Plane as a deterrent and attractant

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At present time one can speak about new direction in ornithological researches, that is - about the aviation ornithology. Its basis is formed by researches of bird behaviour on airports and at the sight of a plane; control of bird behaviour under these conditions; birds detection and forecasting of their behaviour and possibilities of mass birds accumulations on plane flight routes. The main aim of these researches and measures is - to decrease the bird strikes number and to lessen the bird danger for planes.

As it was well said by one of the aviation ornithology experts - it is necessary to keep birds far from planes at airports and to keep planes far from birds on plane's routes. In accordance with all this the evolution of aviation ornithology researches can be traced back after an example of the international conferences on bird danger in Nice (1963), Kingstone (Canada 1969) and of the BSCE meetings. The first World Conference - Colloquium in Nice - was named "Birds at airports". It discussed problem - how to keep birds away of planes at airports. The series of questions discussed at Kingstone Conference was extended considerably. Besides the purely technical questions of bird's airworthines, the series of reports was devoted to bird detection with help of radars and to forecasting the appearance of mass bird's accumulations on plane's routes in order to prevent strikes. For the first time the Kingstone Conference examined in Tanner's report quite new on principle possibilities to frighten birds away of flying plane with help of micro-wave radiation. The further researches, however, have

shown that utilization of this way to frighten birds away of flying plane is unpracticable. I know an attempt to frighten birds in this way at runway. However, other means of scaring away at airports are more profitable.

During last years the scientists are paying ever growing attention to the quite new aspect of bird strikes prevention: the intensification of plane's effect on birds as a deterrent. It is implied naturally that birds are not suicides and they try to fly away of plane fast flying against them.

I think I will not commit any mistake if I say that majority of bird's world population have already seen a plane flying in sky and it represents an indifferent irritant for them. However, when a plane flies against a bird - only fast upward flight and flying away can save the life of a bird. The analysis has shown that more often as a victism of strike become the birds who see for the first time a plane flying at close distance; migrating young birds who appeared at an airport for the first time and who don't know how to extrapolate the direction and very high speed of a plane. Adult, local nesting birds and the birds settled at airports learn fast to take off and to avoid in time a strike with a plane by: 1. Seeing other birds knocked down by planes. 2. Being thrown off by plane's air wave. 3. Following upward flight of the other more experienced birds. In this case the plane is a typical deterrent. Some of these trained birds turn in time away of the plane flying out of an airport, too. However there are some situations when a bird cannot extrapolate the speed and direction of the plane, flying against, because she doesn't see it in darkness or the plane appears suddenly nearly from a cloud. In these cases there can

arise panic reaction, which increases the possibility of a strike. Finally the possibility of a strike is increasing also when a plane changes sharply its flight direction: when taking - off or making contact. 25% of all bird strikes within the airport's area occure just in these two points. Night flights of the turboprop planes form 10% of the day flights, while the number of strikes in the night forms, according to our data, almost a half - for TU-104 and TU-124, 90% - for TU-134 and two times more than during the daytime - for TU-114 plane.

The illumination of the front part of a plane in the night (Larkin, Torre-Bueno, Griffin, Wallkott, 1975) the utilization of various winking flashes of white, blue and other colours at a plane (Belton, 1976), scanning of lazer ray (Laty, 1976) are increasing the distance from which a bird can detect a plane in the night as well as deterrent characteristics of a plane. I consider these works as extremely perspective since we can suppose that a bird has more possibilities to see plane and to turn away than a pilot of fast flying plane to see birds on plane's way and to turn aside in time.

