# SMALL MAMMAL INVENTORIES IN AN EASTERN BRAZILIAN PARK

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## ABSTRACT

Small mammal inventories were conducted between September 1985 and February 1987 in native forest, exotic forest, and open field habitats in a state forestry park in southeastern Brazil. In 40,490 trap nights, 17 species of non-volant small mammals were captured. This small mammal fauna was composed of 6 species of didelphid marsupials and 11 species of rodents. Open field habitats were dominated, in terms of species richness and relative abundance, by rodents. One species, *Akodon cursor*, represented 85% of the captures in this habitat type. Forested habitats, both native and exotic, were composed of more species of rodents, but higher relative densities of didelphid marsupials. Didelphid marsupials *Metachirus nudicaudatus*, *Marmosa incana*, and *M. cinerea* were the three most common and ubiquitous forest-dwelling species captured during the inventory. Exotic *Eucalyptus* forests with native species subcanopy help to maintain the species diversity of small mammals in a landscape greatly altered by human activities.

## RESUMO

Inventarios de pequenos mamíferos foram realizados entre Setembro de 1985 e Fevereiro de 1987 em habitats de florestas nativa, exotica e campo situados no Parque Estadual da Floresta do Rio Doce no Estado de Minas Gerais, Brasil. Em 40.490 armadilhas-noite, foram capturadas 17 espécies de pequenos mamíferos terrestres e arbóreos. Está fauna de pequenos mamíferos compreendeu 6 espécies de marsupiais didelfideos e 11 espécies de roedores. Os habitats de campo foram dominados em termos de espécies e relativa abundancia, pelos roedores. Uma especie, *Akodon cursor*, representou 85% das capturas neste tipo de habitat. Os habitats de floresta, tanto nativa como exotica, apresentou um maior numero de espécies de roedores, porem com uma maior diversidade relativa de marsupiais didelfideos. Os marsupiais didelfideos *Metachirus nudicaudatus*, *Marmosa incana*, e *M. cinerea* foram as tres espécies mais comuns capturadas durante o inventario, no habitat florestal. As florestas exoticas de *Eucalyptus*, com um sub-bosque de espécies nativas, auxiliam na manutençao da diversidade de espécies de pequenos mamíferos num ambiente grandemente alterado pela açao antropica.

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## INTRODUCTION

Despite the country's great size, few studies have been conducted on small mammal communities in Brazil. Most published reports on Brazilian mammals are preliminary species lists (e.g. Avila-Pires and Gouvea 1977) or inventories (e.g. Moojen 1952; Vieira 1955). Some Brazilian studies have focused on densities (Emmons 1984), others on abiotic effects on small mammals (Borchert and Hansen 1983; Peterson in press). Still others have addressed such applied subjects as plantation effects (Dietz et al. 1975) and public health needs or mammals that carry human diseases (e.g. Laemment et al. 1946; Botelho and Linardi 1980; Dias 1982).

Recently, work in Brazil using mark-release techniques has addressed the use of space, longevity, diversity, and social habits of small mammals (see Alho 1982). As Alho (1982) indicated, most of these studies were concentrated in the xerophitic Cerrado and Caatinga habitats (e.g. Lacher 1981; Mares et al. 1981; Fonseca and Redford 1985; Redford and Fonseca 1986; Nitikman and Mares 1987; Streilein 1982). Fewer studies have been carried out in humid forest. Carvalho (1965) live-trapped small mammals in a tropical humid forest in Sao Paulo, and J. Malcolm (pers. comm.) conducted similar studies in another such forest near Manaus, Amazonia. Fonseca (1988) worked on small mammals in a range of forested habitats in eastern Minas Gerais.

The Brazilian Atlantic forest has a highly diverse flora and fauna, with many endemic species of trees (Mori et al. 1981), reptiles (Müller 1973), and birds (Haffer 1974). In-depth mammal inventories in the region are lacking. The mammalian fauna is poorly known. Mittermeier et al. (1982) and Kinzey (1982) reported on the high level of diversity and endemism found in the primates of the region. Preliminary species lists for non-volant mammals in this region also suggest very high diversity and endemism (Moojen 1952; Vieira 1955; Cabrera 1957, 1961; Honacki et al. 1982). For this paper, a preliminary analysis was conducted of the non-volant mammal species that probably occur in the Atlantic Forest region. These data indicate that for the region there are at least 130 species, 54 of which (42%) are endemic. Didelphid marsupials and rodents account for 78% of the endemic species and 82% of the endemic genera.

The purpose of this paper is to report the results of intensive inventories of small mammals in the tropical humid Rio Doce State Forestry Park, Minas Gerais, Brazil. These inventories were part of a larger overall project concentrating on small mammal communities in the Brazilian Atlantic Forest. Gustavo A. B. da Fonseca concentrated his efforts on the effect of habitat size and disturbance on small mammal species diversity in eastern Minas Gerais state. The small mammal biology and natural history observations from his research are presented in Fonseca and Kierulff (This volume). I investigated the effect of forest fire on small mammal communities in the Rio Doce State Forestry Park, eastern Minas Gerais state. In-depth small mammal inventories are lacking from this Park. Gastal (1982) and Avila-Pires (1978) reported preliminary results from intermittent small mammal inventories in this sanctuary.

## ACKNOWLEDGEMENTS

Foremost, I thank John Robinson, my Ph. D. committee chairman, for his continued support throughout the various phases of this project and for his suggestion to work on small mammals in Brazil. Dr. Robinson, along with John Eisenberg, Mel Sunquist, Wayne Marion, S. David Webb, and Oliver Pearson made constructive comments on the manuscript. John Robinson and Kent Redford were instrumental in helping me design and implement the project. L. Aguiar, L. P. de Souza Silva, and E. Sabato helped collect the field data. J. Ladeira, H. Silva-Neto, and A. Lopes solved daily logistical problems in the Park. Housing in the Park was provided by the Instituto Estadual de Florestas. G. Fonseca, C. Valle, and I. Santos helped me obtain my visa to work in Brazil and offered laboratory space in the Federal University of Minas Gerais. This project was funded by an Organization of American States Fellowship and by the Program for Studies in Tropical Conservation. Gustavo and Ana Fonseca opened their doors to me and my family, and we will always be grateful for the assistance that they provided in helping us become acclimated to Brazil. This is contribution No. 35 from the Program for Studies in Tropical Conservation.

## STUDY SITE

Small mammal trapping was carried out in the Rio Doce State Forestry Park (19°48'18" and 19°29'24" south latitude and 42°38'30" and 42°28'18" west longitude). The Park was created in 1944 at the request of Dom Helvecio, the bishop of the region (Gilhaus 1986). The State Forestry Institute of the state of Minas Gerais is the present administrative body.

The climate of the Park is classified as tropical humid (Gilhaus 1986) with a seasonal pulse of precipitation from November through February and a pronounced dry season from June through August. Average annual rainfall for a 20-year period (CETEC 1981) was 1480 mm, although the rainfall recorded during the study year was considerably less (Fig. 1). Mean annual temperature averaged 22°C (CETEC 1981), and mean minimum monthly temperatures varied greatly throughout the year (Fig. 2).

The Park boundaries on the north and the east are two rivers, the Rio Piracicaba and the Rio Doce, respectively (Fig. 3). The southern and western boundaries abut plantations of *Eucalyptus* spp.

The altitude in the Park varies from 230 m to 515 m. CETEC (1981) reported that 21% of the Park is composed of plains, 40% undulating to strongly undulating hills, and 34% strongly undulating hills to mountainous terrain. The predominant terrain derives from dissection of fluvial plains (Gilhaus 1986).

A unique feature of the Park is the system of lakes in the Rio Doce Valley. Approximately 40 lakes and numerous marshes within the Park's boundaries were formed by damming the drainage river of the Rio Doce watershed (Saijo and Tundisi 1985). The marshes are the result of the sedimentation of previous lakes.

The vegetation of the park is classified as tropical semi-deciduous (Gilhaus 1986). Most of the emergent trees lose their leaves during the cool dry months. Forest fire has been a major threat to the vegetation and the wildlife in the park because of the litter that accumulates during the dry season. In 1964 and 1967, major fires burned approximately 30% of the park (Lopes 1982; Silva-Neto 1984).

## METHODS

### Habitats Studied

Small mammals were live-trapped in four habitat types within the Park and in an exotic habitat type near the Park boundary. Five forested and five open/field habitats have been described for the Park by Gilhaus (1986). These are related to the four habitats that were sampled in the park (Table 1). I trapped in five sites within the native forested habitat category. Two of the sites, Rio Doce/Campolina (RD/C) and Rio Doce/Turvo (RD/T), were primary forests and corresponded to the Gilhaus (1986) classification of Tall Primary Forest with Epiphytes. All of the forested and open/field habitats have been altered to some extent by fire, with the exception of the Tall Primary Forest with Epiphytes. With respect to this study, two sites, Rio Doce/Hotel (RD/H) and Rio Doce/Misturado (RD/M) were altered by forest fire in 1967 and burned in an intermediate fashion which produced a forest mosaic of short, secondary, and tall forest. This habitat type corresponded to the

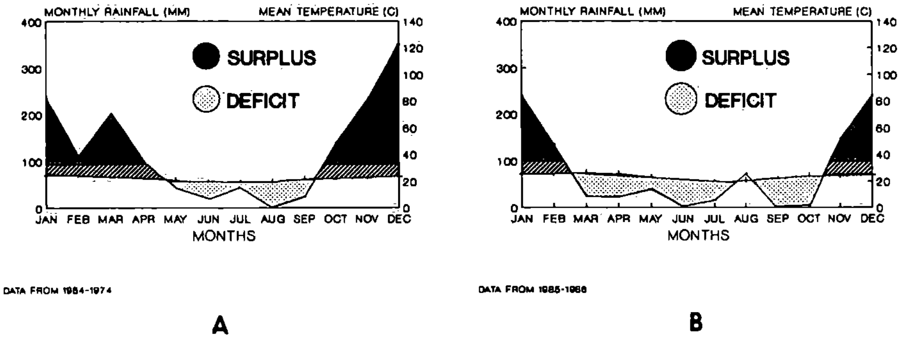


**Figure 1.** Walter and Leith climatic diagrams characterizing precipitation surplus and deficit per month in Rio Doce State Forestry Park, Minas Gerais, Brazil. Y axis is monthly rainfall in mm and Y axis in mean temperature (°C). A = data collected for a 20-year period (1954-1974), and B = data collected during present study.

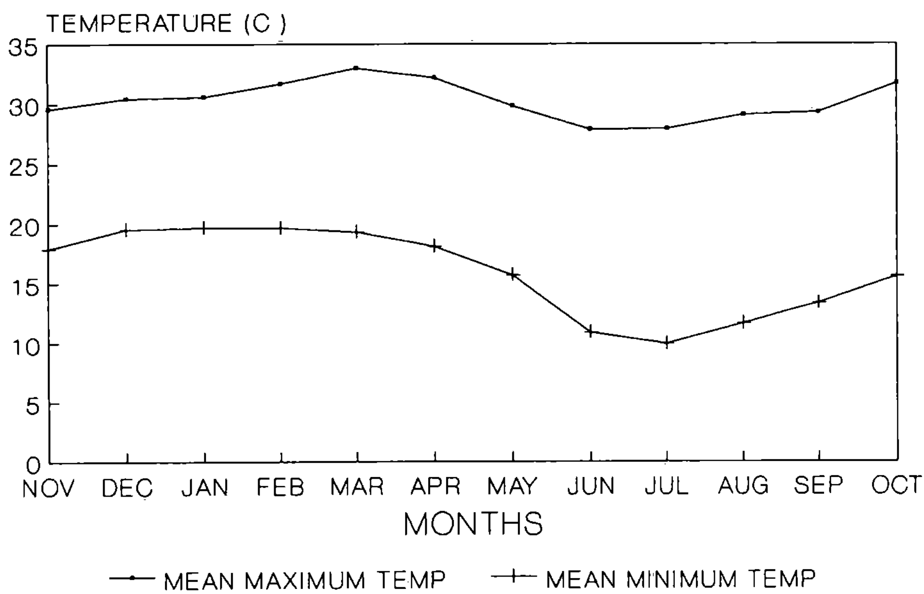


**Figure 2.** Temperature graph demonstrating the pronounced decrease in minimum temperature during June, July, and August in the Rio Doce State Forestry Park, Minas Gerais, Brazil.

