International Journal of Advanced Multidisciplinary Research (IJAMR)
ISSN: 2393-8870
www.ijarm.com

Research Article
Poisoning of a Tiger (*Panthera tigris*) in the Nilgiris, Tamil Nadu, India.

Boon Allwin[1], Stalin Vedamanickam[2], U.S Kalyaan[3] and N.R Senthil[4]

[1]Ph.D, Scholar of Department of Wildlife Science, Madras Veterinary College, Chennai
[2]Veterinary Assistant Surgeon, Kil kotagiri, Nilgiris district
[3] M.V.Sc., Scholar of Animal Reproduction, Gynaecology and Obstetrics, Madras Veterinary College, Chennai
[4] Assistant professor, Centralised Clinical Laboratory, Madras Veterinary College, Chennai
Corresponding Author

Keywords

Phorate poisoning,
Tiger,
Wild pigs,
conflict

Abstract

India is an agricultural country animal husbandry has always been associated with agriculture. People still thrive upon animal products such as milk, meat and manure intensely for their essentialities. India has a huge cattle population and most of them graze in areas close to forests and their fringes competing for their pastoral needs with other wild animals. This then leads to human-wildlife conflicts, which tends to culminate in a number of tragic outcomes, including wild animal poisoning. This paper deals with a case of an suspected agrochemical poisoning and in identifying the poison. A carcass of a tiger as reported was systematically examined and postmortem was carried out. Samples were taken for routine histopathological procedures and composite samples were sent to Regional Forensic Science Laboratory (RFSL) for ruling out any poisoning as the particular area was famous for poisoning wild pigs. The postmortem lesions showed typical signs as in any case of poisoning and the RFSL confirmed the presence of phorate and this was concluded as a case of poisoning. Poisoning is perceived as an easy way for people to rid themselves of wild animals. Numerous factors, including the type of agriculture practices conducted, public knowledge regarding toxicity of a specific product, cost, availability in the local market place and physical properties such as color, taste and odor a determine the extent to which specific pesticides are used to deliberately poison wild animals. Wild pigs are always targeted but unfortunately apex predators are victimized. Therefore the loss of an apex predator, that holds a significant position in the upper trophic level, will have deleterious effect on the balance, ultimately threatening human survival directly and indirectly leading to human wildlife conflict.

Introduction

Life in the Nilgiris has always had its part and parcels with wildlife either as a boon or a bane. It is just in these recent years that the scenarios of Human wildlife conflicts have taken a toll adversely affecting the normal life patterns of people and wild animals. Wild animals often come into conflict with people by destroying agricultural crops and even killing people, thus providing a deterrent to conservation efforts. Further human settlements had a dual impact on wild animal-habitat. The directly visible and measurable one was that of habitat loss through conversion of wild animal's habitat to human use and the second is an indirect human influence and impact on wild animal-habitat. Human settlements were almost in close proximity to water. Areas close to water were the preferred areas for wild animals and loss of such areas has a much more serious impact. Thus human settlements not only deprived the wild animals of the use of significantly large areas of habitat but also deprived them of significantly preferred habitat. Human-wildlife conflicts were found to be intensified as population growth forced the development activities which infringed on wildlife habitats. This led to fragmentation and declining of habitat quality, eventually causing competitions between humans and various wildlife species with regard to space and resources and stressed wild animals often turned to crops or livestock for food.

Many domestic animals also live on the forest fringes, competing for pasture with wild animals, leading to human wild life conflicts which tend to culminate ultimately in a number of tragic outcomes, including wild animal poisoning. In conflict areas, large carnivores were often the primary targets for malicious poisoning and they are wiped out giving a temporary relief, unknowingly leading to an intense biological imbalance causing a catastrophe in the food web.

