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**Silphidae Attraction to Carrion-Baited Air Cans Versus
Carrion-Baited Ground Cans**PAUL P. SHUBECK¹

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INTRODUCTION

A number of studies relating to carrion beetles and carrion have been conducted during the last 25 years. Dethier (1947) suspended squirrel carcasses in the air as bait. Milne and Milne (1944), and Reed (1958) simply placed their carrion baits on the ground, while Walker (1957) used ground cans in which the carrion was placed. All of these authors obtained interesting results in their studies but I have seen no published study comparing the attraction, to carrion beetles, of carrion situated in the air versus carrion placed on or in the ground. The 1964 data used in this paper were taken from a portion of my doctoral thesis (1967). The 1965 data, although obtained during my doctoral research studies, were not included in the thesis. All collecting was done in the William L. Hutcheson Memorial Forest, which is located near East Millstone, Somerset Co., New Jersey.

METHODS

Eight galvanized, one gallon cans were individually baited, each with an uncooked chicken leg. One set of 4, the ground cans, was buried with the open ends level with the surface of the soil. The open end of each can was fitted with a 1/2 inch wire screen cover to prevent loss of carrion but allow entrance of beetles. A sheet of galvanized metal, 1 foot square, was supported on stones to provide a clearance of about 3 inches around the rim and to keep out the rain (Walker, 1957). The 4 individual cans were sunk at points north, east, south, and west, each about 5 meters distant from a central stake.

A second set of 4, air cans described in a previous paper (Shubeck, 1968a), was suspended about 1.5 meters above the ground. Each one of the 4 air cans was situated in the immediate vicinity of each one of the 4 ground cans.

A fresh chicken leg was placed in each of the 8 cans on August 11, 1964 and carrion beetle collections were made 2, 4, 6, 9, and 11 days later. In 1965, a fresh chicken leg was placed in each can on July 17, and carrion beetle collections were made 3, 5, and 7 days later. The remains of the carrion were removed and replaced with fresh chicken legs on July 25, and collections made 2, 4, 6, 9, and 11 days later.

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RESULTS AND DISCUSSION

Six species of Silphidae were collected in the air and ground cans during August 11 to 22, 1964 and July 17 to August 5, 1965. Since only 3 individuals of *Silpha inaequalis* and 4 individuals of *Nicrophorus pustulatus* were recorded during this time no significance could be attributed to these numbers. Four other species were collected in larger numbers and those results are shown as bar graphs in Figures 1, 2, and 3.

