

## GENERAL PHYSICAL PARAMETERS AND HEALTH CHARACTERISTICS OF TRANSLOCATED RACCOONS

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*Abstract:* Basic physical parameters and health characteristics are presented on raccoons (*Procyon lotor*) representative of animals offered for sale to raccoon hunting clubs in the southeastern United States. Comparisons were made with similar data on samples of wild raccoons live-trapped by noncommercial wildlife agencies. Raccoons from animal dealers had more fresh bite wounds and fracture calluses, significantly greater numbers of infected soft tissue lesions ( $P < .05$ ), and generally were in poorer physical condition than animals live-trapped by game biologists. Bite wounds, and infected soft tissue injuries which may have originated as bite wounds, were considered as an enhancement factor for possible rabies transmission. The generally poor physical condition of the raccoons offered to hunters for purchase was viewed as a possible factor contributing to the low survival previous authorities have reported in translocated raccoons.

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Translocation of raccoons for hunting purposes is a controversial game management practice which has occurred on a large scale throughout the southeastern United States. At present, most of this "restocking" is done by private hunting clubs in the Appalachian Mountains. Many areas in these mountains have extremely low resident raccoon populations, and attempts are made to bolster raccoon numbers by release of animals obtained from distant states. Most translocated raccoons are purchased from commercial dealers for \$10 to \$20 per animal, and since hundreds of animals are used, these "restocking" efforts are costly.

At least 6 studies have been made in which ear-tagged raccoons were released in unfamiliar territory (Giles 1943, Nelson 1955, Johnson 1970, Frampton and Webb 1973, Lehman 1976, Wright 1977). A compilation of the results from these reports yielded an overall ear-tag recovery of 1.9%, which is indicative that raccoon translocation is deplorably inefficient. Furthermore, several studies showed that considerable mortality occurred shortly after release (Lehman 1976, Wright 1977).

Since July, 1977, our agency has conducted a comprehensive disease and parasite study on raccoons representative of animals intended for translocation. Necropsy examinations have furnished considerable information on the general health characteristics of these raccoons. This information is presented herein to give insight to the poor survival of these raccoons after release.

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## MATERIALS AND METHODS

From July, 1977 to April, 1978 36 live raccoons from commercial sources were examined. Of these animals, 26 were purchased in 3 lots from a dealer in Brownwood, TX, and 10 were bought from a dealer in Williamsburg, VA. Animals from dealers were caged singly or in pairs during shipment, and *in transit* time varied from 1 to 5 days. Housing facilities prior to shipment were unknown.

For comparison with the raccoons from commercial sources, pertinent data from 38 non-commercially acquired raccoons were used. Animals were live-trapped in Glades County, FL, (N = 12), Liberty County, GA, (N = 10), Hawkins County, TN, (N = 6), and Ohio County, WV, (N = 10). These samples had been collected under permit through the aid of the respective State Conservation Agencies and the St. Catherine's Island Survival Center. Raccoons in the non-commercial samples were held in individual cages for up to 15 days prior to necropsy.

The same necropsy procedure was used throughout. Animals were killed humanely, and sex, age, and weight were recorded. Age was estimated by tooth wear, body size and sexual characteristics (Johnson 1970). Each raccoon was given a complete external inspection and all lesions were recorded. Fresh penetrating wounds or linear tears in the skin which appeared to be bite wounds were classified as such. All raccoons were skinned to search for subcutaneous trauma and musculoskeletal damage. Four rankings were given for physical condition, viz., poor, fair, good, and excellent. Raccoons rated in poor condition were emaciated, whereas those in fair condition had adequate muscle but were without fat. Animals in good and excellent condition also have normal muscle tissue; however, those in good condition had light to moderate body fat, and raccoons in excellent condition had heavy depositions.

Differences in proportion for various wounds were analyzed by methods given by Dixon and Massey (1969). A chi-square test for independence was made to evaluate physical condition in relation to the two types of animal sources.

