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Observations on migratory Turkey Vultures and Lesser Yellow-headed Vultures in northern Colombia

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Turkey Vultures (*Cathartes aura*) breed from southern Canada to Tierra del Fuego, while Lesser Yellow-headed Vultures (*Cathartes burrovianus*) occur from México through Central America to northern Argentina and Uruguay (Meyer de Schauensee 1966). It has long been known that Turkey Vultures breeding in the northern parts of their range are migratory, and data are available on their arrival at or departure from their breeding grounds in spring or fall (Bent 1937). Likewise, parts of their migration routes and winter ranges in Central America are well documented (Chapman 1933, Wetmore 1965, Smith 1980). Migrating Turkey Vultures were observed in northwestern Colombia by Dugand (1947), Haffer (1959), and Olivares (1959), but there are no data on their abundance or ecology. Because seasonal changes in their abundance in Panamá have been observed, it is believed that the northern Lesser Yellow-headed Vultures are also migratory (Ridgley 1976).

A tight flock of at least 150 soaring Turkey Vultures was observed on 14 October 1978, some 16 km to the east of the town of Barranquilla, Colombia. Such an unusually large number suggested migrating birds. A closer view confirmed this; none of the vultures showed the whitish or dull yellow bands across the backs of their necks that characterize the resident race, *Cathartes aura ruficollis*. Although similar in general appearance and size to the Turkey Vulture,

some birds of the flock had conspicuous orange-yellowish heads and dirty-whitish wing patches that identified them as Lesser Yellow-headed Vultures. The results presented here are based mainly on observations and line-transect counts made along the Caribbean coast between the ports of Barranquilla and Santa Marta in northern Colombia. They give a first account of the magnitude and ecological aspects of vulture migrations in South America.

Counts of vultures were made by driving along the Troncal del Caribe highway between Puente de la Barra, near the town of Cienaga, and Los Cocos, near the port of Barranquilla on the Magdalena River. This area includes most of Isla de Salamanca National Park. A detailed description of this region, including a portrayal of its flora and fauna, is found in Franky and Rodriguez (1976). Visibility along most of the highway was not impaired by vegetation, so nearly all roosting or soaring vultures could be counted within a broad corridor of up to more than 500 m on each side of the highway. Twenty-eight line transects, each covering a distance of 44 km, were made between 1000 and 1500 from 17 October 1978 to 17 January 1980. One person drove, holding the speed at a constant 70 km, while a second person, using a hand-operated counter, counted vultures with the naked eye. Due to similarities in their plumage coloration and silhouettes, Turkey Vultures and Lesser Yellow-headed Vultures, when soaring or roosting, were difficult to separate at a distance. Separate counts for resident Turkey Vultures and the race of migrating Turkey Vultures were even more difficult.

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TABLE 1. Date, relative abundance, and average number of vultures (*C. aura* and *C. burrovianus*) observed per line-transect count from 17 October 1978 to 17 January 1980.

Date	Number of individuals	Total/month	Number of counts	\bar{x} individuals
17 Oct 1978	132			
20 Oct 1978	137	353	3	117.7
23 Oct 1979	84			
3 Nov 1978	210			
4 Nov 1978	162	741	4	185.3
15 Nov 1978	117			
26 Nov 1978	252			
7 Dec 1978	154			
14 Dec 1978	165	458	3	152.7
21 Dec 1978	139			
8 Jan 1979	174			
17 Jan 1980	92	266	2	133.0
16 Feb 1979	47			
22 Feb 1979	100	147	2	73.5
16 Mar 1979	39	39	1	39.0
24 Apr 1979	27	27	1	27.0
4 May 1979	19			
15 May 1979	16	35	2	17.5
3 Jun 1979	19	19	1	19.0
12 Jul 1979	24			
20 Jul 1979	21	45	2	22.5
2 Aug 1979	8			
5 Aug 1979	19	66	4	16.5
14 Aug 1979	24			
20 Aug 1979	15			
4 Sep 1979	83			
18 Sep 1979	72	223	3	74.3
26 Sep 1979	68			

The characteristic yellowish nape of resident birds was visible only at close range and when birds were sitting or flying low. Because of these uncertainties, line-transect counts of resident and migrant Turkey Vultures and Lesser Yellow-headed Vultures made throughout the study were lumped into the single category of *Cathartes* vultures. The only other vulture of this genus, the Greater Yellow-head (*C. melambrotus*), is an Amazonian bird whose occurrence in the study area is highly unlikely.

