International Research Journal of Biological Sciences _____ ISSN 2278-3202
Vol. **8(7),** 19-24, July **(2019)** *Int. Res. J. Biological Sci.*

Short Communication

Egocentric and maintenance behaviour of sarus crane (*Antigone antigone*) in Dhanauri wetland, Uttar Pradesh, India

Harsh Gulati* **and Sarita Rana**
Department of Zoology, Institute of Integrated and Honours Studies, Kurukshetra University, Kurukshetra, Haryana, India
harshmagic23@gmail.com

Available online at: www.isca.in, www.isca.me
Received 8th February 2019, revised 17th May 2019, accepted 21th June 2019

Abstract

Sarus Crane is a tallest flying bird that forms a pair bond for their entire life i.e. monogamous bird. Sarus crane shows a variety of behaviours such as Agonistic displays, communal behaviour, egocentric behaviour, maintenance behaviour, acoustic behaviour, breeding behaviour and social behaviour to maintain their health and life as well. The present study was conducted in Dhanauri Wetland which is located near to Thasrana Village, Uttar Pradesh, India to assess the different behaviour activities that comes under egocentric and maintenance behaviour. Egocentric behaviour include foraging, roosting, drinking, walking, standing while later behaviour include activities like preening, wing rising, wing flapping, dust bathing, neck stretching etc. These different activities were recorded by using scan sampling technique. Our study suggested that male Sarus crane prefer to spend maximum of their time in egocentric activities like foraging, walking and drinking while they roost not as much in other activities. It also has been noted that female spend maximum of their time in maintenance activity as they are not indulge as much in egocentric activities. Male and female Sarus crane were more active in foraging and preening activities of egocentric and maintenance behaviour respectively. Due to the availability of habitat in the present study site these birds prefer to forage in agricultural land while they spend very less time in marshland and wetland.

Keywords: Sarus Crane, egocentric behaviour, maintenance behaviour, habitat, Dhanauri wetland.

Introduction

Sarus Cranes, *Antigone antigone* belonging to Order Gruiformes and family Gruidae and one of the tallest flying bird which is only breeding crane species in India. Sarus crane has only one partner during their life time and pair bond during the lives of the birds i.e. Monogamous[1]. These birds are largely distributed in the northern, central and north-eastern parts of India. It is also declared as the state bird of Uttar Pradesh[2]. The Sarus Crane is one of the tallest flying non migratory crane among other species of cranes that reaches up to the height of 1.8 metres[3].Sarus crane has an iris of orange-red, a grey ear covert patch and a greyish - green bill while juveniles have a bill with yellowish base and the fully feathered brown-grey head[4]. Coloration in males and females not differ at all but the females are smaller than males although juveniles differ from adults by their yellowish brown head while they have a light brick red colour while adults have a dark red colour spot on the top[5,6,2,7]. These birds are socialable[8] and particularly during the breeding season they exist in large flocks[9].

Sarus crane shows a variety of necessary behaviour patterns during the course of their lives such as Agonistic displays, communal behaviour, egocentric behaviour, maintenance behaviour, acoustic behaviour, locomotory behaviour, breeding behaviour and social behaviour to maintain their health and life as well[10]. These birds spend most of their time in egocentric activities to fulfill their objectives. Such egocentric activities mainly includes breathing, eating, drinking, resting or sleeping and defecation[10]. Sarus cranes leave their nocturnal roosts shortly after daylight[11]. Activities such as preening, shaking, stretching and oiling are also performed that comes under maintenance behaviour[9]. Other activities like foraging and roosting leads to aggregations of Sarus cranes which enhance the social interactions of these birds. Another individual belong to either same or different species must be present for performing these social interactions[10]. Remarkable emphasis had been made upon social behaviour, acoustic behaviour and breeding behavior of Sarus crane have been done by many workers[3,12,13,14]. But no detailed study upon egocentric behaviour and maintenance behaviour have been made by any of the researcher. The present study relate with the various type of behaviour necessary for the survival and health benefits of Sarus crane.

Materials and methods

The study was conducted in Dhanauri Wetland, located at 28° 20′ 20.12″ North, 77° 37′ 9.87″ East with an elevation of 298m. The Dhanauri Wetlands is located at Tha Srana village of Gautum Budhnagar district in Uttar Pradesh. Dhanauri wetland is now listed as major wetland to protect Sarus crane.

