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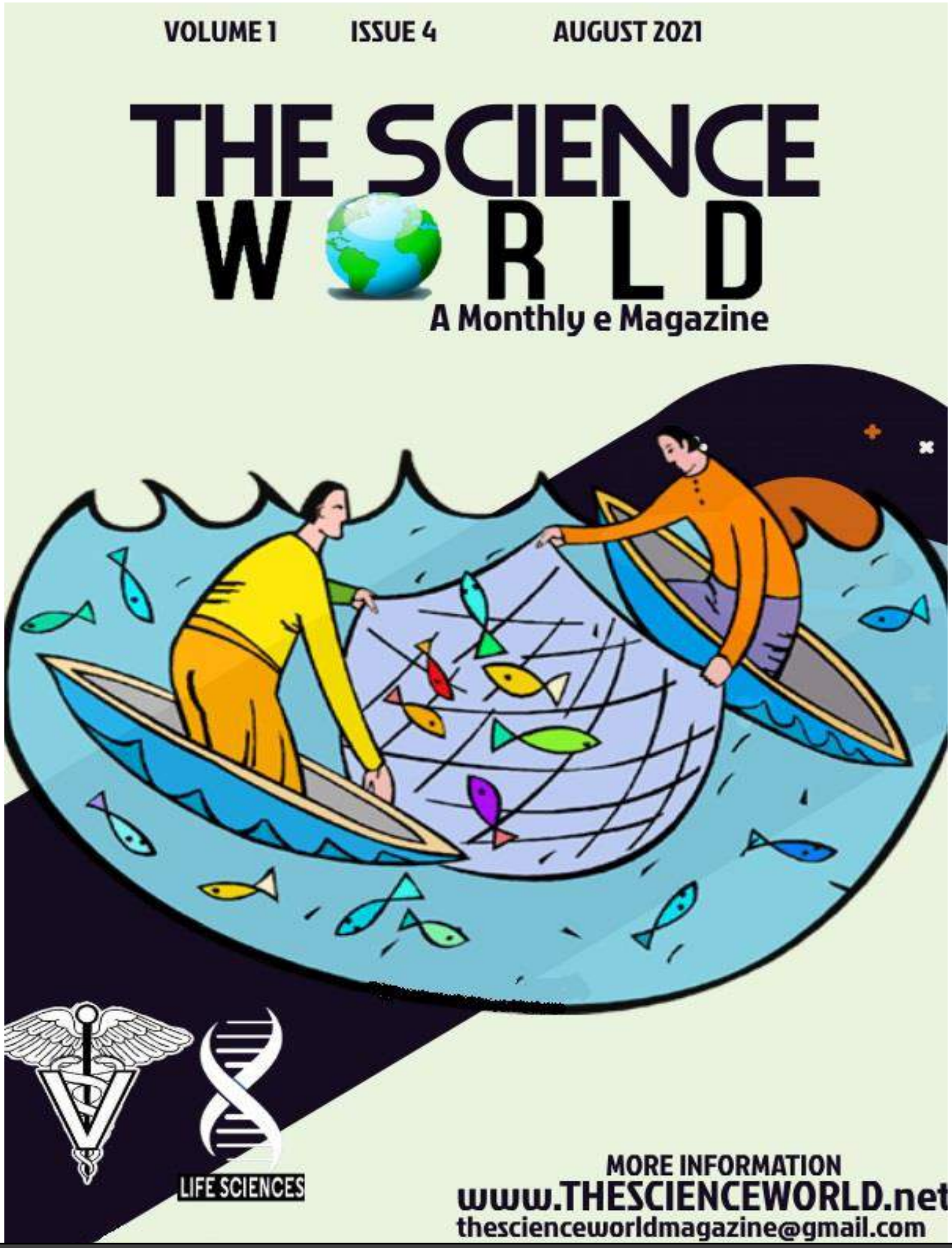

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Human – Wildlife Conflict

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Abstract

Human- animal conflict is one of the main threats to the survival of many number of wild animal in different part of world and is also significant threat to the human population. The main reason is man-made Expansion for our sophisticated livelihood. The result of this conflict has deteriorated effect over the ecological cycle and food chain. Afforestation, conservation and expansion of forests and wildlife habitats, removal of encroachments will reduce this conflict. We, the humans, animals and nature are intertwined. The imbalance in nature creates a huge impact on the sustainability of the living population on the Earth.

Introduction

Human-Animal conflict refers to the interaction between wild animals and people and the resultant negative impact on people or their resources or wild animals or their habitat. Human- Animal conflict is one of the main threats to the survival of many number of wild animal in different part of world and is also significant threat to the human population. It is no exaggeration to say that human-wildlife conflict is caused by human greed. Conflict erupts when certain actions taken by human for his own gain, affect the livelihoods of wildlife (Distefane, 2005). Such a conflict is detrimental to both parties. When the needs of the bland wildlife are taken away, a situation arises where human and wildlife meet !! when they come out in search of adoption needs, We humans, in the name of driving them out, are making a fuss over it, leading to casualties on both sides. The primary reason is the loss of habitat.

Causes of Conflict

Human-wildlife conflict erupts, when wildlife habitats are destroyed by man-made habitat expansion, new industrialization, mineral mining, etc., resulting in loss of habitat and natural disasters such as Forest fires, that infiltrate human settlements in search of its needs.

Unlike humans; animals have food, habitat, and reproduction as their primary goal. Due to the major mistakes, we made like cutting down trees, hunting creates a maximum demand for the ownership of food, extremely creates a loss of Bio-Diversity. Wild animals including elephants, satisfy their hunger by eating cultivated mangoes and coconuts in turn, Carnivore animals such as leopards, tigers, and wolves begins to taste domestic animals and human flesh in need. Thus, the trend of conflict between human life and wildlife occurs.

The construction of national highways, mountain trails, railways, etc. through wildlife habitat not only obstructs wildlife traffic, but also kills animals as they attempt to cross the roads. In addition, as the routes are occupied, the wild animals divert the path, thus enters the villages (Habib, *et al.,* 2005). Due to the destruction of the trees, the rains subsided, the water needed for the community became scarce. In addition, water bodies are contaminated by dyehouse wastes, mineral wastes, etc. which makes the water unfit for drinking. Normally the average daily water requirement of an elephant is 200 litres, when its water demand is not met, it enters our habitat.

Effects

History shows that the tribes that lived in the forests, merged together in harmony with the forests and the animals that lived with them. Moreover, they worshiped and adore the forest where they lived, their habitat, and the wildlife with them as deities. But today, due to human greed, such thinking has changed and we have lost the balance of nature by destroying forests, hunting animals and thinking, "We are the greatest."

We also face a severe Socio – Economic loss by losing our livestock as prey to Carnivores. The main effect of the human-wildlife conflict is fatality. When human and wildlife meet at a point, the conflict erupts and there are casualties on both sides (Konig et al,2020). In addition, Wounded carnivores become Man-Eaters due to the pain caused by the injury and

their inability to hunt. For example, in the state of Uttarakhand, a leopard roamed in Rudraprayag forest circle for 13 years, killing nearly 230 people. The result of this conflict has deteriorated effect over the Ecological cycle and Food chain.This trend of conflict is also greatly reducing the quantity and quality of wildlife.

Solutions

Solutions to the human-wildlife conflict need to be divided into temporary and permanent solutions. When there is a drought situation in the forest, drinking water should be provided to the animals in need. At forest boundaries, the trench should be maintained regularly to restrict its movement. Afforestation, conservation and expansion of forests and wildlife habitats, removal of encroachments along the route without discrimination should be done by the government. In the wild, canals should be built to meet the drinking water needs of the animals. Forest laws need to be tightened. Intensive monitoring should be carried out in forested areas.

Conclusion

The forest is the habitat of animals, and this human-wildlife conflict problem arose only when man began to destroy the forest for his own greed. Animals and nature are intertwined. Our ancestors worshiped nature, with the vision that if we protect nature, it will make us live.

If such like acts continue, the nature's balance will be disturbed and the existence of mankind on this planet will be questioned.

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Retention of Placenta (ROP) in bovines: Treatment and Prevention

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Abstract

Retained placenta also known as retained foetal membrane or retained cleansing commonly occurs in animals. It occurs when the calf's side of the placenta (the fetal membranes) fails to separate from the mother's side. Separation of the membranes normally occurs after the calf is born. Retained placenta is usually defined as the failure to expel fetal membranes within 24 hr after parturition. As far as its causes are concerned it is most commonly associated with dystocia, milk fever (metabolic diseases) and twin births. However it can be prevented by good dry cow management. This includes supply of correct nutrients, particularly magnesium, and fat soluble vitamins, maximising dry matter intake, maintaining the correct body condition score and supplying a clean dry environment.

Introduction

Retained placenta is one of the most common complications occurring in animals following parturition. The affected animals, not only, produce less milk but also losses in their future reproductive efficiency. Expulsion of the placenta within the stipulated period is important for subsequent reproductive efficiency as it helps in initiating involution of the uterus and the appearance of postpartum heat. Delay in involution of the uterus, on the other hand, increase the calving interval and reduces the total number of calving during the reproductive life of the female. In normal physiological parturition, the fetal membranes are expelled within 3-6 hr in cows and buffalo (Arthur, 1982).

Etiology

In the majority of cases, placental retention in cattle is caused either by disturbance of the loosening mechanism in the placentomes or uterine inertia. The physiological process that leads to separation and expulsion of the placenta starts many days or weeks or even months

before parturition so that by the time RFM is diagnosed, the effect and not the cause is treated and the chances to respond to therapy are few. Various pathological factors that affect the loosening process in the placentomes include:

1. Immature placentomes
2. Edema of the chronic villi
3. Advanced involution of the placentomes
4. Hyperemia of the placentomes
5. Placentitis
6. Uterine atony
7. Nutritional factors
8. Mechanical prevention of placental exclusion

Treatment

1. **No treatment:** There is no significant difference between the fertility of cows with a retained placenta and those left untreated compared with cows without RFM. A disadvantage of no treatment is that in several cows a malodorous stench is generated by the animal which generally can be prevented by the treatment-especially, broad. Spectrum antibiotics are quite capable of keeping down the microorganisms that are primarily responsible for putrefaction.

2. **Manual removal:** Manual removal of retained placenta in the cow has been practiced by most veterinarians.

Advantages

1. Involution may be shortened.
2. There may be fewer chances of secondary infections.
3. Especially during summer, the owner may not like to have the odour of the placenta in the barn. As long as the placenta is left, the cow has to be kept in the barn which is inconvenient in the summer.

Disadvantages

1. Even the most careful veterinarian will cause some trauma which may introduce Pathogenic organisms into the uterine wall.
2. Secondary infection may be carried in by the operator.
3. It was reported that the phagocytosis viz. uterine leucocytes were completely inhibited for several days following attempts at manual removal.
4. The time of removal is also controversial.

Procedure to be followed for manual removal

Scrub and disinfect the vulva and surrounding area. Be as clean as possible in entering the uterus. Epidural anesthesia is also indicated to stop straining and also helps in preventing repeated defecation on your gloves. Use sterile plastic or rubber sleeves. Plastic gloves are easy to use and are disposable but may break, rubber gloves are excellent to use but must be washed and sterilized after each use. The hand is inserted (after proper lubrication with sterile lubricant) between the Endometrium and chorion in the inter cotyledonary space of the individual fetal cotyledon and its caruncles are grasped gently, each placentome is grasped and squeezed with the thumb and forefinger, the two structures are gently separated by a rolling, pushing and squeezing motion. This may be added by traction with the other hand on the adjacent portions of the FM as the separation is completed. The cotyledons in the cervical areas of the uterus are removed from the caruncles first and then by traction with the outside hand the placenta is pulled out and tension is maintained as the cotyledons in the middle portion of the horn and the non-gravid horn are removed.

Do not use any force to separate the membranes from the caruncles. Leave the placenta if the cotyledons are strongly adhered, spend no more than 15 minutes removing the placenta, otherwise leave it. The layman's practices of tying a weight on the placenta or of cutting the placenta off close to the vulva are not desirable. First, the weight causes the cow to strain and causes premature and incomplete breaking away after birth leaving a part of it still in the uterus. In rare cases this wt. may cause invagination of the uterus horn. Removing the placenta closed to their vulva to prevent the cow from swinging it against the milker is likely to result in the placenta dropping back into the uterus, followed by early closure of the cervix. The afterbirth may remain in the ut. long after it has separated from the caruncles because the weight of the placenta handing from the vulva is not present to draw it out. If the placenta is dragging on the ground it should be cut off at the level of the hocks to prevent it's being stepped on the tom away from the ut. When the RP is not manually removed several alternate forms of therapy have been observed. Drugs that increase uterine motility including oxytocin (10 IU), estrogen (15-20 mg), ergot derivatives (3 mg, contraindicated in buffaloes), calcium preparations, $PGF_{2\alpha}$ (25 mg) and its analog have shown limited benefit. The lack of effectiveness is not surprising, considering the low incidence of RFM due to uterine atony without a disturbance in the loosening process in the placentome. In recent years the use of broad-spectrum antibiotics has been applied to the uterus either as an infusion or in capsular form.

Prerequisites for intrauterine therapy are:

1. Rapid dissolution and distribution of the drug throughout the uterus.
2. Maintenance of antimicrobial activities.
3. Good penetration into endometrial layers.
4. Limited systemic absorption and lack of irritation.

Despite the almost universal application of antibiotics, their effectiveness or intrauterine treatment is questionable in many cases. It may be safe to conclude that:

1. BSA is able to control putrefaction.
2. Despite repeated intrauterine treatment with antibiotics freedom from infection is not always achieved.
3. The fertility of cows calved normally but getting RFM and treated intrauterine with antibiotics is unlikely to be similar to those when calved normally without RFM.

Disadvantages of repeated intrauterine therapy:

1. Development of resistant strains.
2. Necessity of antibiograms.
3. Milk and tissue residues.
4. Sometimes even a prohibitive cost.

Hormonal treatment

There are mostly used to increase the contractions of the uterus which help in the loosening mechanism of the placenta. Oxytocin may reduce the incidence of RFM if used within 24 hrs after the birth of a calf. Arthur (1982) reported that 10 I.U. oxytocin to cows immediately after calving reduced the rate of retention from 10 to 1 percent. The combination of oxytocin with $PGF_{2\alpha}$ can increase both the tone and frequency of contraction of bovine myometrium thus helping in the expulsion of FM. The estrogens have been widely used in the treatment of RFM. It increases uterine tone, relaxes the cervix, increases blood supply to the uterus and makes it more resistant to infections. Non- antibiotic antibacterials have been advocated for the intrauterine treatment of RFM because of the absence of proven benefit of antibiotics. Infusion of Lugol's solution for 2-3 days until placenta drops is an effective antimicrobial.

Prevention and prophylaxis of RFM

1. Avoid overfeeding
2. Selenium, Vitamin E (Khan *et al*., 2014)
2. Good hygiene, environmental contamination kept minimum
3. Breeding policies reduce dystocia
4. Extended dry period
5. Avoid stress- transport, psychological.

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Popular article

Exotic Outbreaks in Assam amidst the Pandemic: At a Glance

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Abstract

It is said that if one thing go wrong, a lot more wrong things follow up and, from the last one year many things went wrong with us and around us since the arrival of Covid-19. The adversity that covid-19 has caused to the whole world is immeasurable, be it by taking away people's lives or livelihood. The gripping fear of covid-19 changed the very perspective of our lives in many ways and it indeed made us realize the fragile existence of humanity which can even be shattered by a particle which is way too microscopic to be seen by naked eye.

Introduction

Last year amidst the ongoing covid-19 crisis, Assam fought to tackle two exotic viral disease outbreaks ravaging the livestock population. The first outbreak was the African Swine Fever (ASF), which was initially reported as a swine flu affecting the piggery sector in the month of February 2020, but in the month of May 2020, it was confirmed by National Institute of High Security Animal Diseases (NIHSAD) to be the case of African Swine Fever outbreak, which is believed to have reached Assam after the outbreak in China, through Tibet into Arunachal Pradesh then into Assam. The exotic outbreak happened for the first time in the state, with the highest pig population in the country, as well as in the entire Northeast affecting both domestic and wild pigs.

African swine fever Outbreak

African Swine Fever (ASF) is a highly contagious and acute hemorrhagic disease affecting all age groups of pig which is generally prevalent in the countries of sub-Saharan Africa. ASF is characterized by high fever, loss of appetite, hemorrhage in the skin and internal organs and death occurs invariably within 2-10 days after onset of symptoms. The etiological agent of this disease is African

Swine Fever Virus, which is large double stranded DNA virus belonging to the family Asfarviridae. Being a highly virulent virus, the mortality rates may shoot up to as high as 100%.

The primary route of infection is through the upper respiratory tract (nose, pharynx, larynx), where the virus replicates in tonsils and lymph nodes draining the head and neck. The virus is found in all body fluids and tissues of infected of infected pigs. Pathological findings are typically observed in the lymphatic and vascular system that includes hemorrhages in spleen, kidneys, lymph nodes, gastrointestinal tract and respiratory tract. Death occurs as a result of hemostatic and hemodynamic changes in the body and necrosis associated with it. Pigs are usually infected by direct contact with other infected pigs or by ingestion of contaminated feed and water. It can also be transmitted by ticks (soft ticks), biting flies and inanimate objects like shoes, clothing, containers, knives, door handles to susceptible animals. According to the World Organization for Animal health, ASF does not transmit from animal to humans unlike Classical swine fever which was indeed a relief amidst the looming fear of covid-19.

Assam has the largest Pig population in the country of about 2.8 million. The piggery sector of Assam which was already suffering due to the covid-19 imposed lock-down, faced a heavy economic setback due to ASF outbreak. According to official records, nearly 39,000 pigs have died of ASF in the last year. However, the farmers claim contradicts the official number, which is around 1, 00,000. Immediate ban was imposed by the Assam government on buying and selling of pork and around 12,000 pigs were culled as a control measure. The pig farmers all over the state were necessarily compensated to console their draining profit. Still the state has not declared itself free from ASF, as it is not easy to eradicate completely. The disease is still in need of exploration and research, as it is not curable, plus there are no vaccines. Therefore, proper and stringent control measures are been exercised around all the pig farms of Assam to prevent future outbreaks.

Lumpy Skin Disease Outbreak

The second “Exotic” outbreak that took a toll over the animal husbandry sector of Assam was “Lumpy Skin Disease” (LSD) in cattle and buffaloes. Around the end of June, the disease was detected and confirmed to be LSD. According to the State’s Animal Husbandry and Veterinary department, the disease was confirmed in Cachar, Hailakandi, Karimganj districts comprising southern Assam’s Barak Valley. It was also reported in

Kamrup, Nalbari and Barpeta districts.

LSD is an infectious viral disease, transmitted by arthropod vectors such as mosquitoes, biting flies and ticks. Similar to ASF it is not transmitted from cattle to human beings. LSD is caused by lumpy skin disease virus (LSDV), which belongs to the family of Poxviridae and genus Capripoxvirus.

The disease is characterized by biphasic fever followed by rapid eruption of large numbers of cutaneous nodules all over the skin of the body during the second phase of fever in about 7-10 days after occurrence of the first phase with an incubation period of about 2-4 weeks. The nodular eruption which is characteristic to the disease is accompanied by profuse salivation as well as oculo-nasal discharge and the animal avoids any sort of movements and usually prefers to stay under shade. The nodules are circumscribed, elevated, the size may vary from 0.5- 5cms in diameter which might become necrotic and sequester. Pathological findings reveal the nodular mass to be composed of creamy gray tissue with a caseous necrotic core.

According to the official statements of Assam govt. symptoms of LSD also included lesions in upper respiratory tract, emaciation and lymphadenitis. The severity of the disease can be mild to fatal with a morbidity rate of about 10-20% and the mortality rate up to 2- 5%. It created a huge loss among the dairy sector of the affected districts as the milk production in lactating cattle went down for several weeks. Moreover, case of abortion and infertility was also reported in many places. Unlike ASF vaccines were available for treatment of LSD, and proper actions and stringent awareness was raised by government to stop the epidemic.

Conclusion

Outbreaks are something which has been occurring since time immemorial. No one is to be blamed for such occurrences as it is all in the hand of nature. We cannot control the occurrence of outbreaks but we can definitely control the adversity and damages caused by an outbreak and strive to reduce the extent of severity. The cumulative attacks from the viruses be it coronavirus, ASF virus or LSD virus, no doubt it heavily affected the entire country, but it definitely will open doors to new research and developments in the field of health and medicine to prepare for future outbreaks and to some extent prevent future outbreaks.

Rescue and Rehabilitation of Wild Animals

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Abstract

Rescue of wild animals in the current scenario requires co-ordination and co-operation between people from different backgrounds and different agencies. Different approaches and management techniques are required for different species of animals. It is one of the most challenging and difficult tasks to rescue a wild animal and it is equally tough to rehabilitate the rescued animals. Restraining wild animals is also a difficult job, both physical and chemical restraining methods are used.

India is the 7th largest country in world with diverse geographical areas, climatic condition and vegetations. There are more than 350 species of mammals, 1224 species of birds, and 408 species of reptiles. India is one of the richest countries in the world in terms of natural heritage and biodiversity. There are 4 biodiversity hotspots in India namely the western ghats, sundaland, Himlayas and the Indo-Burma region. In these biodiversity hotspots there are many endangered mammals, birds, reptiles, fishes and amphibians are found. The list of endangered animals is too long to incorporate

Degrading Forest is the major cause of rescue of wild animals

here, some of which are endemic to India, like the Asiatic lion, Indian rhino, nilgiri tahr, swamp deer, Sangai etc. Some of the other endangered animals like Royal Bengal tiger, Asian elephants, Asiatic black bear, Red panda, Hoolock gibbons, mouse deer, clouded leopard, pangolins, king cobra, black softshell turtles etc.

As there are diverse wild animal species in India, it is bound to happen that one or many of these wild animals will have health issues like injury and wounds, diseases, orphan animals, conflicts with human which might lead to loss of lives on both sides, straying of animals from protected areas to human settlements etc. In all the above circumstances there may be a need for human interventions. Human interventions include driving a stray animal back to the protected area, treating the sick animals, husbandry care of the orphan and old animals, chemical restraining of animals which become a threat to human lives as well as its own life, trapping of animals etc.

Man animal conflict is increasing every day due to several factors like loss of habitat, fragmentation of habitat, loss of animal corridors, unavailability of feeds due to grazing pressure of domestic animals, old age etc. Stray cases of wild animals mainly happen due to the inter and intra species conflict for establishing supremacy or dominance, injury, old age etc. These interventions require expert persons, logistics and other resources. Coming to the specific concern of rescue and rehabilitation of wild animals, it involves a lot of management and a team of experts. The rescue team members must be in good health condition both physically and mentally.

Wild animal rescue usually happens in a non ideal situation for handling drugs and animal. A team for rescue operation of wild animals must include: Forest officials, One or more expert veterinarian, Animal keepers and handlers Biologist/zoologists, Sociologists, Civil administration and Local leaders.

1. Forest officials: The principal chief conservator of forests (wildlife) and chief wildlife warden must be in team as he is in-charge of overall wildlife. Even though he may not be in

the field but he must be in the loop and necessary permissions must be taken from him for undertaking and executing any rescue operation.

Team after successful rescue operation of an Orphan Asian elephant calf

Team after successful tranquilization and treatment of Wild Asian elephant

2. One or more expert veterinarian : It is always important to have an experienced veterinarian in wild rescue operations. Also, it is suggested that a team for rescue operation should have more than one veterinarian. Veterinarian must be prepared and acquainted with the work being undertaken, know the drugs and doses, tranquilizing equipments and the safety measures. It is very important to make it clear about the drug effect to the rescue team and nearby people as there had been many instances where just after firing of the tranquilizing dart, people approach the animal and get injured or killed. Drug of choice, accuracy of dose, darting platform, species of anima and distance of target are some of the most important factors during tranquilizing and rescue operations.