The abundance of vultures varied seasonally, in accordance with the general migration pattern for nearctic migratory bird species (Table 1, Fig. 1). Thus, it is almost certain that flocks of Turkey Vultures observed along the Colombian Caribbean coast during the northern fall, winter, and spring seasons were migrating or wintering birds. In addition, Lesser Yellow-headed Vultures were observed in the study area in greater numbers during the migration period, often mixed in with the flocks of Turkey Vultures. Roughly, 1 Lesser Yellow-headed Vulture to every 5-10 Turkey Vultures was seen during the mi-

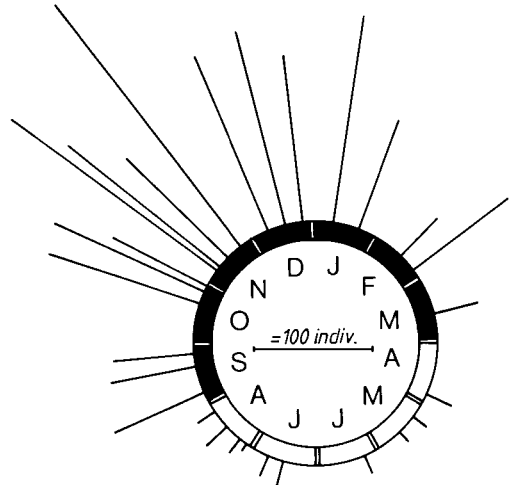


Fig. 1. Yearly distribution of relative abundances of *Cathartes* vultures in the study area, by months (J = January), from 28 line-transect counts 17 October 1978 to 17 January 1980). Black areas indicate migration period.

gration period, compared to a smaller proportion during the rest of the year. Therefore, it appears likely that migratory populations of *C. burrovianus* also wintered in the area.

Blake (1977 and pers. comm.) identifies migrating Turkey Vultures in Colombia, including the Santa Marta region, as belonging to the race *C. aura meridionalis*. Indeed, based on the known ranges of the races that could be possible migrants to the study area and on the measurements of a female specimen collected on 7 January 1979, the Turkey Vultures reported here as wintering birds may well have belonged to this race rather than to *C. aura septentrionalis*, as was assumed by Meyer de Schauensee (1964). The specimen, collected at Pozos Colorados, Santa Marta, was catalogued under Nr. IND-A-3186 at the collection of the Laboratorio de Investigacion de Fauna Silvestre, Div. de Fauna Terrestre, INDERENA, Bogota, D.E., Colombia. It measures as follows: wing length (flattened), 535 mm; tail length, 270 mm; tarsus, 63.5 mm; culmen (from cere), 24.5 mm; body weight, 1,420 g; ovary small, in nonreproductive state. The nominate race, *C. aura aura*, so far reported as a winter migrant only as far south as Panamá, and *C. aura jota*, essentially a highland bird not reported north of central Colombia, can both probably be ruled out as being involved in these migrations (Blake pers. comm.). With respect to the Lesser Yellow-headed Vultures that were observed to winter together with the Turkey Vultures, it seems reasonable to assign them to the nominate race *C. burrovianus burrovianus*, which ranges from southern México to Colombia. Previous records in northern

TABLE 2. Densities (individuals/km) of *Cathartes* vultures in the study area; 28 line-transect counts along 44 km of coast line each for a total of 1,232 km; 2,419 vultures counted.

Period	Number of counts	km	Number of individuals	Density
Migration	18	792	2,227	2.8
Nonmigration	10	440	192	0.4
Totals	28	1,232	2,419	($\bar{x} = 1.6$)

South America for the larger *C. burrovianus urubutanga* include only April through October, suggesting migration from its southern range (Blake 1977). On 10 January 1979 a specimen soaring with a flock of five wintering Turkey Vultures was shot at the same place where the Turkey Vulture described above had previously been collected. It measured as follows: wing length (flattened), 495 mm; tail length, 255 mm; tarsus, 58.0 mm; culmen (from cere), 23.6 mm; body weight, 1,200 g; sex undetermined. Preservation of this specimen was not possible.

If the data from the line transects are subdivided into numbers of *Cathartes* vultures seen during the migration and nonmigration periods (according to the presence or absence of groups of 10 or more Turkey Vultures that soared or roosted together without obvious presence of food: black areas in Fig. 1), then the relative abundance of vultures observed during the migration period from September to March ($\bar{x} = 123.7$ individuals per transect count) was significantly higher than during the nonmigration period from April to August ($\bar{x} = 19.2$ individuals per transect count): $t = 8.00 > 2.86 = t_{19}$; $P \leq 0.01$. The density of *Cathartes* vultures, expressed as the number of individuals per kilometer of line transect, was seven times higher (2.8 individuals/km) during the migration period than during the nonmigration period (0.4 individuals/km) (Table 2).