This wetland is near to Yamuna expressway Highway. This wetland is mainly surrounded by Agricultural land. It also supports other avian fauna diversity.

Reconnaissance survey was made to collect preliminary information of Sarus preferred sites in the study area and intensive study area was selected. Sarus cranes body postures were recorded by utilizing the scan methodology[15]. Intensive study was carried out with regular field visit in the study area to achieve the various objectives of the study. Physical and ecological parameters were recorded during each sighting of Sarus crane such as time of sightings, number of individuals (group size), their age group (Adult/Juvenile), vegetation type where birds sighted, activities of the birds, and the GPS location of the birds etc. The pair of Sarus Crane from three different habitats i.e. agricultural land, marshland and wetland was observed. To study various behavioural activities these observation were made during three different periods of the day i.e. morning (after roost), noon hours and evening[16]. Several behavioural activities were carried out during diurnal observations, foraging, drinking, preening, roosting etc. Timing of each behaviour activity was also recorded. Various egocentric and maintenance behavioural patterns were studied to predict the influence of various factors upon the ethology of Sarus crane. Observation were made by using Canon power shot SX60 camera, 10X50 Nikon binocular for long distance observation and GIS sampling will also be done by taking Garmin e-trex GPS coordinates using Garmin etrex for mapping different habitat in study area. Questionnaire surveys was also be made by local people that was mainly deals with the behaviour of Sarus Crane.

Results and discussion

In relation to our study Sarus Crane performs two types of Behaviour; Egocentric Behavior that mainly included; Roosting, Foraging, Drinking, Walking, Standing, Vigilance and Calling while another behaviour may include Preening, Neck stretching, Wing flapping, Grooming, Basking, Dust Bathing, Wing rising that mainly performed during leisure time i.e. Maintenance behaviour[10]. In the present study, Sarus crane showed different types of behaviours that is categorized into Egocentric and maintenance behaviour. Observation showed that males and females were spending more time in egocentric activities like foraging, vigilance, standing, roosting, drinking, walking and calling while maintenance activities were performed very less by these birds.

It has been observed that these birds active most of their time in egocentric activities like foraging, standing and vigilance; some activities were restricted like roosting and standing at one position as shown in Figure-1. These birds are ground foragers that were observed to spend maximum of their time in foraging activity. From these observation it has been found that Sarus crane mainly prefer to forage and do most of their activities in agricultural land as revealed in table-1. Females consumed most of the time in foraging and walking followed by other activities like vigilance and calling. Female spend very less time in roosting and standing. A part from Egocentric behaviour, Maintenance activities was also performed by these birds like preening, wing flapping, grooming, basking, wing rising, dust bathing and neck stretching. Basking and Dust bathing are two activities that were performed by both males and females for 1.3 and 1.7 minutes respectively as shown in Table-1, which is specifically more than male as compared to other activities of maintenance behaviour.

Our study found that wing flapping and wing rising are the activities on which female as well as male Sarus crane spend very less time during the study as shown in figure-2. It has also been noted that female spend maximum of their time in maintenance activity. Male and female Sarus crane were more active in foraging and preening activities of egocentric and maintenance behaviour respectively. Activities like Preening and stretching of neck has been observed for maximum time by males while they spend very less time in activities like wing rising and wing flapping.

Table-1: Egocentric and Maintenance behaviour of Sarus Crane.

Egocentric Behaviour	Habitat	Time (minutes) spent in different activities by:		Maintenance behaviour	Habitat	Time (minutes) spent in different activities by:	
		Male	Female			Male	Female
Roosting	Marshland	0.52	1.12	Wing Flapping	Agricultural land	0.15	0.56
Foraging	Agricultural land	3.32	3.12	Preening	Agricultural land	2.26	2.21
Drinking	Agricultural land	2.36	1.52	Grooming	Marshland	0.45	1.19
Walking	Marshland	2.51	2.56	Basking	Wetland	1.31	1.49
Standing	Wetland	1.16	1.12	Wing rising	Wetland	0.36	0.55
Calling	Marshland	1.78	1.76	Dust bathing	Agricultural land	1.39	1.51
Vigilance	Agricultural land	2.21	2.11	Neck stretching	Marsh land	1.46	1.11

