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# Highways the Death Door of Wild Life: A Comprehensive Study in Indian Thar Desert

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**ABSTRACT:** Highways play a crucial role in economic development of any country. Besides this, highways are also one of the causal agents of wild life destruction. The present investigation was based on the study of mortality rate in some selected wild animal groups in road accidents viz., Mammals, Birds and Reptiles on the national and state highways passing through the Indian Thar Desert, and the survey of biodiversity of roadside fauna and flora. The survey was also focused on the effects of highways on the population density and biodiversity of the area. Among the selected animal groups Mongoose, Squirrel, Wild Boar, Hedgehog, Chinkara, Desert fox, Nilgai, Greater Coucal (Crow Pheasant), Sparrow, Partridge, Babbler, White eared and Red Vented Bulbul, Peacock, Desert Monitor, Garden Lizzard, Skinks, Cobra, Vipers etc. were found killed in the road accidents. Maximum mortality rate in the road accidents during the survey was observed in Mongoose, Greater Coucal and Desert monitor (*Varanus*) throughout the study period. It was experienced that unavailability of safe passes across the highways, negligence driving and over speed of the vehicles were the major causes of wild life destruction on the highways. Maximum mortality rate of wild animals was found in July to November in each calendar year and minimum was during the month December to February. By the present investigation it was suggested that making transverse tunnels across the highways at regular interval, warning signboards about the wild life abundance regions, awareness among the drivers for wildlife protection and covering the road sides with net fencing in wild life abundant areas may reduce some degree of wildlife destruction in road accidents.

**KEY WORDS:** Biodiversity, Highways, Wildlife destruction

## INTRODUCTION

The road transportation infrastructure comprises the express ways, national and state highways, district road and local roads within cities, towns and villages. There are two types of highways in India, the National highways which are constructed and operating by the National Highway Authority of India (NHAI) and the State highways which are operating by Public Works Department (PWD) of concerned state governments.

As per ministry of Road transport and Highways, India has 144,955 km of national highways as on 31 Dec. 2022. [1] It constitutes about 3% of the total road network of India, and 40% of total road traffic load bears. National highways are passed through many national parks, sanctuaries, biodiversity hot spots and other bio-reserves. On these national highways and express ways, thousands of the goods truck, buses, four wheelers and two wheelers vehicles are passing round the clock. Road Transportation infrastructure is an important criterion for development of any country. In India, road transportation imparts 4.7% of the total GDP. On the contrary, these highways are also a major cause of wildlife destruction. When the wild animals crossing these roads in search of water, food, shelter, mates etc., they accidently got injuries or died by hitting speedy vehicles. Total 52 National highways passing through the Rajasthan having total length of 10,706.34 km, out of which national highway number NH-11, NH-25, NH-125, NH-62, NH-65 are passing through the region of Thar Desert.[1] More "importantly" the Desert National park which is famous for critically endangered great Indian Bustard is situated in this region.

Apart from the national highways there are 170 state highways having the total length of 15517 km as on 31.03.2019 and among these SH-16, SH-19, SH-20, Sh-28, 28B, SH-31, SH-36, SH-38, SH-40, SH-58, SH-61, SH-62, SH-63, SH-64, SH-65, Sh-66, Sh-68, Sh-69 are passing through the Indian Thar Desert.[2] The area covered by these highways are rich in Biodiversity. Many wild animals are residing or habitat in forest land, Gauchar Bhumi and farmland boundaries at flank of these highways e.g. Nilgai (*Boselaphus tragocamelus*), Indian gazelle *(Gazella gazella)*, blackbuck *(Antelope cervicapra)*, desert fox (*Vulpes vulpes*), wild boar (*Sus scrofa cristatus*), Desert cat (*Felis silvestris ornata*), Jungle cat (*Felis chaus affinis*) Mongoose (*Herpestes edwardsi*),

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Hedgehog (*Paraechinus aethiopicus*), Indian Crested Porcupine (*Hystrix indica*), critically endangered Great Indian bustard (*Ardeotis nigriceps*), migratory bird Demoiselle crane *(Anthropoides virgo)*, Peacock (*Pavo cristatus*), Greater coucal (*Centropus sinensis*), Sparrow (*Passer domesticus*); reptiles (*Varanus griseus)*, Garden Lizard *Calotes versicolor)*, Spiny tailed lizard (*Uromastyx hardwickii)*, Toad headed lizard (*Bufoniceps laungwalaensis*) Cobra (*Naja naja)*, Red sand boa (*Eryx johnii)*, Saw-Scaled Vipers (*Echis carinatus*) ect. are common animals found in this region. [3, 4] These wild animals are important genetic resources of the country and deeply integrated in ecosystem stability of this harsh region, but Dozens of killed animals by road accidents can be seen every day on these highways which drastically disturb the food chain and food web of the area. These accidents took place by the heavy as well as light vehicles passed on these highways. Reduction in biodiversity and animal population by these accidents may deteriorate or make unstable the ecosystem. Hence the present investigation was done to know the mortality rate of wild animals by road accidents on highways and impact of these highways on Fauna and Flora of the region.

## MATERIAL AND METHODS

For study of the present work, the following methods have been followed.

