

# FORAGING PATTERNS OF THE TROPICAL KINGBIRD, *TYRANUS MELANCHOLICUS*, IN WET AND DRY HABITATS

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**Abstract.** The Tropical Kingbird is a territorial insectivore which feeds in a variety of habitats. According to the optimal foraging theory, individuals should have a higher attack rate and a shorter giving-up-time in a habitat of high prey density than in one of low density. We compared Kingbird foraging behavior in wet and dry habitats in Palo Verde National Park, Costa Rica, and found no difference in attack rate or giving-up-time. We believe that the birds are more affected by weather and territoriality than by differences in prey density between these two environments. (SLS)

## INTRODUCTION (JLD)

The Tropical Kingbird (*Tyrannus melancholicus*) is a large (21cm) flycatcher that occupies many different open habitats. It forages for flying insects by sallying from exposed, elevated perches (Stiles and Skutch 1989). It is reasonable to believe that kingbirds may exhibit different foraging behavior among their various habitats. In locations where the average prey density in a patch is greater, a foraging kingbird should have a higher attack rate and a shorter time-of-no-capture before abandoning the patch (giving-up-time or GUT).

In our study area, kingbirds occupied both wet and dry environments. Assuming that there might be a greater insect density in the wet environment, we hypothesized that the inter-attack-interval (IAI) and GUT should be lower in the wet area.

## METHODS (TCB)

Tropical Kingbirds were observed on and near marsh habitat in Palo Verde National Park, Guanacaste Province, Costa Rica. The birds were observed foraging over wet areas of

the marsh as well as over dry land in the marsh and in dry fields adjacent to the marsh. They foraged in patches no larger than 20m in diameter, sallying out for prey and returning to nearby perches. When a bird flew to a perch more than 20m away, we considered it to have changed patches. The time interval between the bird's last sally and a patch change was the GUT for that patch.

Between 0700 and 1000 birds were observed for approximately 20min each. During this time we noted the bird's behavior and the time since previous movement. For the purposes of data analysis we assumed that all sallies were of equal length, and that each represented a prey attack, whether or not there was a successful capture. We derived IAI and GUT for each bird and then calculated attack rates.

## RESULTS (ALG)

We observed 28 birds at 36 perches for a total of 427min in the wet habitat, and 8 birds at 11 perches for 76min in the dry habitat (Table 1).

We analyzed the differences in attack rate, IAI and GUT between the

dry and wet habitats. All comparisons were done with a Mann-Whitney U test where the U value was transformed to a t-value.

Our analysis showed no difference between the habitats for attack rate ( $t=0.94$ ,  $p>0.9$ ), IAI ( $t=0.03$ ,  $p>0.995$ ), or GUT ( $t=0.16$ ,  $0.5<p<0.9$ ).

Table 1. Summary of Data Collected

Habitat	Wet	Dry
# Perches	36	11
# Birds	28	8
Time Observed for all Perches	427 min.	76 min.
#Attacks/min /perch(mean)	$0.48 \pm 0.42$	$0.6 \pm 1.2$
Mean IAI (s)	$134 \pm 158$	$137 \pm 138$
Mean GUT (s)	$115 \pm 101$	$99 \pm 48.3$

## DISCUSSION (CNO)

According to our results, there is no significant difference in the foraging patterns of Tropical Kingbirds in the dry and wet habitats selected for study. There are several reasons why this may have been.

The first cause of inconsistency between our hypothesis and results lies in the initial assumption that insect availability is greater in wet areas than in dry areas. Without obtaining an insect census, we do not know that there is a difference in prey densities, and an even prey distribution could

account for similar foraging patterns in the two areas.

Two other factors might have affected kingbird foraging behavior. First, the presence of a strong wind may have caused abnormal foraging behavior. Sallying into the wind may be less energetically profitable, and thus the birds may wait until the wind lessens to sally. This could result in abnormally long IAI's.

Second, territorial behavior may have been important because sometimes when the birds left their perches they were defending their territories from invaders. The time spent on the defense of a patch may take away from the bird's foraging time. Further studies may wish to compare the effects of weather and territoriality on foraging behavior.

## LITERATURE CITED

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- Stiles, F., and A. Skutch. 1989. *A Guide to the Birds of Costa Rica*. Ithaca, NY: Comstock Publishing Associates.