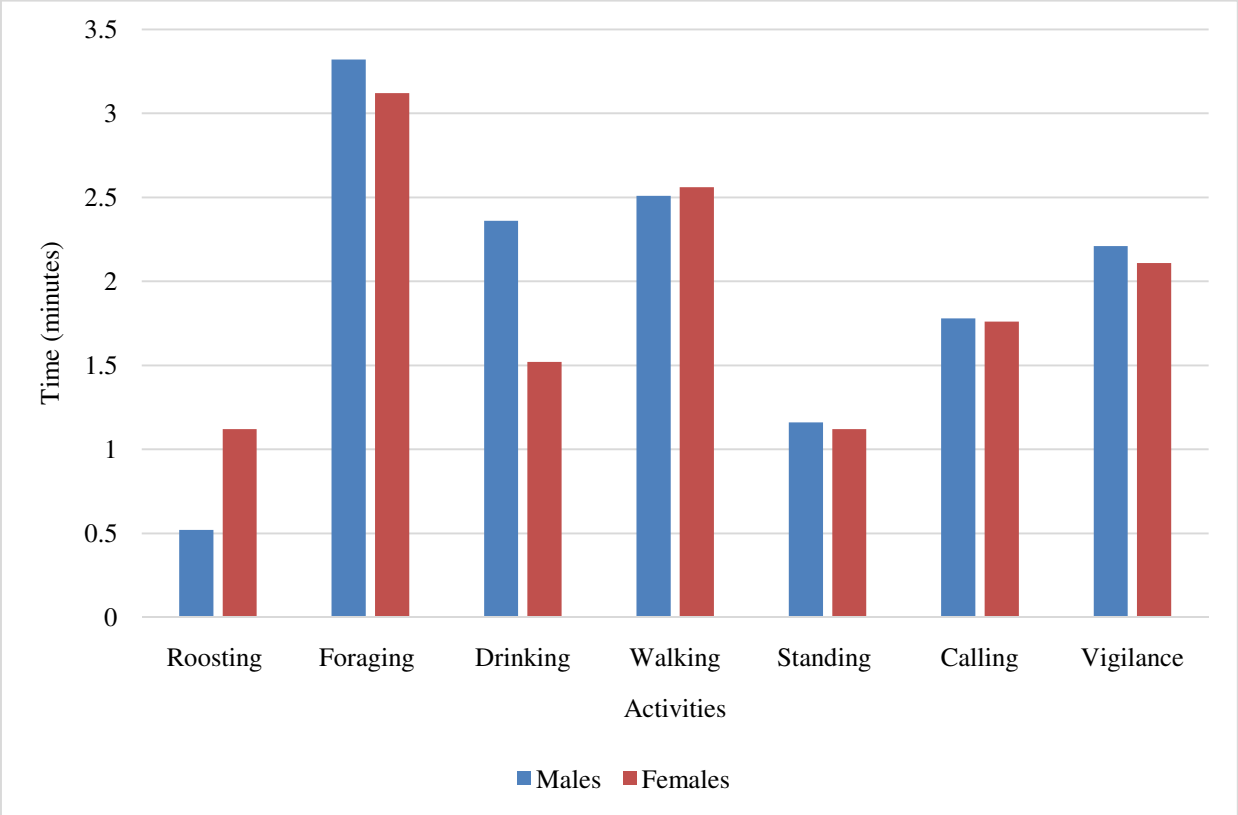

Figure-1: Egocentric activities of male and female Sarus Crane.

