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A BIOLOGICAL BATTLE AGAINST THE THOUSANDS OF GARDEN CHAFERS (*PHYLLOPERTHA HORTICOLA) THAT ATTRACT LARGE NUMBERS OF GULLS (LARUS SP.) DURING THE SUMMER SEASON AT RYGGE AIR STATION, NORWAY*

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ABSTRACT

Seven-eight years ago we first observed very large numbers of Garden Chafers (*Phyllopertha horticola) swarming at Rygge Air Station in June and July, attracting large numbers of Black-headed - (Larus ridibundus) and Common Gulls (Larus canus) feeding on these flying beetles. Every summer season since then the Garden Chafers have been present, although in a smaller number in most recent years. The Garden Chafers appear to be the gulls' main food during this swarming, since we once found as many as 281 dead chafers inside the belly and oesophagus of one single Black-headed Gull. The large number of gulls at the Air Station naturally causes a serious hazard to the aviation. After first having been refused by the authorities to treat with insecticidal chemicals against the beetles, we started in 2004 to spray the grass areas along the runway with the biological control agent, Heterohabditis megidis (also known as Nemasys H), a parasitic nematode known to attack and control the larvae of the Garden Chafer living in the soil. In subsequent years both the runway and the two taxiways were sprayed with nematodes. The nematodes seem to have successfully controlled the Garden Chafer, as the number of Garden Chafer larvae in the soil at the Air Station has decreased since 2004, and the number of gulls present on the runway and taxiways has also decreased.*

BEYOND FALCONRY BETWEEN TRADITION AND MODERNITY: A NEW DEVICE FOR BIRD STRIKE HAZARD PREVENTION AT AIRPORTS

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Fig. 1 and 2. The model in action.

RISK ASSESSMENT: QUANTIFYING AIRCRAFT AND BIRD SUSCEPTIBILITY TO STRIKE.

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ABSTRACT

Different aircraft types have different susceptibilities to colliding with birds; larger, faster aircraft with jet engines are more likely to be struck than smaller, slower propeller driven aircraft. Similarly, different bird species present different risk levels to aircraft depending on their abundance, mass and flocking tendency. The latter are relatively easy to quantify and can be used as input variables in strike risk models. However bird susceptibility to strike is also dependent on inherent behavior traits that may vary significantly between species and are much harder to parameterize. For example flocking species have a high consequence rating if struck because of their additive biomass and increased chance of hitting critical aircraft parts, although their behavior should give them a greater ability to avoid strike in the first place as they have evolved mechanisms to match velocity and avoid collision while in formation. Here we present two simple methods of quantifying aircraft and bird susceptibility to strike. The former requires access to accurate national strike data and is based on comparing aircraft strike rates with aircraft weight and performance categories. The latter requires standardised surveys over time from several airports in a region and is based on comparing species strike rate with species survey density. The aircraft strike susceptibility index can be included in retrospective strike risk assessments and helps provide a more meaningful comparison of strike rates at airports with different aircraft movement patterns. The species susceptibility to strike index can be combined with a range of biological and spatial parameters to give a prospective and ranked risk indication for either an individual species or a whole airport. Ultimately, this alerts operators to the need for appropriate risk treatments and allows species of greatest risk to be targeted in management programs.

