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## PREVALENCE OF PARASITISM BY *Amblyomma americanum* ON WILD TURKEY POULTS AS INFLUENCED BY PRESCRIBED BURNING

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**Abstract:** Captive-raised eastern wild turkey (*Meleagris gallopavo silvestris*) poults were allowed to forage on either recently burned plots or on plots that had not been burned during the previous 3 years. Following a two hour exposure on the study plots, external parasites were recovered from all poults. The louse (*Menacanthus stramineus*) and the lone star tick (*Amblyomma americanum*) were the only parasites recovered. Fifty-nine poults exposed to the burned plots had a significantly ( $P < 0.001$ ) lower prevalence of *A. americanum* infestation than did 57 poults exposed to the unburned plots. Thirty-five percent of the poults exposed to the unburned plots were infested by *A. americanum*. A single *A. americanum* was recovered from one poult exposed to burned plots.

### INTRODUCTION

Prescribed burning of forest litter and underbrush is an accepted and widely used silvicultural practice in the southeastern United States. These burns enhance pine timber production and are often beneficial to certain forms of wildlife. Burning facilitates rapid turnover of nutrients and generally increases the quality of wildlife foods. Additionally, prescribed burning of pine forests has a favorable influence on plant community structure for species of wildlife such as the bobwhite quail (*Colinus virginianus*), white-tailed deer (*Odocoileus virginianus*) and the eastern wild turkey (*Meleagris gallopavo silvestris*).

The use of prescribed burning as a tool for wildlife management has been reviewed by several authors.<sup>1,6,8</sup> Prescribed burning has been used in the management of a wide range of North American wildlife species, including grouse, turkey, song birds, quail, deer, elk, moose and waterfowl. Despite the use of prescribed burning as a wildlife management tool, there is a paucity of definitive information on its applied value for control of wildlife diseases.

General statements have been made on benefits of fire as a tool for parasite control,<sup>4,5,7,8</sup> although descriptive documentation of the effects of burning on the prevalence of parasites is lacking.

The present study was undertaken to evaluate differences in ectoparasite infestations of eastern wild turkey poults allowed to forage on either recently prescribe burned areas or on areas that had not been burned during the previous three years.

### STUDY AREA

This study was conducted in May, June and July, 1977 on Noxubee National Wildlife Refuge in Noxubee County, Mississippi. Study areas were located in a mixed pine-hardwood stand with loblolly pine (*Pinus taeda*) being the dominant species. The hardwood component was dominated by southern red oak (*Quercus falcata*) and post oak (*Q. stellata*). Average basal areas were 12.6 m<sup>2</sup>/ha for pine and 6.1 m<sup>2</sup>/ha for hardwood. The forest was of uneven age but averaged about 45 years old. The entire forest was prescribe burned in

February, 1962 and since that time received two stand improvement treatments and one combination pulpwood-sawtimber cut. The forest was burned six more times from 1962 to 1974. The entire forest was control burned again in March, 1974, and a long term study of wild turkey poult food habits, nutrition, behavior and brood habitat management was initiated by the junior author.

Sixteen 0.65 ha plots (41 m  $\times$  161 m) were established on the area in February 1974. Alternate plots were burned in November, 1975, and the same plots were burned again in February, 1977. The prescribed burns consumed all litter and the crowns of all brush. Initially, alternating plots consisted of areas burned 3 months previously and unburned areas in their fourth year of vegetative growth.

#### MATERIALS AND METHODS

Twelve groups of eastern wild turkey poults containing from 7 to 11 individuals were obtained between May and July from a captive flock belonging to the Department of Wildlife and Fisheries, Mississippi State University. Newly hatched poults were imprinted on domestic chicken hens which served as maternal substitutes. All poults were provided training runs with their maternal substitutes within the compound where the captive flock was housed. This area consisted mainly of short grass and herbaceous cover. During training runs, poults were allowed to range freely with their maternal substitute.

At 8 to 12 (median 9) days of age, each group of turkey poults was released on one of the 16 pre-assigned subplots for a period of 2 h. Poults were then killed, placed in individual plastic bags and frozen for later examination. An attendant accompanied the birds at all times to insure that poults did not leave the plot. Due to inclement weather, four of the 12 trials were only of 1 h. duration, and two were only 70 min.