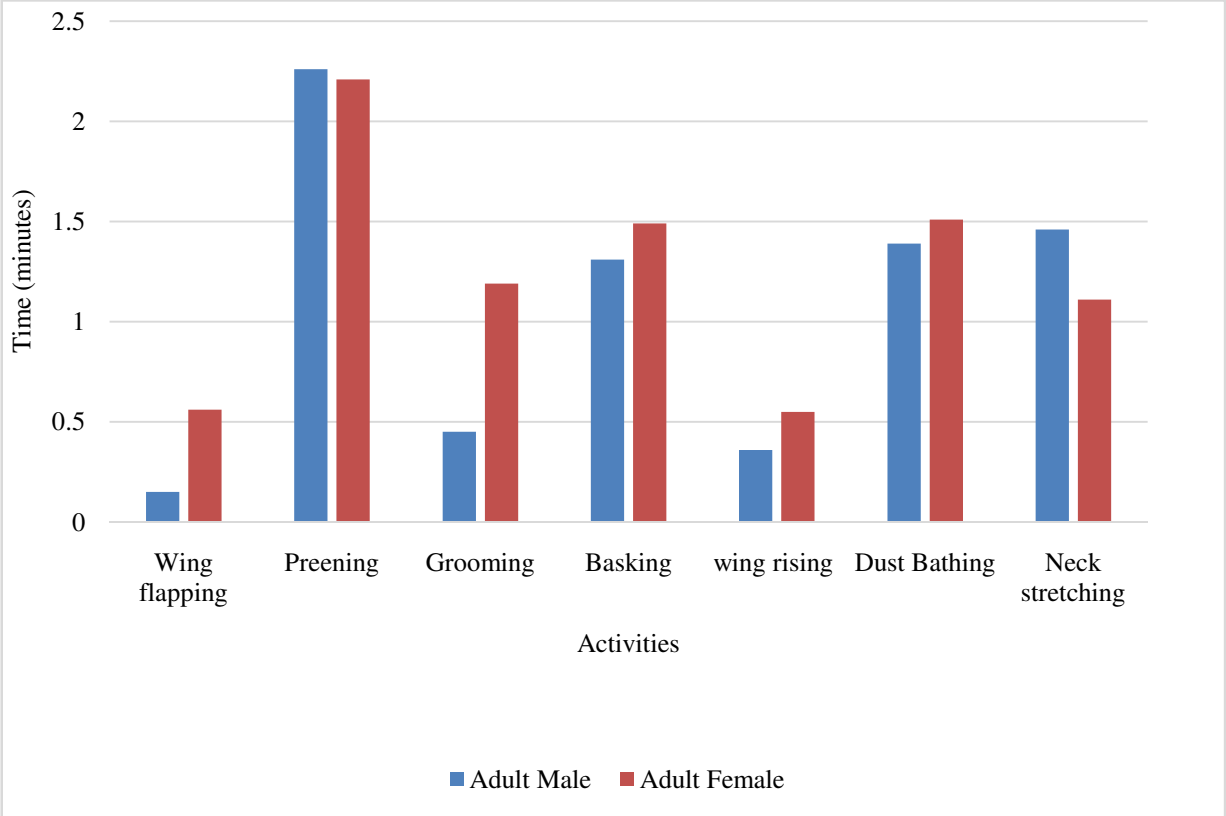

Figure-2: Maintenance activities of Male and Female Sarus Crane.

Figure-3: Foragingby a Pair of Sarus Crane.

Figure-4: Sarus crane pair showing Preening.

Figure-5: Wing rising by female Sarus Crane.

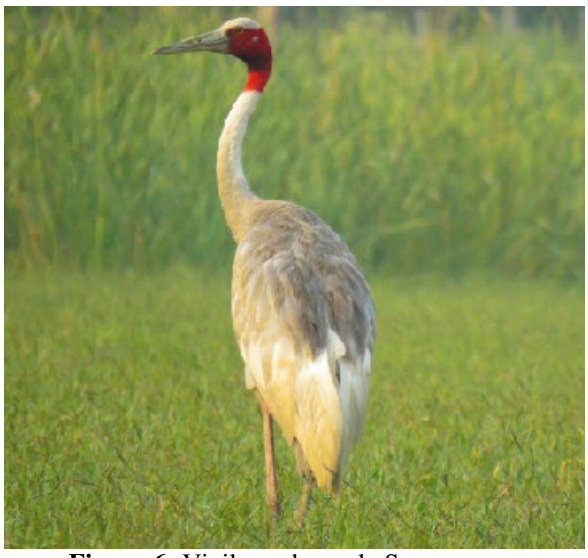

Figure-6: Vigilance by male Sarus crane.

