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BANDING OF THRUSHES AND CATBIRDS AT ALMIRANTE, PANAMA. SECOND YEAR OF OBSERVATIONS[1]

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Banding of migrant thrushes in Almirante, Republic of Panama, was started during the Fall of 1962 and Galindo *et al* (1963) reported results of the first year of work. Operations were continued during last Fall, Autumn and Spring and catbirds were added to the list of species under study. The present paper covers results obtained from September, 1963 through August, 1964.

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MATERIALS AND METHODS

Galindo *et al* (*loc. cit.*) give a detailed description of the study area and of methods used for the mist-netting and banding of birds. The same four plots described in that paper were utilized again. Plot "D", located 5 miles north of Almirante, was used in the Fall and Winter only and was closed down in March, 1964 because of difficulties encountered in transportation of personnel. From 80 to 90 mist-nets were in continuous operation in the Fall and Winter. This number was cut down to an average of 60 to 70 nets after closing down plot "D". Netting methods and schedules were the same as those used during the first year. Investigations on the prevalence of arboviruses in thrushes and catbirds were begun in the Fall. A sample of each species investigated was bled from the external jugular vein in order to determine viremias or immunity responses to various arboviruses. Birds taken more than once were rebled at intervals of 30 days.

RESULTS

Table I presents a summary of operations from September 1, 1963 through May 31, 1964. No thrushes or catbirds were taken during June, July and August. As may be noted, a total of 4,654 birds were banded during this period. Of these, 4,103 were thrushes of four species and 551 were Catbirds. The thrushes taken represent more than twice the number captured in 1962-1963. This may be explained by the fact that in 1962 netting was not begun until after the first week in October, while capture operations were already in progress when the first members of the Fall migration began arriving at Almirante in September, 1963. Another factor which contributed to the increase in the number of thrushes taken was the spotting of nets across observed migratory pathways in plot "A", which resulted in a sharp increase of netted migrants in this area. The distribution by species was similar to that observed the previous year. Swainson's Thrush was again the commonest species with 3,120 specimens taken. This number represents 76% of all thrushes netted. The Gray-cheeked Thrush followed with 743 specimens, Veery with 145 and the Wood Thrush with 95. The significant increase of Veeries from 38 to 145 may be explained by earlier collections during 1963 since, as noted in Table II, 115 specimens of this species were captured before October 15. The recapture rate of thrushes was only slightly higher than in the first year (1.3% against 1.2%). In the three species of thrushes which pass as migrants through Almirante, namely, Swainson's Thrush, Gray-cheeked Thrush and Veery, all birds recaptured were "repeats", that is to say, they were recovered less than 90 days after banding. In the Wood Thrush 12 of the 15 birds recaptured were "repeats". Of the remaining three "retakes", or birds recovered 90 days or more after banding, one was taken in the Spring 158 days after being banded in the Fall of 1963 and two were specimens banded in 1962 and recovered in the Fall of 1963, 360 and 368 days after banding.

Out of 551 Catbirds banded, 142 (25.8%) were recaptured. Of these, 55 were "retakes" and the rest were "repeats". Of the "re-

TABLE I. NUMBER OF BIRDS BANDED AND OF RECAPTURES (SEPTEMBER 1963 TO JUNE 1964)

Species	Birds Banded	Specimens Recaptured	Repeats	Retakes banded in Fall	Retakes banded in previous years	Recoveries
Swainson's Thrush	3120	25	30	0	0	0
Gray-cheeked Thrush	743	12	14	0	0	0
Veery	145	5	6	0	0	0
Wood Thrush	95	11	12	1	2	1
Catbird	551	142	162	53	2	0
Totals	4654	195	224	54	4	1

takes", 53 represented specimens banded during the Fall and recovered the following Spring, while 2 were birds banded the previous year and recovered 317 and 381 days after banding.

There was a single "recovery" noted during the year. This was a Wood Thrush banded in Magnolia Gardens, 11 miles North of Charleston, South Carolina on 8 October, 1963 by Mr. T. A. Beckett III and recaptured at Almirante on 26 October 1963.

Table II presents the number of each species captured by weekly periods for the entire migration season. The first thrush netted was a Veery taken on 23 September. This specimen was followed the next day by another one of the same species and by several Swainson's Thrush. The first Gray-cheeked Thrush was captured on 26 September. The Wood Thrush and Catbird, which are "winter visitants" in Almirante, arrived much later, the first Catbird being taken on 8 October and the first Wood Thrush one day later.

Population peaks during the Fall migration were reached by the migrating thrushes (Swainson's Gray-cheeked and Veery) during the second week in October, occurring about a week earlier than the first year. The Wood Thrush did not show a pronounced peak. Populations of this species built up rapidly soon after the first arrivals were noted and the same population level was maintained for about three weeks followed by a gradual reduction in numbers. However, specimens were banded during almost every week of the season until the middle of April when the last member of the species was taken. This pattern varied from that of the previous year, when no Wood Thrushes appeared in the nets between 15 January and 1 April. The Catbird showed a sharp population peak during the fourth week in October. A week after the peak was reached there was a sharp decline in numbers followed by a leveling of the population curve for the rest of the Fall, Winter and Spring. The last Catbird was taken on 29 May.

In contrast to the previous year when no Swainson's, Gray-cheeked or Veery were taken between 1 January and 30 March, scattered specimens of these species were netted throughout the Winter. Thus, one Swainson's Thrush was captured in January, three Swainson's and one Gray-cheeked showed up in the nets during February and one Veery was taken early in March. Two Gray-cheeked Thrush and one Veery were also banded during the Spring migration, in contrast to the previous year when no specimens of these species were noted in the Spring. The last migrating thrush, a Swainson's Thrush, was banded on 26 May.