A total of 59 and 57 poults was allowed to range on the burned and unburned areas, and total exposure times were 100.8 and 97.7 poult hours, respectively.

An attempt was made to recover all external parasites from each poult through careful visual examination. However, since magnification was not used, very small external parasites may have been overlooked. Plastic bags also were carefully examined. The chi-square procedure was used for statistical analysis of the data.<sup>1</sup>

#### RESULTS

Only two species of parasites were recovered, the louse (*Menacanthus stramineus*) and the lone star tick (*Amblyomma americanum*). Nine *M. stramineus* were recovered from 8 of the 116 poults. Three of these poults were from those assigned to unburned plots and 5 of the poults were from those assigned to the burned plots.

Only nymphal stages of *A. americanum* were recovered. Poults exposed to burned plots had a significantly ( $P < 0.001$ ) lower prevalence of *A. americanum* infestation than did those exposed to the unburned plots (Table 1). Average prevalence of infestation was 2 and 35 percent. The total number of ticks recovered were 1 and 41 for the burned and unburned areas, respectively (Table 1).

#### DISCUSSION

There was not a significant ( $P < 0.05$ ) difference in the prevalences of infestation by *M. stramineus* between poults exposed to the burned or the unburned areas. Probably this parasite was acquired by poults through contact with the maternal substitute. Chickens used as maternal substitutes had a history of lice infestations and had been treated for these parasites on several occasions. However, Kellogg *et al.*<sup>2</sup> reported *M. stramineus* as the most frequently en-

TABLE 1. Lone star tick (*Amblyomma americanum*) infestations of 9-day-old eastern wild turkey poults exposed to a newly burned area (burned 3.5 months previously) and an unburned area (not burned during the previous 3 years) in a pine mixed hardwood forest.

Exposure Date	No. Poults		Mean Minutes of Exposure Time Per Poul				Percent Infested		Total Ticks Recovered	
	Burned Area	Unburned Area	Burned Area	Unburned Area	Burned Area	Unburned Area	Burned Area	Unburned Area	Burned Area	Unburned Area
5-31-77	10	10	60	60	0	70	0	15		
6-6-77	9	9	120	120	11	33	1	3		
6-10-77	-	11	-	120	-	9	0	1		
6-16-77	12	10	120	120	0	70	0	20		
6-21-77	11	10	70	70	0	10	0	1		
7-8-77	9	-	120	-	0	-	0	-		
7-8-77	8	7	60	60	0	14	0	1		
Total <sup>a</sup>	59	57	103	103	2	35	1	41		

<sup>a</sup>Percent infested of poults exposed to burned area is significantly different from that of those exposed to the unburned area at  $P < 0.001$  ( $\chi^2 = 40.3$ , 1 d.f.).

countered parasite of the eastern wild turkey.

There were apparent differences between tick infestations acquired during individual sampling runs. Poults exposed to unburned plots on 31 May and 16 June had much higher infestations than those exposed to unburned plots during the remaining sampling periods (Table 1). Notes on meteorologic conditions were kept on all sampling days. Wind velocity, temperature, humidity and cloud cover were not noticeably different on 31 May and 16 June from the other days. Additionally, vegetative cover and species composition on all unburned plots was similar. Although *A. americanum* has many host species, most host activity is confined to spatially distinct ecotones such as runway, nesting, loafing and feeding areas. Because of this, clumped parasite distribution would be expected and may be the reason for differences in parasite prevalence seen during different sampling periods.

The results of the study indicate major differences in prevalence of parasitism by *A. americanum* on burned areas com-

pared to unburned areas. This difference can not be accounted for by exposure of poults to ticks prior to release on experimental plots since individual broods of poults were randomly assigned to maternal substitutes and prior exposure conditions were identical for all broods. If it is assumed that turkey poults are active for a 12-hour period during daylight hours and rates of infestation observed in the present study are reflective of normal prevalence of parasitism by *A. americanum*, the average poult would be infested by less than 2 ticks per week on the burned areas and about 35 ticks per week on the unburned areas. Thus, the practice of prescribed burning may have an important value as a management tool for reducing parasitism by *A. americanum* on turkey poults. The use of prescribed burning as a practical management tool for control of other parasitic and infectious diseases of wildlife remains unknown. However, the results of this study indicate that further investigation into the relationship between fire ecology and wildlife disease could result in improved disease management practices.

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