Discussion: Environmental factors plays a vital role in regulating animal activities[17]. Sarus crane spend most of their time in self-directed activities to fulfil their objectives and maintain their life and health as well[10]. These activities mainly includes eating, drinking, and sleeping or resting mainly referred as Egocentric activities. While other activities, are usually performed during their free time; these mainly include preening, shaking, stretching, oiling i.e. maintenance activities[10.] They were found to spend more time in egocentric behaviour as compared to maintenance activities. As far as egocentric activity is concerned these male spend maximum time in foraging and vigilance as compared to other egocentric activities. Just after and before roosting Sarus crane does not move far from the foraging areas[1]. During daylight hours of the nonbreeding season, they spend most of their time in agricultural land or other habitats where foraging occurs[10.] Foraging and feeding was more during the winter season for fulfilling energy requirements to tolerate low temperature whereas it was reduced in summer season, allocating more time for resting in and around water to get rid of heat[17]. Earlier researcher[14] observed that Sarus Cranes spend midday hours in shallow water and performing activities like preening, bathing or drinking to avoid the heat stress. The time spent in foraging activities was maximum in morning time[10.] While they preferred to spend the day time in thick vegetation or in shade and performing activities like preening, standing during the day and foraging at the time of dusk[17].These birds mainly prefer to forage in agricultural land while wetland is used as a roosting site[18]. Our observation suggest that Sarus Crane prefer to roost mainly in wetland area as shown in table 1. It has been stated that the birds feed continuously in agricultural land and in shallow water as well[19]. Foraging time is more in morning and evening hours[20]. These birds prefer to forage maximally in early morning and late evening after coming from roost and go back to roost as these birds was active in other activities in midday hours. These birds mainly prefer to roost on the ground or while standing in

shallow water with the exception of the crowned cranes, which regularly perch and roost at night in trees[11]. During daytime, cranes spend maximum of their time in agriculture fields where foraging occurs[10]. Walkinshaw noted that, in the evening, after returning to the roost, Sarus cranes become very noisy in early morning while during flying from the roost the birds tend to be silent[11]. These birds feed periodically all over the day, with intensive foraging occurring until midmorning, and again during late afternoon[21].It has been noted that these cranes are more vocally active in the afternoon rather than the morning, and possibly well in the evening during roosting[10, 11].When there is no disturbance on the roosting site these birds are immobile and silent. One of the Sarus Crane in the flock become active and gives an alarm call after encounter an unfamiliar sound and also help to alert other individuals in their flock[22]. According to our study Sarus Crane prefer agricultural land instead of marshland and grassland for their maximum activities to be performed. Foraging is the most highly observed behaviour during breeding season as compared to non breeding season[16] while our study was contradicted with this statement that they spend maximum time in foraging in non breeding season as they do in breeding season. It also has been suggested that defensive/offensive behaviour mainly shown during the breeding season only[23]. According to the availability of habitat Sarus crane spend most of their time in agricultural field.

Conclusion

The present study conclude that Sarus Cranes spent most of their time in foraging and preening activity of egocentric and maintenance behaviour respectively as compared to other activities. These birds mainly prefer agricultural land for performing their essential activities like foraging, drinking, preening etc. as shown in Table-1. It has also been inferred that wing rising as well as wing flapping are the two activities on which these birds spend very less time as compared with other activities of maintenance behaviour. Our study drawing our attention toward the importance of agricultural land in Sarus daily activities as most of their activities depends on agricultural land. Both male and female bird spend most of their time in different activities together while roosting shown maximum by the female birds as shown in Figure-1.

Acknowledgement

The authors wish to thank Kurukshetra University, Kurukshetra for providing financial support for our study. Our sincere thanks to Head, Zoology Department, Institute of Integrated and Honours Studies for giving us necessary facilities to carry out our study.

References

1. Ali S. and Ripley S.D. (1989). A Handbook of Birds of India and Pakistan. 2, Megapodes to Crab Plovers. Oxford University Press, Bombay.

2. Sarkar A., Upadhyay B., Chauhan A., Sharma A. and Mishra P. (2013). Habit and Habitat of Sarus Crane (*Grus antigone antigone*), and Egyptian Vulture (*Neophron percnopterus*) in Mainpuri (Uttar Pradesh), India. *Journal of Chemical, Biological and Physical Sciences*, 3(3), 1808-1816.

