

SEX AND AGE CLASSES OF MIGRATING RAPTORS DURING THE SPRING OF 1994 AT EILAT, ISRAEL.

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Raptor migration counts have been conducted in the spring and autumn from 1977-87 near the northern tip of the eastern arm of the Red Sea at Eilat (Christensen et al. 1981, Shirihai 1987, 1988, Shirihai and Christie 1992, Shirihai and Yekutieli 1991). The most recent survey was conducted in the spring of 1994 (Yosef 1995). Because early reports did not present results pertaining to the sex and/or age classes of the raptors observed on migration, I am presenting the sexes and ages of raptors that passed this observation point during the daily count.

Observations were made at three points for approxi-

mately 12 hr/d from 15 February-19 May 1994. Except for two d when observations were terminated due to sandstorms, 92 d of observations were carried out (Yosef 1995). At the observation point, soaring birds frequently flew within 50 m of the observers in mornings and late evenings. Species not aged or sexed were not included in the analyses (e.g., short-toed eagle [*Circaetus gallicus*], booted eagle [*Hieraaetus pennatus*], osprey [*Pandion haliaetus*]), as were individuals that were not identified to the species level.

A total of 1022098 raptors of 29 species were counted (Yosef 1995). Of these, only 3993 birds were sexed and/or aged (0.4% of total). Most were steppe eagles (3048,

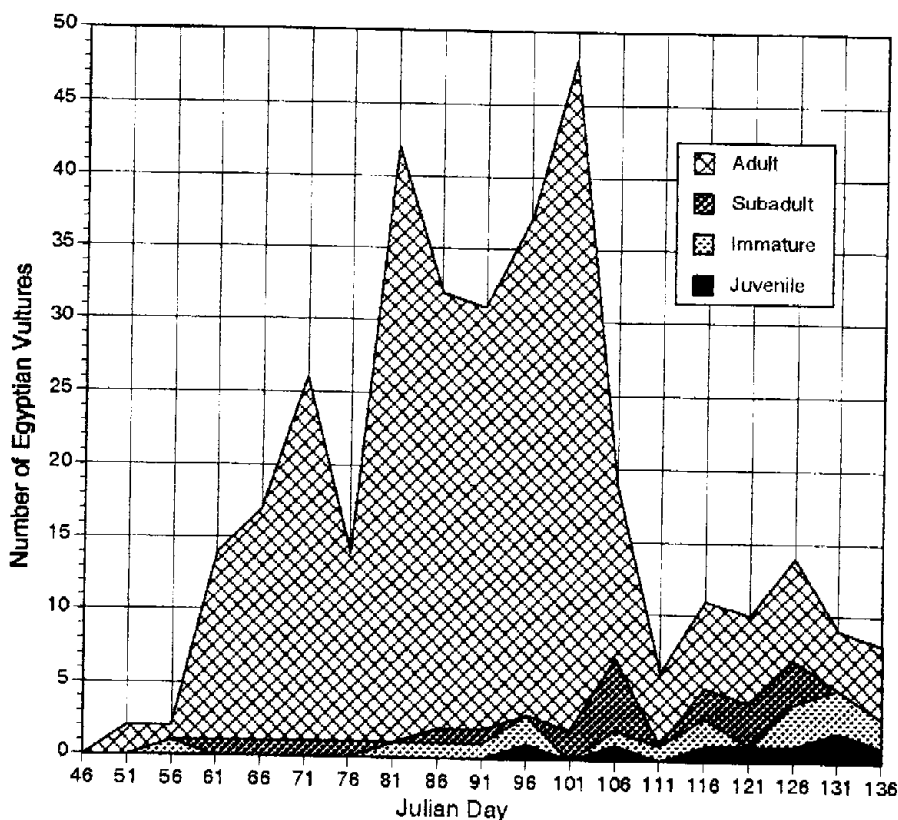


Figure 1. Age classes of migrant Egyptian vultures (*Neophron percnopterus*, $N = 342$) at Eilat in the spring 1994. Data are presented in 5-d periods.

Table 1. Ages and sexes of raptors observed in the spring 1994 at Eilat, Israel. The total observed for each species is given for comparison of percent identified (Yosef 1995).

