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Cases of discoloration in House sparrows, Passer domesticus (L., 1758) (Aves: Passeridae) from Jhansi, India

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ABSTRACT

Many studies have been undertaken regarding color aberrations in birds. Scientists define six most common heritable colour aberrations in birds as Albinism, Leucism, Brown, Dilution, Ino and Melanism. Several times the plumage colours are not the result of mutations or pigmentations and are described as artificial discoloration. This may result due to dust-bathing in industrial areas polluted with cinder dust, ash and soot. Dust bathing is a common and important behavior of House Sparrows. Apparently, this behaviour, has led to many cases of discoloration in House Sparrows (*Passer domesticus*) that have been reported from Jhansi district of Uttar Pradesh, India in 2017. The House sparrows were photographed and compared with literary data. The information was also shared with renowned scientist Dr. H V Grouw to get his opinion. The discoloured Sparrows appeared to be melanistic (Increase of black and/or reddish brown) and Ino-dark (Black and brown becomes pale brown and reddish). But these were actually the results of dust bathing in soot (due to industrial area) and red soil. The paper focuses on the opinions that all discoloration reports and sightings about birds are not due to mutations and they may just be cases of artificial discolorations.

Key words: Discoloration, Color aberrations, House Sparrow, dust-bathing.

INTRODUCTION

Ornithologists have always been mystified by colour aberrations, particularly melanism. As such, due to lack of information regarding plumage pigmentation and mutations, color aberrantions in birds were frequently considered to be new taxa, and were consequently described scientifically (Grouw 2017). Many studies have been undertaken regarding color aberrations in birds. Scientists define six most common heritable colour aberrations in birds as Albinism, Leucism, Brown, Dilution, Ino and Melanism. In general, albinism and melanism are two most commonly reported form of polymorphism in Aves (Mundy 2006). Several times the plumage colours are not the result of mutations or pigmentations and are described as artificial discoloration. It is time and again erroneously referred to as 'Industrial Melanism'. However this type of darkening is non-genetic and is therefore not true melanism (Harrison 1963; Johnston & Selander 1963; Rollin 1964). Artificial discoloration may result due to dust-bathing in industrial areas polluted with ember dust, ash and soot (Grouw 2012). Birds keep their plumage in good condition with routine maintenance, including bathing, drying, oiling, powdering, preening and plumage scratching (Schmidl 1988). Dust bathing is a universally observed and essential behavior of House Sparrows; dust baths are taken in spite of water availability. House sparrows give preference to extremely fine dust. Shallow wide dust fissure are dig by the House sparrows, using their feet. Then they push their bellies into the fine dust powder. Dust bathing has a number of benefits to the birds such as making the skin smooth,

removing parasites from feathers and absorbing excess oil that is removed as the dust while preening (Kumar et al. 2015). In lack of dust bathing, the plumage of birds becomes oily and matted within a few days (Campbell & Lack 1985). In the present study, the cases of discoloration in House sparrows (*Passer domesticus*) are a result of dust bathing in different types of dusts available in the study area.

Study Area

The observations were done in BHEL (Bharat Heavy Electricals Limited) Jhansi that is a factory and township in Uttar Pradesh, India (Fig.1). This unit of Jhansi was established around 14 km from the city on the N.H. No 26 on Jhansi Lalitpur road. It is called second-generation plant of BHEL set up in 1974 (https://www.bheljhs.co.in/about.php).