Ranking species susceptibility to strike

RANK	COMMON NAME	SPECIES	FAMILY	SSS index	Total Strikes
1	Spectacled Monarch	*Monarcha trivirgatus*	*Dicruridae*	*3071*	*1*
2	Brown Quail	*Coturnix ypsilophora*	*Phasianidae*	*1662*	*1*
3	House Sparrow	*Passer domesticus*	*Passeridae*	*1629*	*5*
4	Australian Pratincole	*Stiltia isabella*	*Glareolidae*	*1247*	*1*
5	Red-capped Plover	*Charadrius ruficapillus*	*Charadriidae*	*1030*	*2*
6	Spotted Harrier	*Circus assimilis*	*Accipitridae*	*931*	*1*
7	Lesser Sand Plover	*Charadrius mongolus*	*Charadriidae*	*879*	*1*
8	Black Kite	*Milvus migrans*	*Accipitridae*	*701*	*23*
9	Crested Tern	*Thalasseus bergii*	*Laridae*	*294*	*4*
10	Silver Gull	*Chroicoc. novaehollandiae*	*Laridae*	*277*	*4*
11	Fairy Martin	*Petrochelidon ariel*	*Hirundinidae*	*177*	*43*
12	Ground Parrot	*Pezoporus wallicus*	*Psittacidae*	*135*	*1*
13	Whistling Kite	*Haliastur sphenurus*	*Accipitridae*	*130*	*10*
14	Australian Bustard	*Ardeotis australis*	*Otididae*	*119*	*1*
15	Wandering Whistling-Duck	*Dendrocygna arcuata*	*Anatidae*	*115*	*3*
16	Greater Sand Plover	*Charadrius leschenaultii*	*Charadriidae*	*111*	*2*
17	Pacific Gull	*Larus pacificus*	*Laridae*	*92*	*1*
18	Masked Lapwing	*Vanellus miles*	*Charadriidae*	*88*	*53*
19	White-throated Needletail	*Hirundapus caudacutus*	*Apodidae*	*85*	*10*
20	Nankeen Kestrel	*Falco cenchroides*	*Falconidae*	*76*	*24*
21	Pacific Golden Plover	*Pluvialis fulva*	*Charadriidae*	*65*	*2*
22	Wood Duck	*Chenonetta jubata*	*Anatidae*	*60*	*13*
23	Dusky Moorhen	*Gallinula tenebrosa*	*Rallidae*	*60*	*1*
24	Grey Teal	*Anas gracilis*	*Anatidae*	*57*	*1*
25	Swamp Harrier	*Circus approximans*	*Accipitridae*	*52*	*1*
26	Eurasian Skylark	*Alauda arvensis*	*Alaudidae*	*50*	*3*
27	Sulphur-crested Cockatoo	*Cacatua galerita*	*Cacatuidae*	*49*	*1*
28	Black-shouldered Kite	*Elanus axillaris*	*Accipitridae*	*47*	*2*
29	Welcome Swallow	*Hirundo neoxena*	*Hirundinidae*	*47*	*27*
30	Feral Pigeon	*Columba livia*	*Columbidae*	*30*	*3*
31	Latham's Snipe	*Charadrius mongolus*	*Charadriidae*	*25*	*1*
32	Eastern Osprey	*Pandion cristatus*	*Accipitridae*	*21*	*1*
33	Magpie Lark	*Grallina cyanoleuca*	*Dicruridae*	*19*	*33*
34	Galah	*Eolophus roseicapillus*	*Cacatuidae*	*17*	*14*
35	Australasian Pipit	*Anthus novaeseelandiae*	*Motacillidae*	*15*	*21*
36	Tree Martin	*Petrochelidon nigricans*	*Hirundinidae*	*14*	*18*
37	Australian Swiftlet	*Aerodramus terrareginae*	*Apodidae*	*12*	*2*
38	Pacific Black Duck	*Anas superciliosa*	*Anatidae*	*12*	*29*

Risk assessment in relation to restoration of wetlands (lakes and wet meadows) in proximity to airports, a basic model.

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ABSTRACT
In 1998, the Danish Environmental authorities intended to restore approximately 16.000 ha of low-level areas into functional wetlands, primarily lakes and wet meadows under a national water management plan (VMP2). The primary aim of VMP 2 was to reduce the outwash of nitrogenous and phosphorous compounds from cultivated farmland areas to lakes, fjords and coastal and offshore areas around Denmark. VMP 2 was also intended to increase biodiversity, and birds were expected to be among the first conspicuous species to colonise restored wetlands.