3. Animal keepers and handlers: They play a very important role in every rescue operation of wild animals. They need to follow the orders of the managers or the veterinarian. Their role starts from helping in the tracking of animals and after tranquilizing. Their role includes locating the tranquilized animal, help the veterinarian in covering the eyes of the sedated animal and to make sure that there is no blocking of the nostrils and air ways, hydrate the animal by pouring water in the body, physical restraining of the animal for putting the animal into the cage, locking the doors of the cage, lifting and loading the cage onto the truck, observe the animal during transportation, feeding and watering of the animals if needed, unloading the cage from the truck, releasing the animal by opening the door of the cage and finally post release monitoring. It is also important to mark the animals for physical observation if radio collaring for monitoring is not possible.

An animal keeper taking a Lesser Adjutant Stork for release in its natural habitat

An animal keeper feeding a rescued orphan Asiatic black Bear cub

4. Biologist/zoologists: They also play an important role in a rescue operation by helping in tracking and locating the animals, post release monitoring and help in studying the behaviour of the animal.

5. Sociologists: Sociologists are the persons who work directly with the community, in case of stray animals, their role is very crucial as it is of utmost importance to keep the local people informed and to make people aware about the situation arising out of straying animal, its capture and rescue operation. There are many a situations where local people get agitated and there is a conflict with the rescue team, in such a situation, a sociologist can play an important role, also they can help in doing awareness campaigns regarding wildlife and its conservation.

6. Civil administration: It includes magistrates and other civil servants serving in that area, their role is critical in rescue operation of stray animals. Maintaining law and order situation is very important for the safety of the rescue team, local people as well as for the safety of the animal. Police and defence personals maybe called for crowd control and maintaining of the situation.

7. Local leaders: It is very important to involve the local leaders of the locality in rescue operations. They must be kept in loop of the happenings around the area and necessary decisions must be communicated to them, it is important because people have a direct relation with the people and people tend to listen to them and obey them. Also, it is observed that rescue of large herbivores like Indian rhinoceros, Asian elephants, Indian gaur or wild buffalo require lot of people, more than the rescue team members in such a situation local leaders can play an important role by selecting some people who could help in the rescue operations.

Transport cages and other Logistics

It is very important to have cages which are specially designed for specific species of animals for easy handling and ease of transport and to reduce the chances of injury. Transport cages should be designed in such a way that there are minimum chances of injury and there is ample space for standing to lie down. It should also be kept in mind that cage should not be too large and the animal should not get space for turning. It should have facility for ventilation, Adequate ropes, nets, water buckets, tyres, inflatable tubes, ramps, machete, spade, axe etc are also required.

A sedated rhino on a ramp before pushing it inside transport cage

Ropes are required for securing of the animal, nets for physical restraining and in certain cases lifting of animals and stretchers for carrying of animals. Ramp is an important tool in a rescue operation as it helps in bringing an animal near to the transport cage or the vehicle in cases where the sedated animal moves far away to places where vehicles cannot reach. Usually, for large herbivores ramps are very important. Bamboo poles and wooden battens are also sometimes required for manoeuvring the cage or the ramp.Vehicle is also very important for any rescue operation. The vehicles selected for rescue operations are required to be in good running conditions. Vehicles like JCB or Hydra are also required for loading and unloading of the cages onto the vehicle and for pulling the ramp into the cage. Vehicles meant for rescue operation should always be checked and maintained well, preferably it should be four wheel

drive. A very important factor is that the vehicle ant for rescue operation should only be used for that purpose and it should be available at all ties during emergency.

Challenges of rescue operation

Rescue team- mobilize the required persons at the required time is a challenging task as in most cases staffs get busy with their activities in their respective jobs. It is very important there is a dedicated rescue team or rapid response teams whose primary work is to do rescue operations. There has to be more than one veterinarian, adequate animal keepers, driver and forest officials.

Drugs and medicines- it is very important to study the wildlife found in a particular area, type of conflicts as it helps in understanding of the problems and devising solution to these problems. It is of utmost importance that adequate drugs and medicines are available which are fresh and good quality. Drug of choice is very important in terms of chemical immobilization as different drugs have different effect on different species of animals. Veterinarians and forest officials must make sure that all the drugs and medicines are available for emergency use.

Equipments: It mainly includes tranquilizing equipments like the tranquilizing gun and its accessories. The guns must be examined at regular interval and testing sould be carried out with practice darts to keep it in good condition. Darts of different capacities (1 ml, 2 ml, 3 ml, 5 ml, 7ml and 10 ml) and material (plastic and metal) must be available along. Cartridge, syringe charger, cartridge holder, barrel cleaner, forceps must be available for Dist inject guns and pressure pump and gas for Dan inject and pneumatic guns etc. Needle of different types(barbed, plain) and different sizes (16 mm, 18 mm, 20mm, 22mm, 23mm, 24 mm and 25mm). A minimum of two guns must be available for carrying out rescue operation depending upon the use.

Logistics - Mobilizing the resources which are anticipated to be used in a rescue operation is very important. Before proceeding for any rescue operation it is important to know some details about the animals so as to prepare and carry necessary things to be used in a rescue operation.

Crowd control – It is one of the most important aspect of rescue operation. Crowd gathers around places where wild animals take shelter mainly for two reasons

To see the animal

To observe and see the rescue operation. Successful rescue operations depend on efficient and effective crowd control. For crowd control forest department alone is not enough, involvement of civil administration, police and para military forces are required for effective crowd control. Public addressal systems should be used. Absence of unwanted crowd and people near rescue sites helps in better management of rescue work.

Care and Precaution During Tranquilization

Suitable drug with appropriate dose should be used. Animals should never be tranquilized near a water body or in a hilly terrain. Darts should never be fired unless there is a clear view of darting region of the body. Any obstruction should be removed or cleared. After darting, the animals should always be tracked and monitored for its movement. Blind fold should be used in the sedated animals. Air passage or nostrils should always be clear and there should be no blockage. Transport cage and necessary securing articles must be ready before undertaking any rescue operation.

Sedated oversized rhino inside a cage

Rehabilitation of rescued animals

Rescuing the animal is one part and the other part is the rehabilitation which is equally important. Releasing or taking the rescued animal to a place where there is a threat to its life or there is shortage of feed and water, conflict with resident animals might lead to failure of rescue operation. The rescued animals should be released in place where there is no jeopardy or less risk for its survival. Many a times rescued animals are taken to the zoo which is like putting the animals into confinement, also many a times zoos may not have adequate housing facility for the rescued animals.

Sedated wild Asian elephant translocated across flooded Brahmaputra River in a country

So, it is suggested that proper facility be developed for housing the rescued animals. Rescued animals should be released back into the wild unless there is a threat to its life or it becomes a threat to people's lives.

One thing should always be kept in mind that in spite of all the precautions and care in management, there will be challenges and problems which will be beyond imagination. For tackling and overcoming such unforeseen situations an innovative and a positive mind is required. There are many times when there will be failure of the equipments, drugs, breaking of ramp, cages, tearing of ropes and vehicle damage, which all can be managed with positive attitude and out of the box ideas.

Importance Of Medicinal Plants In Animal Feeding

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Abstract

Herbs and spices have always been helpful to cure diseases. Now we use antimicrobial growth promoters in livestock and poultry feeding. But due to the prohibition of most of growth promoters, plant extracts have gained interest in livestock feeding strategies. The risk of the presence of antibiotic residues in milk and meat and their harmful effects on human health have led to their prohibition for use in livestock feed. Majority of herbal plants are safe and economical. Generally, plant extracts have no problem of drug resistance.

Introduction

Spices and herbs have played a dramatic role in civilization and in the history of nations. From the beginning of history, the strongest nations have controlled the spice trade. The same is true in today; the USA is now the world's major buyer, followed by Germany, Japan and France.

The delightful flavor and pungency of spices make them indispensable in the preparation of palatable dishes. In addition, they are reputed to possess several medicinal and pharmacological properties and hence find position in the preparation of a number of medicines.

Herbs and spices have always been helpful to cure diseases. Now we use antimicrobial growth promoters in livestock and poultry feeding. But due to the prohibition of most of growth promoters, plant extracts have gained interest in livestock feeding strategies. The risk of the presence of antibiotic residues in milk and meat and their harmful effects on human health have led to their prohibition for use in

livestock feed. Majority of herbal plants are safe and economical. Generally, plant extracts have no problem of drug resistance.

Major Compounds in Spices

Spices impart aroma, colour and taste to food preparations and sometimes mask undesirable odours. Volatile oils give the aroma, and oleo resins impart the taste. Aroma compounds play a significant role in the production of flavourants, which are used in the food industry to flavor, improve and increase the appeal of their products. They are classified by functional groups, e.g. alcohols, aldehydes, amines, esters, ethers, ketones, terpenes, thiols and other miscellaneous compounds. In spices, the volatile oils constitute these components.

Major Chemical Constituents in Spices:

Spice Crop	Botanical Name	Active compound
Ajowan	*Trachyspermum ammi* L. Sprague	Thymol, γ-terpenene
Aniseed	*Pimpinella anisum* L.	Anethole, Anisaldehyde
Bay leaf	*Laurus nobilis* L.	1,8-cineole, Linalool, α-terpinyl acetate, Methyl eugenol
Black Pepper	*Piper nigrum* L.	Piperine, β-Caryophyllene, Chavicine
Capsicum	*Capsicum annum* L.	Capsaicin
Celery	*Apium graveolens* L.	Myrcene, Limonene, α-pinene, Phtalides
Cinnamon Cassia	*Cinnamomum verum* syn. *C. Zeylanicum* *Cinnamomum cassia* (L.) Presl.	Eugenol, Cimetaldehyde, Benzyl benzoate, Cinnamaldehyde

Clove	*Syzygium aromaticum* (L.) Merr.et Perry	Eugenol, Eugenyl acetate
Coriander	*Coriandrum sativum* L.	Linalool
Cumin	*Cuminum cyminum* L.	Cuminaldehyde, β-pinene, *cis*-β-farnesene
Curry leaf	*Murraya koenigii* Spreng.	Murrayacine, Koenigine, β-phellandrene, α-pinene
Fennel	*Foeniculum vulgare* Mill.	Anethole, Estragol
Fenugreek	*Trigonella foenum-graecum* L.	Diosgenin, Trigonelline
Garcinia	*Garcinia cambogia*	α-humelene, Valencene, β-caryophyllene
Garlic	*Allium sativum* L.	Allicin
Ginger	*Zingiber officinale* Rosc.	Gingerol, Shogaol, Citral, Zingiberene, *ar*-Curcumene
Horse radish	*Armoracia rusticana* Gaertn.	Allyl izotiocianat
Mint	*Mentha piperita* L.	Menthol
Mustard	*Brassica juncea* L. Czern	Allyl izotiocianat
Nutmeg and mace	*Myristica fragrans* Houtt	Myristicin, Elemicin, Sabinene
Paprika	*Capsicum annum* L.	Capsanthin, Capsorubin
Parsley	*Petroselinum crispum* (Mill) Nyman ex A.W.Hill	1,3,8-p-menthatriene, Apiol, β-phellandrene, Myristicin
Rosemary	*Rosmarinus officinalis* L.	Cineol
Sage	*Salvia officinalis* L.	Cineol
Small Cardamom Large Cardamom	*Elettaria cardamomum* Maton *Amomum subulatum* Roxburgh	1,8-cineole, α-Terpinyl acetate
Star anise	*Illicium verum* Hooker fil.	Anethole
Tamarind	*Tamarindus indica* L.	Furfural, 2-phenyl acetaldehyde
Thyme	*Thymus vulgaris* L.	Thymol
Turmeric	*Curcuma longa* L.	*ar*-Turmerone, Curcumin, Demethoxy curcumin, *bis*-demethoxy curcumin
Vanilla	*Vanilla planifolia* Andrews	Vanillin

Use of Medicinal Plants

1. On appetite and digestibility

Herbs, spices and various plant extracts have appetite and digestion stimulating properties. The spices known for their appetite stimulant effect are cinnamon, cloves, cardamom, laurel and mint. Most of them stimulate the secretion of saliva. Curcuma, cayenne pepper, ginger, anise, mint, onion, fenugreek and cumin enhance the synthesis of bile acids in the liver and their excretion in bile, which beneficially effects the digestion and absorption of lipids. These spices stimulate the function of pancreatic enzymes (lipases, amylases and proteases); some also increase the activity of digestive enzymes of gastric mucosa. Besides the effect on bile synthesis and enzyme activity, extracts from herbs and spices accelerate the digestion and shorten the time of feed/food passage through the digestive tract.

2. Medicinal herbs and spices as antimicrobial

The development and wide use of synthetic and semi-synthetic antibiotics, pros and cons have been experienced throughout the last 50 years which have been directed research back to natural antimicrobial products as indispensable resources. Consequently there is considerable research interest in the possible use of natural products, such as essential oils and extracts of edible and medicinal plants, herbs and spices, for the development of new additives in animal feeding.

Studies found a change in long chain fatty acid profile in the membranes of *E.coli* grown in the presence of limonene or cinnamaldehyde. The changes in fatty acid composition can affect surviving ability of microorganisms.

The mixture of cinnamaldehyde, capsicum oleoresin and carvacrol enhances the growth of lactobacilli, and so increases the ratio of lactobacilli to enterobacteria. So herbs and spices do not posses only the antimicrobial activity, but also modulate the composition of microbial population by prebiotics activity.

Clove bud oil has various biological activities, such as antibacterial, antifungal, anti-oxidant and insecticidal properties. The high level of eugenol present in the essential oil imparts strong biological and anti-microbial activity.

The extracts of *Azadirachta indica* (neem plant) chewing sticks are effective against *Streptococcus mutans* and *Streptococcus faecalis*. Chewing sticks are recommended as oral hygiene tools for health promotion in developing countries.

The *Origanum vulgare* containing more than 30 antibacterial chemicals. *Zizyphus vulgaris* root extract showed excellent inhibitory effect on the growth of gram positive and gram negative microorganisms.

3. Antioxidant properties

The plants rich in antioxidants play a protective role in health and against diseases, and their consumption lowered risk of cancer, heart disease, hypertension and stroke. The major group of phytochemicals that may contribute to the total antioxidant capacity of plant include polyphenols and vitamins (C and E). The antioxidant potential of medicinal plants may be related to the concentration of their phenolic compounds which include phenolic acids, flavonoids, anthocyanins and tannins.

Garlic and onion contain the sulfur-containing active principle, mainly in the form of cysteine derivatives, which effectively lower the lipid levels, and inhibit oxidation of low-density lipoproteins.

The herbs often used and rich in phenolics are: rosemary, thyme, oregano, sage, green tea, chamomile, ginko, dandelion, and marigold. The herbs commonly used for feed/food preservation is rosemary (*Rosemarinus officinalis*). It can be used alone or in combination with tocopherols or synthetic antioxidants.

4. As anti-inflammatory

Extracts of curcuma, red pepper, black pepper, cumin, cloves, nutmeg, cinnamon, mint and ginger showed anti-inflammatory effect in the studies of rats. The major active molecules with anti-inflammatory action are terpenoids and flavonoids. These molecules suppress the metabolism of inflammatory prostaglandins. The other herbs and spices with anti-inflammatory potential are chamomile, marigold, liquorice and anis.

5. As immunostimulant

The immune system generally benefits from the herbs and spices rich in flavonoids, vitamin C and carotenoids. The plants possess immunostimulatory properties are echinacea, liquorice, garlic and cat's claw. These plants can improve the activity of lymphocytes, macrophages and NK cells, they increase phagocytosis or stimulate the interferon synthesis.

6. Chemopreventive and anticancerous

The chemopreventive and bioprotectant property of curcumin in turmeric increases cancer cell's sensitivity to certain drugs commonly used to combat cancer, rendering chemotherapy more effective. It also possesses strong antimicrobial and antioxidant activity

and may slow down other serious brain diseases like multiple sclerosis and Alzheimer's disease.

The specific inhibition of HIV-1 integrase by curcumin suggests strategies for developing antiviral drugs based on curcumin as the lead compound for the development of inhibitors of HIV-1 integrase.

The effect of polyacetelenes in celery leaves towards cancer cells, their bioavailability and their ability to reduce tumour formation indicates that they may also provide benefits for health.

In star anise, the presence of a prenyl moiety in the phenylpropanoids plays an important role in anti-tumour- promoting activity.

Ocimum tenuiflorum possess anticancerous properties. Ocimum suppressed benzo pyrine induced chromosomal aberrations in bone marrow and elevated glutathione (GSH) and glutathione S-transferase (GST) activities in liver of mice. They also suppress the chemically induced hepatomas in rats and tumours in the fore-stomach of mice.

7. Insecticidal properties

Some herbs, especially neem, have strong insecticidal activity. The Meliaceae, especially *Azadirachta indica* (Indian neem tree) contains at least 35 biologically active principles. Azadirachtin is the predominant insecticidal active ingredient in the seed, leaves, and other parts of the neem tree. Neem works as a repellant by disrupting the appetite of insects and diminishing their urge to reproduce.

The greatest advantage to pest control with neem is the fact that it does not harm useful insects such as ladybirds, wasps and earwigs. Additionally, neem is benign to spiders and pollinators such as bees and wasps. Furthermore, the neem deter insects as effectively and economically as DDT and other synthetic pesticides.

8. Anticoccidial activity

The herbs especially *Azadirachta indica, Hobrrhena antidysentrica, Barberis aristata, Embelia ribes, Acorus calamus* and *Artemisia annua* have strong Anticoccidial activity. The neem fruit had compound margosate, responsible for the break down of Eimeria life cycle.

Artemesia annua dried leaves contains artemisinin which protected weight gains and reduced oocyst yields for both *E.tenella* and *E.acervulina*.

9. As a remedy for bird flu

Star anise is the industrial source of shikimic acid, a primary ingredient used to create the antiflu drug, Tamiflu, which is regarded as the most promising drug to mitigate the severity

of the bird flu H5N1 strain of virus. Currently, Tamiflu is the only drug available which may reduce the severity of bird flu.

10. As a bioenhancer

Piperine (1-piperoyl piperidine) in black pepper is shown to possess bioavailability enhancing activity with various structurally and therapeutically diverse drugs. This property of piperine may be attributed to increased absorption, which may be due to alteration in membrane lipid dynamics and a change in the conformation of enzymes in the intestine.

Conclusion

Keeping farm animals healthy is necessary to obtain healthy animal products. For the last decade the use of additives of natural origin in animal and human nutrition has been encouraged. Medicinal plants compete with the synthetic drugs. As the world is becoming more advanced, new diseases are emerging in animals and human beings by irrational use of antibiotics and antimicrobial growth promoters. Now it is the need of the hour to work more extensively on the medicinal plants in the greater interest of mankind.

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Role Of One Health In Wildlife Conservation

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Abstract

Wildlife refers to non-domesticated plants and animal species which live and grow in areas which are uninhabited by human. For the sake of public health and wellbeing, human-kind requires working better to conserve and preserve the nature and ecosystem services, including disease regulation, understanding and mitigating activities which lead to disease emergence. One Health approaches for the conservation of wildlife and for management and mitigation of the risks of emerging infectious diseases have the greatest importance for protection of endangered wildlife. Numerous emerging infectious diseases (EIDs) have arisen from wildlife, thus wildlife has become popular now a day due to media as it causes impact on human health due to EIDs, but there is little coverage on human-induced habitat destruction or wildlife population stress in EID spread and the negative impacts of disease on wildlife. Thus, now a day's public perception towards wildlife associated diseases becomes the most important threats to wildlife conservation. In this situation One Health context emphasizes the interdisciplinary collaboration and the inextricable nature of human and animal health and disease.

Introduction

Wildlife conservation is defined as avoiding threats to wildlife populations, species, habitats and where necessary, restoring wildlife populations, habitats and the ecologic processes necessary to sustain wildlife, as well as influencing people (individuals, communities and institutions) such that human behavior does not degrade wildlife, habitats, or ecologic processes and instead supports the philosophy, ethic and practice of conservation. Wildlife conservation faces many threats. Direct threats include depletion, degradation and overexploitation of habitat and high impact of wildlife diseases on population viability (Daszak et al., 2000). An indirect threat includes decrease social acceptability of human coexistence with wildlife due to zoonotic wildlife diseases. This is a vitally important consideration for wildlife conservation because, without social acceptance of wildlife, social support for conservation will decrease (Decker et al., 2010). The general model of wildlife management is the practice of manipulating wildlife populations, habitats, humans and their interactions (Giles, 1978). Wildlife conservation is not just an unrelated set of practices, policies and supporting science, but it is a

coherent ethic of resource use, allocation and protection. The practice of conservation continues to be supported as long as society agrees with the philosophy and ethic of conservation. Wildlife conservation is therefore a societal value (or set of values) in a normative belief system (philosophy and ethics), and associated actions are collectively the practice of wildlife conservation. One health is a movement capable of mobilizing multiple sectors and combining resources to most efficiently tackle issues that affect the health of multiple species or resources. Emerging infectious diseases (EIDs) associated with wildlife can aggravate negative public perceptions of wildlife and erode public support for conservation and value of wildlife due to the fear of human health consequences (Decker et al., 2011). Because wildlife-associated health and safety hazards present risks to more citizens than perhaps ever before, the balance between positive and negative wildlife-associated impacts may be gradually moving toward the negative in many places. The relative contribution of wildlife-associated disease to this emergent conservation threat is currently unknown, but it significantly decreases community tolerance for wildlife such as coyotes or white-tailed deer due to perceived disease concerns.

One Health is a collaborative, multisectoral and transdisciplinary approach, which is functioning at the local, regional, national and global levels with the goal of achieving optimal health outcomes recognizing the interconnection between person, animals, plants and their shared environment. It's an approach that recognizes that the health of individual is closely connected to the health of animals and our shared environment. Although it is not new, but it has become more important in recent years due to widespread pandemic of newly-identified coronavirus (SARS-CoV-2), which believed to be originated from animals like bats and entered humans from secondary hosts such as pangolins and all this happens because of following factor:

- Population explosion and expanding into new geographic areas. As a result, more people live in close contact with wild and domestic animals.
- Deforestation and intensive farming practices causes disruption in environmental conditions and habitats that can provide new opportunities for diseases to pass to animals.
- The movement of people, animals and its products has increased from international travel and trade, all this helps in quick spread of disease across borders and around the globe.

Conditions associated with wildlife conservation

Wildlife-associated disease has been a long-time and persistent concern in many developing countries, but aside from rabies and a few other ''legacy'' diseases, wildlife-associated disease

had not been widely perceived as a major human or wildlife risk in other parts of the world. However, wildlife-associated disease awareness, beyond effects on wildlife species of interest to the public, has grown in the wake of evidence that 75% of all EIDs are zoonotic, most originate in wildlife, and EID incidence has continued to increase since 1940 (Jones et al., 2008). These populations are largely inexperienced with wildlife and may be more likely to overestimate risks, either due to lack of knowledge, situation novelty, or perceived threats to children or pets. Furthermore, as biodiversity and habitat loss continue, so do the increases in EIDs and human health threats resulting from ecosystem degradation.

What must be done?

