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SHORT COMMUNICATION

Studies on Plastic Bezoar Ingestion in Free Range Axis Deer in Summer

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ABSTRACT

Present study was planned to conduct the prevalence of poly-bezoars and its effect on free range axis deer (*Axis axis*) in around Jabalpur, India. A retrospective study was conducted in and around Jabalpur, India for February to June 2017 to observe the prevalence of poly-bezoars in wild herbivores health. During the study period 19 post-mortem examination was conducted and in 4 cases (21.05%) showed poly-bezoar. The quantity of the poly-bezoars collected from the rumen and reticulum was ranging from 0.75 to 3.5 kg. The study identifies types and estimates the prevalence of foreign bodies in the rumen and reticulum of Axis deer. Awareness may be created on careless disposal of plastic bags and as well as the periodical cleaning of these wastes in the forest/grazing areas.

Keywords: Poly-bezoar, Axis deer, wild herbivores, foreign body

Axis deer (*Axis axis*) is most commonly found wild herbivore of Indian subcontinent and are known to feed on more than 160 species of plants and they are primarily grazers. Their grazing behaviour is also influenced by season and food availability. Ruminal impaction due to indigestible foreign, materials is hardly reported in small ruminants or wild ruminants as they tend to be selective feeders (Nagesh *et al*., 2015). The occurrences of polythene materials were documented by various researchers' mostly in domestic but in wild ruminants information is still not documented. Entrance and migration of foreign objects through the body tissues lead to many complications that differ according to the nature of the foreign body and the way of its entrance into the tissues (Kumar and Dhar, 2013). Accumulation of plastic bag wastes causes environmental pollution that can be manifested in number of ways (Moharam and Maher, 2014). Foreign body ingestion such as plastic bags and other undigestible materials found in ruminants could pose serious health problem among free grazing animals (Tesfaye *et al*., 2012). Another common problem associated with these wastes is death of domestic and wild animals. This necessitates for proactive measures in order to safeguard animal species against extinction (Macur and Pudlowski, 2009). Accourding to FICCI, 2014 plastic industry has become one of the fastest growing global industries and due to increasing population the growth of plastic manufacturing sectors in developing countries has increased. Handling of plastic waste is improper in developing countries because of low environmental standards, poor waste recovery and disposal systems, low economic status, poor hygienic and living standards, less awareness of public regarding harmful effect of plastics, no stringent/strict law regarding waste disposal, and many other factors (Adane and Muleta, 2011). Therefore, study was conducted to know the incidence of Plastic bezoar ingestion in free range axis deer and related complications.

The study was conducted in the late winter to summer season from February - June, 2017. During the study period a total of 19 carcasses of the Axis deer were necropsed at School of Wildlife Forensic and Health. The carcasses were examined for the presence of foreign body. Briefly, during the necropsy procedure, rumen and reticulum of the animals were thoroughly examined externally by visual inspection and palpation. They were then carefully

removed from the abdominal cavity and incised. All the contents were meticulously examined for the presence of foreign bodies which, if encountered, were examined by further dissection and recorded.

Necropsy Findings Most of the carcasses were emaciated with sunken eyes, rough skin coat and showed canine marks on both side of neck and thigh region. No notable gross lesions were evident on vital organs aside from severe congestion and haemorrhages on the ruminal wall with stunted ruminal papillae (Fig. 1). In four animals the rumen showed bunch of plastic bags weighing about 0.75-3.5 kg (Fig. 2). The plastic bags were impregnated with other ruminal contents partially occluding the rumino-reticular openings of the rumen.

