Roosting and feeding flights of Black-headed gulls (Larus ridibundus) in the region of Zurich airport

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on behalf of the youth group of the ALA

1. Introduction

In 1975 the youth group of the ALA (Swiss society for bird study and bird protection), started investigations on the Black-headed gulls (Larus ridibundus) wintering in the Zurich area.

As their roosting place, the lower part of Lake Zurich is a center of that winter population. In the daytime most of the gulls disperse over a large area, mainly to the north of the roosting place for feeding. A considerable number stays at the lake and in the city where the birds are fed by people.

Since Black-headed gulls are often considered as problem birds, the investigation produced some useful results with respect to agricultural and aviation problems. This paper deals mainly with the aspects of interaction between birds and aviation. We wish to thank B. Bruderer and R.K. Furrer for many advices and critical review of this text.

2. Material and methods

2.1. Numbers of wintering gulls

The size of the winter population can be estimated quite accurately by counting the birds arriving at the roost on lower Lake Zurich in the evening and by counting those gulls staying at the lake during the day. Counts are now available for the last three winters (1975/76-77/78). Comparisons with earlier counts allow to quantify the population trend.

2.2. Recruiting area of the roosting place

We were then interested in the size of the recruiting area, i.e. the area used for feeding by the gulls during the day. For this purpose we used the surveillance radar at Zurich airport and we also trapped and colour-marked a large number of gulls.

- Surveillance radar (10 cm): Films from late autumn 1963 were interpreted, gull movements were followed directly on the screen during the last three winters and new pictures were made with a 36 mm - camera. Apart from the

determination of the feeding area, the morning and evening movements' dependence on topography and weather was revealed.

- Colour marking: We trapped nearly 1000 Black-headed gulls with a cannon net (13 x 27 m) at the shore of Lake Zurich in the winter of 1977/78 (following pilot studies in the previous winter). The birds were ringed and additionally coloured at different parts of the body. We used yellow and orange picrid and picramic acid (colours to catch the observer's eye) on some parts of the body as well as special bird marking paint for contrasting collars (showing the marking date in combination with different patterns of the body-colour).

2.3. Behaviour at the feeding place

A study area of 33,2 km^2 (80 % cultivated) was selected north of Zurich airport; it was surveyed on 25 days during winter 1977/78 by driving along the same route at about the same daytime. All gulls were counted and their location and activity was determined.

3. Results

The data have not yet been fully analyzed; the following is therefore only a provisional interpretation of the material.

3.1. Numbers and phenology of the wintering gulls

The average number of gulls wintering in the Zurich area and counted at the roosting place varies between 17'000 and 20'000 birds. Numbers build up very rapidly in October; at the end of the month already some 13'000 are present. At this time many passage migrants are probably still included; a small peak in November gives some evidence for it. Highest numbers are reached in mid to end of January with 18'000 to 22'000 birds. Numbers decrease very quickly in February; at the beginning of March some 10'000 gulls are still in the area. Although considerable passage is probable in spring, no further peak can be recognised.

3.2. Recruiting area of the roosting place

The whole feeding area of these gulls has an extent of about 1400 km^2, whereas the main part visited by the birds comprises some 800 km^2. Most of the birds go to feed on meadows and arable land, mainly in the lowlands (under 450 m) of the northwestern canton of Zurich (where the airport is situated too). The average distances flown from the roosting place are 10 - 20 km, but the

largest ones reach 40 km. Apart from these, a remarkable number of gulls spends the day at the lake and is fed by the public. The number of these "urban gulls" remains rather constant between 2500 - 3000 from December to February; another 500 - 1000 gulls populate the sections of the Limmat river in the center of the city near the lake. Considerable numbers are also found along the other river sections (Limmat, Sihl and Schanzengraben). The flocks in the city itself (mainly in the suburbs) which get their food also directly from people, should not be neglected as well. These numbers can only be estimated and may reach some 5000. The remaining 9'000 - 12'000 gulls in mid-winter fly daily out to the fields for feeding. At the beginning and end of the winter the corresponding numbers are lower.

3.3. Feeding and roosting flights

3.3.1. Flyways

On their feeding and roosting flights, gulls follow the larger valleys and the plains without forests. They like to follow guiding lines like rivers or edges of valleys. Even narrow curves of rivers are often followed. They refrain from flying over large forests and prefer to make detours instead. Chains of hills are crossed at unwooded passes, mostly below 600 meters. The additional flying distances caused by this behaviour are generally 3 - 5 km, i.e. an addition of about 20 - 30 % to the shortest route; in extreme cases the detours may reach up to 15 km, i.e. more than 200 % of the shortest possible way (e.g. flying around the Albis hill chain)(see figures).