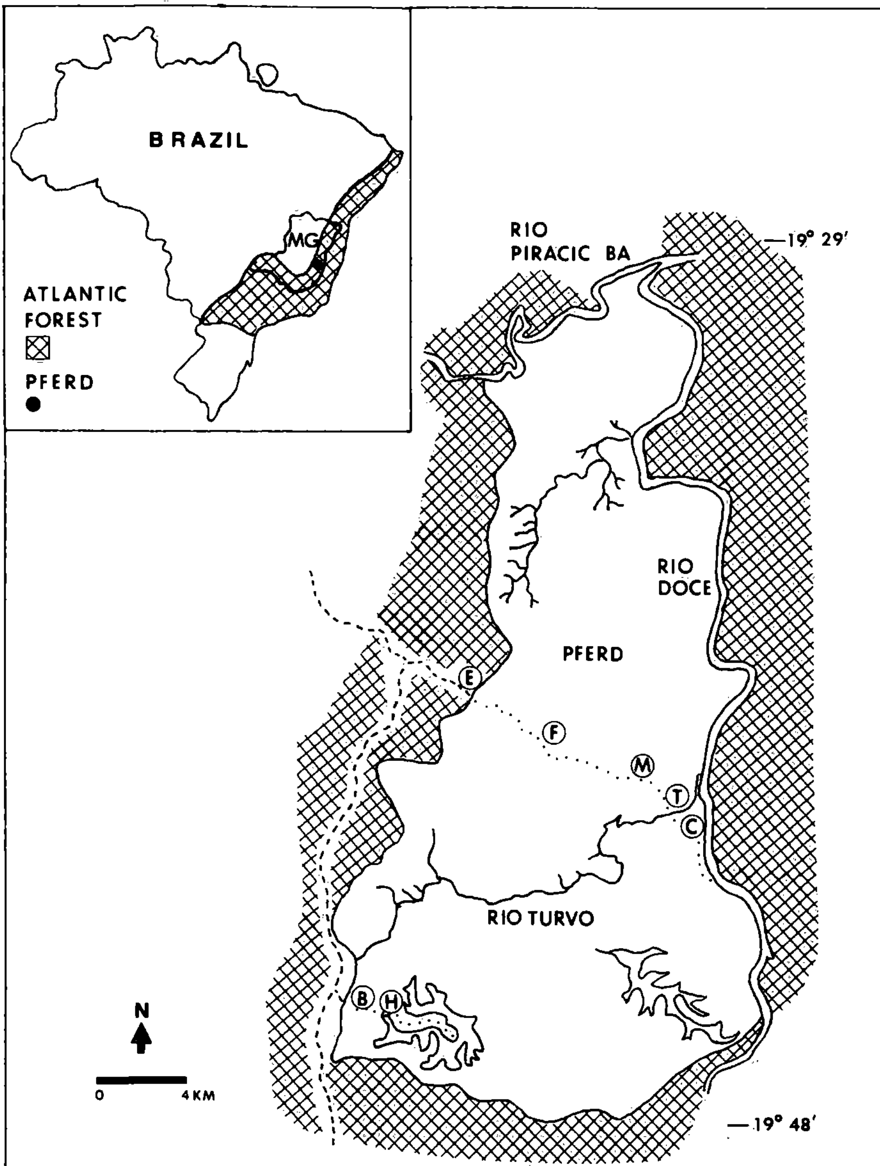


**Figure 3.** Map of Rio Doce State Forestry Park, Minas Gerais, Brazil. Rivers Piracicaba and Doce form the northern and southern boundaries of the Park respectively. Trapping sites are indicated by circled letters: E = eucalypt forest with native species subcanopy (RD/E); B = wet meadow habitat (RD/B); F = homogeneous short secondary forest (RD/F); M = mosaic habitat of secondary and primary forest (RD/M); H = mosaic habitat of secondary and primary forest (RD/H); T = primary forest habitat (RD/T); C = primary forest habitat (RD/C).

Medium to Tall Forest with Bamboos and Graminoids. The remaining native forest site, Rio Doce/Fogo (RD/F), was burned completely to the ground in 1967, and the resulting vegetation type corresponded to the Medium Secondary Forest with Bamboos and Graminoids.

The wet meadow habitat, Rio Doce/Brejo (RD/B), corresponded to both the Low Woodland and Low Tree and Scrub Tallgrass Savanna classified by Gilhaus (1986). This habitat type occurs between the edge of permanent marshes and secondary forest. Grasses were the dominant vegetative cover and were introduced in the region as food for cattle.

The eucalypt forest with native subcanopy habitat, Rio Doce/Eucalypt (RD/E), was planted with *Eucalyptus saligna* in 1954 after the original vegetative cover was removed. The eucalypt forest was harvested selectively in 1964 and again in 1971. However, the eucalypt forest was never clear-cut and the native species were allowed to regenerate, largely through coppicing, and developed into a complex native subcanopy. The result was a homogeneous eucalypt upper canopy and a native species subcanopy or "*mata suja*." Tall exotic grasses covered the ground. Emergent eucalypt trees reached 20 m in height.

## Mammal Trapping

Small mammals were snap trapped in order to obtain voucher specimens, as well as dietary and reproductive information. Such trapping was carried out exclusively in wet meadow and secondary successional habitats. All specimens were either preserved in 10% formalin or made into museum study skins with corresponding complete skulls. I also made study skins of individuals of species of uncertain taxonomic status that were live-trapped in habitats other than those where snap trapping was carried out.

In the wet meadow habitat, live trapping started in February 1986 and continued at monthly intervals through January 1987. I used two parallel trapping lines in this habitat. Each line was 280 m in length and subdivided into 20 trap stations separated by 15 m. All traps were placed on the ground, with even numbered stations having only one Sherman live trap, while odd numbered stations had one Sherman and one locally made small wire live trap. Bait was identical to that used in the homogeneous eucalypt forest.

In the eucalypt forest with native subcanopy and the native forested habitats, the trapping design was identical. In each area, I cut three parallel lines 300 m in length through the forest; 16 trapping stations were placed along the line separated by 20 m. I used Sherman live traps and locally made small (15 X 15 X 30 cm) and large (25 X 30 X 60 cm) wire live traps. All traps were placed within 3.5 m of the trapping post. All trapping posts had a terrestrial small live trap. Odd numbered trapping posts had a small wire live trap placed in a tree or bush. Mean arboreal live trap height was 1.2 m. Odd numbered trapping posts had a Sherman live trap alternating between arboreal and terrestrial positions. The exterior trapping lines were identical with respect to number, kind, and placement of traps. I did not use the large live traps on the interior line. Aside from the large live traps, the exterior and interior lines were equal in trap number. However, the positions of the Sherman and small live wire traps were reversed for the interior line. The Sherman live traps were introduced into each of the forested habitats after the study was well underway in an attempt to sample smaller bodied species. I placed Shermans in two of the native forested sites in January 1986 and introduced Shermans in the remaining forested sites in May of the same year.

I also experimented with traps that were placed in the canopy by a pulley and platform device. This method was similar to that developed by Malcolm (pers. comm.) for use in the Brazilian Amazon. Mean trap height was 11.2 m. I used these arboreal traps to sample the canopy dwelling small mammals. Traps were located at trapping posts along the established lines. I selected trees that were to have arboreal platforms in a subjective manner. I placed traps in trees that I thought had a high degree of canopy connectivity and upper stratum vine density. I spread 42 arboreal platforms across four native forested sites. The primary forest sites, RD/C and RD/T, and one of the mosaic sites, RD/H, each had 12 arboreal traps, 4 traps per line. The other mosaic site, RD/M, had only 6 traps, because I did not believe that there was sufficient upper strata development to support canopy dwelling species. Arboreal canopy trapping started in June 1986 and continued through October 1986. I followed the same schedule in canopy trapping as I had used for terrestrial and arboreal trapping.

I used dry oatmeal, pineapple chunks, and cotton balls soaked with cod-liver oil for bait. Traps were set during the day and remained open for five consecutive nights each month for one calendar year.

## Calculations

A first capture was defined as the first occasion that an individual was trapped and marked. The first capture plus subsequent captures of each individual were considered total captures. Minimum known alive (MKA) was the number of individuals actually captured during a particular month whether the capture was the first capture or a recapture from an earlier session.

Trapping success of small mammals was calculated in the following manner. The number of traps was multiplied by the number of nights the traps were baited and armed per site per month to determine the number of trap nights. Trapping success was the number of first captures, MKA, or total captures of all species divided by the number of trap nights and expressed in percentages.

For example, if 100 individuals were trapped during 1000 trap nights, the trapping success would be (100/1000) X 100 = 10%. Recapture indices were calculated by dividing total captures by first captures; thus indicating the average number of times an individual of each species was captured.

I recorded the following information from each small mammal captured: date, location on trapping line, position of trap, species, sex, whether a juvenile or adult, its reproductive condition, general condition, external parasitic load on a relative scale, and behavior upon release. I also recorded standard body measurements for each individual: body length, tail, ear, hind foot, and mass. Numbered metal eartags were placed in the left pinna of each individual upon the initial trapping of the individual. In general, there was very little evidence of tag loss. Individuals eartagged from open/field habitat tended to have higher occurrence of tag loss compared to individuals in forested habitats.

My taxonomic determinations, when in doubt, were checked by taxonomists specializing in various small mammal groups. Voucher specimens were distributed to the following people: cricetid rodents and marsupials (genus *Marmosa*) were sent to Dr. Phil Myers, University of Michigan; rodents of the subgenus *Oecomys* to Dr. Guy Musser, American Museum of Natural History, and to Dr. Mike Carleton, U.S. National Museum of Natural History.

I used body measurements, mass, reproductive condition, and pelage characteristics to determine the age class (juvenile or adult) of each captured individual. An individual was considered an adult if it was reproductively active. Female rodents were considered reproductively active if they (1) had a perforated vulva, (2) were pregnant, or (3) were lactating. Marsupial females were considered reproductively active if they (1) were lactating or (2) had young attached to the teat field. Male rodents were considered reproductively active if the testes were descended. I could not determine the reproductive status of male marsupials as the testes are permanently descended. However, the activity state of the sternal gland in marsupials can indicate the reproductive time of year. Initially, I used the overall condition and relative size of each individual of each sex to assign age classes. Later, I compared my initial classification with the body measurements and mass. Body measurements and weights were sorted for each sex of each species and plotted according to size. I then assigned a body measurement value as the threshold for separating juvenile and adult age classes. These age classes were then compared to the initial age classes that were assigned in the field.

I used the General Linear Program (PC-SAS) ANOVA to test for the equivalence of adult body measurements and mass means between sexes for each species. This analysis enabled me to determine the extent of sexual dimorphism for the external characters. Statistical significance was set at $\leq$ 0.05.

Feeding categories were determined by stomach content analysis (Charles-Dominique et al. 1981) and from the literature. I relied heavily on information gleaned from the literature on food preferences of small neotropical mammals.

The use of vertical space (i.e. terrestrial, scansorial, or arboreal) of each species was determined from three data sets. For each species, I compared the proportion of captures in trees to that of captures on the ground. There were more terrestrial than arboreal traps, and this bias was corrected by adjusting the number of total trapping opportunities. For this adjustment, I divided the number of arboreal total captures by the total arboreal opportunities (or total arboreal trap nights). The same was done for terrestrial total captures. Results of these two divisions were summed, and each respective result (e.g. arboreal) was divided into the sum. The result generated adjusted percentage success of arboreal and terrestrial captures. The sum of total captures was multiplied by the adjusted percentage in order to generate adjusted number of captures per trapping stratum (on the ground or in arborescent vegetation). These adjustments also were made for each species at each site as well as pooled adjustments across all sites. I tested the null hypothesis that there was no difference in the proportion of arboreal and terrestrial captures for each species across all habitats as well as within each trapping site. Prior to using Student's *t*-test, I adjusted the proportions by an arc-sin transformation. I then compared the proportion of arboreal and terrestrial responses upon release for each species across all habitat types. These adjustments were made for all species in each habitat type.

I used Student's *t*-tests to test the null hypothesis that there was no difference in the locomotory response upon release of each species. These two data sets were then compared to determine if there were any differences between where an individual was captured and its locomotory behavior upon release across all habitat types. These tests also were performed for each habitat sampled. A species was considered to be arboreal if that species was found to have a high proportion of arboreal captures and a high proportion of arboreal behavior upon release. The opposite would be true for a terrestrial species. A species would be scansorial if there were no significant differences in the proportion of spatial captures and no significant differences in the proportion of behaviors exhibited upon release. I then compared my results obtained from the trapping data to the available literature for each species.

