

## THE MORE SERIOUS VULTURE HITS TO MILITARY AIRCRAFT IN INDIA BETWEEN 1980 AND 1994

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### ABSTRACT

The paper summarises the more serious vulture hits to military aircraft in India that occurred between 1980 and 1994. These fifteen accidents, where the pilot got killed in one of them and aircraft perished in all, were caused by the collision of aircraft with the Indian Whitebacked Vulture *Pseudogyps bengalensis* weighing about 4.5 kg. The various ecological factors contributing to these accidents are also analysed here.

All the accidents, involving fourteen fighter jets and one helicopter, had occurred outside the aerodrome suggesting that the attractions for vultures lay outside aerodrome. Majority of these accidents had occurred during the warmer hours of the day which coincide with the peak of vulture activity especially of thermal soaring and foraging. 36% of these accidents had occurred during low level flight of aircraft cruising at higher speeds when avoidance action was difficult. Of these accidents 73.3% occurred between October and March which corresponds with the breeding season for these vultures when parent birds and new arrivals from nests are active.

Suggestions for gathering more data on vulture activity in the flight path of aircraft and recommendations for controlling the population of vultures are also included in this paper.

(key words: vulture-aircraft hits, military aircraft bird hits, bird hit accidents, statistics)

## INTRODUCTION

The Bombay Natural History Society (BNHS) has been assisting the military and civil aviation in India since 1966 by identifying bird strike remnants and providing them with advice on bird strike reduction methods. The bird strike data as well as the information on the ecology and behaviour of vultures on which this paper is based, have been gathered during the projects of the BNHS funded by the Aeronautics Research and Development Board (AR&DB), Ministry of Defence, Government of India.

## MATERIALS AND METHODS

The bird strike data used in this paper was collected from Indian aerodromes through a bird strike reporting form similar to that of the International Civil Aviation Organization (ICAO) modified to suit the Indian situation. Bird and animal remains received from airfields were identified to species level macroscopically and microscopically using standard techniques (Laybourne 1984, Brom 1991). The bird strike data gathered by the BNHS from 1980 to 1994 were analysed to find out the ecological factors contributing to these accidents (Satheesan 1991, Satheesan and Grubh 1992, Satheesan 1992, in press). The data collected during the BNHS field surveys of 30 civil and military aerodromes in India between 1980 and 1994 was referred to explain the various ecological factors involved in vulture hits to aircraft.

## RESULTS AND DISCUSSION

Analysis of 360 bird strike incidents had revealed that birds of prey were responsible for 51.4% of them with 26% by vultures and 21% by kites (Satheesan 1991, 1992). The involvement of raptors in collision with aircraft in India appeared to increase when 60 more samples of bird remnants were identified and data analysed. Then 55.9% of the total 420 incidents were found to be caused by raptors with 25.4% by kites and 22.8% by vultures (Satheesan & Grubh 1992). Later analysis of 612 bird strike incidents revealed that 54.3% of them were caused by raptors with 46.9% by vultures and kites alone (Satheesan, in press). A recent analysis of 652 bird strike incidents, received till May 1994, revealed that raptors were involved in 54.6% with vultures and kites responsible for 21.8% and 25.8% of them respectively. The Indian Whitebacked vulture *Pseudogyps bengalensis* weighing about 4.5 Kg caused 18.1% of these incidents which included 15 aircrashes involving 14 fighter jets and one helicopter of the Indian Air Force (Table 1). In one of the incidents the incapacitated pilot had got killed thus increasing the importance of tackling the vulture hazards to aviation in

TABLE 1. Se

Date	Loca in In
21-10-80	No
23-10-80	No
08-11-83	No
13-02-85	No
16-10-86	No
04-06-87	We
30-10-87	No
09-11-87	No
23-01-89	No
10-11-89	No
01-03-90	No
09-10-92	No
21-04-93	No
27-01-94	No
19-04-94	So

TABLE 1. Serious Vulture hits to military aircraft in India from 1980 to 1994

Date	Locality in India	Type of aircraft	Time hours	Phase of flight	Altitude	Part hit & damaged	Effect on flight
21-10-80	North	Helicopter	1140	Enroute	Not known	Not known	Crashed
23-10-80	North	Fighter jet	1045	Level	100 m	Port wing	Crashed
08-11-83	Northwest	Fighter jet	1310	Decent	750 m	Cockpit canopy & Engine-1	Crashed Incapacitated Pilot killed
13-02-85	Northeast	Fighter jet	1235	Level	Not known	Engine-1	Crashed
16-10-86	North	Fighter jet	1207	Climb	1000 m	Engine-1	Crashed
04-06-87	West	Fighter jet	1000	Enroute	150 m	Radome Engine-1	Crashed
30-10-87	Northwest	Fighter jet	1155	Descent	130 m	Nose Engine-1	Crashed Crops damaged
09-11-87	Northwest	Fighter jet	1218	Circuit	400 m	Radome Engine-1	Crashed
23-01-89	North	Fighter jet	1355	Final Approach	350 m	Not known	Crashed
10-11-89	Northwest	Fighter jet	1112	Climb	50 m	Radome Wind shield Engine-1	Crashed Crops damaged
01-03-90	North	Fighter jet	1640	Enroute	700 m	Engine-1	Crashed
09-10-92	Northwest	Fighter jet	1720	Level	450 m	Radome Engine-1	Crashed
21-04-93	Northwest	Fighter jet	1222	Descent	500 m	Engine-1	Crashed
27-01-94	North	Fighter jet	1122	Climb	170 m	Not known	Crashed
19-04-94	South	Fighter jet	1110	Level	100 m	Wind shield	Crashed

India. The ecological factors contributing to these bird aircraft hit accidents are explained below:

### 1. Locality of accident

All the fifteen accidents had occurred outside the aerodrome and 73.3% of them far away from the airfield at level and descent phases of aircraft flight. 97.8% of vulture hits to military aircraft (n=93) between 1966 and 1993 occurred outside airfield and 57% of all vulture hits (n=107) from 1966 to 1993 occurred away from airfield at level and descent phases of aircraft flight (Satheesan, in press). This showed that the major attractions for these vultures lay outside the aerodrome.