3.3.2. Height of flights

After starting from the feeding or roosting place the birds rise very slowly. First, they fly about 100 m above ground, further away (ca. 10 km) from the starting point some 200 m, and at larger distances from the starting point they reach sometimes 400 m.

3.3.3. Influence of the weather

Feeding on cultivated land is possible only when the soil is not frozen. For this reason, the mild winters of the last years were favourable for the gulls. Snow cover also lowers the feeding efficiency. Feeding flights to farmland are reduced under such bad conditions, more gulls stay around the lake and in the city or along rivers outside of the city (rivers Limmat, Glatt...). Continuous rainfalls over a long time may have the same effect, by reducing flight activity. Even short-term weather fluctuations influence the behaviour

of the gulls: an approaching heavy rain or thunderstorm front may cause the gulls to leave their feeding places in a hurry Visibility, particularly sight contact with the ground seems to be of great importance: light mist makes the gulls fly very low, dense fog makes them reduce or stop the feeding flights.

3.4. Adhesion to the feeding place

Numbers of birds counted weekly in the study area (see 2.3.) fluctuated markedly between 119 and 2994 around a mean of 1234 (sd = 734). This fact represents well the short-time fluctuations of food supply: snow-covered or frozen soil prevents feeding, damp or wet soil favours it. Farming activities also influence gull dispersion: recently ploughed fields are attractive. Nevertheless, gulls can be found more constantly in some parts of the study area than in others. Only few observations exist on the fidelity to a feeding place. Unfortunately, individual marking of the birds was impossible. Colour combinations showed only the marking date. At some places birds with the same combination were found several times, but no clear sequence of observations concerning identically coloured birds exists. Arguments for a possible adhesion of single birds or groups to certain feeding places are very weak of lacking.