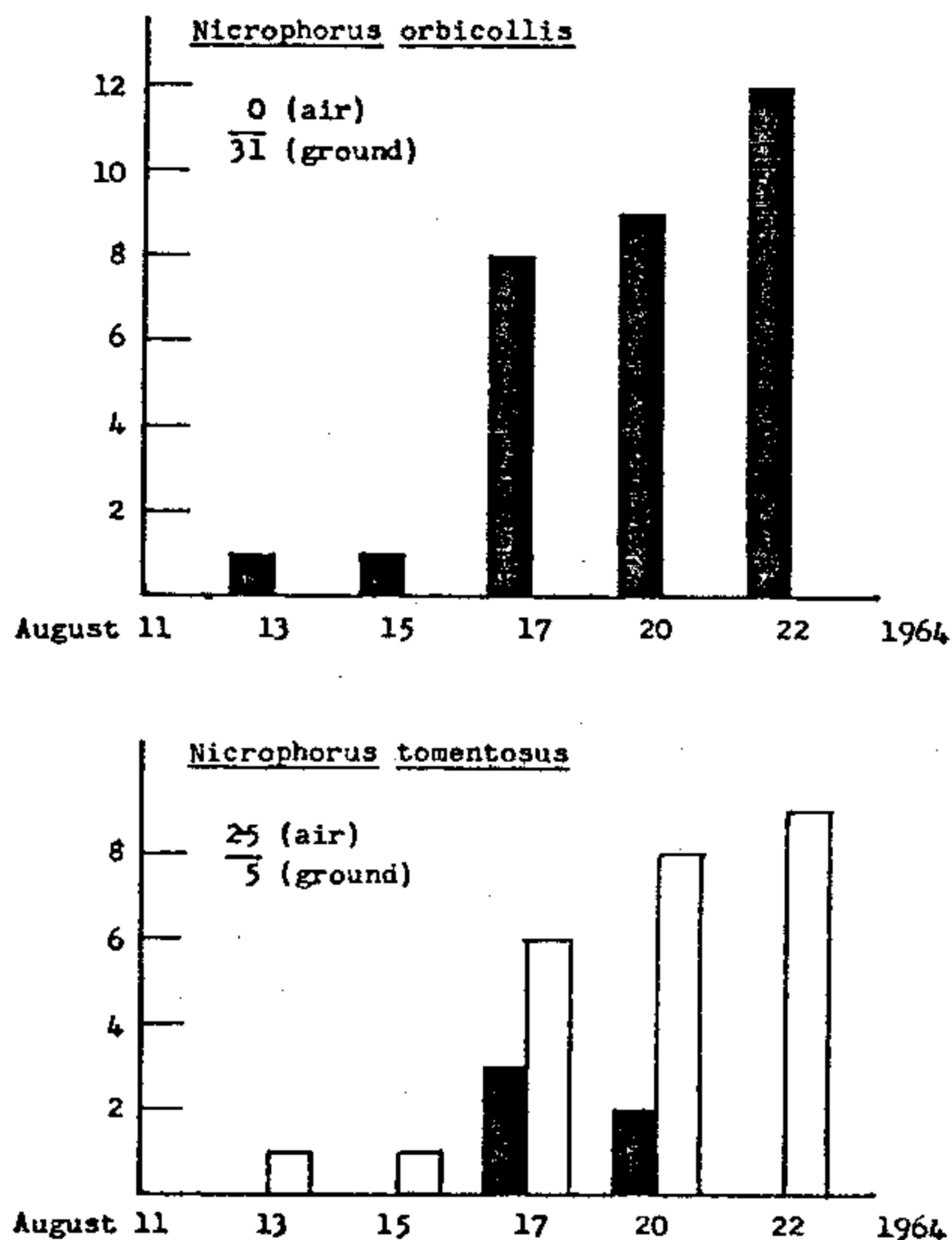


Fig. 1. Two species of Silphidae collected during middle August, 1964. Shaded bars show numbers collected in ground cans while hollow bars show numbers collected in air cans.

In 1964, virtually equal numbers of *Nicrophorus orbicollis* and *N. tomentosus* were collected (Fig. 1). Not one individual of the former species was taken in the air cans whereas 31 individuals were taken in the ground cans. *N. tomentosus*, on the other hand, manifested a much higher attraction for the carrion-baited air cans. Of the 30 individuals taken, 25 or 83.3% were taken in the air cans.

The results in 1965 (Fig. 2) were slightly to moderately different. These samples were collected earlier in the season before the *Nicrophorus* populations had reached their summer peak (Shubeck, 1969) and there may have been less competition between the two species in terms of locating carrion. *Nicrophorus*

orbicollis was found almost equally in air cans and ground cans and the total number was about half the total number of *N. tomentosus* collected. Sixty-one percent of the latter species was taken in air cans and the remainder in ground cans.

Although the studies were conducted during parts of two summers, the periods of time complement each other and it was decided to look also at the data in terms of "one extended period" of collecting from July 20 to August 22. The 50 individuals of *Nicrophorus orbicollis* were thus seen to manifest a 9:41 ratio (air:ground), or 18% being collected in air cans and 82% in ground cans.

