

AN OBSERVATION OF THE TERRITORIAL AND REPRODUCTIVE BEHAVIOR OF THE RED-WINGED BLACKBIRD

BARRY DEVINE

PART I

INTRODUCTION

The Red-winged Blackbird (*Agelaius phoeniceus*) is a territorial species that inhabits and breeds within our range from late February until its departure in early August. The following study was undertaken to observe and record the behavior of this species during its breeding cycle. Observations were made in an attempt to secure knowledge of such vital aspects as territorial behavior of the males, principal habitats selected, foods and feeding behavior, and for the females; arrival, behavior on the marsh, courtship, nest building, fledging of the young and eventual natality rates.

This first paper deals primarily with behavior up until actual nesting begins. A second, and later paper, will attempt to coorelate all observations made, from initial arrival until departure, with the attempt to ultimately add to and clarify the existing limited body of knowledge now documenting this species.

This paper will be divided into a number of sections. These areas will provide information on a variety of aspects of the breeding cycle. Some insight and clarification will be offered concerning previously documented research, though the time span of this study is short where many years are undoubtedly necessary. In addition, some ideas will be presented concerning an examination of what I have come to consider prime or preferred habitat and secondary or habitat of poorer quality. Here, the selection and maintenance of prime habitat by both males and females may show direct effects upon the vitality of the species.

PLANT COMMUNITIES AND THEIR SPECIES COMPOSITION

The area of the study is located on the south shore of Long Island between the towns of Blue Point and Bayport. It is a sizeable area that fronts on the Great South Bay and comprises approximately 200,000 square feet. It is a diverse area botanically and various portions of it are in different seral stages of succession. Basically I have divided the area into four general plant communities.

DUNE GRASS COMMUNITY

Along Great South Bay some 800 feet border the shore and are dominated principally by dune grass (*Ammophila breviligulata*), bayberry (*Myrica pennsylvanica*) and seaside goldenrod (*Solidago sempervirens*). For about 500 feet along the shore, dune grass is dominant with bayberry, poison ivy (*Rhus radicans*), groundsel tree (*Baccharis halimifolia*) and goldenrod growing in close relationship. Here the tide plays a very minor role, as the substrate is high enough so as not to be adversely affected. There are few entrances for salt water inundation of the wetlands that lie behind this dune community.

Further along the beach bayberry and goldenrod become dominant, with wild beach rose (*Rosa spp.*) having healthy distribution. The dune here has been washed away by tidal action and the waters continually erode from the base of the plants. Some have already died, but it is supposed that the sand removed in winter will be replaced to some extent in summer. The community shows wide diversity, being populated additionally by such species as greenbrier (*Smilax glauca*), *Prunus serotina*, *Acer rubrum*, *Ammophila breviligulata*, *Nyssa aquatica*, and *Amelanchier spp.* Essentially, this part of the beach is much farther along successionaly. At one time it may have been a bay mouth bar since it is approximately 200 feet long and nearly 150 feet wide separating the bay from the marsh to the north.

Generally then, the entire wetland area is separated from direct intrusion of salt water by a buffer beach. The waters of the bay do not inundate the marshes to the north except at extremely high tides and only then by flowing in through a narrow channel and a drainage area. This has a very discernible effect upon the vegetation of the more hydric areas to the north.

SWAMP — BOG COMMUNITY

The presence of many fresh water plants removes this area from classification as a salt marsh. Although tidal fluctuation has been noted on many occasions, the area is mainly influenced by entrance of fresh water. Succession has advanced rapidly and it is evident that some disturbance caused the area to retreat somewhat to its present state.

The dominant plant here is *Phragmites communis*. However, it grows in great stands but does not control the area totally. Large low areas of *Spartina patens* to the south generally give way to the more

hydric plants *Scirpus spp.*, *Althaea officinalis*, *Thelypteris palustris*, *Myrica pennsylvanica*, *Acer rubrum*, *Amelanceier spp.*, and *Typha angostifolia* and *T. latifolia*. The presence of such fresh water plants, trees and the nature of the quaking substrate place this area more into a swamp-bog stage rather than a salt marsh. In this area there are some large stands of cattail which are bordered on one side by larger trees such as red or swamp maple, shadbush and tupelo, bull-rush and marsh mallow border it on the other side where the level of the land is lower and shows a greater influence of fresh water.