Materials and Methods

The Veterinary surgeon of Kil kotagiri, Kotagiri town, The Nilgiris district was informed about the presence of the carcass of a female tiger in his jurisdiction. The location of the carcass was amidst the dense tea bushes with a small stream outlaying closely. A detailed necropsy procedure was conducted. A composite sample (300 g) containing stomach and intestinal loop with contents separately and portions of liver, kidney, lung, and heart were collected separately in 500 ml of saturated sodium chloride were collected in sealed containers from the tiger carcass in saturated sodium chloride solution as preservative and sent along with plain preservative as control to the Regional Forensic Science Laboratory (RFSL), Coimbatore, Government of Tamil Nadu, for toxicological analysis. The samples were examined and analyzed using thin-layer chromatography followed by gas chromatography–mass spectrophotometry at RFSL. On walking back to the road an empty sachet of insecticide inscribed Phorate 10% was retrieved approximately 400 mts away from the carcass. Environmental findings led to the suspicion of Phorate poisoning. The ancillary trace evidence (Phorate 10% cover) was collected and retained for analysis. Maintaining chain of custody of collected evidence was done by the forest department, the Squad ranger of the particular range was entitled the duty of sample delivery and result follow up.

Results

Necropsy was done in a systematic manner. Externally, there was no characteristic lesion or striking abnormality. Internally there was generalized congestion and hemorrhage. The oral cavity was inspected for any material of meat shreds trapped in the mucosal folds. The teeth were all intact the gingivae showed congestive changes. The visible mucous membrane was brick red in color. The peritoneal cavity contained sanguineous fluid (haemoperitoneum). There were hemorrhage and congestion on the trachea and the lung showed severe congestion and was edematous. The pericardium was filled with sero-sanguineous fluid and the epicardium and endocardium exhibited petichae. A generalized garlic odour was prevalent throughout the procedure. The stomach contained about 500-1000 gm of partially digested material and with slurry of flesh and lots of hair, bristles and some semi digested bones. The mucosa of the stomach showed petichae and the intestinal mucosa were congested. There was generalized congestion and hemorrhage. The kidneys revealed sub capsular hemorrhage. The shape of the spleen was altered and was dark red in color. These recordings were in agreement with the findings recorded by Kalaivanan et.al.[1].

Typical lesions of toxicity like pulmonary edema, hemorrhagic intestinal tracts, necrotic and degenerative changes in the liver and kidney were evident. The result from the RFSL proved that about **5.6 g %** of phorate equivalent was estimated from the composite sample.

The necropsy findings, circumstantial evidence and laboratory confirmations strongly suggest that the reason for death was due to poisoning by Organo phosphorus compound (OPC) indicatively Phorate.

Discussion

The common uses of phorate for the tea plantations and to the adjoining agricultural cultivation were found out. Phorate is a clear, pale yellow mobile liquid. It is formulated in emulsifiable orgranular concentrates [2]. Phorate is stable at room temperature and between pH 5 and pH 7 for at least 2 years. However, under very acidic (pH<2) or alkaline (pH>9) conditions, the compound hydrolyses [3]. Phorate is a systemic and contact insecticide and acaricide used to control sucking and chewing pests in a wide range of crops, among others corn, sugar beets, cotton, brassicas, and coffee. It is also used as a nematocide [4]. Phorate is biotransformed by oxidation of the thioether moiety to the corresponding sulphoxide and sulphone and by desulphuration of the P=S moiety to P=O, producing a phosphorothiolate ester. Phorate metabolites, including the sulphoxide and sulphone derivatives of phorate and phorate oxygen analogues, are even more acutely toxic and have greater anticholinesterase activity than phorate [5].The 2 major metabolites were the following non-phosphorylated metabolites: sulphoxide (ethylsulphonyl) methyl (43% of urinary metabolites) andmethane (ethylsulphonyl) (methylsulphonyl) (24-28% of urinary metabolites). Phosphorylated metabolites accounted for <15% of urinary metabolites in males and no phosphorylated metabolites were identified in the urine of females. The main residues in liver, kidney, and muscle were dephosphorylated metabolites [6].