The wildlife conservation community has to address communication about wildlife-associated disease with the broader health communities to scale back unnecessarily extreme risk perceptions and promote benefits of nature and wildlife. Decker et al. (2011) recently identified four main sets of actors within the wildlife-associated disease communication system that are human health professionals, wildlife veterinarians, wildlife biologists/ managers and wildlife management stake holders among them wildlife veterinarians can play a key role in facilitating communication among the fauna, human health and wildlife conservation communities. They also assert that wildlife veterinarians are often effective media spokespersons for wildlife conservation as some way to achieve the general public with balanced One Health messages. Domestic animal veterinarians have the networks, and a much broader workforce and distribution to have a significant impact on promoting balanced One Health messages. One Health promotes coordination, collaboration and communication to attain these goals. The veterinary and wildlife professions could engage in One Health strategically to assist the risk- averse public better understand the ‘‘whys’’ and ‘‘hows’’ of emerging zoonosis, including the beneficial aspects of a healthy ecosystem and wildlife. One Health addresses two issues important for wildlife-associated disease risk perceptions that are self-efficacy and societal efficacy. Human, companion animal, wildlife and livestock health communities each address specific and different audiences and may empower individuals and improve societal efficacy by acting as a trusted source of health-related information. A joint, interdisciplinary effort to switch fear messages with factual and holistic information about disease, the protective benefits of biodiversity, and also the ways to attenuate risk related to wildlife-associated disease could maintain or improve societal support for wildlife conservation. Wildlife conservation should be integrated into One Health communications and considerations as soon as possible, but it must be finished full recognition that more science of wildlife conservation is

required. The multidirectional flow of knowledge created by public engagement can result in informed input in wildlife disease management. In the absence of such research and engagement activities, caution should be taken by all fields of the One Health community to not turn the general public aloof from valuing wildlife presence (i.e., effectively devaluing wildlife conservation).

Conclusion

The One Health movement is meant to enhance the health of multiple species and also the environment, and it's great potential and promise during this regard. Natural resources and biodiversity have countless benefits for human health and reducing communicable disease spread. If handled poorly, the incorporation of wildlife in One Health could backfire for conservation, increase public apprehension about wildlife living in proximity to humans or their pets, and cause diminished conservation support. The wildlife profession has to develop, test, and evaluate wildlife-associated disease messages that increase the public's knowledge and improve individuals' perceptions of self-efficacy and societal efficacy for mitigating disease risks without eroding wildlife support or value. Preparation of a foothold statement about One Health communication could also be a logical step toward avoiding the potential down side of the One Health initiative for wildlife conservation.

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A preliminary assessment of snakes and monitor lizards encountered during Covid-19 lockdown in Agra, India

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Abstract

India had undergone a strict lockdown in the year 2020 to curtail the spread of novel coronavirus. Human mobility was restricted and the time spent in and around houses was unlimited. This may have added to the increased frequency of encounters with snakes, monitor lizards, and other urban wildlife. We assessed the data of snakes and monitor lizards rescued during the lockdown in 2020 and compared it with 2018 and 2019 data. During the lockdown, there was an increase in the number of encounters with snakes and monitor lizards but species diversity, seasonality, and activity pattern remained similar with the previous two years. The rescue activity is also an important opportunity to spread awareness among the public about the local snakes and monitor lizards. The overall impact of the lockdown on snakes and other reptiles will be assessed over the years as more data becomes available.

Keywords: Reptiles, snake, monitor lizard, rescue, conflict, covid-19, awareness.

Introduction

In the year 2020, India had undergone a complete lockdown where human mobility was restricted to curtail the spread of COVID-19. During the pandemic, there have been several interesting wildlife encounters reported throughout our country on social and print media. Urban wildlife that resides around human habitation faced new challenges during this pandemic (Corllet *et al.*2020). Most of us spent time in our homes like never before and managed to engage ourselves in activities like gardening, cleaning, and exploring our surroundings daily. We speculate that this may have led to the increase in the frequency of encounters with snakes, monitor lizards, and other urban wildlife that thrives around us. Moreover, we all know that because of urbanization, encroachment, degradation of natural spaces, and other human disturbances there has been an increase in the number of encounters with snakes (Pareek and Singh 2021; Gayen 2019; Roshnath 2017; Purkayastha *et al.* 2011) and with other wildlife. An average of 58000 people dies annually due to snake bites in our country (Suraweera et al. 2020). Yet human-snake

interactions have received very less attention (Ramesh and Nehru 2019). Snakes have always been associated with our culture and are also a cause of fear among people (Pareek and Singh 2021; Gayen *et al.*2019; Roshnath 2017). Snakes are important (Gibbons*et al*. 2000) because they help us to keep a check on rodent populations (Pandey et al. 2016) and act as prey to some mammals and birds. Likewise, Monitor lizards are scavengers that help us to control pests and keep the environment clean. They do not attack humans unless provoked. Although most of the snakes, monitor lizards, and other reptilesare protected under The Wildlife (Protection) Act, 1972, they receive no mercy when sighted (Gayen *et al.*2019; Roshnath 2017). They face many other challengessuch as illegal trade (Joshi *et al.* 2021; Marshall *et al.* 2020); persecution for superstitious beliefs, killed for their meat, skin, and other body parts, etc.

Study area and methods

Wildlife SOS, a non-government organization, has been running a 24 hours helpline with Uttar Pradesh Forest Department for wildlife rescues in Agra, Mathura, and nearby districts (Figure 1) for more than 15 years. When a call for a rescue is received, the contact details are transferred to the rescuer who notes down the address of the location. After the rescue is over, the rescuer enters all the details in a predesigned form and gets it signed by the caller.

Photographic documentation of the rescue and the species is done on the location itself. The rescued snake or monitor lizard is released immediately or on the same day in a suitable natural area. If the snake or monitor lizard is found injured, it is brought to the hospital for its treatmentand released after its recovery. These rescue details are entered in a spreadsheet and also reported to the Uttar Pradesh Forest Department. Translocation of rescued snakes is a topic of research and debate (Ramesh and Nehru 2019; Roshnath 2017; Barve *et al.* 2013). Translocation may have negative impacts on the snakes and as well as on humans. We looked at the patterns of the snakes and monitor lizards encountered and rescued in the years 2018 and 2019.We compared it with patterns during the lockdown of the year 2020. We wanted to know if there was an increase in the number of encounters during the lockdown.Which species of snakes were encountered more.

Where did most of the encounters happen? What time of the day did the most encounters occur? Do these patterns tell us something about their ecology and behavior?

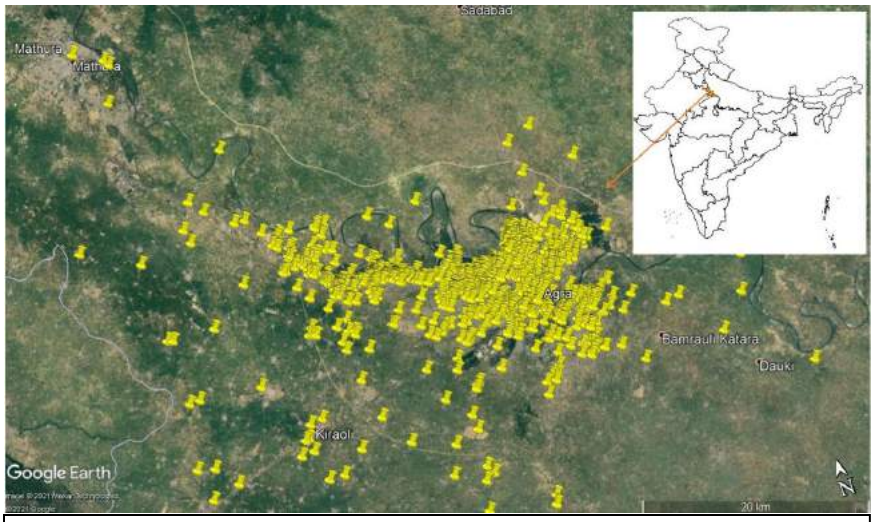

Figure 1. GPS locations of human-reptile (snakes and monitor lizards) encounters in Agra, Mathura and adjoining districts.

Results and discussion

The total number of snakes and monitor lizards rescued in 2018 and 2019 were 309 and 408 respectively. In 2020, we saw that there was a clear increase (564) in the number of calls received for the rescue of snakes and monitor lizards from the city. A maximum number of snakes and monitor lizards were rescued during autumn (September-November) followed by monsoon (July-August) season (Table.1). The pattern remained unchanged throughout these three years. Agra, Mathura, and other adjoining districts are situated on the banks of the river Yamuna. During the monsoon, the river is flooded and many reptile species migrate to cities and adjoining villages through canals and drainages. Overall these cities have limited forest patches.

Table 1: Number of rescues in different season

Season	**2018**	**2019**	**2020**
Winter (December-January)	27	43	39
Spring (February-March)	22	21	24
Summer(April-June)	56	56	91
Monsoon (July-August)	84	122	154
Autumn (September-November)	150	166	256

The most common species rescued in these three years (Table.2) were Indian Rat Snake (*Ptyas mucosa*), Indian Rock Python (*Python molurus)*, Common Wolf Snake *(Lycodon aulicus)*, Spectacled Cobra *(Naja naja)*, Common Indian Monitor *(Varanus bengalensis)*, Common Krait *(Bungarus caeruleus)*, and Checkered keelback *(Xenochrophis piscator)*.Indian Rat snake (Whitaker and Captain 2008) is a diurnal species. It is commonly found throughout the Indian subcontinent. Its diet is eclectic which includes frogs, toads, rats, birds, lizards, and other small vertebrates. It inhabits a wide range of habitats. It is a very fast snake and can escape quickly. Indian Rock Python (Daniel 2002) is diurnal and nocturnal species depending on the extent of human disturbances. Pythons hibernate in the winter season and can be sighted while basking during the day. Being a large-bodied snake it constricts its prey and prefers to eat mammals and birds. Pythons are forest (dense or open) dwellers or inhabit river banks or lakes. Interestingly, of all the pythons rescued from Agra and nearby districts, 33% were from houses, 31% were from farms and fields, 15% from commercial and public facilities, and 9% from the roads, 11% of pythons escaped before their rescue. Common Wolf Snake (Daniel 2002) is nocturnal species. It is commonly found near and in human habitation throughout the country. It can easily climb vertical walls and is mostly rescued from the crevices, ceilings, and roofs. Its diet consists of lizards, geckos, skinks, and mice. Spectacled Cobra (Daniel 2002) is one of the most common venomous snakes found in the country. It is most active during the night but may venture out during the day in search of its prey. Its diet consists of frogs, toads, birds, rodents, snakes, and eggs of invertebrates. It inhabits a wide range of habitats. Common Indian Monitor Lizard (Daniel 2002) is a widely distributed diurnal species. It is a burrow dweller but also inhabits crevices on the ground or rocks. It eats a wide variety of prey like frogs, fish, small turtles to small mammals, and birds. Common Indian Krait (Daniel 2002) is a widely distributed venomous species. It is very active and alert during the night. It is found near human habitation, in farms and fields, in rodent burrows, and termite mounds. Its diet consists mostly of snakes but it consumes rats and frogs too. Checkered keel back (Whitaker and Captain 2008) is a freshwater snake that is commonly found throughout the country in water bodies and paddy fields. It feeds on frog's eggs, tadpoles, frogs, fishes, and water insects. They are reported to eat rats and birds too. The snake is active during the day and night.

Table 2: Species rescued during the years

Species	2018	2019	2020
Indian Rat Snake (*Ptyas mucosa*)	65	66	101
Indian Rock Python (*Python molurus)*	86	86	93
Common Wolf Snake *(Lycodon aulicus)*	66	84	93
Spectacled Cobra *(Naja naja)*	46	60	71
Common Indian Monitor *(Varanus bengalensis)*	28	33	41
Common Krait *(Bungarus caeruleus)*	22	20	23
Checkered keelback *(Xenochrophis piscator)*	11	8	10
Black Headed Royal Snake *(Spalerosophis atriceps)*	3	3	8
Common Sand Boa *(Gongylophis conicus)*	1	9	6
Common Cat Snake *(Boiga trigonata trigonata)*	2	2	4
Red sand boa *(Eryx johnii)*	7	0	3
Common Kukri Snake *(Oligodon arnensis)*	0	1	0
Russell's Kukri Snake *(Oligodon taeniolatus)*	0	1	0
Leith's Sand snake *(Psammophis leithii)*	0	1	0
Unidentified snakes	2	34	111

In 2020, 20% of the snakes escaped from their location of sight before the rescuer reached. These were recorded and were categorized as unidentified snakes. Snakes could manage to escape because of their elusive nature and if given a chance, they would prefer to slither away from human encounters. It can also be because of the disturbance from the people or the inability of the people to keep a track of its movement because of fear. At times, people just call for the rescue even if they have sighted it in their backyard or near their residence, sometimes a few hours earlier. 80% of the rescues were of non-venomous species. Common Cobra and Common Krait are the only two venomous species of snake rescued from the city. In 2020, 60% of the rescued snakes were from domestic residences. This was similar to 2019 (64%) and 2018(56%) data. Other rescues in the year 2020 were from commercial and public facilities (10%) such as schools, offices, restaurants, warehouses, religious places, shops, showrooms, and even from a hospital, 9% were from farms and fields and around 2% were from the roads. Most of the rescue calls received were concentrated during the day (Figure 2) and that also coincides with the human activity peak hours.

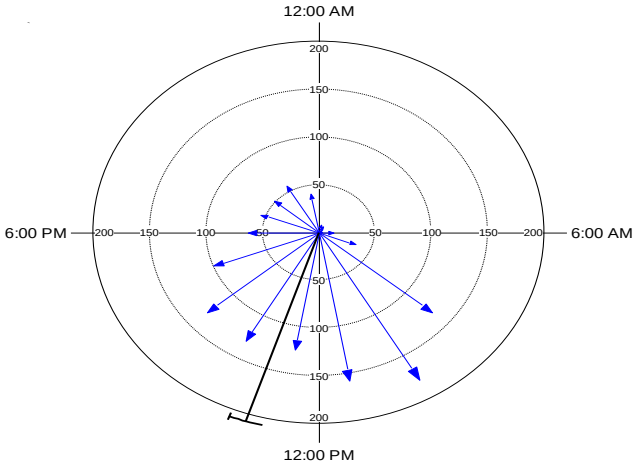

Figure 2.Time of rescue calls received

Conclusions

It may be early to assess the overall impacts of the pandemic and lockdown on the encounters of snakes, monitor lizards and, other wildlife, but such evaluations are possible. Scientific rescue of snakes and monitor lizards provides us an excellent opportunity to interact with the civil society and educate them about the endangered species and the laws. At the same time, we have been able to document the diversity, trends in seasonality and frequency of encounters, activity pattern of the snakes, and monitor lizards. The information can be very useful for further research, develop conservation plans and strategies to manage human-snake interactions effectively.

Pictures showing the role of rescue and awareness activities. Copyright Wildlife SOS.

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Chocolate Toxicosis In Dogs

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Abstract

Chocolate toxicosis is predominant in dogs due to their indiscriminate feeding habits, although it is seen in various species. Pets are accidentally exposed to chocolates around holidays. It can cause cardiac arrhythmias and CNS excitations in animals which may be life-threatening. Freely obtainable sources of chocolate are the causative factors. Theobromine and caffeine present in chocolate are primary toxic principle that contribute to chocolate poisoning in dogs. Dark and baking chocolates are much toxic to dogs than white chocolates but all of these should be kept far from dogs.

Introduction

Chocolate ingestion is a usual condition of canine poisoning which can cause illness and ultimately lead to death of animal. Chocolate derived from the roasted seeds of *Theobroma cacao*, contains the theobromine and caffeine. These have effects on heart, kidney and central nervous system (CNS) in animals and humans (Finlay and Guiton, 2005). Human can metabolize theobromine more efficiently in comparison to dogs, thereby increasing the effects and toxicity to dogs.

Cause of toxicosis

Theobromine (3,7-dimethylxanthine) and caffeine (1,3,7-trimethylxanthine) which are methylxanthines are main toxic principles in chocolate. Even though the relative amount of theobromine in chocolate is 3–10 times that of caffeine, both constituents bring about the clinical signs of chocolate toxicosis. The level in severity of effects of chocolate consumption in dogs depends on the type and amount of chocolate ingested by dog. The precise quantity of methylxanthines in chocolate differ because of the natural difference of cocoa beans and

differences within brands of chocolate products. More the level of caffeine and theobromine in the chocolate, the greater toxic will be the dose. Usually, darker the chocolate, higher the possibility of serious illness to the dogs. The concentrations of theobromine present in white chocolate are 1 mg/ounce, in milk chocolate are 60 mg/ounce, in semi-sweet chocolate are 260 mg/ounce, in dark chocolate are 300 mg/ounce, in baking chocolate are 450 mg/ounce and in cocoa shell yard mulch are 300-1200 mg/ounce. Lower levels of theobromine are present in white and milk chocolate but the sugar and fat content present in these can cause potentially life-threatening pancreatitis.

The LD_{50} of both caffeine and theobromine is reported as 100–200 mg/kg, but at much lower dosages can cause severe signs and deaths. Sensitivity to methylxanthines varies in individual. In general, dog ingesting 20 mg/kg dosage may show mild signs, at 40–50 mg/kg dosage show cardiotoxic effects and at dosages more than or equal to 60 mg/kg, seizures may occur. One ounce of milk chocolate per pound of body weight is lethal dose in dogs although, ingestion of any chocolate in a large amount can cause serious health problems.

Mechanism of action

The toxic principles theobromine and caffeine (methylxanthines) readily absorbed from the gastrointestinal tract and distributed throughout the body. The dogs are unable to metabolize methylxanthines which results into toxicity. Methylxanthines competitively inhibit cellular adenosine receptors and causes diuresis, CNS stimulation, increase in heart rate. Methylxanthines also increases entry of calcium in striated muscles, resulting into contraction of skeletal and cardiac muscle. In CNS, methylxanthines compete for benzodiazepine receptors, inhibit phosphodi-esterase and causes an increase in levels of cyclic adenosine monophosphate. This, in turn, increase circulating levels of epinephrine and norepinephrine.

Clinical signs

Clinical signs of chocolate toxicosis appear in dogs within 24 hours of ingestion. Initial signs are mild and include vomiting, diarrhea, polydipsia, gastrointestinal upset and restlessness. Signs can progress to polyuria, hyperactivity, ataxia, rigidity, tremors, and seizures. In severe cases increase in heart rate, hypertension, tachypnea, cyanosis, hyperthermia and coma can occur (Weingart et al., 2021). Cardiac arrhythmias, hyperthermia, or respiratory failure are the main cause of death. Pancreatitis may occur in dogs due to high fat content of chocolate products.

Diagnosis

Diagnosis of toxicosis is based on clinical signs and history of exposure. Complete blood count and urinalysis can be done to detect disease or organ failure. Electrocardiography can be used to detect cardiac arrhythmias and related abnormalities. To rule out other causes of symptoms radiography may be done. Differential diagnoses should be considered between amphetamine toxicosis, pseudoephedrine toxicosis, ephedra toxicosis, cocaine toxicosis and ingestion of antihistamines, antidepressants or other CNS stimulants.

Treatment

For treatment of toxicosis, firstly calculate the level of toxicity based on dog's weight, chocolate type and amount of chocolate ingested. If possible, to determine the toxicity level, it is always best to bring the chocolate wrapper to the doctor. As there is no antidote of methylxanthines, treatment involves only symptomatic and supportive care. The main priority in treating chocolate toxicosis is stabilizing the symptomatic dogs. To manage potentially life-threatening clinical condition such as for tremors and/or mild seizures methocarbamol (50–220 mg/kg, slow IV; no more than 330 mg/kg per day) or diazepam (0.5–2 mg/kg, slow IV) and for severe seizures barbiturates or other general anesthetics may be used. Tachyarrhythmias should be treated by propranolol (0.02–0.06 mg/kg, slow IV) or metoprolol (0.2–0.4 mg/kg, slow IV). To stabilize cardiovascular function and acceleration of urinary excretion of methylxanthines, fluid diuresis may be used.

Decontamination should be done after stabilization of dog or within 1 hour of ingestion before clinical signs have developed. Apomorphine or hydrogen peroxide should be administered to induce emesis for removal of toxin. Gastric lavage should be done when emesis was not effective or when toxic dose was ingested. Administer intravenous fluids to flush remaining toxins and for hydration and to stop further absorption of toxin into the body, activated charcoal (1–4 g/kg, PO) should be administered (Bates et al., 2015). In symptomatic dogs, as long as signs persist, doses should be repeated at every 12 hours. Monitor cardiac status via electrocardiography, correct acid-base and abnormalities of electrolyte and manage body temperature. Placement of urinary catheter may be employed to prevent reabsorption of methylxanthines and their metabolites via the bladder. In severe cases, signs may present for up to 72 hours.

Prevention

The finest manner to avoid chocolate toxicosis in dogs is to put chocolate and foods containing chocolate out of dog's grasp. Occasionally, small chocolate is safe to dogs although dogs are actually at risk from chocolate. Special "pet chocolate" which does not contain theobromine are safer alternative but it still can cause obesity. Cocoa shell have characteristic chocolate smell due to high levels of theobromine in it and can attract dogs which can be lethal, so keen gardeners should be aware in spreading cocoa shell mulch on their garden in the months of spring and summer.

Prognosis

The dogs which have ingested less quantity of chocolate, prognosis is good and there will be appearance of mild clinical signs only. Whereas, in case of severe signs such as collapse and seizures, prognosis is often poor.

Conclusion

Ingestion of chocolate may result to clinically unfavorable CNS and cardiovascular effects. The severity of clinical effects can be diminish by initial gastrointestinal decontamination. Only symptomatic and supportive treatment is present, comprising managing of cardiac arrhythmias and CNS excitation.

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Wildlife Forensics, laws and Veterinarians

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Abstract

Wildlife crime is increasing day by day, whereby people kill, hunt, trap and trade in different species wild animals, organs of wild flora and fauna. It has become the 4th most lucurative crime in the world. There is an international racket involved in wildlife crime. Pangolin is considered to be the highest traded animal. Different agencies and professionals are engaged in wildlife crime control and contributing in different capacities and in different roles. Wildlife veterinarians too are contributing in their own capacities. There are lot more a veterinarian can contribute with enhancement of skills via trainings and other capacity building measure.

Wildlife conservation and protection of nature has becomeone of the most critical issue for the healthy existence of human life. With the ever dwindling and disappearing forests and wildlife, drastic measures have to be taken to preserve our natural resources. Unfortunately there has also been an increase in crimes related to wildlife for various reasons in the world. Wildlife crime has become the 4th most lucrative crime in the world. Wild animals are being targeted as a source of money, and it is increasingly becoming global in nature. Rhino horn, tiger bones and skin, ivory and pangolin scales are some of the most sought after wildlife products. The demand is both national and international. Many different groups and people are involved in a wildlife crime; this might include a local person who may help in identifying the target, shooters, persons who transfer the items,middlemanand buyers.

Criminals invariably leave behind a clue that usually leads toa conviction if properly and thoroughly investigated and recored. It is often seen that due to the lapses and improper handling of the crime scene, the poachers and criminals escape, and even if they are arrested, they get acquitted due to insufficient evidence. With a piece of proper and comprehensive knowledge in

wildlife crime prevention, laws, and legalities with the help of forensic science, it will be easy for the forest officials and judiciary to convict the poachers.

Forensic science can play an important and crucial role in controlling and preventing crimes against wild animals crimes against wild animals. The term "Forensic" refers to "relating to or denoting the application of scientific methods and techniques to investigate crime". Forensic science refers to the application of scientific methods and procedures to solve and prove that a crime has taken place. With the innovations and use of new techniques by the poachers and criminals, it is of utmost importance that the crime investigating agencies/ forest officials/ police department upgrade and improve their skills and technologies.Many different applications of forensic science can be used for solving the act of crimes. Therefore, forensics can be used from collecting evidence to producing thoseshreds of evidencein court for law. Incidence of suspected poisoning (deliberate), gunshot death, snares and traps and electrocution can be solved easily using forensic science. Sniffer dogs should be used for crime scene investigationwhich helps detect the crime and substances like explosives, wildlife parts and products, and, which helps detect the crime and substances like explosives, wildlife parts and products, scats, and communication gadgets used in the committing the crime.

Forensic science is also growing with the advancement of time, and there is development of new and innovative, easy to use techniques to solve different medico legal and vetero legal issues.

