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Department of Zoology, University of Oklahoma, Norman, Oklahoma.

EXPERIMENTS WITH THE ALL-PURPOSE TRAP

BY JOHN V. DENNIS

With a view to finding out more about the factors which limit or increase trap take, the writer during part of November and December, 1953, and January 1954, conducted a number of experiments with the All-Purpose Trap (described by Seth Low, *Bander's Manuel* IX: 10-11, 1953). Six traps were built for the study. Each was constructed according to specifications but certain refinements, such as concrete floors and drip pool, were not included. The traps were not identical in every detail as some differences, such as in degree of curvature and size of entrances, proved unavoidable.

As originally planned the study was to include comparative tests on baits, water-drip versus grain, and trap take in relation to habitat and to weather and time of day. The traps were placed in pairs, each unit in a pair approximately equivalent so far as location and habitat was concerned. None of the tests required banding of birds, but all birds taken in the traps were examined and given bands, if none were present. Banding was not a necessary part of the study, but a desirable part since the writer wanted to simulate as nearly as possible actual conditions at a banding station. Traps remained in the same position from day to day except when a new phase of the study required removal. Food was constantly maintained in the traps, and, when not in use for experimentation, a section of the top was opened so as to allow birds free entrance and exit. Prior to the study period, except for some experimental runs, no banding or artificial feeding had been carried on in the trapping area. But for many years birds had been in the habit of coming to the area for an abundant supply of weed seeds and such attractions as the ripening heads of the common sunflower.

Considered in this report are preliminary findings in respect to habitat, baits, weather and time of day. Owing to wet weather no tests

were conducted on the water-drip versus grain. And owing to the impossibility of visiting the traps at regular intervals only some broad comparisons have been made in regard to trap take in relation to time of day. Experiments were confined to the period November 23, 1953 through January 13, 1954.

STUDY AREA

The study area was located on a farm two miles south of Leesburg, Virginia and adjacent to a heavily wooded region bordering the Potomac River. Trapping activity was to center about an acre garden plot and a small section of nearby woodland. Within and adjacent to the garden were several small apple trees. Otherwise the land had been used for the growing of vegetables and sudan grass *(sorghum sudanensis)*. Cattle had been let in early in the fall so that little cover remained other than that afforded by the apple trees, weedy growth along the fence rows and a healthy growth of lamb's quarter *(Chenopodium album)* in some sections. The garden, fenced on all sides, was surrounded by pasture land. To the south and east the land was open, but to the north and west pasture soon gave way to extensive deciduous woodland. A section of this woodland, bordering a dirt road about 20 yards to the west of the garden, was included in the trapping area. The woodland contained medium sized oaks, ash, hickory, and along its edge, numerous red cedars *(Juniperus virginiana)*. A rank growth of Japanese honeysuckle *(Lonicera japonica)* had invaded the woodland borders.

TRAPPING SUCCESS ACCORDING TO HABITAT

Three rather sharply contrasting habitats were available for comparison within a short distance of each other — the deciduous woodland, the weedy fence row with small apple trees nearby, and the completely open and almost bare ground making up the larger part of the garden. Traps were placed in pairs in similar situations in each of the habitats, two about 30 yards apart in deciduous woodland, two about 40 yards apart in the garden and adjacent to a weedy fence row, and two about 30 yards apart in the open part of the garden. All traps were located within a radius of not more than 65 yards. Those with the most cover available were in the woodland. Branches and trunks of trees were heavily festooned with Japanese honeysuckle and the ground was covered with dead limbs, dead leaves and various vines and small plants. The traps along the fence row had an intermediate amount of cover. Within a few feet of each were small brush piles and apple trees about fifteen feet tall. Weeds growing along the wire fence offered some additional cover. The traps in the open were 15 yards from the nearest cover, this in the form of a stand of lamb's quarter about three feet high.

A second phase of this study consisted of comparisons between trapping success at the previously described sites in the woodland and along the fence row and two sites in the thick growth of lamb's quarter. The first part of the study was conducted between November 23 and December 8, 1953. Traps were in operation from about 8:30 A.M. until 4:30 P.M. (E. S. T.) Generally trapping was conducted for three successive days and then the traps were allowed to remain open for

two or three days. The first phase saw nine full days of trapping and the second 12 full days. The results of the November 23-December 8 tests are summarized in Table I.

TABLE 1

	Cardinal	Tufted Tit-mouse	Slate-Colored Junco	Red-Bellied Wood-pecker	Blue Jay	Carolina Chick-adee	Downy Wood-pecker	Totals	Percent-age
Woodland	2	11	10	2		1		26	.35
Fence Row	1	9	29		2		1	42	.57
Open Field	1		5					6	.08

Comparison of three habitats by number of captures and percentage for each.

