SOUTH OF THE SEA: LONG TERM RESULTS OF MIGRATING RAPTORS SPRING COUNTS ALONG THE POLISH BALTIC COAST

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ABSTRACT.- The migration of raptors in the Baltic area is mainly documented for the autumn fluxes through the Oresund area, between Sweden and Denmark (Falsterbo). However, the existence of different flyways used by soaring migrants around the Baltic sea may be proved by means of the data collected in spring during the migration counts performed at the Hel ringing station of Operation Baltic (Poland). Counts were performed during every day of field activity, in a sistematic way, lasting 15 minutes in every daylight hour. Between 1966 and 1992 a total of 1098 days has been covered, in the range between March 26th and May 16th (no data for 1976 and 1983). A total of 7040 Eurasian Sparrowhawks (*Accipiter nisus*), 5348 Common Buzzards *(Buteo buteo)*, 973 Rough-legged Buzzard (*B. lagopus*), 56 Goshawks (*A. gentilis*) and 44 Harriers (*Circus* sp.) were counted. Seasonal trends have been evaluated by pentades, as per birds counted / days covered in every five days period, ranging between pentade 24 (March 26th-30th) and pentade 34 (May 15th-19th). The huge amount of field work allowed to make considerations also on a almost resident species such as the Goshawk. Common Buzzard and Goshawk clearly show an early migration pattern, respectively peaking on pentade 24 and 26. Sparrowhawk and Rough-legged Buzzard peak later, between pentades 29 and 31, with a lowest maximum respectively on pentade 25 or 26. This pattern could be due to the differential passage of different populations or different sex/age classes.

We estimated interannual trends by selecting a time window covered in every year, between March 27th and April 19th. For Sparrowhawk and Common Buzzard we found the highest peaks in spring migrant numbers in early-mid eighties, which were followed by a partial decrease to a level 2.5-3 times higher in early nineties than in late sixties. Conversely, after the first step the Rough-legged Buzzard still showed an increasing trend, while the Goshawk registered the highest values in the first years of the program.

It has been established that migration counts may be used for monitoring bird population levels (i.e. Busse 1979). Spring migrants represent the bulk of breeding populations, after the effect of reproductive success and post-breeding survival, so that monitoring spring migrant number may result in monitoring breeding population size. As far as in 1975 Berthold and Shlenker argued, "migration counts will monitor population changes more efficiently than breeding bird censuses". The migration counts performed in bottlenecks such as Eilat (i.e. Yosef 1995) represent a clear example of how highly efficient counts may be performed in a single site.

Busse (1979) also suggested "the cheapest and the easiest for organization is the monitoring based on migration counts". If doubts may arise, everybody should agree that this could be thought at least for scarce and disperse species, or for breeding populations poorly monitored in other ways. Raptor population of North Eastern Europe satisfies both those conditions. Moreover, up to now the only raptor counts data available in the literature for the Baltic area deal with the autumn

fluxes through the Oresund area, between Sweden and Denmark (Kiellén 1998).

To perform long-term migration counts has been one of the main goals of the so-called "Operation Baltic". This was a research program based on mist-netting birds during 30 years, between 1961 and 1990, which resulted in a huge number of reports and publications (i.e. Busse 1990). In this paper we analyse data collected during the Operation Baltic work with standard visual counts on migrating raptors.

STUDY AREA AND METHODS

The ringing stations of Operation Baltic were organized as temporary camps located at the seacoast. During this program, data were collected at three localities situated on the Southern Baltic Coast of Poland: Mierzeja Wislana, Hel, and Bukowo (Fig. 1).

Figure 1. Location of the Baltic Operation Polish ringing stations along the Southern Baltic coast. B: Bukowo; H: Hel; M: Mierzeja Wislana.

The three places had a similar habitat structure, with a narrow strip of forest between sea beach on the northern side, and another water body on the southern side. These narrow land stripes were acting as bottlenecks, concentrating the migrants in narrow streams. In the Hel station, during the daily routine visual counts were also performed in every day of activity, in a sistematic way, lasting 15 minutes in every daylight hour.

Rough count data were grouped to assess seasonal trends and interannual trends for the commonest raptor species. Seasonal trends have been evaluated by pentades, as per "birds counted / days covered" in every five days period. Interannual trends were estimated by selecting a time window covered with observations in every year. Trends were shown as values of single pentades and single years, and as smoothed averages (Busse 1990) according to the formula $AVG = (xi-1 + 2\,xi + xi+1) / 4$, where i is the period (the pentade or the year) examined and xi is the value assumed by the number of birds counted in the ith period.

