superior species where rate of colonization relative to patch extinction rate of the inferior is greater than that of the superior competitor or where the dispersion of subordinates is less clumped than that of superiors. This counterintuitive result underlines the power of modeling to identify those data (e.g., dispersal and extinction rates) required to maximize the persistence of primates in communities, and introduces a concept, the metacommunity, "secondary" to metapopulation dynamics (Valone and Brown, 1995; Harrison, 1994) which are appropriately the major focus of primate conservation biology.

Acknowledgements: I thank V. Schwartz and J. Crisp for commenting on an earlier version of this note, and the Werner Hagnauer family for assistance in many ways. W. Haber kindly assisted me in the identification of plants and animals.

Clara B. Jones, Institute of Animal Behavior, Rutgers University - Newark, 101 Warren Street, Newark, New Jersey 07102, U.S.A.

References

Begon, M. and Mortimer, M. 1986. *Population Biology: A Unified Study of Animals and Plants*. Sinauer Associates, Inc., Sunderland, Massachusetts.

Connell, J. H. 1961. The influence of interspecific competition and other factors on the distribution of the barnacle *Chthamalus stellatus*. *Ecology* 42: 710-713.

Darwin, C. R. 1859. *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. John Murray, London.

De Bruyn, G. J. 1980. Coexistence of competitors: a simulation model. *Netherlands J. Zool.* 30: 345-368.

Frankie, G. W., Baker, H. G. and Opler, P. A. 1974. Comparative phenological studies of trees in tropical wet and dry forests in the lowlands of Costa Rica. *J. Ecol.* 62: 881-919.

Glander, K. E. 1979. Feeding associations between howling monkeys and basilisk lizards. *Biotropica* 11: 23-236.

Glander, K. E. 1981. Feeding patterns in mantled howling monkeys. In: *Foraging Behavior: Ecological and Psychological Aproaches*, A. Kamil and T. Sargent (eds.), pp.231-258. Garland Press, New York.

Harrison, S. 1994. Metapopulations and conservation. In: *Large-Scale Ecology and Conservation Biology*, P. J. Edwards, R. M. May and N. R. Webb (eds.), pp.111-128. Blackwell Scientific Publications, Oxford.

Jones, C. B. 1983. Do howler monkeys feed preferentially upon legume flowers at flower-opening time? *Brenesia* 21: 41-46.

Nee, S. and May, R. M. 1992. Dynamics of metapopulations: habitat destruction and comparative coexistence. *J. Anim. Ecol.* 61 37-40.

Pulliam, H. R. and Caraco, T. 1978. Living in groups: is there an optimal group size? In: *Behavioural Ecology: An Evolutionary Approach*, J. R. Krebs and N. B.Davies (eds.), pp. 122-147. Sinauer Associates, Inc., Sunderland Massachusetts.

Rockwood, L. L. and Glander, K. E. 1979. Howling monkeys and leaf-cutting ants: comparative foraging in a tropical deciduous forest. *Biotropica* 11: 1-10.

Schoener, .W. 1971. Theory of feeding strategies. *Ann. Rev. Ecol. Syst.* 2: 36-404.

Terborgh, J. 1986. Keystone plant resources in the tropical forest. In: *Conservation Biology:: the Science of Scarcity and Diversity*, M.E.Soulé (ed.), pp.330-344. Sinauer Associates, Inc., Sunderland, Massachusetts.

Valone, R. G. and Brown, J. H. 1995. Effects of competition, colonization, and extinction on rodent species diversity. *Science* 267: 880-883.

Young, O. P. 1982. Aggressive interaction between howler monkeys and turkey vultures: the need to thermoregulate behaviorally. *Biotropica* 14: 228-231.

DIFFERING RESPONSES TO A PREDATOR (*EIRA BARBARA*) BY *ALOUATTA* AND *CEBUS*

Here I report on an observation of mantled howling monkeys (*Alouatta palliata*) and white-faced capuchins (*Cebus capucinus*) responding to a predator, a tayra (*Eira barbara*). The observation occurred on Barro Colorado Island, Republic of Panama, during an investigation into the feeding ecology of white-faced capuchins.

On 23 September 1993, while following one of the habituated capuchin study groups (see Phillips, 1994, for a detailed description of the troops), I heard loud aggressive vocalizations from capuchins and howlers. Individual capuchins traveled toward the direction of the vocalizations. I followed them, and approximately 30 seconds later came across a tayra surrounded by five capuchins and three howlers. The howlers were clustered high in the trees; the capuchins were in the understorey, close to the tayra. All were directing threats and vocalizations to the tayra, which was on a fallen tree, approximately 2 m off the ground. One adult male capuchin approached the tayra, leaning toward it while directing threats and vocalizing. After 1.5 minutes of reciprocated threats and lunges, the tayra retreated towards the ground. The adult male capuchin followed, continuing to direct threats and lunges. At all times the capuchin maintained a distance of 2-3 m. After retreating, the tayra made no aggressive response, and continued moving away from the group. Once the tayra had left the area, the howlers and some of the capuchins remained

stationary on branches, while others foraged for invertebrates. Most were vigilant and scanned the area frequently, giving alarm calls. After several minutes had passed, the capuchins traveled in the opposite direction to that of the tayra, and resumed their typical activity of foraging and traveling. The howlers remained in the area. Three other incidents involving predator detection and response by capuchins were observed during 280 observation hours. All involved only *Cebus* - no defensive interactions among species were observed.