A total of 57 percent of all birds trapped — 66 percent of the Slate-colored Juncos and 45 percent of the Tufted Titmice—were taken in the fence row locations. The woodland traps accounted for 35 percent of the birds taken. Among these were 55 percent of the Tufted Titmice and 23 percent of the Juncos. Only six captures were made in the open field, one a Cardinal and five Juncos.

When on December 9, the two traps in the open were moved to nearby stands of lamb's quarter, trapping conditions were beginning to change. A larger percentage of ground foraging birds of fence rows and weed patches were present. Slate-colored Juncos had increased in number and Tree Sparrows had put in an appearance. Also the coming of wintry weather had apparently caused a change in feeding and foraging habits.

The second phase of the habitat study, December 9 through January 13, saw twelve full days of trapping. During this period 475 captures were made in the traps. Of these 48 percent were Tree Sparrows and 35 percent Slate-colored Juncos. The results for each habitat are summarized in Table 2.

TABLE 2

	Cardinal	Tufted Titmouse	Slate-Colored Junco	Red-Bellied Woodpecker	Blue Jay	Carolina Chickadee
Woodland	2	11	35	2		
Fence Row	10	46	48		1	2
Weed Patches	3	2	81			

	Tree Sparrow	White-Br. Nuthatch	White-Thr. Sparrow	English Sparrow	Totals	Percentage
Woodland	46				96	.20
Fence Row	86	1	1		195	.41
Weed Patches	97			1	184	.39

Comparison of three habitats by number of captures and percentage for each.

The weed patch habitat was almost as productive as the fence row sites. Fence row traps accounted for 41 percent of the take and weed patches for 39 percent. The deciduous woodland accounted for only

20 percent of the take. The weed patch traps accounted for the largest take of Juncos, 50 percent, and Tree Sparrows, 42 percent. Tufted Titmice, formerly occurring most often in woodland traps, were most plentiful in fence row sites — 19 percent being trapped in woodland and 78 percent in fence row traps. Cardinals were taken more often during this period — 13 percent were taken in woodland, 67 percent along fence rows and 20 percent in weed patches. The fence row sites led in variety with eight species taken. Five species were taken in woodland and five in weed patches.

EXPERIMENTS WITH BAIT

Up until December 10 the only bait used was a medium scratch feed, about one part cracked corn to one part whole or cracked wheat. On December 10 sunflower seed was added to medium scratch in three of the traps. A trap from each habitat was baited with sunflower and their opposites were left with the customary scratch mixture. Trapping success was compared for the two mixtures during two days in December and three in early January. The results are summarized in Table 3.

TABLE 3

	Cardinal	Tufted Titmouse	Slate-Colored Junco	Red-Bellied Woodpecker	Carolina Chickadee	Tree Sparrow	Totals	Percentage
Sunflower Seed and Scratch Feed	2	27	30	1	2	19	81	68
Scratch Feed Alone		13	13	1		11	38	32

EXPERIMENTS WITH SCRATCH FEED AND SUNFLOWER SEED

Twice as many birds were taken, 68 percent, in traps baited with sunflower seed and scratch as in traps baited with scratch alone. During the period November 23-December 8, the three traps which were to be baited with sunflower seed took only 42 percent of the total catch of Juncos and Tufted Titmice. But with the addition of sunflower seed these same traps took 68 percent of the combined catch of Juncos and Tufted Titmice.

Tree Sparrows did not figure in the trapping totals before the sunflower tests were initiated. But with the choice of two mixtures 63 percent were taken in sunflower baited traps. With 63 percent of the Tree Sparrows and 70 percent of the Juncos showing up in sunflower baited traps it might be asked if this is coincidence or whether these species were actually attracted by the sunflower seed. No positive answer is available, but there is some evidence that sunflower seed may have made the difference. The writer observed Juncos eating sunflower seed at his feeding station during a light snow-fall in early February. Several birds were quite adept at maneuvering the seed between their mandibles until they removed the outer husk. Other Juncos merely picked up and dropped the seed, or ate tidbits made available by more proficient seed-openers. That Tree Sparrows, in particular, may be attracted by sunflower seed is seen in evidence offered by Gladys H. Schumacher *(Bull. Mass. Aud. Soc.*, **35**(5): 211-212. 1951). Writing

of the many sparrows and Slate-colored Juncos at her feeder in the Berkshires, she says: "Recently, during the winter, a lone Tree Sparrow came to stay for a few days. Oddly, he seemed to pick out the sunflower seeds to eat. These seeds seem to be more attractive to the birds than many realize, for most of our little visitors make away with them first."