RESULTS

Between 1966 and 1992 a total of 1098 days has been covered, in the range between March 26th and May 16th (Fig. 2). No counts were performed in 1976 and 1983. The average number of counting days per active spring has been 43.9. Among 13,461 raptors, a total of 7040 Eurasian Sparrowhawks (*Accipiter nisus*), 5348 Common Buzzards (*Buteo buteo*), 973 Rough-legged Buzzard (*B. lagopus*), 56 Goshawks (*A. gentilis*) and 44 Harriers (*Circus* sp.) has been counted.

Seasonal trends have been evaluated ranging between pentade 24 (March 26th-30th) and pentade 34 (May 15th-19th). The huge amount of fieldwork allowed making considerations also on a rarely migrant species such as the Goshawk. Common Buzzard and Goshawk clearly show an

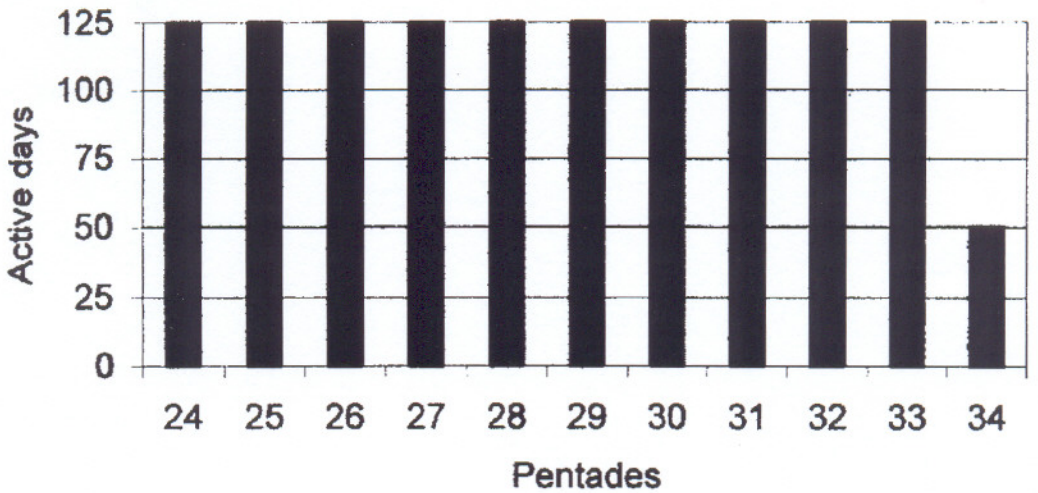

Figure 2. Number of active days per pentade. Lines: active days; dots: inactive days.

early migration pattern, respectively peaking on pentade 24 and 26 (late March – beginning of April). Sparrowhawk and Rough-legged Buzzard peak later, between pentades 29 and 31 (late April – beginning of May), with a lowest maximum respectively on pentade 25 or 26 (Fig. 3). This pattern could be due to the differential passage of different populations or different sex/age classes.

Interannual trend have been estimated on the time window comprised in the range between March 27th and April 19th (Fig. 4). For Sparrowhawk and Common Buzzard we found the highest peaks in spring migrant numbers in early-mid eighties, which were followed by a partial decrease to a level 2.5-3 times higher in early nineties than in late sixties. Conversely, after the first step the Rough-legged Buzzard still showed an increasing trend, while the Goshawk registered the highest values in the first years of the program.

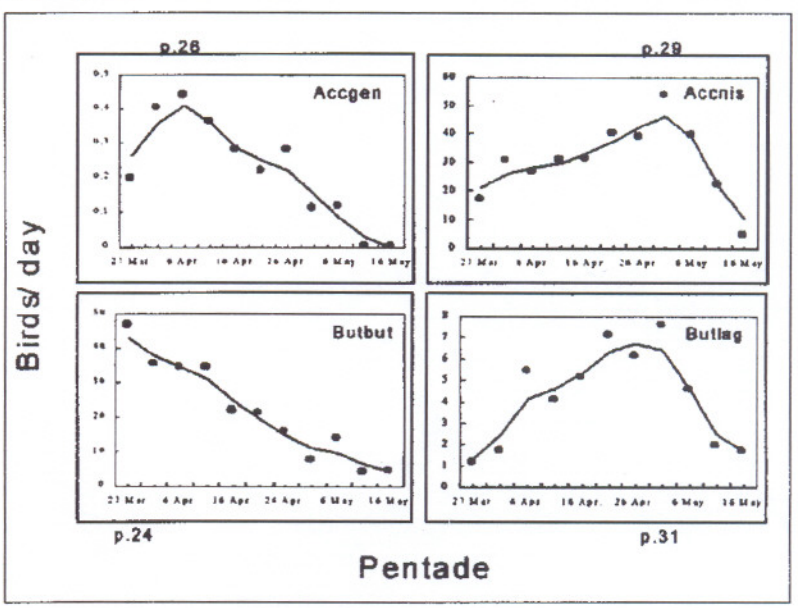

Figure 3. Phenology of migration for the commonest raptor species migrating in spring along the Polish Baltic coast. Points: rough data; line: smoothed data. The pentades with the highest counts per species are highlighted. Accgen: *Accipiter gentilis*; Accnis: *Accipiter nisus*; Butbut: *Buteo buteo*; Butlag: *Buteo lagopus*.