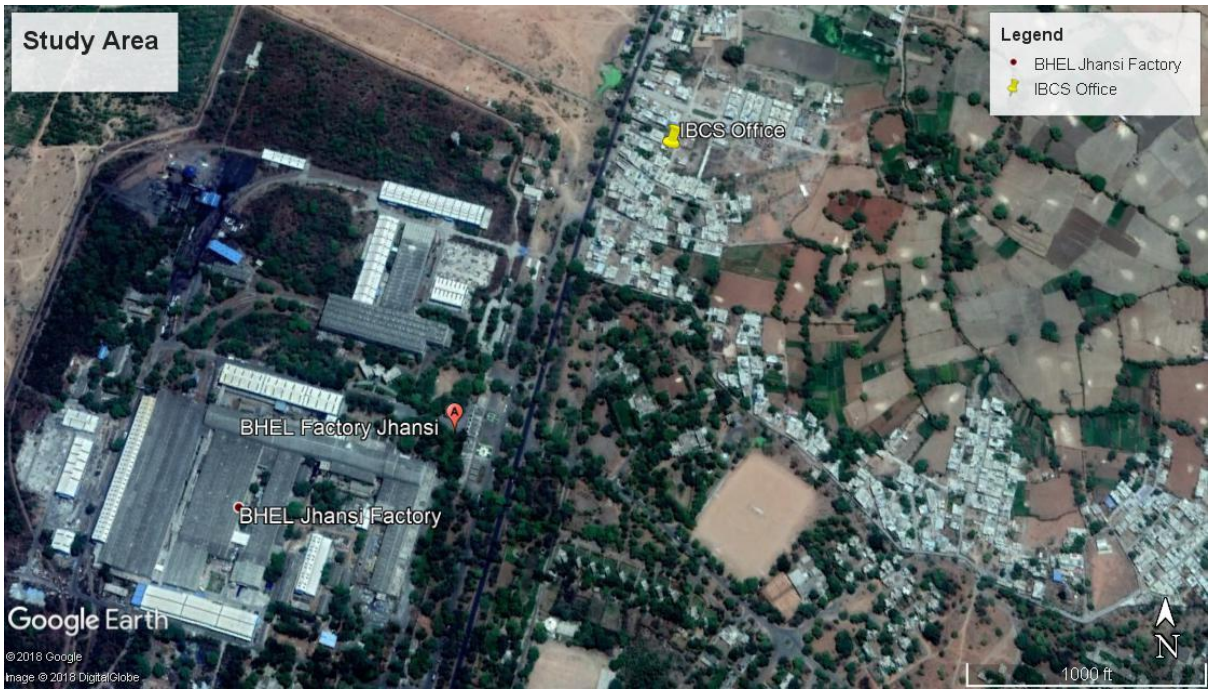

Fig. 1 Map of study area. (Source: Google Earth)

METHODOLOGY

The birds were observed while they visited the garden for bird feed (N 25°19′48.30″, E 78°31′42.24″). The House sparrows were photographed using 7D DSLR Canon Camera. The photographs were compared with literary data. The information was also shared with renowned scientist Dr. H. V. Grouw (Curator, Bird Group, Department of Life Sciences, The Natural History Museum, UK) to get his opinion and expertise.

RESULT AND DISCUSSION

The observations resulted in one case of black coloured male House Sparrow (BHS1) and several cases of reddish House sparrows (RHS^n) during 2017. At first look, the blackish sparrow (BHS1) appeared to be melanistic (Increase of black and/or reddish brown) while the RHS^n were thought to be Ino-dark (Black and brown becomes pale brown and reddish). But these were actually the results of dust bathing in soot (due to industrial area) and red soil. In the present case study, the House sparrow (BHS1) was discolored due to dust bathing in mud containing soot that imparted black colour to it (Fig.2). The plumage colour was rather dark when compared to normal male house Sparrow (Fig.3). The black colour gave the impression that the male might be melanistic case but, the sparrow (BHS1) had old and worn plumage, and black 'soot' also appeared to be present underneath the scales of the feet. Dark plumage caused by dirt or soot is rather common in the house sparrow as this species has the habit of 'dust bathing' what can stain the feathers if the dust bathing is done in places where dirt/soot is around (*Personal communication* Dr.H.V.Grouw).There is high probability of gaining the dark coloration due to dust bathing in an industrial area like BHEL. The discolored House sparrow (BHS1) performed normal activities such as feeding and consuming water with other sparrows. The sparrow (BHS1) was not aggressive towards other sparrows and the other sparrows also exhibited normal behavior towards it. Observations were continued to keep a record of BHS1, however it was seen only for 3-4 days. Also it was a single case reported from the area.