In the night the pilot can not see birds at all. The visual observations of bird migrations ageinst a moon discuss background as well as radar observations (Bruderer, 1971) have shown that the majority of night migrants fly one by one. This first of all increases the probability of the night strike with one bird from a tremendous friable flock, in which the distance between individual birds amounts to 300-500 metres (Bruderer, 1971) and secondly only powerfulground radar can discover individual birds and all flight in order to warn pilot about such a danger. At plane's radar these birds cannot be seen by a

pilot. This stresses one again the necessity of researches to increase the deterrent characteristics of a plane. It is necessary to keep in mind that in the series of cases the plane can act as a attractant. First of all this is a motionless standing plane. I have observed sparrows to begin to inspect 4-motors plane which just stopped at airport; they apparently have found plant seeds in plane's hatches and holows. In the winter a pigeon climbed to warm himself on the carburator's net airintake of the AN-2 plane. In the southern districts of the country starlings construct their nests in the cavities of wings of the AN-2 plane. And they even start to lay eggs. Swallows following the plane moving on runway have caught insects in the whirlwinds of warm air. In one case a turtle-dove has made her nest from pieces of soft wire behind propeller and in front of the airintake of the IL-18 plane. The plane has been standing for repair during several days. Setting the engine into operation after repair could end with getting of iron nest into engine and consequently with serious damage. Birds are attracted by moving planes, too. The hen-harrier has flown along the run-way and has caught the locust insects and possibly mouse-like rodents frightened out by whirlwinds of planes sweeping past runway. In these cases a plane instead of being a deterrent or an indifferent stimulus (when a bird sees it high in the sky) becomes an attractant thanks to positive confirmation by food, nesting and so on.

Judjing from pilots information the aggressive reaction of birds of prey against a plane is possible. The Buzzards have attacked flying motorless plane models.Golden eagles have attacked gliders in mountains. One of the possible reasons for

such an attraction is the attack of bird of prey against a prey. And glider's pilots were provided with pistols to repulse the eagle's attack.

The experiments have shown that young hawks are attacking disproportionate big prey. Judjing from the time of attacks of birds of prey against gliders - these were young birds who committed attack by mistake.

And finally one more kind of bird attraction to a plane is the light of landing lights in the night. It was meant that the light of the landing lights increased deterrent characteristicts of a plane. As a result in some countries one recommended to switch on the landing lights beforehand at 3000 m altitude. So long as this recommendation has practical importance. I shall dwell on it in details. At present time there are many researches which show that in particularly dark nights the number of birds being hurt badly against lamp glasses of a beacon comes to maximum. In India hunting gives maximum of results when birds are attracted by lamp light just in dark nights. From the other part the illumination of all beacon building decreases considerably the number of birs being hurt badly.

From this point of view there is of interest to consider series of cases of bird strikes when birds most probably were attracted by landing-lights. This first of all relates to bird's getting into litten landing-lights of the TU-planes. The head lights of these planes move out of the case only when they are switched on. The area of section of two landing-lights makes less than 1% of the fron part of a plane. Correspondingly the getting of birds into landing-lights under even distribution of hitting over the front part should amount to 1% of the night strikes. If one take into consideration that during the flight

the landing-lights are switched on for a short time only, directly before landing - the possibility of bird getting into landing-lights comes to minimum. In fact the getting of birds into litten landing-lights and their damage have happened in 8 cases from 53 known night bird strikes with TU-planes. This points clearly that the light of landing -lights attracts birds and they fly towards the light as towards the beacon light. However it is much easier for a bird to fly towards beacon light than towards fast flying plane. Therefore the percentage of getting into landing-lights mentioned above, is startlingly high. In some cases pilots had firstly seen a bird in the light of landing-lights and only after the strike occured. The birds got not only into landing-lights but also into front part of the fuselage, in cockpit glasses, wing surface and engine's airintake. In such a way the light of planes landing-lights attracts birds, increasing thereby the possibility of their strike with a plane. Therefore the landing-lights of a plane should be switched on not beforehand at the high attitude, but only when coming to the last straight directly before landing. This doesn't reject illumination of a plane as a means to increase its deterrent characteristics ny analogy with the illumination of a beacon which decreases the number of birds perished there.