Broadly, the role of forensics can be summarized into the following points

- Identification of species: many a time, it has been observed that criminals are arrested for killing and eating wild animals, birds, reptiles etc. Raw and cooked meat, hairs, skins, nails, internal organs, horn, teeth, whole animal specimen (preserved, dried, coloured etc.). It has been observed that the poachers or the criminals always try to escape by saying that the specimen is that of a domestic animal. In such situation, it becomes imperative to establish the species of animal for arresting and conviction of offenders. Identification of species is mademainly by genetic analysis, histology and ultrastructure of hair, specific anatomical characteristics and meat sample analysis for specific characteristics. For identification of tigers, photographs must be taken and sent to Wildlife Institute of India for matching with stock images of the camera trap.

- Crime detection: Wildlife related crimes can be detected and solved by the use of forensic applications. Hunting, poaching, trading of wildlife articles etc can be detected, and perpetrators can be arrested and convicted.
- Apprehending wildlife criminals: Forensics helps in arresting and apprehending criminals by helping in crime detection.
- Prevention of wildlife crime: it helps in situational crime prevention.
- Conviction of criminals in thecourt of law for committing wildlife-related offences and crime, including documentation of the offence and report filing.

Collaboration is key to wildlife crime prevention

It is vital to have collaboration between various agencies like Forest department, Wildlife Crime Control Bureau(WCCB), Police, civil administration, Enforcement Directorate, Customs, CBI & CID. In addition, various para-military and military forces also play an important role in wildlife crime detection and prevention. NGOs also play a crucial role in wildlife crime control. Therefore, collaboration and co-ordination among the various agencies will help in better and faster action regarding wildlife crime control.

Wildlife laws and regulations

Any person working for wildlife conservation must be acquainted with basic laws for tackling wildlife crime. In India, the Wildlife Protection Act, (1972) is the primary legislation in arresting a criminal indulging in crimes related to wildlife. Various sections are promulgated in this act for different crimes and all the animals have been categorised into various schedules like Schedule I, II, III, IV, V, VI and specific punitive measures are mentioned against crimes related to wildlife. CITES, CrPC and Customs Act 1962 are some other legislations that are used in wildlife crime prevention.

Veterinarians are also required to update themselves about such laws, various institutions working for wildlife conservation must organize trainings for veterinarians regarding law and enforcement and forensics. Tranquilizing and euthanasia are two critical aspects where wildlife laws are to be taken into consideration. For euthanizing and tranquilizing of wild animals, necessary permissions must be taken from the chief wildlife warden.

Tranquilizing a male Hog deer that injured two persons in Tezpur Mental Health Hospital- Permission from Chief Wildlife

Post mortem and sample collection is another very important aspect. Any veterinarian registered with the State veterinary council or veterinary council of India working for Government agencies like Animal Husbandry & Veterinary, Professors from Veterinary Colleges and veterinarians working in Forest department can conduct post mortem on wild animals.

While conducting post mortems, veterinarians must collect samples for laboratory analysis to corroborate the post mortem findings. Different samples must be collected in different preservatives. For toxicological examination, viscera should be collected and tested in a forensic laboratory. The use of preservatives is very important. Ethanol and silica gel is usually used as a preservative for genetic analysis, common salt can also be used as a preservative for genetic analysis.

Post mortem of Himalayan gorals Tawang, Arunachal Pradesh- It is important to establish the cause of death

For histopathological analysis formaldehyde or PBS solution, NBS can be used. Ballistic samples should always be touched with gloves and sent to forensic laboratories for determination of gun powder, type or make of arms and ammunitions and shooting distance. Labelling and packing of the samples should be done properly so that there is no mix up or leakage. Swabs should be used for sample collection from liquid and semi-liquid materials.

Disposal of the carcass is also an important aspect, burning and deep burial is advised. When dealing with confiscated samples veterinarians must take the measurements like weight, circumference, length, breadth etc of the samples, type and quality of sample, shape, color, texture etc.

Standard technique for Sample collection

A. Tissue samples
   1. Sterile gloves, mask, cap should be used during sample collection.
   2. A good quality screw cap vial/zip lock bag should be used for sample collection.
   3. Ethanol/Silica gel should be sued as a preservative
   4. The label should include species, date, time and place of collection

B. Blood

1. Blood should be collected using a sterile syringe and transferred to vaccutainer. Serum sample and whole blood sample should be kept separately.

VACUTAINER BLOOD COLLECTION TUBES

Range	Color coding	Additive	Clinical Use for
Whole blood		EDTA	Hematology test Special biochemistry (HbA1c) Immunochemistry (Cyclosporin and Tacrolimus)
Plasma		Lithium Heparin	Cardiac Markers
		Sodium Fluoride + Potassium Oxalate	Glucose Test (FBS free blood sugar)
		Sodium Citrate	Coagulation test
Serum		Plain (NA additive) Clot activator	Serum biochemistry and immunology test Tumor Markers Hormones Vitamin D (should be covered) Oncology RFT – LFT – Lipid profile
		Gel + Clot activator	

Sending samples to Forensic laboratory or disease investigating laboratory

1. The sample should be properly labelled and sealed.
2. Sample vials are usually put inside thermocole box/ cardboard box, wrapped in cloth, should be properly secured and sealed with a wax/lac with official seal of the authority.
3. All samples should be sent with request/authorization letter and post mortem report.
4. The authorization/request letter must mention the species, number, type and weight of the sample. It should be clear and specific.

For dealing with Confiscated/seized Asian elephants

- Microchipping of captive elephants is to be done by veterinarian in the presence of a forest officer (range officer, Assistant conservator of forest or Divisional Forest officer) after receiving a written order/letter from the forest department.
- Microchip number verification is to be done by a veterinarian in the presence of a forest officer (range officer, Assistant conservator of forest or Divisional Forest officer) after receiving written order/letter from the forest department.
- A microchip certificate/verification certificate should be given mentioning the morphometry of the elephant, identification mark etc verified by a forest officer (range officer, Assistant conservator of forest or Divisional Forest officer).

Health certificate for Transport

It should clearly mention the date, time and place of examination along with two witness, various anatomical descriptions like sex, age, height, length, number of nails, horns, identification mark(if any), vaccination record(if any), mode of travel, name of place of starting journey and name of destination along with vehicle number and animals in advanced stage of pregnancy should not be certified for transport. For captive elephants, microchip number must be mentioned.

Sniffer Dogs: Sniffer dogs are gradually used in wildlife crime control and detection. These dogs are usually trained in dedicated dog training centres of defense organizations. A veterinarian is required to take care of the health of the sniffer dog with regular deworming, vaccinations and treatment for illness. Diet, training and exercise are also required to be overseen by a veterinarian.

Documentation

Documentation is a very important aspect when dealing with wildlife.It acts and supports veterinarians in many aspects like record keeping, self-defence in court of law, the establishment of thecause of death/injury etc.

Conclusion

Though many state and central forensic laboratories are helping with wildlife crime, it is not sufficient, which There is a need and scope for dedicated wildlife forensic laboratory in Assam and other parts of India.

Reference

On request only

LEGAL FRAMEWORK FOR WILDLIFE CONSERVATION IN INDIA: ISSUES AND CHALLANGES

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Abstract

Wildlife refers to plants and animal species which live and grow in areas uninhabited by human. It includes all non-domesticated animals and plants including many other organisms like fungi. Wildlife is found in all ecosystems such as forests, plains, grasslands, deserts and all other areas and have a specific and different form of wildlife. But because the human civilizations developed, the domestication of untamed animals and plants began for the advantage of citizenry and this had a substantial impact on the environment because as the human activities increased and development took place on a large scale, the wildlife and the ecosystems were seen being affected by it which affect food chain and biodiversity.

Introduction

India is one of the most biodiversity regions of the world as it contains three of the world's 36 biodiversity hotspots; the Western Ghats, the Eastern Himalayas and Indo-Burma hotspot. It is one among the seventeen mega diverse countries. India is home to 411 species of mammals, 1,232 birds, 456 reptiles, 219 amphibians, 2,546 fish, and 83,436 invertebrates and over 50,000 plant species (IGCMC and UNEP, 2001). Wildlife in India is a valuable gift of nature with diverse group of flora and fauna. With its rich, varied and diverse wildlife reserve, India has set up 104 National Parks, 18 bio-reserves and quite 515 sanctuaries to guard, protect and preserve these species of wildlife. India is endemic to several species of plants and animals which are evident

From one among the study conducted which says that 12.6% avian, 7.6% mammals, 6.2% reptiles and 6.0% species of flowers are presently native to the country. The study also states that around 33% plant species are endemic to India with around 70% endemic and diverse plants and animal species (Thapar, 1998).

Problem and threats associated with wildlife conservation

Wildlife conservation is referred to as the process by which animal and plant species are protected in their natural habitats. Wildlife conservation is very important now a day because of following threats (Klappenbach, 2014):

i. **Habitat loss by destruction and fragmentation:** Habitat destruction and fragmentation can take place by human activities such as felling of trees, dredging rivers, constructing dams, filling wetlands and mowing fields, use of lands for agriculture, construction of houses and roads etc.

ii. **Illegal Trading, poaching and Hunting of endangered species:** Illegal hunting and poaching has posed a major threat to wildlife which is further fuelled by the lack of proper management and use of resources by the forest officials to curb the menace and save the wildlife.

iii. **Climate change:** Global warming and climate change has also played a major role in posing threat to the wildlife. This is also again due to human induced activities which is done by the burning of fossil fuels etc. which resulted in the changing of the climate globally.

iv. **Over exploitation of resources:** Exploitation and over exploitation of resources for food and other purposes has resulted in posing a threat to the wildlife, especially to the endangered species. The over use of the wild animals and plants for food, medicines, clothing etc has badly affected the wildlife populations and thus has become a threat to their existence.

v. **Pollution:** The ever increasing pollution level due to human activities and industrial operations has resulted in the release of harmful and toxic pollutants in the air, water and land.

Legislation related to wildlife conservation

The Government of India has introduced various kind of legislation in response to the growing destruction of wildlife and forests. These are:

1. The Wildlife (Protection) Act, 1972 (Last amended in 2006) - The Wildlife (Protection) Act (WLPA), 1972 is main statute that gives a strong legal framework for prohibition of hunting, prohibition of cutting/uprooting specified plants, protection and management of wildlife habitats, establishment of protected areas, regulation and control of trade in parts and products derived from wildlife, management of zoos, declaration and protection of wildlife sanctuaries and national parks and constitution of various bodies.

2. The Indian Forest Act (1927) and Forest Acts of State Governments - The Indian Forest Act, 1927 aimed to regulate the movement of forest produce and duty imposition in forest produce. It also explains the procedure to be followed for declaring an area as Reserved Forest, Protected Forest or a Village Forest. This act gives us a details about forest offence and acts prohibited inside a Reserved Forest and penalties leviable on violation of the provisions of the Act. After the Forest Act was enacted in 1865, it was amended twice (1878 and 1927). The main objective of the Indian Forest Act (1927) was to secure exclusive state control over forests to meet the demand for timber.

3. The Forest Conservation Act (1980) - It was enacted by the Parliament of India in order to control the deforestation of the forests of India. It came into force on October 25, 1980 containing five sections. Its main objective is to protect the forest along with its flora, fauna and other diverse ecological components while preserving the integrity and territory of the forests.

4. The Environment (Protection) Act (1986) - The roots of the enactment of the EPA lies in the United Nations Conference on the Human Environment held at Stockholm in June, 1972 (Stockholm Conference). EPA is an important legislation that provides for coordination of activities of the various regulatory agencies, creation of authorities with adequate powers for environmental protection, regulation of the discharge of environmental pollutants, handling of hazardous substances, etc.

5. The Biological Diversity Act (2002) - The Biological Diversity Act, 2002 was born out of India's attempt to realize the objectives enshrined in the United Nations Convention on Biological Diversity (CBD) 1992. It aims at the conservation of biological resources, managing its sustainable use and enabling fair and equitable sharing benefits.

6. National Wildlife Action Plan (NWAP) (2002-2016) - The first Wildlife Action Plan was released from 1983 to 2001 and the second for 2002 to 2016. The Union Ministry of Environment, Forests and Climate Change (MoEFCC) announced the third National Wildlife Action Plan for 2017-2031. Under NWAP 2001-2016 priorities given to the increased commercial use of natural resources, continued growth of human and livestock populations and changes in consumption patterns.

7. National Forest Policy (1988) - The National Forest Policy, 1988 is primarily concerned with the sustainable use and conservation of forests and further strengthening of the Forest Conservation Act (1980).

Conclusion

The wildlife protection and conservation is a huge task in India with the growing concerns of illegal trade and exploitation of wildlife resources. This objective cannot be achieved until and unless all branches of the government authorities, villagers & local people residing in and around the protected areas, non-profit and nongovernmental organizations, law enforcement officers and the general public work together towards this goal.

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Major Parasitic Infections in Poultry

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Abstract

Dietary protein plays an important role in individual health status. In India poultry play a significant role in providing balanced food option to individual. Parasite adversely affects the health and production status of poultry and this in turn can also affect the humans. Sometime parasite cause heavy mortality in the flock of birds so their proper knowledge and control measure is need of hour. This popular article provide a brief information about some important poultry parasitic disease and there control measure which in turn can provide benefit to the farmers and enhance their income.

Introduction

Poultry are the domesticated bird and they are mainly kept for providing egg, meat and feathers. Egg and meat of poultry are excellent source of nutrition to mankind and help to attain balanced diet by providing almost perfect combination of carbohydrate, protein and fats. Poultry sector contribute major part in country GDP. India has 729.21 million poultry and it includes 692.65, 23.54 and 13.02 million chickens, duck and turkeys & other poultry, respectively (Islam et al 2016). Poultry suffer from many disease caused by bacteria, virus, fungus etc. and many of them are having zoonotic potential such as Avian influenza, Chlamydiosis, Salmonellosis, Avian Tuberculosis, Colibacillosis, Histoplasmosis, Cryptococcosis, Aspergillosis etc. Parasitic infections pose a serious threat to the poultry sector causing productive losses in terms of high mortality and morbidity. In spite of a well-developed organized poultry sector, backyard poultry practice is a very common practice since long in India. Risk of parasitic infections in the backyard poultry is quite high for obvious reasons. In this popular article we tried to summarise some major parasitic infections affecting the poultry sector.

Nematodes

Nematodes are mainly called as round worms as that have rounded extremities. There are many nematodes which can affect the health status of poultry. Some of major importance are:-

Nematode in respiratory tract:

***Syngamus trachea*-** It is also known as gape worm and cause the condition of "gapes" in poultry. *Syngamus* sp. parasitizes the trachea of a variety of wild as well as domestic birds. These worm appear red in colour due to suckling the blood (some time called "Red Worm"). Adult worms are mostly found in permanent posture of copulation and thus give "Y" shape appearance. They cause irritation in mucosa of respiratory tract which result into inflammation and production of excessive mucous in respiratory tract. The disease is due to physical blockage of the airway by mucous, leading to dyspnoea, manifested by an outstretched neck with open mouth, shaking and tossing of head but may also manifest as lack of condition and mortality.

Soil can remain infected for years and the life cycle is mainly by direct ingestion of egg have 2nd larval stage but sometimes also involve a mechanical host i.e. earthworm. The disease is mostly seen in birds reared in outdoor pens, such as game birds and ornamental or zoo birds. *Syngamus* sp. eggs must be distinguished from those of *Capillaria* sp. Thiabendazole can be used for the treatment of infected birds.

S. trachea in trachea

Male and female worm (Martin et al 2020)

Egg

Nematodes present in gastro intestinal tract (GIT):

Round worms inhabiting in the GIT of poultry mainly fall into 4 categories.

1. Roundworms (*Ascarid*), usually 5 to 7 cm (2-3 inches) long.
2. Hair (Thread) worms (*Capillaria* sp.), only measure 1-1.5 cm long.
3. Caecal worms (*Heterakis gallinarum*), usually 1.5 cm long.

These worms can readily be distinguished grossly differences in size. *Ascaridia* sp. is the largest nematodes of poultry. Adult's worn

lumen of the small intestine but the

larval stages invade the mucosa. *Ascaridia galli* may cause ill-thrift, enteritis or intestinal impaction, the degree of effect being related to the number of worms present. The life cycle is direct and infection is caused by ingestion of egg having 2nd stage larva, so debilitating infestations can occasionally occur in birds on litter, especially if the litter is reused in the case of broilers.

A. galli in intestine (Alam et al 2014)

A. galli egg (Sial et al 2015)

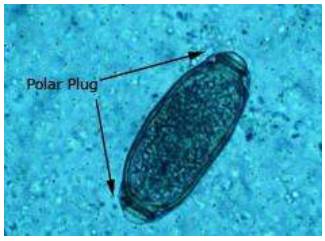
Heterakis gallinarum is found in the caecum of chickens, turkeys and many other species. It is probably never pathogenic and sometimes cause mild enteritis. Its main importance is for the transmission of *Histomoniasis meleagridis. H. meleagridis* is a protozoan parasite and cause infectious enterohepatitis in mainly young turkey and lead to the formation of yellowish-grey punched out markings in liver and bird sheds yellowish sulphur coloured drooping considered as pathognomonic for the infection. *H. gallinarum* only cause thickening and congestion of the caecum, sometimes cause nodular lesions. *Heterakis isolonche* invades the caecal mucosa of pheasants and can cause a severe or fatal nodular typhlitis. All *Heterakis* sp. have a direct life cycle.

Posterior end of male *H. gallinarum* (Park and Shin 2010)

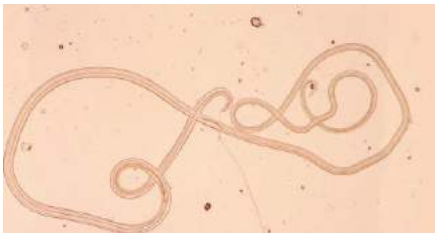
Male and female *H. gallinarum*

Capillaria sp. is the smallest and highly pathogenic when present in large numbers. Different species parasitize different parts of the alimentary tract and may have direct or indirect life cycles. *Capillaria contorta* and *C. annulata* are mainly found in the oesophagus

and crop while *C. obsignata* is found mainly in the intestine. These have direct cycle and can be a serious threat in birds on litter. Post-mortem examination showed the presence of adult worms mainly in mucosal washings under a dissecting microscope. The adult male worms have a single spicule enclosed by a spicule sheath, and the eggs are distinctive.



Capplaria egg



Male *Capillaria* spp (Park and Shin 2010)

Female *Capillaria* spp

Cestodes and trematodes:

A large number of cestodes and trematodes have been found in birds, commonly known as tape worms and flukes respectively. Requirement of intermediate hosts in these infections are well managed in modern poultry set ups however they still require serious attention in backyard poultry systems. Trematodes utilize molluscan intermediate hosts and are especially prevalent in free-ranging waterfowl. Cestodes utilize mainly arthropods and other invertebrates as intermediate hosts. They parasitize the digestive or reproductive tracts. The commonest to occur in modern poultry operations is *Raillietina cesticillus*. Its intermediate host is beetle. Other most important tape worms of poultry are *Davania proglottina, Raillietina Tetragona, R. Echinobothrida* causing severe enteritis to nodular lesions in intestine.

In relation to trematode most important genera is *Prosthogonimus* sp. also known as oviduct fluke. These flukes stay in oviduct of laying bird and cause irritation and therefore result in inflammation of mucosa. The irritated oviduct performs movement so fast that eggs come out without formation of proper egg shell. Sometime oviduct perform retro- peristaltic movement so broken yolk, albumin, bacteria, and parasite may enter in peritoneal cavity and lead to peritonitis.

Diagnosis of these poultry parasites is relied on post mortem examination of the intestinal contents which may reveal round-worms, caecal worms and tape worms without much difficulty. *Capillaria* sp. can usually be found when intestinal contents are washed through a fine mesh sieve.

P. ovatus (Heneberg et al 2015)

Protozoan disease in poultry:

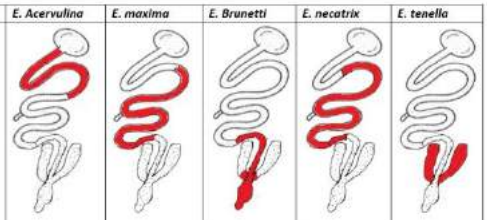
Many protozoan parasite effect the bird but most common and important is coccidian species i.e. *Eimeria* sp. Seven species of *Eimeria (E. acervulina, E. brunetti, E. maxima, E. mitis, E. necatrix, E. praecox* and *E. tenella*) are recognized as infecting chickens. *E. tenella, E. brunetti* and *E. necatrix* are considered as the most pathogenic. Other species such as *E. maxima* and *E. acervulina* are less pathogenic. Life cycle is direct and mainly different part of intestine are infected as per the species of *Eimera*. *E. tenella* affect the caecal part, *E. burnetti* infect rectum part, *E. maxima, E. necatrix* mainly infect middle part of intestine. Infected chicken get off fed and looked depressed, chickens droop, huddle together and by the fourth day, blood begins to appear in the droppings. Within few days' petechial haemorrhage are formed in intestine. By 3-4 days intestine have semi solid blood by 6-7th day intestine are filled with hard core material and by 8th day caecal core comes off. The most easily predictable clinical sign of severe cecal coccidiosis is the presence of bloody droppings. Dehydration may accompany cecal coccidiosis. Coccidiosis caused by *E. tenella* first becomes noticeable at about 3-4 days after infection.

Control of parasitic infection

1. Management practices largely determine the extent and types of parasitic infection.
2. Sheds should be cleaned and sanitized on regular bases.
3. Litter should not be re-used or should be thoroughly disinfected.

Oocyst of *Eimeria* sp.

(https://www.kstate.edu/parasitology/625tutorials/Apicomplexa02.html)

Species	*E. Acervulina*	*E. maxima*	*E. Brunetti*	*E. necatrix*	*E. tenella*
Portion of the intestine where lesions are mostly seen					
Symptoms	Anemia, light enteritis, loss of appetite	Diarrhoea, droppings may be flacked with blood	Enteritis, occasionally bloody	Bloody enteritis, drops in feed intake	Bloody droppings, reduce in feed intake
Pathogenicity	High morbidity, low mortality		Dysentery, high morbidity, high mortality		

Parts infected by Eimeria in poultry
(https://en.engormix.com/poultryindustry/articles/phytogenicapproach- safeguard-birds-t42871.htm)

4. Proper screening and observation for the presence of any symptom should be performed.
5. Veterinary care and guidance should be implemented.
6. Re-use of litter, or inadequate cleaning between crops, may allow a sequential build-up of potentially harmful parasite numbers so care should be taken.
7. Anti-parasitic drug should be given to birds as per symptom.

Conclusion

Parasitic disease cause huge economic loss both in term of mortality of birds and production loss. Proper knowledge of parasites and managemental step will help to boost farmer's income.

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Wildlife: Understanding the Tracks and Signs

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Abstract

Wildlife refers to undomesticated fauna species which include all organisms that grow or live wild in an area without interference by humans. Wildlife can sometimes be hard to spot, especially if it is nocturnal. But the signs that animals frequent an area can be a good start to discovering all kinds of species and ecologists rely on these animal signs to help them understand the numbers, behaviours and movements of species in an area. Tracking is an information-gathering expedition which does not disturb or alarm the target. Tracks and signs are collectively known as spoor includes footprint, scat, track, trails, etc. Tracks and signs can help in an increased awareness among the local people which will further help in providing support to the forest officials who are working in these protected areas as well as the government officials.

Keywords: Wildlife, tracks, signs, spoor, scat

Introduction

In terms of wildlife, India is a land of incredible extreme. Wildlife is found across the mountains, verdant grasslands, luscious tropical jungles and forests, dense wetlands, and arid deserts. Wild animal population size estimation is essential for their management and conservation. Wildlife practitioners mostly depend on the indirect observations of animals. It is essential to understand the relationship between such indirect indices and animal abundance. Wildlife practitioners connect the series of indirect indices to know what to spot, where to search, and to work out what's been occurring from the evidence they find!

