

ECOTYPIC VARIATION IN FEEDING HABITS OF DICKCISSELS
ON THEIR WINTERING GROUNDS

Stephen Fretwell & Tom Shane

In the winter of 1970, we traveled to Venezuela and Colombia, South America to study Dickcissels on their wintering grounds. We had the hypothesis that Dickcissels were limited by the food available in winter, and were looking for evidence that the individuals are food stressed and competing for food. One of the tests that we hoped to use depended on a theory that we were developing known as the theory of ecotypic variation. This theory said that populations of competing individuals would tend to evolve in such a way that different individuals would come to specialize on different foods, so that they could minimize competition. Thus, if the Dickcissel population were limited by seeds, and if there were two types of seeds available, some individuals would tend to eat only one type of seed, while other individuals would tend to eat only the other. And, the individuals eating the first type of seed would be different (bigger or smaller, adapted to foraging on the ground or while perched; etc.) compared to those eating the second type of seed. This assumes that the seeds are so different that the same kind of bird cannot eat both as efficiently as it can eat just one.

While in South America Dickcissels are erratic birds. Very much like the blackbirds, cowbirds, and grackles in this country, they travel about in enormous flocks, roost in large communal gatherings, and invade crop fields with a frequency and devastation terribly dismaying to the Venezuelan and Colombian farmers. They show up at any one place at irregular intervals, stay a short time, and then move on, only to return (or be replaced) a bit later.

We wanted to catch birds in different fields where different kinds of food were available. If Dickcissels could be found in different habitats, eating different foods, then by the theory ecotypic variation birds found in one kind of habitat should be predictably different in size or shape from the birds found in another area. We set out to South America to test this idea, hoping to find someplace where we could study and trap feeding Dickcissels.

Fretwell began his trip at Villavicencio, Colombia. He saw occasional Dickcissels there, but not sufficient numbers for study. So, he wandered east, and north into Acariqua, Venezuela, where he was fortunate enough to meet a Fish and Wildlife team led by John DeGrazio of Denver. They too were looking for Dickcissels, being concerned about solving the farmers problems. Happily, the Dickcissels arrived in Acariqua the same night that he did. As he got off the bus at 3:30 a.m., he heard them flying overhead.

After a short bout with some tropical ailment, Fretwell got to work on the Dickcissels. He was still weak, but John and his colleague, Ken Larsen, did all the work putting up nets, and catching the birds, while he simply measured and studied the individuals captured. Without their help, he could not have accomplished much. We caught birds in nets in three localities: by a stream where the birds came to bathe, in a sorghum field, and in a weed and tall grass field. Some other birds were obtained from poisoned sorghum placed as a control experiment. These birds were known to be eating sorghum. All this work was conducted in mid-January, 1970.

Tom Shane went back to Venezuela later that winter in March, to Calabozo. Shane captured another batch of Dickcissels in different habitats: a weed field, a rice field where the crop was immature, and a rice field where the crop was mature.

We assumed that birds eating larger seeds would be better off if they were bigger in size (wing length). Sorghum has larger seeds than rice kernels, which in turn, are larger than most native grass seeds. Therefore, we expected ecotypic variation to appear as follows: we expected male Dickcissels (which are bigger than females) to appear more frequently in the crop (sorghum, rice) habitats. We expected the smaller females to eat more weed seeds, and to be caught more frequently in weed habitats. We also expected the males that we caught in crops to be larger than the males in wild seeds. Verification of these predictions would support the idea that the Dickcissels compete for winter food by showing that the different sized Dickcissels apparently eat different sized seeds.

The Results

In Table I, we have given the number of males, number of females and sex ratio (percent female) in the Acariqua and the Calabozo samples. At both localities, females were more common than males in the weedy areas, but constituted only 14-37% of the total in the mature crop areas. This verifies the first prediction.

In Table II, we have given sample sizes and mean wing lengths of males in the various habitats. Males in the more mature crop areas were significantly bigger in wing length in both Calabozo and Acariqua. Males in Calabozo (a rice area) were smaller than males in Acariqua, where only sorghum is found.