The Whitebacked Vultures are common scavenging raptors of the Indian sub-continent communally feeding on large mammal carcasses. Carcass dumps and primitive slaughter houses seen outside airfields attract vultures for food (Grubh *et al.* 1988, Satheesan 1991, 1992, in press). These birds are also attracted to thermals in open areas and updrafts in hilly and mountainous areas. vultures utilize thermals for gaining altitude in air and cross-country gliding as well as foraging (food-hunting) flights. Vultures were observed to use several species of trees for roosting and nesting outside aerodromes and mostly close to their regular feeding sites (Satheesan 1992, in press).

Majority (80%) of the aircraft accidents caused by vulture hits had occurred in north and northwest India (Table 1). Analysis made earlier had showed that vulture hits to aircraft occurred mainly in north, northwest, northeast, west and southcentral India. The survey of bird population in the bufferzone of various aerodromes in India showed that vulture populations are much larger in north than south India (Grubh *et al.* 1988, Satheesan in press).

### 2. Altitude and phase of flight of aircraft during accident

About 36% of these accidents had occurred below 200 m during level flight of aircraft cruising at higher speeds (450 mph or above) when neither the pilot nor the bird could take any evasive action.

### 3. Month and time of accident

Majority (80%) of the accidents had occurred between October and March which coincides with the nesting season for vultures when parent birds will have to fly frequently for requirements of the nest and young. Analysis of 126 vulture hits that had occurred between 1966 and 1993 showed that 54% of them occurred from October to March, the breeding season for these birds (Satheesan, in

press). It is aircraft moving towards prey to aircraft

Majority (73%) of the accidents occurred during the warmer months. The accidents depend for their occurrence on the availability of vulture hits to aircraft available at the time of the accident.

Analysis of the accidents had occurred during the warmer months.

### Suggestion

As attraction of vultures to aircraft within a 5 km radius of aerodromes is a major cause of the entire local aircraft accidents. Pilots flying close to local aerodromes should be aware of vulture populations and carry out regular surveys.

### Recommendation

(A) Check for vulture populations around aerodromes and in the buffer zone of meat, to avoid any area (a) where vulture populations are achieved by (a) setting up of vulture control areas (b) instituting vulture control areas (c) setting up of vulture control areas (d) chicken feed

(B) To avoid vulture hits to aircraft between 1500 h and 1500 h, pilots should be aware of vulture control areas and safer time to fly as well as between 1500 h and 1500 h.

(C) Awareness of vulture populations and help reduce vulture hits to aircraft.

are press). It is probable that juvenile birds emerging from nests being unfamiliar to aircraft movements and nesting adults being busy in food-hunting fall an easy prey to aircraft strikes (Satheesan 1991, 1992, in press).

Majority (73.3%) of the accidents had occurred between 1100 and 1400 hours, the warmer hours of the day when huge thermals are available on which vultures depend for soaring, foraging and cross-country flight. Two of the accidents which had occurred later in the afternoon might have occurred due to good visibility available at that time in those days (one in March and the other in October).

Analysis of 109 vulture hits between 1966 and 1993 revealed that 87.2% of them had occurred from 0900 to 1500 hours (Satheesan, in press).

#### **Suggestions for gathering more useful data on vulture activity**

As attractions for vultures lie outside aerodrome a survey of vulture activity in 25 km radius of an aerodrome may not be sufficient. It is essential to survey the entire local flying area including firing and bombing ranges used by the fighter aircrafts. Presence of carcass dumping sites or primitive slaughtering places close to local flying area will be hazardous to safe flying of aircraft. An estimation of vulture population and study of the daily activities of these birds should be carried out inside the airfield and in the local flying area.

#### **Recommendations to reduce vulture strikes to aircraft**

(A) Check population of vultures by removing food available to them around aerodromes. Denying food, that too large mammal carcasses and large chunks of meat, to vultures is the main recommendation to reduce vulture population in any area (Grubh *et al* 1988, Satheesan 1991, 1992, in press). This can be achieved by

- (a) setting up modern abattoirs or modernizing primitive slaughter houses,
- (b) instituting dry rendering plants for disposing animal garbage, and
- (c) setting up carcass processing plants to convert mammal carcasses into chicken feed

(B) To avoid live barriers of vultures aircraft should not be flown between 0900 and 1500 hours below 1300 metres. It is also necessary to avoid areas of known vulture concentrations such as their feeding and communal roosting sites. The safer time to fly aircraft will be between 0700 and 0900 hours in the morning as well as between 1900 and 0500 during night.

**(C) Awareness programme - Education to create awareness among the public to help reduce vulture strike hazards**

Judicious use of schools, colleges, non-governmental organizations and media such as press, radio, television and cinema can help create awareness among the masses on the horrors of bird strikes to aircraft and the financial loss incurred by the nation caused by the ignorance and negligence of the people and how the inhabitants of the locality can co-operate with the aviation authorities to reduce bird strikes by discontinuing or banning illegal slaughtering practices, dumping and spilling of animal garbage anywhere indiscriminately.

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