Birds of Indian airfields: an ecological approach to aviation safety assessment

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Understanding the risks posed by different bird species to aviation safety at Indian airfields remains limited. In the present study, we assessed the bird diversity and composition of seven Indian civil airfields using the standard point count method. A total of 137 bird species belonging to 48 families in 18 orders were recorded. Of the total birds, 21 species were classified as the most common, and 14 as the most dominant in the Indian civil airfields. We propose a new method to assess the risk level of bird species in Indian airfields. Using data collected on relative activity count, relative body mass, and behaviour inside the airfield, we developed a bird hazard value (BHV) to categorise birds into various risk levels based on their potential to cause a bird strike. Based on the BHV scores on selected bird species, we categorised them into high, potential and low-risk groups. Based on their abundance and behaviour in the airfield, rock pigeon (BHV = 144.47), black kite (98.23), house crow (85.55), common myna (54.05) and red-wattled lapwing (32.47) are the high-risk species, whereas cattle egret (BHV = 29.24) and rose-ringed parakeet (14.64) belong to potential-risk species, and black drongo (BHV = 2.47) was in the least-risk species. The outcome of the present study serves as a foundation for understanding bird communities of Indian civil airfields and identifying problematic species. This will help airport management authorities develop appropriate, tailor-made bird hazard management practices for specific problematic species and help to prevent collisions to save both aircraft and birds.

Keywords: Air safety, aviation, avifauna, bird hit, problematic birds.

conflict between aircraft and birds (bird–aircraft collision) damages both sides. Birds on board for millions of years have dominated the sky because their body elements have been modified for flight and because of the strong selection pressure to maintain and improve their flight apparatus[2]. From the human perspective, bird collisions (bird strikes) with aircraft lead to damage, economic loss, and increased chances of mortality[3]. Several attempts have been made and are still in progress across the globe to reduce the chances of bird strikes, including habitat management, infrastructure modification, and resource inhibition inside and around airfields[4,5]. However, bird strikes are still a serious concern for air transport worldwide. The increasing preference for air travel and rampant urbanisation also adds to the increased conflict and resultant bird strikes[5–7].

However, the severity and probability of birds colliding with aircraft are not uniform at every altitude during aircraft flight. For instance, the analysis of bird strike records in the National Wildlife Strike Database for Civil Aviation, USA, revealed that 74% of all the strikes and 66% of the strikes that caused substantial damage to the aircraft occurred at or below 152 m above sea level[8]. Moreover, most bird strikes occur during the landing and take-off periods of the aircraft[9]. This indicates the significance of understanding the birds in the immediate surroundings of the runway, that is, the airfield habitat. The presence of birds inside the airfield can be attributed to the availability of basic resources such as food, shelter, perching sites and breeding grounds[10]. The activities associated with acquiring these resources, including flight, soaring, foraging, nesting and roosting, represent a risk to the movement of aircraft, which can be represented as the probability of causing a collision between the bird and aircraft[10]. Numerous studies have been carried out worldwide to understand the biodiversity of airport environments with an emphasis on birds[11,12]. Furthermore, attempts to rank wildlife