we record here seems a variant of the first category in which the females were unusually tolerant of each other or were so evenly matched that neither could take over the box.

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RED BANDS AND RED-WINGED BLACKBIRDS[1]

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Key words: Red-winged Blackbird; color bands; mate choice; color preferences; reproductive success.

Burley (1981, 1985, 1986a, 1986b) has presented evidence that in monogamous estrildid finches colored leg bands can influence individual mate choice, reproductive success, and mortality. Most strikingly, male Zebra Finches (*Poephila guttata*) with red bands, attractive to females, fledged on average about twice as many offspring as males with bands of relatively "unattractive" colors, and they also lived longer. If such preferences by females for particular leg-band colors are widespread, interpretations of many aspects of the behavior and breeding of color-banded individuals could be affected. Therefore, data on different species with varying breeding biologies are needed to evaluate the generality of color-band preferences and their potential effects. Here we present an analysis of the effects of red color bands on male mortality and reproductive success in a color-banded population of polygynously breeding Red-winged Blackbirds (*Agelaius phoeniceus*) studied from 1977 through 1987. Red is probably an important color signal of male redwings (Smith 1972, Røskaft and Rohwer 1987; see also Burley 1986a). Our particular concern was whether red bands we used in our population studies influenced mate choice and breeding success. Burley (1986b) found that male finches also had color-band preferences for females, but because male redwings did not choose among females that arrived on their territories, we tested only for effects of male color bands.

Redwing breeding biology at our study site, the Columbia National Wildlife Refuge in Washington State, was described by Orians and Christman (1968) and Orians (1980). Males were present throughout the year. Females arrived in March and April to settle on male territories. Nesting began in early April and continued through June. We monitored breeding success for 65 to 85 territorial males each year (Beletsky and Orians 1987). Adult males were jet black with bright red epaulets and black legs. The red epaulet feathers were often covered but were exposed and erected during sexual and agonistic displays (Orians and Christman 1968). A narrow yellow or buff band bordered the epaulets, but was inconspicuous during these displays.

Plastic bands were used in 1977 but #2 anodized aluminum bands were used in all subsequent years. Color combinations were made up of different numbers of red, blue, yellow, and aluminum-colored bands (combinations used in 1977 also included green, white, and purple bands). Black bands were not used because they could not be seen against the birds' legs. Males had from one to three bands placed on each leg. Most males carried four to six bands (mode = 5). A U.S. Fish and Wildlife Service numbered band was part of each combination. No combinations consisted entirely of red bands. Band combinations were generated before each breeding season and given sequentially to new adult males as they were captured in the various parts of the study area. Thus, combinations were not associated with specific age, kinship, territorial status, or location groups. Most males received color bands at the start of their first breeding (territory-owning) sea-

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TABLE 1. Within-year breeding success and number of breeding years of male Red-winged Blackbirds with and without red color bands, Columbia National Wildlife Refuge, 1977–1987.

	Males with		t	Two-tailed P
	At least one red band (n)	No red bands (n)		
I. Annual reproductive success				
All breeding years (n = 791):				
Harem size ($\bar{x}$ ± SD)	4.1 ± 2.4 (560)	4.1 ± 2.4 (231)	−0.01	0.99
Young fledged ($\bar{x}$ ± SD)	5.2 ± 6.1 (560)	5.3 ± 6.0 (231)	0.35	0.72
First breeding years only (n = 370):				
Harem size	3.6 ± 2.2 (251)	3.7 ± 2.4 (119)	0.67	0.50
Young fledged	4.2 ± 5.5 (251)	4.4 ± 5.4 (119)	0.33	0.75
II. Average number of years breeding (males that started breeding between 1978 and 1986, n = 269)				
	2.2 ± 1.4 (193)	2.0 ± 1.2 (76)	−1.11	0.27

son, but some were color-banded 1 or 2 years previously, as adult floaters (Beletsky and Orians, unpubl.).

Males in the study area bred for an average of 2 years (range = 1–11 years; Orians and Beletsky, 1989). About 55% of males, on average, returned to breed each year. Most males wore the same band combination throughout their breeding years. However, a few males had their color combinations changed. These males were credited with having red bands only in the years they actually wore them. Anodized bands, which faded after 6 or 7 years, were replaced with new ones of the same colors when appropriate.