In Denmark, the authorities responsible for airport management are obliged by the National Aviation Authority to take actions to prohibit the establishment of habitats or landscape features within 13 km from airports that potentially attract birds. Hence an obvious conflict of interest exists between the Environmental and Aviation authorities in relation to restoring or establishing wetlands in suitable places near airports. To evaluate the potential bird strike risk from new wetlands close to airports, a general assessment of expected bird occurrence (based on species specific ecology) in relation to various types of wetlands, wetland size and shape and management strategies, was compared to existing bird strike statistics from Denmark 1992-2005. This comparison formed the basis for developing a basic geographical model, which set out guidelines for what habitat changes may be permitted without increasing the risk of bird strikes, as well as proscribing high risk actions in areas close to airports. Basically the model outputs predict that only very minor habitat changes should be made within 6 km of airport runways, whereas larger wetland projects may be considered at distances between 6 and 13 km, pending careful evaluation of potential bird movements across airport areas between the new and existing wetlands. The model can be considered a basic tool in wetland management near airports, but the applicability and usefulness to specific airports will depend somewhat on specific local and regional knowledge of bird occurrence and movements.

THE IMPACT OF LETHAL CONTROL AS A REINFORCEMENT TECHNIQUE WHEN DEPLOYING IBSC BEST PRACTICE STANDARDS ON AN AERODROME

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ABSTRACT
IBSC best practice standard 4 recommends that; "staff should have access to appropriate devices for the removal of birds/wildlife…" This paper discusses how carefully targeted removal of birds significantly increased the effectiveness of non-lethal active bird control on a European aerodrome. Lethal control, in combination with blank shot, was initially tested at two UK landfill sites to remove any risk of increased bird activity in an airfield environment. Deployment under a 7 days a week, daylight hours regime was implemented at one site and deployment under a 5 days a week, operational hours regime was implemented at the other. Measurements of the number of birds removed and overall numbers of birds present were recorded. Daylight hours 7-days a week control minimised both the number of birds shot and the number of birds present. This regime was therefore implemented alongside a suite of nonlethal bird control measures at a European aerodrome. The number of birds shot and number of birds struck by aircraft were then analysed. The integrated system dramatically improved following the inclusion of lethal reinforcement. Lethal control, used sparingly, and as a reinforcement to more traditional techniques, is highly effective at increasing the response rates of birds to deterrence effort.

UPDATE ON FATALITIES AND DESTROYED CIVIL AIRCRAFT DUE TO BIRD STRIKES with Appendix for 2006 to 2008

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ABSTRACT

At the IBSC 26 Meeting in Warsaw Poland, May 2003 an illustrated Working Paper WP WP-SA1 (p.87 of Proceedings) 'Fatalities and Destroyed Civil Aircraft due to Bird Strikes 1912 to 2002' provided brief details of **all** cases during the period. The paper was felt to be useful in drawing attention to the scale of the problem, especially when dealing with those who know little about the subject or who are newly appointed to decisionmaking positions. Since then information has become available on some previously unknown accidents, as well as information on subsequent accidents. Thus, at IBSC 27, Athens May 2005 an update, WP II-3 (p.65 of Proceedings) was presented covering the years 2002 to 2005. This paper provides brief details on further cases between 2006 and 2008 as well as updated statistics covering the period 1912 to 2008.

It is now believed that the total number of fatal bird strike accidents has risen to 56 killing 262 people. And destroying 103 aircraft. These additional accidents are briefly detailed in the Paper so that the totals are now:

- Airliners and Executive Jets – 15 fatal accidents killing 188 and destroying 41 aircraft.
- Aeroplanes 5,700 kg and below – 31 fatal accidents killing 61 and destroying 53 aircraft.
- Helicopters – 6 fatal accidents killing 10 people and destroying 8 helicopters.

The results are broadly unchanged in that the major threat (nearly 80% of accidents) to Airliners and Executive jets is engine ingestion, often due to flocks of gulls (*Larus sp.). Aircraft of 5,700 kg and below as well as* helicopters are most at risk from windshield penetration, mainly the result of collision with birds of prey (*Accipitriformes). These groups of aircraft mainly fly at heights where birds are most likely to be encountered.* Some accidents are the result of pilots attempting to avoid birds.