1) The Random field survey was carried out by direct observation and the quadrate methods for the study of biodiversity and the population density.
2) Study area – National and State highway passing through the Thar Desert of India (Jodhpur, Bikaner, Jaisalmer and Barmer), national highway NH-11 (From Bikaner to Jaisalmer) and State highways- SH-61 (From Jodhpur to Phalodi) were surveyed randomly (Fig. 1).
3) The data were collected in the calendar year 2019-2022 in three replicas in each month. The dead animals including Reptiles, Aves and Mammals were counted and recorded at every 10 kilometer.
4) Fauna were identified by the help of Editor Director ZSI (2004) and avian fauna by the help of World Bird Database. [3,5]
5) Flora was identified by the help of "Flora of Indian Desert" (M.M. Bhandari 1990), "Flora of Rajasthan" (B.V. Shetty and V. Singh 1991) and "The flora of the Indian Desert : Jodhpur and Jaisalmer" (Blatter, E.J. & Hallberg, F. 1918-21) . [6,7,8]

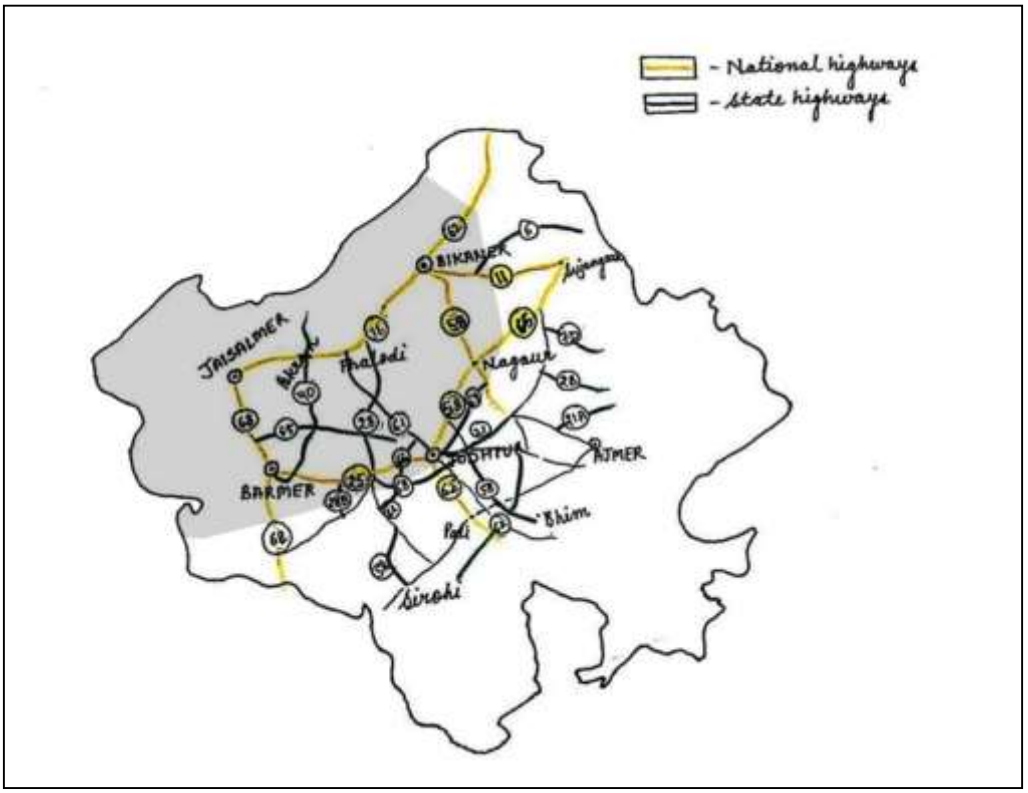


**Fig. 1:** Map showing the National and State highways of Western Rajasthan passing through the the Indian Thar Desert. Shadow shows the studied area.

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## RESULTS

### Faunal diversity of studied area:

Many wild animals were observed during the survey in studied area viz. in group Mammalia- Nilgai, Blackbuck, Chinkara, Wild boar, Desert Fox, Mongoose, Hedgehog, Hare, Rat, Squirrel, Porcupine, Desert Cat were observed; in group Aves- Great Indian Bustard, Peacock, Grey Partridge, Sand Grouse, Cuckoo, Demoiselle Crane (migratory bird), Sparrow, Babbler, Myna, Sunbirds, Prinia, Red-Wattled Lapwing, Crow, Jangle Crow, Pigeon, Parrot, Bulbul, Ring dove, Small dove, Hawk, Vulture, Peasant Crow, Owl, Weaver bird, Wood Packer, Eagle etc. were observed and in group Reptilia- Monitor Lizard, Garden Lizard, Cobra, Sand boa, Vipers, Spiny-tailed Lizard, Sand Lizard, Toad headed Lizard etc. were observed. The observed animals are documented in Table-1. The presence of these wild animals in Indian Thar Desert support the work of Editor Director ZSI (2004), B. R. Jaipal (2013), Aazad P. O, Imran and Chhagani A. K. (2019), Jennifer Vonk, Todd K. Shackelford (2022) and Dheeren et al (2023), who had also reported these animals in this area. [3, 4, 10, 11, 12] Out of these, many wild animals are listed in the Indian Wildlife (Protection) Act.

