

Occurrences of Human Wild Pig Conflict in Tamil Nadu - India

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Abstract

The study was carried out to assess the Human wild pig conflict and how the occurrences of conflict varied with the climatic factors. The areas adjoining the Mudumalai wildlife region, Sathyamangalam wildlife region and Anaimalai wildlife region of Tamil Nadu, India were included in this study programme. The documentation of the quantifiable meteorological factors in the identified conflict areas was done using the weather portal of TNAU.

The occurrences of conflict were also classified as low, medium and high based on the intensity. Conflicts were graded as low, medium and high. Low - infrastructure damage, water source contamination, rooting of land and ecological damage, moderate-agricultural crop raiding, livestock preying, damage to forest restoration and grasslands, high- injury to humans, causing fatalities. Suitable management related measures were recommended pertaining to the findings observed in regard to wild pig- human conflicts pertaining to the variations in the meteorological factors of the areas were studied. The findings revealed that the climate played an important part in the vegetation of plants in the study area and this regulated the crops which in turn regulated the occurrences of conflict. Hence this study would prove useful in addressing conservation and conflict issues.

Keywords: Wild pigs; Meteorological factors; Conflict; Management

Introduction

Wild pigs have caused various kinds of agricultural and environmental damage. They also competed with wildlife and livestock for habitat, harboured diseases and transmitted parasites. They were well established because of their adaptability, reproduction capability and skill at survival. Additionally, wild swine use their snout and keen olfaction to search for food resources. If soil conditions were favorable they could root to a depth of one meter, leading to a widespread source of conflict. Nowadays the proximity of human development did not seem to affect the activities of the wild pigs to a great extent Gerard et al. [1]. Agricultural crop depredation by wild pigs was a major problem in many parts of India. Wild pigs raided crops and utilized the agro-ecosystem for food resources and shelters. Presently, the wild pig populations were fragmented and relatively isolated all over. Some of these isolated populations had become overabundant and became dependent upon the agricultural crops, especially in and around the protected areas or managed forests for their food requirements. Wild pig's damage on human beings varied in different regions and most of these were accidental, leading to casualties, when villagers ventured into forests or when they were working in their crop fields. Monthly variations in human casualties could be correlated with activities of villagers in crop fields, forests and villages. Further, the damage to a variety of agricultural crops was reported and the mature crops were highly susceptible to such damage, Chauhan [2]. Monitoring of the stress response of wild pigs might help to evaluate the factors that cause stress which in turn triggers the conflict with humans. Ficetola et al. [3] quoted that crop damages by wildlife was a human wildlife conflict, particularly within or nearby protected areas that could have an important impact on the management of resources and these damages could make communities intolerant to wildlife which might

limit the effectiveness of conservation strategies. We aimed to at recording the conflicts caused by these wild pigs and we were interested in determining whether climatology had an effect to human-wild pig conflict.

Materials and Methods

Study area

Study on conflict occurrence in wild pigs (*Sus scrofa*) interfering with agriculture was carried out in areas adjoining the Western Ghats (Mudumalai tiger reserve, Anaimalai tiger reserve) and Eastern Ghats (Sathyamangalam region) of Tamil Nadu state in India during November, 2013 to May, 2014. The details of the meteorological parameters of each region were obtained from the Tamil Nadu Agricultural University (TNAU) portal. These meteorological parameters were ascertained to have direct or indirect effect on the wild pigs like seasonal migration, water availability, rainfall and radiation. The wild pig related conflict areas in the adjoining regions of Mudumalai Sanctuary were identified subsequent to the discussion with forest veterinary officer, officials of the forest department, villagers and other village level officers and the level of conflict pertaining to the three regions under study were recorded and correlated with the meteorological factors and the cumulative stress. Conflicts were graded as low, medium and high. Low-infrastructure damage, water source contamination, rooting of land and ecological damage, Moderate-agricultural crop raiding, livestock preying, damage to forest restoration and grasslands, High-injury to humans, causing fatalities. Within the adjoining regions of wildlife areas taken under study suitable management measures were framed and recommended. The faecal samples were processed and subsequently subjected to estimation of cortisol concentration by using the ELISA kit (DSI-EIA-

STEROID-CORTISOL EHE-151) to find out the stress in the respective seasons.