OAK — MAPLE COMMUNITY

This is a rather small area in extent and lies just between the bog to the east and the salt marsh to the west. White oak, (*Quercus alba*), sycamore maple (*Acer pseudo-platanus*) and sugar maple (*Acer saccharum*) are dominant. The vegetation becomes increasingly dense as one penetrates in along the ditch which separates it from the west marsh. Together with the above dominants, *Nyssa aquatica*, *Salix nigra*, *Salix babylonica*, *Salix discolor*, *Robinia pseudo-acacia*, *Juniperus virginians*, *Amelanchier spp.*, and *Lonicera spp.* are prevalent. The area lies on a diagonal behind the beach community and extends as a border around the entire western and northern boundaries of the west marsh.

SALT MARSH COMMUNITY

This community is dominated alternately by such plants as *Spartina patens*, *Distichlis spicata*, and *Phragmites communis*. The first two often grow in dense mats covering large sections of the marsh. The last fills the other areas in great stands. To a lesser extent, the northern part of the marsh separated from the oak-maple community by a series of mosquito ditches, gives way to more hydric plants such as marsh mallow, bullrush, and some small stands of cattail. Tidal effect here is of greater influence than to the east, yet fresh water plays a strong role since tidal inundation is limited to narrow entrances.

As is apparent from the map of the area (Fig. 1), the general outlay shows a long narrow beach. Directly behind this is a salt marsh to the west and the swamp bog to the east. Between the two wetland areas lies the forest community and an adjacent field.

Both marshes were ditched heavily in the 1930's, but are not continually repaired though water does manage to flow in and out to some extent.

Male Red-winged Blackbirds normally arrive in this region during late February and early March. This study was begun in mid-February, and for the initial period before males arrived, the study area was mapped and partially classified floristically.

After arrival of the males the observation routine established was made to correspond with the presence of the males on the marsh. Observations made were usually in the early morning hours, or the hours just prior to sunset. Initially, male red-wings spend time establishing territories at these intervals and go into upland areas to feed during midday. Observations during the period before female arrival consistently found few if any males on the marsh.

As the study period progressed and females began arriving, intermittent observations were begun during midday. From that time on observations were done at various times during the day in order that all activities peculiar to a certain time would not go unnoticed.

TERRITORIAL BEHAVIOR OF MALES

Throughout our region in the northeast, there are many varied times recorded for the arrival of the male red-wings. As has been stated, late February and early March are the times when the majority of the birds arrive. On February 12 the first male was seen perched atop a tall oak tree, but it is felt that this was one of the so called "vagrants" that Allen (1914) refers to. They do not normally frequent the open marsh and are generally birds who have wintered not far south.

February 20 saw a group of 10 pass through the marsh, while the 21st had 3, with 2 calling in the typical "Konc Kee Ree" song.

Allen (1914) refers to these early arrivals, grouping them in a stringent system of categories which from observation tend to be less strict than previously supposed.

In the closing days of February, the 26th, after a heavy snow—the residents began arriving. Of the nine that arrived, all were mature males. Much calling and threat display was observed from each, however the low numbers inhibited any intrusion and conflict since much of the marsh was open to selection.

The territorial behavior of the red-wing has been dealt with to a great extent by Bent, Smith, Allen and a number of others. Basically though, the arrivals of the males on the marsh begin the selection of certain set territories wherein a male will display through the typical "bill-up" and "song spread" behavior. Ordinarily they will claim a certain size area from which all others of their species will be ex-

cluded. Even females are threatened and intimidated until the male is ready to mate. The male will move slowly from place to place mapping out the boundaries of his territory, and it will vary in size with the density of the males on the marsh and the individual bird's prowess in intimidating others of his kind. Smith (1973) calculated these areas to be anywhere from 1,000 to 10,000 square feet depending upon the above factors. The findings of this current study agree favorably with those figures. These areas then become personal breeding territories that males protect and which give them a certain advantage in mating.

Here I would like to introduce the terms prime habitat and secondary habitat. They will become very important in establishing the individual success of the male red-wing and provide information for a comparison of natality rates for the two areas, relating directly to a natural strengthening of the species gene pool.