3. Sundar K.S.G. (2009). Are rice paddies suboptimal breeding habitat for Sarus cranes in Uttar Pradesh India?. *The Condor*, 111(4), 611-623.

4. Prasad S.N., Ramachandran N.K., Das H.S. and Singh D.F. (1993). Sarus congregation in Uttar Pradesh. *Newsletter for Birdwatchers*, 33(4), 68.

5. Bird Life International (2015). Sarus Crane *Antigone antigone*. *Bird Life International*. http://www.birdlife.org/datazone/speciesfactsheet.php?id=2787.

6. Borad C., Mukherjee A., Patel S. and Parasharya B. (2002). Breeding performance of Indian Sarus Crane (*Grus antigone antigone*) in the paddy crop agro ecosystem. *Biodiversity and Conservation*, 11(5), 795-805.

7. World Association of Zoos and Aquariums (2015). Sarus Crane *Grus antigone*. World Association of Zoos and Aquariums WAZA. http://www.waza.org/en/zoo/visit-the-zoo/storks-herons-flamingos-cranes-and-relatives/grus-antigone.

8. Lloyd J. and Mitchinson J. (2009). QI: The Book of the Dead. Faber & Faber.

9. Johnsgard P.A. (1998). *Crane music, a natural history of American cranes.* Lincoln, NE: University of Nebraska Press, 1-136.

10. Johnsgard P.A. (1983). Cranes of the World. Indiana University Press, Bloomington.

11. Walkinshaw L.H. (1973). *Cranes of the World*. Winchester Press, New York.

12. Vyas R. (2002). Status of Sarus crane (*Grus antigone antigone*)In Rajasthan and its ecological requirements. *Zoos' Print Journal*, 17, 691-695.

13. Gole P. (1989). The status and ecological requirement of Sarus crane. Phase I. Paper presented in the Asian Crane Congress at Rajkot, Gujarat, India.

14. Mukherjee A., Soni V.C., Borad C.K. and Parasharya B.M. (2000). Nest and eggs of Sarus crane (*Grus antigone antigone* Linn.). *Zoo's Print Journal*, 15(12), 375-385.

15. Altmann J. (1974). Observational study of behavior: sampling methods. *Behaviour*, 49, 227-265.

16. Gosai K.R., Shrestha T.K., Hill S.D., Shrestha S.M., Gyawali B., Gautum D.N. and Aryan A. (2016). Population structure, behavior, and current threats to the sarus crane (*Grus antigone antigone*) in Nepal. *Journal of Asia-Pacific Biodiversity*, 9(3), 301-305.

17. Yaseen M., Saxena1 R., Dubey S. and Dashora N. (2014). Diurnal Time Budget and Activity Pattern of Indian Sarus Crane (*Grus antigone antigone*) in Chittaurgarh District, Southern Rajasthan, India. *Journal of Chemical, Biological and Physical Sciences*, 4(2), 1258-1270.

18. Aryal A., Shrestha T.K., Sen D.S., Upreti B. and Gautam N. (2009). Conservation regime and local population ecology of Sarus Crane (*Grus antigone antigone*) in west-central region of Nepal. *Journal of Wetlands Ecology*, 3, 1-11. http://dx.doi.org/10.3126/jowe.v3i0.2224.

19. Baker E.C.S. (1929). The game birds of the Indian Empire. *Journal Bombay Natural History Society*, 33, l-6.

20. Kaur S. and Kler T.J. (2017). Studies on different behavioral activities of Indian peafowl (*Pavo cristatus*) in agricultural areas of Punjab. *Jouranal of Entomology and Zoological sceinces*, 5(5), 294-300.

21. Lavery H.G. and Blackman J.G. (1969). The cranes of Australia. *Queensland Agricultural Journal*, 95, 156-162.

22. Archibald G.W. and Meine C.D. (1996). Family` Gruidae (Cranes). In del Hoyo, J., Elliott, A. & Sargatal, J. (eds) *Handbook of the Birds of the World*, 3, 60-89. Barcelona: Lynx Edicions.

23. Latt T.N. (2001). Seasonal change in social structure, behaviour and habitat use by Sarus crane in the semiarid region of north-western India. Dehradun, India: Wildlife Institute of India.