

# The Trembler's Tremble

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## ABSTRACT

The Trembler (*Cinclocerthia ruficauda*) is a member of the family Mimidae. It is abundant on the island of Dominica in the Lesser Antilles. It has an unusual behavior of trembling its wings. I developed a hypothesis to try to explain why the Trembler trembles. That hypothesis is: the trembling of the Trembler is a neotenuous behavior the species has never discarded and now serves no function. To test this hypothesis I observed, described, and compared the wing movements of the Trembler in 15 different instances to the wing movements of two immature Lesser Antillean Bullfinches (*Loxigilla noctis*) as the bullfinches begged for food from an adult bullfinch. The Tremblers trembled in all cases immediately after landing on a new perch. The duration of the tremble had a mean of 0.894 seconds. Out of 15 trembles recorded, only 3 had a duration of greater than 1 second. The other 12 trembles had a mean closer to 0.5 seconds. Those trembles seemed to have no purpose, as far as I could tell. I also was unable to determine a stimulus for this behavior. Therefore, my hypothesis was not rejected.

## INTRODUCTION

The Trembler (*Cinclocerthia ruficauda*) is a member of the family Mimidae, as is another member, the Northern Mockingbird (*Mimus polyglottis*) (Evans, 1992). The Trembler is endemic to the Lesser Antilles (Markowsky et al., 1994). The sexes are very similar with only the females bill being longer than the males. On the island of Dominica, the Trembler is most abundant in the rain forest, but also occurs in secondary forests (Zusi, 1969). Springfield Centre for Environmental Protection, Research, and Education (SCEPTRE) sits within a secondary rain forest. Tremblers are abundant on the grounds of the SCEPTRE.

During my first week at SCEPTRE, I was captivated by the trembling behavior of the Trembler. My first impression was that the Trembler's tremble reminded me of the wing motions of an immature bird prior to being fed by an adult of its species. From that impression I developed the following hypothesis: the trembling of the Trembler is a neotenuous behavior that the species has never discarded and now serves no function.

## METHODS

To test this hypothesis, I observed and compared the wing movements of immature Lesser Antillean Bullfinches (*Loxigilla noctis*) to the wing movements of the adult Trembler, disregarding the vocalizations of the immature bullfinches (Evans, 1992). I observed and recorded the begging behavior of the immature Lesser Antillean Bullfinches twice. The trembling behavior of the adult Tremblers was observed and recorded 15 times with the duration of the tremble also recorded (See Table 1). Other casual observations were made and are discussed later in this paper. Most observations were taken from either the Northwest or Northeast porch of the



main house at SPECTRE. One casual observation was made from the van in the parking area near the Syndicate Trail.

## RESULTS

On 31 May 1998, I observed and attempted to describe the begging movements of an immature Lesser Antillean Bullfinch. The immature bird would slightly fan open it's primary feathers, holding the wings lower than the normal position, the head lowered and the tail slightly raised. It would then move only the wings toward and away from it's body in a rapid motion while it directed a cheeping vocalization toward the adult Lesser Antillean Bullfinch. This behavior was observed twice. Once with the action directed toward a female Lesser Antillean Bullfinch and once towards a male. In both cases the immature bird was fed.

I also attempted to describe the trembling movements of the Trembler. The Trembler held it's wings slightly away from it's body laterally. The primary feathers are slightly fanned out and the wings held slightly lower than the normal position. The tail was held in an upright position. The wings are then moved rapidly toward and away from the body. The tail also slightly moves up and down. The head in some instances was slightly lowered.

On 30 May 1998, between 6:00p.m. and 6:08 p.m., I observed and timed the tremble of two different Tremblers from the Northwest porch of the main house. Trembler #1 landed on the petiole of a Papaya leaf, trembled for 0.5 seconds and hopped to another petiole of a leaf on the same Papaya. It trembled for 0.46 seconds immediately after it landed. It then flew to the left, out of sight. Trembler #2 then appeared and landed on a petiole of the leaf of the same Papaya at 6:06p.m. and proceeded to tremble for a much longer duration (4.79 seconds). Trembler #2 was then approached by another Trembler, possibly Trembler #1, and the two met at the petiole. With wings fluttering, they both fell out of the Papaya to the ground. Then they both flew to the right, followed by a 3rd Trembler. The longer tremble may have been a type of signal, possibly for a mate.

Twelve other observations and recordings were made with the Tremblers trembling from 0.3 seconds to 2.28 seconds and a total mean of all 15 observations of 0.894 seconds. In all cases the trembling occurred immediately after the bird landed on a new perch.

Not included in the mean was a very long tremble that was a casual observation and was not timed. A Trembler was observed from the van at the Syndicate Trail parking area. Our driver, Clem, tossed some bread out on the ground for the birds. The first birds to feed on it were Lesser Antillean Bullfinches. Then a lone Trembler arrived. It proceeded to tremble the entire time as it was feeding on the bread until it flew off. Clem thought that it was an aggressive behavior to keep other birds away.