Table III shows the number of days elapsed between banding and recapture of all "repeats". The pattern in the three species of migrating thrushes was similar to that observed during the previous year, except that longer lapses of time between banding and recapture were noted for all species. Naturally, the two "winter visitants" (Catbird and Wood Thrush) showed much longer periods of time between captures.

In order to evaluate the effect of bleeding on the migrants, a comparative study on recaptured bled and unbled catbirds was carried out. Table IV summarizes the results. As may be noted, of the 365

TABLE II. THRUSHES AND CATBIRDS BANDED BY WEEKLY PERIODS DURING 1963-1964

Species	Sept.	October			November				December					
	1-30	1-7	8-14	15-21	22-28	29-4	5-11	12-18	19-25	26-2	3-9	10-16	17-23	24-30
Swainson's Thrush	10	687	1040	673	157	34	32	10	7	4	2	0	1	NC
Gray-cheeked Thrush	2	68	294	286	61	26	5	1	1	0	0	0	1	NC
Wood Thrush	0	0	18	14	14	1	6	1	1	3	1	3	0	NC
Veery	12	41	62	20	5	1	1	1	0	0	0	0	0	NC
Catbird	0	0	7	18	152	36	29	23	29	18	7	6	7	NC

Species	January				February					March			
	31-6	7-13	14-20	21-27	28-3	4-10	11-17	18-24	25-2	3-9	10-16	17-23	24-30
Swainson's Thrush	0	1	0	0	2	0	0	0	1	0	0	0	1
Gray-cheeked Thrush	0	0	0	0	1	0	0	0	0	0	0	0	0
Wood Thrush	1	2	2	1	8	5	1	5	1	1	1	0	0
Veery	0	0	0	0	0	0	0	0	0	1	0	0	0
Catbird	5	10	14	14	34	16	6	12	11	16	9	14	6

Species	April				May					June 1-August 31
	31-6	7-13	14-20	21-27	28-4	5-11	12-18	19-25	26-31	
Swainson's Thrush	22	37	79	195	20	1	3	0	1	0
Gray-cheeked Thrush	0	0	0	2	0	0	0	0	0	0
Wood Thrush	2	1	1	0	0	0	0	0	0	0
Veery	1	0	0	0	0	0	0	0	0	0
Catbird	18	5	10	19	6	0	3	2	2	0

TABLE III. TIME ELAPSED BETWEEN BANDING AND RECAPTURE OF REPEATS

Days after banding	1	2	3	4	5	6	7	8-14	15-21	22-28	29-35	36-42	43-49	50-56	57-63	64-70	71-77	78-84	85-90	Totals
Swainson's Thrush	7	5	5	0	1	3	4	4	1	0	0	0	0	0	0	0	0	0	0	30
Gray-cheeked Thrush	7	0	1	0	0	0	1	2	2	1	0	0	0	0	0	0	0	0	0	14
Veery	2	1	1	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	6
Wood Thrush	3	1	0	0	0	0	0	2	3	0	1	0	0	1	0	0	0	1	0	12
Catbird	11	9	7	6	7	2	5	23	16	10	13	9	9	3	2	9	9	8	4	162

TABLE IV. RATES AND FREQUENCY OF RECAPTURE OF BLED AND UNBLED CATBIRDS

State of birds released	Total No. of birds released	Birds recaptured		Times recaptured						Times bled			
		No. recaptured	% recaptured	1	2	3	4	5	6	1	2	3	4
Bled	365	93	25.5	65	19	5	1	3	0	321	36	8	
Unbled	186	49	26.4	30	12	5	1	0	1	—	—	—	—
Totals	551	142	25.8	95	31	10	2	3	1				

bled catbirds banded and released, 25.5% were captured again from 2 to 180 days after banding, while 26.4% of 186 unbled catbirds were recovered again. It may be also noted that 3 of the bled birds were recaptured five times, one was taken on 4 different occasions, 5 were recovered 3 times and 19 were recaptured twice. The remaining 65 recaptured specimens were recovered only once after banding. These figures compare favorably with results obtained with unbled specimens. It is also of interest to note that 44 of the 365 bled catbirds were rebled two or three times at intervals not shorter than 30 days, with no apparent ill effects.

Discussion—Preliminary data gathered by M. T. Rogers (personal communication, November, 1963) working on determination of fat content in Fall migrants at our field station, appear to indicate that migrating thrushes (Swainson's, Gray-cheeked and Veery) use all of their fat reserves in flying to Almirante. Birds of these species are forced to quickly replenish their fat supply in order to continue their migratory flight to the South. Upon arrival at the study area they immediately begin to avidly consume fat-producing foods, such as certain types of wild fruits, and as their fat reserves reach a critical level flight is resumed. From a study of Table III it may be deduced that the build-up period of fat reserves lasts from a few days to as long as two or three weeks and is perhaps dependent on the physical condition of individual birds. There is no definite proof as yet that any of these migrating thrushes spend the entire Fall and Winter in Almirante, since no "retakes" of these species have been noted in the study area (see Table I). However, scattered specimens do appear throughout the Winter but these could be interpreted as being late Fall arrivals from the North or early Spring migrants from the South. Observations during the next few years may clarify this point. In contrast to the previous year, one Veery and two Gray-cheeked thrushes appeared in the nets during the Spring migration. The fact that so few specimens of the migrating thrushes show up in Almirante during Spring, may indicate that on their return trip to the North, most of these birds pass through Almirante without stopping. The high rate of "retakes" in the Catbird indicates that a large number of Fall arrivals of these species spend the entire Fall and Winter in the study area.

Data presented in Table IV on the rate and frequency of recaptures in bled and unbled catbirds indicate that drawing a sample of 0.4 to 0.8 cc of blood from the external jugular vein does not appear to seriously injure these birds.

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