As reported previously (Boinski, 1988; Chapman, 1986) and supported by the present observation, adult male *C. capucinus* play an active role in group defense. Although the study troop contained two adult males, only one was observed to directly defend the group and approach the predator. A second adult male directed vocalizations and threats from a distance of approximately 3 m. Female white-faced capuchins generally do not become involved in group defense situations (Fedigan, 1993). In the present observation, an adult female carrying an infant was present, vocalizing and directing threats to the tayra. She remained 3-5 m away from the tayra throughout.

This observation illustrates the differing strategies employed by howlers and capuchins when confronting a potential predator. Whereas *Cebus* responses (particularly the adult male's) were active and directed towards the predator, the howlers remained high in emergent trees, vocalizing loudly. Julliot (1994) reported similar behavior by howlers in response to a crested eagle (*Morphnus guianensis*).

Kim Phillips, Departments of Psychology and Biology, Hiram College, Hiram, Ohio 44234, USA.

References

Boinski S. 1988. Use of a club by a wild white-faced capuchin (*Cebus capucinus*) to attack a venomous snake (*Bothrops asper*). *Am. J. Primatol.* 14: 177-179.

Chapman, C.A. 1986. *Boa constrictor* predation and group response in white faced *Cebus* monkeys. *Biotropica* 18: 171-172.

Fedigan, L.M. 1993. Sex differences and intersexual relations in adult white-faced capuchins (*Cebus capucinus*). *Int. J. Primatol.* 14: 853-877.

Julliot, C. 1994. Predation of a young spider monkey (*Ateles paniscus*) by a crested eagle (*Morphnus guianensis*). *Folia Primatol.* 63:75-77.

Phillips, K.A. 1994. Resource distribution and sociality in white-faced capuchins, *Cebus capucinus*. Unpublished Ph.D. thesis, The University of Georgia, Athens.

On the Occurrence of Parasites in Free-Ranging Callitrichids

From April 1994 to February 1995, 46 individuals of three species of callitrichids (25 black-chinned emperor tamarins, *Saguinus imperator imperator*; 19 saddleback tamarins, *Saguinus fuscicollis weddelli*; and two pygmy marmosets, *Cebuella pygmaea*) were captured in a so-called "*Saguinus* trap" (Encarnación *et al.*, 1990). The study site, the Zoobotanical Park of the Federal University of Acre (9°56'30" - 9°57'19"S, 67°52'08" - 67°53'00"W; 155 m above sea level, area 100 ha), Rio Branco, Acre, Brazil, is characterized by the presence of secondary forests in different successional stages (Calegaro-Marques and Bicca-Marques, 1994). Fecal samples were collected whenever available in order to analyze the presence of ova from gastrointestinal parasites using the Willis method (Matos and Matos, 1981).

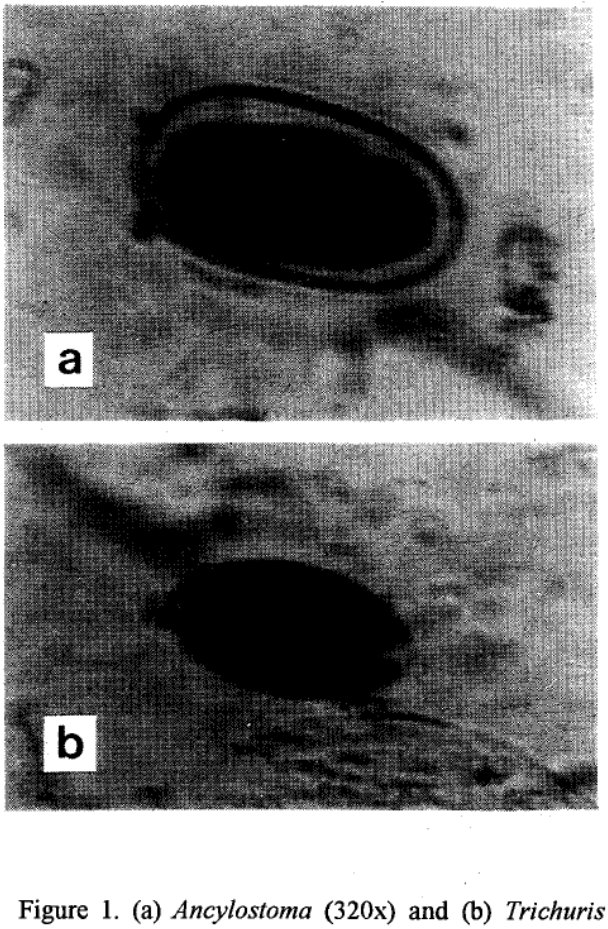

Figure 1. (a) *Ancylostoma* (320x) and (b) *Trichuris* (128x) ova found in *Saguinus fuscicollis weddelli* fecal samples.