

Dinevich L., Leshem Y. 2008. *Some characteristics of daytime bird migration in Israel: radar monitoring data*. Ring 30, 1/2: 3-17.

### **Abstract**

Bird-aircraft collisions often lead to severe plane crashes. An ornithological radar system aimed at preventing such collisions was developed and has been in operation in Israel for over three years. The system enables radar monitoring of bird migration in spring and in autumn, and yields the data in the form of special charts that are sent on-line every 15-30 min to air traffic control bodies. The data enables flight dispatchers to locate areas of massive bird concentrations, as well as directions and altitudes of bird flights, in order to channel the air traffic accordingly.

In addition, it is of high importance to have statistics on seasonal transcontinental bird migrations in order to perform long-term planning of air traffic, especially in the areas crowded with aircraft.

We analysed the radar data collected over several years, and on this basis determined the main statistical characteristics of daytime bird flights over central Israel, including: (1) average and maximum flight altitudes, (2) time of the day and the season when bird migration is especially intensive, (3) dominating directions and velocities of flights.

It was found that average daily altitude maximums of bird flights (in relation to the sea level) were within the range of 1200-3500 m in autumn, and within the range of 1000-2700 m in spring. The absolute flight maximum reached 4300 m in autumn and 3700 m in spring. In autumn, flight altitudes were higher than in spring.

The altitudes of maximum bird concentrations reached 600 m in autumn, and only in rare cases rose to 650 m, while in spring the corresponding figures were 500 and 600 m. Both in spring and in autumn, the average altitude of maximum bird concentration was located within the range of 250-400 m.

The dominant flight direction for day migration was 190-220° in autumn and 10-50° in spring.

In our study, we did not observe any pronounced impact of wind direction on the direction of bird flights, neither close to the ground level nor at the height of 600 m. In Israel, both in autumn and in spring, the winds have a distinct occidental component, and at the height of 600 m the dominant wind directions are W-NW in autumn and W-SW in spring, i.e. at the angle of approximately 90° in relation to the directions of seasonal bird migrations.

The average ground-speed of seasonal migrations was found to be 14 m/s in spring and 15 m/s in autumn, the minimum and maximum ground-speed values of 8 and 18 m/s, respectively.

At the same time, average monthly ground-speed values at the altitude of 600 m, at 11.00 a.m. local time, were found to be within the range of 4-7 m/s in autumn and 3-6 m/s in spring. The peak of day migration intensity was observed within the time interval from 12.00 to 1.00 p.m. The spring migration started at the beginning of March, reached its monthly peak in April and came to the end in late May. The autumn migration started at the middle of August, reached its monthly peak in September and came to the end in November.

The results obtained in the present study should be applied for ensuring air-traffic safety in periods of bird migration and also can be of special interest for ornithologists.

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