## RESULTS

Sex, age, and body weight data on the raccoons from commercial and non-commercial sources are summarized in Table 1.

Table 1. Age structure and body weight data on 36 raccoons from commercial sources and 38 raccoons from noncommercial sources.

Age and Sex	N	Commercial		N	Noncommercial	
		Body Weight (kg)			Body Weight (kg)	
		<i>x</i>	<i>s</i>		<i>x</i>	<i>s</i>
Ad. Male	16	4.58	0.92	18	4.32	0.68
Ad. Female	9	3.59	0.64	8	3.95	0.88
Subad. Female	6	2.86	0.63	4	2.68	0.24
Subad. Male	4	3.42	0.23	4	2.88	0.59
Juv. Male	1	2.02	---	3	3.67	0.75
Juv. Female	0	---	---	1	4.78	---

Numerous external lesions were evident in the raccoons from animal dealers. Eight percent had apparent bite wounds at various locations on the body. Bite wounds were not found in the noncommercially-acquired raccoons. Infected soft tissue lesions excluding fresh bite wounds, viz., abrasions, cutaneous ulcers, abscesses or swellings, were present on at least 1 extremity (leg or tail) of 47% of the dealer-procured raccoons. Thirty-six percent of the sample had similar wounds on the head, neck, or body. Overall, 61% of the dealer-procured raccoons had wounds. In the non-commercial animals, 5% had extremity lesions and 21% had wounds on the head, neck, or body. The total percentage for external lesions in the latter sample was 26%. Extremity lesions and total external lesions were significantly more frequent in the raccoons bought from dealers ( $P < .05$ ).

Fracture calluses were present in the skeletal systems of 4 of the commercial animals. Two additional raccoons in this group had a front leg missing below the elbow. Old fractures were not found in the non-commercial raccoons; however, freshly broken canine teeth were more prevalent ( $P < .05$ ) in these subjects (34%) than raccoons of dealer origin (8.3%).

Table 2 summarizes the physical condition data for both groups of raccoons. A chi-square test suggested that physical condition was dependent upon animal source ( $P < .001$ ).

Table 2. Physical condition ratings for raccoons from commercial (N = 36) and noncommercial (N = 38) sources.

Source	<i>Physical Condition</i>			
	<i>Excellent</i>	<i>Good</i>	<i>Fair</i>	<i>Poor</i>
Commercial	0	9	22	5
Noncommercial	4	24	10	0

## DISCUSSION

Raccoon translocation often is conducted in late winter and early spring (Wright 1977), apparently because raccoon hunters have hope to further increase raccoon populations by reproduction subsequent to release. The age and sex ratios of the animals we examined were not in proportions which would favor such a phenomenon since only 25% (9/36) of the translocated raccoons were adult females. The reproduction significance of the 17% (6/36) subadult females in the sample during the year of release probably was negligible (Johnson 1970). Furthermore, 2 radio-telemetry studies contain accounts of neonatal deaths in young born to females after release (Frampton and Webb 1973, Wright 1977).

Bite wounds inflicted during captivity probably were responsible for many of the infected soft tissue lesions found in translocated raccoons. Of great importance is the opportunity for rabies transmission via wounds acquired in captivity. This disease is considered enzootic in raccoons in Florida (Prather et al. 1975), and recent studies by our organization have revealed rabid raccoons in commercial shipments from that state (SCWDS, unpublished data).

Physical condition ratings definitely were lower for the raccoons that originated from dealers; however, without data on the health of these raccoons prior to their capture, one cannot postulate that commercial husbandry practices were responsible. Changes in health status could have occurred after shipment from the dealers; however, there was not any marked difference in shipping procedures between the two groups. In addition to the 36 live raccoons examined from commercial shipments, there were at least 18 other animals which were known to have died in transit. Mortality did not occur in the non-commercial shipments.

The salient feature of this study is the indication that raccoons purchased by hunters for translocation generally are not good physical specimens. Regardless of the reason for this poor health status, the survivorship of these animals in unfamiliar territory undoubtedly is compromised.

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