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Broadfront Raptor Migration in Interior NW Germany

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ABSTRACT

Unconcentrated migration of raptors during 3-6 morning hours was observed daily for nine autumn and four spring seasons (1976-1985) in NW Germany, about 180km south of the North Sea coast. A total of 4,202 raptors of 16 species was recorded. Passage rates were generally low, especially in spring. Red Kite and Osprey were more common in spring, all others more numerous in autumn. Seasonal migration patterns and year to year variations in numbers are briefly discussed. Common Buzzards passed through the area much later than at the coast or in the region of the Alps. For the other species the timing and amount of migration were similar to those at other inland sites in Central Europe.

INTRODUCTION

Raptor migration in the western Palearctic has so far been studied mostly at places where topography tends to concentrate migrants, especially large soaring birds, e.g. Falsterbo (Rosén 1966; Ulfstrand *et al.* 1974). Alpine passes (Thiollay 1966), Gibraltar (Bernis 1980) or Bosphorus (Porter & Willis 1968; Ritzel 1980) (overview: Porter & Beaman 1985). Much less is known about passage rates and exact timing of unconcentrated broadfront migration over much of Central Europe (but see Gatter 1972; Draulans 1984).

We report here results of systematic observations of migration during nine autumn and four spring seasons at a topographically homogeneous inland site in NW Germany. These data may be representative of a much wider area and could be used to gauge concentration effects of topographical bottle-necks elsewhere in Europe.

METHODS AND MATERIAL

Systematic counts of visible migration were carried out 3km west of Bielefeld (52°03'N; 8°27'E) in NW Germany, about 180km south of the North Sea coast. The observation site on a small hill (165m above sea level) extends 60m above the surroundings. There are no leading lines or topographical barriers concentrating migration in the area. Daily watches were kept by one (three autumns, two springs) or two observers (all other seasons) from mid-August to mid-November of 1976-1984 and late February to mid- or late April 1979, 1982 and 1984-85. Since the study was not primarily concerned with raptors, observations started at sunrise and lasted 3 hours (1976-1979)

or 5-6 hours (1980-1985). Birds were counted with 10x and 15x binoculars, count and weather data were tape-recorded in the field. Total observation hours: 2,602 in autumn; 451 in spring.

Five day averages of birds passing per 10 hours have been calculated according to proposals by Berthold (1973). Further details on observation site and methods have been published elsewhere (Helbig & Laske 1986; Helbig *et al.* 1986).

RESULTS

Sixteen species of migrating raptors were recorded in autumn and fourteen species in spring (Tables 1, 2). White-tailed Eagle and Rough-legged Buzzard occurred only in autumn. Birds of prey accounted for less than 1% of all birds counted at this site, which is typical for northern and central Europe. More raptors migrated in autumn (overall mean: 15.0 birds/10 hrs) than in spring (10.4/10 hrs). Two species were more numerous in spring than in autumn: Red Kite (2.04/10 hrs versus 0.68/10 hrs) and Osprey (0.32 versus 0.08). The relative frequencies of each species among all raptors passing are similar for both seasons (Tables 1, 2), with Red Kite and Honey Buzzard diverging most. The latter species migrates very late in spring (May), when regular watches had already ceased.

Autumn totals were most variable in Red Kite (5 in 1981; 54 in 1982), Sparrowhawk (66 in 1980; 302 in 1982), Marsh Harrier (7 in 1980; 61 in 1981) and Hen Harrier (7 in 1980; 49 in 1984). Spring totals tended to be less variable except for Red Kite (4 in 1982; 40 in 1984). In most species migration was concentrated on a few days per season with favourable weather conditions (Table 3). Flight directions were generally to the south-west in autumn, except in Common Buzzard (WSW-W) and Red Kite (SW-SE), and north-east in spring (more easterly in Common Buzzard). Seasonal migration patterns are given in Figs. 1 and 2. In spring, counts probably ceased too early to cover the end of Marsh Harrier and Kestrel migration or the main migration of Honey Buzzard. In autumn, migration patterns tend to be right-skewed in late migrants (Common Buzzard, Sparrowhawk) and more symmetrical in earlier migrants. In spring, they tend to be left-skewed in early migrants (Common Buzzard, Hen Harrier) and right-skewed in species passing later. Autumn passage spans two to three months in all the common species (cf. Table 1), only in the Honey Buzzard it is clearly shorter. Spring passage tends to be more contracted (1.5 to 2 months).

TABLE 3: Concentration of autumn migration on three peak days per season in six commoner raptor species. Numbers are the average percentages of birds per season (1980-1984) migrating on the strongest, second and third peak day of each species respectively.