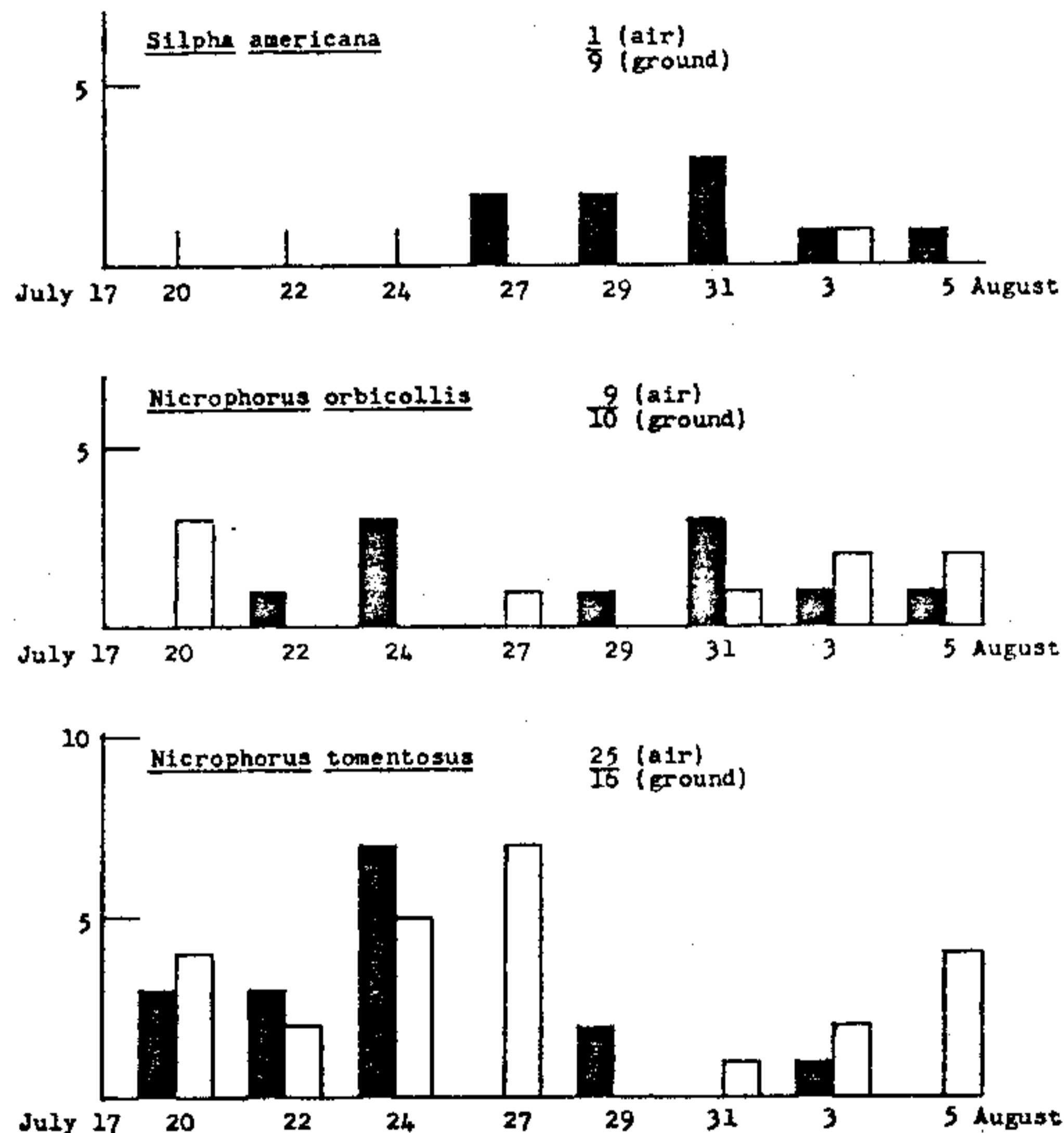


Fig. 2. Three species of Silphidae collected during late July and early August, 1965. Shaded bars show numbers collected in ground cans while hollow bars show numbers collected in air cans.

Nicrophorus tomentosus seemed to have the opposite preference, and of 71 individuals 50 or 70.4% were collected in the carrion-baited air cans, and 29.6% in the carrion-baited ground cans. It should be noted that this species is slightly smaller, more active, and more aggressive than *N. orbicollis* (Shubeck, 1967). The former seems to have the ability to fly directly to carrion. It is probable that the latter species lands in the general vicinity of carrion and then walks to it.

Both *Silpha* species showed a strong preference for the ground cans as compared to the air cans. Only 10 individuals of *Silpha americana* were taken but 9 of them were collected in the ground cans (Fig. 2). The data for *Silpha noveboracensis* are especially meaningful because of the size of the total sample (Fig. 3). Of 125 individuals collected, 108 or 86.4% were attracted to the ground cans. It seems quite probable that *Silpha noveboracensis* and possibly *S. americana*, as a result of random movement and/or anemotaxis, reach the approximate vicinity of carrion, and then walk the final distance. A previous study, in fact, presents strong evidence that *Silpha noveboracensis* in Hutcheson Memorial Forest locates carrion by means of random movement (Shubeck, 1968b). A small percentage (13.6%), do however, have the ability to orient directly to carrion, even when the carrion-baited air can is suspended above the ground.