According to Smith (1980), migrating Turkey Vultures in Panamá tend to abstain from food. In this study, however, Turkey Vultures that had arrived in great numbers were frequently observed feeding. Therefore, it may be inferred that they accepted this area as their winter home and did not extend their migration farther to the south. For several days after their arrival, flocks of 100 and more individuals were observed soaring and roosting jointly. Thereafter, these large flocks dissolved into smaller groups or single individuals. Especially when roosting in groups, wintering vultures took flight readily at the approach of an observer even when he was still 100–200 m away, while Turkey Vultures flushed during the nonmigration period, i.e. resident birds, usually took flight when an observer was at a distance

of only 30–50 m. During the first observations in October 1978, the flocks of migrants roused in this way had a rather spectacular effect upon the local Black Vultures (*Coragyps atratus*). Soon after the first Turkey Vultures had begun to soar above their roosting place, Black Vultures came in from all sides. The speed of their flight and the way they flew in on a straight line to wheel about in the cloud of roused migrants suggested that they came to find carrion. On such an occasion on 17 October, several groups of two and three King Vultures (*Sarcoramphus papa*), almost never seen in this coastal area, were observed flying high above. Previous observations of the behavior of King, Black, and Turkey vultures feeding on carrion have shown (Koester and Koester-Stoewesand 1978) that Turkey Vultures in northern Colombia invariably are the first to appear at the carcass, attracting through their presence Black Vultures that in turn may lure King Vultures to the site. It seems possible, therefore, that the latter two species misinterpreted the unusually large flock of soaring migrants as an indication of the presence of food.

It seems generally accepted that migrants in the tropics harvest superabundant and/or sporadically available resources and are usually subordinate to the resident species (Karr 1976). This may apply only in part at the subspecies level, when one considers wintering versus resident Turkey Vultures. Although no detailed data on this subject were gathered, the amount of what appeared to be suitable food for the local Turkey Vultures did not seem to be more abundant during the wintering period compared to the rest of the year. Thus, if a relatively constant availability of food permitted a relatively stable population of *C. aura ruficollis* to exist in the study area, the presence of additional Turkey Vultures, *C. aura meridionalis*, with presumably similar feeding habits during the northern winter, should have resulted in a general food shortage and competition between these two races. Indeed, resident Turkey Vultures were never observed to share a carcass with their wintering conspecifics, which appeared to be more powerful flyers and generally stronger birds. In a remarkable contrast to the residents, migrants seemed to cope easily with the aggressive feeding behavior of the Black Vultures. This was observed on 15 November 1978, when eight migrants and two Black Vultures fed on the carcass of a dog near the village of Tasajeras, Isla de Salamanca.

During the migration period, resident Turkey Vultures were more numerous in certain locations in which they had not been as frequently encountered during the rest of the year. At times, in Tayrona National Park to the east of Santa Marta, for example, the number of *C. aura ruficollis* nearly equaled the numbers of the common Black Vultures. It may be inferred from this that the wintering race displaced a certain percentage of the resident race to other habitats. Bent (1937) wrote that Turkey Vultures are ef-

fective in cleaning streets, garbage piles, and dump heaps in cities and are often seen feeding on the main highways in Florida where snakes, turtles, and small mammals have been killed by passing automobiles or where fish have been thrown away by fishermen. It is noteworthy that, in contrast to this statement, resident Turkey Vultures were virtually never seen feeding on garbage heaps and strictly avoided towns and cities where Black Vultures are abundant. But, like Turkey Vultures in Florida, *C. aura ruficollis* feeds on road kills and smaller carcasses along the highway in the study area. Compared to residents, therefore, wintering Turkey Vultures appeared to exploit a wider spectrum of food, as they were observed feeding on garbage near Cienaga as well as on road kills.

Seven times as many *Cathartes* vultures existed in the study area during the migration period as during the rest of the year (Table 2). Perhaps the exploitation of a wider range of food sources, comprising those fed upon by the local Turkey Vultures as well as those used by the local Black Vultures, enables wintering Turkey Vultures to coexist with both the resident race and the Black Vultures successfully. No such observations were possible in the case of the Lesser Yellow-headed Vultures. Throughout the year they were seen more frequently in the wetlands and mangrove swamps south and north of the Troncal del Caribe highway, where the majority of the birds believed to be wintering were observed.

The breeding seasons of the Black Vultures and Lesser Yellow-headed Vultures in the study area partly coincide with the migration period of Turkey and Lesser Yellow-headed vultures from the north. While more detailed information on season and breeding biology of the Black Vulture in the area is available (Koester and Koester-Stoewesand in press), our present knowledge of the breeding season of the Lesser Yellow-headed Vulture is limited to a single observation of an adult accompanied by two recently fledged young on 11 May 1979 in the mangrove swamps south of the Cienaga Grande de Santa Marta, known as the natural reserve area El Santuario. Nothing so far is known of the annual cycle of the resident Turkey Vultures and how their cycles might compare with those of the migrants. According to Smith (1980), however, Turkey Vultures in Panamá commence egg laying in February through early April. A similar timing of the breeding season for *C. aura ruficollis* in the study area is likely. Thus, during the northern winter, Turkey Vultures along the northern coast of Colombia are likely to be separated into breeding resident and nonbreeding wintering races.

A more extended ecological study of the relation of the migratory vultures with the residents treated herein and the resulting inter- and intraspecific competition for food and its possible effects on the breeding success of the residents should be of par-

ticular interest. Because vultures are large, conspicuous birds whose feeding habits can be studied without too much difficulty, studies of their behavior and ecology could contribute substantially to our present knowledge of the ecology of bird migration.

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