Fig. 1: Carcass of chital with plastic bezoars

Fig. 2: Congested and Haemorragic ruminal mucosae

In the present study, a total of 19 carcasses of the Axis deer were necropised. Out of 19 the 4 carcasses (21.05%) showed poly-bezoars. The quantity of the poly-bezoars collected from the rumen and reticulum was ranging from 0.75 to 3.5 kg. The present study was conducted in summer season as there are scarcity of food and water in its natural habitat and wild animals tend to move closer near to human dominated landscapes for food and water. All the polythene bezoars impacted axis dears had dog bite marks. Based on the observations, the presence of plastic bezoars in the rumen, these indigestible materials when ingested by ruminants gets lodged in the rumen thereby compromising the ruminal space and interfering with the normal physiological functions of the rumen like rumen motility, rumen microflora etc. These conditions might have caused abdominal pain and restlessness resulting in weakness and easy prey for predator species. Information on impact of polythene, non-metallic and metallic object in free range wild ruminants is scare. This study showed impaction of plastic-bezoar in 21.05 % Axis deers in summer season. History of all the carcasses having polythene bezoars impaction indicated mortality near human habitats or villages within the radius of 2 km. Kumar *et al*. (2000) reported the bezoar in a captive spotted deer and highlight the potential health hazard to wild and domestic animals as a result of improper disposal of plastic materials. Various pathological conditions like indigestion, impaction, tympany, polybezoars, and immunosuppression due to ingestion of plastic and polythene materials (Singh, 2005). Kumar and Dhar (2013) observed poly-bezoar impaction in a captive Sambar (Rusa unicolor) resulting death during course of treatment. In Ethiopia Sheferaw *et al*. (2014) and Roman & Hiwot 2010 reported the polythene in ruminants, where the prevalence was 41.8% (167/400), 23.9% (92/384), 9.2% (53/576) and 44.6% (311/697) respectively. Environmental pollution is one of the growing problems for grazing animals due to absence of recycling industries, cultures of keeping clean environment, improper disposal of plastic bags. These plastic bags were indigestible and their accumulation in the rumen of grazing animals may lead to adverse effect on health (Ghurashi *et al*., 2009). Reports from cattle and sheep reared in urban and sub-urban environments indicates that impaction of rumen from the accumulation of foreign bodies, such as plastic bags causes' interference with the flow of ingesta leading to distension of rumen and absence of defecation (Sileshi *et al*., 2013).

Free ranging wild ruminants are likely to be exposed to the ingestion of indigestible garbage from various sources

due to a wide spread environmental contamination by plastic bags and habitat destruction that predispose animals to nutritional deficiency. Weight reduction in the affected animals are variable according to the stage of lactation, quantities of foreign bodies ingested and severity of the bloat and acute bloat press the diaphragm and ribs which limits the respiratory movements, leading to hypoventilation and decreased venous return to the heart (Tyagi and Singh, 2004). In the manufacturing of plastics and polythenes, several chemicals such as bisphenols, polyvinyl chloride, cadmium, lead, and acrylamide are being used. These chemicals are known as immune suppressants WHO. (2010) Congestion of the ruminal mucosae and ruminitis might be due to chemical reaction of polywastes or due to abrasion on ruminal wall. In India, 95% urban stray animals are suffering from various ailments due to hazardous materials inside their abdomen; out of them 90% are plastic bags (Singh B 2005). This might be due to these materials used for storing wastes, shopping bags and packing food items and disposed everywhere after using, hence they were eaten by the free grazing animals especially more in towns and villages. Reddy and Sasikala (2012) describe that congestion of the ruminal mucosae and ruminitis might be due to chemical reaction of polywastes or due to rubbing on ruminal wall. Shrunken rumen is due to replacement of air and water volume of rumen by the foreign materials. Vanitha *et al.* (2010) reported depression, partial or complete anorexia, recurrent bloat, reduced milk yield, weight loss, suspended rumination, ruminal impaction, and increased susceptibility to other disease conditions are the most common symptoms observed in the affected in cattle. Incidences of polythene bezoars is a rare condition in free range wild herbivores and in all protected areas polythene are banned but particularly in summer season wild animals moves from protected areas/forest to humane dominating landscape for food and water, where they are exposed to poly bezoars. The recent ban on poly bags by state government and National Green Tribunal would go long way towards conservation of wildlife.

CONCLUSION

The present paper describes prevalence of plastic bags observed in the rumen and reticulum of free range axis deer at Jabalpur forest division. The study observations indicated that the grazing areas and forest land were seriously polluted by plastic wastes and improper disposal of plastic bags and pollution of the environment with plastic bags could pose serious health risks for wild ruminants. Awareness may be created on careless disposal of plastic bags as well as the periodical cleaning of these wastes in the grazing area, the study also showed that littering the environment with plastic bags and other indigestible materials could pose serious health to wild animals.

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