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Seasonal variation in prevalence of Indian wild Boar and its damage in agricultural crop fields

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Abstract

The Indian Wild Boar (*Sus scrofa* L.) is widespread animals throughout the India. The present study involves observations on seasonal variation in the prevalence of Indian Wild Boar and its damage in agricultural crops in selected areas of Punjab. The study period ranges from December 2016- April 2018. The activity of Indian Wild Boar varies with seasons. The foraging activity of Indian Wild Boar was observed to be more in the summer and early autumn season and rooting activity in winter seasons. The reasons for this may be scarcity of food resources and increased metabolic activity of animals in winter. The activities of Indian Wild Boar were predominantly nocturnal in nature. The damage of Indian Wild Boar to agriculture crops vary with weather conditions. The damage of Indian Wild Boar was more in those crops which are near the forest areas and human habitat areas. The energy requirements, food availability, and seasonal and geographical variations are major factors influencing food selection by wild Boar. In addition to other factors which effect the activities of Indian Wild Boar such as change the size of human populations, decrease in area of forest and growing of permanent crops in agriculture fields. On the basis of survey report 56% farmers agreed with moderate amount of damage (20-25%) and 44% farmers agreed with slight amount (10-15%) damaged caused by Indian Wild boar.

Keywords: Indian Wild Boar, seasonal variation, agricultural crop field, breeding season

Introduction

The Indian wild Boar (*Sus scrofa* L.) also known as the wild pig is widespread animal throughout the world ^[1]. This species is native of North Africa and Eurasia (Europe and Asia) ^[2]. During the Europe exploration, wild Boar was used for certain livestock practices in Eastern U.S. and certain European countries which result in the increase in population of wild Boar. In some areas of the world Indian wild Boar was used for domestication purposes ^[3]. The 'Sow' is the traditional name of the female wild Boar that comes from the Western Germanic and Old English countries of certain wild Boar species and is more related to the modern German 'Sau' ^[4]. The Indian wild Boar belongs to the Family –Suidae, Order- Artiodactyla, Class- Mammalia, Genus- *Sus* and species-*scrofa*. The animal is medium sized, mixed coloured and having short legs. The organs of smell are well developed and organs of hearing and sight are poorly developed due to the small size of eyes. The neck is thick, short and its shoulder arises upward forming a hump ^[5]. Indian wild Boar is omnivorous in nature but mainly feeds on small mammals, birds, reptiles, amphibians, fishes, insects, vegetables and cereal crops etc. ^[6]. They live in the mixed forest area which provides protective shelter and food resources to the animals but they mostly prefer areas near human habitation because the chance of food availability increases ^[6]. The animal requires large amount of food and the requirement of food increases during the winter and breeding season ^[7]. The breeding period of Indian wild Boar starts from November- April in North India. During the breeding period animals require large amount of food resources for increasing the weight of body and thickness of insulating coat of body. A single male can mate with 5-6 female Boars at a time. This results in the loss of weight of the male Boar up to 20% as compared to the weight of the animal before the start of breeding period ^[2]. After the breeding period male Boar leaves the female and the young ones. The gestation period of the female Indian wild Boar varies with age. The average gestation period of the female Boar completes in 120-128 days but in older female takes longer. The young ones are produced in March - April in Punjab. The female produces 4-6 piglets in each litter but the number of piglets may vary from female to female ^[2]. The average life span of the Indian wild Boar is 10- 12 years but it may varies depending upon the various factors which influence the life activity of animals such as-food resources, shelter

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space, protection from enemies and other harmful diseases^{16, 81}. In 1990, 16 species of wild Boar were recognized, which are divided into 4 groups depending upon the skull height and lacrimal bone length⁹¹. The Indian wild Boar spreads the a number of diseases to domestic animals. They cause foot and mouth disease, Swine plague and some other epizootics animals¹²¹. The Indian Wild Boar causes large damage to agricultural crops such as Rice, Sugarcane, Potato, and vegetables crops¹²¹. They cause damage to the crops when there is less availability of food in the natural environment¹¹⁰. The population of the Indian Wild Boar is decreasing due to excessive hunting and loss of habitat¹¹¹. The Indian Wild Boar comes under Least Concern categories as per IUCN guidelines¹¹².

2. Materials and Methods

2.1 Study Area

The study of prevalence and damage activity of Indian Wild Boar was carried out at three selected locations of Punjab *i.e.* Site I- Punjab Agricultural University Campus (Ludhiana; 75.79° E, 30.90° N, above mean sea level – 189m), Site II- University Seed Farm Ladhawal (Ludhiana; 75. 49° E, 30.59° N, above mean sea level –229m) and Site III- Regional Research Station for Kandi area, Ballawal Saunkhri (Shaheed Bhagat Singh Nagar; 76.38° E, 31.09° N, above mean sea level- 295m) from December 2016 –March 2018 respectively. The questionnaire survey was conducted in 10 villages around the 3 selected locations.