## RESULTS

### Trapping Results

Tables 2, 3, and 4 present the capture results by species for the three habitat types: native forested, eucalypt with native species subcanopy, and wet meadow habitats, respectively. As a group, marsupials represented 79.2% of the first and 83.3% of the total captures in native forested sites and 67.7% and 82.9% in eucalypt forest with native species subcanopy. Rodents represented 97.3% and 98.4% of the first and total captures in the wet meadow habitat.

In the native forested habitat, *Marmosa cinerea* represented over 40% of the marsupial captures (Table 2), while in the eucalypt forest this species represented more than 58% of the marsupial captures (Table 3). *Akodon cursor* was the major contributor to the rodent captures in all three habitats. This species only represented about 7% of the total captures in the native forested habitat, but 40% of the rodent captures. In the eucalypt forest, *A. cursor* represented about 16% of the total captures and 93% of the rodent captures (Table 3). This rodent was the dominant species captured in the wet meadow habitat, representing about 85% of both the total and of the rodent captures.

In both the native and eucalypt forested habitats, marsupials in general were recaptured at a high rate. *Didelphis marsupialis* and *Marmosa microtarsus* both showed low recapture rates and reflect the small sample size. Especially noteworthy was the relatively high recapture rate of *Marmosa cinerea* (Tables 2 and 3). No individuals of other species, neither rodent nor marsupial, were recaptured as frequently as individuals of this species. In the native forested habitat, individuals of *M. cinerea* were recaptured on the average 3.1 times, while in the eucalypt forest the average recapture rate for individuals of this species was 7.7 times.

*Akodon cursor* was the only rodent that had a relatively high number of captures and recaptures (Tables 3 and 4). This species had a recapture rate of 1.6 and 3.0 in the eucalypt and wet meadow habitats, respectively.

## Trapping Success

Table 5 presents the trapping success by habitat type. Trapping success was calculated for small mammals in the native forested habitat. The platform trapping data were excluded. It must be kept in mind that the sampling effort in each general habitat category was different; however, comparisons of trapping success are the result of the number of captures relative to the number of trapping opportunities or nights. Overall, the wet meadow habitat yielded the highest trapping success (18.8%).

Figure 4 compares the progression of trapping success in the native forest habitat (without the platform data), the wet meadow habitat, and the eucalypt forest with subcanopy habitat. Although these three habitats have unequal sampling effort and trapping design, they were sampled for a one-year period and show important temporal trends. From the overall gross comparison portrayed in Figure 4 and the percent trapping success presented in Table 5, in

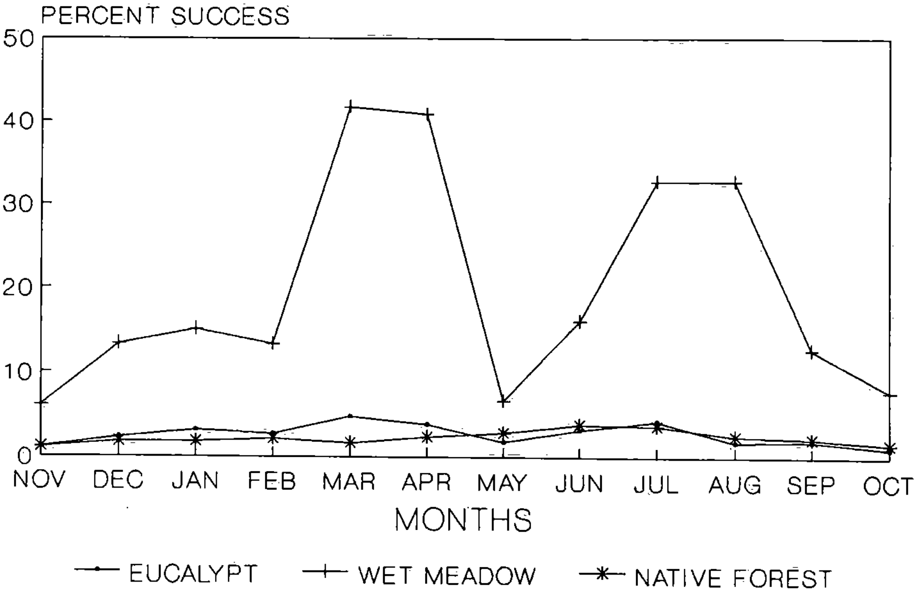


**Figure 4.** Comparison of the trapping success of small mammals in three general habitat types: eucalypt forest with native species subcanopy, wet meadow habitat, and native forest habitat in the Rio Doce State Forestry Park, Minas Gerais, Brazil.

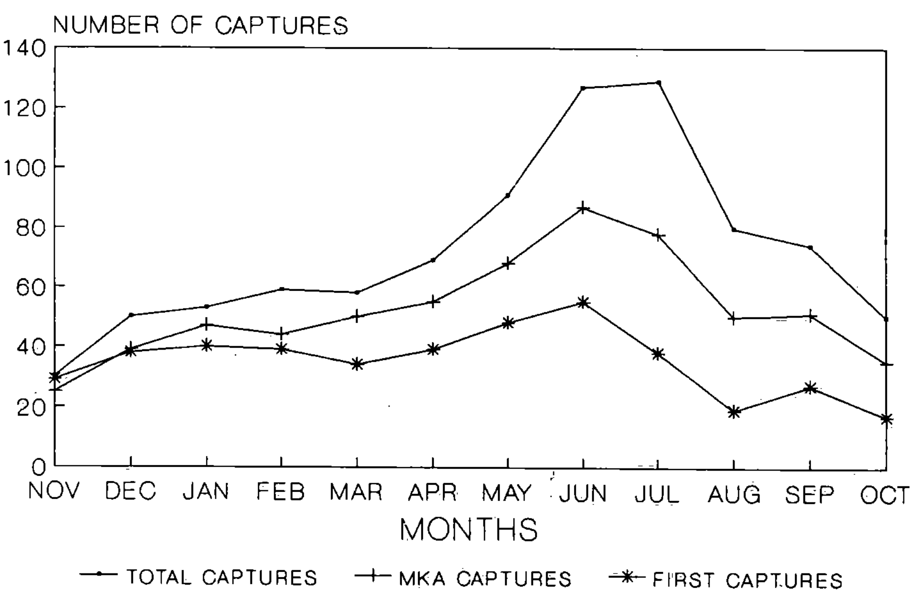


**Figure 5.** Small mammal capture curves for all native forested trapping sites in Rio Doce State Forestry Park, Minas Gerais, Brazil. Capture curves include total captures, minimum known alive (MKA), and first captures.

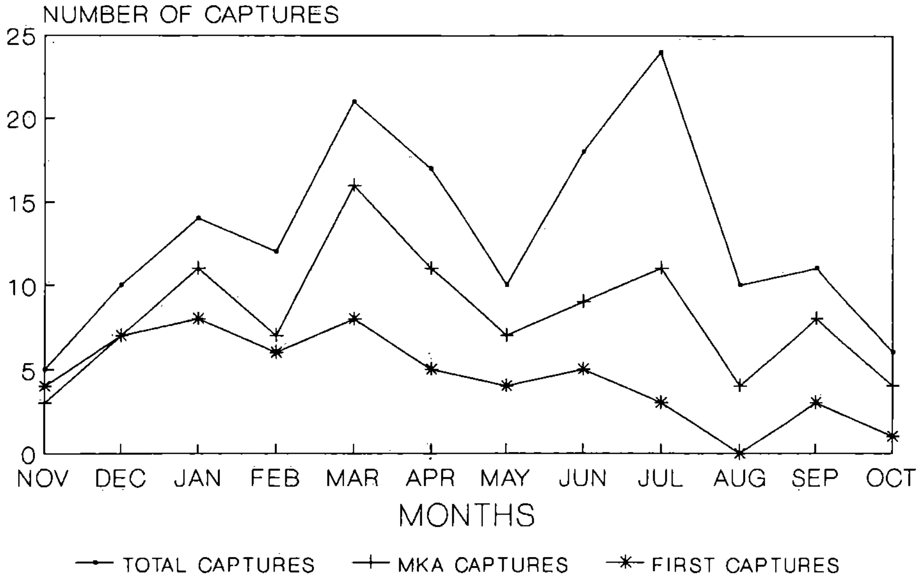


**Figure 6.** Small mammal capture curves for eucalypt forest with a native species subcanopy near the Rio Doce State Forestry Park, Minas Gerais, Brazil. Capture curves include total captures, minimum known alive (MKA), and first captures.

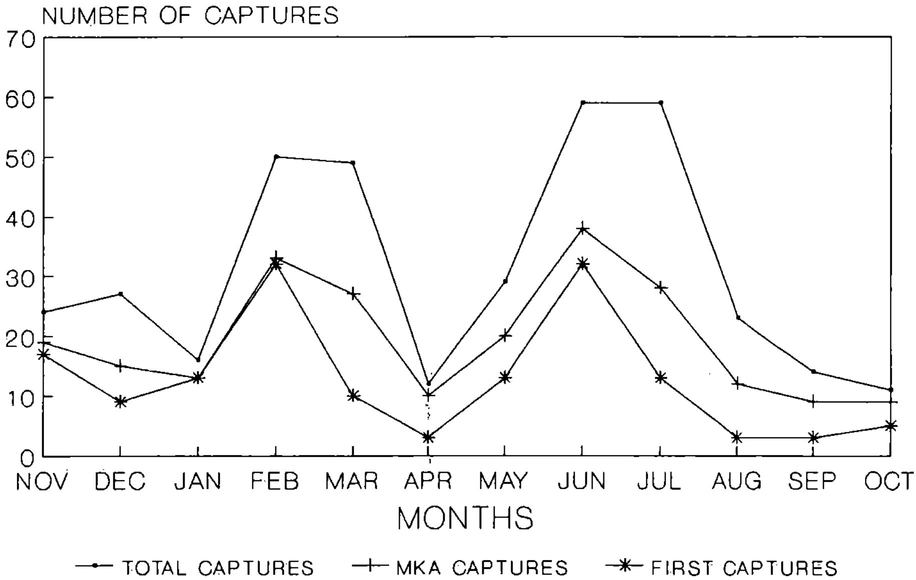


**Figure 7.** Small mammal capture curves for wet meadow habitat in Rio Doce State Forestry Park, Minas Gerais, Brazil. Capture curves include total captures, minimum known alive (MKA), and first captures.

contrast to the wet meadow habitat, it appears that the forested habitats, both native and exotic, were quite similar in overall percent success and monthly trapping success. The wet meadow trapping success fluctuated greatly throughout time, from a high approaching 45% in March and April, to a crash lower than 10% in May, October, and November.

I plotted the total captures, minimum known alive, and first captures through time for each of the three habitats. Figure 5 presents the capture curves for the native forested habitat. Capture rate was relatively low and stable from November through April, with a noticeable increase in June, July, and the early part of August. After the first of August, capture rate dropped back to the levels observed prior to the increase. Figures 6 and 7 compare the capture rate of small mammals in the eucalypt forest and the wet meadow habitat, respectively. The highest number of captures at any one time in the wet meadow habitat was double the highest in the eucalypt forest. However, the trends were similar. Both habitats showed two pronounced peaks in their respective capture curves that corresponded to the same months throughout the year. There was a peak in February, March, and April followed by a crash, and another peak in June, July, and August followed by another crash.

## Trap Types

Overall, trapping success was higher in terrestrial traps than in arboreal ones (Table 6). Caution should be used in these comparisons as the number of trap nights are unequal; almost three times the number of terrestrial trap nights as the number of arboreal ones. However, I feel that some degree of comparison can be drawn from this analysis based upon the number of captures relative to the number of trap nights.

Trapping success by trap type varied considerably (Table 6). Small terrestrial Sherman live traps were the most successful (9.1%), medium terrestrial traps represented the trap with the greatest number of captures and trapping opportunities, and large terrestrial live traps were relatively unproductive.

Arboreal trap type success varied. Small arboreal Shermans were the least productive arboreal trap type (1.8% success). The arboreal platform traps had a success rate of 6.3%.

