THE ADAPTIVE SIGNIFICANCE OF REVERSED SEXUAL DIMORPHISM IN TAIL LENGTH OF WOODPECKERS: AN ALTERNATIVE HYPOTHESIS

By JEROME A. JACKSON

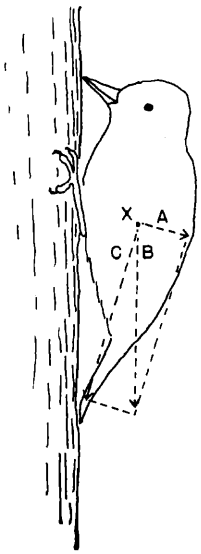
Short (1970) recently pointed out that in many species of woodpeckers the tail of females is longer or relatively longer than that of males; this is in agreement with my own data (Jackson, 1970 a; Jackson, unpublished data). It does seem reasonable to expect such differences to be of adaptive significance as suggested by Selander (1966: 117) and Short (1970), though the hypothesis presented by Short (*op. cit.*) is not in agreement with ecological and behavioral information presented by Laferriere (1965), Ligon (1968, 1970), Kilham (1970), Jackson (1970 b), and Willson (1970).

Short (1970: 91) states that "A possible functional explanation for the longer tail of females is the use of the tail as a supporting prop for excavating, requiring a shorter tail in males that do more excavating. The slightly longer tail of the female may serve less as a prop, and more as a balancing organ when females feed on smaller branches and branchlets." Short (*op. cit.*: 89) suggests that Ligon's (1968) findings that female Red-cockaded Woodpeckers (*Dendrocopos borealis*) forage on the trunk and larger limbs of trees more often than males are an apparent exception to his (Short's) hypothesis, and that perhaps Ligon's "sample may have been an unusual one for the species.

Recent studies indicate that the intersexual differences Ligon (1968, 1970) found in the Red-cockaded Woodpecker occur also in Downy Woodpeckers (*Dendroccpos pubescens*) in eastern North America: Ohio (Laferriere, 1965); New Hampshire (Kilham, 1970); Kansas (Jackson, 1970); Iowa (Jackson, unpublished data); and Illinois (Willson, 1970). Thus, at least for two species of woodpeckers, Short's hypothesis has been tested and found lacking—females *do* forage more on the trunk and major limbs of trees. An alternative hypothesis has been presented by Stolpe (1932) that is in agreement with current knowledge of the foraging ecology of these *Dendrocopos* woodpeckers. Stolpe (*op. cit.*: 212) suggests that an increase in tail length in a woodpecker would lessen the action of gravity tending to pull the bird outward from a vertical surface by bringing the weight of the body more directly over the distal, supporting end of the tail (Fig. 1). It would thus be adaptive for female Red-cockaded and Downy woodpeckers to have longer tails than the males, since the females would expend less energy while foraging on the vertical surfaces of the trunk and larger limbs of trees than would the shorter tailed males. Richardson (1942: 255) agreed with Stolpe (*op. cit.*) in theory, but felt that the hypothesis could not be proven because of uncontrollable differences between species—he did not consider that strong support for Stolpe's idea might come from within a single species.

The morphological evidence presented by Short (1970) suggests

Figure 1. Posture of a woodpecker on a vertical surface (redrawn from Stolpe, 1932). The letter X indicates the bird's center of gravity; the letters A, B, and C indicate the influences of gravity on the bird. A longer tail forces the head and shoulders of the bird in toward the tree, and as a result, keeps the bird's center of gravity in a position that maximizes the force (C) against the tail while minimizing the force (A) tending to pull the bird away from the tree.



that perhaps behavioral patterns similar to those of Red-cockaded and Downy woodpeckers will be found in other species as well.

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SOME OBSERVATIONS ON THE VOCALIZATIONS OF THE EASTERN BLUEBIRD

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INTRODUCTION

During the course of my investigations of the population dynamics of the Eastern Bluebird (*Sialia sialis*) I have come to rely quite heavily on its song and calls as an aid in understanding the birds' behavior. Thomas (1946) has presented a brief summary on the vocalizations of this species, although her primary concern was with other aspects of the breeding behavior of bluebirds. Thus, in order to organize my own observations, recordings were made of the more common calls and material from my notes was extracted and is set forth in the following summary of bluebird vocalizations.

MATERIALS AND METHODS

Observations were made of both wild birds nesting at Stony Creek Metropolitan Park, Macomb County, Michigan, and of captive individuals I have kept at the park's Nature Center and at my home residence. The recordings were all made from three captive birds, two of which were taken as nestlings during the summer of 1969. The third bird, an adult female, was also captured during that year. These birds were kept for observation in a