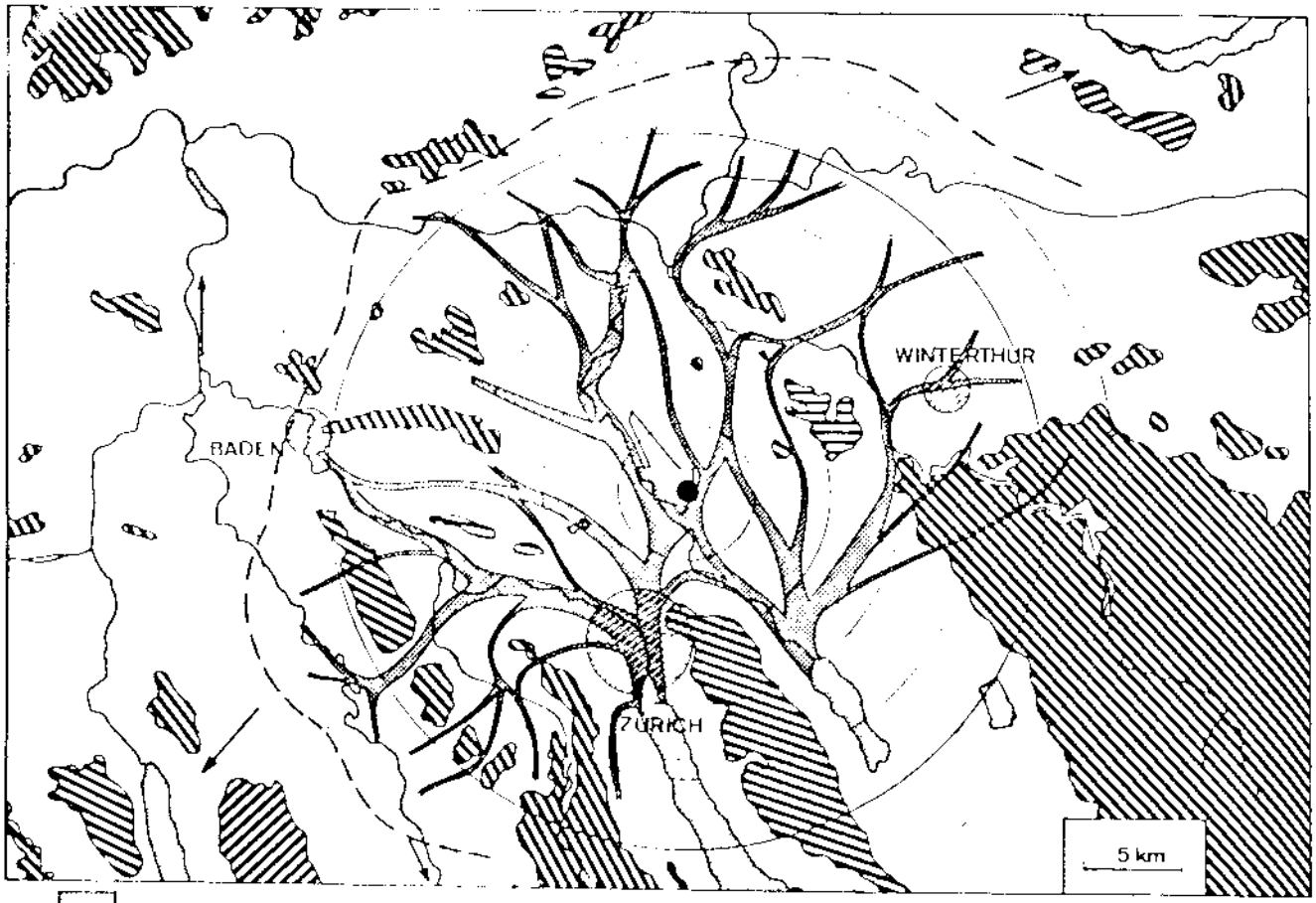
3.5. Other movements of marked birds

Sight records came also from outside the normal dispersal range of the roost. From the reports which reached us, the marking date of 28 records could be fixed exactly, that of an other eleven records only approximately (whith an uncertainty of 4 or 7 days). During the course of the winter the time span between marking and first sighting in regions of other roosts decreased (indication of increasing migratory movements?). Changing from one roost to another or departure can take place very rapidly: a gull marked in the evening of 7.12.77 in Zurich was already seen at a roost at the Lake of Constance near Eschenz one day later (42 km NE). Another bird marked on 17. or 21.12.77 was observed near Basle on 26.12.77 (some 70 km WNW) and a further gull of the same marking date was in Munich (West Germany) already on 9.1.78 (about 250 km NE).

4. Discussion

For the bird strike problem, mainly observations on feeding and roosting flights and on a possible feeding site fidelity may have some significance.

It seems that only the roosting place is a site that is frequented more or less constantly. Visits to the feeding places depend on weather conditions, food supply, and other factors; no habituation can be assumed. This should facilitate measures for gull expulsion from the airport. However, the area of Zurich airport will remain attractive for gulls (and other species, like Lapwings Vanellus vanellus) as long as there are short-grass meadows and arable fields. The same is true for military airports, e.g. Duebendorf airport, which are also situated in the range of well visited feeding areas. Black-headed gulls maintain also a certain conservativism in choosing the flyways from and to feeding areas. More detailed studies are necessary in order to establish the exact time-table, activity rhythm and flight altitudes of the gulls. The potential risk at the crossing points of the birds' flyways with aircrafts in final approach or climb out has to be estimated.



lakes and rivers

areas higher than 600m ASL

main flyways (width corresponding to number of echoes)

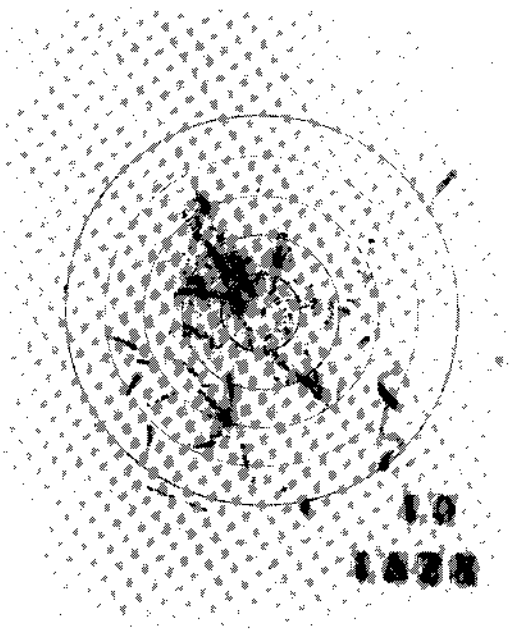
radar

flyways toward other roosts

towns

boundary of recruiting area

Zurich airport



Roosting gulls on 10 cm radar at Zurich airport, 10 November 1976, 1630 h. The distance between two circles is two miles (as in the map above)