SPECIES	AGE				SEX	
	JUVENILE	IMMATURE	SUBADULT	ADULT	FEMALE	MALE
Black kite	1			4		
Egyptian vulture	8	18	21	295		
Griffon vulture	1			13	14	14
Marsh harrier					68	19
Pallid harrier					(Juv- 12	3)
Montagu's harrier	1				12	40
Sparrowhawk					3	2
Levant sparrowhawk					12	5
Steppe buzzard		8		188	15	32
Long-legged buzzard		6		15		
Lesser spotted eagle		2		2		
Spotted Eagle				2		
Steppe eagle	243	110	357	2338		
Imperial eagle	28		6	7		
Golden eagle	3		2	2		
Bonelli's eagle	2			8		
Lesser kestrel					5	9
Eurasian kestrel					11	22
Red-footed falcon	1				2	
Hobby				22		
Eleonora's falcon				7		
Sooty falcon				5		
Peregrine falcon				4		
Barbary falcon					1	2

Aquila nipalensis, Egyptian vultures (342, *Neophron percnopterus*), and steppe buzzards (196, *Buteo buteo vulpinus*). Days on which individual raptors or small flocks were observed gave the greatest accuracy in determining sexes and/or ages of migrants. On days when flocks of thousands were counted, only individual raptors that were conspicuous were either aged or sexed. Because migration is species-specific at Eilat with a few species comprising between 65–98% of the birds seen on any given day (Yosef 1995), exceptional species are more conspicuous to the observer (Yosef 1995). In the Eilat region, the two dominant soaring species are the honey buzzard (53.5%, *Permis apivorus*) and steppe buzzard (37.4%). Because they appear in large flocks, the number of individuals successfully aged or sexed was low (0.05%).

Egyptian vultures (342; 82.0%) were identified as either juveniles, immatures, subadults, or adults (Mundy et al. 1992, Table 1). Adults (295, 86.3%) were observed throughout the survey, but the largest numbers were observed between 4 March–17 April. The bulk of the subadults migrated from 6 April–11 May (Fig. 1). Twenty-one (6.1%) were subadults, 18 (5.3%) immatures, and eight (2.3%) juveniles. Shirihi and Christie (1992) also

found that during spring 1985 almost 95% of Egyptian vultures were adults and that nonadults passed mainly in early May. By coalescing data from five separate surveys, Mundy et al. (1992) found that more juvenile/immature (brown) birds fly south to Africa in autumn in comparison to those returning to Europe and Asia in spring. In the 1994 survey, pied birds (adults/subadults) also comprised 95% of the migrating Egyptian vultures indicating that juvenile and immature mortality may be as high as 80% of that age group, or that only a few birds fly back to Europe and Asia while others remain in Africa (Mundy et al. 1992).

Marsh harriers (*Circus aeruginosus*) were observed in small numbers throughout the survey but there were two peaks in the number of harriers passing the observation point between 22 March–10 April and 21–27 April when as many as five harriers/d were observed. Females dominated the migration (68 vs 19) and males were concentrated between 22 March–15 April. During the first peak nine males vs 25 females were observed, but the second peak comprised mostly females (one vs 19). Pallid harriers (*C. macrourus*) were only seen for three wk. Sexes differed in time of migration with males migrating (19