Despite reason behind the widespread dependency on the tracks and historical perspective, the true population density has generally been sidelined in favor of direct sightings or

technologically advanced approaches to wildlife science, while there are some creative approaches to estimate density from track counts.

Tracks and signs are collectively known as spoor by trackers. Tracks and signs include a set of footprints, any kind of mark or disturbance left by the passing or activity of an animal or person. Spoor may include tracks, scents, or broken foliage. Because anything that touches an object leaves a trace, tracks and signs can be found everywhere. Tracking animals is either a science or an art which can be attained by knowledge and practice; it can be used to know how to trace and find any animal or person by the traces they leave behind.

Tracks are typically imprints or trace-outlines made by feet but may additionally include marks left by an animal's tail, head, antlers, or any other body part that touches another surface. By being attentive to the size, shape, pattern, and distinct features of the tracks left by an animal, one is able to determine which animal left the track and then determine what the animal was doing. When a clear-cut sample is available, tracks are an excellent method we can use to identify the animal. Measuring a track includes Line of travel, Length of track, width, stride, straddle, pitch, orientation.

Signs are anything besides a track that indicates an animal has been there. Signs mainly include trails, scat (poop), markings on trees, discarded food, and skin or hide left behind, etc.

Signs fall into four different categories

(1) Large-scale signs: - These are the first signs that aid in tracking an animal by examining the landscape or environment. This include trails, runs, escape routes, beds, transit beds, lays, dens, nests, feeding areas etc.

(2) Medium-scale signs:- Medium-scale signs provide definitive signs of an animal's presence and are especially common on trails and runs. Medium-scale signs include scratching, rubs, gnaw, chews, ground debris, above ground marks, upper vegetation breakage, bones, feathers, scat, kill sites, cough pellets, urine .

(3) Small-scale signs:- Small-scale signs are difficult to recognize and include compression. Animals walking either lift grit from the surface or compress it into the surface. To detect and dangerous predator.

Listed important track and signs of some species

S.No.	Species	medium-scale signs	Scat	Tracks
1.	Leopard *Panthera pardus*	Kills prey by suffocating, bite marks present on neck/throat	Size-1.5×10cm; Tapered, pointy, segmented, twirled with some hair may be present.; Fresh scat- color varies; Older scat- white due to presence of Calcium.	Zig-zag alternate gait, Rounded tracks but asymmetrical, Sharp nail expressions absent.
2.	Sloth bear *Melursus ursinus*	Territories by clawing at bark and rubbing on trees	Size- 5× 2.5 cm Globular, similar to as cow pile, along trails and trees	Paw size- 5''×5''(front) and 7''×5''(hind), toe no.-5,Waddlers, Claws present on track
3.	Canines(Indian Wolf) *Canis lupus pallipes*	Leave remains at fill site, Mark territories by ground scratching, urination, defecation	Hairy scat,tapers to point at one end	Paw size- 4''×5'', toe no.- 4 Claws present on track
4.	Wild pig *Sus scrofa*	Wild hogs are most noted for heir feeding behaviors that include rooting and overturning soil to access food. This rooting can be several inches to several feet deep. Trampling behavior by wild hogs can also cause crop destruction and habitat loss.	Wild pig scat is usually larger and irregularly shaped.	Deer tracks and wild hog tracks can be distinguished most easily by the overall shape of the track and by the tips of the toes. Wild hog tracks appear more round in overall shape than deer

				tracks (more oval or heart shaped).
5.	Deer (Cervidae) *Rusa unicolor*	Deer lack top incisor teeth and must grip vegetation in their teeth and tear it. This results in rough cuts.	Oblong, pelleted scat, average 20 × 10 mm. The common form of deer scat is a pellet with a dimple on one end and a point on the opposite end. These pellets are found in piles near feeding areas. In summers pellets frequently clumps due to high fiber diet.	Diagonal walker, zig-zagger, tracks are oval shaped or heart shaped. Generally the length of an adult deer track is between 2 3/8 and 3 1/4 inches. Tracks left by fawns are generally 1 3/8 inches long.
6.	Nilgai *Boselaphus tragocamelus*	Nilgai prefer grasses and herbs, though they commonly eat woody plants in the dry tropical forests of India They are the second largest member of the antelope family, with the older bulls often being referred to as “blue bulls”, as the dominant males typically become very dark, taking on a blackish and bluish hue.	Oblong, pelleted scat Nilgai have a characteristic habit of defecating repeatedly in the same location, resulting in the formation of large faecal piles or lavatory sites of nearly a meter in diameter	

Analyze compression, the side-heading provides the most effective method of seeing the compression pattern.

(4) Ghost-scale signs:- Side-heading may also help with analysis of ghost-scale signs. These are providing very minute depressions on the ground. Ghost-scale signs include dullings, shinings, and leaf depression.

Tracks and signs are extremely useful during a survival or wilderness situation. From tracks, we can find out how old the animal is, what direction they're traveling, whether they are male or female, their behavior, and even their emotional state at the time. Using knowledge from tracking may facilitate a person to secure food or water and help to avoid an agitated or

Conclusions

Wild animals are everywhere, but knowing where to find them is often a matter of developing some tracking skills and observational techniques. The knowledge of tracks and signs is important in the difference between natural loss and human interference loss of wildlife. Animal tracking data is being used to address environmental challenges such as climate and land use change, biodiversity loss, invasive species, wildlife trafficking and the spread of infectious diseases.

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Microbiological Evaluation of Processed and Preserved Feed

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Introduction

Animal feed is an integrated or processed product of plant and animal origin whose main purpose is to meet the nutritional needs of an animal. Many feed and feed ingredients are imported and feeds are often produced as a finished or integrated used feed. In recent years, it had been diversification in feed ingredients available and feeding practices. For example, rapid increased use of compound feeds in the dairy industry, reflecting the rapid growth and intensification in that sector. In addition, there was wide range of imported feed and feed ingredients from a variety of overseas sources, which poses an additional risk for the introduction of pathogens and contaminates into the food chain. There has been an interest in further clarifying the relationship between pathogenic bacterial contamination / contamination of animal feeds and human-borne diseases. Bacteria are naturally occurring, or in the form of contaminants of fodder, cereals, oil products and mixed feeds. Animal food can be contaminated with harmful bacteria such as *Salmonella, Listeria and E.coli*.

Bacterial contaminated feed and fodder

In the case of the latter organism, fecal sources and slurry have been identified as the main pollutants in the pastures and integrated feeds. Grain grains and oil-producing products are often contaminated with fungi that appear as plant germs or developing during storage. Serious side effects occur in farm animals due to the production of mycotoxins in certain species and species of these fungi Beneficial bacterial effects in food may arise from the presence of lactic acid bacteria during fossil fertilization during silage.

These bacteria favor the production of lactic acid, which helps lower the pH to about 4.0, thus keeping the winter fodder in herbivores Animal food, due to its composition, provides a

good environment for the growth of microorganisms. The micro-organisms found in the feed can be saprophytic, pathogenic and toxic.

Their growth and expansion in the feed depend on many factors, such as humidity, temperature, type of feed, aerobic and anaerobic conditions, chemical and physical properties of raw materials, total pH of feed, availability of feed supplementation, end times and conditions and as feed decay products. Feeds may be contaminated during processing, storage or shipping.

Some microorganisms introduced during storage, especially fungi, can adversely affect the quality of the feed including reducing dry matter and nutrition, causing a musty or sour smell, and producing toxins. Non-slip materials are undesirable and can significantly reduce feed usage. Contaminated feeds often create zoonoses and for this reason, it is important to establish systems to monitor the risks of microbiological feeds. The importance of microbial evaluation of the feed is not being considered as in livestock feeding till they affect the life or performance of the host animal. These microbes not only affect the animals but also the human with respect to *salmonellosis, scrapie, listeriosis.*

Fungal contamination of concentrates and forages

Contamination can occur during the preparation and storage of harvested and feed products whenever environmental conditions are favorable for mould degradation. The moisture content and ambient temperature are important factors affecting fungal colonization and mycotoxin production in concentrated concentrations and feeds. Dangers arise mainly from the ability of certain species and fungi to produce harmful substances known as mycotoxin. Fungal contamination of animal feed is a global phenomenon and adverse effects have been observed in all classes of farm animals due to the production of mycotoxins by certain species and fungi.

Fungal contamination not only leads to color change, taste and taste, but also causes hepatic and kidney damage due to the production of mycotoxins. These toxins also have genetic factors. The presence of microbial counts in silage is very important in preparing good quality silage. However, this area of animal nutrition is rarely studied without mycotoxins. The importance of microbiological quality has become increasingly important in the last two decades since the outbreak of the report of bovine spongiform encephalopathy in Europe.

Toxigenic fungi of concentrates and forages

Fungi	Occurrence	Mycotoxins
Aspergillus flavus; A.parasiticus	Peanut meal, cottonseed cake, palm kernel cake, maize,compound feeds	Aflatoxins
A. flavus	Oilseed meals, compound Feeds	Cyclopiazonic acid
A. ochraceus; Penicilliumviridicatum; P. cyclopium	Barley and wheat grains	Ochratoxin A
P. citrinum; P. expansum	Cereal grains	Citrinin
P. citreo-viride	Cereal grains	Citreoviridin
Fusarium culmorum; F.graminearum	Cereal grains	Deoxynivalenol
F. sporotrichioides; F.poae	Cereal grains	T-2 toxin
F. sporotrichioides; F.graminearum; F.poae	Cereal grains	Diacetoxyscirpenol
F. culmorum; F. graminearum; F. sporotrichioides	Cereal grains	Zearalenone
F. moniliforme	Maize kernels	Fumonisins;moniliformin; fusaric acid

Aspergillus genus contains all the other fungi in terms of mycotoxin production in grains and kernels. Some researchers have noted that Aspergillus was an important source of milk and other nutrients in the tropics. The three species are responsible for all mycotoxin production by this genus: *Aspergillus flavus*, *Aspergillus parasiticus* and *Aspergillus ochraceus.* *A. flavus* and *A. parasiticus* synthesise the aflatoxins, while *A. ochraceus* produces the ochratoxins. The aflatoxins include aflatoxin B1, B2, G1 and G2 (AFB1, AFB2, AFG1 and AFG2, respectively). In addition, aflatoxin M1 (AFM1) may be derived from the milk of dairy cows that use AFB1-contaminated feeds. Aflatoxigenic Aspergillus is generally considered to be the last fungus, growing under humid / humid conditions and at very high temperatures.

Salmonella species

Many species of Salmonella have been infected with farm animal diseases. Of these, *S.typhimurium* is still widely distributed while *S. enteriditis* has emerged as a common bacterial infection in chickens and a contaminant of eggs and poultry. Animal feed is thought to be an

important source of these germs. Meat and bone meal and fish foods are often contaminated with Salmonella. Deep pasture use provides an additional source of sewage pollution from infected animals. In addition, the practice of distributing cattle to common pastures and natural farms is another significant source of infection.

Escherichia coli

It is widely known that cattle feed contains *E. coli* by contamination of feces. There are special concerns about the occurrence of *E. Coli* O157 as this form is definitely linked to outbreaks of certain diseases in humans. Pasture use means that there is a possibility of contagious *E. coli* transfer to animal pastures, a practice that has created unrest among that facing food insecurity. It was suggested that attention should be focused on *E.coli* repetition in wet feed and storage length in feed boxes.

Foot and mouth disease

Foot and mouth disease became a major problem in the UK between "2001-02" with serious consequences for the livestock industry. The disease is transmitted by inhalation and ingestion of contaminants. The outbreak in the United Kingdom has been tentatively attributed to the feeding of kitchen waste to pigs. While this association may never be confirmed, it is clear that in the intensive rearing of animals due recognition should be given to the need to correctly process animal feeds. However, in the EU, the feeding of kitchen waste containing meat products is banned under a recent directive.

Bovine Spongiform Encephalopathy (BSE)

The prion proteins of processed animal proteins have recently emerged as important feed contaminants implicated in the development of Bovine Spongiform Encephalopathy in cattle. Prion proteins are normal animal tissue components with the capacity to transform into agents causing fatal neurological syndromes in a wide range of species.

The initial onset of BSE was attributed to the feeding of cattle with meat-and-bone meal prepared from carcasses of scrapie-infected sheep. The latter disease is also caused by prion proteins as is the human equivalent, new variant Creutzfeldt - Jakob disease (vCJD). The incidence of vCJD in human being increased with intake of BSE-contaminated beef.

It is this association that has led to extensive and stringent legislation in the European Union concerning the use of specified animal products in livestock feeding.

Silage Microbiology

The steps of silage making play a crucial role in feeding of green forages during post-monsoon seasons throughout the continents. Successful preservation of high moisture forage and other crops depends upon the controlling the activities of microbes, particularly bacteria. Conditions that allow for good preservation include the immediate installation and maintenance of anaerobic conditions at all stages in the ensilage certification process. Under these conditions, lactic acid bacteria multiply, using plant-based sugar to produce a sufficient amount of lactic acid to drops the pH to around 4, which optimum for effective preservation. Moist fodders are difficult to store in this way and often provides the right conditions for the growth of undesirable bacteria such as Clostridia.

During ensilage either one of the two types of fermentation (homo- and hetero-fermentation) takes place and ultimately determine the silage quality. Among these two fermentation types, the homo-fermentative is more desirable as maximum acidity could be obtained which retard the growth of aerobic organisms, mould and yeast and protect the silage form spoilage.

The preservation of the anaerobic environment during silage is not only favored by the growth of lactic acid bacteria but also by the growth of anaerobic clostridial organisms. Bacterial lactic acid (LAB) is of two types. Homofermentative species include *Lactobacillus plantarum*, *Pediococcus pentosaceus* and *Enterococcus faecalis*. Heterofermentative species consist of *Lactobacillus brevis* and *Leuconostoc mesenteroides*. The homofermentative group is effective in converting forage sugar into lactic acid. Two Clostridia groups are also recognised. The saccharolytic group includes *Clostridium butyricum* and *C. tyrobutyricum.*

These types fertilize the remaining sugar and lactic acid in butyric acid, which causes an increase in pH. The proteolytic group includes *C. bifermentans* and *C sporogenes*. These bacteria ferment amino acids to amines and produce ammonia which causes ammonia odor and an increase in pH on the alkaline side (> 5). This increase in pH associated with high humidity facilitates the growth of mold that alters odor, taste and color which also affects animal adaptability. The production of butyric acid due to clostridial fermentation has led to a decrease in the diet of ruminants.

Enterobacteria includes Escherichia coli and Erwinia herbicola and is considered undesirable because they compete with LAB for plant sugars which they add to acetic acid,

ethanol, CO_2 and H_2. They are also able to draw amino acids into NH_3.

Listeriosis

Listeria monocytogenes are still widely distributed in the environment and also occur in silage, especially large barley silage. The increase in Listeriosis in sheep and cattle has been linked to the introduction of large bale silage. The low levels of absorption and limited fermentation of large bale silage and the inclination of bags to all damage promote growth *L. monocytogenes*. This body is especially important because it can contaminate animal products that are designed for human consumption.

Fungi occur in silages as yeasts and moulds. The yeasts include species of *Candida, Saccharomyces* and *Torulopsis.* The moulds associated with silages include various species of *Aspergillus, Penicillium* and *Fusarium*. The occurrence of these fungi is of particular concern due to their potential to produce harmful mycotoxins.

Wilting the crop before ensiling is a common method of restricting fermentation, allowing the growth of LAB but inhibiting the activities of undesirable organisms like Clostridia & Enterobacteria.

Microbiology of ensilage organism Organisms

Organisms	**Conditions required**	**Major products/effects**
Lactic acid bacteria (LAB)	Anaerobic; wilting of crop is desirable; crop should be chopped for rapid establishment of LAB.	Homofermentative pathway: lactic acid and some acetic acid. Heterofermentative pathway: lactic acid, ethanol, mannitol, acetic acid and CO2.
Clostridia	Anaerobic; wet forage	Saccharolytic species: butyric acid, CO2 and H2. Proteolytic species: butyric acid, acetic acid, amines, CO2 and NH3.
Enterobacteria	Anaerobic; optimum pH 7.0; active in early stages of fermentation.	Acetic acid, ethanol, CO2 H2 and NH3.
Listeria	Aerobic; pH above 5.5; growth possible at low temperatures and in high-dry matter silages	Listeriosis, especially in sheep
Fungi	Aerobic; active on surface layers of silage.	Spores and mycotoxins

Microbial assessment

The assessment of microbial contamination in animal feeds needs to be rapid, sensitive and representation of diverse population. The approaches include collection of samples, isolation of microorganisms by the complete enumeration by total plate count (both aerobic and anaerobic organisms), identification of bacterial and fungal isolates; bacterial isolates were identified based on their gram staining and biochemical characteristics (indole test, sugar fermentation, methyl red test, voges- proskauer test, catalase test, coagulase test, citrate test etc.), fungal isolates were identified based on their morphological characteristics on SDA(Sabouraud Dextrose Agar) and Lactophenol cotton blue stain identification. Thin layer chromatography (TLC) quantifies mycotoxins formed and indirectly measures the extent of fungal contamination during the post-harvest and storage periods. These conventional procedures are less sensitive and time consuming; hence, the modern techniques of polymerized chain reaction could be used in assessment of feed microbial quality. This test will be rapid, more sensitive and also representation of diverse microbial contamination in the feed.

Conclusion

Microbiological safety and cleanness of animal feeds is essential not only due to the sanitary conditions of animals, but also because of indirect impact on health of consumers. Therefore, it is important that the producers of animal feeds, having in mind health consequences in animals and humans who consume food products of animal origin, provide the highest possible microbiological cleanness of their products. An essential role is also played by the farmers, who are producers of plant resources – the basic animal feeds for animals. Both farmers and producers within the framework of hygiene and good practice must pay attention particularly to the stage of drying and storing feed resources, in order to prevent microbiological contamination. With continuous collection and evaluation of microbial safety-related data during processing, distribution and use of animal feed, and application of adequate agricultural and management practices, microbial feed safety hazards may be considerably reduced and adequate feed quality ensured. Feed quality and safety are important prerequisites for sustainable development of livestock production.

Piglet Management

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Abstract

In India, the pig reared in north east region and some parts of Uttar Pradesh of the country, it is mainly reared for meat production. Piglet management is most crucial for pig farming to reduce the chances of mortality of piglet. The pig can be raised on kitchen garbage and low quality of feed it convert into meat. the pig farming is most profitable farming as compared as to other livestock farming because it produce short gestation period (114days) and produces 10- 14 litter per farrowing. Beside this, some taboos about pig farming this reason the pig farming in India is not common.

Keywords: Piglet, anaemia, notching, sow

Introduction

Management of piglet should be start in the uterus. Piglets need special attention because they are born with little energy and low disease resistance & have little ability to regulated their own body temperature and can be easily injured by sow. Farrowing should be attended by an experienced person irrespective of the time of a day or night with proper care & management with a few minutes after birth the piglet start moving & finding their way to nipples & begins to nurse. Placental membranes should be removed after birth. All the mucous from snout should be removed. Piglet born wet & covered by a thin membrane. It has cleaned by towel

Colostrum Intake

The first milk, colostrum, is rich in immunoglobulin; first colostrum is very rich and efficient, because the quality of colostrum decreases over time. Finding a good dose of colostrum, especially in a pig pond, is probably one of the most important factors related to pig survival and longevity. The young, strong, newborn piglets reach the udder hours before their newborn mates and then move from the udder to the udder taking the leading colostrum. Therefore, disadvantaged

pigs often need help to get enough colostrum. Below are some ways to ensure that pigs get the right amount of colostrum.

- Prevent colds so that the cold stays warm and functional.
- Separate the feed. This includes removing part of the litter for one to two hours for the first 12 hours after birth. For best results, remove large, hardy piglets for one to two hours in the morning and again in the afternoon, leaving the piglet to suckle. Give the sow 20-30 U.S.P. units of oxytocin (1 to 1.5ml) each time very large piglets are released. Be sure to hold large pigs in a box with extra heat to prevent freezing. Use this method to ensure high colostrum intake before mixing.
- Collect colostrum from pigs or get cow's colostrum and feed the piglets to the stomach tube or syringe. To milk a pig, remove all its piglets for one hour. Then give him 20-30 U.S.P. units or 1 to 1.5 ml of oxytocin, wait a minute or two, then peel the nipples (the front nipples are better because they produce more milk) to get colostrum. Cow colostrum can also be used and can be easily obtained. Any type of colostrum can be frozen in ice cube trays for future use. However, do not melt the cubes in the microwave oven, as rapid melting reduces the immunological value of colostrum. Abdominal tubes can be made with a model of jet fuel tube or by using a urine tube (size 14 French) available at medical stores. Attach the syringe tube and grease the tube with vegetable oil or jelly before placing it 6-7 inches in the pig's belly. Give the pig 10-15ml of colostrum once or twice during the first 24 hours of life.

Navel cord

The umbilical cord should be cut as soon as possible, a few days after the piglet are born. The navel's length is 12 inches and 2 inches should be left. Use a sterile scissors. The navel should be disinfected using an iodine solution to prevent bacterial infections. The arteries, which enable the fetus to absorb nutrients from the dam and release waste during pregnancy, usually do not require much attention. While it is possible for bacteria and viruses to become infected after the pig is born and cause infection or for pigs to bleed excessively, these conditions are rare. If excessive bleeding occurs from the cervix, fasten it with a cord using a square or a surgeon's knot or attach it to a piece of plastic that is available. It is not uncommon for newborn babies to be tied or tied with ropes. Sometimes newborns bleed excessively immediately after a navel fracture, especially if the fracture is shorter than four to five inches [4 to 5 inches]. Hemorrhage can cause

kids to misbehave or die. The reason for the excessive bleeding may be due to the failure of the piglet system. If the thread is dry but burns during processing, cut it with a disinfectant cutter. If the navel is tied, you can leave about an inch. Leave three or four inches if the navel is not tied; check for bleeding. Apply iodine antiseptic by swiping, spraying, or immersion. The dip method requires placing the umbilical cord inside the antiseptic bottle and moving it slightly. Any of these methods are satisfying, but make sure you get a good cover of the navel. Use sterile side cutters and a new iodine solution (which is changed daily when dipping or holding, because iodine solutions degrade in the presence of organisms). Contaminated iodine solution can cause infection. If the cord is dry and wrinkled, it is not necessary to treat it. Just cut it, leaving one to three strands of string.

Needle teeth

The newborn pig has eight needle teeth, sometimes called wolf teeth, found on both sides of the upper and lower jaw. Many producers record these within 24 hours of birth to reduce the spread of piglets and / or pig udder. Some manufacturers have stopped brushing their teeth completely while others have done so as needed and have not seen major problems. It does not seem necessary to cut the teeth of well-fed pigs. However, in cases where pigs are not milking well, or if fat swine disease is a problem, tooth extraction seems necessary to get good results. Use sharp cutters without blades. Otherwise, the teeth will be crushed, which can lead to infection. Also, replace cutters with dislocated jaws. Avoid conventional cord cutters because they are usually made with the quality of metal needed to cut the teeth adequately. Cut one part of the tooth. Do not remove the entire tooth and avoid crushing or breaking it. Otherwise, infection is possible or the pig may not feed properly. Avoid cutting gum or pork tongue. This will make it harder for pigs to be able to suckle. Cut your teeth on the floor and not at an angle. Piglets are not ready to cause skin damage when fighting if their teeth are broken. Wear glasses or goggles to protect your eyes from flying parts of your teeth. Hold the pig as described earlier, and place the cut side cutters on both the needle teeth under one side of the mouth and the flat side of the cutter to the gum line. Place side-by-side cutters, and cut one half of the two lower teeth at the same time. Turn the side cutters and cut the top two teeth. Repeat on the other side of the mouth.