**Table 1:** Fauna of the Indian Thar Desert observed under studied area.

| Sr. No. | Common Name | Scientific name | Family | Habitat/area where observed |
|---|---|---|---|---|
| **Mammalia** | | | | |
| 1 | Black Buck | *Antilope cervicapra* | Bovidae | Forest area Ummed Nagar, Jodhpur |
| 2 | Black Rat | *Rattus rattus* | Muridae | Barren land, Farmland boundaries Throughout the Thar desert |
| 3 | Chinkara | *Gazella bennettii* | Bovidae | Unevenly distributed Throughout the Thar desert |
| 4 | Desert Fox | *Vulpes vulpes pusilla* | Canidae | Forest, Farmland boundaries Throughout the Thar desert, abundant near Osian |
| 5 | Desert Hare | *Lepus tibetanus* | Leporidae | Throughout the Thar desert |
| 6 | Golden Jackal | *Canis aureus* | Canidae | Hilly area of Jodhpur |
| 7 | Indian Boar | *Sus scrofa cristatus* | Suidae | Throughout the Thar desert |
| 8 | Indian Crested Porcupine | *Hystrix indica* | Hystricidae | Hilly area of Jodhpur, Ummaid Nagar, and Osian |
| 9 | Indian Desert Cat | *Felis silvestris ornata* | Felidae | Out skirt of Pokharan, Phalodi and Osian |
| 10 | Jungle cat | *Felis chaus affinis* | Felidae | Osian region of Jodhpur |
| 11 | Indian Desert Jird | *Meriones hurrianae* | Muridae | Throughout the Thar desert |
| 12 | Indian Desert Wolf | *Canis lupus pallipes* | Canidae | Hilly area of Mandore and Manaklao at Jodhpur |
| 13 | Indian Grey Mongoose | *Urva edwardsii* | Herpestidae | Throughout the Thar desert |
| 14 | Indian hedgehog | *Paraechinus micropus* | Erinaceidae | Throughout the Thar desert |
| 15 | Indian Palm Squirrel | *Funambulus palmarum* | Sciuridae | Throughout the Thar desert |
| 16 | Nilgai | *Boselaphus tragocamelus* | Bovidae | Throughout the Thar desert |
| 17 | Bat | *Pteropus vampyrus* | Pteropodinae | Hilly area of Jodhpur |
| 18 | Hanuman langur | *Presbytis entellus* | Cercopithecidae | Mandore area of Jodhpur |

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| **Aves** | | | | |
| 1 | Asian Green Bee eater | *Merops orientalis* | Meropidae | Throughout the Thar desert |
| 2 | Asian Koel | *Eudynamys scolopaceus* | Cuculidae | Throughout the Thar desert |
| 3 | Black Drongo | *Dicrurus macrocercus* | Dicruridae | Throughout the Thar desert |
| 4 | Common babbler | *Argya caudata* | Leiothrichidae | Throughout the Thar desert |
| 5 | Common Pigeon | *Columba livia* | Columbidae | Throughout the Thar desert |
| 6 | Eurasian Hoopoe | *Upupa epops* | Upupidae | Throughout the Thar desert |
| 7 | Great Indian Bustard | *Ardeotis nigriceps* | Otididae | Desert National Park area |
| 8 | Greater Coucal (Pheasant Crow) | *Centropus sinensis* | Cuculidae | Throughout the Thar desert |
| 9 | Grey Francolin | *Ortygornis pondicerianus* | Phasianidae | Throughout the Thar desert |
| 10 | House Crow | *Corvus splendens* | Corvidae | Throughout the Thar desert |
| 11 | House Sparrow | *Passer domesticus* | Passeridae | Throughout the Thar desert |
| 12 | Indian Courser | *Cursorius coromandelicus* | Glareolidae | Plains and rocky habitat of Jaisalmer |
| 13 | Indian Eagle-Owl | *Bubo bengalensis* | Strigidae | Chheela near Phalodi |
| 14 | Indian Jungle Crow | *Corvus culminatus* | Corvidae | Osian, Phalodi, Jaisalmer region |
| 15 | Indian Mynah | *Acridotheres tristis* | Sturnidae | Throughout the Thar desert |
| 16 | Indian Peafowl | *Pavo cristatus* | Phasianidae | Throughout the Thar desert |
| 17 | Indian Ring Neck Parrot | *Psittacula krameri* | Psittaculidae | Irrigated area of Thar Desert |
| 18 | Indian Robin | *Saxicoloides fulicatus* | Muscicapidae | Throughout the Thar desert |
| 19 | Indian Spotted Eagle | *Clanga hastata* | Accipitridae | Throughout the Thar desert |
| 20 | Little Brown Dove | *Spilopelia senegalensis* | Columbidae | Throughout the Thar desert |
| 21 | Purple Sun Bird | *Cinnyris asiaticus* | Nectariniidae | Throughout the Thar desert |
| 22 | Purple-Rumped Sun Bird | *Leptocoma zeylonica* | Nectariniidae | Throughout the Thar desert |
| 23 | Red-Vented Bulbul | *Pycnonotus cafer* | Pycnonotidae | Throughout the Thar desert |
| 24 | Red-Wattled Lapwing | *Vanellus indicus* | Charadriidae | Throughout the Thar desert |
| 25 | Ring Necked Dove | *Streptopelia capicola* | Columbidae | Throughout the Thar desert |
| 26 | Shikra | *Accipiter badius* | Accipitridae | Throughout the Thar desert |
| 27 | Spotted Owl | *Athene brama* | Strigidae | Throughout the Thar desert |
| 28 | Weaver Bird | *Ploceus cucullatus* | Ploceidae | Irrigated area |
| 29 | White-eared Bulbul | *Pycnonotus leucotis* | Pycnonotidae | Throughout the Thar desert |
| **Reptiles** | | | | |
| 1 | Desert Monitor Lizard | *Varanus griseus koniecznyi* | Varanidae | Throughout the Thar desert |
| 2 | Desert Skink | *Liopholis inornata* | Scincidae | Sand dunes of Jodhpur, Barmer and Jaisalmer |
| 3 | Glossy-bellied Racer | *Platyceps ventromaculatus* | Colubridae | Throughout the Thar desert |
| 4 | Indian garden Lizard | *Calotes versicolor* | Agamidae | Throughout the Thar desert |