DISCUSSION

Although the migration of raptors in the Baltic area is mainly documented for the autumn fluxes through the Oresund area, between Sweden and Denmark (Falsterbo), our data suggest the existence of different flyways used by soaring migrants South of the Baltic Sea.

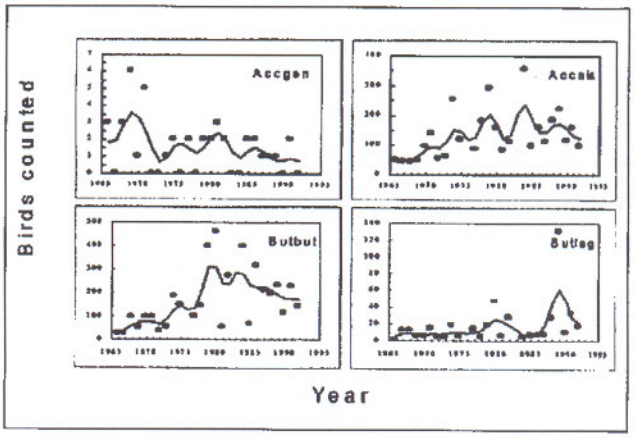

Figure 4. Interannual trends for the commonest raptor species migrating in spring along the Polish Baltic coast. Points: rough data; line: smoothed data. See text for further explanation. Accgen: *Accipiter gentilis*; Accnis: *Accipiter nisus*; Butbut: *Buteo buteo*; Butlag: *Buteo lagopus*.

The geography of this area (see Fig. 1) suggests that the migrants observed are passing through, or moving to breeding quarters in, the Baltic republics, northern Russia, or southern Finland. Data coming from these regions apparently confirm the trends we found. The positive pattern shown by the Sparrowhawk has been equally found on the number of catches during autumn migration, both in Poland (Busse 1994) and in Latvia (Baumanis & Celmis 1993): in both cases low levels were observed during the sixties, and highest levels at the end of the eighties. The fairly stable trend observed for the Goshawk after the sixties is probably true for the whole Baltic area, as suggested by the wintering data analysed by Hilden (1988) for Finland between 1976-1986, by breeding data analysed from Sulkava et al. (1994) again for Finland between 1961-1991, and by Bijlsma (1991) for the breeding populations of Latvia (fairly stable from '60ies), Lithuania (fairly stable from '90ies) and Estonia (slow decline from '80ies).

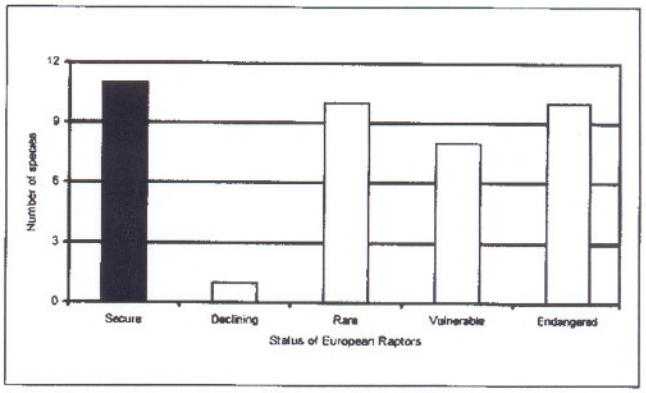

Figure 5. Status of the European Raptor breeding species according to Tucker & Heath (1994). Lines: species monitored on the Polish Baltic coast; dots: other "secure" species; empty bars: species with unsecure conservation status.

The confirmation of these patterns in our opinion indicates that visual counts even on secondary flyways may allow monitoring the status of breeding bird populations. This is particularly important even for the commonest raptor species that are not indexed in most of the common breeding bird monitoring schemes (Hustings 1992). Moreover, our data point out a general low population level for the two Buzzards and for the Sparrowhawk during the sixties, in the so-called "pesticides era". Large-scale effects of organochlorine pesticides have been documented in several ways (e.g Risebrough 1994). Our data also suggest that even the commonest raptor species were largely affected, until a recovery from the mid '70ies. All of these species are now considered in "secure status" for Europe in Tucker and Heath (1994), in spite of a lack of in-depth attention. Hence we conclude that long-term databases on migrant birds are extremely important for understanding population trends and should not be ignored.

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