In our analysis of reproductive success, harem size was the total number of females that built nests on a male's territory during one breeding season. The number of young fledged was the total number fledged from all nests located on a male's territory. For the entire data set, average annual harem sizes and number of young fledged were the same for males that had red bands in their color combinations and for those that wore only bands of other colors (Table 1). Because individual males contributed varying numbers of breeding years to the data set, and because female redwings expressed a good degree of between-year site fidelity (Picman 1981; Beletsky and Orians, unpubl.) that could mask the effects of subtle color-band preferences, we also compared reproductive success for males in the two color groups during their first breeding years. Again, there was no statistical difference in these two measures of success for males with and without red bands (Table 1). Thus, wearing a combination with red bands or one with only blue, yellow, and/or aluminum-color did not measurably affect reproductive success. Also, whether or not a male carried at least one red band did not affect the number of years in which he bred (Table 1). Because all males were banded, we could not assess any potential effects of the bands themselves.

We could not yet conclude that female redwings did not have a preference for red bands because our data did not allow us to test female preferences directly. However, if females prefer red bands, then the success of males at attracting females and reproducing may be positively correlated with the number of red bands they wear. We correlated the number of red bands males carried (range = 0–4) with their harem sizes and fledging success, both for the entire sample (harem sizes: Spearman's r = 0.03, P = 0.23, n = 733 randomly selected cases from a total sample of 791 [random selection by computer statistical program due to the large sample]; fledging success: r = 0.01, P = 0.39, n = 733) and for first breeding years (harem sizes: Spearman's r = − 0.03, P = 0.28, n = 370; fledging success: r = −0.03, P = 0.31, n = 370). There was no significant association between number of red bands and breeding success, strongly suggesting that females lacked preferences for males with red bands. This finding was consistent with the results of many previous studies of this species, which demonstrated that females choosing breeding sites evaluate territory quality much more strongly than male quality (Searcy 1979, Searcy and Yasukawa 1983). Among species in which males, rather than the resources they control, are the primary basis of mate choice, band colors may be more influential.

The important practical conclusion from the present analysis is that it is unnecessary to avoid using combinations of colored leg bands that include red in studies of redwings under "natural" conditions. (Furthermore, as Burley [1985] points out, giving most birds combinations of potentially attractive and unattractive colors could "cancel" color preferences). It is therefore unnecessary for us to modify any previously published results of our study or to take band combinations into account in future analyses. The generality of these conclusions, however, remains to be determined.

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A REASSESSMENT OF THE FIRST NESTING RECORD OF THE PEREGRINE FALCON IN ECUADOR[1]

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Key words: *Peregrine Falcon;* Falco peregrinus; *Ecuador; first breeding record.*

Although the Peregrine Falcon (*Falco peregrinus*) was known to nest in parts of South America, generally shown on maps to be south of 30°S (Cade 1982), it was not until 1981 (Jenny et al. 1981) that the first breeding was reportedly documented for Ecuador. The peregrine is now known to have a wide breeding distribution in South America (McNutt et al. 1988). The pair reported by Jenny et al. (1981) nested near the equator at Guayllabamba in a dry mountain valley some 30 km NW of Quito and was presumably near the northern extreme of the South American breeding range. Hilgert (1988) later studied that nesting site in some detail because it seemed to still be the only confirmed breeding pair in Ecuador. S. A. Temple (pers. comm.), however, saw peregrines during the breeding season in other dry mountain valleys of Ecuador considerably south of Quito. Temple's description of them suggests that they were not North American breeders on their nonbreeding sojourn in South America but were resident South American birds. In this note I assess: (1) the first actual documented breeding peregrine record for Ecuador (nestlings collected) that occurred a century ago, (2) the first scientific reporting of those nestlings that occurred over 75 years ago, and (3) a subsequent comment discrediting that record some 40 years ago. Lastly, I provide a brief analysis of the aforementioned nestlings with pertinent comments.

In December 1877 (no day given) Clarence Buckley collected two nestling peregrines (by size appearing to be one male and one female; British Museum [Natural History] Nos. 87.5.1.801 and 802) at a location he called Yanayacu (or Yauayaca), Ecuador. The age of the nestlings (ca. 4 weeks old, rectrices ca. 59 mm out of sheaths) suggested that they were still in the eyrie or at most along the cliff (? presumably a cliff eyrie) near the eyrie. The location of Yanayacu cannot be precisely placed since it is a common Quichua name meaning "black river," which is used for a river, canyon, or farm (Paynter and Traylor 1977). According to a local Ecuadorian (Eduardo Uzcátegui, pers. comm.) "Yanayacu" is an Indian name used only on locations in the highlands of Ecuador and accordingly would not be a location in the extensive Oriente region or western coastal regions. There is, however, a small river in the highlands called Rio "Yanayacu" that enters Rio Cutuchi near San Miguel de Salcedo (E. Uzcátegui, pers. comm.). The Rio Cutuchi enters Rio Patate that in

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