Table 7 reports the number of total captures of each species and the number of captures per trap type. Odd numbered traps represent terrestrial traps, and even numbered ones represent arboreal traps. In general, the number of captures per species in terrestrial and arboreal traps represented the general use of space for each species. For marsupials, *Didelphis marsupialis* and *Metachirus nudicaudatus* were captured principally in terrestrial medium live traps (3MT), while *Marmosa incana* was captured in all trap types except for the large terrestrial and arboreal platform traps. *Marmosa cinerea* was captured in all trap types except the large terrestrial traps. *Caluromys philander* was trapped principally in arboreal medium live traps and arboreal platform traps. The sample size for rodents was too small to allow for clear trapping trends. *Akodon cursor* is the clear exception. The small terrestrial Sherman live trap was most effective for this species. This was mostly a consequence of approximately 80% of all *Akodon* captures being made in the wet meadow habitat. *Oryzomys subflavus* was trapped principally in terrestrial small Shermans and medium live traps.

## SPECIES ACCOUNTS

The small mammal fauna of the park consisted of 6 species of marsupials and 11 species of rodents. The following accounts present the essential observations regarding the autecology of each species. Additional natural history observations of many of these same species are presented by Fonseca and Kierulff (This volume). The diet, use of vertical space, and habitat requirements are presented in Table 8 for each species captured during the study.

## SUBCLASS MARSUPIALIA

### Family Didelphidae

#### *Didelphis marsupialis* Linne (1758) (Plate 1A)

The black-eared opossum ranges widely in South America from the Isthmus of Panama to southern Brazil. This species occurs sympatrically with *D. albiventris* throughout much of its range (Streilein 1982). In the Rio Doce Valley, however, *D. marsupialis* inhabits moister habitats, while *D. albiventris* occurs in the cerrado vegetation (Valle and Varejao 1981). A. Gardner (pers. comm.) suggested that the form of *D. marsupialis* found in eastern Brazil is distinct and should be referred to as *D. azarae*. This species inhabits brush and forested habitats (Alho 1982; Nowak and Paradiso 1983). Miles et al. (1981) found this species to be nocturnal, with a preference for nesting in tree cavities. This species was captured in all forested habitats in the park. Adult body measurements did not indicate sexual dimorphism (Appendix 1). Females have a well developed pouch. This species is terrestrial. There was a significant percentage of terrestrial captures (Table 9) and terrestrial behavior upon release (Table 10). Several juvenile individuals and one adult were observed to climb readily. Charles-Dominique (1983) reported that this species exploits the lower stratum in forests, but can climb. It is basically an opportunistic feeder and feeds upon fruit and animal matter (Charles-Dominique 1983).

## *Metachirus nudicaudatus* Geoffroy (1803)
## (Plate 1A)

The brown four-eyed opossum has a geographical distribution similar to that of *D. marsupialis* except that it is not found over much of Venezuela nor in northeastern Brazil (Streilein 1982). *M. nudicaudatus* can be confused with *Philander opossum* as both have pale spots above the eyes. In addition, there is considerable confusion over the taxonomy of the two species. Nowak and Paradiso (1983) classified this species as *Philander nudicaudatus* and *Philander opossum* as *Metachirops opossum*. I agreed with Honacki et al. (1982) and followed their classification. This species was captured in all forested habitats (Table 11). *Metachirus nudicaudatus* is sexually dimorphic in its mass and hind foot measurements (Appendix 1). Females do not have a pouch. This species is strongly terrestrial, rarely caught in arboreal traps (Table 9), and rarely climbs upon release (Table 10). Miles et al. (1981) found this species to be nocturnal and construct nests on the forest floor or in ground hollows. There are very little data on the feeding habits of this species due to the small numbers that have been reported to be trapped. Preliminary data indicate that this species is an insectivore-omnivore (Robinson and Redford 1986) or frugivore-omnivore (Hunsaker 1977).

## *Marmosa incana* (Lund 1840)

This mouse opossum is endemic to the Brazilian Atlantic Rainforest (Streilein 1982). *M. incana* occurs in both secondary and primary forest habitat. This species is small in size (adults average weight = 62 g) and strongly sexually dimorphic in body size and color. Males tended to have larger ears and hind feet (Appendix 1) while females tend to have a more rose colored venter and less pronounced face mask (P. Myers, pers. litt.). Females do not have a true pouch. This species tended to use both the ground and arborescent vegetation. I classify the spatial adaptation of this species as scansorial. There was no significant difference in the proportion of terrestrial and arboreal captures (Table 9, $p > 0.90$, df=169), however; individuals tended to remain on the ground upon release (Table 10, $p < 0.001$, df=145). No data exist on the feeding category of this species. Other species of *Marmosa* which have similar body mass are classified as insectivore-omnivores. Stomach content analysis (n=3) showed 100% insects from two orders, Coleoptera and Orthoptera (Table 12). I classify this species as an insectivore-omnivore based on the relationship found between body mass and dietary classification (Robinson and Redford 1986).

### *Marmosa cinerea* Temminck (1824)
### (Plate 1B)

*M. cinerea* has a disjunct geographical distribution in South America; it occurs in northern Venezuela through the Guianas, and it occurs in the Brazilian Atlantic Rainforest extending into Paraguay (Streilien 1982). *M. cinerea* occurs in brush and forested habitat, ranging from secondary to primary. This species is a large bodied *Marmosa* (Appendix 1, average weight= 105 g) and is highly sexually dimorphic based on external body measurements. Males tended to have larger body, tail, ear, and foot (Appendix 1). Females do not have a pouch. This species is strongly arboreal and exploits the high forest stratum (Miles et al. 1981; Charles-Dominique 1983). Miles et al. (1981) found this species to be nocturnal and to construct open arboreal nests rather than use cavities. *M. cinerea* tended to be caught a greater proportion of the time in arboreal traps (Table 9, $p < 0.001$, df=356) and tended to exhibit arboreal rather than terrestrial behavior upon release (Table 10, $p < 0.001$, df=303). This species is primarily an insectivore-omnivore (Robinson and Redford 1986).

### *Marmosa microtarsus* Wagner (1842)

This species is restricted to the Brazilian Atlantic Rainforest (Streilein 1982). *M. microtarsus* differs from its congener *M. agilis* by possessing a pure colored white patch of hairs on the throat and chin (Tate 1933). There are insufficient data in the literature to determine the spatial adaptation of this species. I only recorded one capture during the study, in an intermediately disturbed habitat (Table 11). However, the species has a long prehensile tail and short wide feet which suggest an arboreal lifestyle. This species is probably an insectivore-omnivore.

## *Caluromys philander* Linne (1758)
## (Plate 1B)

This species has a disjunct geographical distribution with populations in Venezuela, the Guianas and northern Brazil and in southeastern Brazil (Streilein 1982). The woolly opossum is classified as a forest dwelling species (Nowak and Paradiso 1983). This species was present in the eucalypt, mosaic, and primary forested habitats (Table 10). Based upon the external body measurements, there was no sexual dimorphism in adults (Appendix 1). Females lack a true pouch. According to Charles-Dominique (1983) and Miles et al. (1981), this species exploits the high forest stratum and is nocturnal. My data (based on 51 captures) showed that there was a higher proportion of arboreal captures (Table 9, $p < 0.001$, df=49) and that this species tended to climb more than remain on the ground upon release (Table 10, $p < 0.05$, df=18). Fruit makes up a large portion of this species' diet (Charles-Dominique 1983; Robinson and Redford 1986).

## Suborder Eutheria

## Order Rodentia

### *Oecomys* (*Oryzomys*) *trinitatus* = (*O. concolor*) Wagner (1845)

This genus is in need of revision and the subgenus *Oecomys* is currently being revised (P. Myers, pers. comm.). This species was previously called *Oryzomys concolor* and was known, within Brazil, as an Amazonian species (Alho 1982). However, Nitikman and Mares (1987) reported trapping this species in gallery forest in the Brazilian cerrado. I captured this species in all native forested habitats (Table 11). The species is not sexually dimorphic (Appendix 1). Gyldenstolpe (1932) and Moojen (1952) stated that this species is "more or less adapted for arboreal life." My data suggested that this rat is scansorial; there were no significant differences in the proportion of terrestrial and arboreal captures (Table 9, $p > 0.10$, df=19) and no significant differences in terrestrial and arboreal behavior upon release (Table 10, $p > 0.20$, df= 9). Most species of the genus *Oryzomys* are frugivore-granivores (Robinson and Redford 1986).

### *Oryzomys subflavus* Wagner (1842) (Plate 2A)

This species is distributed throughout the Guianas, southeastern Brazil, and eastern Paraguay (Honacki et al. 1982; Alho 1982). In Brazil, it occurs in the cerrado, caatinga, and Atlantic Rainforest (Alho 1982). This species was captured in wet meadow and heavily disturbed secondary habitat (Table 11). There were no differences in body measurements between sexes in adult individuals (Appendix 1). I classify this species as terrestrial. This species tended to be captured more on the ground than in the trees (Table 9, $p < 0.01$, df=46) and was never observed to climb upon release (Table 10). Stomach content analysis (n=1) showed 95% grass and 5% fruit (Table 12).

### *Oryzomys capito* Olfers (1818)

This species has a wide distribution throughout the neotropics and occurs in a variety of habitats ranging from agricultural fields (Moojen 1952) to humid forests (Alho 1982). *Oryzomys capito* was primarily captured in humid forests ranging from intermediate levels of disturbance to primary forests in the park (Table 11). There were no significant differences in body measurements between sexes for adults (Appendix 1). My capture and release data are in accordance with Alho's (1982) terrestrial classification for this species. *O. capito* tended to be caught more on the ground than in trees (Table 9, $p < 0.05$, df=19) and tended to remain on the ground upon release (Table 10, $p < 0.001$, df=11).

### *Oryzomys* (*Oligoryzomys*) *nigripes* (*eliurus*) Wagner (1845)

This small-bodied rodent (Appendix 1) occurs in grassland, wet meadow, and secondary forest habitat in northern Argentina, eastern Paraguay, southern Brazil, and the Bolivian Beni (Honacki et al. 1982). In the Park, all captures were made in the wet meadow habitat (Table 11). All captures were made on the ground (n=4), however; the individuals climbed readily in captivity (pers. obs.). The results from the stomach analysis (n=5) revealed a wide range of foodstuffs (Table 12).

### *Abrawayaomys ruschii* Cunha and Cruz (1979)
### (Plate 2A)

This species is only known from the type locality in Espirito Santo, eastern Brazil. It is endemic to the Brazilian Atlantic Rainforest. The single capture of this species was recorded in an intermediately disturbed forest (Table 11). There is very little information available regarding the ecology of this species, and there are only three study skins found in museums (A. Gardner, pers. comm.).

### *Rhipidomys mastacalis* Lund (1840)
### (Plate 2B)

Climbing mice range south from Margarita and Tobago islands to Venezuela and Guianas to northeastern and east central Brazil (Honacki et al. 1982). This species was only captured in a relatively undisturbed primary forest (Table 11). Sample size was too small to detect any differences between terrestrial and arboreal captures and behavior upon release. However, as the common name implies, this species climbs readily. I captured two individuals in my house in the park, a commonly cited "exotic" habitat for this species (Nowak and Paradiso 1983).

### *Nectomys squamipes* Brants (1827)

The neotropical water rat occurs in aquatic habitats either in grasslands and wet meadows or in forests. This species' distribution ranges from the Guianas to Colombia to Peru and in Brazil, Paraguay, and northeastern Argentina (Honacki et al. 1982). It tended to be caught more on the ground (Table 9, $p < 0.05$, df=17) and exhibited a significant tendency to remain on the ground upon release (Table 10, $p < 0.001$, df=10). Stomach content analysis (n=2) showed 50% grass and stems and 50% fruit (Table 12).

### *Akodon cursor* Winge (1887)
### (Plate 2B)

This species occurs in several habitat types from southeastern and central Brazil to Uruguay, Paraguay, and northern Argentina. The wet meadow habitat in the park was the primary habitat to capture this species (Table 11). *A. cursor* was formerly included in *A. arviculoides* (Honacki et al. 1982). This species is sexually dimorphic in tail ($p < 0.01$) and body ($p < 0.008$) length (Appendix 1). *A. cursor* is strongly terrestrial (Table 9 and Table 10). Analysis of stomach contents (n=23) revealed a high proportion of insects, seeds and fruit (Table 12).

*Calomys laucha* **Olfers (1818)**

This species occurs in grassland and wet meadows in southern Bolivia, southeastern Brazil, Paraguay, central Argentina, and Uruguay. This species was only captured in the wet meadow habitat in the Park (Table 11). The results from one stomach sample revealed 100% seeds (Table 12).