TRAPPING SUCCESS AND TIME OF DAY

Visits to traps were spaced too unevenly to permit comparisons of take at set intervals through the day. But daily trapping records indicated an even distribution so far as captures are concerned. No morning or evening peak could be detected. And no appreciable difference existed in the number of birds taken in the morning and the afternoon. For a total of 18 trap days, 263 captures were made in the morning and 268 in the afternoon.

TRAPPING SUCCESS AND THE WEATHER

Owing to the lack of accurate weather data it was impossible to make any very close correlations between weather and trapping success. Only some rather general observations can be made. Extreme weather conditions appeared to have considerable effect upon trap take, but no positive correlations could be made in regard to normal day to day weather changes. In one instance more birds were taken during a rainy spell than during a preceding dry spell and later the exact reverse was true. And again no positive correlations could be made between moderate temperature changes and daily take. One day would see higher take with higher temperature and a week later a comparable take with lower temperature. Severe weather with snow, wind and low temperature, on the other hand, would produce an immediate reaction.

Five inches of snow fell on January 11. On this date and the following two days the weather was abnormally cold and windy. The average take for the January 11-13 period was 3.26 times as great as the average take during the period January 7-9 when the weather was mostly fair and comparatively mild. A much greater proportion of unbanded birds appeared in the traps during the period of severe weather. During the severe weather 30 percent of the birds entering the traps were unbanded. During the preceding period of mild weather only 13 percent of the birds taken were unbanded.

By January 14 most of the previous snowfall had disappeared, but late that day more snow began falling. On the morning of the 15th about three inches of snow with a thin icy coating covered the ground. The day was fairly mild (maximum temperature 38°) and a light rain fell in the afternoon. Despite the mildness conditions were unusually favorable for trapping, and feeding station activity was at an all-time high for the winter. Banding with one All-Purpose Trap outside the study area, the writer took 39 Starlings—the first trapped at the station.

The Starling, although plentiful in the region during winter, rarely comes to feeding stations and has frequented banding traps only when snow was on the ground. Other species are influenced similarly by snowfall. A light snowfall on March 11, 1954 saw the first Brown-headed Cowbirds of the season to be taken in banding traps, 21 in all.

The only Red-winged Blackbirds (two) to be taken at the station entered an All-Purpose Trap during this snowfall. Light snow fell off and on during the morning, but melted almost as rapidly as it fell. By early afternoon the snowfall had ended and remaining snow on the ground rapidly disappeared. With the appearance of bare ground Cowbirds and Redwings left the banding area.

In contrast to winter and early spring snowfalls, those in fall may even lessen activity at a feeding or banding station. Early in November of 1953 a first snowfall saw a reduction in the number of birds entering traps, both at my station and the station of Arthur H. Fast at Arlington, Virginia. Mr. Fast wrote: "I too noticed that the snow had the effect of apparently reducing the bird population. I have noticed that previously and wondered why. . . On the other hand in late winter and particularly in March, a snow seems to greatly increase the birds at times—presumably when they are caught in the area in migration." (Personal communication.)

During the fall natural foods are generally abundant. Fallen snow, acting as a receptacle for weed seeds, would tend to make this type of food more easily obtainable. Therefore, unless continuing snowfall or drifting snow covers over the seed as fast as they fall or are shaken loose by birds, food finding becomes easier and banding traps are not so likely to be attended. Against this is a psychological factor not so easily gauged. Almost everyone with a feeding station in northern latitudes has had an opportunity to note a sudden increase in activity when snow first begins falling or even some hours preceding a snowfall. It is perhaps a feeling of fear which sends birds crowding to known sources of food with the commencement or first threat of falling snow.

Much depends, no doubt, upon duration and depth of snowfall and upon accompanying weather conditions. Ice and drifting snow would tend to make natural foods unavailable. A prolonged period of freezing rain might well cause serious hardship unless artificial food was available. Birds seem to respond less to temperature changes than to precipitation. But after particularly cold nights birds seem to be more receptive to feeding and banding station foods. Certainly very low temperatures would increase the need for energy giving food and thereby tend to make birds less hesitant about entering banding traps.

DISCUSSION

Not nearly enough tests were made nor were the tests extended over long enough periods of time to provide adequate answers to the problems under study. But a beginning, at least, was made and the results indicate several approaches to the problem of greater trapping efficiency.

For the backyard bird-bander there is little point in talking about habitats. He makes out as best he can with his artificial surroundings. But in a rural environment there is a real problem in finding the habitat or habitats which will yield the best results. Fence row sites, near adequate cover and not far from woodland, were found to be the most productive in the study just described. A close second were sites in a stand of lamb's quarter which had taken over a portion of a former vegetable garden. Previous to the trapping experiments field foraging birds had been in the habit of coming to the stand to obtain an abundant

supply of small seeds. The birds readily took to scratch feed and sunflower seed when these were made available in banding traps. This suggests that there is a distinct advantage in locating traps in areas where birds are in the habit of coming for natural foods. The bander should consider the advantages of mobility before settling for a permanent banding station. There are any number of situations which attract birds temporarily at least. The All-Purpose Trap, incidentally, is a good one for mobile banding operations.