Species	1st	2nd	3rd peak
Milvus milvus	25.0	17.4	11.3
Accipiter nisus	12.8	10.6	6.9
Buteo buteo	22.4	15.3	10.5
Pernis apivorus	33.0	19.3	11.4
Circus aeruginosus	24.4	16.8	10.5
Falco tinnunculus	17.7	12.2	8.7

DISCUSSION

Given the daily timing of raptor migration (often a peak around noon or early afternoon) and the early daily observation hours in this study, it is obvious that during 1980-1985 no more than one half of the raptors migrating past our site will have been counted. Keeping this in mind, the

passage rates compare well with those of other inland sites. For most species they are similar to those found in Berlin (Bruch *et al.* 1978), south-west Netherlands (Bijlsma 1980), eastern Belgium (Draulans 1984), Swabian Alb/southern Germany (Gatter 1972) and at the north shore of Lake Constance (Schuster *et al.* 1983). The latter two sites are known to concentrate migration to some extent, but apparently raptors (except Common Buzzard at Lake Constance) are hardly affected. For most species mountain passes in the Alps (Thiollay 1966; Fuchs 1968; Schmid 1984), Pyrenees (Tanguy le Gac 1981) and French Jura (Mulhauser *et al.* 1984) yield autumn passage rates on average 3-5 times higher than those of unconcentrated migration.

The timing of autumn passage of some raptors is remarkably similar over much of Europe from southern Scandinavia to the Iberian Peninsula. For instance, peaks or medians of Kestrel migration are in early to mid-September in southern Scandinavia (Edelstam 1972; Ulfstrand *et al.* 1974) and uniformly around late September to early October anywhere from NW Germany (this study), southern Germany (Gatter 1972; Schuster *et al.* 1983), Swiss Alps (Thiollay 1966) to Gibraltar (Bernis 1980). A similarly uniform picture seems to emerge for Montagu's and Marsh Harrier, Hobby and Merlin wherever systematic observatons have been carried out (lit. op. cit.).

In other species, the timing is more diverse: Sparrowhawks leave Scandinavia and cross Schleswig-Holstein with a peak in late September to early October, almost concurrently or slightly later than peak passage occurs in the Pyrenees and at Gibraltar (Schmid *et al.* 1986). Medians at Heligoland and the Swabian Alb are clearly later (11.-13. Oct; Gatter 1972; Moritz & Vauk 1976), whereas passage through interior NW Germany, southernmost Germany and Switzerland averages another 10-15 days later (medians after 20 Oct; this study; Schmid *et al.* 1986; Schuster *et al.* 1983; Mulhauser *et al.* 1984).

The late peak passage of Common Buzzards in our study was somewhat surprising, because massive concentrated migration from Scandinavia crosses Schleswig-Holstein (about 200-250km north of our site) during the first days of October (e.g. Rosén 1966; Looft & Busche 1981). This stream of migrants does not seem to touch our area at all. Rather, birds passing through inland areas in north and central Germany seem to originate from continental (eastern) Europe (Glutz *et al.* 1971) and migrate almost a month later (also on a more westerly course). Further south in Germany, Switzerland, the Pyrenees and Gibraltar, Buzzard migration usually peaks in mid-October (medians 9-18 Oct). Our data do not include rush migration after cold spells, which can occur into December and January and may include hundreds of birds (Gatter 1972; Schuster *et al.* 1983). However, the fact that we observed only for 5-6 hours from sunrise and days become considerably shorter toward November certainly leads to an underestimation of the early part of Buzzard migration. Nonetheless, unconcentrated passage of over 100 birds within 2-3 hours in early November (*not* following cold spells) seems remarkable compared to other areas. In general, the timing of Buzzard migration is influenced considerably by the regional abundance and availability of rodents, thus secondarily by altitude and snow cover. This allows a later migration in the maritime climate of lowland northern Germany than in Scandinavia or more continental and often more elevated areas further south.

Causes of year to year variation in numbers of migrating raptors are complex and can hardly be interpreted on the basis of counts at a single site, especially if overall numbers are low. Peak numbers of Sparrowhawks near Bielefeld in 1982 were partly caused by a period of inclement weather (12-15 Oct) which blocked migration and led to a synchronised rush migration when conditions improved ("Zugstauauflösung"). The unusually high total of Red Kites in 1982 may have been related to a prevalence of south-east winds during September and early October. This could have facilitated more westerly flight paths of birds originating from the densely settled breeding areas in eastern Lower Saxony and the GDR than is normal (cf. Meinecke & Gatter 1982). The relatively large variation in Merlin numbers, in spite of constant observer effort (autumn totals 1980-1984: 2, 15, 25,13,15), has also been noted elsewhere (Gatter 1972). The numbers of Hen Harriers reaching our area partly depend on vole densities further north (Looft & Busche 1981).