The other discoloration was observed in both male and female House Sparrows (Fig.4 and 5a). In this case the birds were observed taking the dust bath in red dust that was formed due the crushing of red bricks kept for construction work. The plumage of

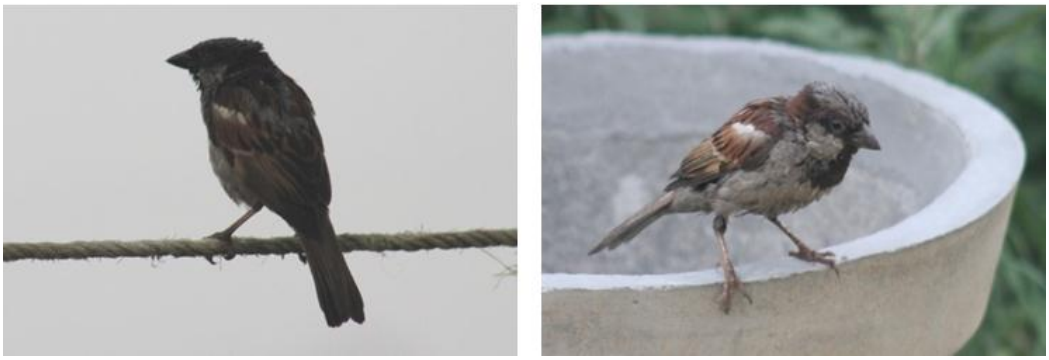

Fig. 2 Discolored (black) male of *Passer domesticus* (BHS1)

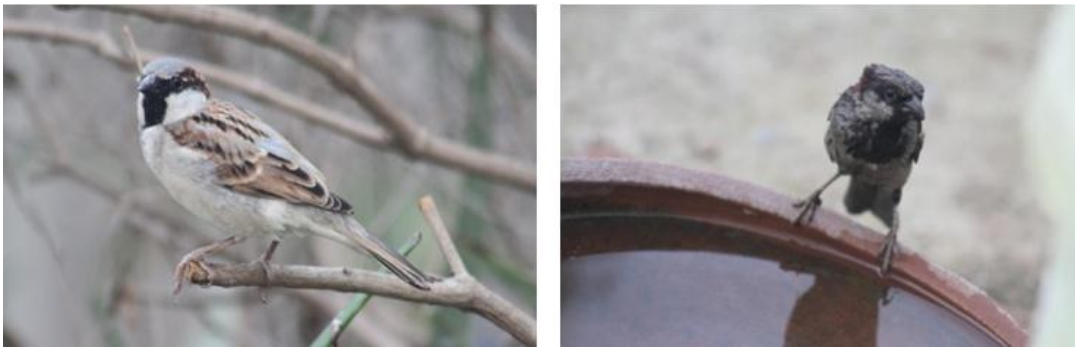

Fig 3. Comparative photographs of Normal male of *Passer domesticus* and BHS1

House sparrows appeared to be reddish brown when compared to the plumage of House sparrows without dust bath (Fig.5b). The colour might be imparted due the presence of haematite and limonite in the Red Loam soil that is found in Bundelkhand Region of India. The adult bearded vultures, *Gypaetus barbatus*, in wild have a rich orange colour on their underparts, neck and head. The orange colour is attained from soils stained with iron oxide (Houston et al. 1993). The Bearded Vultures are known to stain its plumage from soils at regular intervals (Houston et al. 1993, Frey & Callies 1994). It may be a social signaling perspective (Negro et al. 1999), but the accurate purpose of this activity is still hypothetical because of the extreme rarity of field data. Conversely in case of House sparrows, dust bathing was not performed to gain any specific plumage color as is the case of Bearded vultures. It was only by chance that the dust was red colored. The dust bathing have also been studied in Falcons (Dieter 1988) and Egyptian vultures (Overveld et al. 2017). Feather painting is a controversial issue as to whether its function is for visual communication (Negro et al. 1999) or principally serves to protect against bacteria or viruses (Tributsch 2016). The discoloration observed in House sparrows in the present study is because of the dust bathing behavior of these passerine birds that is an important part of their daily activities. Unaffected by the other properties of the soil, the requirement by the House sparrows was to get fine and dry dust for bathing. The fine red soil stained their plumage reddish when they rubbed their bodies in the shallow mud holes.