*Oxymycterus roberti* **Thomas (1901)**

The burrowing mouse occurs in a variety of habitats but is usually associated with moist substrate in open or brush habitats. This species was captured in both wet meadow and secondary forest habitats in the Park (Table 11). This species is endemic to eastern Brazil. This semifossorial mouse is described as an insectivore (Nowak and Paradisio 1983). Stomach analysis (n=2) revealed 100% insects (Table 12).

**Family Caviidae**

*Cavia fulgida* **Wagler (1831)**

This species of cavy is endemic to the open grasslands and wet meadows of the Atlantic Rainforest of eastern Brazil (Honacki et al. 1982; Nowak and Paradiso 1983). I captured this species in grassland and wet meadow habitats in the Park, however; it was not trapped in site RD/B. For this reason this species does not appear in Table 11. Cavies are terrestrial and are herbivore-grazers (Nowak and Paradiso 1983).

**Family Echimyidae**
*Euryzygomatomys spinosus* **Fischer (1814)**

The single species of guiara is endemic to southeastern Brazil, Paraguay, and northeastern Argentina (Honacki et al. 1982). I captured this species in the wet meadow habitat (Table 11). This species inhabits open grasslands and wet meadows, is considered terrestrial or semifossorial (Alho 1982), and is most probably a herbivore-grazer.

## DISCUSSION

The trapping success realized in this study for neotropical humid forests falls within the range of observed success rates (Table 13). However, one striking difference between this and other neotropical small mammal studies was the high number of marsupial captures relative to rodent captures. All reported studies show rodent biases and usually high captures of rodents relative to marsupials. Only Emmons (1984) reported a marsupial to rodent capture ratio approaching equality.

Trapping results from small mammal studies in southeastern Brazil varied considerably with respect to marsupial and rodent biased captures. Only Fonseca (pers. comm.) has reported marsupial biased trapping results from a variety of native forest sites in eastern Minas Gerais. Avila-Pires (1978) captured 245 rodents and 40 marsupials from the Rio Doce Park. Gastal (1982) reported that five species of marsupials were captured in the Park but gave no comparative data for rodents. Dias (1982) trapped more rodents than marsupials in the Rio Doce Valley in Minas Gerais. Davis (1945) trapped 58 didelphid marsupials and 285 rodents in his study site in Rio de Janeiro.

Hunsaker (1977) stated that marsupials require considerable effort to trap. Perhaps one explanation for the observed high marsupial capture rate could be due to the habitat type found in the Park. Charles-Dominique (1983) suggested that didelphid marsupials can reach high local densities in areas of abundant food resources. He postulated that these species are r-strategists and are adapted to the "unstable environment of secondary forests." There is very little primary habitat in the Park relative to secondary habitat. Most of the forest habitat in the Park has been altered by fire in the recent past. The primary forest plots that I sampled yielded the lowest species richness and absolute captures of didelphid marsupials relative to the other secondary forested habitats (Stallings 1988). In Panama, *Didelphis marsupialis* tended to occur at higher densities in primary forest, while *Caluromys* and *Philander* were found at higher densities in secondary forest than primary forest (Fleming 1972).

Marsupials were recaptured with relative high frequency in this study, especially *Metachirus nudicaudatus*, *Marmosa incana*, and *Marmosa cinerea*. My recapture data on marsupials agreed with data reported by Fleming (1972, 1973), August (1984), and to some degree with that found by O'Connell (1979). These data were not in accord with Hunsaker (1977), who stated that didelphid marsupials are difficult to recapture. For example, individuals of *Marmosa cinerea* were captured on the average 7.7 times in the eucalypt forest with native subcanopy habitat. This high recapture rate could be an artifact of the habitat. This trapping site was surrounded by habitat unsuitable for arboreal species. In essence, this habitat was a forested island. On one side there was a monoculture of *Eucalyptus saligna* with no subcanopy, on another a marsh converted to a rice field, and the other two sides of the forest were bounded by pasture. Also, the subcanopy offered more food and resting opportunities than did the homogeneous eucalypt canopy. Perhaps the inability to move far beyond the limits of the forest and the location of the optimal habitat within the forest help explain the observed recapture rate.

Another obvious difference between this study and other inventories conducted in neotropical native forests was the absence of echimyid rodents. Species of the genus *Proechimys* are the most widespread taxa of the family Echymidae in the neotropics (Hershkovitz 1969). These forest species are terrestrial and usually appear on species lists from forest inventories. In Panama, *Proechimys* was a common forest capture (Eisenberg and Thorington 1973; Glanz 1982). Handley (1976) reported *Proechimys* as a common species in Venezuela. Emmons (1984) and Terborgh et al. (1986) reported captures of *Proechimys* from forested sites in Peru and Ecuador.

There are several reports of *Proechimys* captures in Brazilian tropical moist forests. Laemmert et al. (1946), Emmons (1984), Carvalho (1965), Miles et al. (1981) and Malcolm (pers. comm.) reported *Proechimys* in their inventories from the Brazilian Amazon. In the Atlantic Forest, Davis (1945) and Fonseca (1988) reported two species of *Proechimys* from their studies in the states of Rio de Janeiro and Minas Gerais, respectively. Dias (1982) trapped one species of *Proechimys* in three study areas in the Rio Doce Valley. I did not capture one individual of *Proechimys* from the Park in approximately 35,000 trap nights from 1985 to 1986, nor from an additional 30,000 trap nights from 1986 to 1987 (unpubl. data).

One explanation could be the presence of predators in the Park. Eisenberg (1980) speculated that the abundance of rodents in some neotropical sites and the paucity of rodents in other sites could be the result of the absence or presence of top predators, respectively. Hershkovitz (1969) stated that species of the genus *Proechimys* "are the basic source of protein for lowland predators in the Brazilian subregion." The felid community in the Park is intact. All the felids have been observed by field workers in the recent past. I saw spoor from jaguar, puma, ocelot, Geoffroy's cat, and jaguarundi.

The results from the wet meadow habitat were consistent with the literature (Table 13). In every study, there were more rodent captures than marsupial captures. In this study, *Akodon cursor* was the dominant species in terms of absolute numbers and captures. O'Connell (1981) reported that *Zygodontomys*, an ecological equivalent of *Akodon*, was the dominant rodent in grass habitat in Venezuela and represented 85% of the total rodent captures. However, one difference between this study and others was the observed high trapping success. As can be observed from Table 10, *Akodon cursor* made up 85% of the captures and was largely responsible for the high trapping success. One explanation for the high capture rate could be due to the shape and amount of the available grass or wet meadow habitat in the Park. This habitat type occurs particularly at the bases of hills and on the perimeter of the swamps and lake edges. There are no vast areas of this habitat type in the park, and these areas commonly take on a long and narrow shape following the contour lines. There was a high degree of habitat specificity exhibited by the species captured in this habitat. Grassland rodents can achieve high local densities, and perhaps this fact, coupled with the populations being compressed and compacted in narrow and small habitat, helps to explain the observed high trapping success in the wet meadow habitat.

The eucalypt forest with native subcanopy habitat yielded surprising results. I did not expect to find many small mammals in this habitat because of "plantation effects." However, seven species of small mammals were captured, five of which were marsupials. In fact, the marsupial/rodent capture ratio was similar to that observed in the native forested habitat (Table 14). Dietz et al. (1975) captured two species of terrestrial rodents, *Oryzomys nigripes* and *Akodon cursor*, in homogeneous eucalypt forest with grass/bamboo undergrowth. They reported a total of five species, only one of which was not strictly terrestrial, in their two native forested habitats. The plantation habitats in Dietz et al. (1975) and in this study are similar in that both treated eucalypt plantations of similar age and that in both the terrestrial substrate was covered by grass. The major difference was the native species subcanopy in this study. I captured a relatively high number of terrestrial rodents and marsupials and a high number of arboreal marsupials, but no arboreal rodents. The native species subcanopy could be considered a secondary forest sere, if the emergent eucalypt stratum was ignored. Charles-Dominique's (1983) hypothesis that didelphid marsupial abundance increases in secondary habitat would explain the high numbers of marsupials captured in this study.

The temporal capture results from the native forested habitat suggest that seasonality is important with respect to the trappability of small mammals. The trapping data show a pronounced peak in the total number of captures, MKA, and first captures for the native forested habitat during the cool, dry winter. Davis (1945) reported a similar trend and suggested that this was the result of more younger individuals present in the trapping pool or because of a paucity of natural food items during this time of year. My data do not support the hypothesis that more younger individuals explain the pronounced increase; rather it appears that food resource paucity results in the increase (unpubl. data).

The eucalypt and wet meadow habitats both produced peaks in the cool, dry winter and again in the late summer. These two habitats might have yielded similar capture curves because they share a grass substrate. *Akodon cursor* was an important component of both habitats and is an insectivore/omnivore that is reported to use a high proportion of grass and grass seed in its diet (Nowak and Paradiso 1983). *Marmosa incana* and *Metachirus nudicaudatus* are insectivore/omnivores and frugivore/omnivores, respectively, and perhaps track insect availability in grass substrate. The grass species did not produce seeds until late May. Thus, perhaps the peak observed in February, March and April can be explained by the lack of food for both rodents and marsupials. The second peak, which occurred in June, July, and August, could also be explained in terms of a decrease in food availability. Insect and fruit availability are usually low during the hibernal period in seasonal neotropical forests (e.g. Janzen and Schonener 1968). The marsupial species rely heavily on these food resources. The results of a preliminary stomach content analysis on *Akodon*, suggest that insects are important items in this species diet (unpubl. data). Graminoids in this habitat were dry, and seeds were not as readily available as they were during April and May.

Data analysis of trap type revealed that terrestrial small Sherman live traps were very productive in the wet meadow habitat but yielded relatively few captures in the forested habitats. Arboreal small Shermans were relatively unproductive in the forested habitats. Large terrestrial live traps were unproductive in the forested habitats. The most productive trap types in the forested habitats were the medium sized terrestrial and arboreal traps and the arboreal platform traps. Some individuals of species that are considered terrestrial were captured in arboreal traps. Apparently these instances resulted when low arboreal traps were easily accessible from the ground by either a vine or log.

No additional species were added to the inventory list by using the arboreal platform traps. However, these traps increased the capture frequency for the highly arboreal marsupial *Caluromys philander*. In total, I recorded 49 captures for this species in both the eucalypt with native species subcanopy and the native forested habitats. In the latter habitat, however, *Caluromys* was captured only five times in the terrestrial and low arboreal traps, as compared with 29 times in the arboreal platform traps. Clearly, the abundance of this species would have been underestimated if arboreal traps had not been used. Malcolm (per. comm.) obtained similar results with platform traps in Manaus. *Marmosa cinerea* was also trapped with relatively high frequency in this trap type. The use of arboreal platforms for trapping small mammals was first described by Davis (1945) and Laemmert et al. (1946). Unfortunately, the relative success of arboreal traps could not be determined from these studies.

It was surprising to find such a high frequency of *Caluromys* in the eucalypt forest. Although this arboreal frugivore is quite common in native forests, it was not expected in an exotic monoculture plantation. Presumably its principal food resources came from the native species subcanopy. This interpretation gains support from the fact that this species also was captured in terrestrial and low arboreal traps, suggesting that this species regularly moved down through the subcanopy.

The results of this small mammal inventory give substance to previous impressions of a highly diverse and endemic Atlantic Forest fauna. These results also demonstrate the important role that didelphid marsupials play in the community structure of small mammals in one of the largest remaining tracts of native Atlantic Forest in Brazil. Wet meadow habitat in this region supports many rodents, although *Akodon cursor* dominates. Eucalypt forests with native species subcanopy can play an important role in conserving small mammal communities in a region greatly altered by monocultural plantations.