Spring migration of raptors in Europe has received very little attention, partly because numbers are much lower than in autumn (cf. Tables 1 & 2) and because fewer concentration points are known. However, the northern tip of Denmark near Skagen is a major concentration point in spring (Pedersen 1983) and comparative information on inland migration further south would be desirable. Our study can only be a start in this respect, but it does indicate some interesting points: Red Kites and Ospreys are relatively more numerous than in autumn; Merlin passage is not finished by late April (Glutz *et al.* 1971), but regularly extends into May (in three years, we had six rec-

ords involving at least five birds during 29 April - 9 May).

Even in Central Europe a number of questions about raptor migration remain to be answered, and we do not agree with Porter & Beaman (1985) that studies at localities with broadfront migration "would probably be pointless".

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TABLE 1: Migration periods and passage rates of raptors in autumn near Bielefeld, NW Germany, in 1980-1985.

Species	% of all raptors	passage period*	seasonal total max.	seasonal total $\bar{x}$	max. passage rate absolute max.	(birds/3h) average max/year
Milvus milvus	2.8	30.8. - 24.11.	54	22	9	3.8
Milvus migrans	-	12.8. - 7.10.	2	1	2	-
Pandion haliaetus	0.5	28.8. - 16.10.	6	2.2	1	1.0
Accipiter nisus	24.6	10.9. - 21.11.	302	192	42	26.0
Accipiter gentilis	0.4	10.10. - 9.11.	5	1.8	2	1.5
Haliaeetus albicilla	-	2.11	1	-	1	-
Buteo buteo	44.0	3.9. - 28.11	514	344	119	77.0
Buteo lagopus	-	27.10. - 25.11.	2	-	1	-
Pernis apivorus	10.0	10.8. - 11.10.	116	91	66	39.0
Circus aeruginosus	4.2	16.8. - 15.10.	61	33	15	7.0
Circus pygargus	0.3	23.8. - 29.9.	3	1	2	1.0
Circus cyaneus	2.8	1.10. - 5.12.	49	19	6	3.2
Falco peregrinus	-	19.10. - 14.11.	1	1	1	-
Falco subbuteo	1.1	12.8. - 28.10.	16	9.4	5	2.6
Falco columbarius	1.8	28.8. - 7.11.	25	17	5	3.3
Falco tinnunculus	7.3	21.8. - 20.11.	80	57	12	9.3

TABLE 2: Migration periods and passage rates of raptors in spring near Bielefeld, NW Germany, in 1979-1985.

Species	% of all raptors	passage period*	seasonal total max.	seasonal total $\bar{x}$	max. passage rate absolute max.	(birds/3h) average max/year
Milvus milvus	19.7	12.2. - 13.4.	36	22.5	14	7.5
Milvus migrans	1.5	28.3. - 20.5.	3	1.8	2	1.3
Pandion haliaetus	3.0	31.3. - 12.5.	9	3.0	6	2.0
Accipiter nisus	18.0	6.3. - 23.4.	27	21.0	8	6.0
Accipiter gentilis	0.9	20.3. - 28.3.	2	1.0	2	1.0
Buteo buteo	38.5	28.2. - 6.4.	80	45.0	29	20.0
Pernis apivorus	2.6	16.5. - 25.5.	12	3.8	10	3.3
Circus aeruginosus	4.3	16.3. - 16.5.	9	5.0	3	2.0
Circus pygargus	-	22.4. - 14.5.	2	0.5	1	-
Circus cyaneus	2.8	28.2. - 6.4.	7	3.3	2	1.3
Falco peregrinus	-	12.3. - 5.4.	1	-	1	-
Falco subbuteo	0.9	14.4. - ?	1	1.0	1	1.0
Falco columbarius	1.3	8.3. - 9.5.	3	1.5	1	1.0
Falco tinnunculus	6.2	5.3. - 14.4.	14	7.0	3	2.0

* includes some observations in same area outside systematic watches, not included in Fig. 1.

Fig. 1 & 2: Five-day averages of numbers of raptors migrating per 10 observation hours near Bielefeld, NW Germany (1976–1985). Arrowheads and numbers above them show median dates of migration (day of respective month). For species in Fig. 2. sufficient data were available only of autumn migration.