

**Brown-headed Cowbird and their  
Impact on Songbirds**



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**2002**

**Abstract:**

In recent decades, many environmental organizations, conservationists, and biologists have argued that the Brown-headed cowbirds are a major threat to migratory songbirds population. Therefore, I discuss broad aspects about the Brown-headed cowbirds, including nesting and breeding ranges, nurture, and scientific classification. Then, I explain briefly the Brown-headed cowbirds' behavior in the host species' nest and brood parasitism as well as the reaction of the host species against parasites. Moreover, function of the edges and distance in both forested and fragmented landscapes are very important factors that have impact on both the Brown-headed cowbirds and songbirds. Finally, I conclude by talking about the negative activities by humans and some strategies that are used to control the Brown-headed cowbirds parasitism.

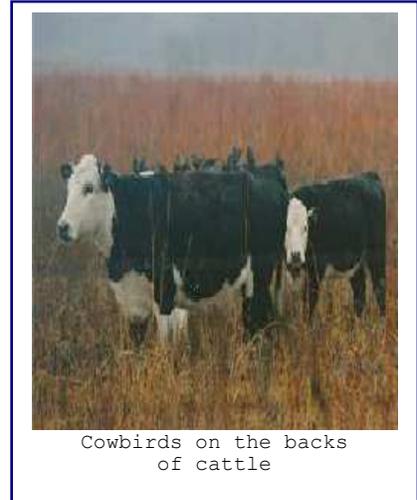
**"In the fight of the 21<sup>st</sup> century, Brown-headed Cowbirds vs. Songbirds, we will determine who wins. We should consider our options carefully, using the best scientific information we have to make management decisions that will benefit migratory songbirds" (10)**

### **Introduction:**

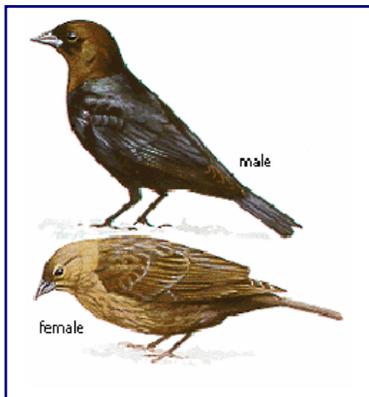
In North America, there are only two cowbirds, Bronzed cowbirds (*Molothrus aeneus*) and Brown-headed cowbirds (*Molothrus ater*), and the latter has the ability to adapt to new geographic regions and various habitats (7, 16). There are over 220 different species that have been parasitized by cowbirds, and there are approximately 140-150 various species have raised cowbirds' offspring (7, 10). The estimate of the cowbird number is up to 60 millions birds, and the females have the ability to lay 40 eggs per season (10). The initial focus of this paper is the Brown-headed cowbirds and their impact on the host species such as songbirds. The Brown-headed cowbirds, in the eye of many conservationists and biologists are seen as the most famed parasite on songbirds in North America (1, 21). As a result, many studies have shown that productivity of songbirds' population decline over the several years because of predation and parasitism (8, 15, 19, 20, 21). However, insufficient information is known about the impact

on the host species that is caused by Brown-headed cowbirds, even though copious studies had been done in the past decades about the Brown-headed cowbirds (3).

In their article, Sasser and Johns reveal that the Brown-headed cowbirds are called "buffalo birds", and they were restricted to short-grass lands (10) before Europeans settled North America (8). Brown-headed cowbirds live in the Great Plains and follow livestock such as cows, bison, and horses. Therefore, they feed on the insects stirred on the livestock's backs (3).



**Physical Characteristics and Classification:**



The Brown-headed cowbirds are small blackbird with a short conical bill and long, pointed wings, and a length of 6.5 inches. The bill is a dull gray, and the eyes are dark black. Males have distinctive black with a unique brown head and neck, whereas females are either gray or brown on upper-parts with a pale throat (11).

The Brown-headed cowbirds belongs to the kingdom of **Animalia**, the phylum of **Chordata**, the subphylum of

**Vertebrata**, the class of **Aves**, the order of **Passeriformes**, the family of **Fringillidae**, the genus of **Molothrus**, and the species of **Molothrus ater** (11).