CONCLUSION

The paper focused on the opinions and observations that all discoloration reports and sightings about birds are not due to mutations and they may just be cases of artificial discolorations. Besides Aves, anomalous coloration is probably present in other animal species as well, but due to lack of knowledge most of these cases have not been reported officially. Direct observations supported by the relatable photographic evidences are imperative tools for the credentials of gray Literature. It is concluded that researchers should take up the initiatives to record and report the records of discolorations and color aberrations in the wildlife so as to have an enhanced understanding of these trends and their significance into the ecology and physiology of the species which has a noteworthy outcome on its survival.

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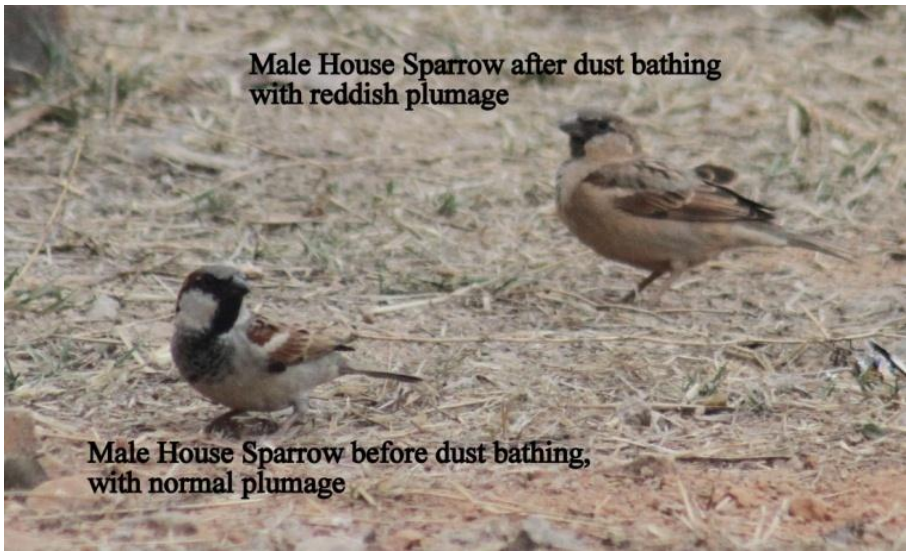

Fig. 4 Comparative plumage of male House sparrow: with and without dust bathing

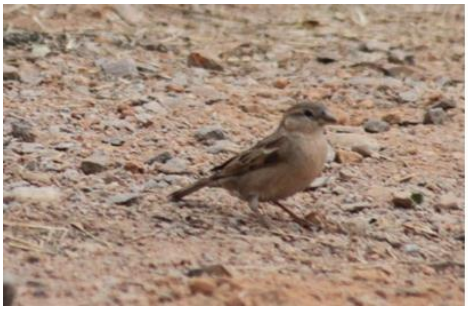

Fig. 5a Female house sparrow (RHS) after dust bath

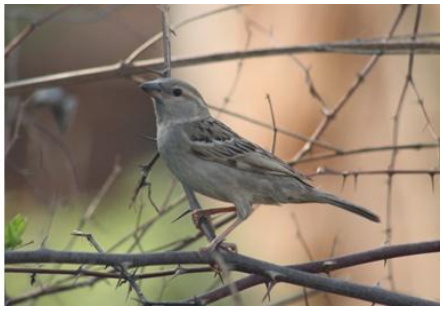

Fig. 5b Female house sparrow without dust bath

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