From the beginning of territory selection, certain areas appeared to be favored over others. All males that arrived first began setting up these boundaries. In all cases these areas had a similarity not simply in plant species, but in vegetation type and size. Each territory fell on the perimeter of the marsh and botanically it was comprised of an area of low vegetation, and an area of higher more dense vegetation. The lower plants were mainly dense areas of bullrush, marsh mallow and some sort of open water; either a mosquito ditch or a low flooded area. Beyond this a portion of higher vegetation was always included. Most favorably this would be cattail or perhaps bayberry, high-bush blueberry, red maple or any such vegetation that was dense and from 4 to 10 feet tall. It is believed that the size, density and amount of protection offered by the vegetation is more important than the actual species itself though these factors are inherent to the species.

Then within a prime habitat was a lower area with some fresh water and another section of higher vegetation. Since young are fed almost exclusively insects, the wet areas and dense lower vegetation are explained as being advantageous in that respect. The higher vegetation provides suitable nesting area and protection for the female and young. This then is an interesting natural mechanism for increasing the vitality of the species. The strongest most dominant males would secure and hold the best territories; those areas including both open water and higher vegetation. Since females select territories on the basis of productive value and nesting sites, and not on the display and coloration of the male (Smith, 1973) this was a non-sexual selective factor of definite advantage in strengthening the gene

pool of the species. In essence then, males best in recognizing valuable territories will have a greater chance of mating with females selecting the best territories and in turn young will have a better chance of survival immediately and in future breeding cycles.

Secondary habitat was botanically inferior and was generally located in the open portions of the marsh and bog. Here there was dense vegetation, mainly *Spartina patens* and marsh mallow. Open water and flooded areas were not usually lacking but were more restricted. The one notable effect which seemed to have the greatest overall effect appears to be the lack of suitable nesting sites of minimal height and adequate protection. Largely, the tallest vegetation was *Phragmites communis*, and it does not grow densely enough as does cattail to provide required support and protection. Though Bent (1958) reports that red-wings frequently nest in the bullrush, buttonbushes, sedges and cattails, it is felt that prime nesting areas are of more suitable character in concealing and supporting the structure. It was found, and believed, that the secondary habitat is rich in dense lower vegetation but that the prime areas are selected first due to the presence of taller vegetation. In fact, of the eight nests located as of this writing, 7 were in what is considered prime habitat, concealed in bayberry, cattail, blueberry, maple and alder; and one was located in a fringe area poorer in quality but the nest built on one low stunted bayberry bush.

The males then have selected and are actively defending their territories. Conflict initially between males on the marsh was very low as species density was also low. Areas of prime habitat were always selected first by arriving males, and as it turned out, all were mature. This indicates that all of the mature males were able to identify prime habitat for mating purposes. Perhaps there is some mechanism which has selected the best to move north first.

From the beginning it was noted that calling was limited to the hours immediately after sunrise and before sunset. Midday is reserved for feeding in the upland meadows on the primary weed seed foods. The study area was generally devoid of all red-wings during midday and territories were left unguarded.

As the study period continued and more mature and later immature males arrived, all prime habitat was filled and the poorer or secondary habitat was partly filled. Before secondary habitat was filled however, stiffer competition was noted in the prime areas. Many individual mature males entered held territories but were quickly intimidated by resident males and left. As is usual in most cases of

territorialism, an animal is dominant within the bounds of his territory. Threats and displays are all that is normally needed to force off an intruder. Beyond his territorial boundary however, the resident animal quickly loses his edge and is forced back himself. For this reason, threat and displays replace actual fighting and it is the exception where the chase and fight is seen. Within the study period though, there were definitely times when conflict was more intense, and physical conflict was common. These occurred just prior to the arrival of the females and the building of nests. At both of these times conflict increased markedly over previous weeks and remained so for 2-3 days.

The call of the male red-wing does not appear normally to be directed at any individual bird. In fact intruding males are often frightened by merely the arrival of the resident in their vicinity. The display of puffed-up wings and threat call are often made in the opposite direction to the intruder, though still they have their intended effect. What was interesting though was that mature male intruders will sometimes enter a territory, display and call; while immatures often enter in groups of from 3-5 and are never seen to call or display and in all cases observed were unsuccessful in ousting a resident male.