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**Table 1.** Forested and open/field habitats in the Rio Doce State Forestry Park, Minas Gerais, Brazil. Habitats follow Gilhaus (1986).

| Habitat Type | % Total |
|---|---|
| **FORESTED HABITATS** | |
| Tall Primary Forest with Epiphytes | 8.4 |
| Tall Forest | 30.0 |
| Medium to tall Forest with Bamboos and Graminoids | 30.6 |
| Medium Secondary Forest with Bamboos and Graminoids | 17.2 |
| Low Secondary Forest | 0.1 |
| **OPEN/FIELD HABITATS** | |
| Low Woodland | 1.1 |
| Low Tree and Scrub Tallgrass Savanna | 0.6 |
| Tallfern Field | 0.1 |
| Evergreen Tallgrass Field with *Typha* sp. | 3.0 |
| Partially Submerged Shortherb Field and Aquatic Habitat | 8.9 |
| | 100.0 |

**Table 2.** Capture results from native forested plots in Rio Doce State Forestry Park, Minas Gerais, Brazil. RECAP INDEX= total captures/first captures, and represents the average number of times that an individual of species X is captured. Numbers in parentheses represent percent of contribution of capture per species per taxonomic group.

| Species | Total Captures | % Total | First Captures | % Total | Recap Index |
|---|---|---|---|---|---|
| **MARSUPIALS** | | | | | |
| *Didelphis marsupialis* | 35 | 4.5 (5.4) | 32 | 7.8 ( 9.9) | 1.1 |
| *Metachirus nudicaudatus* | 140 | 18.0 (21.6) | 91 | 22.3 (28.1) | 1.5 |
| *Marmosa incana* | 154 | 19.8 (23.8) | 90 | 22.1 (27.8) | 1.7 |
| *Marmosa cinerea* | 283 | 36.4 (43.7) | 92 | 22.5 (28.4) | 3.1 |
| *Marmosa microtarsus* | 1 | 0.1 ( 0.2) | 1 | 0.2 ( 0.3) | 1.0 |
| *Caluromys philander* | 34 | 0.4 ( 5.3) | 18 | 4.4 ( 5.5) | 1.9 |
| | 647 | 83.2(100.0) | 324 | 79.4(100.0) | |
| **RODENTS** | | | | | |
| *Nectomys squamipes* | 15 | 1.9 (11.5) | 9 | 2.2 (10.7) | 1.7 |
| *Rhidpidomys mastacalis* | 7 | 0.9 ( 5.4) | 3 | 0.7 ( 3.6) | 2.3 |
| *Akodon cursor* | 52 | 6.7 (40.0) | 27 | 6.6 (32.1) | 1.9 |
| *Oecomys trinitatis* | 21 | 2.7 (13.8) | 19 | 4.7 (22.6) | 1.1 |
| *Oryzomys capito* | 18 | 2.3 (13.8) | 15 | 3.7 (17.9) | 1.2 |
| *Oryzomys subflavus* | 13 | 1.7 (10.0) | 7 | 1.7 ( 8.3) | 1.9 |
| *Oxymycterus roberti* | 3 | 0.4 ( 2.3) | 3 | 0.7 ( 3.6) | 1.0 |
| *Abrawayomys ruschii* | 1 | 0.1 ( 0.8) | 1 | 0.2 ( 1.2) | 1.0 |
| | 130 | 16.8(100.0) | 84 | 20.6(100.0) | |

**Table 3.** Capture results from eucalypt forest with native forest subcanopy. RECAP INDEX= total captures/first captures and represents the average number of times that an individual of species X is captured. Numbers in parentheses represent percent of contribution of capture per species per taxonomic group.

| Species | Total Captures | % Total | First Captures | % Total | Recap Index |
|---|---|---|---|---|---|
| **MARSUPIALS** | | | | | |
| *Didelphis marsupialis* | 7 | 4.4 ( 5.3) | 3 | 5.6 ( 8.3) | 2.3 |
| *Metachirus nudicaudatus* | 18 | 11.4 (13.7) | 9 | 16.7 (25.0) | 2.0 |
| *Marmosa incana* | 14 | 8.7 (10.7) | 8 | 14.8 (22.2) | 1.8 |
| *Marmosa cinerea* | 77 | 48.7 (58.8) | 10 | 18.5 (27.8) | 7.7 |
| *Caluromys philander* | 15 | 9.6 (11.5) | 6 | 11.1 (16.7) | 2.5 |
| | 131 | 82.8(100.0) | 36 | 66.7(100.0) | |
| **RODENTS** | | | | | |
| *Akodon cursor* | 25 | 15.8 (92.6) | 16 | 29.6 (88.9) | 1.6 |
| *Oryzomys capito* | 2 | 1.4 ( 7.4) | 2 | 3.7 (11.1) | 1.0 |
| | 27 | 17.2(100.0) | 18 | 33.3(100.0) | |

**Table 4.** Capture results from wet meadow site in Rio Doce State Forestry Park, Minas Gerais, Brazil. RECAP INDEX= total captures/first captures and represents the average number of times an individual of species X was captured. Numbers in parentheses represent percent contribution of captures per species per taxonomic group.

| Species | Total Captures | % Total | First Captures | % Total | Recap Index |
|---|---|---|---|---|---|
| **MARSUPIALS** | | | | | |
| *Marmosa incana* | 3 | 0.8 (50.0) | 2 | 1.3 (50.0) | 1.5 |
| *Marmosa cinerea* | 1 | 0.3 (16.7) | 1 | 0.7 (25.0) | 1.0 |
| *Caluromys philander* | 2 | 0.5 (33.3) | 1 | 0.7 (25.0) | 2.0 |
| | 6 | 1.6(100.0) | 4 | 2.7(100.0) | |
| **RODENTS** | | | | | |
| *Nectomys squamipes* | 5 | 1.3 ( 1.4) | 4 | 2.7 ( 2.7) | 1.3 |
| *Akodon cursor* | 315 | 84.5 (85.8) | 105 | 70.0 (71.9) | 3.0 |
| *Oryzomys capito* | 1 | 0.3 ( 0.3) | 1 | 0.7 ( 0.7) | 1.0 |
| *Oryzomys subflavus* | 31 | 8.3 ( 8.4) | 22 | 14.7 (15.1) | 1.4 |
| *Oryzomys nigripes* | 4 | 1.0 ( 1.1) | 4 | 2.7 ( 2.7) | 1.0 |
| *Calomys laucha* | 4 | 1.0 ( 1.1) | 4 | 2.7 ( 2.7) | 1.0 |
| *Oxymycterus roberti* | 4 | 1.0 ( 1.1) | 4 | 2.7 ( 2.7) | 1.0 |
| *Euryzygomatomys spinosus* | 2 | 0.5 ( 0.5) | 2 | 1.3 ( 1.4) | 1.0 |
| | 373 | 98.4(100.0) | 150 | 97.3(100.0) | |

Table 5. Trapping success of small mammals calculated by habitat category in Rio Doce State Forestry Park, Minas Gerais, Brazil.

| Habitat Category | Number of Trap Nights | Number of Captures | % Success |
|---|---|---|---|
| Native forest (excluding platforms) | 30,960 | 710 | 2.3 |
| Native forest, platforms only | 1,050 | 66 | 6.3 |
| Wet meadow | 1,980 | 373 | 18.8 |
| Eucalypt forest w/native species Subcanopy | 6,000 | 158 | 2.6 |
| Eucalypt forest w/no subcanopy | 500 | 1 | 0.0 |
| TOTALS | 40,490 | 1,308 | |

Table 6. Trapping success by trap type for all species in all habitat types. Trap types are arranged according to trapping location: terrestrial or arboreal. Trap types are as follows: 1ST= small terrestrial Sherman live trap; 3MT= medium sized terrestrial live trap; 5LT= large terrestrial live trap; 2SA= small arboreal Sherman live trap; 4MA= medium sized arboreal live trap; 6PA= arboreal platform trap.

| Trap Type | No. Captures | No. Trap Nights | Percent Success |
|---|---|---|---|
| **TERRESTRIAL** | | | |
| 1ST | 370 | 4,080 | 9.1 |
| 3MT | 553 | 18,000 | 3.1 |
| 5LT | 42 | 5,760 | 0.7 |
| | 965 | 30,480 | 3.2 |
| **ARBOREAL** | | | |
| 2SA | 48 | 2,640 | 1.8 |
| 4MA | 228 | 8,640 | 2.6 |
| 6PA | 66 | 1,050 | 6.3 |
| | 342 | 12,330 | 2.8 |

Table 7. Trap response by species across all habitat types. Trap types are explained in Table 6.

| Species | Trap Types | | | | | | |
|---|---|---|---|---|---|---|---|
| | Total | 1ST | 2SA | 3MT | 4MA | 5LT | 6AP |
| *Didelphis marsupialis* | 42 | 0 | 0 | 24 | 2 | 15 | 1 |
| *Metachirus nudicaudatus* | 158 | 0 | 0 | 129 | 3 | 26 | 0 |
| *Marmosa incana* | 171 | 13 | 14 | 106 | 38 | 0 | 0 |
| *Marmosa cinerea* | 361 | 2 | 29 | 145 | 150 | 0 | 35 |
| *Caluromys philander* | 51 | 0 | 0 | 9 | 13 | 0 | 29 |
| *Marmosa microtarsus* | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| *Nectomys squamipes* | 19 | 4 | 0 | 13 | 1 | 1 | 0 |
| *Ripidomys mastacalis* | 7 | 0 | 0 | 3 | 3 | 0 | 1 |
| *Akodon cursor* | 392 | 312 | 2 | 78 | 0 | 0 | 0 |
| *Oecomys trinitatis* | 21 | 1 | 3 | 9 | 8 | 0 | 0 |
| *Oryzomys capito* | 21 | 8 | 0 | 11 | 2 | 0 | 0 |
| *Oxymycterus roberti* | 10 | 7 | 0 | 3 | 0 | 0 | 0 |
| *Abrawayaomys ruschii* | 1 | 0 | 0 | 0 | 1 | 0 | 0 |
| *Oryzomys subflavus* | 44 | 18 | 0 | 20 | 6 | 0 | 0 |
| *Calomys laucha* | 2 | 2 | 0 | 0 | 0 | 0 | 0 |
| *Oryzomys nigripes* | 4 | 3 | 0 | 1 | 0 | 0 | 0 |
| *Euryzygomatomys spinosus* | 2 | 0 | 0 | 2 | 0 | 0 | 0 |
| **Totals** | 1307 | 370 | 48 | 553 | 228 | 42 | 66 |
| **Percentages** | 28.3 | 3.7 | 42.3 | 17.4 | 3.2 | 5.0 | |

Table 8. Ecological place of each species captured during this study in the Rio Doce State Forestry Park. GM= grasslands and wet meadows, B= brushy areas, S= secondary forests, P= primary forests, F= fossorial or semifossorial, SA= semiaquatic, T= terrestrial, S= scansorial, A= arboreal, HG= herbivore-grazer; FG= frugivore-granivore; FO= frugivore-omnivore; IO= insectivore-omnivore.

| Species | Habitat | Spatial Adaptation | Dietary Classification |
|---|---|---|---|
| **MARSUPIALS** | | | |
| *Didelphis marsupialis* | B, S, P | T, S | FO |
| *Metachirus nudicaudatus* | S, P | T | IO/FO |
| *Marmosa incana** | B, S, P | S | IO |
| *M. cinerea* | B, S, P | A | IO |
| *M. microtarsus** | S, P | A | IO |
| *Caluromys philander* | S, P | A | FO |
| **RODENTS** | | | |
| *Oecomys trinitatis* | S, P | S | FG |
| *Oryzomys capito* | S, P | T | FG |
| *O. subflavus** | GM, B, S | T | FG |
| *O. nigripes** | GM, B | S | FG |
| *Akodon cursor** | GM, B, S | T | IO |
| *Calomys laucha* | GM, B | T | FG |
| *Nectomys squamipes* | GM, B | SA | HG |
| *Abrawayaomys ruschii** | S | T | FG? |
| *Oxymycterus roberti** | GM, B, S | F | IO |
| *Rhipidomys mastacalis* | S, P | A | FG |
| *Cavia fulgida** | GM, B | T | HG |
| *Euryzygomatomys spinosus** | GM, B | F | HG |

* Taxa endemic to the Brazilian Atlantic rainforest or the eastern coastal area of South America.

