Migrational movements of Blue Jays west of the 100th meridian

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Introduction

Since the start of the bird-banding program in North America, the movements of Blue Jays *(Cyanocitta cristata)* have been of great interest. The first report of bird-banding recoveries by the Biological Survey (Lincoln 1924) listed 38 Blue Jay returns, all from the same station at which they were banded. The second Biological Survey report (Lincoln 1927) listed 11 Blue Jays recovered at places removed from the original banding station, although 219 of the 230 reports still were returns at the original station. Seven of these 11 recoveries were within the same state as the original banding station, with the 4 others all showing southward movements during fall. Two of these recoveries constituted movements of over 667 km. Over the next 15 years, many long-distance movements by banded Blue Jays were reported (e.g., Whittle 1928, Anon. 1929, Roberts 1936, Stoner 1936), as were sightings of large mass movements or migrations of Blue Jays (e.g., Sherman 1931, Tyrrell 1934, Cottam 1937, Broun 1941, Lewis 1942).

In the first summary of Blue Jay banding data, Gill (1941) demonstrated that Blue Jays migrate southwestward in fall and northeastward in spring in eastern United States (see also Middleton 1974). More interestingly, from an analysis of local recoveries and 272 reported returns, Gill suggested that Blue Jays become sedentary with advancing age. Earlier, Forbush (1927) had suggested that 2 populations of Blue Jays existed in New England — one migratory and the other sedentary. Laskey (1958) added more fuel to the fire by showing that individual Blue Jays may be migratory one year, sedentary the next, and then migratory again. Wenger (1975), having analyzed all the Blue Jay banding returns through 1971, proposed a solution that explained most of the above observations. He found no age difference in migratory behavior (cf. Hardy 1961, Johnston 1964), with only a small percentage of Blue Jays being either migratory or truly sedentary. Rather, he suggests that the majority of Blue Jays are sedentary, but will migrate if environmental conditions deteriorate. For example, a food shortage (e.g., acorn mast failure) was suggested as the reason for two great mass movements — in fall of 1939 when 7350 Blue Jays passed Hawk Mountain, Pennsylvania, in 16 days in late September (Broun 1941), and in fall of 1962 when Blue Jays invaded Massachusetts (Nunneley 1964).

While investigating the range extension of Blue Jays into western North America (Smith 1978), I found that the breeding range was slowly moving westward, whereas the number of winter sightings in the Pacific Northwest was increasing dramatically. I was puzzled by the lack of winter sightings in the Intermountain region, and decided to analyze the banding recoveries west of the 100th meridian to determine what pattern might emerge. Here, I present that analysis, which strongly suggests that most Blue Jay sightings in the Pacific Northwest are individuals originating in western Canada rather than birds crossing the Rockies from central United States.

Results

A total of 1496 records of Blue Jays banded west of the 100th meridian were supplied from the Bird Banding Laboratory (Table 1). Of these, 168 (11%) had been recovered at least once. Most represent local returns inasmuch as 133 (79%) had been recovered within the same latitude-longitude block as the original banding station. Nineteen (11%) were recoveries in the same state (i.e., banding region) and only 16 (10%) were recovered in other banding regions. Most recoveries occurred within 5 years of banding (Fig. 1), a pattern quite similar to that reported by Laskey (1958). Eleven recoveries were made east of the 100th meridian, all being recovered south of the original banding site. Only 2 recoveries of Blue Jays banded east of the 100th meridian have been made west of the 100th meridian. One was banded in Iowa in January and recovered in Saskatchewan in October of the same year; the other was banded in Minnesota in December and recovered in Manitoba 5 months later.

A computer program (Zar and Southern 1977) was used to determine distance and direction of the 35

Table 1. Analysis by banding region of Blue Jays banded west of the 100th meridian.

Region	Year of last banding record	Total no. banded	No. recovered from banded	No. recovered same Lat-Long	No. recovered same region	No. recovered different region
Kansas	1972	25	0	0	0	0
Nebraska	1969	737	108	91	7	10
South Dakota	1975	197	12	9	1	2
North Dakota	1968	37	5	3	0	2
Saskatchewan	1971	34	9	9	0	0
Colorado	1975	392	27	16	9	2
Wyoming	1973	4	0	0	0	0
Alberta	1975	69	7	5	2	0
Utah	1977	1	0	0	0	0
Total		1496	168	133	19	16

recoveries that were outside of the latitude-longitude block of the original banding station. The 25 Blue Jays that were recovered at least 50 km from the original station showed a marked tendency to move southeastward in winter (Table 2 A) and northwestward in summer (Table 2 B), although 4 individuals wintered much farther north than they had done during a previous winter (Table 2 C). The 12 Blue Jays recovered within 50 km of the banding site were usually captured in the same season as banded and no pattern seems evident. Three of the recoveries were greater than 1200 km from the banding site, and birds recovered at least 50 km from the original banding site had an average recovery distance of 462 km (see Table 2).

The following conclusions can be drawn from these data: 1) although most Blue Jays are recaptured near the site of banding, long-distance movements are possible; 2) individuals that do migrate move southeastward in winter and northwestward in summer; 3) some birds that migrate one winter do not migrate in subsequent winters (i.e., remain nearer the breeding grounds). It appears that movements in the western part of the Blue Jay's range differ little from movements in the eastern part.