**Nesting and Breeding:**

Following livestock makes it difficult, or even impossible for Brown-headed cowbirds to establish their own territories and nests to feed and raise their offspring (3, 10). Therefore, they use a breeding strategy known as "brood parasitism" (3) to ensure the continuum of their population. Generally, in such a strategy, Brown-headed cowbirds lay their eggs in the nests of other species where the host species rear the eggs as their own chicks (9, 14). Moreover, for a successful breeding, Brown-headed cowbirds require sparse forests, riparian areas, clear-cut, edges (16), and agricultural and residential openings (18, 19).

Having briefly discussed the nesting and breeding, the mating system of Brown-headed cowbirds is monogamous, a mixture of monogamy, or promiscuity. The mating regulation is affected by two factors: (a) the spatial distribution of the host species nests, and (b) the proportion of males and females of the Brown-headed cowbirds' population.

Furthermore, Brown-headed cowbirds female area ranges are either (a) small range to allow males to protect their mates and result in monogamous or polygynous relationships,

or (b) large range, resulting in promiscuous relationships (7).

### **Nurture and Feed:**

Basically, Brown-headed cowbirds forage on the ground but rarely in vegetation (8, 10). They feed 75% on seeds and 25% on arthropods (e.g. beetles and grasshoppers) (10) in higher fragmented landscapes where there is an abundance of feeding habitats (e.g. agricultural and suburban areas) (5, 8, 15, 21). For example, waste grain in rice (*Oryza sativa*) fields in southern states provides a great deal of food resource for many species, including the Brown-headed cowbirds (8).

### **Distribution of Brown-headed Cowbirds:**

Former to the 1800s, the Brown-headed cowbirds only inhabited the plains and prairies west of the Mississippi River (8). They were completely absent from places such as dense, old-growth forests, and unbroken forests, which covered most of eastern North America (8,12). The expectation of such an absence was due to the lack of feeding habits as well as the limited social behavior, which restricted the Brown-headed cowbirds only to open habitats (8).

However, more productive habitats were created by the first settlers in the eastern part of the United States for

farming, which in turn provides more opportunities for the Brown-headed cowbirds to expand their population and inhabit new areas (8,14)

Toward the end of the 1800s, Brown-headed cowbirds were widespread in the eastern North America. Even though they have such a wide distribution, they were not abundant. However, they were limited to cultivated lands. Thus, the population of the Brown-headed cowbirds has remarkably increased in recent decades (8).

In addition to that, the United States Department of Agriculture, Forest Service (USDA) describes the wildlife distribution and occurrence of the Brown-headed cowbirds as the following (4):

**Breeding Range:** The range of brown-headed cowbird extends from southeastern Alaska, northern British Columbia, southern Mackenzie District, northern Alberta, and north-central Saskatchewan; east to southern Manitoba and southern Newfoundland; south to central Florida, the Gulf Coast, and southern Texas; and south in Mexico to Oaxaca and northern Baja California.

**Winter Range:** The brown-headed cowbird winters from northern California, central Arizona, the Great Lakes States, and New England south to Mexico, the Gulf Coast, and southern Florida.

#### **Behavior and Brood Parasitism:**

There are numerous studies that have been conducted to achieve better understanding the behavior and the brood parasitism of the Brown-headed cowbirds. As mentioned,

Brown-headed cowbirds are considered as professional parasites on many host species nests. To be able to effectively reproduce, the Brown-headed cowbird females have a high ability of spying and watching other birds building their own nest and birds sitting on their nests. They continue doing these things until the opportunities present themselves (10).

After locating the apposite nest, the Brown-headed cowbird females begin to play the interesting game. They remove one egg from the nest and lay one of their own for several days in various nests (5, 6, 8, 13, 16). The purpose of this behavior is to lay as many eggs as possible (10).