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| 5 | Indian Monitor | *Varanus bengalensis* | Varanidae | Throughout the Thar desert |
| 6 | Indian Spectacled Cobra | *Naja naja* | Elapidae | Throughout the Thar desert |
| 7 | Indian Spiny Tailed Lizard | *Saara hardwickii* | Agamidae | Planes such as Catchment area, Oran, grass land etc. of Thar desert |
| 8 | Rajasthan toad-headed lizard | *Bufoniceps laungwalaensis* | Agamidae | Jaisalmer |
| 9 | Red Sand Boa | *Eryx johnii* | Boidae | Throughout the Thar desert |
| 10 | Saw Scaled Viper | *Echis carinatus* | Viperidae | Barren land, farmland boundaries etc. |

**Flora of the studied area:**

Several plant species were found during the survey at the flank of National and State highways which are the habitat of many birds, reptiles and animals. Mainly Arani, Ber, Khejadi, Banwaliya, Neem, Angreji babool, Desi babool, Bajer bel, Gadaria ri bel, Aankh phutani bel, Bui, Hingota etc. were found on the road side farmland boundaries and barren land. The plants observed under the survey and their interactions with animals are documented in Table 2.

**Table 2:** Plants found along with the road side in the studied area of the Indian Thar Desert and their interection with wild animals

| Sr. No. | Names of the Plants | Habit | Family | Local/ Vernacular Name | Plant animal Interaction |
|---|---|---|---|---|---|
| 1 | *Aerva persica* (Burm. f.) | Under Shrub | Amarantahceae | Bui | The inflorescence fiber used by birds for nesting. |
| 2 | *Albizia lebbeck* (Linn.) Willd. | Tree | Fabaceae | Sares | Dense canopy of plant is use by birds for nesting, and resting place by wild animals. |
| 3 | *Azardiracta indiaca* A. Juss. | Tree | Meliaceae | Neem | Dense canopy of plant is use by birds for nesting, and for the resting place by wild animals. Fruits are eaten by many birds. |
| 4 | *Balanites aegyptiaca* (Linn.) Delile | Small Tree | Zygophyllaceae | Hingota | Some birds like common babbler and robin make their nest in its thorny canopy for protection. |
| 5 | *Calotropis procera* (Ait.) R. Br. | Shrub | Apocynaceae | Aakaro, Aak | Many insects feed on it and birds eat them. The fibers of dried fruits and stems are used by birds for nesting. |
| 6 | *Capparis decidua* (Forsk.) Edgew. | Shrub or Tree | Capparaceae | Kair | Nectar of flowers is feed by Sun birds, honey bees and many butter flies. The ripe fruits (Dhalu) are eaten by many birds. Thorny dense canopy is used by Rabbits, Foxes, Mongooses, Hedgehog, Porcupine, Wild boar, Peacock, Grey Partridge, Chinkara, Nilgai etc. for their shelter and breeding sites. |
| 7 | *Clerodendron phlomoides* Hort. Ital.ex DC | Medium size tree | Lamiaceae | Arani | Dense canopy of plant is use by birds for nesting and for hiding by small wild animals. |
| 8 | *Coccinia grandis* (Linn.) J.O. Voigt | Climber | Cucurbiraceae | Gol | Its dense net is used by birds for protection and nesting |

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| 9 | *Cocculus hirsutus* (Linn.) Diels | Climber | Menispermaceae | Bajar-bel | Many birds eat their ripe fruits. |
| 10 | *Corallocarpus epigaeus* (Rottl. & Willd.) | Climber | Cucurbiraceae | Ankh Phutani bel | Its dense net is used by birds for protection and nesting |
| 11 | *Cordia gharaf* (Forsk.) | Small Tree | Ehretiaceae | Goondi | Ripen fruits are eaten by many birds and squirrels. |
| 12 | *Crotalaria burhia* Buch-Ham. | Under shrub | Fabaceae | Shinio | Dried stems are used by birds for nesting and the plant is used as fodder by Nilgai . |
| 13 | *Ctenolepis cerasiformis* (Stocks) Hook. f. | Climber | Cucurbiraceae | Ankh Phutani bel | Its dense net is used by birds for protection and nesting |
| 14 | *Dactyliandra welwitschii* Willd. | Climber | Cucurbiraceae | Badi ankh Phutani bel | Its dense net is used by birds for protection and nesting |
| 15 | *Dalbergia sissoo* Roxb. | Treee | Fabaceae | Shisham | Dense canopy of it's used by birds for nesting and resting place by wild animals. |
| 16 | *Echinopas echinatus* Roxb. | Under shrub | Asteraceae | Unt-kantalo | Many insects feed on nectar of flowers. Often create problem after drying in running of animals. |
| 17 | *Ephedra foliata* Boiss. & Kotschy ex Boiss. | Large Climbing Shrub | Gnetaceae | Aundho khinp | Its dense net is used by birds for protection and nesting |
| 18 | *Euphorbia caducifolia* Haines | Shrub | Euphorbiaceae | Danda thor | Many small animals viz. Rabbit, fox, Mongoose, and Birds e.g. Titar (Grey Partridge) are lives inside its thorny dense canopy for protection. |
| 19 | *Grewia tenax* (Forskk.) Fiori | Shrub | Malvaceae | Girgon | Birds eat its ripe fruits. |
| 20 | *Heliotropium bacciferum* Forsk. | Herb | Boraginaceae | Kali bui | Many insects and butter fly feed on its nectar and, plant used as fodder by Chinkara, and nigai. |
| 21 | *Heliotropium europaeum* L. | Herb | Boraginaceae | Pili bui | Many Insects feed on its flower nectar. |
| 22 | *Leptadenia pyrotechnica* (Forsk.) | Under shrub or shrub | Apocynaceae | Khimp | Dried stem are used by birds for nesting. |
| 23 | *Lycium barbarum* Linn. | Shrub | Solanaceae | Morali | Birds and Squirrel eats its ripe fruits. The leaves are eaten by Chinkara and Nilgai. |
| 24 | *Maytenus emarginata* (Willd.)Ding Hou | Medium size tree | Celastraceae | Kankero | Its canopy is used by animals for shedding. The leaves are eaten by Chinkara and Nilgai. |
| 25 | *Merremia aegypsia* (Linn.) | Climber | Convolvulaceae | Rota-bel | Dense net of its used by birds for protection and nesting. |
| 26 | *Mukia maderaspatana* (L.) M. Roem. | Twiner | Cucurbiraceae | NA | Dense net of its used by birds for protection and nesting. |
| 27 | *Parkinsonia aculeata* Linn. | Small Tree | Fabaceae | NA | Canopy is used by animals for shedding. |