Piglets born alive fall into two broad categories—normal and disadvantaged

It is important to note the difference between normal and reduced pigs in order to get the right treatment. Ordinary piglet will be born quickly, walk within a minute or two and suckle for

about 15 minutes. From the nipples to the nipples, they absorb a large portion of the immunoglobulin-filled colostrum. If the pig is a good mother and the breeding area is adequate, the normal piglets thrive without much help from the caregiver.

Piglets are weakened by the reproductive process, they are overweight, have a problem (congenital), are slow to reach the udder, or are cold. Weak pigs at birth include those that were deprived of oxygen but did not kill, regenerated "obvious" regeneration, and piglets that experience severe physical trauma. The longer a pig takes to breed the greater the chance that these problems will arise. Young piglets, especially those weighing less than 2.75lb at birth, are less likely to survive weaning than heavy piglets.

Splay leg

It is a common birth defect seen in disadvantaged pigs. Piglets are less likely to walk and breastfeed. Their weakened condition jeopardizes their ability to compete with dirty, littering partners to get breasts in the first hours after birth. This reduces their colostrum intake. Cool pigs often feel a low body temperature which puts them at risk of death. Often these pigs appear to be shivering and huddled in garbage, because their hot demands have not yet been met. They are designed for all pigs in the trash, while others are designed for disadvantaged pigs. There is a general time when it is most desirable to do many of these methods**.**

Attended Farrowing

Studies show that attending and assisting in breeding can increase the survival of the pig and the number of weaned piglets. By being present at the breeding season, one can quickly see the disadvantaged piglet and begin to help them. However, each producer should evaluate the costs and benefits of supervised farrowing. Having multiple direct debris at the same time (using batch farrowing or continuous farrowing in the farrowing room complex) makes use of the task easier.

Prevent Chilling

Breeding houses need to be provided with two different microclimates: one cool pig (60-65 ° F) and a hot one for newborn pigs (85-95 ° F for the first few days, and then down to 70-80 ° F range). To achieve this goal, keep the room temperature to about 65-70 ° F and provide space heating of the trash. Take a closer look at sow responses and litter at room temperature to ensure that their thermal needs are met. If the temperature provided by the heaters is too high, the piglets will move away from the heat source. This not only depletes energy but can also cause the pig to become very warm and even increase the death of the pig. The hot needs of the pigs are met when

they are sleeping in an area prone to gentle contact. If it accumulates, care should be taken to provide additional heat.

Provide space heating in breeding grounds starting 24 hours before the expected breeding. Heat lamps, heat pipes, glowing heaters, and hovers are the most common ways to provide space heat in filling houses. Most of the time, however, space heating is placed only on the side of the pig in the entrance area. Studies show that having an extra heat lamp placed at the back of the udder during farrowing reduces the death of the pig. The extra heat ensures that the piglets warm up as soon as they are born. What is important is that the extra heat is directed to the back of the pig before farrowing and to the end of farrowing. If there is no extra heat behind the pig during farrowing, place the needy piglets in a warm place immediately after birth.

Cross-fostering

The death of the lowest pig is seen in litter high weight litters with low-in-litter piglet different weight. Cross-fostering is the most effective way to reduce pig weight gain internally. The main objectives of cross-breeding are to reduce the variability in weight within the litter and to evenly propagate the number of piglets with the ability of the pig to grow (determining the number of active teats).

Cross-cutting should be done carefully to get the best results. A good cross-fostering system makes milk available to all pigs and does not jeopardize the health status of pigs in separate first weaning systems (SEW). Below are some important tips to ensure the best results from the merger.

- Make sure that the pigs that will be transferred eat the color from their pond. Allow the piglets to stay in their pond for at least four to six hours after birth before they are sent. Otherwise, the piglet may not eat enough colostrum, especially if they are raised in a seedbed that was released one to two days earlier.
- Cross-foster piglets before 24 to 48 hours of age. Pigs establish breast fodder (preferred udder) in the first days after birth and will almost always suckle the same udder or two nipples until weaning. It is in the best interest of pigs to establish the integrity of the udder, as it reduces competition and udder fights. When breastfeeding is unreliable, the piglets fight hard during lactation and gain weight. Weight loss after breastfeeding is disruptive and creates a fight between live and promoted pigs. The exception to this rule is the rearing of a single piglet that continues to contend with a single udder.

- In SEW programs where the age of weaning is important to raise the piglets after they are 24 to 48 hours they put them at risk of encountering a nurse who spreads the germs to which the piglets have not received protection from clostridia. Therefore, diseases can be passed from one nurse to another.
- Some producers have successfully transferred older, smaller piglets to the female stalk following early weaning from the nurse's litter. In these cases, make sure that the recommended weaning years do not exceed the recommended age of weaning on the farm.
- Choose small, humble pigs with small, small breasts of medium length to raise piglets that are less than the minimum size.
- Check for signs of disease in breeding grounds before crossing. This is important in reducing the spread of disease. Avoid moving a healthy pig to sick litter or vice versa.
- Transfer males rather than females when keeping animals taken inside the herd. In addition, the accuracy of the selection of females can be reduced and gilts raised by breeding ponds have less reproductive performance.

Piglet Anaemia / Nutritional anaemia

It causes thrift of the pigs. Piglets are pale brown and collect fluid around the throat, chest and internal organs. They may be attacked and affected by various conditions and ailments. Anemia accounts for about 10% of deaths before untreated waste weaning. Pediatric anemia has been a major problem since pig producers began dumping garbage in confinement, denying suckling pig's access to the ground. Iron is an important component of hemoglobin, a protein that contains about one third of the weight of red blood cells. The red blood hemoglobin has the unique function of transporting oxygen from the lungs to the body's tissues to support cellular metabolism and to transport the resulting carbon metabolism back to the lungs. In the absence of iron deficiency, the piglet cannot absorb a sufficient amount of hemoglobin. Therefore, baby pig anemia is a blood condition in which the oxygen-carrying capacity is greatly reduced, and this condition is usually caused by iron deficiency.

Causes of Iron Anemia Deficiency

Iron deficiency develops rapidly in captive-fed mammals due to (1) low iron retention in the newborn pig, (2) low iron content of colostrum and milk, and (3) depletion of contact iron from the soil (4) the rapid growth rate of the breeding pig. Low iron storage in the newborn pig. Piglets are born with a total of 50mg of iron in their body (liver), most of which are present in the form of

hemoglobin in the bloodstream and in the liver. With an iron requirement of about 7mg daily to maintain the level of blood hemoglobin in a normal developing baby, 1 mg is taken or taken with milk and feed. Rapid growth rate of lactating pigs. Compared to other domestic mammals, the baby pig has a greater ability to grow. This rapid growth of growing pig with increasing plasma volume requires high intake of iron to maintain adequate hemoglobin.

Symptoms of Iron Deficiency Anemia

Iron deficiency can range from chronic borderline anemia to severe anemia. Symptoms of chronic anemia are poor growth, loss of appetite, rough hair, wrinkled skin and painful mucous membranes. The most common symptom of severe anemia is difficulty breathing or movement of the diaphragm muscles after exercise, and this is called "thumps." In the worst case scenario, fast-growing pigs may die suddenly due to lack of oxygen. Anemia also reduces the pig's resistance to diseases and respiratory problems, and enteritis can occur more frequently in chronic pigs.

Necropsy detection in anemic pigs includes enlargement of the heart and spleen, fluid in the chest and abdomen, and low blood pressure. The mucous membranes can also be seen.

Diagnosis

Piglet anemia is diagnosed by examining unprocessed blood samples and smears during autopsy. By itself, the obvious appearance of pigs can be misleading and should not be relied upon to diagnose anemia.

Treatment

Pigs can get extra iron from injections, oral doses or other means. Once weaned, pigs will usually get enough iron in their diet.

Injecting

Injecting piglets with iron dextran, iron galactan or other iron compounds is a common method of supplementation. The vaccine is usually given before the piglets are 72 hours old. Follow the manufacturer's instructions and apply it to the muscles or under the skin. Clean needles and syringes before use and clean the injection site. Avoid excessive leakage at the injection site by using a suitable hypodermic needle gauge. Pigs are often injured in the injection site and injections in the leg can cause paralysis, increasing the chances of being accidentally bitten by a pig: 1 ml or 100 - 150mg of iron dextran I / M on day 4^{th} and 14^{th} day per pig

Metal compounds can cause muscle spasms in the injection site and these areas do not heal well and are difficult to detect. Error is usually found only by consumers, which lowers the image

of a good quality product. Another problem is the occasional development of infections or abscesses in the injection site.

Oral

Natural iron in preparation with iron galactan given to newborn piglets within 18 hours of birth, avoids many complications of iron injections. Pollution, disability and infection are eliminated but repairs are expensive. Pigs should be vaccinated within 18 hours of birth as iron galactan is only absorbed in the intestines at a very young age; similar to the absorption of colostrum. Pigs should receive the full recommended dose and be given a second dose when the first one is renewed. It is not wise to rely on this method when pigs are flooded as digestion may not work properly. Use another method of preparation after 18 hours.

Add a small amount of ferrous sulphate (25mg) and copper sulphate (5mg) to the pork diet or add it to drinking water. Inanimate iron can be given to piglets by mouth to prevent anemia. A moderate amount is absorbed daily through the abdominal wall so repeated administration is required. Chemicals such as ferrous sulphate are cheaper, but require repeated doses, increased duration and work.

Paint

Paint sows udder with the following combination of ferrous sulphate 50 gm, copper sulphate 7 gm, Zinc sulfate 3 gm, Sugar 50 gm in one liter of water.

Alternatives

Metal compounds, non-contaminated soil or both can be sprayed in breeding pens, and the provision of feed with iron supplements may be helpful. It has also been reported that piglets can gain iron by licking bare metal in sows and piglets mixed with iron.

Prevention of Iron Deficiency Anemia

There are many ways in which supplemental iron can be given to piglets (1) orally (orally) or (2) by parents (by injection) to meet their iron requirements. These nutrients first appear as plasma iron (transferrin) which is transported from the bone marrow to the production of red cell hemoglobin, to the myoglobin muscle that aids in the conversion of muscle tissue, liver the iron enzyme needed for cellular modification. Injectable muscle-dextran is taken from the muscles by nearby lymph nodes and released into plasma as strong as iron-dextran and can be used for hemoglobin or myoglobin.

Oral

Additional iron can be applied orally (a) by placing the soil in the barn, (b) by swiping the pig's udder with a metal solution, (c) by dipping the pig in metal tablets, pastes or liquids, (d) by inserting fluid, food preparation, pellet or blocks into place incoming, or (e) feeding high levels of iron in pig feed and allowing pigs access to feed and faces.

The ground

This is an effective way to supply iron when the soil is constantly changing and free of parasite swine eggs. If the creep floor is slightly separated, place the soil on the solid part of the pen concrete. When the creep floor is completely smooth, place the soil on a shallow tray. The disadvantages of this approach are that the workers are involved and have difficulty finding land on which the land is located.

Udder application

If the iron solution is absorbed into the pig's udder daily throughout the milk, this will effectively prevent anemia. However, the work required is far superior to today's pig producers.

Evaluation

A weekly administration of iron pills, pastes or fluid preparations will prevent anemia. What is worse in this way is the work involved in the repetition and the lack of proof that the pig has eaten enough. Placing metal arrangements on the cliff. The number of metal arrangements in the market is designed to be placed in an area that enters the grain pen. These consist of metal solutions with special suppliers, iron salts mixed with peat moss, iron salts mixed with sugary energy sources in the form of food or pellets, and metal blocks designed to be attached to a dividing wall between adjacent bearing pens. Most of these commercial metal arrangements are very effective in preventing anemia if they are properly placed in the entrance area where pigs will feed.

Parental route

The extra iron to prevent anemia can also be controlled by injection. For the metal injections to work effectively, a person must use (a) the right type of metal, (b) the right amount of metal, and (c) the proper metal handling method. Hygiene procedures should be used to prevent the production of abscesses.

Form of metal

The type of iron should be (1) used successfully in hemoglobin production by pigs all the time nursing from a single injection, (2) it is compatible with fluids and tissues and is not toxic in

any way to the levels required for treatment, (3) does not cause pain at the injection site, and (4) can be controlled with a small volume of fluid of the right viscosity to allow for the use of a small needle but not causing excessive "running" back. "Iron-dextran and iron-dextrin properties, when properly produced, meet all of these processes and are the best alternatives to the market.

Dosing of metal

The right amount of iron you can inject depends on the age at which the pigs will be weaned. If pigs are weaned at 3 weeks of age, 100mg of iron is a sufficient amount for injection. If pigs are weaned over three weeks of age, 150-200mg of iron should be injected.

Another way to prevent iron deficiency anemia should be mentioned. It is an oral measurement of newborn pigs with iron dextran. When a newborn pig receives an oral dose of 100-200 mg of iron from iron-dextran, the iron is effectively absorbed. Recent studies show that this single dose almost acts as an iron injection when the dose occurs within the first six hours of life. However, this method has problems with moderate chance and the possibility of greater iron-dextran dissipation in oral doses compared with injections.

Weaning of piglets

Weaning is usually done at 7-8 weeks. The pig should be separated from the piglets for a few hours each day to prevent weaning stress and its diet is gradually reduced.

Orphan pigs

They can be raised with foster sow or by using milk instead own mother

The cause

1. Larger litter than pig can grow
2. Death of a pig
3. Failure to breastfeed

Identification programs

Pigs can be identified permanently by neglect or by photographing their ears. Numerical ear tags are also used but they are usually not suitable for pigs labeled together as marks may be lost. Tags are often used to rewrite stock that has already been identified by neglect or tattooing e.g. newly purchased farmers. Ear tattoos are widely used in the land herd and in large white grasslands and in other commercial pigs. Even well-designed tattoos can be difficult to read and use in the daily treatment of pigs. Ear tattoos (pliers and numbers) are more expensive than ear piercings and most commercial pig farmers find hearing ear a suitable method of identification.

Pigs that can be placed in the ears can be easily identified from a distance and the drag still remains visible to the pig's health.

Ear piercings

Ear plugs are best done on the piglets for a few days after farrowing, at the same time as other procedures such as giving a metal supplement. The notes should be carefully made so that they can be easily read when the pigs are growing. The notes under the pigs' ears need to be cut deeper than those near the tip; otherwise they may grow over time. If the notches are too close to the curved base of the ear they may pass around the curve with age and be ignored. On the other hand, the notch cut near the tip of the ear should not be too deep otherwise the ear can fall off. This is most likely to happen if notches are as close as needed in some systems. The shallow cords in the upper part of the ear are easily readable. Attention should not be made too close to the head above the ear or the ear may drip.

There are a number of ear-splitting programs and a few are described in Figure 1. Basically, the position not included in the ear corresponds to the number. In some systems, notches are required to be close together (double attention) in the same location.

The combination of numbers can be:

- Identify rubbish with the same number as their dam e.g. all pigs from number 51 could have that number put in their ears.
- Identify the garbage with its garbage number - one ear can be replaced with a week's birthday number and the other with a birthday order for that week e.g. the fifth litter born in the 44th week will be marked 44 in the left ear, 5 in the right ear.
- Identify each pig in the litter - this numerical system is used in research centers and other pigs when measuring the performance of each pig. One ear is not designed to identify a dam, a litter number and the other ear indicates the number of pigs in the litter.

Pigs are ignored by the ear using specially designed pliers, leaving a v-shaped ring in the ear. Earplugs are available from other stock and station agents and pig machine specialists.

Ear attention provides:

1. A durable, inexpensive screening program
2. Individual ownership of all animals

Universal Ear-notching program

Attention to the ear helps to identify the pig's litter and any other litter, giving each pig a different identification number. The notes are placed in one of the five places on the right ear of the pig - to indicate the number of litter - and in one of the three places on the left ear - to indicate the number of each pig. "Reading" notches allows producers, judges, and other pig experts to know more about the pig they are watching.

Universal Swine Ear Notching System 81

Right Ear: The right ear is used to mark dirt, and all pigs in the same litter should have the same ears.

Left Ear: The left ear is used for chopsticks to show the number of each pig in the litter. Each pig will have different artisans in this ear.

Catching a pig properly is key. Each pig should be built differently. Therefore, to copy pigs correctly, you should know the location and the corresponding number of each note.

The most common ear-to-ear procedure is shown in Figure 1.

The right ear has five areas of note, and each location is given a number. Those five numbers are 1, 3, 81, 9, or 27. Refer to Figure 1 for each notch area. With the exception of 81 notes, one or two notes may be in four of these places.

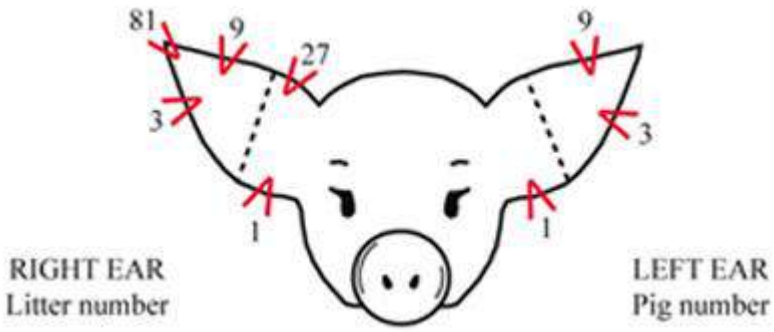

Figure 1. Universal ear notching system

To determine the litter number for a pig, add the numerical values assigned to each notch, as shown in Figure 2.

Litter No. = 1+1+81+9 = 92

Litter No. = 1+3+3+27 = 34

Figure 2. Examples for litter numbers 92 and 34.

The left ear has three locations for notches, and each location is assigned a number. Those three numbers are 1, 3 and 9. The litter number is notched in the pig's right ear and the individual pig number in the pig's left ear.

Combining Both Ears

After a pig is notched in its right and left ear, it has a unique identity.

Techniques to Ensure Effective Notching

Avoid placing a notch in the middle of the outer edge of the ear. Such marks can be easily confused with 1 or 3 or 9 or 27.

Remember, referring to the left and right ear refers to the left or right ear, as seen in the back of a pig. The left and right do not refer to the left or right of the spectators where the pig is facing the viewer.

If pigs can be weaned within 1-3 days of age, the task becomes much easier. If you let the pigs get bigger (100 lb), the work is much harder mentally and physically. These notes usually form a 3/16 to 1/4 inch deep notch. For large pigs, a note that makes notch 1/2 inch depth is recommended. It is important to find a disinfectant to clear the notes after each use. In some cases, spraying large pigs with wound dressing may help.

Avoid making shallow notes, as they may be difficult to read or heal. A very deep notch, especially one facing the ear canal, can lead to a torn ear. Leave at least 1/4 inch between notes to ensure easy reading. Do not make the notch too close to the ear canal, as this can be removed.

If the ears of older or older pigs are not drawn, you may need to place them in separate pens until the notes have cooled. Unemployed pen partners can attract bloody strings and start biting the ears.

When combining ear care with other pig processing, consider doing one last resort, as it often causes more bleeding than other procedures, such as dental cuts, vessel care, injections or tail suspensions.

Ear tattoos

A necessary tool for a set of tattoo nails, three or four sets of 9 mm needle blocks ranging from 0 to 9 with ink or appropriate paste. Similar diagnostic procedures can be used for ear recognition unless numbers rather than positions are tattooed on the ear. Before painting the body, make sure both pig ears and tattoo blocks are clean. The thin part of the lower ear (inside or outside) is best suited for tattooing. The points of the tattoo needle should be covered with ink ink; the toothbrush helps with this, otherwise, dip the needle blocks into the ink pad. Needles should pierce the pig's ear completely, avoiding veins where possible. After painting, carefully apply ink to the piercing marks. This technique should be done with great precision to ensure that the tattoo can be clearly read over time. If you have trouble reading the tattoo number, try washing the ear or lighting a torch behind it.

Ear tags

Once gilts and pigs have been selected within the herd or imported, they can be identified by easily readable plastic tags. There are various shapes and types of ear tags. Some tags are pre-numbered, others are provided blank and can be numbered with a special pen. Several colors are selected to maximize the encoding possibilities. For example, animals with duroc parents may be given red tags, while those with Hampshire genes may be given white ones with black numbers. Tags are applied with special application filters, usually in front of the ear to reduce the risk of the mark being torn e.g. by fighting.

Docking

A blank tail is the easiest thing to fix the tail or eat human flesh. This leads to injury and possibly infection. To reduce tail biting, draw (or cut off) the tail of newborn piglets within 24 hours of birth. Tail concentrations are often required for buyers of newly weaned or fed piglets. It should be done about 24 hours after birth because it does not put pressure on the baby for these reasons: the piglet are small and easy to catch; during this period, people dumping waste are less likely to investigate and reduce or bite the newly installed tail; piggeries and kids are still clean; and the pig is well protected by antibodies from pig colostrum. However, some producers are

reluctant to put the pig's tail in the trash until it is empty. Men are easier to find in the trash if their tails are not set.

Dock the tail about one inch (or the width of your thumb) from where the tail joins the pig's body. Cutting too short a tail can interfere with the function of the muscles around the skull later in the life of the pig and can exacerbate the loss of earrings or paralysis of the hind leg. If more tail is left, tail bites may occur. Occasionally, the tail will bleed excessively. If this happens, tie it using the same method as the rib cables. To refresh well, cut the tail slightly so that the hot belt has time to make the tail sway as you cut. Cauterizing leaves a cleansing wound that is more bleeding than when using cutters. Apply an antiseptic to the wound. The tail should be completely cured within 7-10 days.

Castration

Castration, a surgical removal of two testicles, is the practice of treating male piglets intended for slaughter. The testicles produce sperm and the male hormone, testosterone. Pork from pigs, or male pigs that have not been placed on slaughter weight, can smell during cooking which is very annoying for many people. This is called “pig smell” or “boar taint”.

There are various ways to castrate pigs. The shape of the animal during surgery and the way and level of restraint are determined by the age and size of the animal. The best time to castrate a pig is when he is four to 14 days old. Young piglets are easy to catch or prevent, are less prone to surgery, and are protected by antibodies to pig colostrum and milk. Pigs can be successfully castrated when they are less than four days old; however, one of the major disadvantages of thinning the scrotum is that the scrotal hernias are very difficult to detect and the testicles may shrink.

1. It prevents uncontrolled breeding in the herd.
2. Provides a volunteer or farmer to control which pigs he wants to use for breeding.
3. Some feel that castration can improve the feed conversion ratio of young pigs.
4. Chopped pigs are about the same size as untrustworthy pigs.
5. Reliable pork has a smaller or stronger flavor than unrefined pork.
6. In many cultures, people prefer to eat pork when purchased.

One-Man Spreading Methods Using a Knife

Hold the pig with both hind legs with its head down. Push both testicles and make a hole in the skin towards the tail. Be sure to cut down on the scrotal bag to ensure good flow. It doesn't

matter if you cut the white membrane or not. Uncover the testicles by cutting them and pull them out a little. Pull each testicle and press your thumb into the pig's neck. The use of your thumb is very important to ensure that the cord will break in the area of your thumb and not from the depths inside the pig's body. Otherwise, it can cause a hernia.

Alternatively, place the pig's head between your legs after performing the cuts as described above, grasp each testicle and cut the cord close to the cut with a rubbing motion. Also, cut any thread or tissue that comes out of the cut and spray the wound with an antiseptic.

Two-Page 2 Spreading Method

One person catches a pig with its hind legs and another performs circumcision. With one hand, tighten the skin over the bag to help expose the testicles and the site of the cut. With a pruning knife, make two cuts as long as the testicles close to the center. Cut deep enough to pass through the skin of the outer body. It doesn't matter if you cut the white lining (tunica vaginalis), around the testicle, or not. Press, or pop, testicles through the hole. Enlarge the hole slightly at the end closest to the tail if the testicle does not appear.