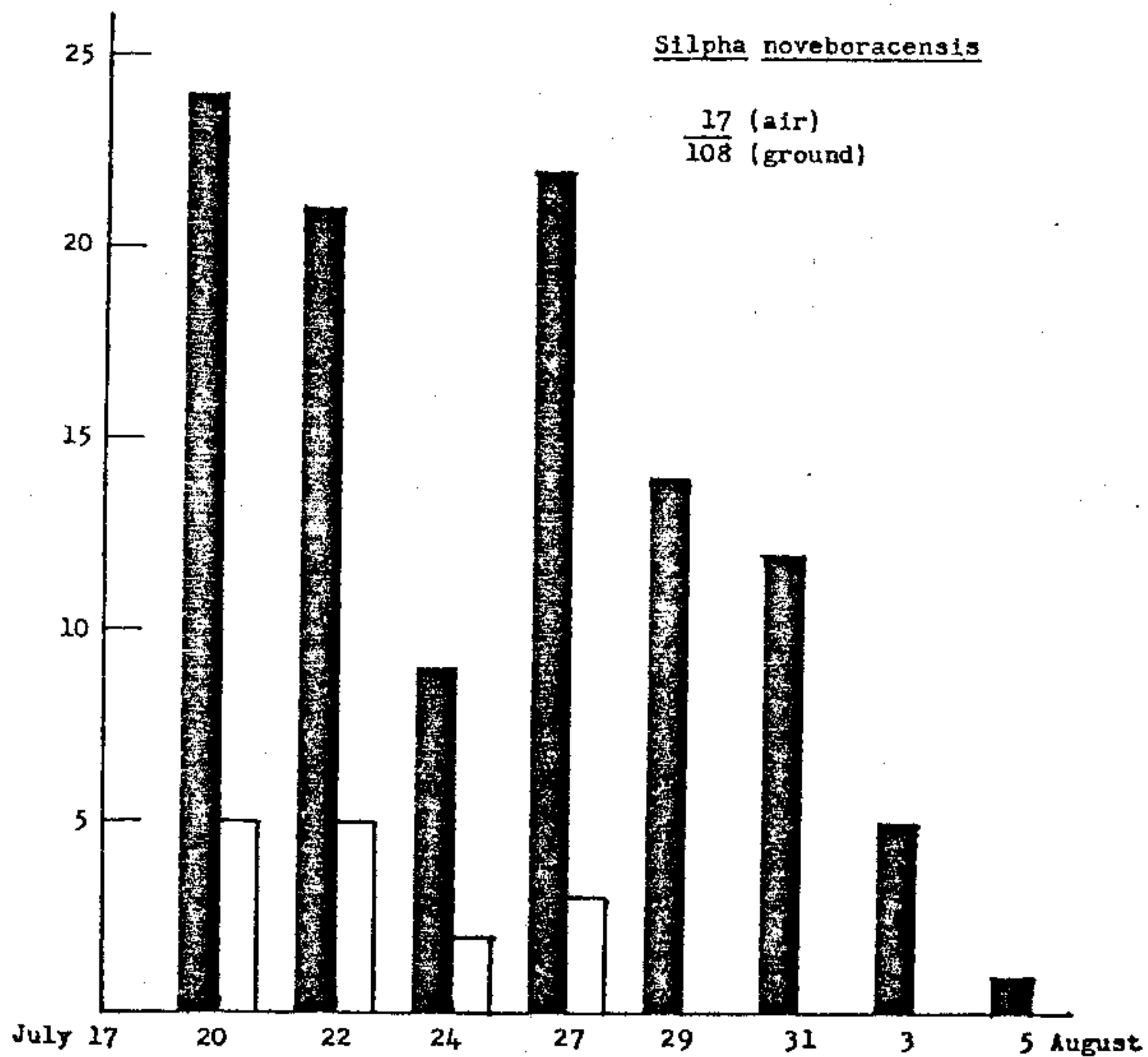


Fig. 3. The dominant species of Silphidae collected during late July and early August, 1965. Shaded bars show numbers collected in ground cans while hollow bars show numbers collected in air cans.

CONCLUSIONS

Given the choice of carrion-baited air cans and carrion-baited ground cans, 4 species of Silphidae in Hutcheson Memorial Forest were observed to manifest very strong preferences (70% to 90%) for one type or the other. *Nicrophorus orbicollis*, *Silpha americana*, and *S. noveboracensis* were attracted primarily to

the ground cans. The air cans, on the other hand, were most attractive to *Nicrophorus tomentosus*.

ACKNOWLEDGMENTS

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- 3.0016. (Silphidae attraction to carrion-baited air cans versus carrion-baited ground cans. —Paul P. Shubeck)

ABSTRACT: Silphidae attraction to two kinds of carrion-baited traps was studied in Hutcheson Memorial Forest, East Millstone, New Jersey. Four cans, suspended in the air, and four cans, buried with the open ends flush with the surface of the soil, were individually baited with a fresh chicken leg. Five collections were made during August 1964, and eight collections were made during July and August 1965. Of six species of Silphidae collected in these cans, four species were taken in numbers large enough to give an indication as to their preferences of carrion-baited ground cans versus carrion-baited air cans. *Nicrophorus orbicollis*, *Silpha americana*, and *S. noveboracensis* were attracted primarily to the ground cans while *N. tomentosus* strongly preferred the air cans.

DESCRIPTORS: Coleoptera; Silphidae; attraction to bait; New Jersey.