**Table 9.** Student's *t*-tests between adjusted and arcsin transformed percentages of terrestrial and arboreal captures of small mammals in all forest types. NS = non significant.

| Species | % Terrestrial Captures | % Arboreal Captures | V | *P* < |
|---|---|---|---|---|
| *Didelphis marsupialis* | 66.6 | 23.5 | 40 | .001 |
| *Metachirus nudicaudatus* | 76.3 | 3.9 | 156 | .001 |
| *Marmosa incana* | 43.9 | 46.1 | 169 | NS |
| *Marmosa cinerea* | 27.8 | 62.2 | 356 | .001 |
| *Caluromys philander* | 16.3 | 73.8 | 49 | .001 |
| *Nectomys squamipes* | 69.6 | 21.0 | 17 | .050 |
| *Rhipidomys mastacalis* | 28.8 | 61.1 | 5 | NS |
| *Akodon cursor* | 83.5 | 6.3 | 390 | .001 |
| *Oecomys trinitatis* | 31.2 | 58.8 | 19 | NS |
| *Oryzomys capito* | 62.9 | 27.0 | 19 | .050 |
| *Oryzomys subflavus* | 58.0 | 32.5 | 46 | .010 |

**Table 10.** Results of Student's *t*-tests between terrestrial and arboreal behavior upon release of small mammals captured in all habitats. NS= non significant. Species abbreviations are explained in Table 8.

| Species | N | % Terrestrial Behavior | N | % Arboreal Behavior | V | T | *P* < |
|---|---|---|---|---|---|---|---|
| DM | 33 | 73.2 | 3 | 16.7 | 34 | 3.265 | 0.01 |
| MN | 150 | 80.7 | 4 | 9.1 | 152 | 4.934 | 0.001 |
| MI | 95 | 53.5 | 52 | 36.5 | 145 | 3.448 | 0.001 |
| MC | 11 | 10.8 | 294 | 78.9 | 303 | 7.743 | 0.001 |
| CP | 2 | 18.4 | 18 | 71.6 | 18 | 2.488 | 0.05 |
| NS | 12 | 90.0 | 0 | 0.0 | 10 | 10.882 | 0.001 |
| RM | 1 | 24.0 | 5 | 67.8 | 4 | 1.393 | NS |
| AC | 70 | 90.0 | 0 | 0.0 | 68 | 26.282 | 0.001 |
| OT | 9 | 64.8 | 2 | 25.3 | 9 | 1.763 | NS |
| OC | 13 | 90.0 | 0 | 0.0 | 11 | 11.326 | 0.001 |
| OS | 10 | 90.0 | 0 | 0.0 | 8 | 9.933 | 0.001 |

**Table 11.** Number of total captures and percent of total for each species (SPP.) per habitat type. Numbers in parentheses represent the percentage of captures per species per habitat percentages are rounded to the nearest whole number.

| | Habitat Types[+] | | | | | | |
|---|---|---|---|---|---|---|---|
| SPP* | RD/F | RD/H | RD/M | RD/T | RD/C | RD/E | RD/B |
| DM | 4 (3) | 2 (1) | 1 (1) | 7 (6) | 21(24) | 7 (4) | - |
| MN | 20(14) | 44(16) | 21(15) | 30(23) | 25(28) | 18(11) | - |
| MI | 25(18) | 75(27) | 20(14) | 28(22) | 6 (7) | 14 (9) | 3 (1) |
| MC | 74(52) | 71(26) | 69(49) | 38(30) | 31(35) | 77(49) | 1 (0) |
| MM | - | 1 (0) | - | - | - | - | - |
| CP | - | 16 (6) | 2 (1) | 13(10) | 3 (3) | 15(10) | 2 (1) |
| NS | - | 6 (2) | 9 (6) | - | - | - | 5 (1) |
| RM | - | - | - | 7 (6) | - | - | - |
| AC | 3(2) | 46(17) | 2(1) | - | 1 (1) | 25(16) | 315(85) |
| OT | 4 (3) | 8 (3) | 4 (8) | 3 (2) | 2 (2) | - | - |
| OC | - | 4 (1) | 12 (9) | 2 (2) | - | 2 (1) | 1 (0) |
| OS | 12 (9) | 1 (0) | - | - | - | - | 31 (8) |
| ON | - | - | - | - | - | - | 4 (1) |
| OR | - | 1 (0) | 2 (1) | - | - | - | 4 (1) |
| AR | - | 1 (0) | - | - | - | - | - |
| CL | - | - | - | - | - | - | 4 (1) |
| ES | - | - | - | - | - | - | 2 (1) |
| | 142 | 276 | 142 | 128 | 89 | 158 | 373 |

[+] RD/F= secondary habitat burned completely to the ground; RD/H= secondary habitat burned in mosaic fashion; RD/M= secondary habitat burned in mosaic fashion; RD/T= primary forest with little effect from forest fire; RD/C= primary forest; RD/E= eucalypt forest with native species subcanopy; RD/B= wet meadow.

* DM= *Didelphis marsupialis*; MN= *Metachirus nudicaudatus*; MI= *Marmosa incana*; MC= *Marmosa cinerea*; MM= *Marmosa microtarsus*; CP= *Caluromys philander*; NS= *Nectomys squamipes*; RM= *Rhipidomys mastacalis*; AC= *Akodon cursor*; OT= *Oecomys trinitatis*; OC= *Oryzomys capito*; OS= *Oryzomys subflavus*; ON= *Oryzomys nigripes*; OR= *Oxymycterus roberti*; AR= *Abrawayaomys ruschii*; CL= *Calomys laucha*; ES= *Euryzygomatomys spinosus*.

Table 12. Stomach content analysis of small mammals captured in Rio Doce State Forestry Park, Minas Gerais, Brazil (N= number of stomachs analyzed).

| Species | % Fruit | % Seeds | % Grass | % Insects |
|---|---|---|---|---|
| *Marmosa incana* (n=3) | - | - | - | 100 |
| *Akodon cursor* (n=23) | 19 | 19 | 8 | 52 |
| *Oryzomys subflavus* (n=1) | 5 | - | 95 | - |
| *Oryzomys nigripes* (n=5) | 34 | 11 | 21 | 34 |
| *Oxymycterus roberti* (n=2) | - | - | - | 100 |
| *Calomys laucha* (n=1) | - | 100 | - | - |
| *Nectomys squamipes* (n=2) | 50 | - | 50 | - |

Table 13. Percent capture by taxonomic group, trapping success, and number of trap nights by habitat type for this study compared to other neotropical field studies. % M= percent of total marsupial captures; % R= percent of total rodent captures; % T.S.= percent trapping success; # T.N.= mumber of trap nights.

| Study | Site | % M | % R | % T.S. | # T.N. |
|---|---|---|---|---|---|
| NATIVE FOREST | | | | | |
| This study | Brazil | 83.2 | 16.8 | 2.3 | 30,960 |
| Dietz et al. 1975 | Brazil | 9.3 | 90.7 | — | — |
| Carvalho 1965 | Brazil | 0.3 | 99.7 | 3.6 | 10,080 |
| Emmons 1984 | Peru | 48.0 | 52.0 | 6.9 | 2,987 |
| Emmons 1984 | Peru | — | — | 7.0 | 4,390 |
| Emmons 1984 | Brazil | — | — | 0.8 | 434 |
| Dias 1982 | Brazil | 2.3 | 97.7 | — | — |
| Nitikman and Mares 1987 | Brazil | 30.7 | 69.3 | 6.0 | 12,170 |
| Laemment et al. 1946 | Brazil | 31.0 | 69.0 | 10.0 | 30,000 |
| August 1984 | Venezuela | 25.0 | 75.0 | 0.9 | 30,269 |
| Davis 1945 | Brazil | 17.0 | 83.0 | — | — |
| Fleming 1972, 1973 | Panama | 19.0 | 81.0 | 16.0 | 24,732 |
| O'Connell 1979 | Venezuela | 12.0 | 88.0 | — | — |
| WET MEADOW/SAVANNA/PANTANAL | | | | | |
| This study | Brazil | 2.0 | 98.0 | 18.8 | 1,980 |
| August 1984 | Venezuela | 0.0 | 100.0 | 1.9 | 3,660 |
| August 1984 | Venezuela | 25.0 | 75.0 | 0.1 | 4,400 |
| Lacher and Alho, in press | Brazil | 0.0 | 100.0 | 4.2 | 3,582 |
| Borchert and Hanson 1983 | Brazil | 0.0 | 100.0 | 3.5 | 4,173 |
| O'Connell 1981 | Venezuela | 10.0 | 90.0 | — | — |
| HOMOGENEOUS EUCALYPT FOREST | | | | | |
| Dietz et al. 1975 | Brazil | 0.0 | 100.0 | — | — |
| EUCALYPT FOREST WITH NATIVE SUBCANOPY | | | | | |
| This study | Brazil | 83.0 | 17.0 | 2.6 | 6,000 |

**Appendix 1.** Standard body (mm) and mass (g) measurements for species of small mammals captured in Rio Doce State Forestry Park, Minas Gerais, Brazil. Measurements are presented for adults of both sexes. N=sample size, MIN=minimum measurement, MAX=maximum measurement, MEAN + SD=arithmetic mean and one standard deviation. Significant differences in measurements between sexes for each species are designated by * ($p < 0.05$) and ** ($p < 0.001$).

| | N | MIN | MAX | MEAN ± SD |
|---|---|---|---|---|
| *Didelphis marsupialis* -- **ADULTS, HINDFOOT > 51 mm** | | | | |
| MALES | | | | |
| MASS | 9 | 578.00 | 1300.00 | 938.89 ± 295.32 |
| BODY | 9 | 292.00 | 415.00 | 354.78 ± 39.98 |
| TAIL | 9 | 312.00 | 393.00 | 355.33 ± 28.41 |
| EAR | 9 | 47.00 | 55.00 | 50.67 ± 2.78 |
| FOOT | 9 | 51.00 | 63.00 | 57.89 ± 4.20 |
| FEMALES | | | | |
| MASS | 8 | 568.00 | 1855.00 | 1158.62 ± 369.98 |
| BODY | 8 | 335.00 | 400.00 | 372.87 ± 24.82 |
| TAIL | 8 | 345.00 | 400.00 | 377.25 ± 18.01 |
| EAR | 8 | 46.00 | 58.00 | 51.37 ± 3.93 |
| FOOT | 8 | 51.00 | 64.00 | 57.87 ± 4.97 |
| *Metachirus nudicaudatus* -- **ADULTS, MASS > 90 g** | | | | |
| MALES | | | | |
| MASS* | 35 | 102.00 | 480.00 | 281.51 ± 117.00 |
| BODY | 35 | 170.00 | 300.00 | 233.89 ± 36.76 |
| TAIL | 35 | 227.00 | 373.00 | 307.66 ± 41.67 |
| EAR | 35 | 28.00 | 40.00 | 35.40 ± 2.66 |
| FOOT** | 35 | 35.00 | 52.00 | 43.71 ± 3.86 |
| FEMALES | | | | |
| MASS | 51 | 91.00 | 345.00 | 235.88 ± 68.93 |
| BODY | 50 | 150.00 | 265.00 | 222.93 ± 28.56 |
| TAIL | 51 | 178.00 | 363.00 | 297.96 ± 43.19 |
| EAR | 50 | 31.00 | 43.00 | 35.72 ± 2.62 |
| FOOT | 51 | 34.00 | 47.00 | 41.35 ± 2.96 |
| *Marmosa incana* -- **ADULTS, MASS > 35 g** | | | | |
| MALES | | | | |
| MASS | 46 | 35.00 | 130.00 | 66.04 ± 27.74 |
| BODY | 46 | 95.00 | 192.00 | 138.00 ± 21.96 |

| | N | MIN | MAX | MEAN ± SD |
|---|---|---|---|---|
| TAIL | 45 | 162.00 | 296.00 | 195.09 ± 21.52 |
| EAR** | 46 | 24.00 | 32.00 | 27.52 ± 1.96 |
| FOOT** | 46 | 18.00 | 26.00 | 21.52 ± 1.72 |
| **FEMALES** | | | | |
| MASS | 22 | 44.00 | 73.00 | 58.64 ± 8.32 |
| BODY | 22 | 110.00 | 162.00 | 137.50 ± 11.90 |
| TAIL | 22 | 163.00 | 199.00 | 183.41 ± 8.62 |
| EAR | 22 | 23.00 | 29.00 | 25.86 ± 1.49 |
| FOOT | 22 | 16.00 | 24.00 | 19.82 ± 1.79 |
| *Marmosa cinerea* -- ADULTS, MASS > 50 g | | | | |
| **MALES** | | | | |
| MASS | 36 | 56.00 | 194.00 | 109.94 ± 28.75 |
| BODY | 36 | 146.00 | 210.00 | 176.89 ± 16.08 |
| TAIL* | 35 | 200.00 | 291.00 | 259.63 ± 20.42 |
| EAR* | 36 | 24.00 | 35.00 | 30.81 ± 2.49 |
| FOOT* | 36 | 24.00 | 31.00 | 28.19 ± 1.62 |
| **FEMALES** | | | | |
| MASS | 28 | 53.00 | 230.00 | 99.07 ± 41.40 |
| BODY | 28 | 125.00 | 205.00 | 165.68 ± 23.09 |
| TAIL | 28 | 192.00 | 293.00 | 248.68 ± 26.41 |
| EAR | 28 | 24.00 | 34.00 | 29.14 ± 2.77 |
| FOOT | 28 | 22.00 | 35.00 | 26.64 ± 2.57 |
| *Marmosa microtarsus* -- ADULTS | | | | |
| **MALES** | | | | |
| MASS | 1 | 31.00 | 31.00 | 31.00 |
| BODY | 1 | 106.00 | 106.00 | 106.00 |
| TAIL | 1 | 148.00 | 148.00 | 148.00 |
| EAR | 1 | 14.00 | 14.00 | 14.00 |
| FOOT | 1 | 17.00 | 17.00 | 17.00 |
| *Caluromys philander* -- ADULTS | | | | |
| **MALES** | | | | |
| MASS | 18 | 123.00 | 261.00 | 189.83 ± 35.72 |
| BODY | 18 | 180.00 | 245.00 | 215.33 ± 17.08 |
| TAIL | 18 | 225.00 | 322.00 | 295.72 ± 22.15 |
| EAR | 18 | 31.00 | 38.00 | 33.67 ± 1.94 |
| FOOT | 18 | 32.00 | 41.00 | 35.61 ± 2.00 |