Generally, the Brown-headed cowbird females lay about 40 eggs per season (1, 10). These eggs have a length of 8 inches. They differ from the host's eggs by having brown to black spots (7). Usually, they hatch earlier than the host species' eggs (9, 10), with a 12-day of incubation period



(1, 10). The Brown-headed cowbird's offspring are larger than the host's young, so thus, they have more chances to dominate and garner a large amount of food brought to the nest, so they grow faster than the host's young (7, 9, 10).

### Host Reaction against Parasites:

Many host species lack the ability to protect their own nests or do not recognize the parasite's eggs. These species include (e.g.) Warblers, Vireos, Phoebes, and Song Sparrows. However, there is a number of species that can reject the Brown-headed cowbird's eggs such as Robins, Catbirds, Blue Jays, and Brown



Female black-capped vireo  
feeds cowbird chicks  
in her nest

Thrashers (1, 7, 10). In one of his behavioral experiments, Rothstein concludes that some North American species have recognized the Brown-headed cowbird's eggs and learned to reject them (7). He states that knowing some information such as having the same taxonomic groups, the lengths of association with Brown-headed cowbirds, the distinguishable eggs, and the ability for rejection, the behavior of accepting and rejecting the eggs is still a central mystery behavior (7).

In addition, there are some different strategies that can be used by the host species to eradicate the eggs of the Brown-headed cowbirds. Strategies include destroying the eggs, rebuilding the nest to cover the Brown-headed cowbird's eggs, or deserting the parasitized nests (7, 8).

### **Edge Effects and Distance:**

Edge effects are considered one of the most destructive results of habitat fragmentation. To better understand such effects, it is imperative to provide a clear definition about the meaning of the edge. The edge as defined by Yahner is " the junction of two different landscape elements (e.g. plant community type, successional stage, or land use" (15, p.334). Moreover, the edge effect refers to several environmental changes such as diversity, abundance, and spatial distribution of wildlife communities (15).

The Brown-headed cowbirds associate with edge areas where they can be more close to the host species habitat and nests (16, 20). Thus, the closer the host species to the edges, the more likely they will severely suffer parasitism by the Brown-headed cowbirds (1, 14). For instance, a study conducted by Goguen and Mathews (2000) revealed that the Brown-headed cowbirds abundance decreased when the distance from active livestock grazing areas increases, but it is not related to the host density or habitat types (14). For example, Brittingham and Temple classified forests into three types based on cover type (agricultural fields, recently logged areas, or brushy second growth). They found that the Brown-headed cowbirds

do not distinguish between these types of openings (8). Furthermore, examining the abundance of Brown-headed cowbirds, many studies concluded that density of Brown-headed cowbirds was inversely related to the distance from the habitat's edge (5, 6, 8, 14, 18).

Generally, Brown-headed cowbirds have the ability to commute up to 7km between their breeding habitat and opening habitat (5, 9, 18). They are largely absent from heavily forested habitat (5, 16). In their study, Brittingham and Temple categorized host species nests into four groups based on the distance from the nest to the closest edge in an area > 0.2 ha forest as follows: 00-99m, 100-199m, 200-299m, and  $\geq$  300m. They concluded that 26 nests out of 40 were parasitized between 00-99m; 17 nests out of 37 were parasitized between 100-199m; 4 nests out of 11 were parasitized between 200-299m; and 3 nests out of 17 were parasitized beyond 300m. As a result, the relationship between Brown-headed cowbirds parasitism and distance from the edge is counteractive. The number of parasites declines when the distance from the edge increases (8).

#### **Landscapes and Forest Fragmentation:**

Fragmentation has been considered as one of the most major factors that lead to the decline of many wildlife species, including songbirds (8, 15, 21). The population

rate of the Brown-headed cowbirds is observed to be higher in fragmented landscapes than it is in forested landscapes due to the availability of food resources (1, 2, 5, 9, 12, 16, 19, 20) regardless of the abundance of host species (5). Furthermore, the Brown-headed cowbird's eggs, for example, are found more in some landscapes than Wood Thrush's eggs per nest (5, 13). That is, the Brown-headed cowbirds parasitism abundance is very low in heavily forested landscapes (5, 20, 21).