Statistical analysis

The statistical analysis of the data was carried out as per the guidelines furnished by Snedecor et al. [4] Chi square tests, cross checked using SPSS wherever applicable.

S.No	Season	Temperature°C	Relative Humidity %	Wind Speed (Kmph)	Soil Temp°C	Rain Fall (mm)	Solar Radiation
Mudumalai	Winter	10.735	91.25	4.2	9.65	12.96	280.45
	Summer	21.39	83.25	4.3	20.03	6.08	388.84
Sathyamangalam	Winter	27.33	70.65	5.1	25.12	6.21	370.16
	Summer	34.87	69.38	6.9	32.22	0	510.05
Anamalai	Winter	24.96	79.15	5.7	23.98	7.54	419.55
	Winter	10.735	91.25	4.2	9.65	12.96	280.45

Table 1: Meteorological parameters of the various regions during the seasons.

Conflict

Conflicts were recorded as mentioned as low, medium and high. Low - infrastructure damage, water source contamination, rooting of land and ecological damage, moderate-agricultural crop raiding, livestock preying, damage to forest restoration and grasslands, high-injury to humans, causing fatalities. Highly significant variations were recorded on occurrences of conflict among the three study regions during winter (Table 2).

Region	Low	Medium	High	X ²
Mudumalai	32 (48.48%)	27 (40.90%)	7 (10.6%)	15.45**
Sathyamangalam	16 (45.71%)	18 (51.42%)	1 (2.86%)	
Anamalai	4 (16%)	21 (84%)	NIL	
NS- Not Significant *-Significant **-Highly Significant				

Table 2: Regional variation of conflict in winter.

Similarly, highly significant variations were recorded on occurrences of conflict among the three study regions during summer (Table 3). Interestingly there were no seasonal variations in conflict occurrence except in areas adjoining Mudumalai showing significant variations (Table 4). This suggested that, invariable of the climate, the conflict occurrence remained the same. Climatic factors did not have an effect on conflict occurrence.

Stress assessment

The faecal samples of wild pigs were obtained from adjoining areas of Mudumalai, Sathyamangalam and Anaimalai wildlife regions.

Results

Meteorological parameters

The different meteorological parameters comprising of temperature (degree centigrade), relative humidity (per cent), wind speed (kmph), soil temperature (degree centigrade), rainfall (mm) and solar radiations (cal/cm²) were presented in Table 1. The range of values for each of the meteorological parameters was furnished.

Wild pigs in summer: Faecal cortisol concentration in ten fresh faecal samples (n=10) ranged from 175.79 to 684.37 ng/g in adjoining areas of Mudumalai. The faecal cortisol concentration in ten fresh faecal samples (n=10) ranged from 141.81 to 413.42 ng/g in adjoining areas of Sathyamangalam. Faecal cortisol concentration in ten fresh faecal samples (n=10) ranged from 201.91 to 515.43 ng/g in adjoining areas of Anaimalai. The mean ± S.E. values of faecal cortisol concentration of wild pigs in the adjoining areas of Mudumalai, Sathyamangalam and Anaimalai were 349.41 ± 59.81, 223.57 ± 27.53 and 336.03 ± 38.83 ng/g, respectively.

Wild pigs in winter: In winter the wild pigs of adjoining areas of Mudumalai (n=10), the faecal cortisol level ranged from 76.31 to 116.40 ng/g. Similarly, the wild pigs of adjoining areas of Sathyamangalam (n=10) revealed faecal cortisol concentration ranging from 103.22 to 177.48 ng/g and in case of adjoining areas of Anaimalai (n=10) the range of faecal cortisol concentration varied from 61.04 to 112.23 ng/g. The mean ± S.E. values of faecal cortisol concentration of wild pigs in the adjoining areas of Mudumalai, Sathyamangalam and Anaimalai were 99.17 ± 7.16, 144.08 ± 12.46 and 88.32 ± 9.00 ng/g, respectively. This revealed that the wild pigs were stressed much more during summer than in winter.