No banding was done so ultimate determination of the numbers of deposited residents is unknown. However, most resident males were seen to call from certain preferred locations on the periphery of their areas and from knowledge of this it was ascertained that as is generally thought, replacement is infrequent, perhaps rare. Territories though are subject to changes. From initial boundaries, the size of the territory may be diminished on many sides as intraspecific competition increases and more dominant males are able to extend their own boundaries. This allows more males to inhabit a smaller area until it reaches carrying capacity, though the effect upon clutch size and condition is unknown. Observations lead me to believe that this occurs largely in prime habitat, and that secondary habitat territories are greater in size and are infrequently intruded upon or diminished.

Conflict in the study area appears to be cyclical in nature. With the initial arrival of the males and plenty of habitat available, conflict is minimal until perhaps 7-10 days later. At this point most territories have been established and the arrival of large numbers of mature and immature males causes the conflict for territory to increase greatly, becoming overt. Lasting for some 2-3 weeks actual chases and fighting are common as competition from intraspecific inter-

action becomes intense. Finally, as territories are diminished and to some unknown degree lost and regained, competition decreases to a minimal level. At this time no overt actions are observed, and the only mechanism needed to force off an intruder is to meet him before entrance.

Approximately a week before the arrival of the resident females, competition increases greatly in intensity. The overt hostility of chases and actual fighting are continually observed, as are consistent intrusions on resident territory. From all indications it appears that there is some mechanism through which males become aware that females are arriving and mating is in the offing. Perhaps it is the arrival of one or two females in the area that triggers this behavior. Almost instinctively the males without territory, peripheral males, realize the importance of this time and desperate attempts are made to secure territories.

Within a week or more competition has become minimal again. The area appears quiet but for the continual calls and displays that are usually directed at no one bird in particular.

A day or two before actual nest building was observed, conflict again grew intense in the same manner. Many more intrusions were observed and the area was alive with chase and combat. Here again it appears that some mechanism signals the beginning of nesting. Instinctively the peripheral males are aware that mating is about to occur. Desperate attempts are again made to secure a mating territory.

Since red-wings are considered promiscuous and females ordinarily have anywhere from 2-4 clutches per season (Bent, 1958) at this point in the study it is not known whether this increase in competition from the peripheral males continues throughout the entire nesting period until mid-July. However, it is doubtful since Smith (1973) concludes that territories break down after young fledge. This must of necessity be when the young of the last clutch fledge, so that boundaries are kept up for the entire period. Still it is not known whether the first mating dispenses the conflict for territory or whether this conflict from peripheral males continues unabated with the numerous nests built.

Several observations in areas other than this study area reveal some trends not previously documented. Though Bent (1958) concludes that the birds prefer areas located near water, they are found in dry uplands a considerable distance from water. Observations recorded by Black (1974) have revealed territorial activity in dry uplands in a grass and cedar stage. These males have been seen to estab-

lish well delineated territories though the areas are well removed from the vicinity of water or marshes. Bent only states a considerable distance, but what does this mean? Black's observations reveal that these territories were approximately one mile from the nearest water. Does this indicate that these are perhaps the peripheral males of the inhabited marsh that intraspecific competition has caused to expand their range and forage for alternate foods and nesting area? However, additional observations may reveal that these are acceptable diversions and of no consequence.

Another interesting fact observed by this author is in relation to the roosting behavior of male red-wings. They are known to leave the established territories sometime after sunset and travel to the roosts where several hundreds or thousands of both red-wings, grackles and starlings may spend the night. The roost area observed was located in a small white pine forest at Suffolk Community College. Depending upon the time of sunset, the three species began to arrive. During this time male red-wings were observed calling and displaying amidst the community in the pine forest. Investigation of previous research mentions nothing concerning territorial activity within a roost. In fact, I assume it to be non-existent since the birds are in large numbers in a small area and any establishment of a territory would be inconceivable. Yet these males that were calling and displaying continually within the roost were not observed during the day and one can only assume that however unsuccessful, they were in fact attempting to claim a certain area.

In all, within the study area, approximately 45-50 territories were established in both prime and secondary habitat. The relationship to numbers of females will be dealt with in a later section, as will natality of young produced in relation to the two varied habitats.

Box D, Mecklenburg, New York 14863