2.2 Materials

The camera (Sony DSC-H300) was used to capture the pictures from research field areas. GNSS viewer navigation application was used to know altitude, longitude and latitude of selected locations

2.3 Methods

Regular observations were taken from the selected locations *i.e.* fortnightly from Punjab Agricultural University Campus, Ludhiana, bi-monthly from University Seed Farm Ladhawal (Ludhiana) and monthly from Regional Research Station for Kandi area, Ballawal Saunkhri (Saheed Bhagat Singh Nagar). During data collection Line-Transsect and Pug – marks methods were followed¹¹³¹. The other activities of the Indian Wild Boar including foraging, rooting, wallowing and track marks in the agriculture crop fields were also observed. The damage of the Indian Wild Boar to the various crops at different months and different stages of crops were also observed.

3. Results and Discussion

The damage of Indian Wild Boar to different agricultural crops was varied with seasonal conditions in the northern part of India. The damage of Indian Wild Boar was recorded at those crops which present near the forest and human habitat areas¹¹⁴¹. In the northern part of India mainly 6 seasons were observed *i.e.* winter (January- February), spring (March-April), summer (May- June), rainy/ monsoon (July-August), early autumn (September- October), late autumn (November-December)¹¹⁵¹.

A total 80 observations of 594 tracking/ wallowing activities were recorded at the three selected locations. Out of these activities 83(13.973%), 317 (53.367%) and 194 (32.659%) were at orchard fruit crop area of site I, at crop fields of site II and orchard fruit crop of site III respectively. The damage of

Indian Wild Boar to different agricultural crops was observed in the fields at site II and site III (Table 1).

The activities of Indian Wild Boar *i.e.* foraging, rooting, wallowing and track- marks were recorded at all the three selected locations during December 2016- April 2018 (Table 1). The no. of tracks/rooting activity of Indian Wild Boar were changed from season to season and the damage to different agricultural crops also varies accordingly. The higher number of wallowing activity of Indian Wild Boar was recorded in agricultural crop field and orchard fruit crop field at Site-I, Site-II and Site-III in summer and early spring season and rooting in winter season respectively. These activities of animals were mostly nocturnal^{116, 1171}. The numbers of activities largely increased from winter to summer season at all the selected locations. The observation on the wallowing/rooting/damage activity of Indian Wild Boar showed that maximum activity was observed in the end-summer to winter season. The peak period of rooting/damage activity was in the November - January months, because, in this period Rice and Potato crops were at maturation stage. The Indian Wild Boar feed on these crops to get more nutritive food for proper development of body and prepare itself for breeding period. After, the pregnancy period of female sows started, the activity of animal slightly decreases day by day in all the selected locations; it may be due the need of more rest for proper development of young ones inside the body. After the birth of young ones, when they started feeding, then increase in the damage activity of animal was observed (Table 1).

Table 1: Observations on the activity of Indian Wild Boar.

Months	No. of Tracks/ wallowing activity					
	Site- I		Site-II		Site-III	
December 2016	5	100%	0	0.0%	0	0.0%
January 2017	6	100%	0	0.0%	0	0.0%
February"	3	15.78%	16	84.21%	0	0.0%
March"	5	20.83%	19	79.16%	0	0.0%
April"	3	16.66%	15	83.33%	0	0.0%
May"	0	0.0%	0	0.0%	0	0.0%
June"	8	22.22%	18	50%	10	27.77%
July"	6	15.38%	20	51.28%	13	33.33%
August"	2	5.55%	23	63.88%	11	30.55%
September"	7	15.90%	21	47.72%	16	36.36%
October"	10	17.54%	29	50.87%	18	31.57%
November"	9	13.43%	35	52.23%	23	34.32%
December"	7	9.09%	39	50.64%	31	40.25%
January 2018	8	10.95%	35	47.94%	30	41.09%
February"	3	5.26%	27	47.36%	27	47.36%
March"	4	10.25%	20	57.142%	15	38.461
April"	0	0.0%	0	0.0%	0	0.0%
Total	83	13.973%	317	53.367%	194	32.659%
Mean		5.375		17.5		9.312

The activity of Indian Wild Boar also changes with respect to change the environmental condition as observed in selected locations. The Indian Wild Boar cause the damage to the Rice (*Oryza sativa*), Sorghum (*Sorghum bicolor*), Maize (*Zea mays*), Potato (*Solanum tuberosum*) and other vegetable crops were recorded in selected locations¹¹⁷¹. In summer they cause damage to fruit crops was recorded at Site-I and Site-III¹¹⁸¹. In winter season damage to Maize, Potato and other vegetable crops were observed. The activities of Indian Wild Boar were also changed due change the size of human populations and certain other biological factors such as: energy requirements,

food availability, and seasonal and geographical variations, which cause the habitat fragmentation and change the feeding preference of wild animals [19, 20]. This results in the wild animals entering into the area of agriculture and human habitat to take proper food for their growth [21]. There was a season-wise variation in the damage caused to agriculture crops by Indian Wild Boar (Table 2).

In winter season (January – February) Moderate amount of damage to Potato (due to the removal of leaves from plant at above the ground level) and Mustard crops were recorded at site II. At site-III, from large to moderate amount of damage was recorded in Amla (*Phyllanthus emblica*) fruit crop. The activity of Indian Wild Boar was decreased at all the three selected locations.