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| 28 | *Pentatropis spiralis* (Forssk.) Dec'ne | Twiner | Apocynaceae | Aakari bel | Its dense net is used by birds for protection and nesting |
| 29 | *Pergularia daemia* (Forssk.) Chiov. | Twiner | Apocynaceae | Menda singi, Gadariari bel | Its dense net is used by birds for protection and nesting |
| 30 | *Prosipis juliflora* (Swartz) DC. | Shrub or Tree | Fabaceae | Banwaliya | Ripen pods are eaten by Nilgai, Chinkara, and Porcupine. |
| 31 | *Prosopis ceneraria* (Linn.) Druce | Tree | Fabaceae | Khejadi | Whole plant including leaves, fruits are eaten by Chinkara, Nilgai, birds ect. |
| 32 | *Rivea hypocrateriformis* (Desr.) Choisy | Woody Climber | Convolvulaceae | Rota-bel | Its dense net is used by birds for protection and nesting. |
| 33 | *Salvadora oleoides*Decne. | Small Tree | Salvadoraceae | Meetha Jaal, Piloo | Ripen fruits are eaten by birds, squirrel etc. and leaves-stem are eaten by Chinkara and Nilgai. |
| 34 | *Salvadora pursica* Linn. | Shrub or Tree | Salvadoraceae | Khara Jaal | Most frequently used by various birds for nesting. Snakes, Small animals e.g. Rabbit, Fox, Mongoose used its dense canopy for hiding and shelter. |
| 35 | *Senna alexandriana* Mill. | Under shrub | Fabaceae | Sona mukhi | Many Insects feed on its flowers. Seeds are eaten by ants. |
| 36 | *Senna fistula* L. | Small Tree | Fabaceae | Amaltas | Canopy is used for shedding by big animals. |
| 37 | *Solanum albicaule* Kotschy ex Dunal | Prickly Under Shrub | Solanaceae | Ringani | Ripen berries are eaten by squirrel and birds. |
| 38 | *Tecomella undulata* (Sm.) | Tree | Bignoniaceae | Rohiro | Canopy is used for shedding by big animals. The nectar is used by sunbirds, honey bees etc. |
| 39 | *Tehrosia wallichii* Fawc. & Rendle | Under shrub | Fabaceae | Biyani | Many Insects are feed on its flowers. |
| 40 | *Tephrosia purpurea* (Linn.) Pers. | Under shrub | Fabaceae | Biyani | Many Insects are feed on its flowers. |
| 41 | *Vachellia jacquemontii* (Benth.) Ali | Shrub | Fabaceae | Bu-banvali | Its prickly canopy is used by birds for nesting and protection. |
| 42 | *Vachellia leucophloea* (Roxb.) Willd. | Tree | Fabaceae | Urajio | Canopy is used for resting by big animals. Pods and Leaves are eaten by Chinkara and Nilgai. |
| 43 | *Vachellia nilotica* (Linn.) Del. | Tree | Fabaceae | Babool | Canopy is used for shedding by big animals. The pods are eaten by Nilgai and Chinkara. |

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| 44 | *Vachellia senegal* (Linn.) Willd. | Tree | Fabaceae | Kumatiyo | Canopy is used by big animals for resting, and for nesting by birds. Many insects are feed on its nectar. |
| 45 | *Vachellia tortilis* (Forssk.) Galasso & Banfi | Tree | Fabaceae | Kinkar | Most abundant plant found along with road side and used by animals for resting under its large canopy and for nesting by birds. At flowering time many insects are feed on its nectar and pods are eaten by Chinkara, Nilgai, Porcupine. |
| 46 | *Ziziphus mauritiana* Lamk. | Tree | Rhamnaceae | Ber | Prickly canopy is used by small birds for nesting and protection. The leaves and fruits are eaten by Nilgai, Chinkara and desert Fox. |
| 47 | *Ziziphus nummularia* (Burm. f.) | Shrub | Rhamnaceae | Badi ber | Prickly canopy used by birds for nesting and protection, Leaves and fruits eaten by Nilgai, Chinkara, Green Pigeon, Parrot etc. |

**Table 3:** Wild animals killed in road accident (Number of animals/10 km) on National highways passing through Thar Desert during the calendar years 2019-2022. Each datum is an average of three sampling.