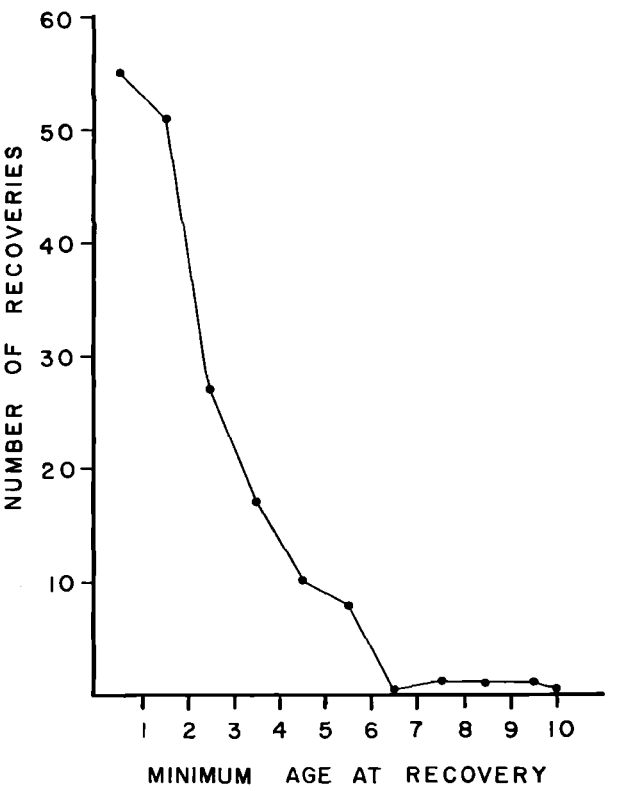

Figure 1. All the recoveries and returns of Blue Jays banded west of the 100th meridian showing the recoveries as a function of the number of years after banding.

Discussion

Bellrose (1972) suggested that the diurnally migrating Blue Jay has a "primative" sun-compass (cf. Wiltschko and Wiltschko 1978) and can tell only north and south directions. This study and the others mentioned earlier support the contention that almost all Blue Jay movements are in a north-south direction. Therefore, wintering Blue Jays in the Pacific Northwest almost surely are originating in western Canada inasmuch as Blue Jays commonly occur as far west as central Alberta (see Smith 1978, Fig. 1). No data exist to suggest that Blue Jays move in an east-west direction, negating the possibility that Blue Jays are arriving in the Northwest from the Midwest.

Another fact that supports the Canadian origin is that several authors (e.g., Groh 1958, Schorger 1962, Bellrose 1972) have suggested that Blue Jays use the same flyways year after year and rely heavily on landmarks such as rivers. As early as 1897, Mead reported Blue Jays following the Arkansas River southeastward during fall migration through Wichita, Kansas. Undoubtedly, the directions of movements found in my analysis are caused by Blue Jays following the Mississippi River drainage. Hence, Blue Jays from western Canada could easi-

Table 2. Blue Jays recovered at least 50 km from banding site analyzed by season.

A. Birds recovered in another season south of banding location.
B. Birds recovered in another season north of banding location.
C. Birds wintering north of original fall or winter banding site.

	Season[1] banded	Season recovered	Sample size	Mean direction (°)	Mean distance (km)
A.	Fall	Fall[2]	1		
		Winter	3 } 5	148	607
		Spring	1		
	Summer	Winter	1		
		Spring	4 } 6	177	346
		Fall	1		
	Spring	Winter	4	149	516
B.	Winter	Fall	1		
			} 2	325	1094
		Spring	1		
	Spring	Summer	1	36	138
	Fall	Summer	1	271	153
C.	Winter	Winter	2	330	699
	Fall	Winter	2	333	1041

[1]Winter—Nov.-Mar; Spring—Apr.-May; Summer—Jun.-Aug.; Fall—Sept.-Oct.
[2]Same individual, recovered two weeks after banding.

ly be following the Columbia River (see Fitzner and Woodley 1976) or the Snake River; winter concentrations of Blue Jays have occurred in southeastern and central Washington and more recently in southwestern Idaho (Smith 1978).

During the winter of 1976-77, a great influx of Blue Jays occurred in the western United States (Smith 1978) and a perusal of the reports in *American Birds* since that time shows that Blue Jay reports are still common in winter. Weber (1977) concluded that the Blue Jay invasion of Washington during 1976-77 probably was of Canadian origin, based upon similar reasoning to that which I have presented in this report. However, confirmation of the Canadian origin of western Blue Jays will have to await a banding recovery or return showing the actual migration route involved.

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First host record of *Collyriclum faba* for the Barn Swallow

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While conducting a study of the breeding biology of the Barn Swallow *(Hirundo rustica)* near Cohoctah, Livingston Co., Michigan, I captured an adult female (banded #850-45131) during banding operations on 23 July 1974. During examination I found an unusual cluster of cysts directly below the brood patch and above the vent; otherwise, the bird appeared normal and healthy. After being held briefly for photographs of the abnormal growth, the bird was released.

A slide of the cyst sent to W.C. Johnson at Michigan State University was subsequently identified as that of the vent fluke *Collyriclum faba*. This is the first reported host record of this trematode in the Barn Swallow (Johnson, pers. comm.).

A recent report of a Michigan host record for the Eastern Bluebird *(Sialia sialis)* by Pinkowski (*Jack-Pine Warbler*, 54:41, 1976) supports the suggestion that the parasite is found sporadically in a few individuals of a population. About 300 adult and young swallows have been banded at this colony over a three-year period with only this one occurrence of vent fluke parasitism.

It is possible for a small number of swallows to pick up both intermediate hosts of the vent fluke during the breeding season. Snails, the first intermediate hosts, are probably contacted during efforts to obtain mud for nest construction. Insects normally act as secondary intermediate hosts, with contact made during normal aerial foraging. These sources of possible contact are mentioned by both Kiber (*EBBA News*, 31:257-262, 1968) and Beal (Food Habits of the Swallows, a family of valuable native birds. USDA Bull. 619, 1918). The investigation of 467 stomachs by Beal (op. cit.) showed that snails are taken occasionally and that dragonflies *(Odonata: Anisoptera)* make up 4% of the total diet.

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