Table 1

<u>Date</u>	<u>Time</u>	<u>Duration in seconds</u>	<u>Action</u>
29May1998	6:00p.m.	0.5	landed on Papaya leaf near Northwest porch of main house
	6:06p.m.	0.46	landed on Papaya leaf near Northwest porch of main house
	6:08p.m.	4.79	landed on Papaya leaf near Northwest porch of main house
4June1998	6:45a.m.	2.28	landed on Immortal Tree near Northwest porch of main house
	6:52a.m.	0.38	landed on Immortal Tree near Northwest porch of main house
	7:00a.m.	0.34	landed on Cherry Tree near Northeast porch of main house
	9:05a.m.	0.5	landed on Papaya near Northwest porch of main house
5June1998	6:20a.m.	0.3	landed on Papaya leaf near the Northwest porch of main house
	7:00a.m.	0.5	landed on Cherry Tree near Northeast porch of main house
	7:15a.m.	1.18	landed on iron fence near Northeast porch of main house
	7:23a.m.	0.62	landed on Cherry Tree near Northeast porch of main house
	1:45p.m.	0.45	landed on Papaya near Northwest porch of main house
	1:52p.m.	0.4	landed on Papaya near Northwest porch of main house
	1:58p.m.	0.31	landed on Papaya near Northwest porch of main house
	2:07p.m.	0.4	landed on Papaya near Northwest porch of main house
<b>Total:</b>		<b>13.41 seconds</b>	
<b>Mean:</b>		<b>0.894 seconds</b>	

## DISCUSSION

Campbell (1993) describes the how and why of a behavior as the ultimate causation and proximate causation, respectively. The ultimate causation or why natural selection favored the trembling behavior and not a different one has been hypothesized by a few. Noble (1916) described the function of the Trembler's tremble as a camouflage movement making the bird resemble a bunch of moving leaves. Bond (1928) described the function as a behavior making the bird more conspicuous. Zusi (1969) described the function as a social signal with aggressive content (Markowsky et al., 1994). Markowsky et al. (1994) describes the function as possibly a visual intra-specific contact signal. I believe that there was a visual intra-specific contact signal in the instances where the tremble lasted for greater than a few seconds. This contact was seen when the 2nd Trembler interacted with the 1st Trembler when it trembled for 4.79 seconds and the long tremble of the lone Trembler in the parking lot at the Syndicate Trail. The lone Trembler was in a seemingly vulnerable situation and may have been acting in an aggressive manner since no other birds attempted to approach it. It's the short duration trembles that seem to have no immediate purpose, as far as I can tell. My hypothesis attempts to address the question of why.

As for the proximate causation or how does the Trembler tremble, other members of the family Mimidae, such as the Northern Mockingbird, have a wing flashing behavior that differs in form and function to that of the Trembler. In the Northern Mockingbird, it is thought to be a foraging behavior (Markowsky et al., 1994). A few have tried to describe the actual movement of the Trembler. Markowsky et al. (1994) describes it as a



perched bird drooping both wings 1 to 2 cm, then quickly raising them back to a normal position, several times in rapid succession. Wings are not raised from the body. Zusi (1969) describes the Tremble as rapid vertical and lateral motions, the tail cocked, wings drooping and angled away from the body and primaries slightly spread. The quivering of the wings caused a secondary quivering of the tail. In order to really describe this motion, I believe that it would be beneficial to film this movement and study it in a slower context.

## **CONCLUSION**

Behavior is defined by Campbell (1993) as: to act, react or function in a particular way to a stimulus. Now the question is what is the stimulus to the Trembler's tremble? My hypothesis states that the trembling of the Trembler is a neotenuous behavior that the species never discarded and now serves no function. I believe that this behavior is nearly identical to the behavior of the immature Lesser Antillean Bullfinch when it begs for food from an adult bullfinch. The stimulus in this case is the food or being fed. Markowsky et al. (1994) recorded trembling with changes in perch site 104 out of 106 times. In most instances when the Trembler trembled immediately after landing the tremble lasted for a very short duration. Usually, close to a half of a second. I was unable to determine an obvious stimulus in these instances. This leads me to conclude that there now is no stimulus, but possibly once in it's original immature form the stimulus to this behavior was food or being fed.

I find it difficult to believe that the Trembler's tremble has a beneficial function. This behavior seems to make the bird more obvious to conspecifics as well as predators. On the island of Dominica, the Trembler is listed as a game bird and can be hunted from September 1st to the last day in February (Natural History of Dominica, no date given).

## **FUTURE RESEARCH**

As I stated earlier, it would be beneficial to film the movement of the Trembler and study the movement in a slower motion. Also, more studies could be done to determine if this behavior occurs in the presence of predators, such as hawks.

#### REFERENCES

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