| | N | MIN | MAX | MEAN ± SD |
|---|---|---|---|---|
| **FEMALES** | | | | |
| MASS | 12 | 115.00 | 286.00 | 186.75 ± 44.67 |
| BODY | 12 | 200.00 | 240.00 | 216.75 ± 12.27 |
| TAIL | 12 | 283.00 | 313.00 | 299.83 ± 9.68 |
| EAR | 12 | 30.00 | 37.00 | 33.42 ± 2.02 |
| FOOT | 12 | 30.00 | 42.00 | 35.00 ± 2.92 |
| *Nectomys squamipes* -- ADULTS, MASS > 60 g | | | | |
| **MALES** | | | | |
| MASS | 8 | 75.00 | 235.00 | 146.12 ± 64.97 |
| BODY | 8 | 138.00 | 203.00 | 173.00 ± 24.63 |
| TAIL | 8 | 160.00 | 302.00 | 199.75 ± 47.06 |
| EAR | 8 | 20.00 | 24.00 | 22.00 ± 1.51 |
| FOOT | 8 | 42.00 | 53.00 | 47.87 ± 3.52 |
| **FEMALES** | | | | |
| MASS | 4 | 98.00 | 217.00 | 160.50 ± 57.97 |
| BODY | 4 | 165.00 | 200.00 | 183.00 ± 17.11 |
| TAIL | 4 | 188.00 | 231.00 | 206.75 ± 20.35 |
| EAR | 4 | 21.00 | 24.00 | 23.00 ± 1.41 |
| FOOT | 4 | 46.00 | 50.00 | 48.00 ± 1.83 |
| *Rhipidomys mastacalis* -- ADULTS | | | | |
| **MALES** | | | | |
| MASS | 1 | 80.00 | 80.00 | 80.00 |
| BODY | 1 | 130.00 | 130.00 | 130.00 |
| TAIL | 1 | 156.00 | 156.00 | 156.00 |
| EAR | 1 | 22.00 | 22.00 | 22.00 |
| FOOT | 1 | 27.00 | 27.00 | 27.00 |
| *Akodon cursor* -- ADULTS, MASS > 25 g | | | | |
| **MALES** | | | | |
| MASS | 73 | 25.00 | 66.00 | 41.18 ± 10.55 |
| BODY** | 73 | 83.00 | 123.00 | 104.82 ± 9.24 |
| TAIL* | 65 | 75.00 | 108.00 | 93.49 ± 7.65 |
| EAR | 71 | 14.00 | 22.00 | 18.62 ± 1.46 |
| FOOT | 72 | 21.00 | 30.00 | 26.06 ± 1.38 |
| **FEMALES** | | | | |
| MASS | 38 | 26.00 | 66.00 | 38.53 ± 10.04 |
| BODY | 38 | 76.00 | 120.00 | 99.53 ± 10.99 |
| TAIL | 38 | 76.00 | 103.00 | 89.58 ± 7.02 |

| | N | MIN | MAX | MEAN ± SD |
|---|---|---|---|---|
| EAR | 37 | 16.00 | 20.00 | 18.30 ± 1.02 |
| FOOT | 38 | 23.00 | 30.00 | 26.00 ± 1.47 |
| *Oryzomys capito* -- ADULTS, MASS > 35 g | | | | |
| MALES | | | | |
| MASS | 5 | 38.00 | 72.00 | 59.60 ± 13.81 |
| BODY | 5 | 118.00 | 135.00 | 127.60 ± 8.14 |
| TAIL | 5 | 124.00 | 145.00 | 132.00 ± 8.69 |
| EAR | 5 | 16.00 | 24.00 | 21.00 ± 3.16 |
| FOOT | 5 | 23.00 | 35.00 | 30.80 ± 4.55 |
| FEMALES | | | | |
| MASS | 10 | 50.00 | 65.00 | 59.10 ± 5.22 |
| BODY | 10 | 110.00 | 147.00 | 124.40 ± 10.86 |
| TAIL | 10 | 115.00 | 135.00 | 125.40 ± 6.15 |
| EAR | 9 | 21.00 | 22.00 | 21.44 ± 0.53 |
| FOOT | 10 | 30.00 | 34.00 | 31.80 ± 1.32 |
| *Oecomys trinitatis* -- ADULTS | | | | |
| MALES | | | | |
| MASS | 10 | 42.00 | 100.00 | 65.50 ± 16.95 |
| BODY | 10 | 114.00 | 135.00 | 124.60 ± 7.53 |
| TAIL | 10 | 133.00 | 155.00 | 147.40 ± 7.99 |
| EAR | 9 | 16.00 | 25.00 | 18.67 ± 2.78 |
| FOOT | 10 | 13.00 | 39.00 | 29.50 ± 8.66 |
| FEMALES | | | | |
| MASS | 5 | 61.00 | 95.00 | 76.20 ± 12.87 |
| BODY | 5 | 124.00 | 143.00 | 131.80 ± 7.79 |
| TAIL | 5 | 129.00 | 236.00 | 166.60 ± 42.07 |
| EAR | 4 | 18.00 | 21.00 | 19.00 ± 1.41 |
| FOOT | 5 | 28.00 | 33.00 | 30.60 ± 2.07 |
| *Oryzomys nigripes* -- ADULTS | | | | |
| MALES | | | | |
| MASS | 2 | 25.00 | 28.00 | 26.50 ± 2.12 |
| BODY | 2 | 83.00 | 100.00 | 91.50 ± 12.02 |
| TAIL | 2 | 122.00 | 132.00 | 127.00 ± 7.07 |
| EAR | 2 | 16.00 | 17.00 | 16.50 ± 0.71 |
| FOOT | 2 | 22.00 | 26.00 | 24.00 ± 2.83 |

| | N | MIN | MAX | MEAN ± SD |
|---|---|---|---|---|
| **FEMALES** | | | | |
| MASS | 2 | 7.00 | 22.00 | 14.50 ± 10.61 |
| BODY | 2 | 47.00 | 85.00 | 66.00 ± 26.87 |
| TAIL | 2 | 83.00 | 115.00 | 99.00 ± 22.63 |
| EAR | 2 | 15.00 | 15.00 | 15.00 ± 0.00 |
| FOOT | 2 | 20.00 | 24.00 | 22.00 ± 2.83 |
| *Oryzomys subflavus* -- **ADULTS, MASS > 40 g** | | | | |
| **MALES** | | | | |
| MASS | 10 | 54.00 | 101.00 | 77.90 ± 17.64 |
| BODY | 9 | 118.00 | 170.00 | 144.00 ± 16.15 |
| TAIL | 9 | 147.00 | 193.00 | 172.67 ± 16.40 |
| EAR | 9 | 22.00 | 26.00 | 23.78 ± 1.30 |
| FOOT | 9 | 34.00 | 38.00 | 35.33 ± 1.22 |
| **FEMALES** | | | | |
| MASS | 12 | 58.00 | 135.00 | 88.58 ± 22.22 |
| BODY | 11 | 114.00 | 170.00 | 146.00 ± 19.28 |
| TAIL | 11 | 140.00 | 200.00 | 178.09 ± 17.48 |
| EAR | 11 | 20.00 | 27.00 | 23.82 ± 2.32 |
| FOOT | 11 | 27.00 | 37.00 | 34.45 ± 2.77 |
| *Abrawayaomys ruschii* -- **ADULTS** | | | | |
| **MALES** | | | | |
| MASS | 1 | 63.00 | 63.00 | 63.00 |
| BODY | 1 | 128.00 | 128.00 | |
| 128.00 | | | | |
| TAIL | 1 | 146.00 | 146.00 | |
| 146.00 | | | | |
| EAR | 1 | 20.00 | 20.00 | 20.00 |
| FOOT | 1 | 31.00 | 31.00 | 31.00 |
| *Calomys laucha* -- **ADULTS** | | | | |
| **FEMALES** | | | | |
| MASS | 1 | 20.00 | 20.00 | 20.00 |
| BODY | 0 | -- | -- | -- |
| TAIL | 1 | 74.00 | 74.00 | 74.00 |
| EAR | 1 | 17.00 | 17.00 | 17.00 |
| FOOT | 1 | 19.00 | 19.00 | 19.00 |

| | N | MIN | MAX | MEAN ± SD |
|---|---|---|---|---|
| *Oxymycterus roberti* -- **ADULTS** | | | | |
| **MALES** | | | | |
| MASS | 5 | 45.00 | 120.00 | 73.80 ± 29.19 |
| BODY | 5 | 94.00 | 150.00 | 125.80 ± 20.20 |
| TAIL | 3 | 105.00 | 125.00 | 118.00 ± 11.27 |
| EAR | 5 | 19.00 | 25.00 | 21.40 ± 2.19 |
| FOOT | 5 | 33.00 | 39.00 | 35.00 ± 2.35 |
| **FEMALES** | | | | |
| MASS | 4 | 82.00 | 110.00 | 93.00 ± 12.62 |
| BODY | 4 | 145.00 | 245.00 | 173.00 ± 48.19 |
| TAIL | 2 | 121.00 | 122.00 | 121.50 ± 0.71 |
| EAR | 4 | 22.00 | 23.00 | 22.25 ± 0.50 |
| FOOT | 4 | 30.00 | 36.00 | 32.50 ± 2.65 |
| *Euryzgomatomys spinosus* -- **ADULTS** | | | | |
| **MALES** | | | | |
| MASS | 2 | 165.00 | 210.00 | 187.50 ± 31.82 |
| BODY | 2 | 185.00 | 188.00 | 186.50 ± 1.14 |
| TAIL | 2 | 61.00 | 65.00 | 63.00 ± 2.83 |
| EAR | 2 | 17.00 | 18.00 | 17.50 ± 0.71 |
| FOOT | 2 | 35.00 | 35.00 | 35.00 ± 0.00 |
| *Cavia fulgida* -- **ADULTS** | | | | |
| **MALES** | | | | |
| MASS | 1 | 285.00 | 285.00 | 285.00 |
| BODY | 1 | 223.00 | 223.00 | 223.00 |
| TAIL | 1 | – | – | – |
| EAR | 1 | 22.00 | 22.00 | 22.00 |
| FOOT | 1 | 46.00 | 46.00 | 46.00 |
| **FEMALES** | | | | |
| MASS | 1 | 280.00 | 280.00 | 280.00 |
| BODY | 1 | 234.00 | 234.00 | 234.00 |
| TAIL | 1 | 17.00 | 17.00 | 17.00 |
| EAR | 1 | 21.00 | 21.00 | 21.00 |
| FOOT | 1 | 47.00 | 47.00 | 47.00 |

| | N | MIN | MAX | MEAN ± SD |
|---|---|---|---|---|
| *Dasyprocta azarae* -- **ADULTS** | | | | |
| **MALES** | | | | |
| MASS | 1 | 2560.00 | 2560.00 | 2560.00 |
| BODY | 1 | 450.00 | 450.00 | 450.00 |
| TAIL | 1 | 28.00 | 28.00 | 28.00 |
| EAR | 1 | 45.00 | 45.00 | 45.00 |
| FOOT | 1 | 130.00 | 130.00 | 130.00 |
| **FEMALES** | | | | |
| MASS | 1 | 2056.00 | 2056.00 | 2056.00 |
| BODY | 1 | 460.00 | 460.00 | 460.00 |
| TAIL | 1 | 19.00 | 19.00 | 19.00 |
| EAR | 1 | 38.00 | 38.00 | 38.00 |
| FOOT | 1 | 120.00 | 120.00 | 120.00 |