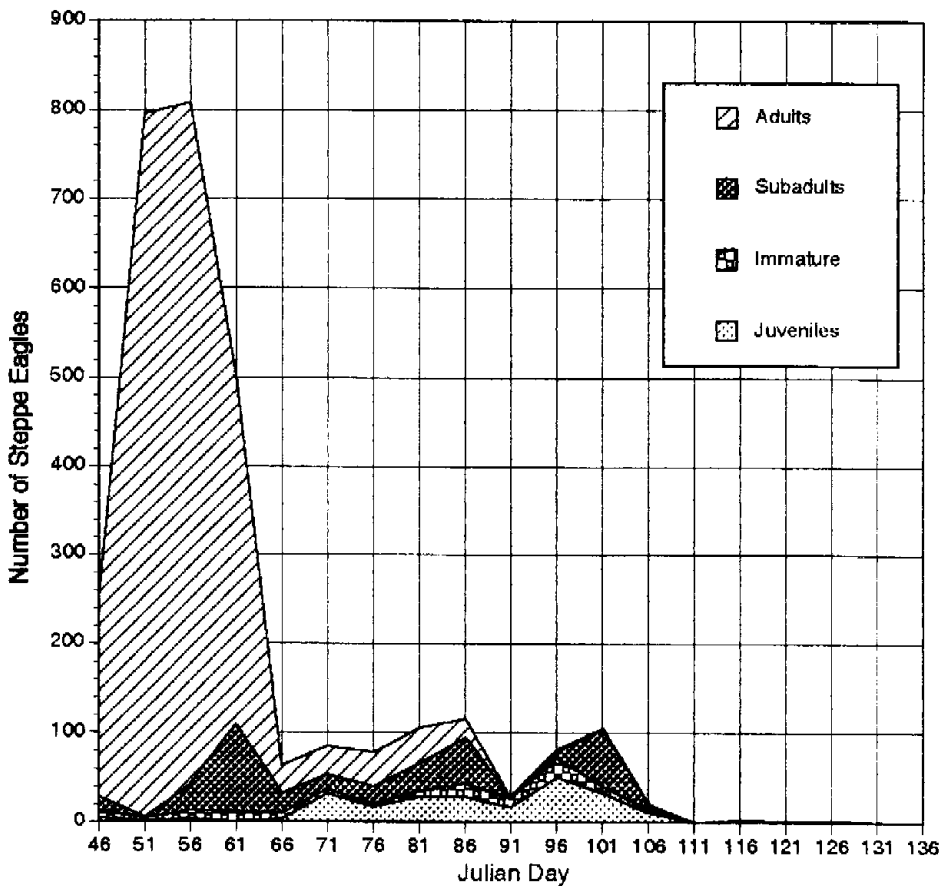


Figure 2. Age classes of migrant steppe eagles (*Aquila nipalensis*, $N = 3048$) at Eilat in the spring 1994. Data are presented in 5-d periods.

March–15 April, median = 26 March) earlier ($t = 4.69$, $df = 11$, $P < 0.0007$) than females (26 March–10 April, median = 31 March). Montagu's harrier (*C. pygargus*) migrated one wk later than pallid harriers from 8–23 April.

Sparrowhawks (*Accipiter nisus*) were solitary migrants and their size and flight at low altitudes made them difficult to identify. Thus, only 17 (13.9%) of 122 seen were sexed. Nevertheless, females dominated the passage (12 vs five).

Levant sparrowhawks (*Accipiter brevipes*) usually passed through the Eilat mountains in large flocks during the hottest hours of the day and were usually very high. If they roosted, they left before first light so they were difficult to sex and age. This problem was further confounded by the fact that recent radar studies indicate that it is possible that levant sparrowhawks are also nocturnal migrants (Stark and Liechti 1993). A total of 32 males and

15 females were identified mostly when they were in flocks of 5–10 birds.

The steppe buzzard was the second-most-numerous species but only 196 (0.05%) were aged (Table 1). All adults on the 1994 survey were identified between 15 February–26 March. This finding concurred with Shirihai and Christie (1992) who contend that adults predominate in the migration up to mid-April, and then the flight is comprised mainly of juveniles.

Long-legged buzzards (*B. rufinus*) migrated in small numbers from late-February to late-April. Numbers, and consequently age ratios, may have been underestimated because of its similarity to the more numerous steppe buzzard (Shirihai and Forsman 1992). The majority identified were adults.

Although the lesser spotted eagle (*A. pomarina*) was seen in small numbers from mid-March to mid-April, of the 65 observed in 1994, only four were aged (two subadults, two adults).