| **Month** | **Wild animals killed in road accidents on National highways (Number/10km distance)** | | | |
|---|---|---|---|---|
| | **Mammalia** | **Aves** | **Reptilia** | **Total** |
| January | 3 | 1 | 0 | 4 |
| February | 1.33 | 2 | 1 | 4.33 |
| March | 1 | 4 | 3 | 8 |
| April | 2 | 1.66 | 4 | 7.66 |
| May | 1 | 2 | 1 | 4 |
| June | 2.33 | 3 | 2 | 7.33 |
| July | 4 | 2 | 5 | 11 |
| August | 7 | 4.66 | 7 | 18.66 |
| September | 7 | 4 | 7 | 18 |
| October | 5.33 | 5 | 4 | 14.33 |
| November | 2 | 3.33 | 5 | 10.33 |
| December | 1.66 | 2 | 0.33 | 3.99 |
| **Total** | **37.65** | **34.65** | **39.33** | **111.63** |

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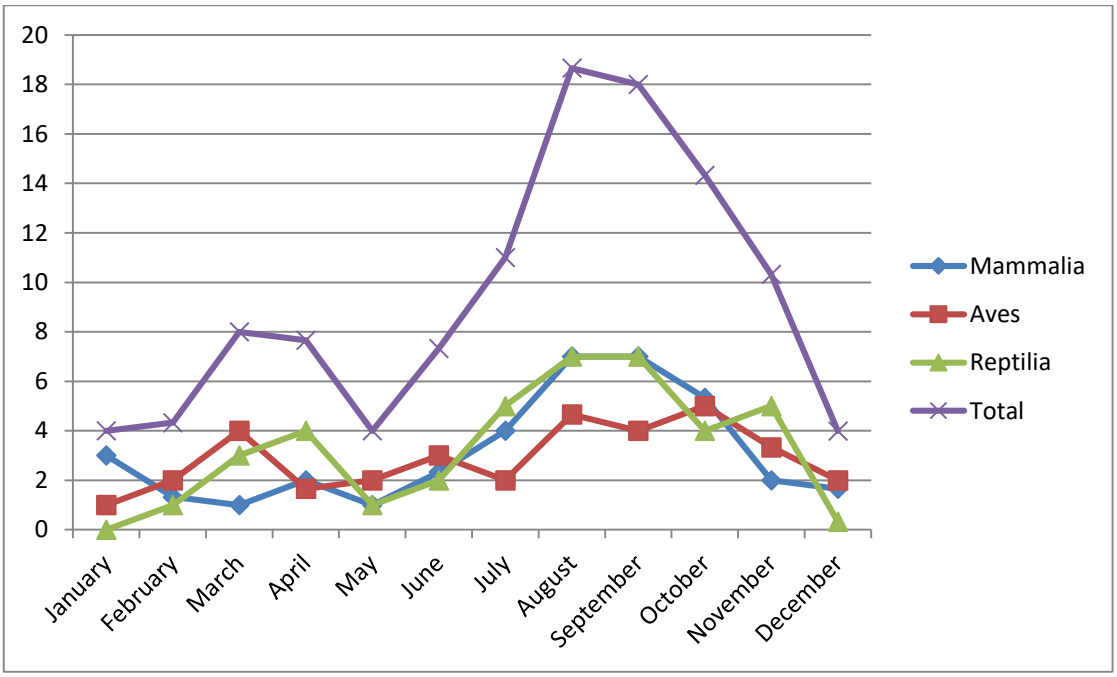


**Figure 2:** Mortality of wild animals in road accidents on National highways passing through Indian Thar Desert.

**Table 4:** Wild animals killed in the road accident (Number of animals/10 km) on the state highway passing through the Indian Thar Desert during the calendar year 2019. Each datum is an average of three replicas.

| **Month** | **Wild animals killed in road accidents on State highways (Number/10km distance)** | | | |
|---|---|---|---|---|
| | **Mammalian** | **Aves** | **Reptilian** | **Total** |
| January | 2 | 1 | 0 | 3 |
| February | 0.66 | 2 | 0.33 | 2.99 |
| March | 0 | 3 | 4.33 | 7.33 |
| April | 2 | 2 | 4 | 8 |
| May | 0.66 | 1 | 2 | 3.66 |
| June | 0 | 2 | 2 | 4 |
| July | 3 | 2.33 | 7 | 12.33 |
| August | 7 | 6.33 | 9 | 22.33 |
| September | 6.33 | 5 | 7 | 18.33 |
| October | 5 | 5 | 4.66 | 14.66 |
| November | 1 | 1.66 | 4 | 6.66 |
| December | 1.66 | 2 | 1.33 | 4.99 |
| **Total** | **29.31** | **33.32** | **45.65** | **108.28** |