Region	Low	Medium	High	X ²
Mudumalai	23 (79.31%)	5 (17.24%)	1 (3.44%)	16.48**
Sathyamangalam	2 (20.00%)	8 (80.00%)	NIL	
Anamalai	4 (33.33%)	8 (66.66%)	NIL	
NS- Not Significant *-Significant **-Highly Significant				

Table 3: Regional variation of conflict in summer.

S. NO	Season	Low	Medium	High	X ²
Mudumalai	Winter	32 (48.48%)	27 (40.90%)	7 (10.6%)	7.48*
	Summer	23 (79.31%)	5 (17.24%)	1 (3.44%)	
Sathyamangalam	Winter	16 (45.71%)	18 (51.42%)	1 (2.86%)	2.67NS
	Summer	2 (20.00%)	8 (80.00%)	NIL	
Anamalai	Winter	4 (16%)	21 (84%)	NIL	0.53NS
	Summer	4 (33.33%)	8 (66.66%)	NIL	

NS- Not Significant
*-Significant
**-Highly Significant

Table 4: Seasonal variation of conflict.

Discussion

Meteorological parameters and conflict

Massei and Genov [5] indicated that wild boars could adapt to a wide range of habitats and had the highest reproductive rates among ungulates and further, wild boars could greatly affect the species abundance, species richness, soil chemistry and food webs and had a great impact on plant and animal communities and affected many components of ecosystem. Wild pigs caused various kinds of agricultural and environmental damage. They also competed with wildlife and livestock for habitat, harbored diseases and transmitted parasites. They were well established because of their adaptability, reproduction capability and skill at survival. Additionally, wild swine use their snout and keen olfaction to search for food resources. If soil conditions were favorable they could root to a depth of one metre, leading to a widespread source of conflict, Mapston [6]. From the discussion with veterinary officer of forest department, village personnel and farmers, it was understood that wild pig-human conflicts in terms of entry into their agricultural fields were found to occur almost throughout the year. Though the extremes of temperature including the solar radiations in both the summer season and winter season, varying levels humidity (Table 1) and other related factors could lead to stress in case of wild pigs of the wildlife regions, it was also equally true that most of the stress causing factors like existence of feed resources related competitions among co-existing species belonging to different taxonomic classes, presence of the predators or the hunting type of carnivore species like tigers and leopards etc. were found to be almost persistent type of stress related factors in case of wild pigs. Further, variable crops were planted in both the summer and winter seasons by the related farming community. Hence, logically it could be stated that conflicts between wild pigs and humans in terms of entry into the agriculture fields, in particular might occur throughout the year, regardless of the occurrence of variations in the meteorological parameters documented in summer as well as in winter seasons (Tables 2, 3 and 4). The variations in the number of conflict related events pertaining to wild pigs might be dependent on the following factors:

The variations in the type of crops preferred at various levels by the wild pigs:

- Variations in the fruiting or ripening or harvesting stage of the crops in the agricultural fields luring the wild pigs.
- Variations in the period of plantations of such crops in the agricultural fields of adjoining areas of wild life.

Kamler et al. [7] reported that high densities of wild boar in agricultural areas had naturally brought about an increase in the damage to farm crops, which, in some places, even threatened the agricultural economy and good food supply could assist in high reproduction of wild boar further intensifying damage. Seward et al. [8] stated that rooting, trampling, and compaction influenced plant regeneration, community-structure, soil properties, nutrient cycling and water infiltration. Wild boars had a unique method of obtaining food from below the soil surface by rooting and these impacts on the ecosystem could be so far reaching and while digging, they tended to turn over the ground surface, displacing large volumes of soil. This method of foraging led to the impaired water quality and increased prevalence of exotic plants to native plant species Ditchkoff and West [9-13].

However, it could be logically assumed that lack of adequate feed materials and lack of watering resources might become the additional stress causing factors in case of the wild pigs during summer season [14-18]. The sampling in wild pigs could not subjected to the season wise grouping because of the practical difficulties encountered towards the collection of faecal samples in fresh condition during this study [19-21].

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