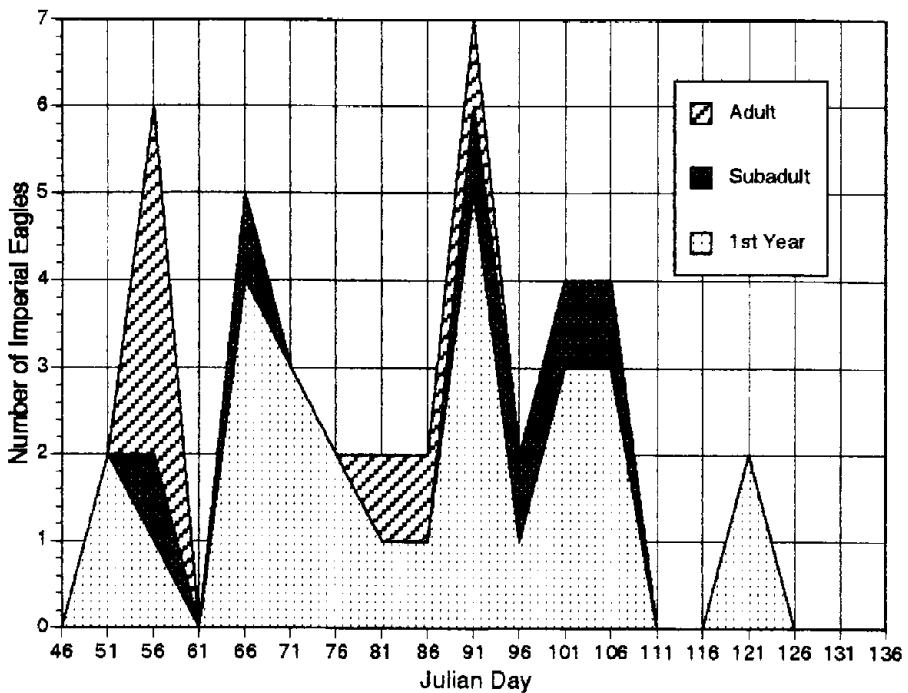


Figure 3. Age classes of migrant imperial eagles (*Aquila heliaca*, $N = 41$) at Eilat in the spring 1994. Data are presented in 5-d periods.

Most adult (2338, 76.7%) steppe eagles migrated by late-March. This concurred with previous surveys which indicated that 60–75% of the steppe eagles migrating through Eilat in spring are of breeding age. Juveniles (1st and 2nd calendar yr) and immature (3rd–5th calendar yr) birds were observed evenly distributed throughout February, March and April (Fig. 2) which differed from Shirihai and Christie (1992) who found that from the end of March and throughout April many immatures pass, while by mid-April the majority are juveniles.

Imperial eagles (*A. heliaca*) migrated throughout the survey. Two peaks previously described (first wave in late-February to mid-March, second wave in early-April, Christensen et al. 1981, Shirihai and Christie 1992) were not evident in 1994 and adults were not predominant. In fact, first-yr birds dominated the migration in general (68%, Fig. 3). Although Shirihai and Christie (1992) implied a decline in numbers between 1977–88 ($r^2 = 0.665$, $N = 6$, $P < 0.048$), this was not substantiated during the 1994 survey ($r^2 = 0.27$, $N = 7$, $P < 0.23$).

Falcons (*Falco* spp.) were spread out over the migration in small numbers. Only 14 (16.9%) lesser kestrel (*Falco naumanni*) were identified and many may have been missed because they migrate mostly along the coast and in open areas. Male kestrels (*F. tinnunculus*) outnumbered females two-to-one. All hobbys (*F. subbuteo*) seen were adults. Many were probably missed owing to their

low, dodging flight in the canyons below the observation posts. All seven Eleonora's falcons (*F. eleonora*) and five sooty falcons (*F. concolor*) seen were also adults. Of the four peregrine falcons (*F. peregrinus*) seen, one was a juvenile and the other three adults. Of the four Barbary falcons (*F. peregrinoides*) observed, one was a female and the other two males.

Differences between this study and prior surveys in the ages and sexes of migrants observed is indicative of the need to be cautious of using the results obtained from raptor migration surveys. A good example of the potential for error is the very low number of adult imperial eagles observed during this survey compared to 1992 results. It is possible that the majority of the adult population followed routes further north of Eilat, or might even have wintered north of Eilat (western Negev desert and Hula Valley). This study stresses the importance of surveys that identify age and sex of migrant raptors.

RESUMEN.—Varios conteos de rapaces en migración han sido realizados en primavera y verano en Eilat, extremo norte del brazo este del Mar Rojo. Los estudios iniciales no indicaban sexo y/o clases de edad de las rapaces observadas. Durante 92 días de observación, registramos un total de 1022098 individuos de 29 especies de rapaces. De ellos, 3993 individuos fueron sexados y/o clasificados por edad (0.4% del total). La mayoría (3049) correspon-

dió a *Aquila nipalensis*, 342 a *Neophron percnopterus* y 196 a *Buteo buteo vulpinus*. Aquellos días en los que se registraron aves individuales o pequeñas bandadas, fueron los mejores para determinar sexo y/o edad. Este trabajo enfatiza la importancia de los estudios migracionales que identifican sexo y determinan edad de las especies cuando es posible. Información de este tipo es necesaria para obtener estimaciones gruesas de poblaciones continentales de rapaces.

[Traducción de Ivan Lazo]

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