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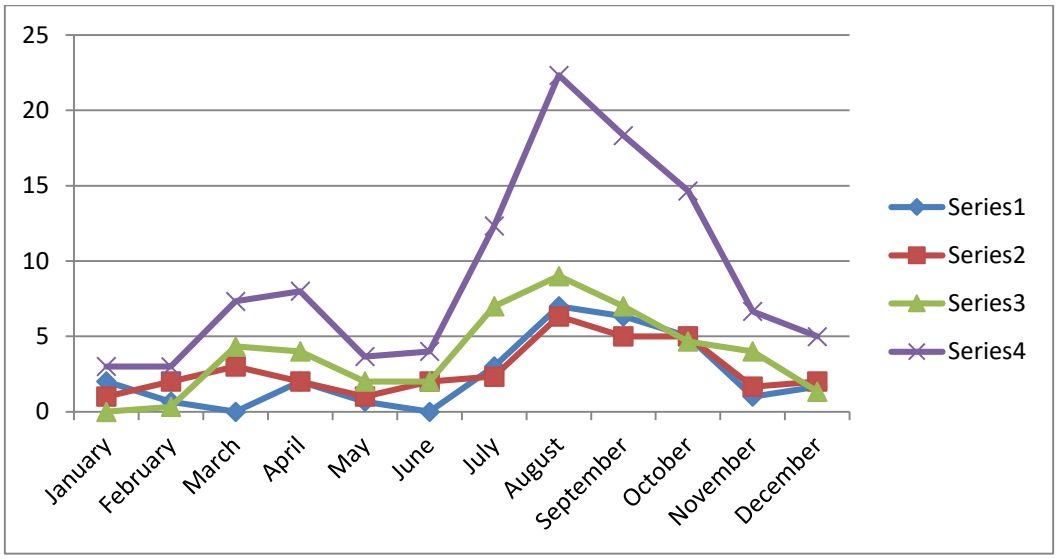


**Figure 3:** Mortality rate of wild animals in road accidents on State highways passing through Indian Thar Desert.

**Mortality rate of wild animal's on the National Highways**

The mortality of wild animals in road accidents on the studied National highways was recorded throughout the calendar year. The present study revealed that the number of Mammalian wild fauna killed in road accidents was highest in July to September month (4-7 animals/10km) of the year while the minimum death was recorded during March to June (1-2.33 animals/10km). Likewise, birds found dead on the roads was maximum in August to November (3.33-5 animals/10km), whereas minimum destruction was found in the months of December to February (1-2 animals/10km). On the other hand, Reptilian crushed on the roads were found highest in July to September (5-7 animals/10km) month whereas, minimum reptiles were found dead during the month of December to March (0-3 animals/10km). It may be due to their minimum activities or goes into hibernation during the winter season. This finding is support the work of Cloudsley-Thompson (1999). [9] The mortality data are documented in (Table 3). There are two peaks of total mortality of wild animals on the highways are seen, one small peak in the months of March-April and another high peak observed during July-September (Figure 2). This was due to their highest population density achieved by the breading during the favorable rainy season and maximum activities for feeding and mating around the roadside habitats.

**Mortality rate of wild animal's on the State Highways**

The knockdown of wild animals by speedy vehicles on the State highways was calculated throughout the year of 2019-2022. The study showed that the number of Mammalian wild fauna killed in road accidents found highest in July to September month (3-7 animals/10km), while the minimum death was recorded in November to February (0.66-2 animals/10km). Likewise, birds were found dead on the road was maximum in August to October (5-6.33 animals/10km) whereas, minimum destruction was found in the months of December to February (1-2 animals/10km). On the other hand, Reptilian wild animal crushed on the roads were found highest in July to September (7-9 animals/10km) month of the year, whereas minimum number was found in the month of December to February (0-1.33 animals/10km), it may be due to the minimum activities of animals during the winter season. The data are documented in Table 4. Similarly, there were total number of wild animal killed in road accidents on the State highways showed two peaks, one low peak in the months of March-April and another high peak during August-September of the year. This was most probably due to their favorable condition for breeding and other activities (Figure 3).

**DISCUSSION**

The destruction rates of wild animals on state and national highways were found more or less similar. The seasonal variation in the number of wild animals hitting accidently by vehicles may vary due to the maximum and minimum activities and population variation of animals in different seasons. During our survey it was found that in the biodiversity rich area of Thar Desert few animals

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and birds had been found most frequently killed in road accidents e.g. in Group Mammalia: Mongoose, Wild boars, Squirrel, Desert Fox, Chinkara were found most frequently killed. The reasons were different in each animal; in case of Mongoose they often cross the road in a patch of two to three members due to which they are vulnerable to road accidents, in case of wild boars they are often crush in the night due to the low sight and in case of Desert Fox and Chinkara they are vulnerable to accidents due to the sudden appearance before the vehicles, in case of the squirrel they became confused by speedy vehicles and often move back due to which they gripped by vehicles. In Group Reptilia: Desert Monitor and Sand Boa were killed most frequently in road accidents. The reasons were slow movement of these animals on the road and the bigotry attitude of humans about these animals due to which they intentionally crush them during road crossing. In Group Aves: Greater Coucal and Grey Francolin were found most frequently killed in road accident. The reasons are different in both; in case of Greater Coucal they often flew at lower site and often sudden dive on the roads from the flanking trees to cross the road while in case of Grey Francolin they often cross the road in line of one behind one hence are prone to accident. Apart From this many birds which have high and speedy flight were also found killed in road accidents e.g. Hawks, Sun bird, Ring Dove, Shrike etc. Besides this some of the rare and endangered animals were also found killed in road accidents in present study e.g. Jungle cat and Indian Grey Wolf which are the rare animals of the Thar Desert. Some of the glimpse of dead animals are shown in Plate 1 & 2.