Knowing that Brown-headed cowbirds prefer fragmented forests, they most often appear in agricultural and residential landscapes near edges rather than in interior and continuous forests. To justify this tendency, it is more difficult for the Brown-headed cowbirds to penetrate heavily forested landscapes. Being in fragmented landscapes makes it easy for them to forage and search for host species nests (1, 17). Additionally, more edges are created in fragmented landscapes, which force interior songbirds to expose their nest near the edges to avoid the effect of Brown-headed cowbirds parasitism (16).

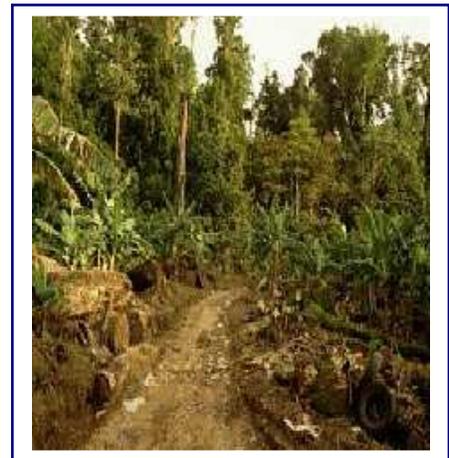
Songbirds are more likely to successfully reproduce in large forested areas as well as old-growth forests (8, 13). Songbirds are very infrequent in, or even absent from, small patches. Bond (1975), in Brittingham and Temple,

found that songbirds are rare in small patches of forests (8). Also, many songbirds (e.g. Warblers, Flycatchers, Tanagers, and Thrushes) that nest close to forest edges lack the ability to cope the negative impact of the Brown-headed cowbirds parasitism (16).

### **Human Activities:**

Should the entire blame be directed to the Brown-headed cowbirds? Wolfe questioned. He believes that it is the human iniquity in creating massive clear-cuts in landscapes all over North America (3, 19). Humans provide golden opportunities for predations and parasites such as the Brown-headed cowbirds to expand their geographical range (3, 10).

Researchers indicate that human activities have negatively contributed both directly and indirectly to many changes to Mother Nature. These alterations somehow influence songbirds' habitats (9). For example, changes may include agriculture, grazing, deforestation, and residential development (1). As a result, such changes have become ghastly to migratory songbirds (9).



Even though conservationists and environmental organizations significantly accuse the Brown-headed



cowbirds as a major cause of the decline of songbird population, several studies fail to show and explain the Brown-headed cowbirds' impact on the host species (1).

However, beside the Brown-headed cowbirds parasitism factor, Wilcove

suggests several important factors that have contributed to the songbirds decline. These factors include, but are not restricted, "the loss of winter habitat in Latin America, a low rate of colonization and a high rate of extinction in small and isolated woodlots, the lack of critical microhabitats or food resources in small tracts, and higher rates of nest predation in small woodlots compared to large forest tract" (2, p.1211).

#### **Management Implication:**

Reducing Brown-headed cowbirds parasitism is very important goal to be achieved in order to protect many songbirds in the United States (14). Songbirds migrate to Latin America in the wintertime, so controlling Brown-headed cowbirds in North America is not necessary since there is little evidence that show effects on host species

(1, 10). However, it is not easy to develop effective solutions to prevent, or at least lessen the impact of the Brown-headed cowbirds.

Land managers, conservationists, and environmental agencies suggest several strategies to control and manage the Brown-headed cowbirds' impact. One strategy is livestock removals. In this strategy, livestock is removed away from the host breeding habitats at least during the breeding season. The aim behind removing livestock is to reduce the impact of the Brown-headed cowbirds, and then, to protect the most endangered and threatened species along the forest edges (14).

Another common strategy is known as a trapping technique. Trapping is regarded to be very expensive and likely kills non-targeted individual species (10), although it is the most effective technique for reducing the number of Brown-headed cowbirds (1). In such a technique, traps are put in small patches and located where Brown-headed cowbirds gather along with the forest edges (1, 10).



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