Woodland sites were considerably less productive than the fence row or weed patch sites. In addition mice were a greater problem here than elsewhere. They were continually at work carrying off grain and disturbing the dirt floors of the traps. Also the gray squirrel *(Sciurus carolinensis)* entered woodland traps more frequently than traps in the other habitats. Traps in the open without cover were almost completely neglected by birds. This was as to be expected and emphasizes the importance of cover in banding operations.

One point of importance, to be mentioned, is that of flight lines. For the biggest banding returns traps should be located along lines of flight to feeding or roosting areas. The fence row referred to in this study had long been an avenue of travel between woodland, the vegetable garden and open fields. Several banders attribute their success with certain species to the fact that their banding stations lie along well travelled flight lines. B. S. Bowdish (personal communication) of Demarest, New Jersey, who bands around 250 Blue Jays a year, thinks that his success with this species is due to the proximity of a flight line. Ben B. Coffey (personal communication) of Memphis, Tennessee who has had spectacular results with the Common Grackle and, to a lesser extent, the Starling writes that his home station was on a flight line one year and that a cooperator has been on a "line" for at least four successive seasons. The mixed flocks of Starlings and Grackles drop down to feed from three to five times a day.

Without recourse to experimentation many banders find that their take more than doubles when they use a richer mixture than they had previously used. The addition of sunflower seed in this study in half the traps boosted their take over traps with scratch alone by 50 percent. It should be mentioned, however, that elements of chance and variations in trap location may have influenced these totals. More tests along the same lines would be desirable as would comparisons between waterdrip and other baits.

A very real problem with banders who are away working most of the day is that of when to band. For example, would early morning or late evening be more productive? Casual findings from this study indicate that time of day had little influence upon trap take. However, careful studies might reveal some significant trends.

Another problem for the bander with limited time at his disposal is that of taking advantage of suitable banding weather. In this study there was no indication that normal weather changes affected banding results to any great degree. Severe weather conditions and snowfall particularly were seen to have very pronounced effects. Snowfall early in the season was found to reduce take in the banding traps, but later snowfalls greatly increased the take and sometimes brought new species

into banding traps. And significantly a much larger proportion of the birds taken during these later snowfalls were unbanded as contrasted with the take preceding a snowfall. This suggests that either the bird bander falls far short of taking all the common banding station visitors in his region or else that with severe weather birds move about much more and that the unbanded birds which show up at such times may well be outsiders.

It might be mentioned that at the feeding station birds seem to respond much more readily than at the banding station to weather changes. During five days in February, 1953 a feeding station near Leesburg was kept under observation by the writer from 9:30 A.M. until 10:30 A.M. The number of visits made by each species was recorded. The best attendance was on a bright sunny day after an unusually cold night. The poorest attendance was on a day with bright sunshine and a strong northwesterly wind. Attendance was average during a rain storm and on a partly cloudy day with no wind. The number of visits recorded during the observation periods varied from 103 to 213.

It would be interesting to compare over a period of time attendance at a feeding station with daily take at a nearby banding station. The experimenter would have to take into account the factor of diminishing return at banding traps which comes with continued operation. But if traps are in operation only a part of the day or at less frequent intervals (and when not in operation birds have free access to the bait) then the feeding station and banding trap are somewhat on a par. But for most birds, it is reasonable to assume, that the banding trap appears as an obstacle and only gradually does the bird become conditioned to entering it freely. Some individuals, as banders well know, become conditioned to such a degree that they become habitual trap attendants. Under the influence of conditioning, it seems likely, that a large proportion of banding station visitors become so addicted to trap feeding that they continue to come and go regardless of weather conditions. The same is doubtless true of the feeding station, but probably to a lesser degree. Almost any passing bird is apt to drop in at a feeding station. Thus with birds coming and going more freely feeding station attendance would be a more reliable index than that of the banding station as to how weather conditions influence the feeding activities of birds.

17 Liberty St., Nantucket, Mass.

BIRD-NETTING AS A TECHNIQUE FOR BANDING SHORE-BIRDS

BY ROBERT CUSHMAN MURPHY

In November 1953, while at Manila as a delegate of the United States to the Eighth Pacific Science Congress, I observed the results of netting by a method that might serve in banding procedure.

The Philippine bird-catchers go at night to the borders of the rice fields and capture birds by using electric torches and hand-nets. The latter, which I did not see, are said to be of two kinds, one a long-