In spring season (March- April), large amount of damage to Amla crop was recorded at site-III in the month of March. At the same time wheat crop was observed at the ripening stage in all the three selected locations. In April, harvesting of Wheat and Maize (winter) crops were recorded at site-II. The activity of Indian Wild Boar becomes slightly increased in comparison to winter season as observed at Site- II and Site-III.

In summer season (May-June), the activity of Indian Wild Boar was increased at all the three selected locations. The pug-marks of animal observed in orchard fruit crop at site-I, crop field and Maize at site-II as also reported by other workers [19, 20]. The damage of Indian Wild Boar was observed near the human habitat area of site-III in May. In June, crop

field was prepared for growing of Paddy crop at all the three selected locations [20, 21].

In rainy/monsoon season (July- August), post-plantation of Paddy crops were done in many areas of Punjab up to July month. In August, Paddy crop present at growingstage, Sorghum at maturing stage and Maize at harvesting stage (summer season) were recorded at site-II. The slight amount of damage by animal was observed in Paddy crop at site- II. The pug-marks of animal were not observed during this period due to regular rainfall at Site-II and Site-III. The activity of Indian Wild Boar becomes fluctuated due to change the environmental conditions.

In Early autumn season (September- October), In September, Paddy and Maize crops were at in-florescence and sowing stage respectively at site-II and site-III. In October, Paddy and Maize crops at maturing stage were recorded at site-II and site-III. The damage of animal was recorded in Paddy, Potato and orchard fruit crops at site-II, site-I and site-III. The activity of animal slightly increased at selected locations.

In late autumn season (November-December), after the mid-November, harvesting of Paddy and Maize were recorded at all the three selected locations. In the beginning of December, the collection of Potatoes from crop field and sowing of Maize (winter season) were recorded at site-II. The slight amount of damage was recorded in Potato and Wheat crops at Site-II and Site-III. The damage activity of animal remain stable at site-I and site-II but increased at Site-III [21].

Table 2: Observations on the seasonal variations in the crop damage by Indian Wild Boar.

Sr. No.	Seasons	Months	Stages of Crops	Damage
1.	Winter	January-February	Potato crops at ripening stages in January. In February, leaves from stem were removed and maize at ripening stage was observed at site –II and Site-III respectively. The winter season of maize at maturation stages was observed at Site-II.	The damage were observed in orchard fruit crops, Potato and Mustard crops at site-II and site – III.
2.	Spring	March-April	In March wheat crop at ripening stages were observed at all the three selected locations. In April the harvesting of wheat and maize (winter season) was started in many areas of selected locations.	The activity of animals slightly increases as compared to winter season. The damage was observed in Amla crop at site-III.
3.	Summer	May- June	In May, whole the crop field was prepared for plantation of paddy in crop field. In June, the post-plantation of paddy crops was started at many places of selected areas.	The activity of animal was increased more as compared to last season at all the three selected locations.
4.	Rainy/ Monsoon	July- August	In July, the post-plantation of paddy crop was done in many places of Punjab. In August, harvesting of maize (summer season) was reported at site-II and paddy crop was at maturation stages was observed at all the three selected locations.	The damage activity of animal slightly decrease. The no. of pug-marks of animal was disappeared at site-II and site-III due to rainfall.
5.	Early Autumn	September-October	In September, both the paddy and maize (Autumn season) at in-florescence stage was observed at site-II and site –III. In October, both the paddy and maize crops were observed the changed the colored of plant body.	The damage was observed in Paddy, Potato and Orchard fruit crops were observed at all the three selected locations.
6.	Late Autumn	November-December	In Mid-November, harvesting of Paddy and Maize (Autumn season) were started at site-II and site-III. In beginning of December, the collection of Potato from field were observed at site-II. The sowing of Maize (Winter season) were started at site-II and site-III.	The slight amount of damage was observed in Wheat and Potato crops at site-II and site-III.

4. Conclusion

Damages to agricultural crops by Indian Wild Boar were observed at selected areas under study. The damage activity of the Indian Wild boar changed from season to season and crop to crop. They mainly cause damage to Maize, Sorghum, Rice, fruit crops, Potatoes and other vegetable crops. The damage activity was more observed in agricultural crops present near the forest areas. The activity of Indian Wild Boar was observed more in summer season as compared to other

seasons, because, in summer season requirement of food have to be fulfilled with limited resources. Different types of activities were observed like:-feeding, wallowing, rooting and foraging. The feeding activity of Indian Wild boar was nocturnal in nature. The damage activity of the Indian Wild boar were also varied with environmental conditions of that particular areas *i.e.* rooting and foraging activity in winter and wallowing and tracking activity in summer seasons were observed. Although the Indian Wild Boar comes under Least

Concern categories as per IUCN guidelines still its population fluctuated due to various anthropological activities. So, there is need to develop and adopt eco-friendly strategies to reduce the crop damage and minimize the man-animal conflicts.

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