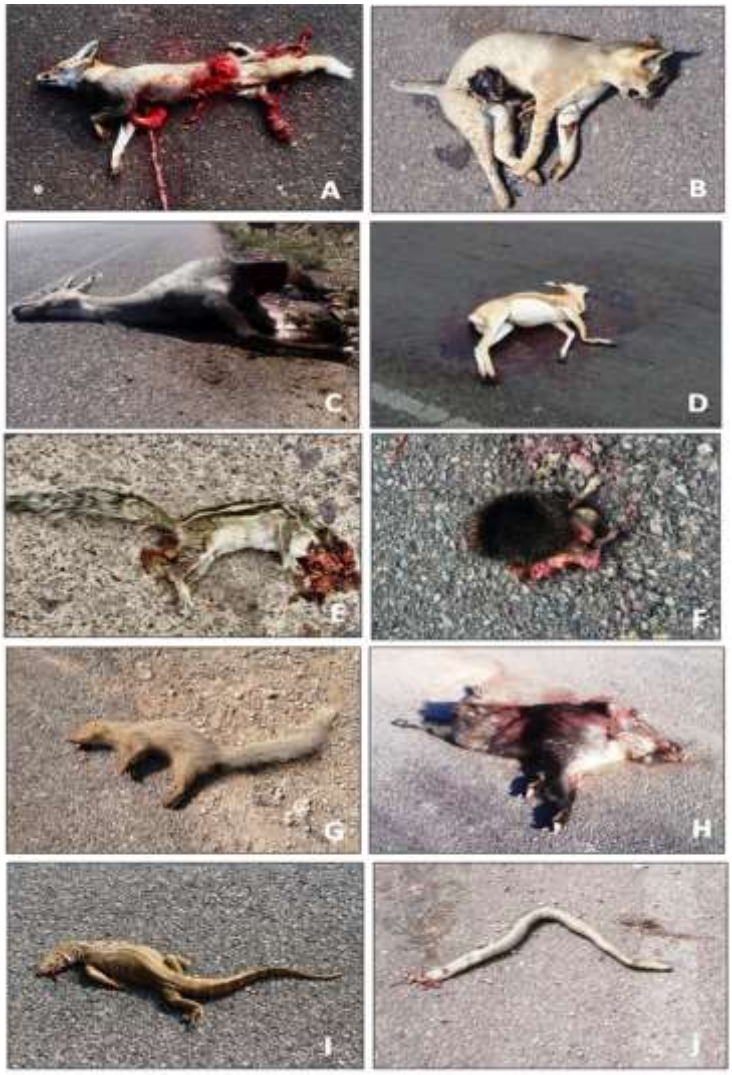


**Plate 1:** Wild animals (Mammalia & Reptiles) found dead in road accidents on studied highways of Indian Thar Desert: (A) Desert Fox; (B) Jungle Cat; (C) Nilgai; (D) Chinkara; (E) Squirell; (F) Hedge hog; (G) Mongoose; (H) Wild Boar; (I) Desert Monitor; (J) Sand boa

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**Plate 2:** Wild animals ( Aves) found dead in road accidents on studied highways of Indian thar Desert: (K) Greater Coucal; (L) Hawk; (M) Grey Francolin; (N) House Spparrow; (O) Yellow Footed Green Pegion; (P) Ring Dove; (Q) Long Tailed Shrike; (R) Purple Rumpped Sunbird; (S) Peacock; (T) Peahen

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## CONCLUSION

By the present investigation, it was found that the highways are one of the major causes of wild life destruction in the studied area. The survey of the studied area revealed that maximum rate of mortality in all three group viz. Mammalia, Aves and Reptilia were observed in July-September and minimum in November- January. The data showed an alarming situation of wild animal's destruction on the highways. Unavailability of safe passes, unaware driving sense, negligence driving and over speed vehicles were the major causes of the wild animal's destruction on the highways. It is suggested that making transverse tunnels beneath the road of highways at regular interval, displays of sign boards about wild life abundance area, applying security measures for wild animals e.g. covering of road sides with net fencing in wild life abundant areas and awareness campaign among the drivers and local people for wildlife protection, may reduce the some degree of wildlife destruction on highways.

## REFERENCES

1. National Highway Authority of India. https://nhai.gov.in
2. Public works department, govt. of Rajasthan. http://pwd.rajasthan.gov.in
3. Editor-Director. 2004. *Conservation Area Series, No.* 19: 1-135 (Published by the Director, *Zool. Surv. India*, Kolkata)
4. B.R Jaipal (2013). Food and Feeding Preferences of Indian Desert cat (*Felis silvestris ornata*). *J.Env.Bio.Sci*. 2013:27(2): 257-259.
5. The World Bird Database. https://avibase.bsc-eoc.org
6. Bhandari M.M. (1990). *Flora of The Indian Desert*. MPS Repros, 39, BGKT Extension, New Pali Road, Jodhpur
7. Shetty B.V. & Singh. V. (1991). *Flora of Rajasthan* (Vol.2). Botanical Survey of India.
8. Blatter, E.J. & Hallberg, F. (1918-21). The flora of the Indian Desert (Jodhpur and Jaisalmer) .*Journal of Bombay Natural History Society*, 26-27(3).
9. Cloudsley-Thompson, J.L. (1999). Daily and Seasonal Cycles, Hibernation, Aestivation and Migration. In: The Diversity of Amphibians and Reptiles. Springer, Berlin, Heidelberg
10. Jennifer Vonk, Todd K. Shackelford (2022). Encyclopedia of Animal Cognition and Behavior. Springer Nature Switzerland AG
11. Aazad P. O, Imran and Chhagani A. K. (2019). Status of Indian Grey Wolf (*Canis lupus*) in Human landscape of Thar Desert, Rajasthan. *Indian Forester*, 145 (10), 1009-1012.
12. Panwar Dheeren, Panwar K.R., Meena S.S., and Ahrodia Rampal (2023). Role of Traditional Farmland boundaries (Maat) in Biodiversity Conservation in Cultivated Region of Indian Thar Desert. *Journal of experimental Zoology India*, 26 (2) pp. 2089-2100.