Remove the end of the tail facing the tail at right angles to body length and cut the cord close to the cut. Do not pull straight up the testicles. Repeat the second test procedure. Spray the wound with antiseptic.

Post-Castration Care

Look for animals that are believed to have excessive bleeding or the presence of tissue or intestines (hernia). Apply pressure to the wound for about two minutes to prevent bleeding. Cut any cord that may come out of the cut as this can serve as an infection thread, but make sure it is not in the intestines.

If the intestines are out and dark or torn, it is usually best to fill the pig. If the problem was noticed soon after the bowel movement, it could have been saved by a pig. First, gently flush the intestines with clean, warm water containing the disinfectant, and then insert them back into the socket holding the pig's head down with its hind legs. Close by wrapping the tunica vaginalis (the white lining around the testicle). If a skilled surgeon is not available to repair the tunica vaginalis, simply close the pruning hole to allow time for the skilled surgeon to repair the hernia a few hours later. If a skilled surgeon is not available within a few hours, a swine flu should be obtained. It is much easier to restore the bowels if the tunica vaginalis covering the testicles cannot be removed during pruning. Use an antibiotic after surgery.

Weighing

Pig producers who use birth weights as part of their management plan can incorporate weight into the pig processing process. Most pigs are not measured at birth, but in that case, this should be done first, followed by all other processing. Some producers measure each pig and record the sex and weight. Some weigh all the rubbish on the scales and record the weight of the entire garbage.

Records

We recommend that pig producers use production records to identify strengths and weaknesses in performance. If problems are encountered with accommodation, these problems will continue to spread if accurate records are not kept. It is important to know that reproductive features are available. Record keeping allows high sowing to be seen and stored on the farm. This will lead to a continuous improvement in lactation function which should lead to fewer problems in the reproductive tract. In addition, accurate records provide an important overview of the work of the veterinarian. Records help managers identify people who do a good job (not being rewarded) and help identify areas of weakness that the manager can work on to correct.

Records kept at the breeding grounds include: date of birth, number of live and dead piglets, date and cause of death of piglets, birth information, number of weaned piglets, and pig (or litter) weaning weight. Comments on anything unusual or wrong with a pig should also be noted. In addition, many producers record feed feeds during breastfeeding. Medicines given to animals should be recorded to ensure compliance with treatment guidelines and withdrawal periods.

Have cards, clipboard, or other recording devices next to each case of a pen or pen. Having the opportunity to record information while it is being collected or viewed ensures accuracy.

Daily Pig Monitoring

Examine each pig at least twice a day for evidence that milk is producing enough milk. Careful monitoring of the pig's behavior and body condition is the best way to determine whether a pig is milking properly. Milk failure should be treated aggressively and waste may need to be given extra milk as the pig recovers. Piglets are healthy, well-fed and run around and play, especially when the pig gets up to eat. For the first few days of their life, the piglets do less than eat and sleep. However, in a few days they start working away from the udder. These activities are delayed in sick or malnourished pigs. After successful nursing, the piglets usually sit down and sleep. Milk is often seen around their mouths.

During normal sow, milking from the udder starts about one to three minutes following the onset of nursing behavior (which occurs about every hour in the first lactation). The oxytocin is then released and the milk is reduced. The piglets will suckle slowly for about 30 seconds and then let go. Pigs nursing an elderly woman with lactation failure will spend more time in the udder, including fighting, and will have less content. If the teeth of a pig needle are not cut, it can be very damaging to the face and nose of friends of the litter and sometimes to the pig's udder. Well-fed pigs have firm, shiny skin and an economical appearance, i.e., "blooming".

Conclusion

It is concluded the piglet management is more crucial for pig farming in India. The most of the piglet are died during this period; it leads to losses the pig farming. So it necessary to prevent the piglet from piglet anemia and crushing by sow, it maximizes the profitability of pig farming. Owner take proper care and management of piglets step by step it leads to less mortality of piglet and it became healthy adult pig as result increases the profit of the pig farming.

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Animal welfare and common offences against farm animals

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Abstract

Livestock plays an important role in the Indian economy. In agriculture throughout human history, animals providing us labor, fiber and food and enriching the soil with their waste. Animals and crops have always been in a symbiotic relationship with one another; now, however, rather than viewing animals as sentient beings and part of the large interdependent systems, we have come to view animals as units of production. Their health and welfare are not considered as being fundamentally connected to the health of the whole; the main concern is only for the final product. Animals raised on large and commercial farms often live in over-crowded, dirty, confined spaces, subject to brutal physical manipulations and slaughtered inhumanely. Protection of animals is enshrined as a fundamental duty in the Indian Constitution and there exist some animal welfare legislations in India such as the Prevention of Cruelty to Animals Act 1960 and some other legislations. Some of the common offences against farm animals like phooka, mischief, maiming, bestiality, bishoping etc. are major obstructions in animal welfare. It's time to need stronger enforcement of laws for offences and cruelty against animals and ensuring animal welfare.

Introduction

An animal that reared on a farm is commonly known as a farm animal. We can Sort the animals into three groups that are wild animals, farm animals and pets. Farm animals are kept for agricultural purposes. This includes such domesticated animals raised to produce labor and commodities such as milk, meat, eggs, fur, leather and wool. These animals are reared mostly for economic or for recreation purposes. Animal agriculture is not simply a theoretical interface between humans and other species, it is an economic endeavor, it functions foremost as a business, and the stakeholders in the position to have the most power over the welfare of the animals in the sector are those working within the livestock industry.

Livestock plays an important role in Indian economy. About 20.5 million people depend upon livestock for their livelihood. Livestock contributed 16% to the income of small farm households as against an average of 14% for all rural households. Livestock provides livelihood to two-third of rural communities. It also provides employment to about 8.8 % of the population in India. In agriculture throughout human history, animals providing us labor, fiber and food and enriching the soil with their waste. Animals and crops have always been in a symbiotic relationship with one another; now, however, rather than viewing animals as sentient beings and part of the large interdependent systems, we have come to view animals as units of production. Their health and welfare are not considered as being fundamentally connected to the health of the whole; the main concern is only for the final product. Animals raised on factory farms often live in overcrowded, dirty, confined spaces, subject to brutal physical manipulations and slaughtered inhumanely. Every Animal Should Be Treated With Respect, Empathy, And Understanding. Animal welfare can be defined as the balance of positive and negative emotions, where positive emotions are key to good animal life. (Laurijs *et al*. 2021)

Animal welfare is a multidimensional concept combining several scientific disciplines. It is driven by ethical and societal concerns, as people are obligated towards animals in their care. People approach animal welfare from many different perspectives; some choose not to consume animal products at all, while others do so in keeping with a set of ethical standards. Concern for animal well-being is increasing in technologically advanced societies that practice a strong respect for human liberty and have available a broad selection of affordable food. The predominant philosophical position of animal welfarist is that the capacity of animals' sentience, rather than species-affiliation, should serve as the guiding principle for human treatment of animals. Humane animal farming is better for everyone. Animals live longer, healthier and more active lives. High welfare farming can be less damaging to the environment and farmers can earn more too. For the promotion of animal welfare generally and for the purpose of protecting animals from being subjected to unnecessary pain or suffering, in particular, the central government established the Animal Welfare Board under The Prevention of Cruelty to Animals Act, 1960. The Animal Welfare Board of India is a statutory advisory body on Animal Welfare Laws and promotes animal welfare in the country. From ensuring that animal welfare laws in the country are diligently followed, to provide grants to Animal Welfare Organizations and advising the Government of India on animal welfare issues. As per the world organization of Animal Health (OIE), animal

welfare means how an animal is coping with the condition in which it lives. An animal is in a good state of welfare if (as indicated by scientific evidence) it is healthy, comfortable, well nourished, safe, able to express innate behavior and if it is not suffering from unpleasant states such as pain, fear and distress. Farm Animal Welfare Council (FAWC) designed guidelines known as "the Five Freedoms" to protect farm animals from unnecessary suffering and to promote good animal welfare and address both physical and mental suffering. These Five Freedoms define welfare as the freedom: 1) from hunger and thirst 2) from discomfort 3) from pain, injury or disease 4) from fear and distress and 5) to express normal behavior. (FAWC, 2009)

Common offences against farm animals in India

Protection of animals is enshrined as a fundamental duty in the Indian Constitution and there exist some animal welfare legislations in India such as the Prevention of Cruelty to Animals Act 1960 at the Central level and cattle protection and cow slaughter prohibition legislations at the State levels. Some of the common offences against farm animals are.

Phooka or doom dev: It includes any process of introducing air or any substance into the female organ of a milch animal with the object of drawing off from the animal any secretion of milk. These kind of practices are adopted in rural areas. This act is punishable under The Prevention of Cruelty to Animals Act, 1960.

Mischief, Maiming and Bestiality: These are three common offences against animals in India. Mischief includes killing, poisoning or maiming animal. Poisoning is the commonest method of mischievous killing of animals. Maiming means making an animal useless by the use of violence. This type of offences is common and its aim is to harm the owner when an animal damages the crop or other property. These are punishable under section 428 and 429 I.P.C. Some other offences on farm animals are beating, overloading, using a diseased animal for work, starvation and these are punishable under the Prevention of Cruelty to Animals Act, 1960.

Bestiality means sexual activity, actual or simulated, between a human being and an animal. It occurs due to wrong believes of illiterate people, mental abnormalities and excessive sexual desire with less opportunity for natural intercourse. It is punishable under section 377 I.P.C.

Overcrowding and Confinement: Animals in confinement are frequently densely crowded or confined to cages without enough space to turn around. Many Dairy cows are sometimes tethered

in a barn for long periods, unable to take more than a few steps, side to side. Female hogs, known as sows, are confined to gestation crates shortly before giving birth and while nursing. These are cages only slightly larger than their bodies, not big enough inside for the animals to turn around. The system was developed to keep sows from accidentally crushing piglets; however, research is showing that sows kept in other systems do not have significantly higher piglet mortality rates. Keeping any animal in a cage or place where it doesn't have reasonable opportunity of movement and keeping an animal in total and habitual confinement with no reasonable opportunity to exercise are against the welfare of animals.

Stress in Farm animals: In farm animals Stress having a great impact on growth, production, reproduction and disease. A single measure of stress might not be a reliable indicator and it is usually more informative to combine multiple indicators of stress to assess animal welfare. Popular measures of stress such as alterations in hormonal profiles can be complemented with behavioral and immunological changes. Pigs are particularly more susceptible to stress. Malignant hyperthermia a drug induced stress syndrome, black muscle necrosis and porcine stress syndrome are mainly caused due to stress. Environmental temperatures above 30°C also cause reduction in feed intake, body weight and production. Hyperthermia and hypothermia due to environmental changes and due to management default are also against the animal welfare.

Transportation of farm animals: Animal transport of long duration is more likely to compromise animal welfare than short journeys, factors such as extreme temperatures and lack of food, water and rest are all exacerbated by the length of exposure, and thus, journey duration. Carrying an animal in any vehicle in a way that causes it pain and discomfort are against the welfare. The transport of animals rules 1978 is the governing rules for the transportation of farm animals and other animals. It has been seen that before transportation of farm animals no health certificate were made during road transport. Overcrowding of farm animals in a vehicle and no first aid for animals during transportation are common in many regions of India. These aspects are most likely solvable for many of our farm animal species. Therefore, provided conditions are optimal, most healthy and fit farm animals could possibly be exposed to long transport durations without necessarily compromising their welfare. In contrast, animals in a poor state of fitness should not be transported at all.

Animal welfare implications of neonatal problems: Neonatal mortality and morbidity in farms are caused due to many diseases and faulty management practices. The major causes of problems in these newborns are outlined briefly and include hypothermia due to excessive heat loss or to hypoxia-induced, starvation-induced or other forms of inhibited heat production. They also include maternal undernutrition, mismothering, infection and injury. Some of the potentially causes of newborn mortality and morbidity may be breathlessness, hunger, extreme environmental condition, sickness and pain, and possibly also separation anxiety.

Bishoping: It is the act of changing the appearance of animal to look younger and animal owner get more money for their animal. This act is practiced mainly in animal fairs and exhibitions whereby this method animals are made to appear younger. Sometimes it was done by making small holes in the table of incisors and filling them with some black substances such as marking nut. Air is also blown under the skin of animals and chronic ulcers and fistulae are often covered with colored mud. Frauds in the sale of livestock are punishable under section 420 I.P.C.

Some other common offences in farm animals are which are punishable under the Prevention of Cruelty to Animals Act, 1960.

A. Beating, kicking, overriding, overloading, torturing and causing unnecessary pain to any animal.
B. Using an old or injured or unfit animal for work.
C. Administering an injurious drug/medicine to any animal.
D. Keeping an animal on an unreasonably heavy or short chain for an unreasonable period of time.
E. Being an owner failing to provide the animal with sufficient food, drink or shelter.
F. Abandoning an animal without reasonable cause.
G. Willfully permitting an owned animal to roam on streets or leaving it on the streets to die of disease, old age or disability.
H. Offering for sale an animal that is suffering pain due to mutilation, starvation, thirst, overcrowding or other ill-treatment.
I. Using an animal as bait for another animal solely for entertainment.
J. Organizing, keeping, using or managing any place for animal fighting.
K. Shooting an animal when it is released from captivity for such purpose.
L. Unethical or non-judicious use of hormone for letting down of milk.

Animals tend to be healthier and happier in systems with higher farm animal welfare standards, which can lead to reduced veterinary spending and lower mortality rates. Raising animals humanely can use less feed, fuel and water than intensive farming, reducing costs and pollution.

Humane farms can create jobs, boost profits and keep local food supplies healthy. By humane farms, we can reduce environmental damage, recycling nutrients and improving the soil.

Concepts of animal health and welfare in organic livestock systems

Organic agriculture is a production system that sustains the health of soils, ecosystems and people. It relies on ecological processes, biodiversity and cycles adapted to local conditions, rather than the use of inputs with adverse effects. Organic agriculture combines tradition, innovation and science to benefit the shared environment and promote fair relationships and good quality of life for all involved. The organic concepts of animal health and welfare can be understood very well within the framework of the four principles for organic production: ecology, care, health, and fairness. Animal welfare involves naturalness and human care as key features. Naturalness giving animals a framework that allows 'naturalness:' as much as is possible in a domesticated life: - Allowing natural behavior - Allowing the animal to meet its natural needs - Natural environments - Species-specific feed - Space to interact and withdraw - As much freedom of choice as possible, to eat, drink, move, lay comfortably down - Harmony between animals and surroundings. Human care giving Intervening when necessary and interacting gently with animals: Taking responsibility for the animals in the farms that they are not suffering and that they do not experience pain, distress, injuries, frustration, disease, hunger, or thirst - Interacting gently and with care with animals in daily life - Creating the framework which allows naturalness, and in which it is possible to observe the animals sufficiently without necessarily interfering.

Role of a veterinarian in animal welfare

Good animal welfare requires disease prevention and veterinary treatment, appropriate shelter, management, nutrition, humane handling and humane slaughter/killing. John Webster defines animal welfare by advocating three positive conditions: Living a natural life, being fit and healthy, and being happy. The role of a veterinarian is very crucial in animal welfare as he/she monitors the implementation of PCA Act and the rules in the state, conduct awareness programs or help NGOs to conduct awareness programs through various media including pamphlets, TV and radio, workshops for specific issues on the direction of State Animal Welfare Board. Inspect slaughterhouses, both municipal and private, to ensure standard protocols laid down by AWBI. Prohibit the introduction of air or any chemical substance by injection into milch animals. Respond to complaints about the misuse and abuse of farm animals and other animals by their owners and

by others. Immediate take action in respect of any activity that concerns the pain and suffering of animals and promoting harmony in the society through animal welfare.

Conclusion

However, there is ~~a~~ still long way~~s~~ to go in truly developing a solid foundation for animal law in India. The provisions for animal protection in the Indian Constitution remain principles instead of concrete law enforceable in courts. The penalties under the Prevention of Cruelty to Animals Act 1960 for cruelty against animals are simply not strict enough to truly deter crimes against animals. The law is not strictly enforced and contains several provisions which provide leeway through which liability can be escaped. Extensive reforms need to take place in this regard to provide a stronger animal protection law for India. In India pressure enforced by law has required animal agriculture industries to alter or discontinue some systems of production in an attempt to improve the well-being of farm animals.

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Save the Species: The Royal Bengal Tiger

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The Sundarbans is a Bengali word which means beautiful jungle Sundri (Beautiful) and Ban (Forest). This largest surviving mangrove came into existence when Ganges, Brahmaputra and Meghna rivers started depositing the sediments in area of southern coastal Bangladesh (Mukul *et al*., 2019). It is habitat of the last refuge of tiger adapted to living in a mangrove ecosystem. The United Nations Educational, Scientific and Cultural Organization (UNESCO) has enlisted 4 protected areas in the Sundarbans as World Heritage Sites, viz. Sundarbans National Park, Sundarbans West, Sundarbans South and Sundarbans East Wildlife Sanctuaries (Giri *et al*., 2007).

Royal Bengal Tiger (*Panthera tigris tigris*)

The Bengal tiger, is found in four countries of the Indian subcontinent namely India, Bangladesh, Nepal and Bhutan. They are adapted to varied habitats that includes rainforest, tropical evergreen forests, dry deciduous forests, subtropical pine forests, broadleaf temperate

forests, alluvial savanna, grassland, Mongolian steppe, open woodland, Amur steppe, thorn scrub/woodland and mangrove forests (Sunarto, 2010). Bengal tiger, *Panthera tigris tigris* subspecies, indigenous to the Indian subcontinent, formerly known (Kitchener *et al*., 2017).

As per International Union for Conservation of Nature (IUCN) red list of threatened species, this prime species of Sundarbans is a 'critically endangered' species whose population in the Indian subcontinent declined drastically. Around 300-500 tigers are estimated in Bangladesh, 220-274 tigers in Nepal and 103 tigers in Bhutan, while most tigers (about 10,000) are in confinement in zoos, circuses or privately owned (Chundawat *et al*., 2011). The tiger is a critically endangered species, therefore finding new ways to safeguard and conserve this magnificent animal is critical. Considering ecosystem health, the tiger and its conservation are essential for the future of this forest.

Contribution to Ecology and Ecosystem

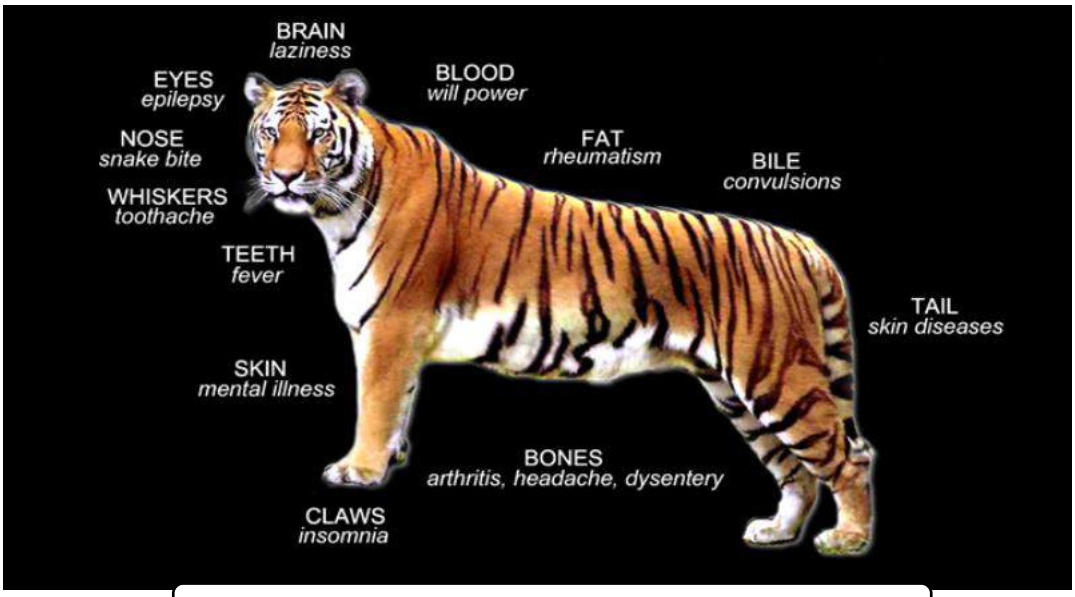
The Royal Bengal tiger is the National animal of India and that have played a pivotal role in Indian wildlife history and culture. Indeed, the global recognition of the Sundarbans is mostly based on the existence of this magnificent species. It is crucial to recognize that tigers play a necessary role in the ecosystem, as they are a predator at the top of the food chain: the apex predator, the tiger helps to synchronize the number and distribution of prey, which in turn influence the forest structure, composition, and regeneration (Wegge *et al*., 2009).

Tiger serves a remarkable contribution in the ecology. It is not just a flag-bearer of conservation but also an umbrella species, whose protection guarantee the conservation of other species, that are a direct or an indirect part of the tiger's food chain. Many scientists refer it as an ecological litmus paper as it acts as an indicator species from which numerous ecological changes in terms of species richness, equitability, size, biomass, etc. are determined which helps in indicating the overall health of the ecosystems (Ashraf, 2004). Despite its subsequent role in ecological sustainability and services, tiger population is diminishing at an alarming rate (Sunarto, 2010). For centuries, they have been hunted for their coat as well as a sport, without thinking about their future. The population of tigers notably decreased to only about 3,890 tigers in the wild, hence it is now on the edge of total extinction.

Threat

A number of threats have been spotted for the degeneracy of tiger across the world. Bengal tiger facing number of serious problems such as prey depletion, poaching, habitat loss, conflict with humans, etc., (Halder, 2011).

One of the greatest threats to the tigers in the wild is poaching. Striped skin is the most valuable part which is in the great demand for wall hangings, coats, etc., and also many body parts are considered useful in traditional Chinese medicine (Nowell & Jackson, 1996). In Asia, it has been one of the sports, and people are willing to pay enormous amounts of money to kill a tiger. Another major threat is spread of farmland and habitat loss due to increased population which fast-track the degradation of forest resources and their production (Mukul *et al*., 2019). Due to decrease in habitat of ungulate animals, the number of tigers is decling as they are the primary food of tigers. Focus is given on the importance of prey depletion in conserving healthy tiger populations (Karanth *et al*., 2004) as in many areas across Asia, there still survive large tracts of suitable habitat, but tigers are absent or in extremely low numbers, most likely due to a lack of prey (Check 2006). Local villagers depend on forest for their livelihoods and are known to compete with ungulates (prey), eventually affecting population of ungulate animals (Madhusudhan, 2004).



Tiger parts used in Traditional Chinese Medicine

Climate change has immediate impact on biodiversity as it has already led to warmer temperature, changing precipitation, and more frequent extreme weather events (Pachauri *et al*., 2014). Sea level rise (SLR) associated with climate change likely to also adversely affect the biodiversity and wildlife habitats in coastal low-lying regions (Nicholls and Cazenave, 2010). One of the most vulnerable places to climate chamge and sea level rise is Tropical Asia (Pachauri *et al*., 2014). Over-extraction of forest resources to meet the demand of growing requirements of humans being is another important component for decreasing the Sundarbans. It has been over-exploited for timber, fuelwood, animal fodder, native medicines, and food for decades to centuries.

The lack of professionals, skilled officers, failure of institutions to effectively manipulate coastal mangrove sources, negative planning and aptitude of coastal land use was, some of the reasons of mangrove forest administration's failure. However, negligence and corruption amongst the personnel of authorities and forest department alongside the association of neighbourhood's political leaders with the encroachers add to the administration's failure (Rahman *et al*., 2010).