The general agricultural practices pertaining to the nilgiris include cultivation of carrots, potatoes, cabbages and lots of exotic vegetables. The package of practices includes use of agro chemicals such as phorates, carbamates, endosulfans and malathion in general to their fields. The minimum toxic dose of phorate that was found to be toxic in domestic animals ranged from 0.25- 1.00 mg/kg [7]. A very interesting fact was that the damages that these people faced by the crop raiding by the wild pigs in this region and the adjoining regions was least tolerated as nearly 50% of the profit was lost on curbing wild

pigs [8]. The availability of the highly palatable feed varieties, increase in predator-prey density, increase in competition among the co-existing herbivores and omnivores in the adjoining forest region, carrying capacity of the region, extensive activities or manipulation by human beings in the forest regions have made wild pigs an agricultural pest this was in agreement with findings made by Chauhan [9].In this context poisoning wild pigs using agro chemicals was conflict mitigation strategy in these regions. Usually potatoes laced with poisons or commercial broilers stuffed with toxic compounds have found to be positioned on the tracts of the wild pigs, luring them into taking up the toxin. However, tigers and tigers also share the same landscape and often become accidental targets ending down the apex predator that occupies the topmost level in the food chain. This in turn reflects very badly as there increase in the predator quotient and the prey like wild pigs supervene and cause excessive damage than a higher level that was prevailing. Therefore, what was supposed to be a conflict mitigation strategy ended up increasing the damage.

Conclusion

The use of agro chemicals for attributable crop growth becomes inevitable in our country (India) but this serves as a blessing in disguise for a lot of defaulters who take advantage of this and are unaware of the damage they are causing for sense of temporary relief. Hence, the management plan in the protected regions shall focus in the measures that help to prevent the deterioration of feed-resources for the wild pigs. Similarly, appropriate crop insurance schemes might be strengthened pertaining to the wild pig associated high risk croplands identified and all these might definitely help to mitigate the conflict problems between the wild pigs and humans in the areas adjoining the wildlife region thereby preventing the break in the food chain and ultimately maintaining balance.

References

[1]Kalaivanan NR, Venkataramanan K, Sreekumar C, Saravanan A, Srivastava RK(2010). Secondary phorate poisoning of large carnivores in India. Eur. J. Wildlife. Res. 57:191-194.

[2] Gallo MA, Lawryk NJ. Phorate. In: Hayes WJ Jr, Laws ER Jr, eds. Classes of pesticides. San Diego
CA, USA: Academic Press, Inc, 1991: 1055-7 (Handbook of pesticide toxicology; Vol 2, Sect 16.7.4).

[3] American Conference of Governmental Industrial Hygienists (ACGIH). Phorate. In: TLVs® and
other occupational exposure values - 1999. [CD-ROM]. Cincinnati OH, USA: ACGIH®, Inc, 1999.

[4] Tomlin CDS, ed. In: The Pesticide Manual. A world compendium. 11th ed. Farnham (Surrey), UK: British Crop Protection Council, 1997.

[5]Food and Agricultural Organization/World Health Organization (FAO/WHO): Joint Meeting of the FAO Panel on Experts on Pesticide Residues in Food and the Environment and the WHO Expert Group on Pesticide Residues (JMPR). Phorate. In: Pesticides residues in food – 1994 evaluations.Part II- Toxicology. Geneva, Switzerland: WHO, 1995; rep no WHO/PCS/95.2; http://www.inchem.org/documents/jmpr/jmpmono/v94pr08.htm.

[6] Hussain M. Thimet ® insecticide, phorate (CL 35,024): Disposition and metabolic fate of carbon-14
labelled CL 35,024 in the rat. Princeton NJ, USA: American Cyanamid Co, 1987; rep no PD-M Volume 27-59; unpublished report,

[7]Tiwari RM, Sinha M (2010). Veterinary Toxicology, Oxford Book Company, Jaipur, pp.24.

[8]Gopakumar S, Santhoshkumar AV and Kunhamu TK (2012).Wild boars: Is elimination the way forward?. Curr Sci.102:14-15.

[9]Chauhan NPS, Barwal KS, Kumar D (2009). Human–Wild Pig Conflict in Selected States in India and Mitigation Strategies. Acta Silv. Lign. Hung.5:189-197.