internal and external worms due to fully developed defense mechanism of body. Growing calves, weak and immature buffaloes can be infected with worms both by internal and external parasites. In growing buffaloes there is decreased growth rate and weight gain due to parasitic infestations and buffaloes remain under stress and may predispose them to certain other viral and bacterial diseases. There is very low percentage of mortality due to parasitism, but the morbidity may be high due to large area of contaminated pasture due to feces of affected buffaloes and close confinement / interaction of buffaloes within a dairy shed. In lactating buffaloes parasitic infestation result in the decreased production of milk, become nutritionally weak and lick to other buffaloes, wood, manger or soil and develop chronic deficiency of calcium and phosphorous, and become lethargic and may not graze properly. The estrous behaviour of animal is affected and reproductive efficiency is reduced. Parasites add stress to an already stressed lactating animal and may cause reduction in appetite of animal, affect the ability of animal to meet the nutritional needs during production period, increase production cost of milk due to the use of anti-parasitic drugs. Internal parasites damage intestinal tissue, interfere with normal digestion and absorption of nutrients and result in diarrhea, malabsorption, emaciation, anorexia, weight loss, low grade fever and depressed growth. Lung parasites injure the bronchioles of lungs, and result in difficulty in breathing and coughing. Hepatic worms result in liver malfunction and weight loss. Parasites suck blood of animals and cause decrease in protein in body and lead to odema formation. The body coat becomes rough due to mites infestations. The tape worms may cause impaction of intestine in buffaloes. The use of drugs for treatment of parasitic infestations in dairy buffaloes results in drug residues in milk. The taste of milk may change to some extent and there is bad odour in milk of dairy buffaloes receiving anti-parasitic drugs, and cause discarding of milk, especially use of inj. ivermectin causes change in taste of milk and bad odour from milk, milk is also rejected for human consumption from health point of view. Some commonly used anti-parasitc drungs like albendazole and thiabendazole are reported to be teratogenic and embryotoxic and are also contraindicated in early pregnancy.

VI. Parasitic Control Program

Prevention and early detection are the keys to successful treatment and control of external parasites in dairy buffaloes. Different means and management practices can be adopted for control and preventing parasitism in dairy buffalo herds. The buffaloes should be raised in hygienic and clean surrounding, and should be given balanced feed. The imbalanced feed results in the nutritional imbalances and buffaloes become prone to parasitic infestation. In the feeding area all type of intermediate hosts should be killed. The snail, cockroach, beetles, and other insects serve as intermediate host for carrying parasitic infections to healthy buffaloes. The bedding and litter should be dry to prevent spread of *Eimeria spp.* in dairy herds. In case of ascariasis, coccidiosis, babesiasis, theileriasis, prompt treatment should be started. The manger and water tanks should be cleaned on daily basis because due to feces of affected buffaloes the eggs of parasites are transmitted through contaminated water and feed. The dewormers available in the market can be used for deworming like, albendazole, toltrazuril, diaveridine, etc. can be given for the treatment and control of parasitic infection. In case of round worm and tape worm infestation, after giving the treatment the fecal dropping of animas should be cleared immediately, otherwise the buffaloes will eat the expelled worms and will become affected. Strict bio-security measures should be adopted. The fleas can be controlled by spraying buffaloes with repellent. The contact of wild animals with dairy buffaloes should be avoided. The fecal samples should be regularly examined for detection of eggs of parasites and for start of treatment accordingly. The buffaloes should also be examined regularly for

presence of ticks or fleas on the body and early action must be taken against external parasites accordingly. The contamination level in the environment should be decreased. The immunity and resistance level of buffaloes should be increased. The adequate and specific treatment for different parasites should be adopted. Overstocking should be avoided. The population of intermediate hosts (snail, insects, flies) should be reduced. Rotate grazing should be practiced. Young buffaloes should not be allowed to graze a pasture after older ones to avoid exposure to many parasites and buffaloes should be dewormed at regular intervals. The calf pens should be thoroughly cleaned to prevent accumulation of eggs of parasites in the pens. To avoid exposure of parasites to buffaloes the pasture grazing should be avoided the hay and silage should be made as the eggs of parasites cannot survive under low moisture content. Water troughs should be constructed to avoid excessive spilling and fecal contaminations. For treatment of parasitic infestations broad spectrum anthelmintics may be used which has high degree of efficacy and eliminates adult and larval stages of worms and safe drug should be given that does not have teratogenic and embryo-toxic effect. Some anthelmintics like fenbendazole is reported to be safe and of economically beneficial and increases milk production and also increases conception rates. The breeding sites of flies should be limited and animals should be prevented from attacking flies. At farm level spray of insect repellents on the body of buffaloes may be done, or ear tags, neck brands or pour-on products containing insect repellent or insecticides should be used. The wounds having flies over it indicate 'myiasis' and in order to prevent 'myiasis' after castration, dehorning, branding, tagging and accidental injury the wound management should be done and fly repellent should be applied.

Preventing parasitism in dairy buffaloes can increase production of dairy products, like, milk, butter, cheese, etc. and can decrease the economic losses of dairy farmers due to parasitic infections. Due to increased production the per capita availability of animal protein in the form of milk can be increased and food scarcity can be overcome in Pakistan. Moreover, by preventing parasitism the milk production is increased and the increased foreign exchange can be earned for Pakistan by exporting surplus milk, dry milk and dairy products.

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