Conservation

The tiger is a distinctive animal which plays a critical role in the health and diversity of an ecosystem. It is a top predator and keeps the population of wild ungulates in check, thereby conserving the balance between prey herbivores and the vegetation upon which they feed. Therefore, it’s not just about saving a beautiful animal, it is about making sure that our ecosystem is properly regulated.

Conservation Goal: The goal of the management plan keep wild tiger populations in India's tiger reserves steady and growing. By lowering pressure on wild tigers, the conservation goal is to retain the natural ecology and behaviour of tigers in the wild and grow the tiger population in India to >2,000 by 2025.

Conservation Objective: Conservation objectives are used to calculate how far you've come toward your conservation goal. The tiger population has improved over the last decade, rising from 1410 in 2006 (Jhala et al., 2008) to 1706 in 2010 and 3346 in 2018. (Jhala et al., 2019).

Project Tiger

Indian tiger population was approximate at 40,000 animals in 1900s. The first official estimate, done in 1972, documented only about 1800 tigers. As a result, a task group was

formed under the Indian Board of Wildlife, and on their advice, 'Project Tiger' was begun on April 1, 1973, with the following goals:

- To maintain a viable tiger population in India for scientific, economic, artistic, cultural, and environmental reasons.
- To preserve biologically significant places as a national heritage for the benefit, education, and enjoyment of the people.

Nine tiger reserves were established at the start of the project. There are currently 27 tiger reserves spread over 17 states. A total of 37,761 km^2 is covered by these reserves.

Conservation Strategies:

- Hundreds of artificial waterholes are created to ensure wild animals get access to drinking water during peak summers and thereby stop them from straying out of their territory into human settlements. These holes are replenished through rain water harvesting techniques too.

Tiger drinking water from artificial

- A salt lick is used by animals to supplement their nutrition, ensuring that they get enough minerals in their diets. Salt licks has essential nutrients like calcium, magnesium, sodium, and zinc.
- Several vaccination drives are conducted to prevent the threat of outbreak of contagious & fatal diseases like Foot and Mouth Diseases from domesticated cattle grazing to wild herbivores and carnivores.
- Expose the aesthetic value of tigers and forests to tourists, which in turn will create seriousness and awareness amid tourists to save a majestic species like Tiger.

- An active education and outreach program will help the locals to acknowledge the significance of conservation of Tigers.
- The use of chemicals for agriculture by communities throughout the forests and buffer zones should be restricted.
- Incentives should be given to the farmers, who lose their livestock to the tigers, in order to control revenge by the farmers.
- The infrared cameras are used to evaluate, monitor and document population of tiger and its prey animals. Every tiger has different stripe pattern, which help in the counting of tiger population.

Active infrared camera trap for detecting wildlife

Conclusion

It can be stated that massive prey population rehabilitation and minimal human interference are important aspects for effective tiger conservation. It is disheartening, but true, that this great carnivore, which formerly ruled the Sundarbans, must now seek shelter in forest reserves with altered behavioural patterns in order to survive. The effect of such shifts has aroused in poor breeding of these animals. Their number is extremely less because they are hunted for fur, medical applications, and because of human–animal conflicts. Government policies and conservation strategies alone are insufficient. In any case, the most important aspect is to maintain optimism that these lovely species will restore their numbers in the future.

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CARE AND MANAGEMENT OF CHICKS

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Abstract

Poultry is one of the developing sector in India. Now a day's rapidly increasing fuel and feed cost is a serious issue for poultry farm owners. Health, growth and minimum feed consumption are essential things for chicken. Due to conduction, convection and radiation in poultry farm huge amount of losses are created. These all factor can be achieved by maintaining proper atmosphere as chicken.

Introduction

Chick's management helps to maximize the efficiency of production. Scientific poultry management aims at maximizing returns with minimum investment. The day old chicks do not possess the insulating feather coverage to protect them from cold. It may result in the losing of body heat to the environment resulting in chilling which will create the ground for many diseases.

The main objective in brooding chicks is to efficiently and economically provide a comfortable, healthy environment for growing birds. Temperature, air quality, humidity and light are critical factors to consider. Failure to provide the adequate environment during the brooding period will reduce profitability, resulting in reduced growth and development, poorer feed conversion, and increased disease, condemnation and mortality.

To promote the early development of feeding and drinking behavior and ensure a good chick start to maximize subsequent bird growth, uniformity, health and welfare and final production performance (meat/egg).

Chicks Arrival

Successful rearing of poultry starts well before the arrival of the baby chicks. Chicks should get feed and be placed on the farm as soon as possible after hatching.

Hatched chicks should be active, uniform in size and healthy. Although newly hatched chicks can survive on their own body reserves for up to 72 hours, depending on environmental conditions, their survival is increased if they are provided with food and water within 24 hours of hatching. The sooner they are provided with these and a warm area, the higher the rate of survival. Chicks must not be chilled or overheated at any time.

Unloading of the chicks

The longer the chicks remain in the boxes, the greater the degree of potential dehydration. This may result in early mortality and reduced growth as indicated by 7-day and final live weight. Place chicks quickly, gently and evenly onto paper within the brooding area.

When the chicks arrive, gently lift them from the box and place them under the warm brooder. Never drop the chicks or pour them from the box. It may injure some chicks and leave them stunted. Chicks can become overheated during transport from hatchery to the farm, particularly while waiting for unloading after reaching the farm. Overheating can cause serious dehydration, heat stress and affect the disease resistance of the chicks. Hence do not withhold the chicks in boxes for a long time. The empty chick boxes should be removed from the house without delay to avoid any biosecurity issues.

Environment

Chicks cannot regulate their own body temperature until they are around 12–14 days of age. Ideal body temperature must be attained by providing optimal environmental temperature. Preheating the house is vital as floor temperature at chick placement is as important as air temperature. Stabilize temperature and relative humidity for at least 24 hours prior to chick arrival.

Recommended values are:

- Air temperature of 30°C/86°F (measured at chick height in the area where feed and water are positioned).
- Litter temperature of 28–30°C/82–86°F.

• Relative humidity of 60-70%.

Monitor these values regularly to ensure a uniform environment throughout the whole brooding area, but by far the best indicator of temperature is chick behavior.

Leave chicks to settle for 1 to 2 hours to become accustomed to their new environment. After this time, make a check to see that all chicks have easy access to feed and water. Make adjustments to equipment and temperatures where necessary.

Ventilation

Good ventilation is needed to bring in fresh air and to remove carbon-di-oxide, ammonia fumes and other harmful gases, to control the moisture level in the house, to regulate temperature and to help in controlling various diseases.

For the first 7 days, provide 23 hours of light with 30-40 lux intensity (3-4 foot candles) to help the chick adapt to the new environment and encourage feed and water intake.

Brooding

When the chicks arrive, gently lift them from the box and place them under the warm brooder. Never drop the chicks or pour them from the box. It may injure some chicks and leave them stunted.

Chicks require warmth. In tropical climates, the use of brooders is especially important at night. A thermometer should be located at the chick level.

Brooding Temperatures

First week (brooder)…..90 to 92 deg. F.

First week (house)……..84 to 88 deg. F.

Second week (house)….80 to 84 deg. F.

- The floor of the house should be completely covered with new litter material to a depth of approximately 5 cm (2 inch).
- Arrangement for brooding should be done in the middle of the area, of the pen, leaving the end of the house unused. The area should be first covered with clean dried gunny bags over which newspapers are to be sprayed. This is done to prevent the chicks from eating the litter material.
- The brooder is placed on the spreader newspaper. Generally 6 numbers of 40 watt bulbs are used in the hover.
- The corners of the brooding room or pen should be rounded off with card board. This is done to prevent the birds from pilling up in the corners after the removal of the chick guard.

- To maintain the room temperature of the building, the nets of the sidewalls should be covered with curtains made of gunny bags or Hessian cloth hanged from outside. During the coolest part of the year a plastic curtain may also be used from inside the house in addition to the curtains used from outside of the building. Curtains should be fixed in such a way that it can be rolled back whenever felt necessary.
- At least 12 hours before the arrival of chicks all the switches of the brooder and the house should be put on to maintain the required temperature of 950 F(35o C). This can be measured by putting a thermometer at the edge of the brooder 5 cm (2 inches) above the floor.
- A few hours before the chick's arrival the waterers should be filled so that it will be of room temperature when the chicks arrive. The water should be boiled and cooled and mixed with glucose and vitamin. It is essential to provide 3 chick waterers for each 100 chicks for first 2 weeks.
- Seven-day weights and feed conversion are excellent overall indicators of how successful the brooding management has been. Failure to achieve optimal seven-day weights and feed conversion will result in poor production performance.

A good brooder should have the following:

1) Optimum Temperature (start 34o C at the end 28o C)

2) Good Ventilation (oxygen)

3) Optimum light

4) Adequate space (30 to 40 birds per sq. m)

Feeding

- Feed should be provided in crumb form and placed on trays, lids or paper.
- Feeders should be raised incrementally throughout the growing period so that the lip of the trough or pan is level with the birds back at all times.
- The feed level within the feeders should be set so that feed is readily available while spillage is minimized.
- Never allow the feeders to run empty at any time.

Watering

Leave the chicks to settle 1 to 2 hours. Later check to assure to assure birds have found access to feed and water. Dehydration on the day of arrival is the main cause of death. Many chicks can be saved by taking them one by one, dipping their beaks into water and leaving near waterer.

- Mini drinker should be provided at a rate of 6/1,000 chicks.
- Drinker should never be allowed to dry out.

- Must be cleaned and refilled as necessary.
- Maintain maximum water levels until chicks are large enough to create spillage.
- Drinker should be removed approximately 48 hours after placement. It should be placed slightly higher than litter to maintain water quality yet not so high that access is impeded.

Conclusion

The objective of the chick's management is to achieve the required flock performance in terms of bird welfare, live weight, feed conversion, uniformity and production performance within economic constraints. Poultry production is a sequential process, with ultimate performance being dependent on each step being completed successfully. For maximum performance to be attained by chicks management stage must be assessed critically and improvements made wherever required.

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Trends in Emerging Zoonotic Diseases: A public health threat

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Abstract

Emerging zoonotic diseases are the newly occurring infections that has emerged as a global threat and have been increasing in the past few decades and crossing species barrier to infect humans, has become a serious public and global health threat. There are several events which directly relate with the transmission and spread of suchinfections. So,the epidemiology and early diagnosis of these infections is very important to tackle the epidemics wherein veterinarian can play a crucial role in the prevention and control of such zoonotic infections. One Health is an approach which recognizes the interdependence of human health, animal health and environmental health, to achieve better public health outcomes.

Infectious diseases are those disorders that iscaused by pathogenic microorganisms such as bacteria, viruses, parasites or fungi etc and has emerged as a global threat in the past few decades. Zoonoses or Zoonotic diseases are the infectious diseases that are naturally cross transmitted or are spread from animals to humans or vice versa.The infected human unknowingly carries the infectious agent to another human and then from there it spreads to others until it

becomes a pandemic.In 1880, Rudolf Virchow, the father of modern pathology described "zoonoses" as the link between human and animal diseases for the first time.Every year the World Zoonoses Day is celebrated on 6th July all over the world since the year 1885 to emphasize and bring awareness amongst people about the zoonotic disease and to celebrate global activities taking place to minimize the associated risks in the future.

Emerging zoonotic diseases are those infections that have recently appeared within a population or its incidence in a geographic range is rapidly increasing or threatens to increase in the near future. Generally, the emerging infections can be caused by previously undetected or unknown pathogen or known pathogen that have spread to new geographic locations or new populations. The emergence and re-emergence of zoonotic diseases is not new. The World Health Organization in 2007 notified that infectious diseases are emerging at a rate that has not been seen before. Since the 1970s, about 40 infectious diseases have emerged, including SARS, MERS, Ebola, Chikungunya, Avian flu(H5N1), Swine flu, Zika virus and most recently COVID-19 which marked the third re-emergence in the 21st century of the zoonotic corona virus (CoV), SARS-CoV-2 crossing species to infect humans and has become a serious public and global health threat.

According to the WHO, it is estimated that, globally, about one billion cases of illness and millions of death occur every year from zoonoses.There are over 200 known types of zoonotic diseases. Over 40 new infectious agents have been detected worldwide in the last three decades.Almost 60% of emerging infectious diseases that are reported globally are zoonoses. As per Centers for Disease Control and Prevention (CDC), 75% of emerging infectious diseases are zoonotic and originate from wildlife. These are some of the infections which most of the time, farmers who rear animals doesn't realize the seriousness of such infections until it takes a severe form. Animals are the significant carriers of these infections.The spread of such infections is rapid, hence it becomes very critical for people to be aware. However, our understanding of the mechanisms underlying their emergence remains rudimentary. We are all very much acquainted with the COVID-19 pandemic that is going on around the world right now, though at the start we had very little information about it.

Transmission route

The animals play a major role in spreading zoonotic diseases. It can spread through direct contact or can be vector-borne or foodborne.These diseases are spread usually when humans come in

contact with animals which are infected or carry the pathogen, when they consume the meat or milk of such animals, or when they use animal products. Humans can get zoonotic viral infections from their pets, contact with wildlife animals, from farm animals, from hunting and butchering etc.

Factors that affects the emergence of Zoonoses

There are certain events or factors that cause the emergence or re-emergence of zoonoses such as Microbial adaptation and change, Human susceptibility to infection, Climate change and weather, Changing ecosystems like (Agriculture, dams, changes in water ecosystems, deforestation / reforestation, flood / drought, famine etc), Human demographics and behavior, Economic development and land use, International travel and commerce, Technology and Industry, Breakdown of public health measures,Poverty and social inequality,War and Lack of political will,Intent to harm. Frequent travelling of people and living in more densely populated areas, and coming into closer contact with wild animals, are the potential factors for emerging infectious diseases to spread rapidly and cause global epidemics is a major concern.

How can we take the steps to control of zoonoses?

The unpredictable onset and rapid spreading of zoonotic outbreaks means public health systems need to be able to quickly identify early signs of such threats and react promptly. So, to reach this aim, the following steps are very crucial:-

First, the understanding of the causes of disease emergence, the ecology of the agents involved, and their animal hosts.

Second, the creation of a network that merges the contributions of different expertise and work together holistically.

At present, the main players of the network are in place (e.g. medical doctors, veterinarians, public health experts, and food quality inspectors), but they act separately.Therefore, in the current system, a cohesive network for receiving and acting on early warnings at different levels ismissing.

The One Health approach is an example of how separate efforts can be aligned to work together effectively. The concept of OneHealth recognizes the interdependence of human health, animal health, and environmental health, and aims to achieve better public health outcomes through the understanding and prevention of risks that originate at the interface between humans, animals, and their environments. Such approach implies a multidisciplinary effort in the implementation of programmes, policies, and research, where multiple sectors communicate and work together, with the common goal of helping disease prediction, prevention, and preparedness. Three major international organizations viz., WHO, the UN Food and Agriculture Organization(FAO) and the World Organization for Animal

Health(OIE), have started to put this vision into practice by consolidating a formal partnership to combat human-animal- environment health related risk

Tragically, two million people in low and middle income countries die each year from neglected endemic zoonotic diseases – such as anthrax, bovine tuberculosis and rabies.People who rear cattle, cow and other animals should know about zoonotic diseases. They can ask for help from veterinary professionals to identify these infections and understand the preventive measures and vaccinations that can be taken to stay protected from such contamination.Veterinary professionals can be the most significant source of spreading awareness of these infections. Veterinarians should be involved in addressing zoonotic diseases. Veterinarians can collaborate with people at local, national and international level as a part of the one health initiative to curb such zoonotic infections from spreading.

As the COVID-19 pandemic continues to take lives and disrupt economies across the world, a new report has been launched to minimize or prevent future pandemicsby the UN Environment Programme and the International Livestock Research Institute.The following steps can be taken to prevent and control of zoonotic transmission:

- Proper personal hygiene like washing of hands before and after handling of animals, wear mask, gloves, farm specific clothing or laboratory coats when handling animals or any biological samples.
- Environmental maintenancesuch as keep animal housing areas well organized and clean.
- Herd/flock maintenance: observe animals for health status on a daily basis.
- Be aware of zoonotic diseases both at home and away from home and raise awareness of health and environment risks and prevention.
- Expand scientific inquiry into the environmental dimensions of zoonotic diseases
- Enhance monitoring and regulation of food systems using risk-based approaches
- Develop and implement stronger biosecurity measures and strengthen animal health (including wildlife health services)
- Prevent bites from mosquitoes, ticks, fleas and other pet animals
- Learn more or train the people about ways how to handle food safety like proper boiling of milk and milk products, properly cooking of meat and meat products before consume etc.

Plight of Wildlife for Protection

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Abstract

Wildlife Protection is one of the most important duties of the statutory authority, Social organizations and NGOs. Government agencies and non-profit groups have also expressed interest in assisting in the development of laws associated to wildlife protection. Only a few countries have National Parks, despite the fact that about 4% of the earth's geographical area is maintained specifically to save endangered plants and creatures. Our ecology would be incomplete without wildlife. Many animals are on the verge of extinction and immediately require protection. The activities of humans have become a major danger to animals. Biodiversity is vanishing at an alarming rate around the world. Deforestation of timber, paper, rubber and other products form tress led to the shrinkage of their habitat. Habitat degradation, human pressures such as hunting, poaching other activities contribute to the loss of biodiversity, which has indirect effect on the ecosystem.

Key words: Biodiversity, Habitat, Threat, Wildlife protection.

Introduction

Wildlife Protection refers to the practice of safeguarding the plants, animals and their habitat to prevent them from extinction and to check their survival in that habitat. The seriousness of wildlife protection must be taught to people and they should be guided on how to coexist with different species of animals. Because of the harmful consequences of human activities on wildlife, wildlife protection has become an essential element. Various laws have been proposed to limit the loss of biodiversity in tropics by

developing various kinds of protected areas. Poaching poses a threat to wildlife species such as tigers and elephants. For some people, fishing, hunting, poaching and related activities are a kind of sport. Animals are slaughtered without regard for their species. Some people want to kill animals for the purpose of profiting from their body parts such as ivory from elephants, skin form alligator, feathers form attractive birds and so on.

We must prioritise the protection of the flora and fauna in the wildlife in order to save the planet. There has been a massive loss of natural habitat for wild animals due to the loss of trees and deforestation. A large number of species are on the verge of extinction. We must recognise the urgent need to protect animals and act accordingly. Several efforts can be made by both the government and the people of the world to protect them. The Wild Life (Protection) Act, 1972 was enacted for protection of plants and animal species. The government should vigorously enforce wildlife prevention and conservation laws. People should refrain from using items derived from wild animals. Their hunting would be reduced as a result of this. Environmental education should be made a mandatory subject in schools and colleges to ensure that the next generation is properly informed about the issue.

Plants and animals coexist in nature in a delicate equilibrium. Killing animals throws the ecology into disarray. We need to raise animal awareness amongst one another. To raise public awareness of wildlife, the Indian government launched Project Tiger, Nature Camps, and Jungle Lodges, among other natural projects and wildlife protection programmes. These initiatives not only aid in the preservation and protection of our natural heritage. Assam has Kaziranga National Park for protecting Rhinoceros, Similarly there are many such areas for protecting the wildlife such as the Kanha National Park (Madhya Pradesh), Gir National Park (Gujarat), Sunderbans National Park (West Bengal) and so on. All these were developed in order to protect the wildlife.

As A Citizen How To Protect Wildlife?

Whether we value wildlife for its intrinsic value or for its contribution to a functioning ecosystem that supports a diverse range of species as well as human livelihoods and well-being, there is no denying that we, as humans, have a responsibility to not only stop harming wildlife, but also to look for ways to increase wildlife populations and strengthen the habitats they rely on. Nearly 90% of the living creatures are facing extinctions and we can help them in all possible ways.

1. Protecting the habitats of wildlife since it is the major reason of animals facing extinction.
2. Creating awareness and educating those who are around us about the seriousness of wildlife protection.
3. Reducing the use of insecticides, herbicides and pesticides.
4. Boycotting the products that use wildlife resources.

Why should wildlife be protected?

They should be protected for:

a) Our future generations,

b) Environment, and

c) Medicinal purposes.

a) Future generations:

The fact that we desire to save endangered species is one of the best grounds for doing so. Seeing and engaging with animals gives us a lot of joy. Species that go extinct now are no longer around for us or future generations to see and enjoy. They can only learn about them in books and on the internet.

b) Environment:

Nature is interconnected in every way. When one animal or plant is removed, the ecology is disrupted, and other animals may suffer as a result. Bees, for example, may appear minuscule, yet as pollinators; they perform a critical function in our ecology. They are in charge of the reproduction plants, in other words. Many plant species would become extinct if bees were not present, causing havoc throughout the food chain.

c) Medicinal purposes:

Nature has inspired or provided inspiration for many of our treatments. With the extinction of plants and animals comes the promise for new therapies and drugs that we have yet to discover.

Wildlife Protection Management

The limitations that apply to hunting are among the most common types of protection rules. There are various types of bans. Limits on the number of animals that can be hunted (for example, under a single licence or over a set length of time) are uncommon in the main legislation. In certain nations, the protected species listings are included in the main legislation. Benin (laws of 1993), Mauritania (law of 1997), and Cameroon are all examples of this technique. In the latter situation, the degree of implementation mandates that the categorization established by the law (article 78) be updated at least every five years.

The various practices for wildlife protections may include:

1. **Specific Species Protection:**

   Legislation establishing protection standards may be limited to more valuable or rare species, or it may include a wider range of species, wildlife, and biodiversity. The legislative technique for protecting individual species is frequently to create lists by classifying animals that will receive varied degrees of protection.

2. **Assessment of harmful processes around wildlife habitats:**

   A number of domestic laws have begun to mandate the assessment and mitigation of any processes that may be potentially harmful to wildlife, rather than restricting their scope solely to protection and management, in response to recent changes in international law. For example, any "process or action" that may have a negative influence on animals must undergo "wildlife impact assessments."

3. **Biodiversity protection:**

   Many legal systems have begun to address biodiversity protection and management, either by incorporating relevant objectives within environmental or wildlife management legislation or by enacting distinct legislation.

4. **Regulation of the act of hunting:**

   Hunting is an economic and social activity in many cultures, where it can be a major source of food and income. Even if this is not the case, it is frequently a popular sport. Wildlife management and, as a result, the approval of applicable legislation is often the topic of heated political controversy in many nations where hunting is supported by powerful interest groups. Frequently, the questions at hand boil down to whether hunting should be allowed or banned, whether in general or, more commonly, with respect to specific species, specific places, or specific times of the year. In reality, this has tended to confine wildlife management to a binary of hunting vs. non-hunting.

5. **Use of license as a management instrument:**

   Licences or other types of licences are a common administrative tool for managing natural resources, and they are also used in the case of wild animals to enable hunting or other purposes. When appropriately employed to limit the number of animals that can be taken under a single licence, licences can help with management. However, provisions that clearly link the quantity of animals allowed to be taken under licences

to surveys or management plans are uncommon, and the administration is often given wide latitude in this regard.

6. Game based Ranching:

In remote locations, game ranching and breeding can be key contributors to food supply and profitability. They could also have a big impact on the ecosystem, especially on other creatures and biodiversity in general. As a result, it is critical that the applicable legislative framework take both concerns into consideration, seeking to strike a balance between encouraging these endeavours and discouraging them.

Conclusion

Biodiversity is vanishing at an alarming rate around the world. Habitat loss, fragmentation, degradation, and direct human pressures such as hunting and other extractive human activities all contribute to the loss of biodiversity, which leads to the loss of essential ecosystem services. Plant, avian, and mammalian species diversity, and abundance were all altered as a result of varying levels of human disturbance and environmental variables. For halting the loss of biodiversity in tropical nations, various conservation techniques have been proposed. Using technology such as the Global Positioning System (GPS), identify wildlife on the road and broadcast the information to warn vehicles approaching them. Necessary steps must be taken to protect the wildlife in all ways possible.

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