Discussion

First, the data are consistent with the ecotypic theory. This does not prove that Dickcissels are limited by winter food, but it is consistent with that idea.

Second, note that there are generally more males than females. In the Acariqua sample from the bathing area, only 29% were females. French also found this to be true in Trinidad in winter (1967) where females were only 32% of several thousand birds caught at the roost. The Calabozo sample contained about as many females as males, but no more. A sex ratio skewed in favor of males is also true on the breeding grounds. In 1964, Steve Calver and Fretwell (1967) wandered across the midwest in June looking at Dickcissels. These authors saw very few females. Usually, most males were unmated; only in eastern Missouri did there seem to be enough females for most males to be mated. Thus, as far as we know, the sex ratio of Dickcissels in the whole population is skewed in favor of males.

We think sorghum is causing this problem, if it is a problem. Sorghum is a new and expanding crop in Venezuela, and clearly the males can and do feed on it. Apparently, the males survive on the extra crop food, while the females die as usual. Thus, there are now many more males than females.

Further Work

There is a clear need for banders to compare measurements on samples of other species of birds caught in winter in different habitats. The ecotypic theory is an important one philosophically, as it is the basis for the claim that "it takes all kinds to make a world." Clearly, a wider acceptance of this philosophy would make it a better world.

In a more practical vein, we believe that the Dickcissel might be endangered by the trends in sex ratio. The excessive numbers of males has made it difficult for the females to successfully breed. In northern areas, where Dickcissel males greatly outnumber females (Fretwell and Calver, 1967, also recent observations), the nesting success of females is very low (Von Steen, 1965; Zimmerman, 1966). In Texas, most males are mated, and females do much better (data from Margaret Francis from Dallas). The reason for this effect is under study, but we believe it involves cowbird parasitism. If the sex ratio were to skew much further in favor of males, females everywhere might be unable to breed successfully, threatening the population of the species.

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Table 1. Sex ratios of Dickcissels in various habitats
 A. Acariqua, Venezuela

	Weeds	Caught in Sorghum	Known to be eating sorghum*
Males	4	17	11
Females	8	10	2
Percent female	67	37	15

*Ate poisoned seed set out to protect crops.

Table 1 B. Calabozo, Venezuela

	Weeds	Young rice	Mature rice
Males	14	8	6
Females	16	8	1
Percent female	53.3	50.0	14

Table 2. Average wing length of male
Dickcissels in various habitats

Sample size	A. Acarigua, Venezuela			B. Calabozo, Venezuela		
	Sample at bathing area*	Caught in Sorghum	Eating Sorghum	Weeds	Young rice	Mature rice
Wing length in mm	62	17	11	14	8	6
	82.83	83.78	84.61	80.52	81.44	82.42

*These were supposedly a random sample of the regional population, as Dickcissels come to bathe in large communal groups.

--Stephen Fretwell and Tom Shane

RETURNS OF TRANSIENT WARBLERS TO A COASTAL STATION

By Mrs. Roger W. Foy

The return of a transient warbler to its place of banding within a specified period of time is rather unusual. It has been stated that when there is a close agreement between the dates of handling there is a good reason to suspect that the individual bird concerned is in fact a transient. Such is the case with at least one, if not all three Yellow-rumped Warblers (*Dendroica coronata*) banded at my station (for a detailed description see EBBA News, Vol. 34 (4) on November 19, 1972, as a HY-U(M?), band no. 1290-59476. This bird returned within two weeks of original date of banding a year later on November 4, 1973, as a SY-M.

Some might call this particular bird in question a "doubtful transient", but to us it is a true migrant. When the bitter winter comes to this barren coastal beach (January, February & March) we are hard pressed to see a Yellow-rumped Warbler, much let alone net or trap one, and we are in operation year 'round since July 1969.

In December 1968 EBBA News, Ian C. T. Nisbet asked for records of returns of species which are known only as transients in area of banding station. He made two categories;